MINERAL INVESTIGATIONS IN THE VALDEZ CREEK MINING DISTRICT, SOUTH-CENTRAL ALASKA

By Joseph M. Kurtak, D.D. Southworth,
Michael D. Balen, and Karen H. Clautice.

(McCallie Creek area near Broad Pass)

UNITED STATES DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, JR., SECRETARY

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

BTU	British thermal unit
°F	degrees Fahrenheit
ft	foot
in	inch
lb	pound
no	number
oz	troy ounce
oz/ton	troy ounces per short ton
%	percent
ppm	parts per million
ppb	parts per billion
ton	short ton
yd^3	cubic yard

MINERAL INVESTIGATIONS IN THE VALDEZ CREEK MINING DISTRICT, SOUTH-CENTRAL, ALASKA (FINAL REPORT).

by
Joseph M. Kurtak[1], D.D. Southworth[1],
Michael D. Balen[1] and Karen H. Clautice[2]

ABSTRACT

The U.S. Bureau of Mines conducted a four-year (1987-1990) mineral resource assessment of the Valdez Creek Mining District, southcentral Alaska. A total of 237 mineral occurrences in the 5.7 million acre district were examined. This includes nineteen previously unreported occurrences, considered to be significant.

Placer gold has been the main commodity produced from the district. Deposits consist mainly of buried interglacial paleochannels and reworked Tertiary conglomerate. Placer production from 1903 to 1989 totals 257,340 oz gold and measured placer resources total an estimated 182,226 oz gold. There is, in addition, an undetermined amount of platinum group metals in the placers. Lode production from breccia pipes and quartz veins totals 1580 oz gold. Breccia pipe and skarn deposits contain an indicated resource of 446,000 oz gold. Subbituminous coal production totals 64,000 tons. A total of 47,559 lbs of copper production resulted as a byproduct of precious metal mining. Sediment-hosted volcanogenic sulfide deposits and skarn deposits contain an indicated resource of 266 million lbs of copper. Sheeted greisen veins contain an indicated resource totalling 5.0 million tons averaging 0.2% tin.

Bureau studies indicate potential for placer gold, and vein stockwork and sediment-hosted lode gold and silver deposits. Serpentinized dunite and gabbro contain anomalous amounts of platinum group metals, nickel, and chromium. Samples collected near several diorite porphyry stocks are anomalous in tin.

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[1]Geologist, Alaska Field Operations Center, Anchorage, Alaska

[2]Geologist, Alaska Division of Geological and Geophysical Surveys, Fairbanks, Alaska

INTRODUCTION

In 1987 the Bureau of Mines (Bureau) began a four-year study to evaluate the mineral potential of the Valdez Creek Mining District (Fig. 1). The study was designed to: (1) evaluate the mineral resources of the district (2) perform theoretical mining feasibility studies on the various mineral deposit types in the area, (3) study the application of modern beneficiation techniques to known mineral deposits, and (4) perform a probabilistic mineral resource/economic assessment (ROCKVAL) on the mining district.

This report evaluates the mineral resources of the mining district, and includes the results of the application of beneficiation techniques to several deposits. The industrial minerals are described in a separate open-file report (315)[3]. The complete geochemical results for all samples collected during the study have been compiled in a separate open-file report (15). The results of a site-specific study dealing with select placer deposits in the district have been published in a separate Bureau open-file report (114). The mining feasibility and probabilistic mineral resource/economic assessment will be published as separate Bureau open-file reports (14, 17, 224).

After compiling all known literature concerning the mining district, field investigations were made of the known mines, prospects, and mineral occurrences. Reconnaissance studies were undertaken in areas having little previous information. The results of each year's fieldwork were published in yearly progress reports (16) (177). This report is a comprehensive examination of all field data collected during the course of the study. The results of the beneficiation studies are included in this report.

Several site-specific geologic studies were contracted to other government agencies and consultants. The Alaska Division of Geological and Geophysical Surveys (ADGGS) completed geologic mapping in the Healy A2 and A3 Quadrangle (247, 307), Mt. Hayes A6 Quadrangle (309), and Talkeetna Mountains B2 Quadrangle (68). The ADGGS also completed soil geochemical studies and geologic mapping in the Lucky Hill-Gold Hill areas (353, 354, 355), and made examinations of the Quaternary geology of Valdez Creek (246). The ROCKVAL study was also performed by the ADGGS (224).

A commercial geophysical company conducted a very low frequency (VLF) survey at the Golden Zone Mine to test for extensions of vein-bearing faults beneath glacial cover. The Bureau supported a University of Alaska geology graduate student who studied the geology and chemical evolution of placer gold at the Denali Placer Mine on Valdez Creek (327).

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[3]Underlined numbers in parenthesis refer to references in the bibliography section preceding the appendices.

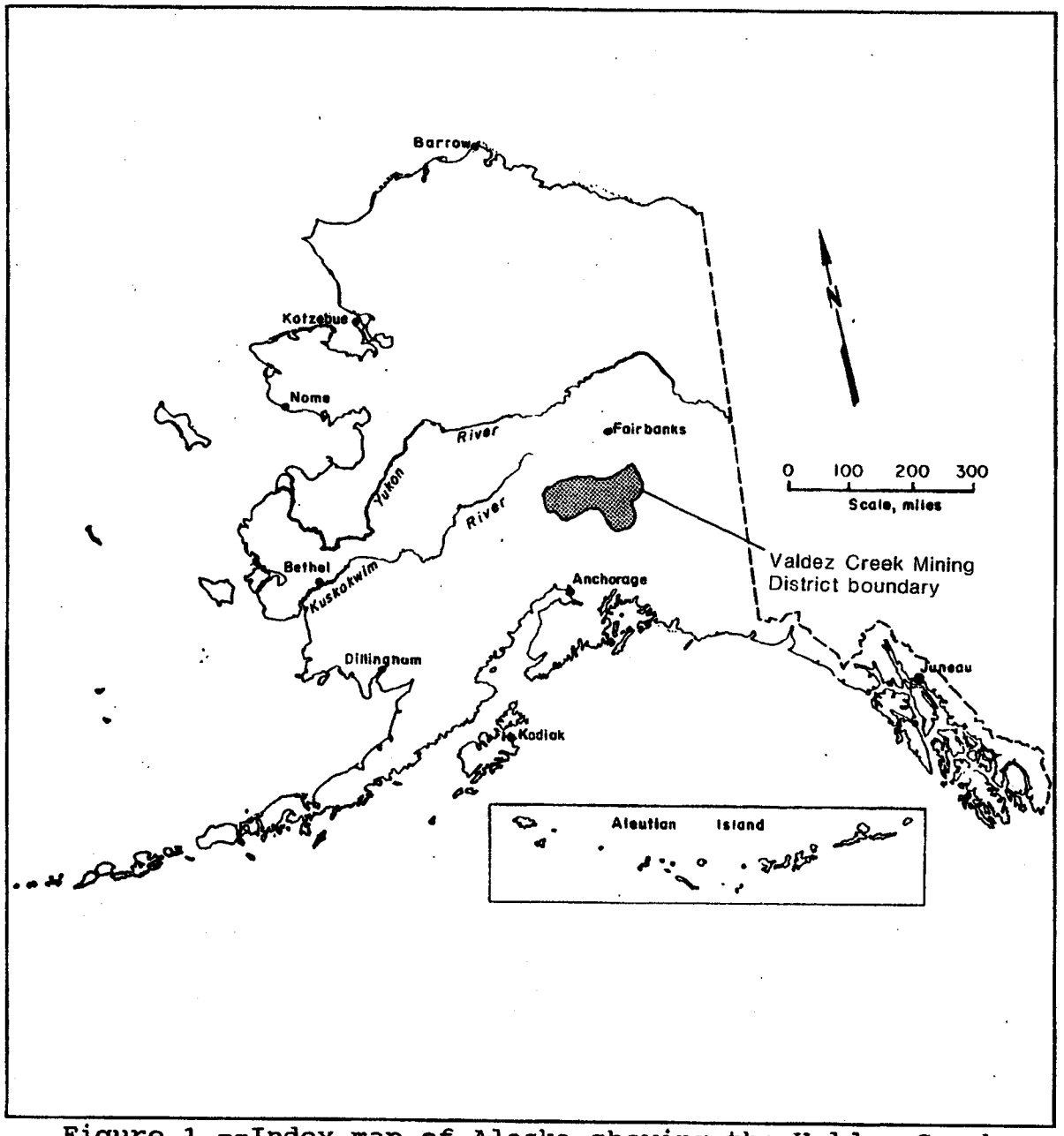

Figure 1.--Index map of Alaska showing the Valdez Creek Mining District.

Helicopter support was provided for a geology graduate student from Princeton University who studied metamorphic rocks in the Valdez Creek area (103, 104, 105).

ACKNOWLEDGEMENTS

Completion of this study would not have been possible without the assistance and support of numerous people, a few of whom are mentioned here. Anchorage Field Operations Center (AFOC) personnel who made important suggestions concerning the geology and mineral deposits of the Valdez Creek Mining District include Denise Herzog, Mark Meyer, Nathan Rathbun, and Chris Roe. The mineral resources of the Tyone and Peters Creek areas were summarized by Steve Fechner. Bureau of Mines Western Field Operations Center personnel who helped get the project started include Peter Gabby, Stephen Iverson, Rick Johnson, Andy Leszcykowski, Terry Neuman, Steve Schmauch, and Spencee Willett. Thanks also goes to the AFOC field assistants Vic Fisher, Laurie Dilley, Jerry Harris, and Dan O'Haire.

The ADGGS geologists who made contributions to the understanding of the regional geology and geochemistry of the area include Tom Bundzten, Gar Pessel, Dick Reger, Tom Smith, Diana Solie, and Milt Wiltse.

The Bureau was well received by local prospectors and miners throughout the district, many of whom went out of their way to assist the Bureau during fieldwork. These include Lyle Beecroft, Howard and Ed Lightfoot, Leo Mark Anthony, Joe Britton, Claude Morris, Jake Tansey, Kevin Thompson, Anson Renshaw, Jr., and Angel Vidal.

Thanks also goes to Jerry O'Conner and Dean Yongue of the Valdez Creek Mining Company and Chuck Hawley of Golden Zone Developments Ltd. for providing access to their properties and geologic data. Wally Taupe gave the Bureau an excellent tour of the Zackly Prospect and provided the Bureau with geological information about the area.

GEOGRAPHY AND CLIMATE

The Valdez Creek Mining District is located in southcentral Alaska. It comprises the upper Susitna River drainage basin and is bounded on the north by the crest of the Alaska Range, on the west by the Kahiltna Glacier, on the south by the Talkeetna Mountains, and on the East by the Copper River Basin (fig. 2) (240). The topography of the area varies (fig. 3) from broad glaciated lowlands, such as those along the lower Susitna River, with rolling morainal topography and outwash plains at elevations of 300 feet, to the rugged glacier-covered peaks of the 20,320 foot high Mt. McKinley Massif.

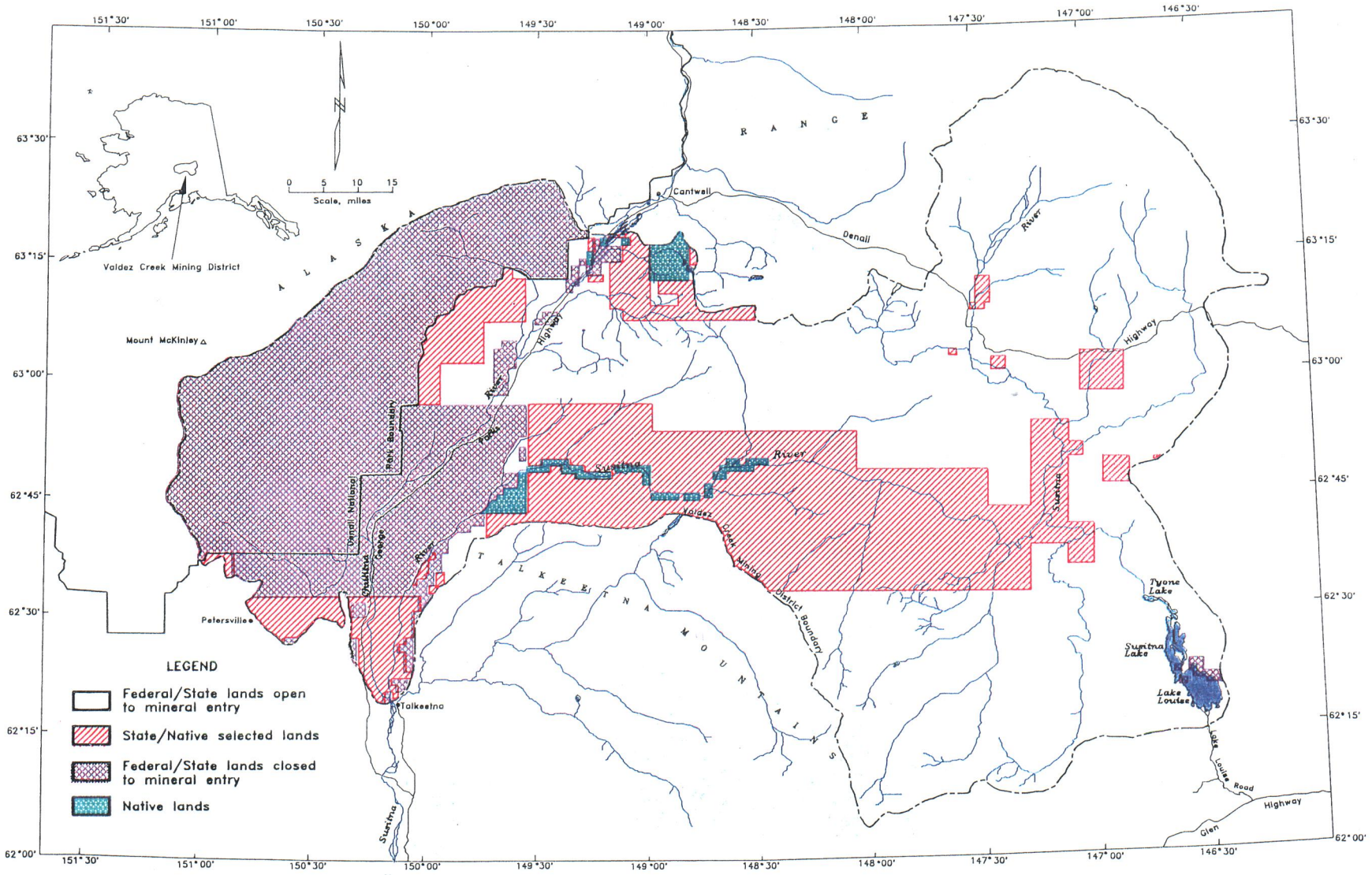

Figure 2. - Land status map of the Valdez Creek Mining District, Alaska.

Figure 3.--Looking north from the Denali Highway across Monahan Flat to the south flank of the Alaska Range. The high point on left of photo is Mt. Deborah (12,339 ft).

Vegetation in the lower elevations includes extensive stands of black spruce, white spruce, cottonwood, and birch trees, with an undergrowth of willow and alder. Stands of white spruce and alder with a ground cover of tundra vegetation occur on the upper slopes. Stunted spruce are found up to treeline, ranging from 2,500 to 3,000 feet elevation. Above treeline only stunted alpine vegetation and lichen occur.

The district is sparsely populated, the majority of people living along the Parks Highway which cuts through the western portion of the district. Talkeetna, near the southwest corner of the district, is the largest settlement with a population of 269 people. Cantwell, located on the Parks Highway 10 miles outside the northern boundary of the district, has a population of 150 people. The Lake Louise area in the southeast corner has a year-round population of nearly 100 people. The Denali placer mine camp, when operating, is populated by up to 170 miners. In addition to the Parks Highway, ground access is provided by the Denali Highway which connects Cantwell with Paxson on the Richardson Highway to the east of the district.

The climate of the area is cool with cloudy, rainy summers and cold winters. Talkeetna, located at an elevation of 345 feet, has an average January temperature of 8° and an average July temperature of 58°. Yearly precipitation totals 28 in with a mean snowfall of 107 in. At Broad Pass, 2000 feet higher and 80 airline miles north of Talkeetna, the average temperature is 1° in January and 52° in July. Precipitation averages 20 in with a mean snowfall of 121 in (180). Snow can be found in the high country until late June and the high peaks can get snowed on as early as mid-August.

LAND STATUS

The Valdez Creek Mining District includes federal, state, and private land holdings, including native selected lands (Figure 2). The federal lands fall under the administration of the Department of Interior's Bureau of Land Management (BLM) and the National Park Service (NPS). State lands are administered by the Department of Natural Resources, Division of Lands. Current land status for specific areas can most accurately be determined by reviewing the Master Title Plats at the BLM Office in the Federal Building in Anchorage, Alaska.

PREVIOUS STUDIES

The first recorded observations of the geology and mineral deposits in the district were made by U.S. Geological Survey (USGS) geologists (111). Subsequently, several geologic studies have been conducted in the Valdez Creek Mining District by the USGS, Territorial Department of Mines (TDM), ADGGS, private companies, and students working on graduate degrees.

Several USGS bulletins give good descriptions of early mining on Valdez Creek (52) (213) (263) (336). The USGS has also mapped geology and undertaken geochemical sampling throughout several of the 1:250,000 scale map areas that cover the district (93) (138) (182) (183) (225) (232) (233). The TDM made several mineral investigations in the area during and after construction of the Denali Highway (153) (172) (267) (271).

Beginning in 1950, the Bureau undertook investigations, including drilling, at the Golden Zone Mine in the Chulitna area (219). A Defense Minerals Exploration Administration Project at the Kathleen-Margaret Prospect on the Maclaren River was administered by the Bureau in the late 1950's (362). Copper prospects on Windy Creek were also examined (173). A brief examination of the placer and lode deposits in the Valdez Creek drainage was made in 1984 as a precursor to the present Bureau study (198).

The results of geologic field studies by university graduate students in the area are pending or have been published in the form of theses and dissertations (103) (104) (105) (120) (123) (143) (301) (320) (323).

MINING HISTORY

As early as 1897 prospectors were working in the country near the headwaters of the Susitna River, but they left only sketchy written records and little evidence of their passing (20). The first recorded exploration into the district by a geologist was in 1898 when George Eldridge along with topographer Robert Muldrow led a USGS survey party up the Susitna River and into the Broad Pass area. The party panned creeks along the route, getting a few gold colors and finding some barren quartz veins (111). During the same year an army expedition led by Sergeant William Yanert was the first to actually cross Broad Pass. On their return trip south they met prospectors camped at the mouth of Indian River and noted that a party of six men on the lower Chulitna River had taken enough gold from the river to warrant further operations (357)

The remoteness and rugged terrain of the Valdez Creek Mining District slowed penetration into the country by prospectors. It was not until 1903 that a major discovery was made. A group of prospectors including Peter Monahan, J.S. Smith, J.M. Johnson, and J.C. Clarkson headed north from the coastal town of Valdez in February, 1903. Using dog teams they crossed the Valdez Glacier to the Klutina River drainage, then into the Susitna River drainage, Lake Louise and Tyone River. They stopped to prospect when spring arrived and the creeks thawed. Gold was found on the Oshetna River, but apparently not enough to keep them from moving on. They continued north and after reaching the Maclaren River split into two parties. The one led by Monahan ascended the Susitna River while the other, led by Maclaren, headed east. The Monahan party

found gold on Butte, Gold, and Wickersham Creeks, but not enough to warrant mining operations. They then crossed to the East side of the Susitna River and in August discovered placer gold near the mouth of a small tributary called "Galina" Creek by the local Ahtna natives, meaning "place where game abounds"(106). Working for 15 days they are reported to have recovered 100 ounces of gold. They renamed the stream "Valdez" Creek after the town from which their venture originated (213).

They returned to Valdez for the winter and after obtaining financial backing, came back the following year to continue working the very rich ground. This time they were followed by other gold seekers. During 1904 claims were staked along Valdez Creek and its tributaries, including gold-rich Lucky Gulch (fig. 4). Prospectors not finding open ground fanned out over the rest of the upper Susitna basin, making some discoveries, but none with the richness of the original discovery. Valdez Creek was mined by surface and underground methods until 1942 (figs. 5 and 6) (106), when the War Production Board shut down gold mining in Alaska. A resurgence of mining, beginning in the early 1970's, has continued with a total production of 243,908 ounces of gold recovered through 1989 (246).

The first records of prospecting in the southeastern portion of the district date back to 1907 when prospectors were working in the Nelchina River-Tyone Creek areas (191). Some mining was later done on Yacko, Tyone, and Busch Creeks, but production was minor. A small rush occurred in the area when workable gold placers were discovered at nearby Albert Creek, south of the district boundary (191).

The first significant mineral discovery west of Broad Pass also came in 1907, when John Coffee discovered placer gold on Bryn Mawr Creek, a tributary to the West Fork of the Chulitna River (52). Follow-up of the placer find later led to the discovery of lode gold which was subsequently developed into the Golden Zone Mine. It was productive for a short time in the early 1940's (138). It was also the largest lode gold producer in the district. The discovery of this prospect led to considerable prospecting in the area, but no major precious metal discoveries were made. Coal was discovered northeast of the Golden Zone Mine. This deposit was later developed as the Dunkle Mine which produced coal between 1940 and 1954 (264).

Mining activity first took place in the southwestern part of the district in 1908 when three men mined successfully on Long Creek, a tributary to the Tokositna River (52). Mention of high grade copper lodes in the Clearwater Mountains dates back to 1918 (185). Within the last 30 years several copper deposits including the Kathleen-Margaret, Denali and Zackly prospects have undergone development, including underground workings. The Kathleen-Margaret has been the only copper prospect with recorded production, shipping a small amount in 1954 (362).

Figure 4.--Placer gold recovered from Lucky Gulch in 1905, including a 44-oz nugget. Man in photo center is probably John Carlson, discoverer of gold in Lucky Gulch (Anchorage Museum of Art and History).

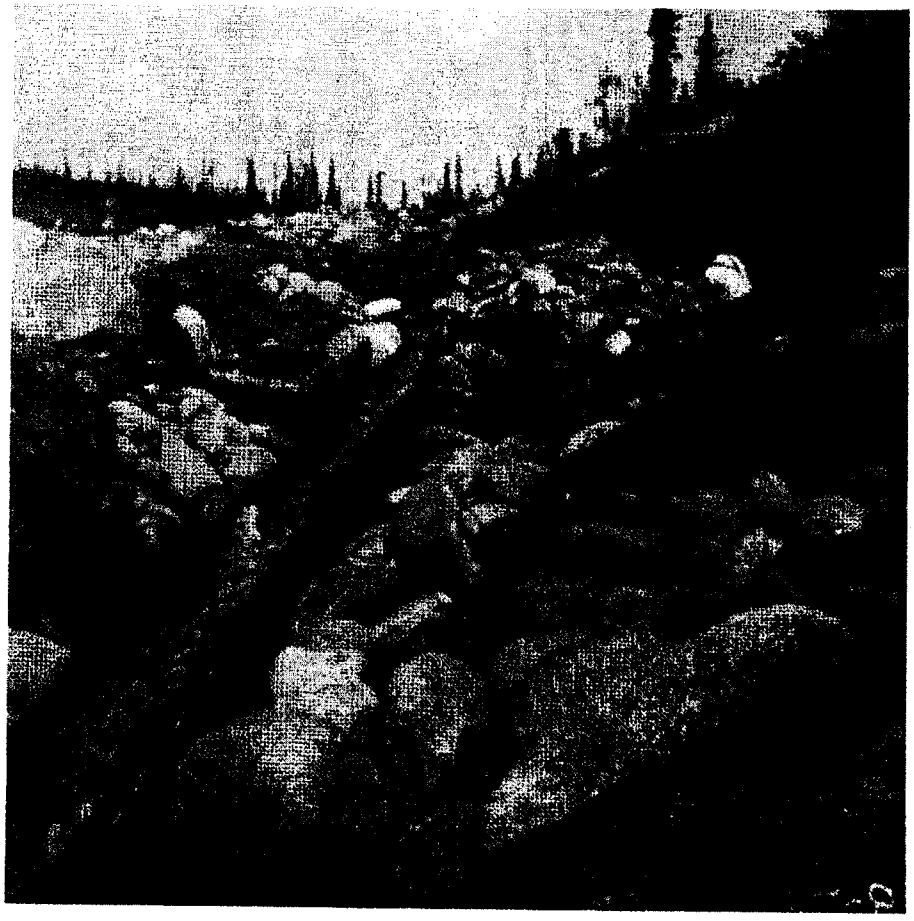

Figure 5.--Hand mining on Valdez Creek in 1905
(Anchorage Museum of History and Art)

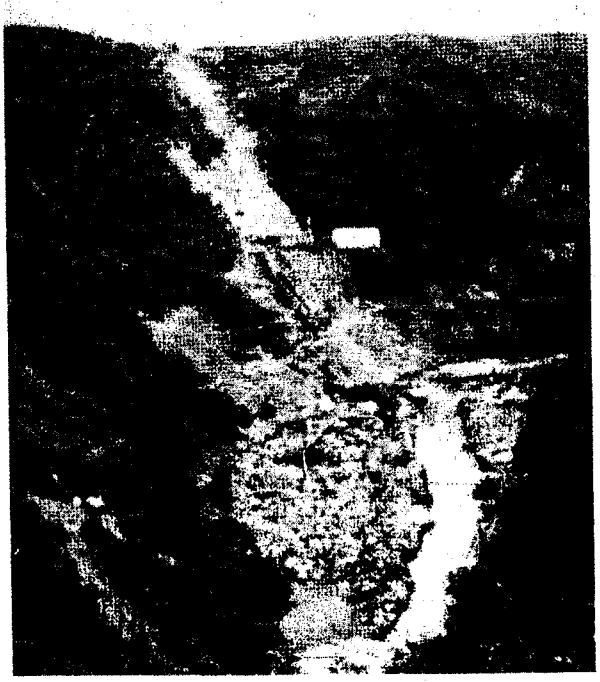

Figure 6.--Monahan Tunnel portal at the bottom of Tammany Channel. Looking northeast across Valdez Creek, 1910 (U.S. Geological Survey).

In the early 1970's, high gold prices caused a resurgence of placer mining on Valdez Creek that has continued to the present. In 1989 over 60,000 ounces of gold were recovered from Valdez Creek, making it the largest gold producer in Alaska for that year. The mine was closed for 8 months during 1990 due to low gold prices. Plans to reopen the operation were proceeding during September, 1990 (343).

During the course of this study seven lode and five placer properties were being evaluated by the private sector and three placer deposits were being mined. No lode deposits were being mined during this time period. Nine exploration firms working in the area included: Amax Exploration, Nerco Inc., Cominco Inc., Hawley Resource Group, Ashton Mining and Exploration, Sphinx Mining, General Crude Oil, Valdez Creek Mining Company, and Canalaska Resources Ltd. A considerable amount of placer drilling was done in the Valdez and Windy Creek drainages. Core and rotary drilling were done at the Zackly, Lucky Top, Gold Hill (West), and Timberline properties. An adit was driven and core drilling was done
at the Golden Zone Mine. A complete exploration history for each property is included in the property summaries in Appendix A-F.

BUREAU INVESTIGATIONS

During the summers of 1987-1989 Bureau personnel spent a total of 184 days conducting field investigations in the Valdez Creek Mining District. Helicopters were used for the majority of the fieldwork and all-terrain vehicles used for some site-specific investigations. Lodges in Talkeetna, Cantwell, Lake Louise, and along the Denali Highway were used as bases of operation. Placer mining camps on Yacko, Tyone, and Long Creeks were used as bases during site-specific studies.

Investigations were based on a literature search of the information regarding known mines, prospects, and mineral occurrences. The majority of these sites were located and evaluated. Samples were collected for analyses and the geology was mapped if warranted. If enough data were available, an attempt was made to determine potential resources and mineral development potential for each site visited. Adjacent areas having little or no previous information were also investigated. This was done to determine if similar geological environments existed between areas of known mineralization.

A total of 24 mines[4], 15 prospects[5], and 198 mineral occurrences[6] were examined during the course of the study. Nineteen previously unreported occurrences were discovered during Bureau investigations.

The level of knowledge within the study area varies. A high level exists in and around areas of known mineralization, especially the Tyone, Creek, Valdez Creek, Maclaren Glacier, Clearwater Mountains, Butte Creek, and North Chulitna areas. The high glaciated portions of the south flank of the Alaska Range are lesser known due to difficult access. Only previous data could be used to evaluate that portion of the district within Denali National Park and Preserve, due to restricted access by the National Park Service. A sparse knowledge also exists along much of the lower Maclaren and Susitna River drainages due to excessive vegetative cover.

SAMPLING

A total of 1632 rock and 781 placer samples were collected during the course of the study. Rock samples were of seven types: 1) continuous chip-small rock fragments broken in a continuous line for a measured distance across an exposure; 2) Channel-fragments and dust from a channel of uniform width and depth cut across an exposure of mineralized rock; 3) random chip sample-collected at random points from an apparently homogeneous mineralized exposure; 4) spaced chip-collected in a continuous line at designated intervals across an exposure; 5) representative chip- sample volume collected in proportion to volumes of different rock types observed at a specific locality; 6) select-collected from the highest grade portion of a mineralized zone; and 7) grab- collected more or less at random from outcrop, dump, or float.

Metallurgical samples consisting of 200 to 300 lb of representative mineralized material were collected from outcrops or dumps at four selected deposits: the Denali, Zackly, Black Creek, and Golden Zone Prospects. The samples were sent to the Bureau's Salt Lake City Research Center for analysis. Tests included gravity concentration by tabling, cyanide amenability, and floatation. A Screen analysis was made of leach residues, to determine the optimum gold recovery techniques. The results of these tests are included in the appropriate property summaries (Appendix A-F).

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[4] Ore shipments made over a period of several years or production confirmed.

[5] Development work done, but no ore shipped.

[6] Mineralization exists, but no sign of development.

Placer samples (fig. 7) consisted of approximately 0.1 yd^3 of stream or bank material run through a 10x48 in. sluice box and then panned down to produce approximately 2.5 oz of concentrate. Visible gold was recovered from the sample and weighed. If the sample contained at least 1.5 grams gold, a gold-fineness determination was made. The residual concentrates were analyzed for gold and the elements listed in Table 1.

Placer samples containing <0.0005 oz/yd^3 gold were considered as background values. Samples containing from 0.0005 - 0.005 gold were considered to be significant and those with >0.005 oz/yd3 gold were highly significant.

Bulk placer samples weighing approximately 900 lbs were collected from three sites in the Valdez Creek drainage. The material was dried, screened to size fractions, and weighed to determine size fraction distributions. The visible gold was also recovered and screened to determine the size fraction distributions of the gravel.

ANALYTICAL PROCEDURES

All rock samples and placer concentrates were analyzed by Chemex Labs, Inc., of Vancouver, British Columbia, Canada[7]. Analytical procedures for the placer samples involved gravimetric recovery and weighing of the visible gold and/or platinum, grinding the remaining concentrate to -140 mesh, and performing inductively coupled plasma (ICP) spectroscopic analysis to determine the elemental composition of the concentrates. Further analyses by atomic fluorescence spectroscopy (AFS) was performed to determine the quantity of gold, platinum and/or palladium contained in the placer concentrates.

Rock samples were ground to -140 mesh and geochemically analyzed by ICP spectroscopy. Samples containing highly anomalous visible quantities of gold, silver, platinum-group metals (PGM), copper, lead, zinc, or antimony were further analyzed by fire assay and/or atomic absorption techniques. The detection limits for the elements that were analyzed by ICP, AFS, and fire assay methods are listed in Table 1.

GEOLOGIC SETTING

The Valdez Creek Mining District lies generally south of the east-west trending Denali Fault and is cut by the Talkeetna Fault system trending northeast-southwest through the center of the district (figures 8 and 9). These major structural features

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[7] Use of Chemex Labs does not signify Bureau of Mines endorsement

TABLE 1 - Detection limits by analytical technique for samples from the Valdez Creek Mining District.

Inductively coupled plasma (ICP) spectroscopy		
Element	**Minimum**	**Maximum**
Al	0.01%	25.00%
Ag	0.2 ppm	200 ppm
As	1.0 ppm	10,000 ppm
Ba	10.0 ppm	10,000 ppm
Be	0.5 ppm	10,000 ppm
Bi	2.0 ppm	10,000 ppm
Ca	0.01%	25.00%
Cd	0.5 ppm	10,000 ppm
Co	1.0 ppm	10,000 ppm
Cr	1.0 ppm	10,000 ppm
Cu	1.0 ppm	10,000 ppm
Fe	0.01%	25.00%
Ga	10.0 ppm	10,000 ppm
Hg	1.0 ppm	10,000 ppm
K	0.01%	20.00%
La	10.0 ppm	10,000 ppm
Mg	0.01%	25.00%
Mn	1.0 ppm	10,000 ppm
Mo	1.0 ppm	10,000 ppm
Na	0.01%	10.00%
Ni	1.0 ppm	10,000 ppm
P	10.0 ppm	10,000 ppm
Pb	2.0 ppm	10,000 ppm
Sb	5.0 ppm	10,000 ppm
Sr	1.0 ppm	10,000 ppm
Ti	0.01%	10.00%
Tl	10.0 ppm	10,000 ppm
U	10.0 ppm	10,000 ppm
V	1.0 ppm	10,000 ppm
W	10.0 ppm	10,000 ppm
Zn	2.0 ppm	10,000 ppm

TABLE 1. - Analytical detection limits--Continued.

Atomic fluorescence spectroscopy		
Element	Minimum	Maximum
Au	2.0 ppb	10,000 ppb
Pd	2.0 ppb	10,000 ppb
Pt	5.0 ppb	10,000 ppb

Fire assay plus atomic fluorescence spectroscopy		
Element	Minimum	Maximum
Au[8]	0.002 oz/ton	20.00 oz/ton
Au	5.0 ppb	10,000 ppb

Neutron activation - gamma spectroscopy		
Element	Minimum	Maximum
Sb	0.001%	100.000%

[8] ½ assay ton

Figure 7.--Collecting placer samples in Lucky Gulch (map no. A53).

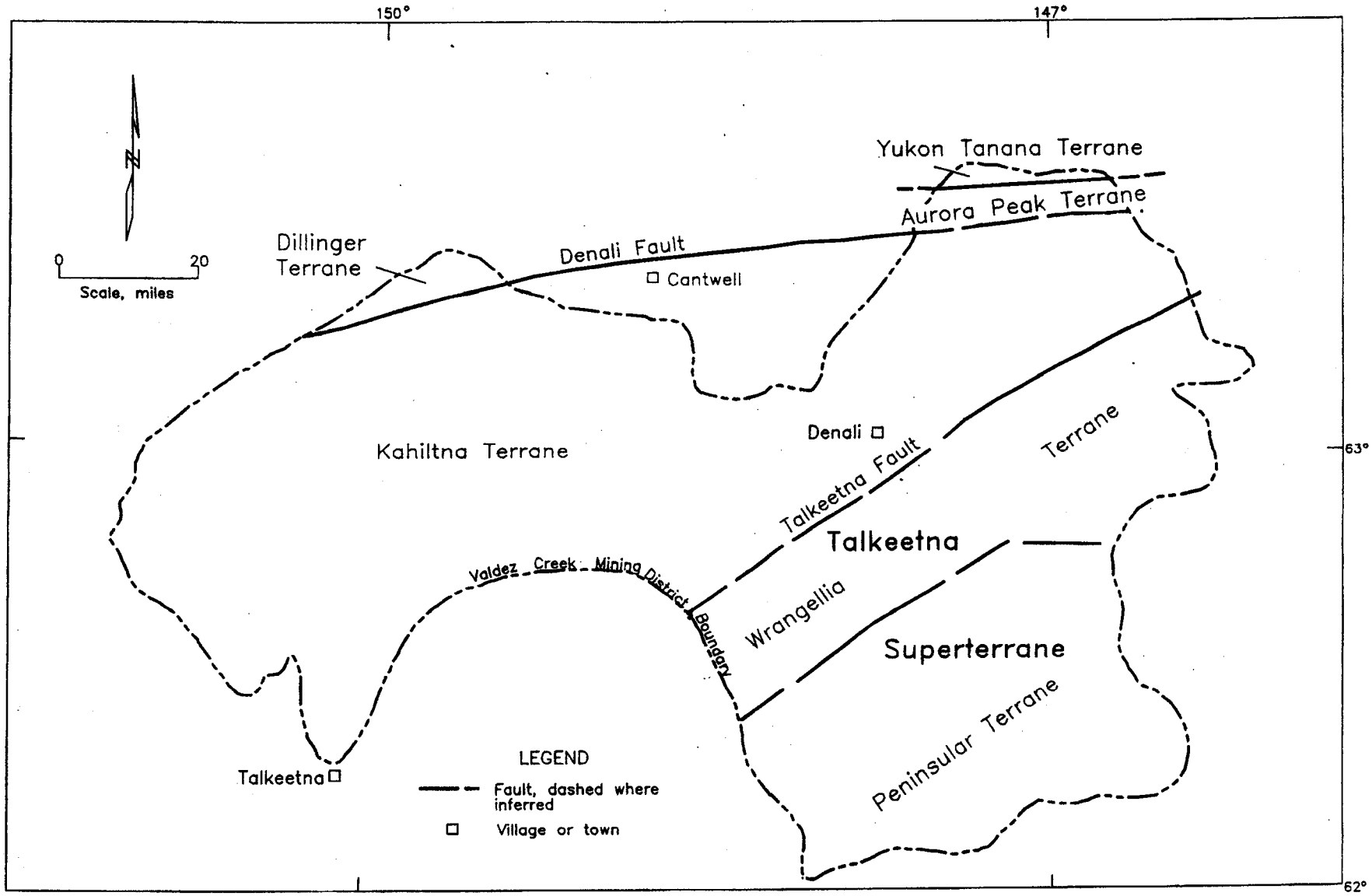

Figure 8. - Tectonostratigraphic Terranes in the Valdez Creek Mining District, Alaska

roughly separate distinct geologic regions, or tectonostratigraphic terranes, interpreted to have evolved under different geologic conditions. Rock units north of or within splays of the Denali Fault represent Paleozoic through earliest Mesozoic oceanic sediments of the Dillinger Terrane (167), Aurora Peak Terrane (102), and North American craton or Yukon Tanana Terrane (167). The region immediately south of the Denali fault lies within the Kahiltna Terrane (167), composed of Jura-Cretaceous marine clastic sedimentary rocks intruded by upper Mesozoic and Cenozoic granitic plutons. Sediments of the Kahiltna are thought to represent a flysch basin formed as the land mass south of the Talkeetna Fault system, termed the Talkeetna Superterrane (316), converged with the North American Continent in Mesozoic time. Stratigraphy of the Talkeetna Superterrane represents several volcanic arcs, which range from pre-Permian through Jurassic in age; the Talkeetna Superterrane includes Wrangellia Terrane (165) to the north and Peninsular Terrane (167) to the south. The volcanic rocks in these arcs are anomalous in Copper and host numerous copper occurrences and prospects. During accretion, ultramafic and related rocks, representing oceanic basement were apparently intruded as partially-molten magma into the crust along sutures formed adjacent to terrane boundaries. These rocks are anomalous in PGM, nickel, and chromium. Wrangellia and Peninsular Terranes may at one time have been discrete land masses. Since the accretion of the Talkeetna Superterrane onto North America and the closing of the intervening flysch basin in late Mesozoic time, Tertiary volcanism and shallowly emplaced intrusives have affected the region. Precious and base metal veins related to the intrusives were emplaced at this time. Gold and copper-bearing skarns were formed as plutons intruded Jurassic limestone within the Wrangellia Terrane.

Other evidence of young tectonism in the region is found in the displacement of the Denali Fault System, where more than 240 miles of right lateral movement is possible (337), mostly form late Mesozoic through Cenozoic time, and in continental fluvial deposits of Tertiary age found, in some places, perched well above present streams. Gold and PGM were deposited as low-grade placers with the Tertiary Fluvial deposits. Coal deposits formed in some of the Tertiary basins formed during tectonism. Glacial drift from at least five glaciations, ranging in age from pre-Illinoian (more than 1.7 million years ago) to Holocene (less than 9,500 years ago), cap the bedrock geology. During interglacial periods rich deposits of placer gold were formed in deeply-cut bedrock channels and later covered by the tills of subsequent glacial advances (246).

A summary of the geology of the generalized terrane units is shown in Figure 8. More detail is available on the geologic map of the district (fig. 9).

The Dillinger Terrane, located within splays of the Denali fault, includes Ordovician to Middle Devonian oceanic sediments that consist of thinly laminated siltstone, argillite, and limestone (unit DOs)[9]. To the east, Aurora Peak rocks, including polydeformed calc-schist, quartzite, and pelitic schist of Paleozoic to Mesozoic oceanic protolith (unit MzPzs), are found south and outboard of the North American craton, which is represented by unit Pzs, polydeformed pelitic schist and quartz mica schist of the Yukon Tanana Terrane.

South of the Denali Fault, the Kahiltna Terrane comprises predominantly a Jura-Cretaceous flysch unit (KJf) and its regionally metamorphosed equivalents in the Maclaren River area (including argillite--KJfa, phyllite--KJfp, and schist--KJfs). High grade gneiss and schist (unit KJg) in the northern Maclaren River area are thought to be in-part equivalent to the Kahiltna flysch terrane but also contain igneous protoliths not present in the flysch assemblage. Calcareous sedimentary rocks of Late Triassic age in the Susitna River area (unit TRcs) and Mesozoic volcaniclastics of the Chulitna area are included within the geographic boundaries of the generalized Kahiltna Terrane (fig. 8), but are not part of the flysch assemblage. The bedrock geology of these areas may represent faulted slivers and tectonic melanges formed by the closing of the flysch basin in Late Cretaceous time, or in the case of the Chulitna area, an allocthonous terrane rafted north with Wrangellia (168).

The Talkeetna Superterrane amalgamates Wrangellia Terrane to the north and Peninsular terrane to the south. Rock units representing Wrangellia include a pre-Permian volcanic arc (unit Pzv) upon which the Permian volcanics (Pv), sediments (Ps) and carbonates (Pm) were deposited. Overlying the Permian volcanics are Triassic basalts (TRb), probably correlative with the Nikolai basalts to the east and possibly with a belt of basalts extending to the Skolai Group in Vancouver B.C. (22). Late Triassic fossils within limestone near the top of unit TRb and within Triassic volcaniclastics and sediments (TRvs) date the upper portions of these units as Karnian to Norian. The southern portions of the project area lie within Peninsular Terrane, a volcanic arc system that includes lower Jurassic andesitic to dacitic flows, breccias, and volcaniclastics (unit Jtk) with associated Jurassic plutons.

MINERAL DEPOSITS

Because of its size, the district is divided into six subareas for ease of discussion. The boundaries of the subareas were designated on the basis of geologic continuity and/or similarity of mineral deposit types. The subareas, lettered A-F, are shown on Figure 10. Each mine, prospect, or mineral occurrence site is

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[9]Refer to fig.9 unit descriptions.

designated by an alphanumeric prefix (map number) according to the subarea in which it is located. Detailed descriptions of each site including history, Bureau investigations, production, and geology can be found in Appendices A-F, which are keyed to the district subarea letter designations. Appendix G summarizes this information by map number. The following section will discuss the mineral deposit types found in each of these subareas.

AREA A

Area A (fig. 10), in the northeast corner of the district, encompasses the upper Susitna and Maclaren River drainages in the Clearwater Mountains. The northern portion of the area A contains rugged glaciated terrain on the south flank of the Alaska Range and is composed mainly of argillite of the Jura-Cretaceous Kahiltna terrane flysch. These rocks have been intruded by upper Mesozoic and Cenozoic plutons and by a narrow belt of mafic/ultramafic rocks. Rocks south of the Talkeetna Fault are mainly Jurassic volcanic rocks of the Wrangellia terrane.

Coal

The Coal Creek Occurrence (A38) is the only coal occurrence in area A. A coal bed within Tertiary sandstone and shale is poorly exposed on the south side of Coal Creek. Estimates of thickness vary from 3-8 feet, but its lateral extent is unknown. The total extent is probably not great since only a small amount of tertiary sediments are exposed in the immediate area. A sample of "as received" low-rank bituminous coal from the site contained 0.3% sulfur, 8.5% ash, and 14% moisture. Burning of the sample produced from 10,000 - 12,930 BTU's. There has been some local use of the coal by miners at Valdez Creek (213) (263).

Copper

Volcanic-hosted deposits

A belt of late-Triassic amygdaloidal metabasalt (greenstone) flows containing local thin beds of nonmarine volcaniclastic rocks and limestone extends across the southern flank of the Alaska Range, through the Clearwater Mountains, and into the Butte Creek area. Locally gabbro dikes and cumulate mafic/ultramafic sills intrude the greenstone. This belt of rocks has been correlated with the Nikolai Greenstone which hosts significant copper deposits to the southeast (230).

The greenstone hosts numerous occurrences of copper sulfide mineralization concentrated in quartz veins and veinlets within shear zones and faults (figs. 10 and 11). Shearing and faulting of the greenstones probably occurred during regional metamorphism. During metamorphism hydrothermal fluids leached copper from the surrounding greenstones and redeposited it in the open spaces

Figure 11.--Calcocite-bearing quartz vein in Triassic greenstone basalt, east of the Maclaren River (map no. A22).

provided by faulting. The copper minerals chalcopyrite, bornite, chalcocite, tetrahedrite, and malachite occur with quartz-epidote-carbonate gangue. The veins range in width from less than one inch to 20 feet, the majority being very narrow and discontinuous.

The largest greenstone-hosted deposit in the district is the Kathleen-Margaret Prospect (A13) west of the Maclaren River, where a 20-foot wide mineralized quartz vein is traceable for 100 ft along strike (184). Select samples from this prospect contain up to 38% copper, 4.08 oz/t silver, and 0.08 oz/t gold. The Kathleen-Margaret is the only deposit of this type in the district from which any copper has been produced (Table 2). At the Viking occurrence on the west fork of the Maclaren River (A18) samples contain up to 3.2% copper, and a sample from a 1.3-ft wide magnetite-rich vein of undetermined length contained 1.26 oz/t gold.

Sediment-hosted deposits

Late Triassic intercalated metasediments and andesitic volcanic rocks near the headwaters of Windy Creek contain stratiform sulfides at the Denali Prospect (A42). Pyrite, chalcopyrite, and very minor chalcocite occur in an argillaceous limestone unit between andesitic volcanic flows. Sulfide minerals occur as massive beds, finely laminated layers or homogeneous mixtures of sulfide and detritus. It has been proposed that the deposit is a volcanogenic (275) or a hydrothermal replacement type (87). The Denali Prospect is the only known deposit of this type in the district and contains 5.0 million tons of reserves averaging 2% copper. The prospect occurs within a lens of limestone that lies near the northern edge of the greenstone belt near its faulted contact with metasedimentary rocks. Similar limestone bodies along this contact (fig. 9) are potential exploration targets for similar copper deposits.

Skarns

Several copper-bearing skarns occur along contacts between Triassic limestone lenses and intermediate intrusives in the Maclaren River area. The largest known of the skarn is the Zackly Prospect (A26) (fig. 12), which contains a resource of 1.24 million tons averaging 2.69% copper (329). The skarn is composed mainly of garnet and clinopyroxene, and has undergone retrograde metamorphism and silica-clay alteration. Copper minerals consist mainly of bornite and chalcopyrite, along with some secondary copper minerals (120). It also has significant gold values, which has created a considerable amount of interest in the property. This resource at the Zackly Prospect will be discussed under the lode gold/silver section.

At the Maclaren Glacier occurrence (A9), samples from a magnetite-rich skarn contain up to 2.79% copper. Due to poor

Figure 12.--Aerial view of the Zackly Prospect, looking east. Small gully just right of photo center separates quartz monzodiorite on the left from skarn-bearing limestones and volcanics on the right (map no. A26).

exposures the extent of the mineralization is unknown. At the Honey Creek occurrence (A28) samples collected across a 100-foot long copper-stained skarn zone contained up to 1.86% copper.

Lode Gold/Silver

Polymetallic veins

Massive stibnite veins, quartz veins, and felsic dikes occur at the vicinity of the Mex Claims (A31) (fig. 13) and Gossan lode occurrence (A39). The veins and dikes cut argillite, limestone, dolomite, and shale, and contain anomalous levels of several metals. Samples contain up to 27% antimony, 0.55 oz/t silver, 0.09 oz/ton gold, 40 ppm tungsten, and 28 ppm mercury. The veins are narrow and discontinuous in nature and have little tonnage potential.

Disseminated/Stockwork Deposits

The Mex Claims (A31) near the headwaters of Little Clearwater Creek, previously described as containing polymetallic veins also contain metasediments anomalous in gold and silver. Samples of lower Triassic altered metasediments, including argillite, shale, and limestone averaged 18 ppb gold. Individual samples of malachite stained-, pyrite-, and quartz/carbonate-bearing metasedimentary rocks contain up to 20 pbb gold and 0.79 oz/ton silver. Samples of the metasediments also contained up to 0.24% tungsten, 56 ppm mercury, and 565 ppm arsenic. The gold, arsenic, mercury, tungsten, and antimony assemblage is characteristic of disseminated gold deposits such as at Carlin, Nevada, where silicification and argillic alteration of limestone beds has resulted in deposits of gold (87) (254). Intermediate intrusives of unknown age have small skarn zones around their margins, but the skarns contain little mineralization. The metal assemblage and presence of altered carbonate sediments, suggests that the Mex Claims area may have potential for sediment-hosted low grade precious metal deposits.

At the Gossan occurrence (A39), 2.5 miles southwest of the Mex Claims, similar rock types contain up to 50 ppb gold. Breccias and shear zones are anomalous in arsenic, mercury, antimony, and tungsten.

In the Lucky Hill (A51)-Gold Hill (A54) areas near the headwaters of Valdez Creek, gold-bearing quartz veins and veinlets cut calcareous phyllite and argillite. The veins appear to be associated with quartz-carbonate alteration zones on the margins of small intermediate intrusive bodies and dikes in the area. Historically gold has been washed from the colluvium on local hillsides (336) and soil geochemical sampling has resulted in the discovery of lode gold mineralization one mile south of Lucky Hill (107). Potential exists for bodies of gold-bearing quartz vein

Figure 13.--Sampling mineralized veins on the Mex Claims (map no. A31), near the headwaters of Little Clearwater Creek.

stockworks and quartz-carbonate alteration zones associated with intrusives in the area. At the time of this writing the ground was being tested by drilling. Zones up to 15-ft wide containing up to 0.8 oz/t gold have been intersected. Lode gold has been recovered from vein stockworks nearby at the Black Creek Lode (A50).

Five miles east of the Black Creek Lode, an east-west-trending contact between altered quartz diorite and argillite can be traced for one mile across lower Sunny Gulch (A59). Adjacent to the contact, the argillites are sheared and contain narrow, discontinuous quartz-carbonate veins and veinlets. Samples of the sheared argillite contained up to 20 ppb gold and 1 ppm silver. The diorite is sheared and chloritized near the contact with the argillite. A sample of this material contained 410 ppb gold. Select samples of quartz breccia float found nearby contained 0.13 oz/t gold. Rocks further out from this contact are reported to be anomalous in gold and arsenic (306). Several faults within the argillite run parallel to the contact and can be traced back to the Black Creek Prospect (A50).

Fissure Quartz Veins

Gold-bearing fissure quartz veins occur within an altered Cretaceous quartz diorite stock on the north side of Timberline Creek at the Timberline Prospect (A60). The veins are fault controlled, discontinuous, and may extend for up to 1000 feet along strike. Widths vary from a few inches to two feet and associated alteration selvages are up to eight feet wide. Sulfides consist of pyrrhotite, arsenopyrite, pyrite, and minor chalcopyrite. Samples averaged 0.3 oz/t gold and contained up to 3.7 oz/t gold. The values are very localized and the vein selvages do not contain significant gold values.

In 1989 quartz monzonite, possibly related to the Timberline stock was uncovered by placer mining on Valdez Creek one mile to the west. A sample contained 40 ppm arsenic, but no significant gold (343). The covered area between the two intrusive exposures has potential for gold-bearing quartz veins similar to those exposed at the Timberline Prospect.

Skarns

Several skarn deposits associated with Triassic limestones occur within the Clearwater Mountains. The most significant of these is the Zackly Prospect (A26) (fig. 12) previously mentioned as a copper-bearing skarn, a precious metal/copper-bearing, located on the West side of the Maclaren River. It was originally located as a copper prospect; however later discovery of associated precious metals has led to considerable exploration work on the property over the past ten years.

Endo and exoskarn occur over a one mile-long zone at the contact between Cretaceous intermediate intrusive rocks and an intercalated sequence of Triassic limestone and mafic volcanic rocks. Gold and copper mineralization is confined to a steeply dipping 2600 foot-long zone that averages 8.5 feet thick. The deposit contains indicated resources of 1.24 million tons at 0.18 oz/t gold, 0.96 oz/t silver, and 2.69% copper (329). A Bureau feasibility study indicates that an underground method would be required to mine any ore that might be developed (17). A bulk sulfide floatation test done by the Bureau recovered 18% of the gold and a cyanide leach recovered 45% of the gold (193). Further beneficiation studies to improve gold recovery from this deposit will be required.

Some small skarn exposures are associated with intermediate intrusive rocks at Cathedral Creek (A10), Honey Creek (A28), and Little Clearwater Creek (A31). Samples from these sites did not contain significant gold values.

Placer Gold/Platinum/Palladium

Buried paleochannels on lower Valdez Creek at the Denali Mine (A56) have been the largest source of gold in the district (fig. 14). During mid-Pleistocene interglacial periods a series of at least three main channels were incised 80 ft into argillite bedrock, and filled with gold-bearing fluvial gravels. During late Wisconsin glaciation the channels were buried under a 60- to 200-foot thick mantle of boulder-rich till, which protected the gold in the incised channels from the dispersing effects of glaciation. Placer gold occurs throughout the fluvial gravel, but is concentrated in the lower 5 to 9 ft of the channels (25) (150). The channels are reported to contain an additional inferred-indicated gold resource of 756,536 ounces (343). The source of the gold is probably the Lucky Hill-Gold Hill area, where gold-bearing quartz-carbonate veins exist (213) (246).

Sampling by private industry and the Bureau indicates potential exists for similar placer deposits on upper Valdez Creek (A14). Potential placer resources also may occur in ice-marginal and medial morainal deposits. Placer samples collected from bench gravels along upper Valdez Creek above White Creek contained up to 0.017 oz/yd^3 gold. Placer samples collected from bench gravels along lower White Creek (A58) contained up to 0.007 oz/yd^3 gold. Placer drilling by private industry along lower White Creek indicates potential for deeply buried placer deposits (187). There is potential for buried channels and ice-marginal deposits in lower Lucky Gulch (A53). A low-grade resource may exist in the alluvial fan formed where Valdez Creek exits its narrow channel onto the Susitna River lowlands. map no. A56).

Figure 14.--Aerial view of Denali Placer, looking west. The open-pit workings are following a buried gold-bearing paleochannel. Overburden at head of pit is 200 ft thick (map no. A56).

Two streams draining the north side of the east fork of the Susitna River (A1, A2) are anomalous in placer gold. The drainages contain schistose rocks associated with the regionally metamorphosed east Susitna batholith. Samples contain up to 0.01 oz/yd^3 gold and 58 ppm cobalt. The cobalt sulfide mineral linnaeite was detected during microprobe analysis of the placer concentrates (188). This is the only site in the district where such a mineral was detected. Lode prospecting in the area may be worthwhile to locate a lode source for the cobalt.

A placer sample collected in the narrows on the west fork of the Maclaren River (A25) contained 0.009 oz/yd^3 gold. Further sampling is needed to determine the extent of the placer gold. Near the headwaters of the west fork of the Maclaren River (A4), several glaciers have retreated at least 1 mile since the 1950's, exposing bedrock. Rock samples collected from quartz veinlets in schist and sheared slates were anomalous in molybdenum and tungsten. Placer samples collected from streams cutting moraines below the glacier contained up to 1700 ppb gold and 0.15% arsenic. The recently exposed bedrock in the area deserves further prospecting to delineate the extent of the mineralization.

Minor amounts of platinum and palladium were recovered from two placer samples collected in Area A. On the East fork of the Maclaren River (A14), a sample contained 40 ppb platinum and 6 ppb palladium. Serpentinized dunites, occurring upstream from the sample site may be the source of the platinum and palladium. On Grogg Creek (A46) one sample contained 2 ppb palladium. No mafic/ultramafic rocks were located in the drainage.

Molybdenum

Small amounts of molybdenite and chalcopyrite occur in mid-Cretaceous to early Tertiary, coarse-grained granitic dikes and sills within gneiss and schist of the East Susitna batholith (A3). A select sample contained 0.17% molybdenum, but the values vary greatly and the occurrences are small.

On the west fork of the Maclaren River (A29), quartz veins associated with granitic intrusive rocks have cut upper Cretaceous argillite and are reported to contain molybdenite. However, only trace amounts of molybdenum were found in samples collected by the Bureau at the occurrence.

Nickel/Chromium

A narrow discontinuous zone of peridotite, gabbro, and serpentinized dunite extends into the eastern portion of Area A near the Eureka Glacier. Recent investigations by the Bureau (116) indicate that the dunites were emplaced contemporaneously with early Tertiary thrust faulting and are part of a 120 mile-long belt

that extends west across the district as far as Butte Creek in area B (fig. 10). At occurrences (A7-A9) west of the Eureka Glacier, samples contain up to .36% nickel and 0.15% chrome. These elements are probably associated with silicate minerals in the rock and thus not amenable to existing recovery methods.

Lode Platinum and Palladium

Platinum and palladium occur within the belt of mafic/ultramafic rocks mentioned above under the nickel/chromium section. Samples collected west of the Eureka Glacier near the eastern boundary of the district (A7-A8) contained up to 570 ppb platinum and 370 ppb palladium. Platinum-group-metals have been recovered as a byproduct from gold placers draining the same belt of mafic/ultramafic rocks at Slate Creek, 50 miles to the east (116). During this study, time spent examining the Eureka Glacier occurrences was limited, and further studies are warranted.

On Eldorado Creek, near the headwaters of the Valdez Creek drainage (A47) samples of float coming from a nearby alkali gabbro body contained up to 92 ppb palladium and 45 ppb platinum. Bedrock sampling of the alkali gabbro body itself is needed to determine the actual source of these elements.

Tungsten

At the Mex Claims (A31) near the headwaters of Little Clearwater Creek, samples of shale from bulldozer trenches contained up to 0.24% tungsten. Ultraviolet lamp inspection reveals the tungsten mineral to be scheelite which may be associated with quartz-carbonate veinlets within the shale. It is possible that the shale is not in place, but has slumped downslope to its present location from the margin of a nearby intrusive body. Placer samples collected along Little Clearwater Creek, draining this area, are anomalous in tungsten.

AREA B

Area B (fig. 10) lies in the east-central portion of the district, mainly within the northeastern Talkeetna Mountains. It encompasses the middle Susitna River, Butte, Watana, and Deadman Creek Drainages. South of the Talkeetna Fault it is composed of volcanic rocks of the Permian-Jurassic Wrangellia Terrane, which contain a narrow belt of mafic/ultramafic rocks. The volcanic rocks, which have been intruded by Tertiary-Cretaceous intrusive rocks are locally overlain by tertiary conglomerate. Rocks north of the Talkeetna Fault consist mainly of argillites of the Jura-Cretaceous Kahiltna Terrane.

Copper

Volcanic-hosted Vein Deposits

The belt of late-Triassic greenstone described in Area A extends into the Butte Creek portion of Area B (fig. 9). In Butte Creek it hosts numerous small occurrences of copper-bearing veins in shear zones (fig. 10). At the Lichen Prospect (B36) quartz-epidote veinlets are confined to a single volcanic horizon which extends for 3000 ft along strike, contain chalcopyrite and bornite. Samples are reported to contain up to 4.5% copper and 475 ppb gold. The deposit is described as being volcanogenic in origin (308). At the August Claims (B27) a chalcopyrite-bearing breccia zone occurs in greenstone near the contact with a lense of marble. Samples contained up to 1.4% copper, but the extent of the mineralization is unknown. The property has been drilled (27, 189).

Lode Gold/Silver

The upper portions of the Gold Creek drainage are underlain by a series of intermediate composition upper Cretaceous-lower Tertiary stocks that intrude lower Cretaceous argillite and siltstone (fig. 9). At the Su Claims (B7), lying between Gold and Butte Creeks, the sediments have been hornfelsed and propylitized by the intrusives. The propylitized rocks are recognized by abundant limonite stain, disseminated pyrite, and local concentrations of chalcopyrite and molybdenite. The prospect originally drew attention due to its molybdenum content and its potential as a porphyry-type system. Anomalous gold values were detected during drilling operations. Samples contained up to 0.11 oz/t gold over an 8-ft drill interval. Surface trench samples contained up to 410 ppb gold over a 230-ft interval (162). Surface samples of the altered siltstone collected by the Bureau averaged 76 ppb gold.

Concentric alteration zones have not been identified at the Su Claims. In other porphyry systems such as those in Arizona, a gold halo occurs in a low pyrite shell around the main orebody (130). Potential for a similar halo composed of a stockwork-type vein system may exist at the Su claims.

The Gold Creek (East) lode occurrence (B9), is located on Gold Creek, which drains the north side of the altered siltstone outcrops at the Su Claims, 2.5 miles to the east. Samples from silicified fault zones within intermediate intrusive rocks, which are exposed in the creek bottom, contain up to 0.25 oz/t gold, 0.26 oz/t silver, and 0.5% copper. This hydrothermal mineralization may be related to the same intrusive(s) that altered and mineralized the siltstones at the Su Claims. Placer samples collected from Gold Creek (B8) contained highly significant gold and tungsten. The placer gold and tungsten may also come from veins related to the nearby intrusive rocks at the Su Claims. The ground between

Gold Creek and the Su Claims has potential for vein stockwork precious metal mineralization. The area between the two sites is mostly tundra-covered and will require extensive soil sampling and drilling to thoroughly test it.

Placer Gold

Gold placers on Wickersham (B6), Nay Nadeli (B5), Gold (B8), and Jay Creeks (B31) have been mined historically, but production has been minor (213). During the Bureau study the only active operation was located on Jay Creek (fig. 15). Samples collected by the Bureau in this drainage contained up to 0.001 oz/yd^3 gold. Hydrothermal activity related to intermediate plutonic rocks that have intruded metavolcanic rocks near the head of this drainage may be the source of the gold.

Samples collected from test pits on Gold Creek contained up to 0.010 oz/yd^3 gold and one sample contained 1890 ppm tungsten. A sample collected from placer workings on Nay Nadeli Creek contained 0.013 oz/yd^3 gold. Placer samples collected from lower Butte Creek (B2) contained up to 0.003 oz/yd^3 gold. Placer samples collected along Watana Creek (B23) contained up to 0.002 oz/yd^3 gold and 20 ppb platinum.

Lode Platinum/palladium

A belt of mafic/ultramafic rocks extends for 7.5 miles near the crest of the rugged hills on the south side of Butte Creek (B13) which drains into the Susitna River (fig. 16). Irregularly-shaped dikes of serpentinite, pyroxenite, and gabbro intrude a larger mass of altered diorite. Dike width varies from three to several hundred feet with serpentinization confined to faulted contacts. Locally the serpentinized rocks contain abundant magnetite. Samples of troctolitic gabbro contain up to 140 ppb platinum and 16 ppb palladium. Samples of pyroxenite contain up to 0.35% chromium and 908 ppm nickel. This occurrence lies at the southwestern end of an intermittently-exposed belt of mafic/ultramafic rocks that also contains PGM mineralization near the eastern boundary of the district in area A (A7-A8). Further prospecting and sampling of the mafic/ultramafic belt is warranted to determine the extent of the PGM mineralization.

AREA C

Area C (fig. 10) in the southeast corner of the district, includes the area drained by the Susitna River at the east end of

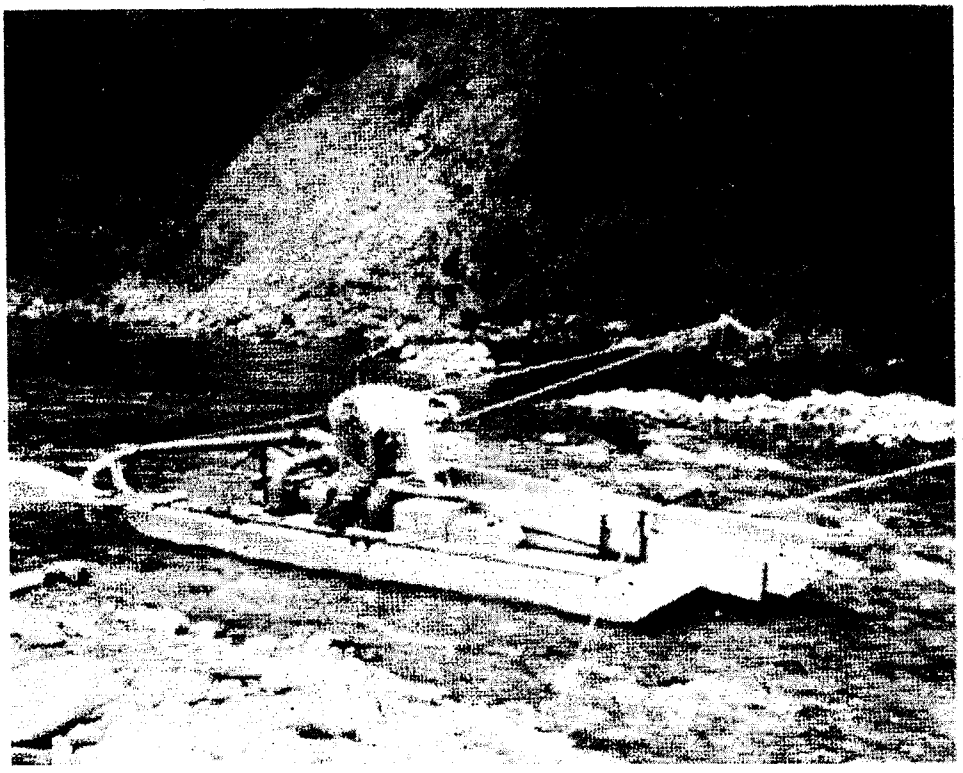

Figure 15.--Eight-inch floating suction placer dredge, lower Jay Creek (map no. B31).

Figure 16.--Sulfide-bearing gabbro and ultramafic sills in Talkeetna Mountains south of Butte Creek (map no. B13).

the Talkeetna Mountains and north flank of the Nelchina River drainage. Rocks in the area lie mostly within the Permian-Jurassic Peninsula Terrane and consist of conglomerate, sandstone, and volcanic rocks cut by younger intrusive rocks. A mantle of Tertiary volcanic rocks and conglomerate overlie portions of the area.

Lode Copper/Silver

Faulted contacts between diorites and tuffaceous volcanic rocks of the lower Jurassic Talkeetna Formation near the headwaters of Granite Creek (C11) in the eastern Talkeetna Mountains, contain siliceous sulfide-rich zones. Sulfides consist of pyrrhotite, chalcopyrite, sphalerite, and minor bornite (fig. 17). Sulfides are disseminated throughout an apparent width of at least 350 ft. Narrow, nearly-massive zones occur locally. Samples over a 3.5-ft interval contained up to 0.15 oz/t silver, 0.87% copper, and 0.16% zinc. One float sample contained 1.5 oz/t silver.

This occurrence has some similarities to the Johnson River Prospect lying 220 miles to the southwest on the Alaska Peninsula. The Johnson River Prospect consists of a gold-bearing quartz, zinc, copper, lead sulfide stockwork lying at a faulted contact of the Talkeetna Formation and intermediate intrusive rocks (317). Although the Granite Creek occurrence does not have the high gold values found at Johnson River, similar contact relationships in the Granite Creek area should be prospected for precious metal mineralization.

Samples of silicified granitic float and dikes collected at the headwaters of the Black River, in the eastern Talkeetna Mountains (C6), contained up to 0.69% copper, 0.16 oz/ton silver, 150 ppb gold, and 446 ppm molybdenum. This occurrence may be related to a porphyry-type system which has yet to be located.

Placer Gold/Platinum/Palladium

In the Busch Creek (C1), Yacko Creek (C18), and Tyone Creek (C22) drainages production records are incomplete. Available data indicate these creeks may have produced approximately 10,000 oz gold and an unknown amount of PGM beginning in the early 1900's (fig. 18). This area was examined in detail by the Bureau (114). The gold in these drainages is very fine, flat and occurs with abundant magnetite, making its recovery difficult (250). Samples of stream gravels in Busch Creek contained up to .012 oz/yd^3 gold. Placer concentrates from mining operations on Busch Creek (fig. 19) contained up to 1600 ppb platinum and 120 ppb palladium (fig. 20).

Placer samples collected on Yacko and Tyone Creeks contained up to 0.003 oz/yd^3 gold. Heavy mineral concentrates contained up to 9600 ppb platinum. The gold occurring in the active streams

Figure 17.--Sulfide-bearing, silicified fault zone near headwaters of Granite Creek. Weathering-resistant zone in photo center contains highest concentration of silicia (map no. C11).

Figure 18.--Placer gold mining area on Yacko Creek (map no. C18). Ridges on right and left photo edges are capped with gold-bearing gravels.

Figure 19.--Jig plant placer mining operation on Busch Creek (map no. C1).

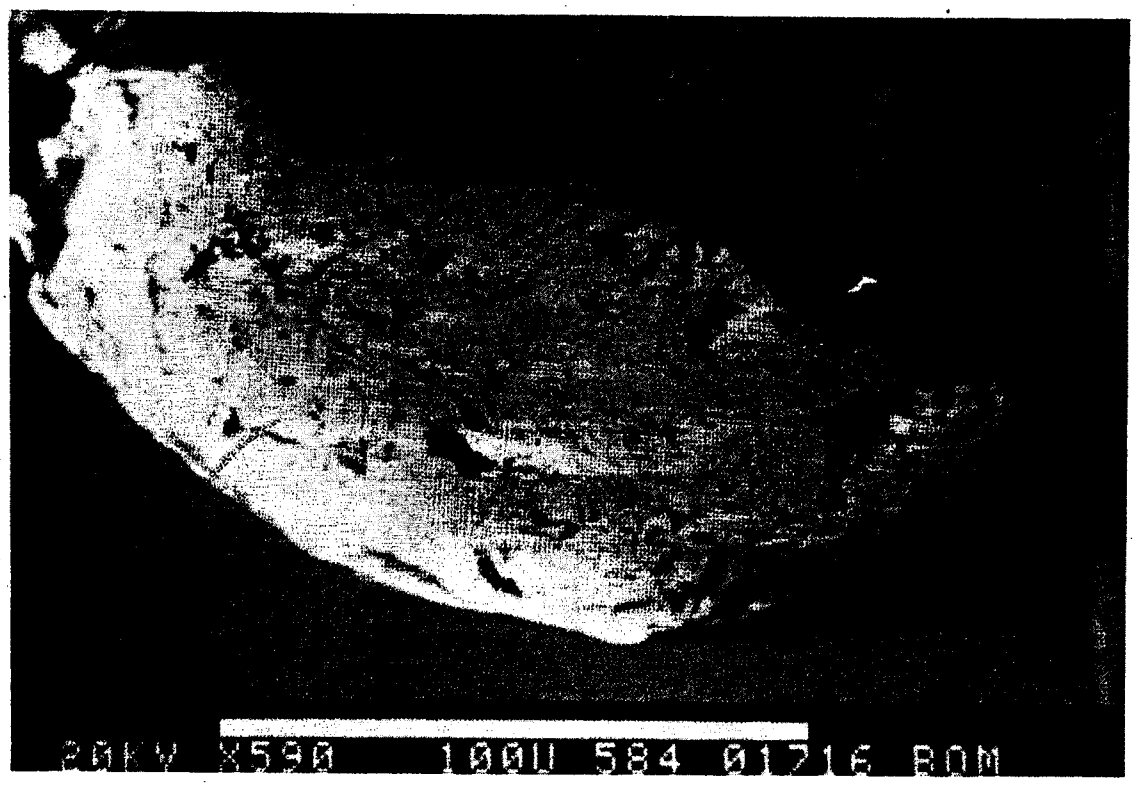

Figure 20.--Placer platinum grain, Bush Creek (map no. C1). Bar scale equals 0.1 millimeter.

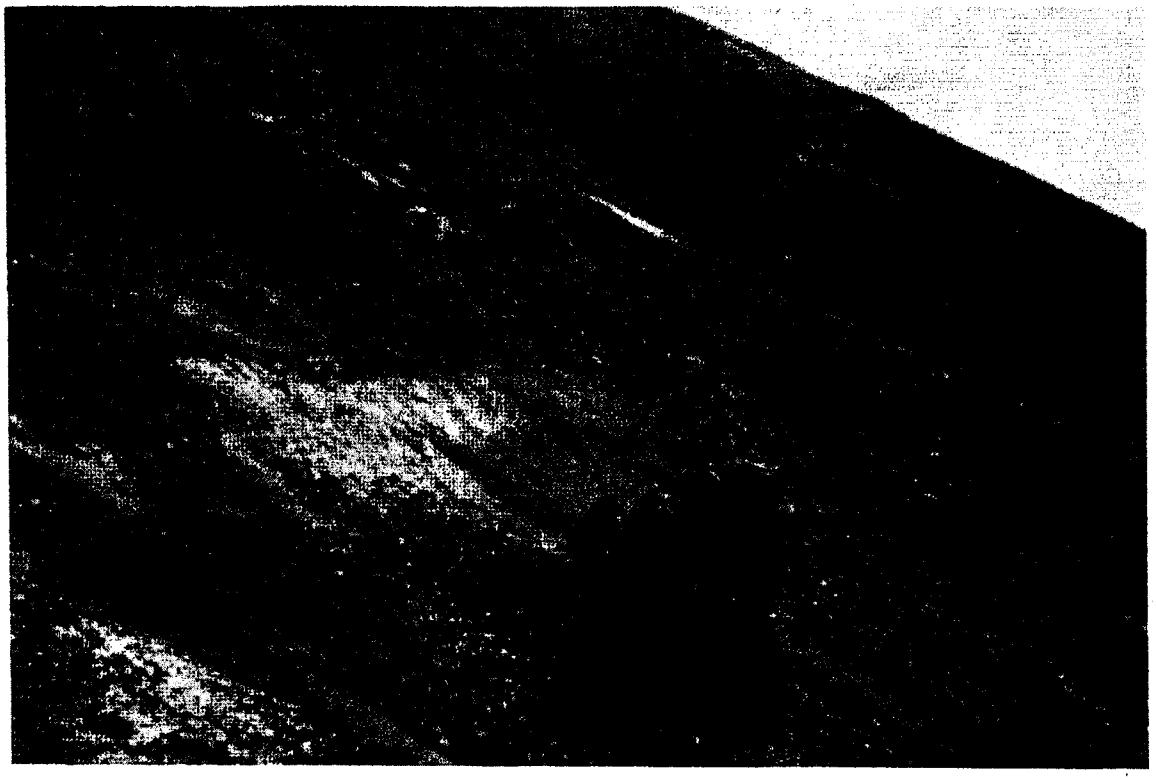

Figure 21.--Exposure of Boedecker Vein 0.25 mile west of prospect workings (map no. E46).

appears to have come from reworked Tertiary fluviatile conglomerates and the Jurassic Naknek Formation. The streams draining these formations have the highest gold content. Placer samples of Tertiary conglomerate were collected across thicknesses ranging from 6 to 50 ft. These samples contained up to 0.0027 oz/yd^3 gold, 280 ppm platinum, and 6 ppb palladium (114).

Glacial till in the area locally contains placer gold. At the headwaters of Busch Creek till contained up to 0.007 oz/yd^3 gold and similar deposits on Red Fox Creek (C23) contained up to 0.008 oz/yd^3 gold. The gold in the tills may come from reworking of the Jurassic and Tertiary conglomerate during glacial advances. The source of the gold found in the conglomerates themselves is difficult to determine. Erosion of highlands to the south and west during late Mesozoic and early Tertiary time may be the source of the conglomerates and hence the gold. Sampling of any mafic/ultramafic rocks found in the area would be worthwhile to determine possible sources of PGM (115).

AREA D

Area D (fig. 10) lies in the central part of the district in a wedge-shaped area of the Talkeetna Mountains between the Susitna and Chulitna River drainages. Rocks consist mainly of argillites of the Jura-Cretaceous Kahiltna Terrane flysch. Intruding these rocks are several stocks of Tertiary granitic rock.

Coal

Within area D there are two coal occurrences: Coal Creek (west) (D1) and Broad Pass (D28). At both localities, tightly-folded beds of slate, graywacke, and Jurassic greenstone are unconformably overlain by Tertiary, generally unconsolidated, coal-bearing, pebble conglomerate and pebbly sandstone. The coal is primarily lignite, and at both localities small quantities (less than 100,000 tons total) have been produced (195). Samples of coal obtained from the Broad Pass mine and analyzed by the Bureau averaged "as received" from 27% moisture, 19% ash, and approximately 0.23% sulfur. Most of the coal produced from these properties was used by local communities and miners during the 1930's and 1940's. Indicated resources at the Broad Pass mine are 50 million tons (195); Coal Creek (west) contains inferred resources of 13.5 million tons (195).

Lode Gold/Silver

Polymetallic veins

Polymetallic mineralization including anomalous levels of one or more of the elements gold, silver, copper, tin, antimony, tungsten, lead, zinc, mercury, molybdenum, or arsenic occur at

several localities within area D. At the Green Spike occurrence (D4), up to 0.38 oz/ton silver and 0.48% copper was present in select samples; at Tsusena Creek (D5) up to 0.55% tin and 26.5 oz/ton silver were present. Also present are up to 0.10% tungsten, up to 1.2% lead, and up to 5.45% zinc. At Antimony Creek (D25), the Bureau collected one sample of massive stibnite in quartz float that contained 520 ppb gold and 28.5% antimony. Near the headwaters of Honolulu Creek (D22) samples of massive sulfide float contained up to 141 oz/ton silver and 0.03 oz/ton gold. A sample across a 60-ft wide zone of altered granite contained 1.09 oz/ton silver. Some drilling has been done nearby by private industry.

Disseminated/Stockwork Deposits

Several sites within area D have potential for disseminated and stockwork-type mineralization containing anomalous precious and base metals. At the Mint mine (D16), samples of silicified argillite with stockwork-type quartz veinlets contained 56.6 oz/t silver, along with up to 3.03 ppm gold and up to 815 ppm antimony.

Fissure Quartz Veins

At the Ihly prospect (D13), quartz veins in slate have been reported to carry both gold- and silver-bearing galena (52).

Placer Gold

Strongly anomalous metal values were noted in placer samples collected at several sample sites. Along the east fork Chulitna River (D27), reconnaissance placer samples contained up to 0.003 oz/yd^3 gold, greater than 1000 ppm tin, and up to 170.5 ppm silver. At Gold Creek West (D14), 0.018 oz/yd^3 gold was recovered from one of the six samples collected, and two others contained significant gold. A placer sample collected at the confluence of a small tributary of the Susitna River at Devil's Canyon (D11) contained 0.002 oz/yd^{3}gold and anomalous silver, tin, and tungsten.

Molybdenum

At Treasure Creek (D17), descriptions of argillic and quartz-sericite-pyrite alteration assemblages of the quartz monzonite, together with the results of geochemical analyses, suggest the presence of a porphyry molybdenum-tungsten-tin-silver system. One sample contained 1.0% molybdenum, 0.40% tungsten, 1.71 oz/t silver, and 180 ppm lead.

Area E

Area E (fig. 10), in the northwest corner of the district, lies between Broad Pass and the crest of the Alaska Range. It is mainly rugged, glaciated terrain drained by the Chulitna River. Part of this area lies within Denali National Park and was not evaluated by the Bureau. Geology consists mainly of an elongate belt of intercalated volcanic and sedimentary rocks which have been intruded by a narrow belt of serpentinized dunite. The rocks surrounding these are argillites of the Kahiltna flysch sequence. This sequence has been intruded by Cretaceous-Tertiary granitic rocks.

Chromium/Nickel/Platinum-Group Metals

Tectonic slivers of chromite-bearing serpentinite occur in an 18-mile long belt in the Upper Chulitna area. At the Christy Creek occurrence (E29), select samples of chromite contained up to 51% chromium. Beneficiation studies carried out on Christy Creek ore by the Bureau's Albany Research Center produced a chromite concentrate containing 47.4% Cr_2O_3 and a chrome:iron ratio of 2.5:1, a high-chromium chromite. A sample of serpentinite from Christy Creek also contained 0.21% nickel; six of eight samples contained greater than 0.13% nickel. At the Little Shotgun Creek lode occurrence (E35), one sample contained 0.10% chromium and 0.13% nickel. At the Partin Creek Chromite occurrence (E37), serpentinite and carbonate-altered serpentinite carry up to 0.10% chromium , 0.19% nickel, and 8 ppb palladium. Eight of nine samples collected at the Partin Creek occurrence contained from 2 to 8 ppb palladium. Nickel is also reported from Eldridge Coal Creek (E39) and at the Sorefoot claims (E43). Serpentinite at the prospect contains massive sulfides, with chromium, nickel, and copper, in pyrite and chalcopyrite (137).

Coal

At the Dunkle Coal mine site (E9), gently folded, lignite-bearing sedimentary rocks lie in a small fault-bounded basin. The coal seams are broken by high-angle reverse faults with displacements of up to ten feet.

Analyses performed by the Bureau (264) determined a moisture content for Dunkle coal, as received ranging from 15.4% to 18.8%, ash contents of from 32% to 37%, and sulfur contents of from 0.5% to 0.6%. The B.T.U. value of moisture-free and ash-free coal ranged from 12,900 to 13,600 B.T.U.

Five thousand tons of Dunkle coal were mined underground and probably shipped to Alaskan military bases during the early years of World War II (264). During the early 1950's, another 59,000 tons of coal were produced (219). Small quantities of coal from

the Dunkle mine were also used at the Golden Zone mine for heating, cooking, and power generation in the early 1940's (219).

Lode Gold/Silver

Breccia Zones

At the Golden Zone Mine (E-19, fig. 22) a cylindrical volcanic breccia pipe 300 feet in diameter and at least 1500 feet deep is surrounded by a halo of quartz-veined , altered and weakly mineralized rock. The alteration zone contains arsenopyrite, sphalerite, chalcopyrite, malachite, stibnite, galena, gold, and silver, along with anomalous molybdenum, bismuth, cobalt, tin, and cadmium (138). Bulk sampling and metallurgical processing by the Bureau analyzed samples whose head analyses indicated a grade of 0.09 oz. gold/ton. In beneficiation and processing tests by the Bureau only 46.9% of the gold was recovered. This was due to very fine particle size, and the presence of arsenic sulfide minerals associated with the gold (194). At Blind Creek (E22), quartz veins in a 200 foot-wide breccia zone in volcanic siltstone and conglomerate contain gold, silver, and lead.

Fissure Quartz Veins

Gold-bearing fissure quartz veins occur in chert at the Silver Kitty prospect (E24), and at the Boedecker prospect (E46, fig. 21) flat-lying quartz veins ranging from 2- to 10-ft wide reportedly carry free gold. The best sample collected by the Bureau at the Boedecker prospect contained 1.42 ppm gold.

Skarns

At the Riverside prospect (E18), skarn mineralization consists of limestone replaced by pyrite, sericite, epidote, and pyroxene, suggestive of skarn; no anomalous metal values were obtained from samples collected by the Bureau. Localized areas of skarn mineralization occur in several other prospects (E8, E10-E12) located near the margins of intrusive stocks in the Dunkle mine vicinity (266). Gold, silver, copper, lead, and zinc are present as sulfide minerals within quartz stringer veins in sheared hornfels, andesite and diorite. In the immediate vicinity of intrusive bodies, andesite, graywacke, and conglomerate contain hornfels, and garnet, and have been altered to skarn (266). Samples collected at the Nim prospect (E12) contained up to 35 ppb gold, 0.27% copper, and 200 ppm zinc. Resources at the Snoopy prospect (E11) are estimated at 2.5 million tons (266). At the Nim (E12) resources are estimated to be 100 million tons (266).

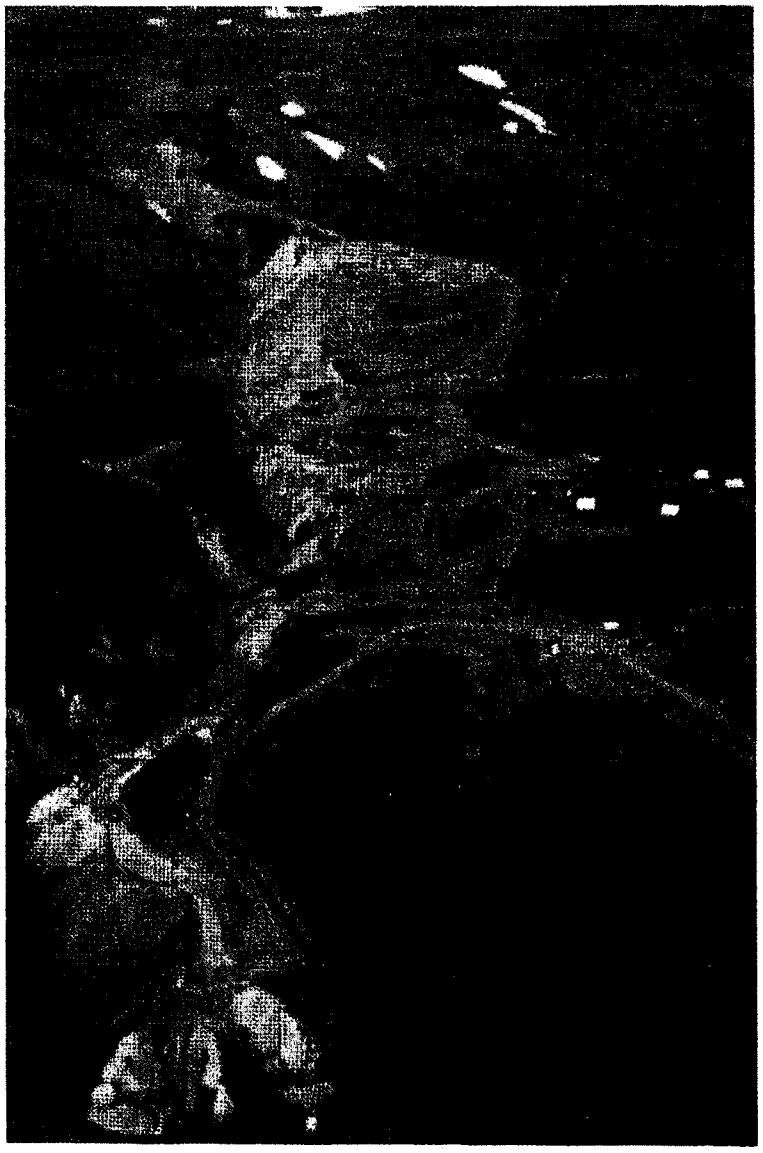

Figure 22.--Aerial view of Golden Zone Mine looking south. Breccia pipe is exposed in upper center of photo (map no. E18).

Polymetallic Veins

At the Long Creek prospect (E25) samples of silicified argillite collected from near an intrusive contact contained up to 16 oz/ton silver, 25.6% arsenic, 0.42% copper, 5.9 ppm gold, and 110 ppm tin. At the McCallie Glacier occurrence (E31), samples of silicified metavolcanic rocks contained up to 0.88 oz/ton gold, 3.9 oz/ton silver, 1.8% lead, and 1.64% antimony. At the Copper King prospect (E21), up to 2.8 ppm gold is found disseminated in silicified argillite and associated with up to 5.3 oz/ton silver, 8.3% copper, 100 ppm tungsten, and 0.17 % zinc. The Partin Creek Lode occurrence (E34), adjacent to the McCallie Glacier occurrence, also appears to be polymetallic, with select samples containing up to 1.4 oz/ton gold, 14.7 oz/ton silver, 1.7% copper, 660 ppm lead, 996 ppm zinc, 0.81% antimony, and 29% arsenic.

Disseminated/stockwork Deposits

At the Lindfors prospect (E19), disseminated gold is found in silicified argillite associated with anomalous silver (9 ppm), 0.11% copper, 523 ppm zinc, and 10 ppm antimony. The Lindfors prospect is adjacent to the Golden Zone mine, and it is unclear whether economic minerals there originated during intrusion of the nearby quartz-diorite, formation of the Golden Zone breccia pipe, or were deposited with the argillite (266).

Placer Gold

Placer prospects (E1-E4) are within Denali National Park and were not visited by the Bureau. A placer concentrate sample collected at the Black Bear prospect (E5) was inadvertently analyzed as a rock and contained 0.744 oz gold/ton. A placer sample from the Colorado Creek occurrence (E6) contained highly significant gold (0.03 oz gold/yd^3). Placer samples collected from the Bull River (E14) and Colorado Creek (E6) sites contained highly significant gold (0.01 oz gold/yd^3.) The drainage has moderate mineral resource potential for supporting a small- to medium-sized placer operation (266). Highly significant gold values were obtained from samples collected at Bryn Mawr Creek (E17), downstream from the Golden Zone Mine. At McCallie Creek (E32), a placer sample contained 1500 ppb gold. At the Shotgun Creek Placer occurrence (E36), two of the eight placer samples collected by the Bureau contained significant gold; one sample contained 0.008 oz/yd^3, gold, and one contained 0.003 oz/yd^3. Samples from the Golden Bell prospect (E39) contained only background (less than 0.0005 oz/yd^3) gold values.

Lode Tin

There are three lode tin prospects within Area E. At the Coal Creek tin prospect (E40), drilling by mineral exploration concerns has established an ore body of at least 5 million tons grading 0.20% tin, with accompanying silver. At this prospect, the Bureau collected samples that contained up to 680 ppm tin. The tin occurs in tourmaline greisen and is associated with anomalous silver, tungsten, and zinc. One sample contained 4.9% zinc, and was strongly anomalous in tungsten and cadmium. Anomalous tin in placer samples from Bull River (E14) suggests the possibility of a lode tin occurrence in the headwaters of that stream (266), however, since this area is within the recently extended Denali National Park, it is not available for exploration. At the Ready Cash prospect (E30), select samples from quartz veins contained up to 0.39% tin, and eight samples of quartz vein material contained greater than 0.10% tin. Other samples of the tin-bearing quartz vein material from the Ready Cash contained up to 121 oz silver/ton and to 0.59 oz gold/ton. At the Ohio Creek prospect (E23), metallurgical tests of two bulk samples of tin greisen with head analyses of from 0.16% to 0.53% tin produced tin concentrates containing 39.4% and 72.2% tin, respectively (349). Placer samples collected near the Ohio Creek prospect during the present study contained only background (less than 100 ppm) values of tin, with no other anomalous elements.

AREA F

Area F (fig 10) lies in the southwest corner of the district on the south flank of the Alaska Range, mostly between the Chulitna and Kahiltna River drainage. Over half of this area is included within Denali National Park and was not evaluated by the Bureau. Rocks consist mainly of argillite of the Jura-Cretaceous Kahiltna Terrane flysch sequence that has been intruded by Tertiary granitic rocks.

Coal

A block of fourteen coal claims were staked on Bluff Creek (F2) by Crown Minerals Company in 1967. The site was not visited by the Bureau.

Lode Gold

Gold in quartz was reported in 1915 in the Whistler Creek area (F1) (335), but this prospect is inside Denali National Park and was not visited by the Bureau. At the Felsite claims (F13), surface exposures of weakly consolidated Tertiary conglomerate were sampled by placer methods. Samples of the conglomerate were highly significant, averaging 0.01 oz/yd^3 gold (114). Additionally, a felsic dike is reported to carry 0.03 ppm gold (137). At the Rocky

Cummins prospect (F20), gold and arsenopyrite are reported from a discontinuous 2.5 ft. wide quartz vein. A grab sample of the vein material contained 3.16 oz/ton gold. Three of the thirty rock samples collected by the Bureau at this property contained greater than 0.10 oz/ton gold.

Placer Gold

At the Tokositna River (F-3), placer samples contained from nil to 0.0008 oz/yd^3 gold). At Bunco Creek (F-11), the Bureau collected ten placer samples which contained from trace to 0.0022 oz/yd^3 gold. At Canyon Creek (F-12), eight placer samples contained significant gold, averaging 0.001 oz/yd^3 gold. No platinum-group metals were detected in any samples from Canyon Creek, although PGM were anticipated. In the Ramsdyke Creek region (F-14), samples contained up to 0.001 oz/yd^3 gold, and one sample contained 40 ppb platinum. At Bear Creek Mining (F15), a placer concentrate sample contained 1000 ppb gold and 10 ppb platinum.

Molybdenum

Two miles south of Curry (F7) is the site of an Alaska Railroad rock quarry. A few flakes of molybdenite are reported to line small joints and fractures in the aplite dikes (348). A select sample from an aplite dike within quartz diorite contained 0.12% molybdenum. The mineralization is discontinuous in nature.

PRODUCTION AND RESOURCES

Production and resource figures for mines and prospects in the Valdez Creek Mining District are shown in Table 2. This information was gathered from a variety of sources, including Bureau permanent individual mine records (340), U.S.G.S. Bulletins, unpublished company reports, and personal communications. Resource classifications were based on the following criteria developed by the Bureau and USGS (342).

TABLE 2 - VALDEZ CREEK MINING DISTRICT - PRODUCTION AND RESOURCES

Map* No.	Name	Years Operated	Production (tons)	oz Au	oz Ag	lbs Cu	Average Grade			Resources
							Au	Ag	Cu	
A13	Kathleen-Margaret Lode	1954	15	1	23	4900	0.06	1.5	6.1	Inferred/Indicated: 61,000 tons, 4.8% copper
A26	Zackly Lode									Indicated: 1.24 million tons, 2.69% copper, 0.19 oz/ton gold, 0.96 oz/ton silver
A42	Denali Lode									Indicated: 5 million tons, 2 % copper, 0.4 oz/ton silver
A49	Black Creek Placer	1958-62		15	1					Unknown
A50	Black Creek Lode	1979	200	70	?		0.35			Unknown
A51	Lucky Top Lode/Rainbow Hill									Inferred: 1.5 million tons, 0.25-0.5 oz/ton gold
A53	Lucky Gulch Placer	1915-1958		2155	59					Unknown
A56	Denali Placer	1903-1989		241,936	37,280		0.127 oz/yd^3 in 1989			Inferred/Indicated: 756,536 oz gold, 0.048 oz/yd^3
A58	White Creek Placer	1908-1931		550						Unknown
A60	Timberline Creek Lode	1934		Minor						Unknown

*Refer to Figure 10.

TABLE 2 - VALDEZ CREEK MINING DISTRICT - PRODUCTION AND RESOURCES-CONTINUED

Map* No.	Name	Years Operated	Production (tons)	oz Au	oz Ag	lbs Cu	Average Grade			Resources
							Au	Ag	Cu	
B8	Golden Creek (East) Placer	1980		Minor						Unknown
A61	Timberline Creek Placer	1924		Minor						Unknown
A62	Dry Creek Placer	1933		318						Unknown
B5	Nay-Nadeli	1982-1985		Minor						Unknown
C1 C18 C22	Tyone, Yacko, Busch Creek Area	1907-1988		10,150						Inferred: 353 millon yd^3 trace-0.0027 oz/cy gold
D14	Gold Creek (West) Placer	1978		Minor						Unknown
E9	Dunkle Coal Mine	1941-1954	64,000							Measured: 8400 tons, Indicated: 116,000 tons Inferred: 192,700 tons
E18	Golden Zone Mine	1941-1942	15	1581	8617	42,659				Inferred: 1.72 million tons, 0.134 oz/ton gold, 0.54 oz/ton silver, 0.13% copper
E39A	Coal Creek Tin Lode									Indicated: 5 million tons 0.2% tin, 5.0% zinc, 2.0 oz/ton silver
E45	Boedecker Lode	1934-1935		Minor						Unknown
F12	Canyon Creek Placer	1908-1933		244	9					Inferred: 21 millon cy, average 0.001 oz/cy gold

*Refer to Figure 10.

"Measured - Quantity is computed from dimensions revealed in outcrops, trenches, workings, or drill holes; grade and/or quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well-defined that size, shape, depth, and mineral content of the resource are well established.

Indicated - Quantity and grade and/or quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, and measurement are further apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observations.

Inferred - Estimates are based on an assumed continuity beyond measured and/or indicated resources, for which there is geologic evidence. Inferred resources may or may not be supported by samples or measurements."

Gold has been the principle metal recovered from the Valdez Creek Mining District. Production totals 258,992 oz (Table 2). The majority of this total (246,936) comes from placer deposits in the Valdez Creek drainage, along with minor amounts from the Tyone, Busch, and Yacko Creek drainages (114) (247) (343). A total of 36,270 oz silver was recovered as a secondary metal from the placer operations.

Lode gold production totals 1652 oz with the majority coming from the Golden Zone mine (E18) and the remainder from the Timberline, Black Creek and Boedecker lodes. The Golden Zone and Kathleen-Margaret (A13) lodes also produced a total of 8640 oz of silver and 47,559 lbs. of copper (138) (362). The Dunkle Coal Mine has produced 64,000 tons of subbituminous coal.

The Denali placer Mine (A56) contains a measured resource of 182,226 oz, averaging 0.086 oz/yd^3 (343), making it the largest known gold resource in the district. Canyon Creek (F12) contains an inferred resource of 21 million yd^3 averaging 0.001 oz/yd^3 gold (114). Lode gold indicated resources total 454,000 oz with the majority occurring at the Golden Zone Mine, followed closely by the Zackly Prospect (A26) (329).

The Denali prospect (A42) contains measured resource of five million tons averaging 2% copper, which is the largest copper resource in the district (127) (275). The Coal Creek Tin Prospect (E39) contains an indicated resource of 5 million tons averaging 0.2% tin and 2.0 oz/ton silver (332). The Dunkle Coal Mine contains an indicated resource of 116,000 tons of subbituminus coal (264).

MINERAL DEVELOPMENT POTENTIAL

Based on resources and grades of mineralization, all the located mines, prospects, and mineral occurrences were classified according to the following Bureau criteria:

High Mineral Development Potential - High grades and probable continuity of mineralization exist. The property is likely to have economically minable resources under current economic conditions. A high potential exists for developing tonnage or volume with reasonable geologic support for continuity of grade.

Moderate Mineral Development Potential - Either high grade or continuity of mineralization exists, but not both. Mineralization has limited extent as shown by geology, dimensions, and/or grades are low and tend to stay low. The property is not economically minable (i.e., due to low tonnages and grades) under existing conditions (economical, political, technological). It could serve as a material source if economics were not a factor.

Low Mineral Development Potential - The property exhibits uneconomic grades and/or little evidence of continuity of mineralization. There is little or no potential for developing ore resources or it is an insignificant source of the material of interest.

Unevaluated - This category includes all properties not located or visited in the field. Data are only available from previous reports.

Unknown - Insufficient work was done at the prospect for an evaluation.

Placer samples were rated according to the following classification based on Bureau sampling:

Highly significant - recovered values higher than 0.005 oz/yd^3 gold;
Significant - recovered values from 0.0005-0.005 oz/yd^3 gold;
Background - recovered values less than 0.0005 oz/yd^3 gold.

Mineral development potential ratings for the Valdez Creek Mining District are summarized in appendix G.

A total of three sites are considered to presently have high mineral development potential under 1990 conditions. The highest of these is the Denali Placer Mine (A56) which contains high grades and resources well delineated by drilling. This is followed by placers on Yacko (C18) and Gold Creeks (C13) which have lower grades and unproven resources. A total of 51 sites were given a moderate rating, 84 low, 69 unknown, and 18 unevaluated.

Appendix G summarizes all sites of interest, including mineral resource potential, by map numbers shown on fig. 10.

SUMMARY

Gold has been the main metal produced from the Valdez Creek Mining District, with production totalling 258,992 oz. The majority of the gold was produced from placer deposits in the Valdez Creek drainage. Silver production totals 44,910 oz with the majority produced as a byproduct of placer gold mining on Valdez Creek. Copper production totals 47,559 lbs with the majority as a byproduct of precious metal mining at the Golden Zone Mine. The Dunkle Coal Mine has produced 64,000 tons of subbituminous coal.

Placer gold makes up the largest metal resource in the district with an indicated/measured resource totalling 309,884 oz. The majority of these resources occur at the Denali Placer Mine on Valdez Creek. The placer deposits occur in buried interglacial paleochannels. Reworked Tertiary conglomerates in the Yacko and Tyone Creek areas make up an additional large, low grade resource.

Inferred lode gold resources total 453,000 oz with the majority occurring in a breccia pipe at the Golden Zone Mine and skarns of the Zackly Prospect.

Indicated resources of copper total 277 million lbs. with the majority located at the Denali Prospect in sediment-hosted volcanogenic sulfide deposits. Here a resource of 5 million tons averages 2.0% copper. Copper also occurs with precious metal resources at the Golden Zone mine and the Zackly Prospect.

At the Coal Creek Prospect, greisen veins contain an indicated resource of 5 million tons, averaging 0.2% tin, 2.0 oz/ton silver, and 5.0% zinc.

The Dunkle coal mine contains an indicated/measured resource of 124,400 tons of subbituminous coal.

In the White Creek, Lucky Gulch, and Eldorado Creek areas at the headwaters of Valdez Creek potential exists for placer gold in buried paleochannels and ice-marginal glacial deposits that concentrated gold during glacial episodes. Potential also exists for large low grade deposits in the alluvial fan at the mouth of Valdez Creek. Placer samples collected in the Watana Creek drainage contained significant gold. Placer samples collected from tributaries to the east fork of the Susitna River contained significant gold and were anomalous in cobalt. Jurassic and Tertiary conglomerates in the Busch, Yacko, and Tyone Creek drainages are favorable for placer gold and PGM. Near the headwaters of the west fork of the Maclaren River, samples of bedrock exposed by recent glacial ice retreat are anomalous in molybdenum and tungsten.

In the Lucky-Gold Hill area near the headwaters of Valdez Creek potential exists for vein stockwork-type precious metals mineralization in quartz-carbonate alteration zones associated with metasediments and metaintrusives. Sheared contacts between metasediments and intrusives stocks extending from Timberline Creek to Eldorado have potential for stockwork-type precious metals veins. On the north side of Butte Creek potential exists for precious metals mineralization associated with an intrusive stock. At the headwaters of Little Clearwater Creek potential exists for sediment-hosted precious metal deposits in calcareous sediments associated with polymetallic veins.

Select samples collected at the Viking Prospect contain significant gold and the extent of the mineralization has not been determined.

At the Tsusena Creek prospect samples contained up to 26.5 oz/ton silver and 0.55% tin. At the Mint Mine samples contained up to 57 oz/ton silver.

At the McCallie Glacier occurrence select rock samples contain significant gold and the extent of the mineralization has not been determined. At the Ready Cash prospect quartz veins contain significant silver and tin.

Rock and placer samples collected from several southern tributaries to the Susitna River in the Devils Canyon area are anomalous in silver, gold, copper, molybdenum, lead, zinc, tin and platinum.

Serpentinites, dunites and gabbros in the Talkeetna Mountains south of Butte Creek and west of the Eureka Glacier contain anomalous amounts of platinum, palladium, nickel, and chromium. Float samples of alkali gabbro collected at the headwaters of Eldorado Creek are anomalous in palladium and platinum.

Placer and rock samples collected near several porphyry stocks in the Honolulu Creek-East Fork Chulitna River region are anomalous in tin. Potential exists for greisen-type vein deposits in the area. Near the headwaters of Honolulu Creek sulfide-rich quartz vein float and altered granite contain significant silver.

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EXPLANATION OF APPENDICES

Name	:	Historical or most commonly used name listed first, followed by other claim names.
Location	:	Both geographic and public land survey grid locations are used.
Map Location No.	:	Refer to Figure 10.
MAS No.	:	U.S. Bureau of Mines Minerals Availability System sequence number.
Kardex No.	:	Alaska Mineral Property Reference File.
Quadrangle	:	Refers to USGS quadrangle, scale 1:63,360.

Sample Types (see p. 20-25)

CC	:	Continous chip
CH	:	Channel
CR	:	Representative chip
P	:	Placer
G	:	Grab
RC	:	Random chip
S	:	Select
SC	:	Spaced chip

Analytical Results - Abbreviations

AD	:	Above detection limit
diss.	:	Disseminated
NA	:	Not analyzed
ND	:	Not detected
v.	:	very

APPENDIX A

NAME(S): Unnamed Placer Occurrence, East Fork Susitna River

Map Location No. A1

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B1
Sec: 6-7 T: 18S R: 4E
Sec: 31 T: 17S R: 4E Meridian: Fairbanks
Geographic: Upper East Fork Susitna River, 27 miles upstream from the Denali Hwy crossing of the Susitna River.
Elevation: 2700 ft.
Access: Susitna River

PRODUCTION: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Area is located in the northern part of the Maclaren Terrane which is comprised of the regionally deformed and metamorphosed East Susitna Batholith. The batholith consists predominantly of diorite and granodiorite. The rocks are schistose and grade locally into migmatite and migmatitic schist, schist, and amphibolite. The batholith age is late Cretaceous to early Tertiary (86).

BUREAU INVESTIGATION:

Collected 3 samples from a small, north side, south-flowing tributary to East Fork Susitna River.

Sample no. 2825 contained 0.006 oz/yd^3 gold. Sample no. 2826 was collected 1.5 miles upstream of 2825 and contained trace amounts of gold. Sample no. 2827 was collected 0.5 miles below 2825 and contained trace gold.

The section of the East Fork Susitna River above the confluence with the Susitna River and below the main fork of the East Fork Susitna Glacier appears to be mineralized along its northern bank. The source of the placer mineralization is unknown. Some prospecting was done, but no color anomalies were located. All of the outcrops examined were granitic, as was the float in the glacial till.

RESOURCE ESTIMATE: No estimate made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Area needs additional sampling and trenching to further evaluate the placer resource.

REFERENCES: 86

TABLE A1 - ANALYTICAL RESULTS - UNNAMED PLACER OCCURRENCE, EAST FORK SUSITNA RIVER

Sample no.	Type	Sample length (feet)	Analysis						Description
			Fire Assay oz/st		ppb	oz/yd³	Elements in ppm (unless otherwise indicated)		
			Au	Ag	Au	Au	Co	Ga	
2825	P				>10000	0.0058	17	30	2 coarse, 50 fine gold grains
2826	P				>10000	0.00032	58	10	1 coarse, 5 fine gold grains
2827	P				3600	0.00032	13	20	10 fine, 20 v. fine gold grains

NAME(S): Unnamed Placer Occurrence, East Fork Susitna River

Map Location No. A2

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 34 T: 17S R: 4E
Sec: 33 T: 18S R: 4E Meridian: Fairbanks
Geographic: Upper East Fork Susitna River.
Elevation: 2800 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Large lateral moraines present along valley walls. Area is located in the northern part of the Maclaren Terrane, which comprises the regionally deformed and metamorphosed East Susitna Batholith. The batholith consists predominantly of diorite and granodiorite. The rocks are schistose and grade locally into migmatite and migmatitic schist, schist, and amphibolite. The batholith age is Late Cretaceous to Early Tertiary (225).

BUREAU INVESTIGATION:

The Bureau collected 2 samples from a small, north side, south flowing tributary to the East Fork Susitna River. The samples contained elevated quantities of gold. Scanning electron microscope analysis show the presence of linnaeite, a cobalt sulfide, in the concentrates of sample no. 2923 (188). Sample no. 2923 was collected from an alluvial fan located 100 yards upstream from the confluence of the tributary with the East Fork Susitna River. The fan contained a large volume of poorly sorted gravel (total yardage not estimated) consisting of material sizes ranging from silt to 3 feet diameter boulders. The sample was collected from an abandoned flood channel. Sample concentrates contained 2 very coarse, 5 coarse, 10 fine, and 10 very fine particles of gold, along with visible pyrite and garnets. All of the stream float consisted of granitic gneiss and migmatite.

Sample no. 2677 was collected from a location where the tributary was eroding through the large lateral moraine that exists along the northern valley wall of the East Fork Susitna River. The sample was collected directly from the moraine material, and contained 10-20 very fine particles of gold.

RESOURCE ESTIMATE: No estimate made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

The northern valley wall along the section of the East Fork Susitna River downstream from the East Fork Susitna Glacier appears to contain placer gold mineralization. Placer gold was recovered from numerous samples collected from tributaries draining the northern side of the East Fork Susitna River Valley (see also, property A-1). Sample no. 2677 showed that the lateral moraine contains placer gold, and could represent a significant placer gold resource. This area deserves further sampling and mapping. Sampling should consist of bulk placer samples collected from the alluvial fans at the base of East Fork Susitna River tributaries and from the lateral moraine located on the north side of the East Fork Susitna River valley downstream from the East Fork Susitna Glacier.

REFERENCES: 188, 225

TABLE A2 - ANALYTICAL RESULTS - UNNAMED PLACER OCCURRENCE, EAST FORK SUSITNA RIVER

Sample no.	Type	Sample length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	oz/yd^3	Elements in ppm (unless otherwise indicated)				
			Au	Ag	Au (Afs)	Au	Ag	As	Co	Ga	
2677	P				2,200	trace	ND	25	7	30	
2923	P				6,800	0.010	ND	315	18	40	Sample collected from abandoned channel. Collected 2 very coarse, 5 coarse, 10 fine, and 10 very fine gold particles.

NAME(S): Lamb Claims Lode Occurrence

Map Location No. A3

Deposit Type: Vein
Commodities: Copper, Molybdenum

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 8, 17 T: 18S R: 5E Meridian: Fairbanks
Geographic: 2.5 miles south of glacier at headwaters, east fork Susitna River
Elevation: 4000-6500 ft

PRODUCTION: None.

HISTORY:

1955 - Lamb claims (No. 1-6) located over molybdenum mineralization (112).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The claims are located on a northwest-southeast trending ridge which is underlain by biotite gneiss, schistose granitic rock, and amphibolite (225). Pegmatite dikes and sills from a few inches to over 15 ft thick both cut and run parallel to schistocyte. Locally pegmatite and gneiss are limonite-stained due to oxidizing biotite, and contain small amounts of molybdenite, chalcopyrite and malachite.

BUREAU INVESTIGATION:

Samples were collected from the pegmatite dikes and gneissic rocks on the east side of the ridge top. A sample of granite gneiss (Table A3, no. 618) contained 0.17% molybdenum. Sample no. 1682 contained 0.5% copper and 170 ppm tungsten in biotite gneiss float collected on the west side of the ridge.

RESOURCE ESTIMATE:

The copper and molybdenum appear to be confined to dikes or narrow zones in the gneissic rocks, indicating little potential for large tonnages.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and molybdenum.

RECOMMENDATIONS: None.

REFERENCES: 112, 225

TABLE A3 - ANALYTICAL RESULTS - LAMB LODE CLAIMS

Sample	Type	Sample length feet	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	W	
618	S				ND	1.00	37	18	46	.17%	ND	Granite gneiss, molybdenite
619	RC				ND	0.5	18	20	6	22	ND	Granite gneiss, molybdenite
620	G				ND	0.5	28	30	ND	9	ND	Pegmatite dike
621	RC				ND	0.5	.24%	22	16	3	ND	Pegmatite dike, chalcopyrite
622	G				ND	0.5	42	24	1	19	ND	Limonite-stained pegmatite dike
1577	CR				ND	ND	9	30	ND	ND	ND	Pegmatite dike
1578	CC				ND	ND	2	20	4	ND	ND	Pegmatite dike
1579	CR				ND	ND	6	8	3	21	ND	Pegmatite dike, trace molybdenum
1587	P				ND	ND	30	2	107	ND	80	Bench gravels near landslide
1682	S				145	2.5	.50%	2	91	31	170	Biotite gneiss, chalcopyrite
1683	S				10	0.5	295	6	3	2	ND	Pegmatite
1684	S				15	0.5	245	8	4	12	ND	Pegmatite dike float
1698	RC				15	0.5	98	ND	95	ND	30	Biotite gneiss
1700	RC				ND	0.5	11	12	27	1	ND	Granite gneiss, pegmatite
1901	S				5.0	0.5	64	16	11	4	200	Pegmatite

NAME(S): Placer Occurrence
Headwaters W. Fork Maclaren River

Map Location No. A4

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes (B6)
Sec: 1 T: 18S R: 5E Meridian: Fairbanks
Sec: 6 T: 18S R: 6E Meridian: Fairbanks
Geographic: Near glaciers at headwaters, west fork Maclaren River
Elevation: 3700-4600 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by schist, amphibolite, slate, and schistose quartz monzonite (225). The glaciers at the head of the drainage have retreated at least one mile from where 1950? air photos show them, exposing previously ice-covered bedrock. The slate and schist contain quartz veins, probably of metamorphic origin.

BUREAU INVESTIGATION:

Both rock and placer samples were collected in the area. Sample no. 2756 contained 360 ppm arsenic and no. 2754 contained 250 ppm tungsten. No. 2755 contained 22 ppm molybdenum. Placer sample no. 2662 contained 1.8 ppm gold and no. 3005 contained 0.15% arsenic.

RESOURCE ESTIMATE:

Placer gold is distributed in morainal material. Metal values are anomalous, but not economic.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Further prospecting along margins of glaciers to locate bedrock source of molybdenum and tungsten.

REFERENCES: 225

TABLE A4 - ANALYTICAL RESULTS - HEADWATERS WEST FORK MacLAREN RIVER PLACER

Sample no.	Type	Sample length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Mo	
2662	P				1800	0.5	77	6	132	740	310	ND	Glacial moraine, 1 fine gold flakes
2754	P				10,000	1.0	40	20	128	45	250	ND	Active stream gravel 4 fine 10 very fine gold flakes
2755	RC				ND	ND	37	6	140	ND	ND	22	Sheared slate limonite stain, quartz veinlets, pyrite
2756	P				40	ND	41	10	88	360	120	ND	Active stream gravel no visible gold
2757	RC				ND	ND	42	6	128	ND	ND	13	Muscovite schist quartz veinlets
2758	G				ND	ND	22	4	110	ND	ND	3	Quartz veins in slate
2759	RC				ND	ND	12	N	38	ND	ND	2	3-ft. wide quartz lense
2760	P				1600	ND	12	20	64	65	30	ND	Active stream gravel no visible gold
3005	P				1700	1.0	11	14	122	.15%	260	ND	Stream below recent moraine 1 fine 30+ very fine gold flakes

NAME(S): Falling Rock
Lode Occurrence

Map Location No. A5
MAS No. 0020680028
Kardex No. 68-96

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes B6
E. 1/2 Sec: 25 T: 18S R: 5E Meridian: Fairbanks
Geographic: E. tributary to the west fork of Maclaren River
Elevation: 3500-4000 ft.

PRODUCTION: None.

HISTORY:

1965 - Northland Mines Inc. located Falling Rock claim No.1.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by argillite, schist and amphibolite of the pre-Cretaceous Maclaren metamorphic belt. Quartz-carbonate veins, probably of metamorphic origin, mostly follow the schistocyte. There appears to be a similarity between this veining and that which is probably the source of gold in the Valdez Creek drainage (172, 225).

BUREAU INVESTIGATION:

A placer sample collected in the vicinity of the reported occurrence (Table A5, no. 3004) contains anomalous gold. Of two rock samples collected two miles north of the reported occurrence, one (no. 3006) contained 640 ppm tungsten.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Prospecting at site of reported occurrence.

REFERENCES: 172, 225, 339

TABLE A5 - ANALYTICAL RESULTS - FALLING ROCK OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
3004	P				1200	0.5	29	12	116	200	120	Active stream gravels, 1 fine, 2 v. fine gold flakes
3006	G				ND	ND	3	ND	ND	ND	640	Vein quartz float, pyrite, epidote
3007	S				ND	ND	1	4	2	ND	ND	Limonite-stained vein quartz float

NAME(S): Unnamed Lode Occurrence, East Side Maclaren River — Map Location No.A6

Deposit Type: Vein
Commodities: Copper, Gold, Silver

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 25 T: 18S R: 6E Meridian: Fairbanks
Geographic: East side Maclaren Glacier.
Elevation: 4000 - 4500 ft.

PRODUCTION: None.

HISTORY:

A stream sediment sample collected in this area was anomalous in silver (102).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the area consists of Upper Paleozoic schist, argillite and shale. Quartz-carbonate (anchorite?) veins averaging 0.2 ft wide cut the meta-sediments and may be included within a shear zone of undetermined width. Quartz veins up to 0.3 ft wide parallel schistocyte, occur in sheeted-type zones up to 20 ft wide, and traceable for 150 ft along strike. Malachite staining was observed locally.

BUREAU INVESTIGATION:

Samples collected from the veins contained up to 3.0 ppm silver, and 190 ppb gold (Table A6, nos. 1657, 1658). Samples also contained up to 45 ppm antimony (1645).

RESOURCE ESTIMATE:

The metal values are not economic, but may indicate the presence of higher metal concentrations in the area.

MINERAL DEVELOPMENT POTENTIAL: Low potential for silver and gold.

RECOMMENDATIONS: More prospecting and sampling in area.

REFERENCES: 102, 225, 260

TABLE A6 - ANALYTICAL RESULTS - UNNAMED OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	
1564	RC				ND	0.5	28	4	64	ND	5	Quartz veins, black oxides
1657	S				80	3.0	276	ND	50	5	20	Quartz-carbonate vein float, malachite
1658	RC				185	3.0	162	ND	32	15	ND	Sheeted quartz veins 0.3 ft. wide
1645	RC				ND	2.0	32	ND	14	ND	45	Quartz veins avg. 0.2 ft. wide
1646	RC				ND	3.0	30	ND	87	15	35	Quartz-carbonate veins
1656	S				ND	2.5	76	4	26	ND	5	Quartz carbonate vein float

NAME(S): Unnamed Lode Occurrence
Eureka Glacier

Map Location No. A7

Deposit Type: Ultramafic
Commodities: Nickel, Palladium, Platinum, Copper, Cobalt, Chromium

LOCATION: Quadrangle: Mt. Hayes B5
Sec: 27&28&34 T: 18S R: 7E Meridian: Fairbanks
Geographic: Glacial cirque one mile west of the Eureka Glacier.
Elevation: 5000-6000 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Long narrow serpentinized dunite bodies and gabbro occur within quartz diorite. The dunite bodies are fault-bounded on the north by the Maclaren schist and may have formed a preexisting well lubricated layer for thrusting to occur along. Recent investigations indicate that the dunite bodies were emplaced contemporaneously with thrust faulting and are part of a 120 mile long ultramafic belt that extends from the Chistochina area to Butte Creek (Map No. A7) (115, 116).

BUREAU INVESTIGATION:

Samples were taken of the dunite and gabbro (Table A7). A sample from a sulfide-bearing olivine gabbro (No. 3038) contained 0.36% nickel, 370 ppb palladium, and 570 ppb platinum. Samples collected from fault-bounded ultramafic dikes in the steep cliffs just west of the Eureka Glacier contain up to 300 ppb platinum and 220 ppb palladium (.4). Samples collected along the trend of the same rock types one mile west contained up to 0.19% nickel (no. 1662).

RESOURCE ESTIMATE:

The ultramafic rocks are anomalous in nickel, palladium, and platinum. This is an eastward extension of the same zone sampled at Map No. A8.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Eureka Glacier Lode Occurrence. Further prospecting along the trend of the dunite/gabbro bodies.

REFERENCES: 115, 116, 225, 257, 323

TABLE A7 - ANALYTICAL RESULTS - EUREKA GLACIER LODE OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						ppb		
			Au	Ag	Au	Ag	Cu	Pb	Zn	Cr	Ni	Pd	Pt	
1567	G				ND	1.5	100	ND	70	.25%	.13%	NA	NA	Serpentinized dunite
1568	CR				ND	1.5	104	ND	61	.28%	.23%	NA	NA	Serpentinized dunite
1662	RC			0.1	ND	3.5	108	ND	83	.38%	.19%	16	15	Serpentinite
1663	S				ND	0.5	33	ND	12	222	40	ND	ND	Quartz boulder fuchsite?
1664	RC				ND	0.5	82	ND	54	.30%	.17%	14	15	Serpentinized dunite
1665	RC				10	0.5	170	ND	58	109	31	4	5	Altered monzonite
2644	CR				64	ND	.13%	ND	86	.26%	896	280	570	Serpentinite limonite stain
2645	CR				8	ND	29	ND	148	.33%	.11%	4	10	Serpentinized gabbro
2646	G				4	ND	73	ND	74	.28%	.17%	6	10	Gabbro
2647	CR				ND	ND	78	ND	70	.36%	.15%	10	15	Serpentinized gabbro
2648	S				4	ND	103	ND	62	.26%	.10%	14	20	Bronzite-bearing gabbro
2649	S				4	ND	14	ND	40	.14%	322	ND	ND	Hornblende gabbro
2650	G				4	ND	85	ND	66	.27%	.20%	8	15	Pegmatitic dunite
2651	G				4	ND	130	ND	66	.16%	.20%	14	25	Peridotite pentlandite?
2805	G				ND	ND	6	4	22	137	6	NA	NA	Smoky quartz

TABLE A7 (CONT.) - ANALYTICAL RESULTS - EUREKA GLACIER LODE OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						ppb		
			Au	Ag	Au	Ag	Cu	Pb	Zn	Cr	Ni	Pd	Pt	
2806	CR				NA	ND	47	2	76	68	22	NA	ND	Limonitic calcite vein
2807	G				NA	ND	16	4	62	37	3	NA	ND	Limonitic calcite vein
2808	RC				NA	ND	44	10	50	36	1	NA	ND	Limonitic schist
2809	RC				NA	ND	7	4	38	48	4	NA	ND	Limonitic schist
3038	S				370	ND	.15%	ND	88	.21%	.36%	550	80	Olivine gabbro chalcopyrite, pyrrhotite
3039	S				14	ND	110	ND	70	.27%	.20%	15	4	Dunite float
3050	S				16	ND	241	ND	74	.26%	.21%	10	6	Dunite chalcopyrite, pyrrhotite
3051	G				22	ND	81	ND	76	.25%	.12%	20	6	Pyroxenite pyrrhotite

NAME(S): Unnamed Lode Occurrence
East Fork Maclaren River

Map Location No. A8

Deposit Type: Ultramafic Rocks
Commodities: Nickel, Chrome, Palladium, Platinum

LOCATION: Quadrangle: Mt. Hayes B5
Sec: 32 T: 18S R: 7E Meridian: Fairbanks
Sec: 5 T: 19S R: 7E Meridian: Fairbanks
Geographic: Tributary to East Fork Maclaren River, 2 miles west of Eureka Glacier
Elevation: 4500 - 5500 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Tertiary quartz monzonite contains inclusions or dikes of serpentinized dunite. The monzonite is sheared silicified and limonite stained where the Fish Lake thrust fault passes through the area. The intrusive rocks are in contact with Triassic tufts and black shales of the Tangle Lakes Formation (323).

BUREAU INVESTIGATION:

A traverse was made down a deep gulch that crosses the intrusive-metasediment contact and samples were collected of the various rock types. The serpentinized dunites contained up to 0.24% nickel and .22% chrome (Table A8 no. 1294, 2814). A sample of the altered monzonite contained 12 ppb palladium and 5 ppb platinum.

RESOURCE ESTIMATE:

The nickel and platinum/palladium values in the samples are anomalous.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Further prospecting of the dunites.

REFERENCES: 69, 225, 257, 323

TABLE A8 - ANALYTICAL RESULTS - UNNAMED LODE OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						ppb	ppb	
			Au	Ag	Au	Ag	Cu	Pb	Zn	Ni	Cr	Pd	Pt	
1294	G				5	0.5	91	ND	61	0.21%	0.15%	NA	NA	Serpentinized dunite?
1685	S				15	0.5	256	ND	58	0.24%	0.13%	NA	NA	Serpentinized dunite?
1686	RC				ND	0.5	72	ND	58	23	41	NA	NA	Altered quartz monzonite fault zone
1687	RC				6	0.5	228	ND	34	22	32	12	5	Altered quartz monzonite fault zone
1688	RC				ND	0.5	21	ND	35	34	50	NA	NA	Altered quartz monzonite fault zone
1689	RC				ND	0.5	271	ND	37	5	41	NA	NA	Silicified dike
1690	RC				5	0.5	127	8	282	70	82	NA	NA	Meta siltstone
1691	RC				15	0.5	48	ND	165	30	86	NA	NA	Carbonaceous shale limonite stain
2813	P				40	ND	22	12	58	46	196	4	10	Bank run gravels
2814	S				ND	ND	79	ND	88	895	0.22%	4	10	Dunite float from creek

NAME(S): Maclaren Glacier Lode Occurrence Map Location No. A9

Deposit Type: Skarn
Commodities: Copper, Nickel, Chrome, Iron

LOCATION: Quadrangle: Mt. Hayes B5
Sec: 5&6 T: 19S R: 7E Meridian: Fairbanks
Geographic: East side Maclaren Glacier, 2.5 miles north of Boulder Creek.
Elevation: 4000 - 5500 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Triassic(?) Limestone is intruded, cut by a diabase dike and altered to skarn on south side of fault. Triassic(?) Argillite and slaty argillite occur north of the fault. The skarn contains 10-20% magnetite in some exposures. The skarn extends over 0.5 mile. Exposures largely covered by alluvium (69, 257).

BUREAU INVESTIGATION:

A magnetite-bearing zone was found in limestone or altered dike, lacking calcsilicate minerals. Samples contained up to 17% iron, 2.79% copper, 0.12% chrome, 0.14% nickel (Table A9, no. 644).

RESOURCE ESTIMATE:

The iron content of the magnetite-bearing rocks is too low to be an economic source of iron, but does contain anomalous amounts of copper, nickel and chrome. The extent of the mineralization is unknown.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and nickel.

RECOMMENDATIONS: Further prospecting along mineralized skarn zone.

REFERENCES: 69, 225, 257, 323

TABLE A9 - ANALYTICAL RESULTS - MACLAREN GLACIER LODE OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Cr	Ni	Fe	
644	G				45	1.0	2.8%	ND	409	140	.12%	.14%	16.9%	Argillite malachite stain, magnetite
645	RC				45	0.5	103	4	72	80	48	266	12.4%	Skarn? .30% magnetite
1566					45	1.0	64	2	36	50	105	34	3.6%	Limestone copper stain
1580					ND	1.5	9	10	156	95	124	23	2.1%	Hornfelsed argillite
1581					ND	1.0	104	ND	70	ND	90	37	6.3%	Skarn
1582					ND	0.5	6	12	11	0.5	122	1	1.2%	Quartz vein in diorite
1659	G				10	2.0	58	4	30	15	67	1	2.2%	Siliceous metasediments
1660	CC	3.0			ND	1.5	45	6	36	35	50	1	4.6%	Siliceous metasediments/ tuft diss. pyrite
1661	RC				ND	2.5	179	6	88	45	69	17	6.4%	Siliceous metasediments/ tuft diss. pyrite

NAME(S): Cathedral Creek Lode Occurrence
Neversweat (2 Claims)
Dog Claims

Map Location No. A 10
MAS No. 0020680133
Kardex No. 68-30, 207

Deposit Type: Porphyry, skarn
Commodities: Copper

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 28&33 T: 18S R: 6E Meridian: Fairbanks
Geographic: Ridges on north and south sides of Cathedral Creek.
Elevation: 5100 - 5700 ft.

PRODUCTION: None.

HISTORY:

1954 - Neversweat claims located.
1982 - Claims located by Resource Associates of Alaska.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of pre-Cretaceous argillite, graywacke, phyllite, andesitic(?) volcanic rocks, and marble of the Maclaren Glacier metamorphic belt (225). On the southwest side of the Cathedral Creek basin these have been intruded by Cretaceous-Jurassic quartz monzonite. Contact metamorphism has resulted in some skarn development.

BUREAU INVESTIGATION:

Samples were collected from a variety of rock types in the Cathedral Creek basin. Samples of garnet-bearing skarn contained up to 120 ppm tungsten (Table A 10, no 1828). Samples of pyrite-bearing quartz monzonite contained up to 0.09% cooper (no. 1839). Quartz-carbonate vein stock works occur in some of the metasediments, but samples contained no significant metal values.

RESOURCE ESTIMATE: Samples contain no significant metal values.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 225

TABLE A10 - ANALYTICAL RESULTS - CATHEDRAL CREEK AREA

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1828	S				NA	0.5	322	10	122	ND	120	Skarn, minor garnet
1829	S				NA	0.5	88	2	141	ND	50	Skarn, minor garnet
1830	S				NA	0.5	59	2	45	10	70	Skarn, minor garnet
1831	S				NA	0.5	0.03%	16	90	35	20	Diorite pyrite, chalcopyrite
1832	S				5	1.0	0.03%	ND	167	45	ND	Silicified limestone, limonite stain
1836	S				200	0.5	0.01%	ND	58	30	ND	Granodiorite float
1837	S				ND	0.5	24	4	46	15	ND	Fine grained mafic intrusive
1838	S				ND	0.5	0.01%	2	93	10	ND	Diorite, pyrite, chalcopyrite
1839	S				ND	0.5	0.09%	ND	106	15	10	Diorite, pyrite, chalcopyrite
1840	S				ND	0.5	0.2%	ND	83	ND	ND	Diorite, pyrite, chalcopyrite
1841	S				ND	0.5	50	6	38	ND	ND	Fine grained mafic intrusive, pyrite
1842	S				ND	0.5	27	4	26	15	ND	Limonite-stained diorite
1843	CH	6.0			ND	0.5	97	10	94	105	ND	Andesitic metavolcanic
1844	S				ND	0.5	0.04%	4	100	ND	10	Sheared mafic intrusive
1845	S				ND	0.5	0.01%	10	23	140	ND	Limestone with quartz veinlets
2746	G				ND	ND	98	250	110	ND	20	Sheared phyllite, quartz veinlets
2747	G				0.02	0.5	161	2	130	ND	20	Altered metavolcanics

TABLE A10 (CONT.) - ANALYTICAL RESULTS - CATHEDRAL CREEK AREA

2748	G				ND	ND	11	4	55	ND	ND	Phyllite
2749	RC				ND	ND	11	6	88	ND	ND	Calcareous phyllite, pyrite
2750	RC				ND	ND	24	6	108	10	ND	Slate with quartz veinlets
2998	P				1100	ND	66	6	108	80	40	Bank run grave 6 v. fine gold flakes
3002	RC				ND	ND	14	8	30	30	ND	Carbonate veins in quartzite/phyllite
3003	RC				ND	ND	8	ND	58	10	ND	Carbonate veins in phyllite

NAME(S): Two Plate Creek Lode Occurrence
Two Plate Creek Claims (No. 1-5)

Map Location No. A 11
Kardex No. 68-28

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 4 T: 19S R: 6E Meridian: Fairbanks
Geographic: West side Maclaren Glacier.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY: 1954-1979 - Placer claims located on Two Plate Creek.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Mineralized fragments containing bornite, chalcopyrite, and chalcocite are reported on the south valley wall. In this area greenstone is intruded by hornblende diorite. The mineralization probably has its source in quartz-epidote lenses in the greenstone (172).

BUREAU INVESTIGATION:

A series of rock samples (Table A11), contained up to 0.43% copper (no. 1158). This sample came from float on a talus slope. A placer sample collected near the mouth of Two Plate Creek is anomalous in gold (no. 1154).

RESOURCE ESTIMATE:

Copper value of one sample is high, but mineralization is probably very localized.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for copper.

RECOMMENDATIONS: Trace float to find bedrock source of copper.

REFERENCES: 172, 225, 339

TABLE A11 - ANALYTICAL RESULTS - TWO PLATE CREEK LODE OCCURRENCE

Sample no.	Type	Sample length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1154	P				5.0	0.5	165	ND	64	75	50	Active stream gravel, 4 very fine gold flakes
1156	RC				ND	0.5	394	16	64	5	50	Limonite-stained argillite, quartz veinlets
1157	RC				ND	0.5	193	14	71	ND	ND	Quartz-carbonate veinlets in argillite
1158	S				25	2.0	0.43%	14	49	ND	ND	Limonite-stained argillite quartz veinlets
1159	S				ND	0.5	392	8	105	ND	ND	Argillite, quartz veinlets
1833	S				10	1.0	0.04%	ND	85	ND	10	Andesite? in contact with limestone
1834	S				ND	0.5	0.02%	ND	47	95	ND	Limonitic quartz breccia zone
1835	S				ND	0.5	0.01%	ND	49	20	ND	Hornfels zone, pyrite, chalcopyrite

NAME(S): Spray Creek Lode Occurrence
Tiny Tim, KAA Claims,
Maclaren Copper Claims (No. 1-4)

Map Location No. A12
Kardex No. 68-41

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 2&3 T: 19S R: 6E Meridian: Fairbanks
Geographic: West tributary to Maclaren River near foot of Maclaren Glacier.
Elevation: 3600 - 4000 ft.

PRODUCTION: None.

HISTORY:

1955 - Alaska Copper Mines located claims.
1989 - KM no. 11 claim located by Sphinx Mining

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

In the deeply incised gorge of lower Spray Creek, randomly-oriented shear zones cut epidotized greenstone. The shear zones are up to 5 ft wide and exposed for up to 100 ft along strike. Quartz-carbonate veinlets occurring locally within the shears contain bornite, malachite, and tetrahydrate. Chalcopyrite and bornite are reported to occur in fractures in greenstone on the steep Spray Creek north valley wall (172).

BUREAU INVESTIGATION:

No evidence of mineralization was observed from the air on the north valley wall. Samples were collected from the quartz veinlet-bearing shear zones on lower Spray Creek. These contained up to 3.17% copper and 0.26 oz/ton silver (Table A12, no. 1652). The samples were also anomalous in tungsten, antimony, and mercury.

RESOURCE ESTIMATE:

Samples contain high copper values, but the veins are too small to be economic. Silver values are too low to be economic.

MINERAL DEVELOPMENT POTENTIAL:

Low development potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 172, 225

TABLE A12 - ANALYTICAL RESULTS - SPRAY CREEK AREA

Sample no.	Type	Sample length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Sb	Hg	
1160	RC				30	4.0	0.72%	22	82	ND	ND	ND	ND	Altered argillite, epidote-quartz veinlets
1651	RC				760	0.5	0.02%	20	68	145	145	5	2	Sheared greenstone quartz-carbonate veinlets
1652	S			0.26	45	9.0	3.17%	18	276	ND	ND	ND	ND	Sheared greenstone bornite, malachite
1653	RC				15	0.5	0.15%	14	100	10	10	ND	ND	Sheared greenstone bornite, malachite
1654	RC			0.07	10	2.5	0.57%	18	147	5	80	5	ND	Sheared greenstone bornite,malachite, tetrahydrate
2751	RC				ND	ND	29	ND	96	90	90	10	2	Greenstone
2752	RC				ND	ND	52	ND	106	ND	ND	5	ND	Greenstone
2753	G				ND	ND	33	ND	94	ND	ND	ND	ND	Greenstone

NAME(S): Kathleen Margaret Prospect
Kathleen-Margaret Claims (numbers 1-10)
Alaska Copper Mines

Map Location No. A13
MAS No. 0020680036
Kardex No. 68-4, 15, 28, 41, 84, 143

Deposit Type: Vein
Commodities: Copper, Gold, Silver

LOCATION: Quadrangle: Mt. Hayes B6
W 1/2 Sec: 11 T: 19S R: 6E Meridian: Fairbanks
Geographic: West side Maclaren River below Maclaren Glacier
Elevation: 4000 - 4200 ft.

PRODUCTION:

15 tons ore, containing 4900 lbs. copper, 23 oz silver, 1 oz gold (340)

HISTORY:

1918 - High grade copper lode ten feet wide reported on Maclaren River (185).
1952 - Kathleen-Margaret veins discovered by F.S. Pettyjohn (59).
1953-59 - Development work done by Alaska Copper Mines, Inc., under contract with Defense Minerals Exploration Administration (DMEA). Trenching, 1140 ft. of diamond drilling, and 800 ft. of crosscut and drift done. Contract later terminated by government (362).
1965 - Sunshine Mining Co. leased property and did additional surface trenching plus a small amount of diamond drilling.
1988 - Sphinx Mining leased property, did additional mapping, sampling, and geophysics before returning property to owner (184).

WORKINGS AND FACILITIES:

800 ft. of underground workings, bull dozer trenches, two airstrips on river plain below prospect, Eimco mucker, and air compressor at adit portal. Remains of campsite and 55 gallon drums filled with mined ore on river plain. A 10.5 mile-long road was built from Maclaren River Lodge on the Denali Highway to the prospect, but several sections have been washed out at stream crossing, making it impassable except for tracked or large-tired vehicles.

GEOLOGIC SETTING:

The prospect is located in upper Triassic metabasalt which dips gently to the south. These rocks contain disseminated specks of chalcopyrite and host numerous small low grade copper occurrences in a belt of copper-bearing greenstone that extends along the south flank of the Alaska Range. The metabasalt is locally cut by numerous faults, tertiary diabase dikes, altered porphyritic rock, and discontinuous quartz veins. One of the porphyritic dikes is exposed by the underground workings along a fault near a mineralized quartz vein. A major 35 ft thick east-trending fault zone cuts off the largest quartz vein on the prospect. North-south-trending, nearly vertical, copper-bearing quartz-carbonate veins exposed both on the surface and underground are traceable up to 100 ft along strike. These range in thickness from a few inches to 20 ft. The quartz shows signs of fracturing, indicating post emplacement fault movements. The largest, called the "Main Vein", is the only one that has been extensively explored. The copper content of the vein

diminishes to the north, and it is terminated by a fault on the south. A southern extension of the vein beyond the fault zone has not been located, but two small quartz veins located on the south side of Discovery Creek may be a continuation. A 125 ft high raise driven up through the "Main Vein" penetrated nearly barren rock through most of its length, except at the highest point, where two samples assayed 3.44% and 4.61% copper. The downward extension of the vein below the adit level was tested by drilling, but the results are questionable. Drill samples indicate a decrease in grade with depth. Bornite and chalcopyrite, the two main copper minerals present, replace the quartz in the veins. Chalcocite and pyrite also occur in the veins. Sampling of the veins indicates anomalous amounts of gold, silver, tungsten, arsenic, and antimony. Specific minerals containing these elements were not identified in the mineralized rock. The decreasing copper content away from the large east-west trending fault indicates that it may be the avenue along with copper-bearing hydrothermal solutions traveled, depositing sulfides in the adjacent "Main Vein" (185).

BUREAU INVESTIGATION:

Due to the amount of previous work done by government geologists, an exhaustive evaluation was not undertaken. Underground sampling was begun, but terminated after two Bureau of Mines geologists were temporarily trapped underground by a cave-in (Table A13, numbers 1124-1130). A series of samples was collected from the discovery outcrop (1132-1142, 1641-1644), the surface trenches (1143-1152) and an ore pile near the adit (1131, 1647). See figure A13 for sample locations. Samples from the discovery outcrop contained up to 38% copper, 0.08 oz/ton gold (no. 1641), and 4.08 oz/ton silver (1139). Two grab samples from an ore pile near the adit averaged 1.2% copper, 0.17 oz/ton silver, and 0.06 oz/ton gold. A metallurgical test sample of unknown weight was collected by the Bureau in the 1950s. It was readily amenable to beneficiation by standard floatation methods, with over 95% of the copper recovered at a grade of 1.2% (351).

RESERVES:

Inferred/Indicated Reserves:

15,000 tons at 3.5% copper (362)

46,000 tons at 5.2% copper (184)

Approximately two tons of ore were stockpiled at the mine site in 1960 (185).

The small size of the ore chutes, discontinuous mineralization, and low precious metal values do not make the property economic. The amount of previous underground drifting and drilling indicate little chance for extension of the mineralized zones or potential nearby for undiscovered veins.

MINERAL DEVELOPMENT POTENTIAL:

Moderate development potential for copper, silver, and gold.

RECOMMENDATIONS:

Core drilling beneath adit level to substantiate downward extension of vein.

REFERENCES: 59, 81, 184, 185, 192, 235, 269, 340, 351, 362

TABLE A13 - ANALYTICAL RESULTS - KATHLEEN-MARGARET PROSPECT

Sample no.	Map no. *	Type	Sample length (feet)	Analysis											Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	Hg	
1123	12	CC	5.6		0.07	130	2.5	0.40%	10	49	450	5	ND	23	Latite porphyry dike
1124	12	CC	1.8		1.09	600	37.5	6.13%	16	689	.30%	.43%	20	721	Quartz vein, chalcopyrite, bornite, stibmite?
1125	11	CC	7.5		0.12	135	4.0	0.90%	10	50	260	30	ND	7	Quartz vein bornite, chalcopyrite
1126	11	CC	6.5		0.13	50	4.5	0.80%	6	45	85	30	ND	ND	Quartz vein bornite, chalcopyrite
1127	10	CC	4.7			50	1.0	439	12	23	20	10	ND	ND	Quartz vein bornite, chalcopyrite
1128	10	CC	4.4			45	1.0	848	14	15	25	5	ND	ND	Quartz vein bornite, chalcopyrite
1129	10	CC	4.7		0.88	600	30	6.96%	18	261	75	35	20	10	Quartz vein chalcopyrite, bornite, chalcocite
1130	10	CC	5.8			10	1.5	473	6	8	5	5	ND	ND	Quartz vein chalcopyrite, bornite chalcocite
1131	9	G		0.11	0.12	3670	4	0.76%	10	52	105	15	ND	1	Ore dump near adit

*See appendix fig. A13.

TABLE A13 (CONT.) - ANALYTICAL RESULTS - KATHLEEN-MARGARET PROSPECT

Sample no.	Map no. *	Type	Sample length (feet)	Analysis											Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	Hg	
1132	8	CC	1.7		0.04	15	1.5	0.70%	ND	119	ND	ND	ND	ND	Limonite-stained argillite
1133	8	CC	0.7		1.17	280	40	7.42	ND	513	465	490	90	40	Fault gouge in argillite
1134	8	CC	3.5		0.25	465	8.5	1.71%	14	151	5	ND	10	ND	Limonite-stained argillite
1135	8	CC	4.0		0.061	732	51	5.9%	8	529	15	520	230	ND	Quartz vein, bornite, chalcopyrite
1136	8	CC	5.0		0.40	455	13	3.07%	10	119	22	515	ND	ND	Quartz vein, bornite, chalcopyrite
1137	8	CC	1.9		0.86	875	29.5	33.2%	ND	1025	120	10	100	ND	Quartz vein, bornite, chalcopyrite chalcocite
1138	7	CC	9.0			75	3.0	1.1%	28	112	15	10	ND	ND	Limonite-stained argillite
1139	7	CC	0.5		4.08	465	140	34.2%	22	1155	30	5	ND	ND	Quartz vein
1140	7	CC	0.75		0.15	30	5.0	1.2%	14	170	15	15	ND	ND	Fault gouge in argillite

*See appendix fig. A13.

TABLE A13 (CONT.) - ANALYTICAL RESULTS - KATHLEEN-MARGARET PROSPECT

Sample no.	Map no. *	Type	Sample length (feet)	Analysis										Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	Hg	
1141	7	CC	7.5	0.03	0.96	1080	33.0	9.06%	12	315	185	135	50	2	Quartz vein chalcopyrite, bornite, chalcocite
1142	7	CC	1.5		0.12	35	4.0	1.38%	14	62	30	10	ND	ND	Quartz vein chalcopyrite, bornite, chalcocite
1143	6	S			3.65	980	125	22.6	ND	700	160	40	ND	1	Limonite-stained vein quartz float
1144	5	G			0.04	5	1.5	0.14%	8	39	20	ND	ND	ND	Vein quartz rubble in trench
1145	4	CC	5.4			30	0.5	0.14%	8	39	20	ND	ND	ND	Vein quartz rubble in trench
1146	4	CC	1.5			ND	0.5	402	ND	102	ND	ND	ND	ND	Quartz vein salvage
1147	4	CC	6.0		0.34	90	11.5	0.35%	8	74	995	330	ND	9	Limonite-stained quartz vein
1148	4	CC	1.0		0.16	185	5.5	0.38%	10	125	265	30	ND	ND	Fault gouge in argillite
1149	3	CC	4.0		0.13	115	4.5	0.73%	12	59	55	5	ND	ND	Quartz vein
1150	3	CC	8.5		0.09	40	3.0	0.24%	8	83	75	5	ND	ND	Quartz veins in sheared argillite
1151	2	S				70	0.5	268	6	120	25	ND	ND	ND	Altered argillite

*See appendix fig. A13.

TABLE A13 (CONT.) - ANALYTICAL RESULTS - KATHLEEN-MARGARET PROSPECT

Sample no.	Map no. *	Type	Sample length (feet)	Analysis											Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	Hg	
1152	1	S			2.09	955	71.5	6.85%	38	517	760	.18%	30	61	Carbonate veins in marble
1153	-	CC	2.5			55	1.0	0.70%	6	43	10	10	ND	ND	Quartz carbonate vein
1641	8	CC	0.75	0.081	1.58		54	38.4	40	.18%	165	20	.18%	ND	Vein breccia discovery outcrop
1642	8	CC	1.2	0.01	0.60		20.5	32.6%	12	.19%	75	30	.20%	ND	Massive sulfides, 95% chalcopyrite
1163	8	CC	0.83	0.042	0.48		16.5	14.6%	10	949	95	15	.15%	1	Quartz-rich zone adjacent to no 1642
1644	8	CC	3.0		0.80		27.5	6.89%	4	364	440	10	720	3	Quartz-rich zone of vein
1647	9	G		0.012	0.22		7.5	1.64%	2	128	80	25	270	2	Ore dump near adit
1648	-	CG				ND	0.5	0.01%	2	72	10	5	20	ND	Greenstone, epidote in fractures
1649	-	G			1.75	63	60	5.4%	38	614	820	.19%	790	54	Quartz vein float, malachite, bornite
1822	-	S				NA	0.5	0.15%	2	40	25	5	30	ND	Quartz vein malachite
1823	-	S				NA	0.5	176	2	73	ND	5	20	ND	Limonite-stained andesite

*See appendix fig. A13.

TABLE A13 (CONT.) - ANALYTICAL RESULTS - KATHLEEN-MARGARET PROSPECT

Sample no.	Map no. *	Type	Sample length (feet)	Analysis											Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	Hg	
1824	-	CH	6.0			NA	1.0	0.31%	64	68	25	ND	50	ND	Quartz vein and salvage
1825	-	G				NA	1.0	0.37%	4	38	15	5	50	1	Quartz vein and salvage
1826	-	S			1.75	NA	60.0	9.47%	8	646	285	5	.12%	2	Quartz vein, bornite, chalcopyrite
1827	-	CH	1.5			NA	0.5	0.15%	2	36	75	ND	20	ND	Quartz vein and salvage

*See appendix fig. A13.

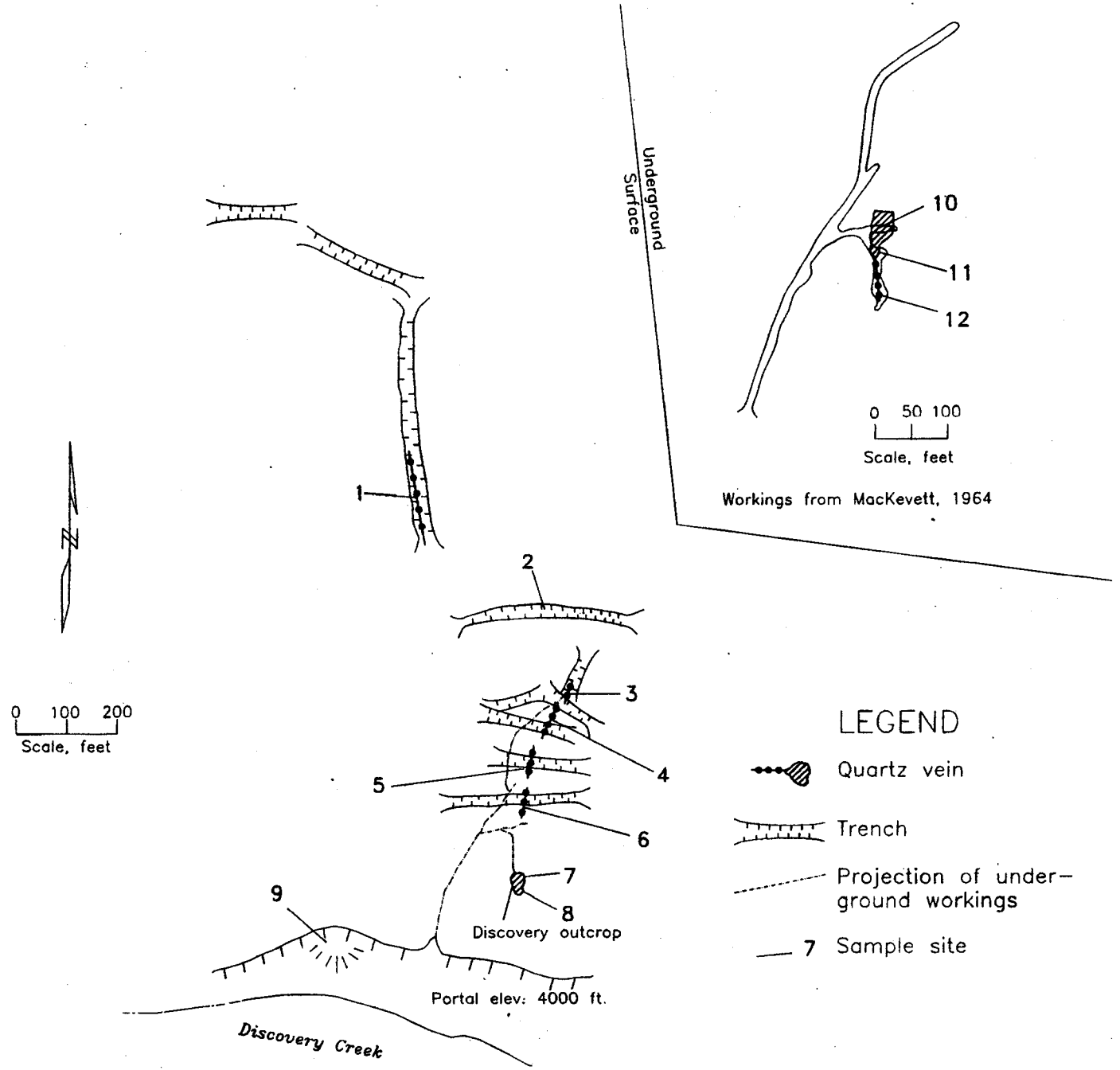


Figure A13. - Kathleen-Margaret Prospect, showing geology and sample sites

NAME(S): East Fork Maclaren River Placer
Three Bears Claims (No. 1-9)

Map Location No. A 14
Kardex No. 86-206

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes B5
Sec: 16-18 T: 19S R: 7E Meridian: Fairbanks
Geographic: East tributary to Maclaren River.
Elevation: 3000 - 3350 ft.

PRODUCTION: Unknown.

HISTORY:

1979-80 - Three Bears claims staked.
1981-86 - Test holes with backhoe and suction dredging.

WORKINGS AND FACILITIES: Prospect holes.

GEOLOGIC SETTING:

The East fork drains the Eureka Glacier, which provides a source of many different rock types. The lower creek drains siliceous volcanic rocks, metabasalt, quartz monzonite, and some small exposures of serpentinized dunite (323).

BUREAU INVESTIGATION:

Three placer samples were taken along the stream (Table A14). No. 1036 contained 0.0019 oz/yd^3 gold. Sample no. 1576 contained 40 ppb platinum and 6 ppb palladium.

RESOURCE ESTIMATE:

One sample contained significant gold, but the entire area has been glaciated, probably dispersing any concentration of placer gold that may have existed. The source of the platinum/palladium may be the ultramafic rocks lying to the north of the East fork.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: More detailed sampling and trenching along creek.

REFERENCES: 323, 339

TABLE A14 - ANALYTICAL RESULTS - EAST FORK MACLAREN RIVER PLACER

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		oz/yd³	Elements in ppm (unless otherwise indicated)					ppb		
			Au	Ag	Au	Ag	Cu	Zn	As	Ni	Pd	Pt	
1035	P				0.0005	0.5	85	94	ND	87	NA	NA	Active stream gravel, 1 coarse, 3 fine, 100-150 v. fine gold flakes
1036	P				0.0019	0.5	54	83	150	67	NA	NA	Active stream gravel, 5 fine, 30 v. fine gold flakes
1576	P				ND	1.0	44	115	40	80	6	40	Bank run gravel, 1 fine, 30 v. fine gold flakes

NAME(S): Mary Joe Placer Occurrence

Map Location No. A15
MAS No. 0020680037
Kardex No. 68-5, 34

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes B6
SE 1/4 Sec: 14 T: 19S R: 6E Meridian: Fairbanks
Geographic: W. side Maclaren River drainage, two miles above Cottonwood Creek.
Elevation: 3000 ft.

PRODUCTION: None.

HISTORY: 1954 - Claims located

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING: Triassic metabasalt (225).

BUREAU INVESTIGATION: No running water in drainage to wash placer sample.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Collect placer samples earlier in season when water is available.

REFERENCES: 225, 339

NAME(S): Cottonwood Creek Lode Occurrence Map Location No. 16

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes B6
SW 1/4 Sec: 16 T: 19S R: 6E Meridian: Fairbanks
Geographic: East side of Cottonwood Creek, 4 miles above its mouth.
Elevation: 4500-5000 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Limonite-stained rocks color the talus slopes on the east side of Cottonwood Creek. Metabasalt in the vicinity contains quartz-epidote veinlets along with chalcopyrite, bornite, chalcocite, and malachite (172). A 51-in thick quartz vein containing up to 1.5% copper is reported in the area (59).

BUREAU INVESTIGATION:

Fracture fillings in the metabasalt contained up to 8.58% copper and 3.7 oz/ton silver (Table A16, no. 647).

RESOURCE ESTIMATE: Copper grades are high, but the veins are small.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 59, 172

TABLE A16 - ANALYTICAL RESULTS - COTTONWOOD CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
646	S				90	0.5	0.61%	106	236	30	10	Metabasalt float, chalcopyrite
647	S			3.7	60	125	8.58%	464	450	5	180	Fracture filling in metabasalt, chalcopyrite
648	S				ND	0.5	547	6	72	ND	ND	Fracture filling in metabasalt, chalcopyrite
1846	S				5	0.5	0.12%	ND	69	ND	10	Metabasalt diss. chalcopyrite
1847	S			0.19	15	6.5	0.79%	ND	94	ND	120	Metabasalt diss. chalcopyrite

NAME(S): Snowstrike Lode Occurrence
West Fork Maclaren River

Map Location No. A 17
Kardex No. 68-193

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes B6
NE Sec: 15 T: 19S R: 5E Meridian: Fairbanks
Geographic: East tributary to west fork Maclaren RiverElevation: 3700-4800 ft.

PRODUCTION: None.

HISTORY: 1978 - One claim located

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

This area is underlain by metabasalts containing limestone lenses that have been locally fractured and brecciated. Quartz carbonate veins occur within some of the fracture zones. Some of the quartz is malachite-stained and contains bornite and chalcopyrite. A narrow dike of quartz diorite is reported to occur near the mineralized area (172).

BUREAU INVESTIGATION:

Limonite-stained metabasalt outcrops were observed on the south wall of a cirque occurring at the head of the drainage on which the snowstrike is reported to occur. Vein quartz boulders in the talus below the outcrops were malachite stained and one contained 0.12% copper (Table A17, no. 1695). A sample of the breccia zone in the metabasalt contained no significant metal values. Lower on the creek in the reported vicinity of the snowstrike, metabasalt was found to contain 0.5 - 1.0 ft-wide quartz carbonate veins containing minor pyrite. Two samples from the veins did not contain significant metal values (no. 1696-1697).

RESOURCE ESTIMATE:

Base and precious metal values are very low.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 172, 339

TABLE A17 - ANALYTICAL RESULTS - SNOWSTRIKE LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1585	CR				ND	2.5	150	ND	71	10	40	Limonite-stained metabasalt
1586	RC				5	1.5	79	ND	75	35	40	Silicified limestone
1694	RC				ND	0.5	122	ND	97	65	50	Breccia zone in basalt/tuff
1695	S				ND	0.5	0.12%	6	14	30	20	Quartz boulder malachite bornite
1696	RC				10	0.5	192	ND	38	ND	30	Quartz veins and veinlets
1697	RC				ND	0.5	251	ND	94	ND	40	Limonite-stated basalt

NAME(S): Viking Lode Occurrence
Viking Claims (No. 1-2
Sheba Creek
Sheba Head
Albertson-Pettyjohn Copper Prospect

Map Location No. A 18
MAS No. 0035
Kardex No. 68-79

Deposit Type: Vein
Commodities: Gold, Silver, Copper

LOCATION: Quadrangle: Mt. Hayes A6
NW 1/4 Sec: 30 T: 19S R: 6E Meridian: Fairbanks
Geographic: East tributary to west fork Maclaren Glacier.
Elevation: 5500 ft.

PRODUCTION: None.

HISTORY: 1961 - Viking claims located.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Triassic magnetite-rich metabasalt has been intruded by Jurassic-Cretaceous quartz monzonite. Numerous copper-stained malachite, chalcopyrite-bearing veins cut the metabasalt. The largest of these is 10 ft wide and trends for at least 100 ft along strike (225).

BUREAU INVESTIGATION:

Samples collected from the magnetite-rich veins cutting the metabasalt carried significant precious metal and copper values (Table A18). No. 2641 taken across a 1.3 ft-wide zone contained 1.26 oz/ton gold. Sample no. 3211 contained 0.216 oz/ton gold, and 0.68 oz/ton silver. Sample no. 3212 from a 4.5 ft. wide vein which is exposed for at least 100 ft. along strike contained 6.3% copper. Copper-bearing veins averaged 2.1% copper.

RESOURCE ESTIMATE:

The veins contain significant gold and copper, but exposed strike lengths are short.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for gold, silver, and copper.

RECOMMENDATIONS: Drilling to determine extent of veins in covered areas.

REFERENCES: 225

TABLE A18 - ANALYTICAL RESULTS - VIKING LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	W	
2641	RC		1.26			NA	80	200	140	155	30	0.12%	Vein in metabasalt magnetite, chalcopyrite
2642	CH	1.1	0.05	0.23	1800	8.0	0.96%	60	250	5	20	ND	1.0-ft-wide vein, magnetite, chalcopyrite, malachite
2643	S		0.14	0.18	4700	6.0	0.53%	70	210	80	15	ND	Vein in metabasalt
3208	CR		0.004			ND	0.11%	ND	106	5	5	ND	Massive magnetite
3209	CR				ND	ND	40	2	72	ND	10	ND	Magnetite-rich basalt
3210	CR				ND	ND	222	6	72	20	10	ND	Magnetite-rich basalt
3211	CH	0.3	0.216	0.68		23.2	2.52%	ND	252	10	5	ND	4.0-inch-wide magnetite vein
3212	CR		0.081	0.78		26.8	6.3%	6	438	10	ND	ND	4.5-ft-wide magnetite carbonate vein
3213	CH	2.5	0.113	0.23		8.0	3.17%	ND	266	20	5	ND	Magnetite vein and wallrocks
3214	CR		0.050	0.33		11.4	1.04%	ND	214	10	5	ND	Magnetite vein
3215	G		0.002			ND	165	ND	44	15	15	ND	Metabasalt wall rocks
3216	G		0.002			ND	126	ND	58	ND	10	ND	Mafic intrusive? rock
3217	G		0.001			0.2	258	ND	30	10	ND	ND	Diorite dike

NAME(S): Cottonwood Creek Placer Occurrence

Map Location No. A 19
Kardex No. 68-212

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6, B6
Sec: 26&27 T: 19S R: 6E Meridian: Fairbanks
Geographic: West tributary to Maclaren River, 8 miles upstream from Denali Highway.
Elevation: 3000 - 3900 ft. ft.

PRODUCTION: None.

HISTORY: 1979 - Claims located

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Cottonwood Creek drains Triassic metabasalts (339).

BUREAU INVESTIGATION:

Placer samples were collected at intervals along the drainage (Table A19) sample no. 1849 contained 0.00006 oz/cy gold.

RESOURCE ESTIMATE: Placer samples contain background gold values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 225, 339

TABLE A19 - ANALYTICAL RESULTS - COTTONWOOD CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		oz/yd³	ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Au	Ag	Cu	Pb	Zn	As	W	Hg	
1038	P				.00005		0.5	159	14	89	ND	60	6	Active stream gravel, 4 v. fine gold flakes
1848	P					4500	ND	122	2	105	ND	50	ND	Active stream gravel, 1 fine, 2 v. fine gold flake
1849	P				.00006		0.5	144	4	111	ND	60	ND	Active stream gravel, 2 v. fine gold flakes
1850	P					300	ND	268	12	109	ND	60	ND	Active stream gravel, 2 v. fine gold flakes

NAME(S): Hidden Lake Prospect, Lakeview Prospect
Ghezzi Prospect, Locomonua Claims
Copper Claims (numbers 1 & 2)

Map Location No. A 20
MAS No. 0020680038
Kardex No. 68-45

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A6
NE 1/4 Sec: 26 T: 19S R: 6E Meridian: Fairbanks
Geographic: On bluff just southeast of Hidden Lake, Maclaren River.
Elevation: 3000 ft.

PRODUCTION: None

HISTORY: 1957 - Mr. A.R. Ghezzi was working the prospect (267).

WORKINGS AND FACILITIES: Two open cuts.

GEOLOGIC SETTING:

The prospect lies on a bedrock knob that has been smoothed by a previous advance of the Maclaren Glacier. The bedrock is composed of amygdaloidal Triassic metabasalt flows that have undergone prophylitic alteration. Copper minerals consisting of malachite, bornite, and chalcopyrite occur in quartz-epidote veinlets and as amygdala fillings. This source of the copper minerals may be related to a large shear zone cutting through the area.

BUREAU INVESTIGATION:

The copper mineralization is confined to two small zones approximately 200 ft. apart. It does not appear likely that they lie on the same shear zone. Mineralized zones vary from 1-5 ft. wide and are exposed for ten feet in an open cut. Samples contained up 2.9% copper (Table A20, no. 1295) and 0.26 oz/ton silver (no. 1584).

RESOURCE ESTIMATE:

The copper grades are high, but the mineralized zones are very small.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 225, 267, 339

TABLE A20 - ANALYTICAL RESULTS - LAKEVIEW PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
633	S				ND	0.5	443	4	39	ND	Metabasalt quartz, epidote veinlets
634	S				ND	1	0.30%	6	33	40	Metabasalt malachite, chalcopyrite, bornite
635	S				ND	0.5	134	ND	78	40	Metabasalt
636	RC				ND	0.5	149	ND	77	10	Metabasalt
1295	G			0.19	5	6.5	2.88%	2	161	ND	Metabasalt, quartz-epidote veinlets, malachite, bornite
1296	RC				ND	0.5	0.47%	12	92	ND	Metabasalt, quartz-epidote veinlets, malachite, bornite
1297	RC				25	0.5	829	6	91	ND	Metabasalt, quartz-calcite veinlets
1583	S			0.15	5	5.0	1.66%	ND	171	ND	Metabasalt, epidote veinlets, bornite?
1584	CC	0.3		0.26	ND	9.0	1.86%	ND	156	ND	Quartz-epidote vein, bornite
1692	RC				ND	1.0	0.65%	ND	89	ND	Metabasalt, malachite

NAME(S): Sunshine Claims (No. 1-7)
Greentree, Northland Mines
Maclaren River

Map Location No. A 21
MAS No. 0020680040
Kardex No. 28-161, 167

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Mt. Hayes A5
NE 1/4 Sec: 29, 30, 32 T: 19S R: 7E Meridian: Fairbanks
Geographic: Ridge between Boulder Creek and Maclaren River.
Elevation: 4300 - 4800 ft.

PRODUCTION: None.

HISTORY: 1974-75 - First record of claim location.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of northwest-striking, Triassic metabasalt (323).

BUREAU INVESTIGATION:

Several small areas containing quartz-epidote-carbonate lenses and veinlets were found in the metabasalts. One sample (Table A21 no. 1693) contained 0.71% copper.

RESOURCE ESTIMATE:

The copper occurrences are very small, extending for only a few feet along strike.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 323, 339

TABLE A21 - ANALYTICAL RESULTS - SUNSHINE CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1408	S				ND	0.5	0.26%	4	27	5	Metabasalt with quartz-epidote blebs, copper oxides
1570	S				10	0.5	0.12%	ND	15	ND	1-in-wide quartz veinlet, chalcocite? malachite
1571	S				ND	0.5	0.03%	ND	22	ND	Quartz vein up to 5-ft wide malachite, chalcocite?
1572	CC	0.7			10	1.5	63	ND	29	5	Epidote-quartz lens
1670	S				10	0.5	0.12%	ND	15	ND	Vein quartz float, malachite, chalcocite?
1693	RC				5	1.0	0.71%	ND	91	35	Epidote-carbonate veinlets

NAME(S): Greenstone Occurrence — Map Location No. A 22
Northland Mines, Aplo Minerals, Inc. — Kardex No. 68-91, 167

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A5
SE 1/4 Sec: 33 T: 19S R: 7E Meridian: Fairbanks
Geographic: East side of upper Boulder Creek.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY: 1966-76 - 286 claims staked in area.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of Triassic metabasalt of the Boulder Creek Volcanics (323). A series of en echelon N25°E-striking, steeply dipping, quartz veins are intermittently exposed for up to 300 ft along strike. Vein widths vary from a few inches to 1 foot and are exposed over an approximate 120 ft vertical extent. A steel-grey sulfide mineral was identified as chalcocite (220) and associated malachite occurs in the veins. Sulfides are mostly concentrated on the hanging wall margin of the veins. Epidote and brecciated wallrock also occur in the veins.

BUREAU INVESTIGATION:

Samples from the veins contained up to 2.15% copper (Table A22, no. 1669) and 0.18 oz/ton silver.

RESOURCE ESTIMATE:

The veins are too small to be an economic source of copper and do not contain significant silver values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 220, 323

TABLE A22 - ANALYTICAL RESULTS - GREENSTONE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1409	CC	1.0			410	1	0.35%	12	15	ND	Quartz vein traceable for 150 ft. along strike
1410	CC	0.5			ND	0.5	0.26%	2	22	ND	Same vein as above
1569	S				15	2.5	0.50%	2	42	ND	Quartz-epidote vein, bornite, malachite
1573	CC	0.5			ND	ND	31	8	2	ND	Quartz vein limonite stain
1574	CC	?			ND	ND	41	10	7	ND	Quartz vein, epidote
1575	CR				ND	1.0	18	6	43	ND	Quartz vein, epidote
1667	CC	0.2			ND	0.5	31	ND	14	10	Quartz vein w/epidote on margins
1668	CC	0.8			ND	0.5	220	ND	21	ND	Quartz vein w/epidote on margins
1669	S			0.18	145	6.0	2.15%	ND	157	ND	Quartz vein, chalcocite, malachite
1670	S				10	0.5	0.12%	ND	15	ND	Vein quartz float, chalcocite, malachite
1671	CC	0.7			25	1.0	0.31%	ND	50	ND	Quartz vein, chalcocite, malachite, bornite?
1672	CC	0.3			5	0.5	225	ND	6	ND	Quartz vein, chalcocite, malachite, bornite?
1673	CC	0.9			25	1.0	0.32%	6	39	5	Quartz vein, chalcocite, malachite, bornite?
1674	CC	0.4			90	1.0	0.34%	ND	46	ND	Quartz vein, chalcocite, malachite, bornite?

NAME(S): Richards Claims (no. 1-10)
Northland Mines
Boulder Creek

Map Location No. A 23
MAS No. 0020680039
Kardex No. 68-086

Deposit Type: Lode
Commodities: Copper?

LOCATION: Quadrangle: Mt. Hayes A5
NW 1/4 Sec: 11 T: 20S R: 7E Meridian: Fairbanks
Geographic: North of the west end of Seven Mile Lake.
Elevation: Unknown ft.

PRODUCTION: None.

HISTORY: 1964-66 - Richards claims staked.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of metabasalt, locally altered, limonite-stained, and containing quartz-epidote veinlets (323).

BUREAU INVESTIGATION:

A sample collected from the quartz veinlets contained no significant mineralization (Table A23, no. 2811).

RESOURCE ESTIMATE: Unknown as little time was spent in the area.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: More prospecting needed in area.

REFERENCES: 323, 339

TABLE A23 - ANALYTICAL RESULTS - RICHARDS CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
2811	G				ND	ND	54	ND	86	ND	Altered metabasalt rubble crop, limonite stain, quartz veinlets

NAME(S): Boulder Creek Placer Occurrence
Seven Mile Discovery

Map Location No. A 24
MAS No. 0020680042
Kardex No. 68-198

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A5
Sec: 9&19 T: 20S R: 7E Meridian: Fairbanks
Geographic: East tributary to Maclaren River.
Elevation: 3000 - 3500 ft.

PRODUCTION: None.

HISTORY: 1978-81 - Seven Mile claims located (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Boulder Creek drains an area of metabasalt flows, which are locally amygdaloidal (323).

BUREAU INVESTIGATION:

Two placer samples were collected on Boulder Creek (Table A24). Sample no. 1037 contained 0.0002 oz/y^3 recoverable gold.

RESOURCE ESTIMATE: Gold values are insignificant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 323, 339

TABLE A24 - ANALYTICAL RESULTS - BOULDER CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Au	Ag	Cu	Pb	Zn	As	
1037	P				0.0002		0.5	57	14	84	5	Active stream gravel 7 fine, 5 v. fine gold particles
3000	P					2900	ND	33	6	80	35	Bank run gravel 1 fine, 15 v. fine gold particles

NAME(S): West Fork Maclaren River Placer

Map Location No. A 25
Kardex No. 68-208

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
Sec: 22 T: 20S R: 6E Meridian: Fairbanks
Geographic: West fork Maclaren River 2 miles above junction with Maclaren River.
Elevation: 3000 ft.

PRODUCTION: None.

HISTORY: 1980 - Seven claims staked on creek.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The west fork drains a variety of rock types, but the majority is composed of Triassic metabasalt (225).

BUREAU INVESTIGATION:

One sample collected in a winding narrow portion of the west fork contained 0.009 oz/cy gold (Table A25 no. 1195).

RESOURCE ESTIMATE: The gold content of the sample is highly significant.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: Trench sampling with backhoe.

REFERENCES: 225

TABLE A25 - ANALYTICAL RESULTS - WEST FORK MACLAREN RIVER PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		oz/y^3	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1195	P				0.009	0.5	31	6	90	ND	Active stream gravel 8 coarse, 35 fine, 30 v. fine gold particles.

NAME(S): Zackly Lode Prospect
Zackly Claims

Map Location No. A 26
MAS No. 0020680160

Deposit Type: Skarn
Commodities: Copper, Gold, Silver

LOCATION: Quadrangle: Mt. Hayes A6
S 1/2 Sec: 36 T: 19S R: 5E Meridian: Fairbanks
Geographic: South end of ridge between the west fork and main Maclaren River drainage.
Elevation: 4650 ft.

PRODUCTION: None.

HISTORY:
Indicated Reserves:
1919 - Copper mineralization reported near the headwaters of the Maclaren River (81).
1961 - Territorial Department of Mines reports bornite and malachite in area (273).
1979-1980 - Resource Associates of Alaska (RAA) discovers skarn mineralization and stakes claims (326).
1981 - 8,000 to 10,000 feet of drilling.
1982 - Partnership formed with Teton Exploration. 15,000 ft. drilling (329).
1986 - RAA assumes total control of 750 claims, later to be bought out by Nerco, Inc. (326).
1987 - RAA joint ventures with Boulder Gold, an Australian subsidiary. 12,000 ft reverse circulation and 3000 ft diamond drilling (326).
1988-1989 - Only assessment work done (326).
1990 - Nerco plans joint venture on property with Phelps Dodge Corporation (326).

WORKINGS AND FACILITIES:

Property accessed by bulldozer trail from road up Maclaren River to Kathleen-Margaret Prospect. Numerous trenches, drill pad, and a large camp. 36,000 ft of drilling.

GEOLOGIC SETTING:

The Zackly skarn is located where cretaceous quartz monzodiorite/monzonite has intruded interbedded mafic volcanic rocks and limestone of the Triassic Nikolai Greenstone. The volcanic rocks assimilated during intrusion are indicated as the source of the metals in the skarn. Contact metamorphism, endoskarn and exoskarn, occur for over a mile along the intrusive-limestone contact. Three stages of metal mineralization have occurred within the zoned skarns. Copper-gold mineralization is confined to a steeply dipping east-west trending 2600 ft. long zone that averages 8.5 ft. thick and extends 1000 ft. down dip (figure A26). The skarns consist mainly of garnet and clinopyroxene, and have undergone retrograde metamorphism and silica-clay alteration. Both sulfide and oxide copper minerals occur in the skarn, along with native gold.

Copper, silver, and mercury soil geochemistry has been used to locate the skarn in areas of overburden (120, 251, 329).

BUREAU INVESTIGATION:

Samples were collected across mineralized skarn exposed in trenches (Table A26, no. 1675, 1681). A 300 lb. bulk sample was collected for beneficiation studies by the Bureau of Mines Salt Lake Research Center.

A bulk sulfide floatation test, having a calculated head grade of 0.072 oz/st gold, recovered 18% of the gold. A cyanide amenability test used 1000 grams of sample ground to 80% -325 mesh. After a 72 hour leach only 45% of the gold was recovered (Table A). A 3965 gram sample ground to 100% -10 mesh was then also leached for 72 hours, using a 20 lb/st sodium cyanide (NaCN) solution, and the tailings separated into size fractions (Table B). This table shows that as the gold particle size gets smaller the percentage of gold in the tailings increases until the particle sizes are smaller than -325 mesh. This indicates that once the particles are reduced to a small enough size (-325 mesh) the cyanide solution can then dissolve the gold present in the ore (193).

A factor that inhibits gold recovery is the copper oxide content of the ore which interferes with the NaCN solution. A H2S04 pre-leach of the ore dissolved out the copper, allowing for a 98% recovery of the gold. This process, though enhancing recovery is very hazardous due to the production of HCN gas if the H2S04 and NaCN solution should ever come into contact with one another (193).

Table A - Summary of cyanide amenability test - Zackly ore sample

Product	Weight	Assay oz/st		Distribution Percent	
	gm	Au	Ag	Au	Ag
Leach Solution	1100.4	0.028	NA	44.5	NA
Leach Residue	962.5	0.040	NA	55.5	NA
Head (calculated)	962.5	0.072	NA	100	NA

Table B - Summary of cyanide leach gold particle size distribution test - Zackly ore sample

Screen Analysis		Gold		
Mesh Size	Weight	Weight	Assay	Distribution
	gm	percent	oz/st	percent Au
+20	874.9	22.1	0.030	8.4
20/35	652.1	16.4	0.025	5.2
35/48	245.1	6.2	0.078	6.1
48/65	160.5	4.0	0.194	10.0
65/100	208.5	5.3	0.220	14.7
100/150	156.2	3.9	0.394	19.7
150/200	131.6	3.3	0.264	10.9
200/325	224.7	5.7	0.214	15.4
-325	1211.4	33.1	0.023	9.6
Total	3965.0	100.0	0.079	100.0
Leach Solution	4135.4		0.072	48.7
Leach Residue	3965.0		0.079	51.3
Head (calc)	3965.0		0.154	100.0

RESOURCE ESTIMATE:

Beneficiation studies by the Bureau indicate that only 45% of the gold could be recovered from the ore by conventional cyanide leach and grinding to -325 mesh. More studies will be needed to enhance the gold recovery if the deposit is to be economic. An economic analysis of this deposit type has been made by the Bureau (17).

INDICATED RESERVES:

1.24 million tons of 2.69% copper, 0.18 oz/ton gold, and 0.96 oz/ton silver (329).

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for gold, silver, and copper.

RECOMMENDATIONS: Further beneficiation studies of gold-bearing skarn.

REFERENCES: 17, 42, 81, 120, 193, 225, 251, 273, 326, 329

TABLE A26 - ANALYTICAL ANALYSIS - ZACKLY LODE PROSPECT

Map No.	Sample no.	Type	Sample Length (feet)	Analysis											Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Mo	Hg	
1	1675	CC	7.0	0.05	0.31	1800	10.5	1.35%	6	135	45	430	14	3	Cut across skarn zone
1	1676	G		0.08	NA										300 lb. bulk sample of ore
1	1681	S		0.18	2.45		84	7.1%	20	541	45	.11%	ND	1	High graded sample
6	1868	P				9500	ND	86	2	84	ND	150	ND	2	Active stream and bank gravel 3 v. fine gold particles
5	2761	G				ND	0.5	81	6	32	5	10	ND	ND	Metabasalt quartz veinlets
4	2762	G				ND	ND	74	4	108	5	10	ND	ND	Silicified metabasalt, pyrite
4	2763	G				ND	ND	123	2	58	ND	ND	ND	ND	Silicified metabasalt, pyrite
3	2764	G				ND	ND	4	6	34	ND	ND	ND	ND	Hornfels near skarn
2	2765	G				6	ND	103	ND	76	ND	ND	ND	1	Hornfels near skarn

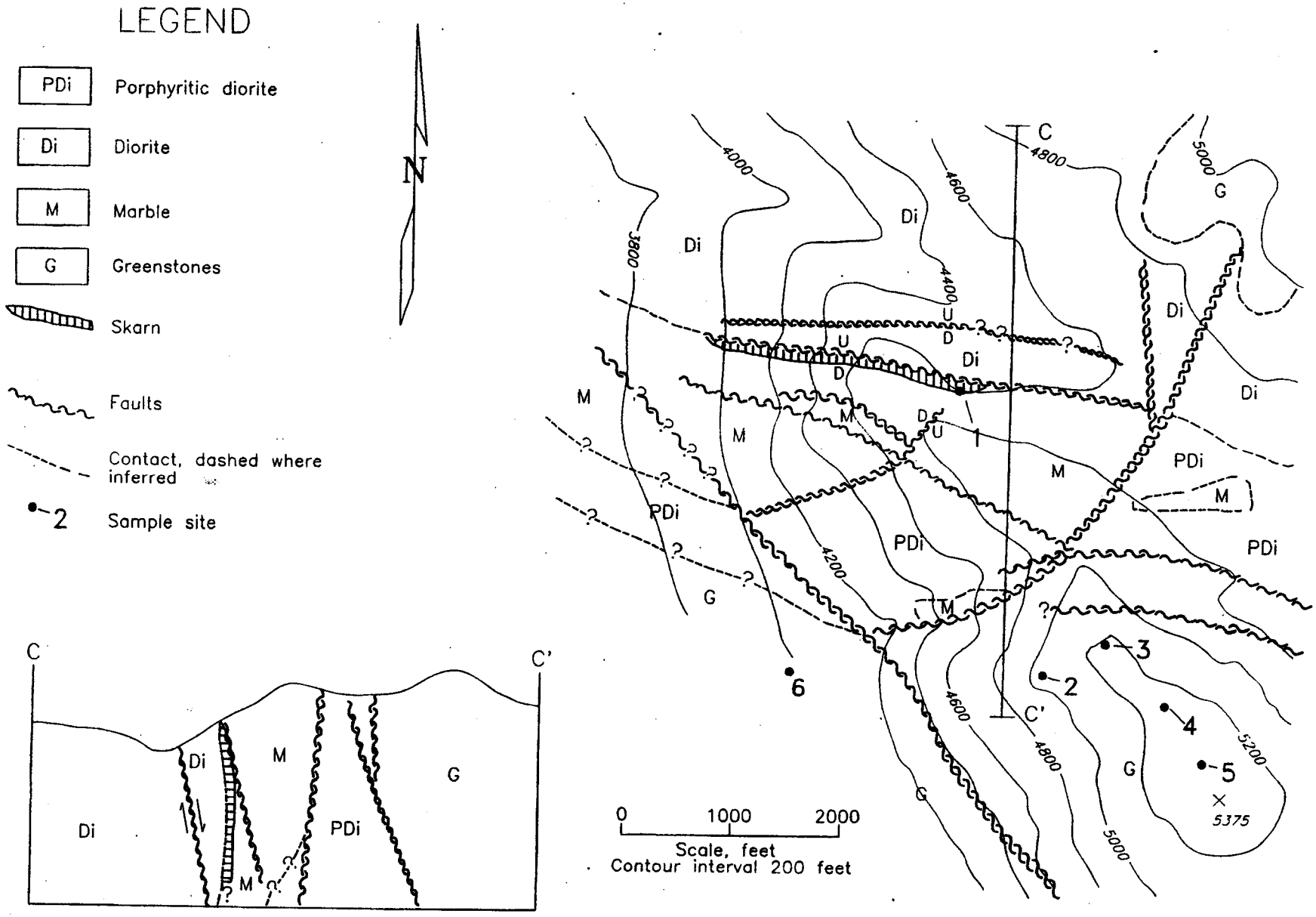


Figure A26. - Zackly Prospect, showing geology and sample sites (Geology and Topography after Teton Exploration, 1980)

NAME(S): VABM Little Lode Occurrence Map Location No. A 27

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A6
Sec: 4 & 5 T: 20S R: 5E Meridian: Fairbanks
Geographic: In vicinity of VABM Little, West Fork Maclaren River
Elevation: 5200-5900 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by weakly metamorphosed Triassic greenstone, basalt, and andesite, locally sheared, fractured, and shattered (67, 225). In some areas the fractures in basalts have been filled with quartz-epidote veinlets containing chalcopyrite, tetrahydrate, bornite, and covellite(?).

BUREAU INVESTIGATION:

Fifteen samples were collected, mostly from rubblecrop (Table A27). A sample of epidote-quartz veins up to 6 inches wide in a 30 ft diameter area of rubblecrop contained 1.08 oz/ton silver and 7.68% copper (no. 1298). A 0.5 inch wide tetrahydrate-bearing quartz veinlet contained 1.1 oz/ton silver, 7.43% copper, and 990 ppm tungsten (no. 1741). Sample no. 1852 from quartz vein float, was poor in precious metals but high in the base metals, tungsten, mercury, and antimony. Sample no. 1299, taken from an epidote-bearing brecciated quartz vein, approximately 1.0 ft wide contained 16.9% copper and 0.85 oz/ton silver. The vein widens to 2.0 ft in places and is traceable intermittently for 250 ft across a ridgetop. Another sample (no. 1300) collected on the same vein and approximately 200 ft north of no. 1299 contained 0.26% copper. The vein is mineralized with chalcopyrite, bornite(?), and tennantite(?).

RESOURCE ESTIMATE:

The veins contain high silver and copper values, but are very narrow and discontinuous.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for silver and copper bearing veins.

RECOMMENDATIONS: Trenching in rubblecrop areas to determine vein extent.

REFERENCES: 67, 225

TABLE A27 - ANALYTICAL RESULTS - VABM LITTLE LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
637	S				ND	0.5	311	12	41	15	ND	ND	ND	Greenstone, propylitic alteration
638	CC	0.8			ND	0.5	36	6	6	15	ND	ND	ND	Quartz vein
639	CC	0.5			45	0.5	0.12%	12	11	ND	ND	ND	ND	Silicified greenstone chalcopyrite
640	CC	0.2			ND	0.5	49	18	4	5	ND	ND	ND	Quartz vein chalcopyrite
641	CR				165	2.5	0.52%	10	38	85	ND	1.0	ND	Quartz vein chalcopyrite malachite
642	S				ND	0.5	305	10	67	ND	ND	ND	ND	Quartz-epidote veins bornite
1298	S			1.08	80	37	7.68%	4	299	ND	60	1.0	ND	Epidote-quartz veins bornite
1299	G			0.85	220	29.0	16.9%	10	483	.94%	240	ND	ND	Epidote-bearing brecciated quartz vein
1300	CC	0.2			15	0.5	0.26%	8	66	150	ND	ND	ND	Same vein 200 ft. N. of no. 1299

TABLE A27 (CONT.) - ANALYTICAL RESULTS - VABM LITTLE LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1739	S				15	2.5	0.86%	ND	88	ND	160	5	165	Silicified metabasalt tetrahydrate, bornite
1740	CR				10	1.5	0.36%	ND	72	ND	80	ND	190	Quartz-epidote veinlets tetrahydrate
1741	S			1.1	250	38.0	7.43%	2	526	5	990	2	ND	Quartz veinlet tetrahydrate, covellite
1742	S				ND	0.5	412	ND	46	20	ND	1	ND	Intrusive rock
1851	CH	0.4			10	0.5	0.01%	ND	80	10	ND	ND	5	Gouge zone in metabasalt
1852	S				400	ND	1.51%	2.12%	1.16%	990	330	323	0.67%	Quartz vein tetrahydrate(?)

NAME(S): Honey Creek Lode Occurrence
Honey Claims
Mex Claims, Pat Claims

Map Location No. A 28
MAS No. 0020680033
Kardex No.

Deposit Type: Vein
Commodities: Silver, Copper

LOCATION: Quadrangle: Mt. Hayes A6
SW 1/4 Sec: 29 T: 19S R: 5E Meridian: Fairbanks
Geographic: On ridge between Clearwater Creek and W. Fork Maclaren River.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY:

1972-74 - Pat claims located
1979 - Honey claims located

WORKINGS AND FACILITIES: Small hand-dug pits.

GEOLOGIC SETTING:

The upper Honey Creek drainage is underlain by locally-altered, Triassic metabasalt in faulted contact with argillite, slate, and limestone. The metabasalt is locally fractured due to shearing, silicified, and cut by felsic dikes (312). Some of the limestone has been silicified and metasomitized to skarn. Quartz veins in the fractured metabasalt and skarn contain pyrite, chalcopyrite, arsenopyrite, tetrahydrate, and tennantite(?).

BUREAU INVESTIGATION:

Samples were collected from several small poorly exposed mineralized zones in the metabasalts and limestones. A 8.0-long channel sample across a 100 foot long copper-stained skarn zone exposure contained 1.81 oz/ton silver, 1.86% copper, and 340 ppm tungsten (Table A28 no. 1747). A 7.0-foot-long sample across a quartz breccia zone exposed for at least 500 feet along strike contained 0.06 oz/ton gold and 0.57 oz/ton silver. Six placer samples were collected along Honey Creek below the bedrock mineral occurrences. Sample no. 1864 contained 0.001 oz/yd^3 gold. Sample no. 1867 also contained significant gold. Alaska Department of Geological and Geophysical Survey personnel, under contract to the Bureau of Mines, mapped the geology of the area and collected rock samples (67).

RESOURCE ESTIMATE:

The small quartz veins have significant silver and copper values, but short strike lengths and unknown depths.

The quartz breccia zone is substantial in size, but contains low precious metal values. The skarn zone contains significant precious metal and copper values, and is anomalous in tungsten. It's total extent is unknown. Honey Creek contains significant placer gold.

MINERAL DEVELOPMENT POTENTIAL: Low potential for precious metal veins and placer deposits. Moderate potential for precious metals in breccia zones and skarns.

RECOMMENDATIONS: Detailed sampling, trenching and drilling to determine extent of mineralized zones.

REFERENCES: 67, 312, 225

TABLE A28 - ANALYTICAL RESULTS - HONEY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
611	RC				ND	0.5	14	16	81	45	ND	ND	10	2.5-in wide vein in limestone
612	RC				ND	0.5	10	10	46	10	ND	ND	10	3.0-in wide quartz vein in limestone
613	CC	5.0			ND	0.5	68	16	85	55	ND	ND	5	Silicified zone in limestone
614	CC	0.2			ND	0.5	41	14	89	30	ND	ND	5	Silicified zone in limestone
615	RC				ND	0.5	157	24	34	60	10	ND	15	Felsite dike with diss. pyrite
616	G				ND	0.5	33	10	38	20	ND	ND	5	Felsite dike with diss. pyrite
617	RC				ND	0.5	185	4	74	20	10	ND	5	Silicified limestone
1743	CH	7.0	0.06	0.57	2100	19.5	936	ND	107	155	200	ND	ND	Quartz breccia zone, tennantite(?)
1744	S			0.13	430	4.5	306	ND	72	45	ND	ND	ND	Carbonate vein with pyrite

TABLE A28 - ANALYTICAL RESULTS - HONEY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
611	RC				ND	0.5	14	16	81	45	ND	ND	10	2.5-in wide vein in limestone
612	RC				ND	0.5	10	10	46	10	ND	ND	10	3.0-in wide quartz vein in limestone
613	CC	5.0			ND	0.5	68	16	85	55	ND	ND	5	Silicified zone in limestone
614	CC	0.2			ND	0.5	41	14	89	30	ND	ND	5	Silicified zone in limestone
615	RC				ND	0.5	157	24	34	60	10	ND	15	Felsite dike with diss. pyrite
616	G				ND	0.5	33	10	38	20	ND	ND	5	Felsite dike with diss. pyrite
617	RC				ND	0.5	185	4	74	20	10	ND	5	Silicified limestone
1743	CH	7.0	0.06	0.57	2100	19.5	936	ND	107	155	200	ND	ND	Quartz breccia zone, tennantite(?)
1744	S			0.13	430	4.5	306	ND	72	45	ND	ND	ND	Carbonate vein with pyrite

TABLE A28 (CONT.) - ANALYTICAL RESULTS - HONEY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1745	S				15	0.5	86	ND	60	40	10	ND	ND	Limestone breccia
1746	S				135	0.5	668	2.0	63	320	20	ND	5.0	Limestone with pyrite, chalcopyrite
1747	CH	8.0		1.81	820	62.0	1.86%	ND	744	120	340	ND	ND	Skarn zone chalcopyrite
1748	S													Fault gouge zone 100 ft long
1853	P				10	ND	152	4	112	ND	50	ND	5	Active stream gravel 1 fine gold
1854	P				ND	4.0	0.14%	326	132	20	90	ND	5	Active stream gravel 20 v. fine gold
1855	S				70	2.5	826	118	110	480	10	ND	25	Vein in altered metabasalts
1856	CH	3.5		0.20	90	7.0	0.27%	22	127	30	50	4	5	Altered metabasalt vein hanging wall
1857	CH	3.6		0.15	245	5.0	0.13%	ND	101	265	20	ND	ND	Vein breccia zone

TABLE A28 (CONT.) - ANALYTICAL RESULTS - HONEY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1858	CH	2.4		0.39	275	13.5	0.29%	4	145	145	40	1	ND	Altered metabasalt vein foot wall
1859	CH	4.5			460	2.5	0.25%	ND	108	25	50	ND	ND	Skarn pyrite, chalcopyrite
1860	RC				80	2.5	0.09%	ND	66	160	60	ND	5	Skarn pyrite, chalcopyrite
1861	SC				60	1.0	0.12%	ND	66	60	10	ND	5	Altered metabasalt pyrite, chalcopyrite
1862	G				5	0.5	0.04%	ND	64	ND	ND	ND	ND	Black marble
1863	G			0.09	10	3.0	2.97%	ND	274	10	430	ND	ND	Skarn malachite stain
1864	P				1	1.5	526	146	144	45	290	ND	5	Active stream gravel 1 v.coarse, 2 v. fine gold
1865	P				ND	2.0	845	16	104	25	90	1	5	Active stream gravel 2 fine, 8 v. fine gold

TABLE A28 (CONT.) - ANALYTICAL RESULTS - HONEY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1866	P				ND	3.0	475	16	143	25	130	ND	ND	Active stream gravel 2 fine, 2 v. fine gold
1867	P				6600	1.0	896	6	149	20	150	4	5	Active stream gravel 2 fine, 2 v. fine gold

NAME(S): Mensim Lode Occurrence
Mensim Claims (No. 1-2)
Little Green Claims (No. 1-2)
Green Tree

Map Location No. A 29
MAS No. 0020680034
Kardex No. 68-85

Deposit Type: Vein
Commodities: Copper, Molybdenum, Silver

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 19&20 T: 19S R: 5E Meridian: Fairbanks
Geographic: West tributary to West Fork Maclaren River
Elevation: 5000 ft.(?) ft.

PRODUCTION: None.

HISTORY: 1964 - First record of claim staking (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Upper Cretaceous folded argillite is limonite-stained due to oxidation of disseminated pyrite and iron-bearing carbonate. Talus in area contains acidic intrusive float. Some intrusive float contains disseminated chalcopyrite and molybdenite. Molybdenite-bearing quartz also occurs in the talus. The intrusive float may represent dikes, but a small stock may also occur in the area. Samples are reported to contain up to 0.25% molybdenum (225).

BUREAU INVESTIGATION:

A series of 15 samples were taken in the area (Table A29). One sample of vein quartz float contained 29 ppm molybdenum (no. 608). Another sample of vein quartz contained 0.98 oz/ton silver (no. 605).

RESOURCE ESTIMATE:

The copper-molybdenum mineralization was not located, but some vein quartz rubble contained significant silver.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Prospect area to locate copper-molybdenum mineralization.

REFERENCES: 172, 225, 339

TABLE A29 - ANALYTICAL RESULTS - MENSIM LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	As	Sb	
601	G				ND	0.5	15	20	81	ND	10	ND	Felsic dike, trace pyrite, arsenopyrite
602	G				395	0.5	8	14	7	ND	70	5	Quartz carbonate vein
603	G				35	1	11	4	2	ND	145	5	Metasandstone, carbonate veinlets
604	G				ND	0.5	4	12	2	ND	ND	ND	Quartz vein
605	G			0.98	20	33.5	13	282	54	ND	5	5	Vein quartz rubble
606	G				ND	1.5	15	10	88	ND	ND	5	Metasandstone quartz-carbonate veinlets
607	G				15	0.5	156	10	88	ND	ND	ND	Limonite-stained argillite
608	G				5	2	184	2	16	29	5	ND	Vein quartz float, limonite stained
609	G				ND	1	56	28	11	5	15	ND	Altered quartz diorite serlcite
610	CR				ND	0.5	97	14	78	4	ND	ND	Silicified argillite
949	G				125	0.5	ND	28	33	1	40	ND	Felsic dike, diss. pyrite
950	G				ND	0.5	10	16	16	ND	10	ND	Quartz-carbonate vein adj. to above dike

TABLE A29 (CONT.) - ANALYTICAL RESULTS - MENSIM LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	As	Sb	
1415	S				ND	0.5	71	8	4	ND	ND	ND	Limonite-stained quartz float
2652	CH	0.2			10	ND	27	14	32	ND	25	ND	Small quartz vein
2653	CH	2.5			5	ND	8	4	12	1	295	ND	2.5-wide quartz vein 70 ft. long exposure

NAME(S): Unnamed Occurrence
West Fork Maclaren River

Map Location No. A 30

Deposit Type: Breccia zone
Commodities: Zinc

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 23 T: 18S R: 5E Meridian: Fairbanks
Geographic: West tributary to West Fork Maclaren River
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by schist and amphibolite of the pre-Cretaceous Maclaren terrane (225).

BUREAU INVESTIGATION:

A previously reported mineral occurrence exists in the area (232). Several samples (Table A30) collected from a 5-15 ft wide fault derived breccia zone cutting schist, proved to carry significant zinc values. Sample no. 2665 contained 0.18% zinc. The extent of the zone is unknown.

RESOURCE ESTIMATE:

The zinc values are of interest, but the lack of precious metals and small size do not presently warrant further exploration.

MINERAL DEVELOPMENT POTENTIAL: Low potential for zinc.

RECOMMENDATIONS: Prospecting along trend of breccia zone.

REFERENCES: 225, 232

TABLE A30 - ANALYTICAL RESULTS - UNNAMED OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Mo	
2663	P				6	ND	42	6	304	15	3	Active stream gravel 4 v. fine gold flakes
2664	G				ND	ND	196	4	0.18%	80	1	5-15 ft wide breccia zone in schist
2665	G				10	ND	298	4	0.18%	340	2	5-15 ft wide breccia zone in schist
2666	S				ND	ND	126	ND	0.13%	35	1	5-15 ft wide breccia zone in schist
2667	S				ND	1.0	73	6	0.12%	10	6	Limonite-stained fault breccia

NAME(S): Mex Claims (No. 1-122)
Lance Gold (No. 1-3)

Map Location No. A 31
Kardex No. 68-144

Deposit Type: Vein and disseminated lode
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
Sec: 31 T: 19S R: 5E Meridian: Fairbanks
Sec: 6&7 T: 20S R: 5E Meridian: Fairbanks
Sec: 1&12 T: 20S R: 4E Meridian: Fairbanks
Geographic: Near divide between Clearwater and Little Clearwater Creeks
Elevation: 4700-5500 ft.

PRODUCTION: None.

HISTORY:

1931 - First published account of iron-stained rocks east of Clearwater Creek (262).
1972-1974 - Claims located in area
1981 - Claims located by Cominco American and later quit claimed to Mankomen Exploration
1982 - Geochemical sampling on grid. Geophysical work including magnetics, EM & VLF. Trenching.
1983 - Property leased to Anschutz Mining Corp.
1988 - Amax Exploration had lease on claims and later turned back to owner.

WORKINGS AND FACILITIES: Trenching

GEOLOGIC SETTING:

The Mex claims overlie upper Paleozoic-early Mesozoic sequence of greenstone, tuff, argillite, limestone, sandstone, and shale of the Clearwater Terrane. Cutting these are felsite, quartz diorite, quartz monzonite, and granodiorite of unknown age.

Rocks of the Clearwater Terrain have been metamorphosed, altered and deformed during thrusting over the younger Maclaren Terrane (67), making the geology difficult to decipher. Zones of both disseminated and vein type epithermal mineralization contain anomalous precious and base metals, antimony, and mercury. Locally the shales and argillites contain significant amounts of tungsten. Skarns occur adjacent to some of the intrusive rocks.

Alteration has stained both the metasedimentary and intrusive rocks with iron oxide and gossans occur locally. Quartz veins plus silicified zones occur in the metasediments and metabasalt. The epithermal mineralization and alteration are associated with the felsite dikes that intrude all other rocks units in the area (67).

BUREAU INVESTIGATION:

After initial sampling by the Bureau indicated a variety of significant metal values, the Alaska Department of Geological and Geophysical Survey (ADGGS) was contracted to conduct detailed mapping and sampling in the area (67, 68).

Samples collected by the (ADGGS) from stibmite veins contain up to 0.09 oz/ton gold, and associated hornfelsed rocks contain up to 2.5 oz/ton silver. Quartz-scheelite veins contain up to 0.27% tungsten (67).

Bureau samples of massive stibmite veins contained up to 27.0% antimony 0.06 oz/ton gold (Table A31, no. 1591) and pyrite-bearing metasediments up to 0.79 oz/ton silver (no. 1405).

Samples of shale contained up to 0.24% tungsten (no. 1871), and altered calcite-bearing limestones up to 56.0 ppm mercury (no. 1404). Metasediments containing anomalous amounts of gold averaged 18 ppb gold.

Placer samples collected near the headwaters of Little Clearwater Creek which drains the Mex area (map no. A32) contained anomalous tungsten and mercury.

RESOURCE ESTIMATE:

The rocks of the Mex claims are unique in that they contain significant amounts of a number of elements, including gold, silver, antimony, tungsten, and mercury. None have been found to occur in economic quantities, but elements such as mercury and antimony are associated with economic gold deposits in other areas of the world. In deposits such as at Carlin, Nevada, and Mercur, Utah, gold is associated with stibmite, arsenic, and mercury minerals. At Carlin a young assemblage of gold-arsenic, mercury, and antimony mineralization was emplaced in a near surface environment. This assemblage associated with extensive silicification and argillic alteration of limestone beds has resulted in important deposits of gold. Similar deposits may exist in the Mex claims area but are concealed or poorly exposed. The presence of a receptive carbonaceous host will be a key factor in the existence of a potential ore body. Samples of metasediments at the Mex claims contain up to 20 ppb gold. (254, 333). A similar suite of elements and host rocks occur at the Gossan claims (A39) 2.5 miles to the southwest.

The silver contents of the stibmite veins is significant, but the veins are only a few inches wide and have little strike length.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for silver-bearing polymetallic veins. Moderate potential for sedimentary-hosted disseminated precious metal deposits.

RECOMMENDATIONS: Rock and soil grid geochemical survey over entire area to localize metal anomalies, followed by trenching and drilling. Detailed sampling of potential carbonaceous host rocks.

REFERENCES: 67, 68, 254, 262, 333

TABLE A31 - ANALYTICAL ANALYSIS - MEX CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
746	G				10	0.5	52	2	43	30	ND	1	5	Altered sandstone
747	G				ND	0.5	497	6	53	30	ND	ND	ND	Altered metasediments
748	G				15	0.5	50	10	105	ND	ND	ND	ND	Metadiorite
749	G				ND	0.5	129	16	65	10	ND	ND	ND	Metadiorite
1401	G				ND	0.5	101	2	47	50	ND	ND	ND	Metasandstone (?)
1402	G				ND	0.5	131	ND	65	70	30	ND	ND	Altered limestone
1403	G				ND	0.5	15	8	29	20	10	ND	5	Altered argillite/limestone breccia
1404	G				ND	0.5	63	14	66	75	40	56	15	Altered sandstone, calcite veinlets
1405	G				ND	27	0.38%	1.67%	0.13%	15	40	ND	5	Metasediments pyrite & malachite
1406	RC				20	0.5	18	120	127	20	ND	ND	ND	Metasediments limonite, pyrite
1407	S				ND	0.5	114	104	13	ND	ND	ND	ND	Metasediments quartz/calcite veinlets
1252	SC				5	0.5	62	8	101	25	ND	ND	ND	Argillite/limestone diss. pyrite

TABLE A31 (CONT.) - ANALYTICAL RESULTS - MEX CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1253	SC				5	0.5	69	8	85	20	ND	ND	ND	Argillite/limestone diss. pyrite
1254	CR				20	0.5	89	16	64	15	10	ND	35	Altered intrusive latite(?)
1255	RC				20	2.5	170	74	19	5	ND	11	20	Quartz pod
1256	RC				10	0.5	4	12	10	5	ND	ND	ND	Quartz vein
1257	G				5	0.5	45	8	126	45	ND	ND	10	Limonite-stained argillite
1258	G				5	0.5	50	12	109	40	10	2	10	Limestone/argillite/ limonite stain
1259	G				ND	0.5	49	6	63	20	.13%	0	ND	Limestone/argillite in trench
1175	G				ND	0.5	96	6	57	15	ND	ND	ND	Argillite/limestone trench
1176	G				ND	0.5	161	10	80	75	10	ND	5	Limestone/argillite trench
1177	S				ND	0.5	58	10	89	45	ND	2	5	Argillite, diss. pyrite
1178	G				ND	0.5	18	18	16	ND	ND	ND	ND	Granite, diss. pyrite

TABLE A31 (CONT.) - ANALYTICAL RESULTS - MEX CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1179	G				ND	0.5	112	12	70	60	10	ND	5	Limestone, diss. pyrite
1588	G			0.55	25	19.0	127	0.14%	4	10	ND	1	ND	Quartz vein
1589	G			0.22	ND	7.5	0.03%	286	8	45	ND	28	50	Quartz vein
1590	S		0.058	0.36	1700	12.5	80	ND	10	55	ND	14	26.8%	Massive stibmite vein
1591	S		0.060	0.13	1900	4.5	363	4	24	65	ND	12	27.3%	Massive stibmite vein
1593	CR				15	1.0	37	14	40	5	40	ND	935	Altered felsite dike, diss. pyrite
1594	CR				ND	2.0	92	4	108	15	50	1	80	Altered silt-stone diss. pyrite
1595	RC				ND	1.0	92	44	35	ND	270	ND	75	Gossan
1596	RC				ND	1.5	81	44	45	15	110	ND	25	Gossan
1588	G			0.55	25	19.0	127	0.14%	4	10	ND	1	ND	Quartz vein
1589	RC			0.22	ND	7.5	0.03%	286	8	45	ND	28	50	Quartz vein malachite stain
1749	RC			0.10	ND	3.5	0.10%	ND	91	65	10	ND	10	Argillite, quartz veinlets
1750	RC				ND	0.5	105	ND	48	80	ND	ND	5	Limestone, calcite veinlets

TABLE A31 (CONT.) - ANALYTICAL RESULTS - MEX CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	Sb	
1871	G				5	0.5	120	ND	40	235	.24%	ND	10	Shale
1872	P				3000	0.5	135	2	159	565	.22%	20	5	Active stream gravel, 1 coarse 4 fine gold particles
1873	S				20	0.5	39	4	86	65	300	ND	ND	Shale
1870	G				25	0.5	294	ND	108	40	ND	ND	ND	Limonite-stained shale
1875														100 lb. bulk sample of tungsten-bearing rock
1876	P				ND	1.0	58	2	170	400	.41%	10	5	Active stream gravel 1 fine gold
1902	RC				ND	0.5	83	14	29	ND	130	ND	ND	Metavolcanic rock trace pyrite
1903	RC				ND	0.5	74	42	44	5	130	ND	ND	Metavolcanic rock trace pyrite
1904	RC				ND	0.5	47	2	54	5	20	ND	5	Metavolcanic rock trace pyrite

NAME(S): Little Clearwater Creek Placer Occurrence Map Location No. A 32
MAS No. 0020680030
Kardex No. 68-141,211

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
W 1/2 T: 21S R: 5E Meridian: Fairbanks
Geographic: Joins with Clearwater Creek at Denali Highway.
Elevation: 3000-3700 ft.

PRODUCTION: None.

HISTORY: 1979 - Tamany Mining Co. stakes Little Clearwater Creek claims.

WORKINGS AND FACILITIES: Test pits along creek.

GEOLOGIC SETTING:

Little Clearwater Creek drains bedrock composed of Triassic metabasalts (225).

BUREAU INVESTIGATION:

A series of placer samples were collected along Little Clearwater Creek (Table A32). These samples contained up to 0.015 oz/cy gold (no. 3142), 0.40% tungsten, and 379 ppm mercury (no. 1869).

RESOURCE ESTIMATE:

One sample collected on Little Clearwater Creek contained highly significant gold. Several samples contained significant tungsten and mercury. The Mex claims (Map No. A31) which lie at the headwaters of Little Clearwater Creek contain rocks amomalous in gold, silver, antimony, tungsten, and mercury. Volume of gold-bearing gravel unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: Trench sampling along creek.

REFERENCES: 225

TABLE A32 - ANALYTICAL RESULTS - LITTLE CLEARWATER CREEK PLACER OCCURRENCE, LITTLE CLEARWATER CREEK LODE OCCURRENCE, CLEARWATER CREEK PLACER OCCURRENCE, CORKSCREW CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			oz/yd³	Fire Assay oz/st	ppb	Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Hg	W	
1192	P		0.00013		ND	0.5	28	8	91	ND	48	20	Corkscrew Creek
1193	P		0.0006			0.5	84	82	102	15	7	40	Little Clearwater Creek 1 fine, 6 v. fine gold
1194	P		0.00003		25	0.5	63	2	109	15	16	50	Clearwater Creek
1196	P				2700	0.5	42	16	93	ND	20	80	Oscar Creek, 5 v. fine gold
3141	P		0.001			ND	118	8	174	75	7	150	Little Clearwater Creek pit 2 coarse, 5 fine gold
3142	P		0.015			ND	122	8	160	155	6	930	Little Clearwater Creek pit 12, coarse 13 fine
3143	P				100	ND	119	8	15	55	37	220	Little Clearwater Creekpit, 1 coarse, 6 fine
3218	P				3	2.4	113	8	206	75	9	220	Little Clearwater Creek pit, 11 fine gold
1414	S			0.34	10	11.5	1.08%	6	83	30	ND	20	Metabasalt malachite, chalcopyrite, chalconite
1869	P		0.001			0.5	137	2	137	325	379	3950	Active stream gravel 1 coarse, 8 fine gold
1874	P				ND	ND	157	2	139	75	8	150	Active stream gravel 1 fine, 10 v. fine gold
3218	P		0.003			2.4	113	8	206	75	9	220	Little Clearwater Creek pit 11 fine gold

NAME(S): Clearwater Creek Placer Occurrence

Map Location No. A 33
MAS No. 0020689003-5
Kardex No. 68-238-242

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
N 1/2 Sec: 1 T: 22S R: 4E Meridian: Fairbanks
Geographic: Clearwater Creek, just above junction with Little Clearwater Creek.
Elevation: 2990 ft.

PRODUCTION: None.

HISTORY: 1981 - Rainy Day claims staked (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Clearwater Creek cuts Quaternary glaciofluvial deposits in the vicinity of the claims (225).

BUREAU INVESTIGATION:

A placer sample collected by the Bureau (Table A32, no. 1194) contained 0.00003 oz/yd^3 gold.

RESOURCE ESTIMATE: The gold content of the placer sample is not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 225, 339

NAME(S): Jack L. Dees Claims
Jack W. Frost Claims

Map Location No. A34
MAS No. 0020689011

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
NW 1/4 Sec: 10 T: 22S R: 4E Meridian: Fairbanks
Geographic: North tributary to Clearwater Creek, one mile upstream from Corkscrew Creek.
Elevation: 2800 ft.

PRODUCTION: None.

HISTORY: 1982 - Placer mining application made

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The unnamed stream cuts several different units of Quaternary glacial deposits (225, 303).

BUREAU INVESTIGATION: Site not visited.

RESOURCE ESTIMATE: None.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Collect placer samples on creek.

REFERENCES: 225, 303

NAME(S): Corkscrew Creek
Placer Occurrence

Map Location No. A35

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes A6
Sec: 4&9 T: 22S R: 4E Meridian: Fairbanks
Geographic: One-two miles up Corkscrew Creek from Clearwater Creek junction.

PRODUCTION: None.

HISTORY: 1974 - Two placer claims staked on Corkscrew Creek.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Corkscrew Creek cuts several different units of Quaternary glacial deposits (225, 303).

BUREAU INVESTIGATION:

A placer sample collected on lower Corkscrew Creek (Table A32, no. 1192) contained 0.00013 oz/yd^3 gold.

RESOURCE ESTIMATE: The gold content of the sample is not significant.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 225, 303

NAME(S): Little Clearwater Lode Occurrence Map Location No. A36

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A6
NE 1/4 Sec: 36 T: 20S R: 4E Meridian: Fairbanks
Geographic: 1.7 mi. southwest of peak 5315.
Elevation: 4850 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock is composed of Triassic metabasalt, locally cut by quartz/calcite-filled fractures. Associated with these are malachite, chalcopyrite, and chalcocite (225, 233).

BUREAU INVESTIGATION:

One sample of metabasalt (Table A32, no. 1414) contained 1.08% copper and 0.34 oz/ton silver.

RESOURCE ESTIMATE: The mineralized zones are mostly in rubble and are small.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 225, 233

NAME(S): Yukon Claim Group
Mendletna Claims No. 1-2
Clearwater Creek
Coal Creek

Map Location No. A 37
MAS No. 0020680027
Kardex No. 68-69, 78

Deposit Type: Lode
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A6
NW 1/4 Sec: 23 T: 20S R: 4E Meridian: Fairbanks
Geographic: 1.5 miles NE of Pass Creek - Clearwater Creek junction.
Elevation: 4500-5100 ft.

PRODUCTION: None.

HISTORY: 1957 - Mendeltna claims staked.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Country rock in the area is composed of Triassic metabasalts, locally sheared and silicified, containing quartz and calcite-filled veinlets and amygdules. Mafic dikes cut the metabasalt. The veinlets and amygdules are locally stained with malachite and contain chalcocite and tetrahedrite(?). The mineralized zones are very narrow and discontinuous.

BUREAU INVESTIGATION:

A select sample of a small pod of mineralized metabasalt contained 3.72% copper and 0.14 oz/ton silver (Table A37, No. 1411). A second small pod (no. 2670) contained 3.28% cooper and 0.08 oz/ton silver. Geologists with the Alaska Department of Geological and Geophysical Surveys working under contract with the Bureau also located copper and silver mineralization in this area (67, 68).

RESOURCE ESTIMATE:

Select samples contain high copper values, but the exposures are very small and discontinous.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS: None.

REFERENCES: 67, 68, 225, 233

TABLE A37 - ANALYTICAL RESULTS - LITTLE CLEARWATER LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Hg	W	
1411	S			0.41	ND	14	3.72%	2	170	ND	50	Fractured metabasalt malachite, chalcocite
1412	S				ND	1.0	0.50%	6	40	ND	10	Silicified metabasalt chalcocite
1413	CC	0.5			ND	0.5	205	4	31	ND	10	Silicified, sheared metabasalt
2668	CH	0.5			ND	ND	895	4	68	ND	10	Calcite breccia vein in metabasalt malachite stain
2669	G				ND	ND	0.45%	ND	84	4.0	ND	Metabasalt malachite
2670	S			0.08	ND	2.8	3.28%	ND	104	1.0	ND	Metabasalt, malachite tetrahetrite? quartz carbonate veinlets
2671	SC				ND	ND	952	ND	74	ND	10	Sheared metabasalt malachite stain
2672	SC				ND	ND	519	ND	42	ND	10	Sheared metabasalt malachite stain
3009	RC				ND	ND	1.76%	ND	90	ND	ND	Malachiet-stained greenstone
3010					ND	ND	4.29%	2	156	ND	ND	Greenstone, bornite, covellite

NAME(S): Coal Creek East Occurrence

Map Location No. A38
MAS No. 0020680026
Kardex No. 68-36

Deposit Type: Bedded
Commodities: Coal

LOCATION: Quadrangle: Mt. Hayes A6
SE 1/4 Sec: 15 T: 20S R: 4E Meridian: Fairbanks
Geographic: Halfway up and on the south side of Coal Creek, a tributary to Clearwater Creek.
Elevation: 3700 ft (?)

PRODUCTION: Small amount used by Valdez Creek (262).

HISTORY:

1931 - Coal from this occurrence was used in forges at Denali Mine on Valdez Creek (262).

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

The outcrop exposed on the south side of the creek is a contorted and broken bed reported to be 10-12 ft. thick with several lenses of noncombustible mineral matter in it. The coal seam is at least three feet wide and was excavated to a depth of three feet. An analysis was made of the coal which showed the "as received" sample to contain 0.3% sulfur, 8.5% ash, and 14% moisture (262). The coal bed lies within Tertiary sandstone and shale (67).

BUREAU INVESTIGATION: Not examined.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 67, 213, 262

NAME(S): Gossan Lode Occurrence
CM Lode Claims (No. 1-12)
Gossan Claims (No. 1-22)
Mex Claims

Map Location No. A39
MAS No. 0020680031
Kardex No. 68-146

Deposit Type: Hydrothermal
Commodities: Copper, Gold

LOCATION: Quadrangle: Mt. Hayes A6
Sec: 10&15 T: 20S R: 4E Meridian: Fairbanks
Geographic: Ridge north of Coal Creek and east of Clearwater Creek.
Elevation: 4000-5200 ft.

PRODUCTION: None.

HISTORY:

1931 - First mention of iron-stained rocks east of Clearwater Creek.
1962 - First record of sampling in area.
1973 - Gossan Claims staked.
1981 - CM claims staked.

WORKINGS AND FACILITIES: Some trenching.

GEOLOGIC SETTING:

Rocks examined by the Bureau consisted of argillite, limestone/dolomite, and schist. Many of the rocks are altered and exhibit limonite, hematite, and manganese staining due to weathering of iron-bearing carbonates and disseminated pyrite. Shear zones cut the rocks and areas of quartz-bearing fault breccia occur locally. Northeasterly-striking folded andesitic to basaltic greenstone intruded by small body of granodiorite are reported in the area (2). The abundant alteration is probably related in part to hydrothermal effects associated with the intrusion of the granodiorite. The abundant rusty-colored staining, readily visible from the air, is what probably led to the "gossan" name being given to the area.

BUREAU INVESTIGATION:

A series of samples were taken from several of the limonite-stained rocks and breccia zones (Table A39). A chalcopyrite-bearing quartz vein contained 0.62% copper (no.1167), and altered argillite contained 50 ppb gold. Schist from a shear zone contained 50 ppm tungsten (no. 2673), and fault breccia contained 15 ppm mercury (no. 2675). The Alaska Department of Geological and Geophysical Surveys, working in the area under contract with the Bureau, mapped the geology of the area and also collected rock samples. Besides elements previously listed, their samples were also anomalous in antimony, an element enriched in many hypogene gold deposits (24)(67)(68).

RESOURCE ESTIMATE:

Anomalous gold, arsenic, mercury, antimony and tungsten in the rocks in this area are all associated with hypogene gold deposits in other regions (24) and may be part of an alteration halo associated with the low grade gold

mineralization here. A similar suite of elements and host rocks occur on the Mex claims (A31) 2.5 miles northeast.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for copper.
Moderate potential for low grade, large tonnage, gold deposit.

RECOMMENDATIONS:

Gridded soil and rock geochemical survey to outline areas of anomalous elements, followed by drilling of anomalous zones.

REFERENCES: 24, 67, 68, 153, 172, 225, 233, 263

TABLE A39 - ANALYTICAL RESULTS - GOSSAN LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	Hg	
1166	RC				20	0.5	57	8	58	20	ND	1	Dolomite limonite-stained fractures
1167	RC				50	1.5	0.62%	14	181	ND	ND	ND	Quartz vein, pyrite, chalcopyrite
1168	RC				ND	0.5	168	20	57	ND	ND	ND	Argillite, limonite, diss. pyrite
1169	S				ND	0.5	73	12	60	40	ND	ND	Limestone/dolomite diss. pyrite
1170	G				ND	0.5	72	16	64	30	ND	ND	Limestone, siderite, calcite on fractures
1171	G				ND	1.5	53	84	227	ND	10	ND	Phyllite diss. pyrite, limonite stain
1172	G				15	0.5	35	24	151	25	ND	ND	Argillite limonite stain, diss. pyrite
1173	S				50	0.5	33	24	73	ND	10	ND	Altered argillite
1174	RC				20	0.5	697	36	545	55	10	ND	Argillite
2673	SC				ND	ND	658	16	378	85	50	ND	Altered schist limonite stain
2674	S				ND	ND	180	28	234	30	40	ND	Quartz breccia
2675	S				ND	ND	360	18	112	35	20	15	Fault breccia float in trench
2676	S				ND	ND	272	38	82	15	ND	ND	Quartzite float diss. pyrite

NAME(S): Pass Creek Lode Occurrence Map Location No. A40

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Mt. Hayes A6
SW 1/4 Sec: 28 T: 20S R: 4E Meridian: Fairbanks
Geographic: South tributary to Pass Creek, one mile above junction with Clearwater Creek.
Elevation: 4100 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the area consists of Triassic metabasalt that is locally sheared, silicified, and cut by quartz veinlets. Quartz stringers contain traces of malachite and native copper (?).

BUREAU INVESTIGATION:

A sample of quartz fissure filling in basalt (Table A41, no. 1416) contained 0.16% copper. Copper mineralization occurs in float and can be traced a short distance.

RESOURCE ESTIMATE:

The bedrock source of the occurrence could not be located, and the copper mineralization was confined to a small area.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 225, 233

NAME(S): Unnamed Lode Occurrence, Pass Creek Map Location No. A41

Deposit Type: Vein
Commodities: Copper, Silver

LOCATION: Quadrangle: Mt. Hayes A6
S 1/2 Sec: 33 T: 20S R: 4E Meridian: Fairbanks
Geographic: South tributary to Pass Creek.
Elevation: 4500 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the area consists of Triassic metabasalt, that is locally sheared, silicified, and cut by quartz veinlets. Occassionally copper stain and chalcocite can be found (225).

BUREAU INVESTIGATION:

Several zones stained by copper oxides were sampled (Table A41). Samples contained up to 4.9% copper (no. 3035). A placer sample (no. 3037) collected on a tributary to Clearwater Creek, one mile south of this occurrence, contained no gold.

RESOURCE ESTIMATE:

Copper values are locally very high, but the occurrences are small.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 82, 225, 233, 302, 305

TABLE A41 - ANALYTICAL RESULTS - UNNAMED LODE OCCURRENCE - PASS CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
2959	CR				ND	ND	146	ND	50	35	Siliceous veinlets in metabasalt
2960	S				ND	1.2	2.52%	ND	240	10	Metabasalt, malachite stain
3035	S				15	5.2	4.9%	ND	414	85	Metabasalt, malachite, chrysocolla
3036	S				ND	2.2	3.6%	ND	292	ND	Metabasalt, chalcocite, malachite, azurite
3037	P				ND	ND	101	ND	104	ND	Active stream gravels
1416	S				10	0.5	0.16%	6	59	15	Metabasalt, native copper, malachite

NAME(S): Denali Prospect
CD Claims (100)
Copper King Claims

Map Location No. A42
MAS No. 0020670008
Kardex No. 67-142

Deposit Type: Sediment-hosted volcanigenic
Commodities: Copper

LOCATION: Quadrangle: Healy A1
NE 1/4 Sec: 34 T: 20S R: 3E Meridian: Fairbanks
Geographic: Headwaters of south fork of Pass Creek.
Elevation: 4400 - 4800 ft.
Access: Eleven mile road up Windy Creek from the Denali Highway.

PRODUCTION: None.

HISTORY:

1963 - Copper mineralization found in area during followup of geochemical anomaly. First claims located in area (320).
1964-66 - Trenching and core drilling.
1969 - Percussion and core drilling plus underground tunneling.

WORKINGS AND FACILITIES:

Numerous trenches, a bunkhouse, and shop buildings. Many buildings were destroyed by avalanche in 1989. Underground workings total 400 feet (320).

GEOLOGIC SETTING:

The deposit consists of a series of stratiform sulfide deposits in a bedded sedimentary unit, intercalated with at least two volcanic flows. Sediments overlying the volcanic rocks include argillite, blue-gray and black limestone, shale, and tuffaceous sediments. A Jurassic diorite intrusion was emplaced 2500 feet north of the sulfide occurrences, resulting in formation of hornblende hornfels and albite-epidote facies contact metamorphism. An early Tertiary prehnite-pumpellyite-quartz facies burial metamorphism has also affected the rocks in the area. No hydrothermal alteration adjacent to the sulfide mineralization is present.

Sulfide minerals consist of pyrite, chalcopyrite, and very minor chalcocite. Pyrite occurs as framboidal aggregates and chalcopyrite in very fine grains in detrital beds. The sulfides are commonly in planar accumulation parallel to bedding. Sulfide veinlets do not crosscut major bedding units (320).

Several ideas as to the genesis of the deposit have been proposed. Some workers believe that copper-rich (acidic?) solutions derived from volcanic rocks reacted rapidly and deposited copper-rich sulfides upon entering the limy, carbonaceous, reducing environment of the adjacent sedimentary rocks (87)(275)(303)(320).

BUREAU INVESTIGATION:

A 320 lb. sample was collected in the upper adit and sent to the Bureau's Salt Lake Research Center for beneficiation tests. The results are shown below. The sample had a head grade of 12.5% copper and 0.019 oz/ton gold. A standard flotation test recovered 64% of the copper and 56% of the gold. The low recovery is due to the fine-grained nature of the sulfides.

RESOURCE ESTIMATE:

Indicated reserves: 5 million tons contained in at least six separate orebodies that average approximately 2% copper and 0.4 oz/ton silver (127) (275).

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for copper.

RECOMMENDATIONS:

Further metallurgical testing to improve the copper recovery will be needed.

REFERENCES: 87, 127, 190, 275, 303, 320

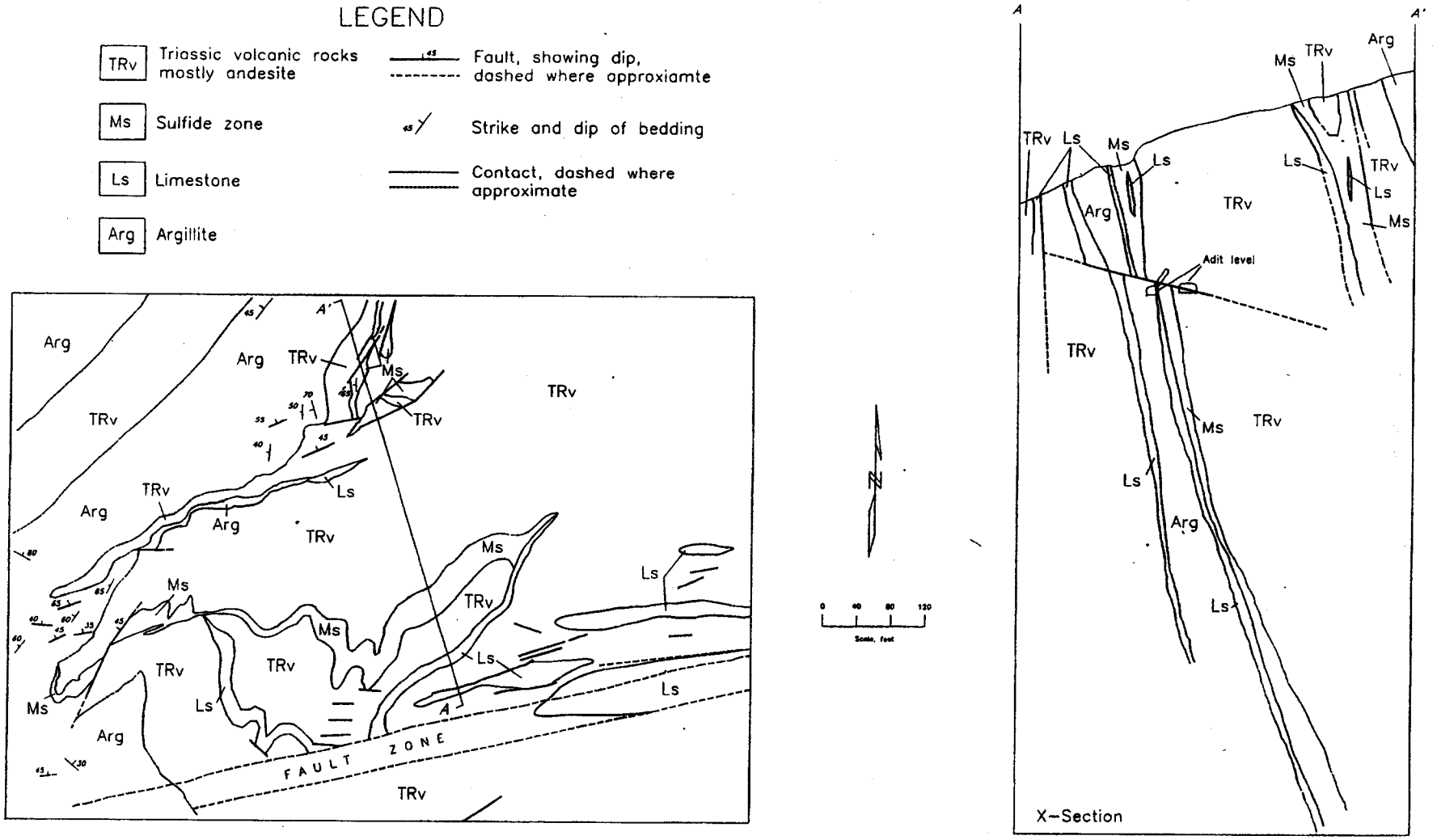


Figure A42. - Bedrock geology of a portion of the Denali Prospect (After Stevens, 1971)

NAME(S): Pass Creek Placer Occurrence — Map Location No. A43
Reflection
Serendipity
Pass Claims (No. 1-45)

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 20 T: 20S R: 4E Meridian: Fairbanks
Sec: 13, 14, 15 T: 20S R: 3E Meridian: Fairbanks
Geographic: Upper Pass Creek above east - west bend in drainage.
Elevation: 3250-3600 ft.

PRODUCTION: None.

HISTORY:

1984 - Claims located along Pass Creek.
1987 - Claims declared abandoned by BLM.

WORKINGS AND FACILITIES: None

GEOLOGIC SETTING:

Upper Pass Creek drains a variety of rock types, dominated by Jurassic argillite and Triassic volcanic flows. Metaintrusives of intermediate composition occur north of Roosevelt Lake (303).

BUREAU INVESTIGATION:

A series of placer samples were collected along the upper Pass Creek drainage (Table A43). One sample (no. 2784) contained 1200 ppb gold and was collected below the now abandoned claim block. The gold from the sample was not recovered and weighed, so an oz/yd^3 determination could not be made.

RESOURCE ESTIMATE:

The placer samples contained only minor amounts of visible gold.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None

REFERENCES: 304

TABLE A43 - ANALYTICAL RESULTS - UPPER PASS CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
2784	P				1200	ND	165	16	190	10	130	Active stream gravel, 1 fine, 4 very fine gold flakes
2785	P				760	ND	56	16	170	5	110	Active stream gravel, 5 very fine gold flakes
2786	P				200	ND	36	8	120	20	40	Active stream gravels, 1 fine 5 very fine gold flakes
2919	P				210	ND	44	8	110	20	30	Active stream gravel, 1 fine, 3 very fine gold flakes

NAME(S): Pass Lake Lode Occurrence Map Location No. A44

Deposit Type: Disseminated
Commodities: Gold

LOCATION: Quadrangle: Healy A1
NW 1/4 Sec: 14 T: 20S R: 3E Meridian: Fairbanks
Geographic: Steep ridge north of Pass Lake.
Elevation: 4500 - 5300 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Jurassic argillite and graywacke intruded by Cretaceous intrusives of intermediate composition. Faults crosscut both rock types (303). The argillites are iron-stained, fractured and contain from trace to 15% disseminated pyrite.

BUREAU INVESTIGATION:

Several samples were collected from the iron-stained argillite (Table A44). Sample no. 1164 contained 15 ppb gold and 213 ppm copper.

RESOURCE ESTIMATE: The gold value of one sample was slightly anomalous.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for low grade, large tonnage gold deposit.

RECOMMENDATIONS:

Collect more samples of iron-stained argillites. Locate and sample intrusive contact with argillite.

REFERENCES: 303

TABLE A44 - ANALYTICAL RESULTS - PASS LAKE LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1161	RC				ND	1.5	184	16	60	ND	Iron stained, fractured argillite, minor diss. pyrite
1162	RC				ND	0.5	100	26	62	ND	Iron stained, fractured argillite, minor diss. pyrite
1163	G				ND	0.5	138	12	72	15	Iron stained, fractured argillite, minor diss. pyrite
1164	RC				15	0.5	213	12	20	15	Iron stained fractured argillite 10-15% pyrite
1165	RC				ND	0.5	96	28	110	ND	Iron stained fractured argillite 10-15% pyrite

NAME(S): Surprise Creek Lode Prospect — Map Location No. A45
Surprise Claims Placer & Lode (no. 1-21)

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy A1
SE 1/4 Sec: 9 T: 20S R: 3E Meridian: Fairbanks
Geographic: North side of Surprise Creek above Roosevelt Lake.
Elevation: 4100 - 4600 ft.
Access: Jeep trail from Valdez Creek.

PRODUCTION: Unknown.

HISTORY:

1908 - Prospecting reported on Surprise Creek (336).
1984 - Original Surprise claims located.
1984-86 - Assessment work done.
1988 - Road built up Roosevelt Creek to property. Exploration pit dug. Bulk sample taken to Palmer, Alaska, where testing determined its gold content too low to be economic (330)

WORKINGS AND FACILITIES: Road and pits.

GEOLOGIC SETTING:

The north side of Surprise Creek is underlain by Cretaceous pelitic semischist and schist. Quartz veins of metamorphic origin occur within the schist and contain trace sulfides. In the upper portion of Surprise Creek the schist is in faulted contact with Jurassic argillite (304).

BUREAU INVESTIGATION:

No quartz veins were exposed in the exploration pit. Samples collected from quartz-carbonate veins exposed above the pit contained up to 150 ppb gold (Table A45, no. 1887). A placer sample collected on lower Surprise Creek contained 0.001 oz/cy gold.

RESOURCE ESTIMATE:

The gold content of the quartz veins is very low, but the placer gold is significant.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for lode gold and moderate potential for placer gold.

RECOMMENDATIONS: Trench sampling of placer gravels.

REFERENCES: 303, 330, 336

TABLE A45 - ANALYTICAL RESULTS - SURPRISE CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis							Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)					
			Au	Au	Ag	Cu	Pb	Zn	As	
1887	S			150	3.5	253	82	910	360	Quartz-carbonate vein minor arsenopyrite
1888	RC			10	ND	6	4	6	5	Barren quartz vein
1889	P		0.001	10,000	4.0	41	16	116	25	Collected from ditch along roadside
2024	RC			ND	ND	2	ND	1	ND	Quartz vein
2025	CC	3.0		ND	ND	12	4	4	5	Quartz vein
2026	CC	0.5		15	ND	8	4	22	100	Quartz vein trace arsenopyrite
2027	CC	2.0		ND	ND	4	6	2	ND	Quartz-carbonate vein
2028	CC	2.0		ND	ND	7	2	3	25	Quartz-carbonate vein
2029	CC	2.0		10	ND	35	2	21	90	Quartz-carbonate vein

NAME(S): Grogg Creek Placer Prospect
Claims (no. 1-5)

Map Location No. A46
MAS No. 0020670113
Kardex No. 67-210,256

Deposit Type: Placer
Commodities: Gold, Platinum, Palladium

LOCATION: Quadrangle: Healy A1
Sec: 3, 4 T: 20S R: 3E Meridian: Fairbanks
Geographic: A tributary from the east into upper Valdez Creek.
Elevation: 3700 ft.
Access: Jeep road from Valdez Creek.

PRODUCTION: Unknown.

HISTORY:

1974 - Oldest record of claim staking, but older placer tailings indicate earlier mining.
1986 - Shaker plant and sluice boxes processed 200 cy of gravel near the mouth of Grogg Creek.
1988 - Active sampling and mining.

WORKINGS AND FACILITIES: Sluice boxes, washing plants, numerous test pits.

GEOLOGIC SETTING:

Grogg Creek drains Cretaceous pelitic schist and, to a lesser extent, Jurassic argillite. Small exposures of Cretaceous granodiorite occur along the drainage (303). Abundant quartz float occurs in the stream bottom, and quartz vein float was seen on the south valley walls, where limonite staining also occurs.

BUREAU INVESTIGATION:

A series of samples was collected both at existing placer working and for reconnaissance along Grogg Creek (table A46). No. 1855 from a test pit contained 0.004 oz/cy gold and 10 ppb platinum. No other samples collected contained platinum, but no. 2918 contained 2 ppb palladium. Samples from previously dug test pits contained 3-10 gold colors per pan.

RESOURCE ESTIMATE: Grogg Creek contains significant placer gold.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS:

More trench sampling and analysis of samples for platinum and palladium.

REFERENCES: 303

TABLE A46 - ANALYTICAL RESULTS - GROGG CREEK PLACER PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)				ppb	ppb	
			Au	Au	Ag	Cu	Pb	Zn	Pt	Pd	
629	P		0.001		0.5	35	28	62	NA	NA	Active stream gravel
1885	P		0.004		12.5	13	44	80	10	ND	From trench dug to schist bedrock
1886	P			3600	ND	4	2	107	ND	ND	Bank run gravel
2023	P			ND	0.5	14	2	73	ND	ND	Bank run gravel
2918	P			340	ND	34	8	104	ND	2	Bank run gravel

NAME(S): Eldorado Creek Lode Occurrence Map Location No. A47

Deposit Type: Disseminated
Commodities: Palladium, Platinum

LOCATION: Quadrangle: Healy A1
Sec: 29, 32 T: 20S R: 3E Meridian: Fairbanks
Geographic: Upper Eldorado Creek.
Elevation: 3900 - 4200 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The headwaters of Eldorado Creek drain a strongly fractionated alkali gabbro body of hornblendic monzogabbro composition (303).

BUREAU INVESTIGATION:

A series of float samples was collected from Eldorado Creek downstream from the alkali gabbro body (Table A47). Sample no. 3047 contained 92 ppb palladium. Sample no. 3042 contained 45 ppb platinum and 117 ppm nickel.

RESOURCE ESTIMATE: The samples are anomalous in platinum, palladium, and nickel.

MINERAL DEVELOPMENT POTENTIAL: Low potential for platinum and palladium.

RECOMMENDATIONS: Sample alkali gabbro body in detail.

REFERENCES: 303

TABLE A47 - ANALYTICAL RESULTS - ELDORADO CREEK LODE AND PLACER OCCURRENCES

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated				ppb	ppb	
			Au	Ag	Au	Ag	Cu	Zn	Ni	Pt	Pd	
1918	P				520	ND	26	70	ND	25	10	Bench above creek bottom, 12 very fine gold flakes.
3040	G				ND	0.4	23	90	38	25	14	Hornblendite outcrop epidote alteration
3041	G				2	ND	68	72	23	ND	4	Argillite float epidote alteration
3042	G				6	0.6	896	36	117	45	44	Pyroxenite float epidote alteration
3043	G				ND	0.4	130	86	17	ND	6	Silicified diorite float
3044	G				ND	0.8	100	96	8	15	16	Hornblende gabbro float epidote alteration
3045	G				ND	0.6	23	88	9	ND	6	Hornblende gabbro float epidote alteration
3046	G				ND	0.4	46	84	17	10	14	Hornblende gabbro outcrop local carbonate veins
3047	G				ND	0.6	182	70	14	ND	92	Hornblende pyroxenite
3048	G				ND	ND	1	44	4	ND	2	Trachytic syenite
3049	G				ND	ND	3	8	2	ND	ND	Aplite dike

NAME(S): Eldorado Creek Placer
Lightfoot Placers (no. 9-19)
Nex Yer 600 (no. 1-4), Caribou No. 1

Map Location No. A48
MAS No. 0020670115
Kardex No. 67-262

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 17&20 T: 20S R: 3E Meridian: Fairbanks
Geographic: Lower Eldorado Creek, tributary to Roosevelt Creek.
Elevation: 3600 - 3700 ft.
Access: Jeep road from Valdez Creek.

PRODUCTION: Minor (262).

HISTORY:

1936 - Placer claims staked on Eldorado Creek prior to this year (336)
1989 - Placer drilling by Caprock Corporation.

WORKINGS AND FACILITIES: Test pits and placer tailings.

GEOLOGIC SETTING:

The Eldorado Creek drainage is predominated by Jurassic argillite and an alkali gabbro body occurs at its headwaters (303).

BUREAU INVESTIGATION:

Sample no. 1918 (Table A47) collected from a bench on the west side of Eldorado Creek near its junction with Black Creek contained 520 ppb gold. No weight was determined as the gold was too fine to separate.

RESOURCE ESTIMATE:

The Eldorado stream valley has been glaciated, probably dispersing the placer gold. The gold recovered was not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: Dig test pits along active stream channel.

REFERENCES: 263, 303, 336

NAME(S): Black Creek Placer Claims No. 1-6

Map Location No. A49
MAS No. 0020670116
Kardex No. 67-3

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
NE 1/4 Sec: 19 T: 20S R: 3E Meridian: Fairbanks
Geographic: West tributary to Eldorado Creek from south end of Lucky Hill. Black Creek is mislabelled on USGS Topographic sheet. Is actually the next creek to the south on the topographic map.
Elevation: 4000 ft.

PRODUCTION:

15 oz. gold (340)
1 oz. silver

HISTORY:

1954 - Placer claims first staked.
1958-62 - Mining done.

WORKINGS AND FACILITIES:

Hydraulic cut in creek bottom, sluice boxes, and hydraulic pipe. Several ditches were excavated to lift water for mining up from Eldorado Creek, and a ditch was excavated to tap water for mining from the headwaters of White Creek.

GEOLOGIC SETTING:

Black Creek cuts into Jurassic argillite that has been intruded by a small, metamorphosed, intermediate composition, intrusive body (303). Gold has been mined from a lode on the north side of Black Creek adjacent to the placer (see figure A50).

BUREAU INVESTIGATION:

A sample collected from both bedrock and colluvium in the hydraulic cut contained 0.001 oz/yd^3 gold and 25 ppb platinum (Table A49, no. 1751).

RESOURCE ESTIMATE:

The hydraulic cut contains significant gold, which may have a source in the lode deposit nearby.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: More detailed sampling in hydraulic cut walls.

REFERENCES: 303, 340

TABLE A49 - ANALYTICAL RESULTS - BLACK CREEK Pplacer

Sample no.	Type	Sample Length(feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	W	As	Pt	Pd	
1751	P				0.001	0.5	66	50	35	25	4	Combined bank run and active stream gravel

NAME(S): Black Creek Lode (A-H Claims)
Wagner Lode

Map Location No. A50
MAS No. 0020670117
Kardex No. 67-10, 157

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy A1
SE 1/4 Sec: 18 T: 20S R: 3E Meridian: Fairbanks
Geographic: On west tributary to Eldorado Creek, one mile south of USGS topographic map location of Black Creek.
Elevation: 3850 ft.

PRODUCTION:

200 tons of ore milled.
Average grade of ore milled -- 0.35 oz/ton gold, giving an estimated production of 70 oz gold.

HISTORY:

1934-78 - Lode claims first staked and underground work done.
1979 - 50 tons mined.
1980-1988 - Road building, trenching, and extension of underground workings.
1989 - Bad ground in face on adit forced mine to begin new adit nearby. 35 ft. completed.

WORKINGS AND FACILITIES:

Small crushing plant and mill, bunkhouses, cook shack, and 175 ft. of underground workings.

GEOLOGIC SETTING:

Upper Jurassic argillite in the prospect vicinity has been locally sheared and altered to phyllite and graphitic schist. The argillite has been intruded by two small late Cretaceous intrusive bodies of intermediate composition (303, 304). Some lenses of argillite are completely enclosed by intrusive rock.

All rocks in the area have been deformed and altered by regional metamorphism. Locally, intense shearing has occurred. The shear zones are silicified and contain zones of quartz stringers or veins; locally they also contain carbonate alteration. The quartz stringer zones occur most frequently in the graphitic schist, and are best exposed underground. Sheared intrusive rocks also contain quartz stringers and veins and are better exposed on the surface than the schist due to resistance to physical weathering. The shear zones trend N70°W to E-W and can be traced at least 1700 ft. to the ridgetop lying west of the prospect.

Locally the quartz contains minor pyrite, arsenopyrite, and sphalerite. Visible gold was occasionally observed. Most of the veins appear to be rather discontinuous, but one was traced intermittently on the surface for 150 ft. along strike. The underground workings, which have cut through the southern intrusive body, stop short of the northern one.

BUREAU INVESTIGATION:

The surface and underground workings of the prospect were mapped and numerous rock samples collected. Poor bedrock exposures made geologic mapping difficult. The resulting map (fig. A50) was based mainly on float. Samples from surface quartz vein rubblecrop averaged 0.17 oz/ton gold. The highest sample (no. 887) contained 0.26 oz/ton gold. The highest values came from veins in intrusive rocks and are associated with anomalous arsenic values.

A 300 lb. sample, collected underground across a 6 ft. wide mineralized zone, was shipped to the Bureau of Mines Salt Lake City Research Center for beneficiation testing. A flotation test had an average head grade of 0.012 oz/ton gold and 0.04 oz/ton silver. The tests were not reliable because the sample was so low grade (193).

Samples were collected from the altered and sheared rocks surrounding the prospect area. Samples of altered argillite from the apparent west extension of a shear zone that passes through the prospect carried up to 250 ppb gold (no. 1366). Samples from quartz lens 1000 ft. north of the prospect contained up to 2500 ppb gold (no. 1379).

RESOURCE ESTIMATE:

None of the veins or stringer zones now exposed on the property have enough continuity to establish reserves. Gold is present, but values are spotty and discontinuous. Quartz stringer zones associated with the northernmost intrusive body had the highest gold values, and similar values may extend to depth along the intrusive contact with the surrounding metasediments.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for lode gold.

RECOMMENDATIONS:

Drilling from head of existing workings to into northern intrusive body to test for gold-bearing quartz veins. The surface samples with the highest gold content came from this body.

REFERENCES: 193, 303, 336, 354, 355

TABLE A50 - ANALYTICAL RESULTS - BLACK CREEK LODE

Map no.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
	737	S				ND	0.5	111	6	13	5	ND	Vein quartz float
2	887	RC		0.26		9000	0.5	12	10	17	ND	ND	Quartz vein rubblecrop
16	890	CC	11.0			30	0.5	31	12	73	80	10	Stock work quartz stringers
14	891	S				10	0.5	25	4	164	25	10	Quartz pod trace pyrite
18	892	RC				30	0.5	46	14	98	160	ND	Fissile argillite
19	893	CC	0.6			ND	0.5	1	18	9	15	ND	Quartz vein
20	894	CC	4.5			5	0.5	31	22	85	60	20	Sheared intrusive
13	895	CC	0.8	0.10		3500	0.5	11	40	22	0.11%	ND	Quartz vein and salvage limonite
12	896	RC				55	0.5	21	20	236	ND	ND	Sheared intrusive
6	897	S		0.63			0.5	2	10	4	5	ND	Vein quartz float
5	898	S				25	0.5	9	14	9	ND	ND	Vein quartz float limonite stain
5	899	CC	7.0			155	0.5	20	28	83	ND	ND	Sheared intrusive limonite stain
7	900	CC	5.0			295	0.5	36	38	841	345	10	Sheared intrusive limonite stain
10	1301	S				834	0.5	234	28	10	30	ND	Limonite stained quartz float

TABLE A50 (CONT.) - ANALYTICAL RESULTS - BLACK CREEK LODE

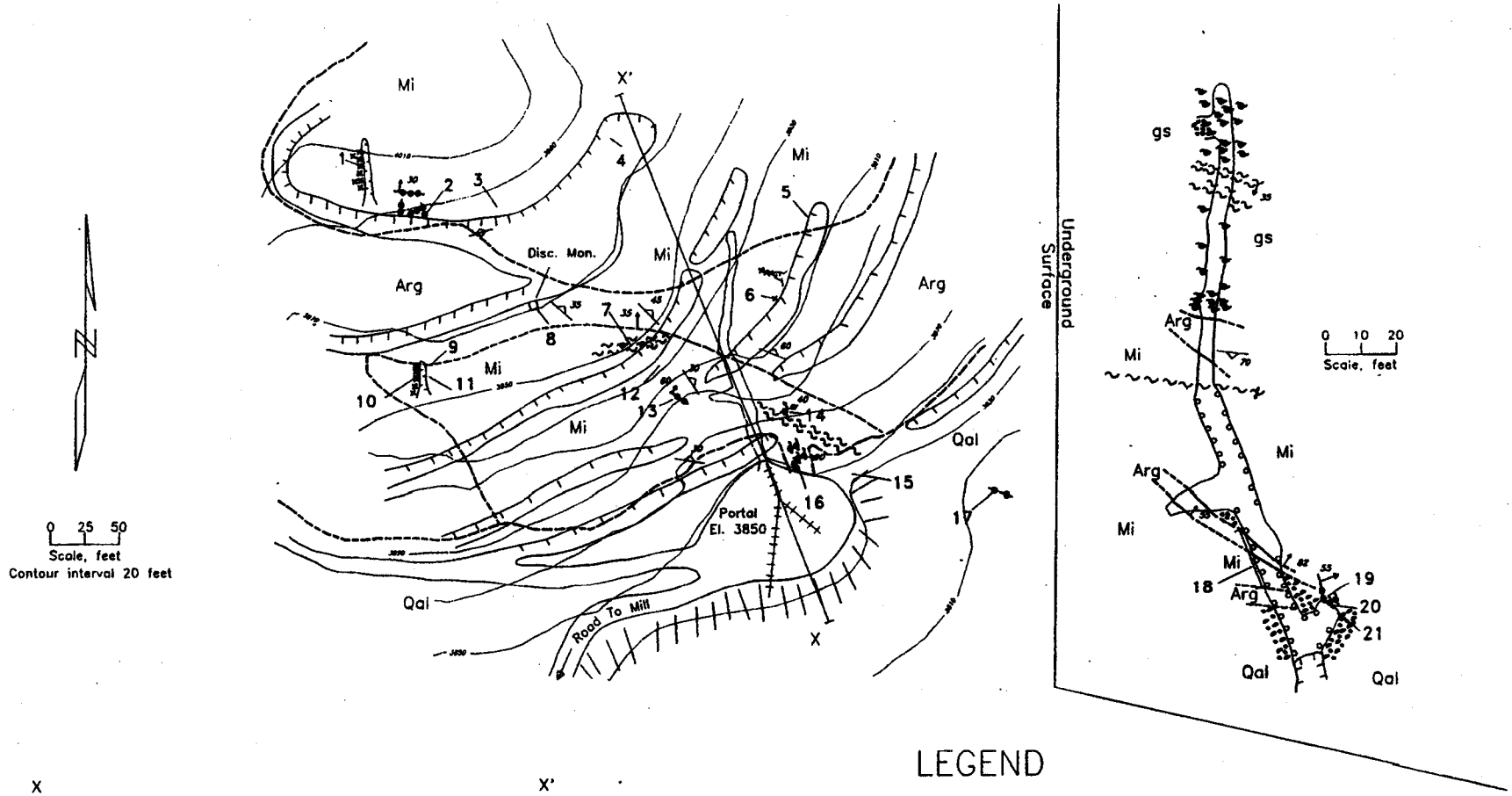
Map no.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
11	1302	RC				25	0.5	120	22	88	ND	ND	Sheared intrusive
9	1303	RC				35	0.5	105	12	84	45	ND	Argillite
8	1304	S		0.13		4600	0.5	147	16	10	25	ND	Vein quartz float
3	1305	RC				ND	0.5	43	28	106	10	ND	Sheared intrusive limonite stain
1	1306	S				5	0.5	72	12	18	15	ND	Vein quartz float limonite stain
4	1307	S				720	0.5	64	32	11	10	ND	Vein quartz float limonite stain
	1308	S				ND	0.5	57	10	11	ND	ND	Vein quartz float limonite stain
	1309	G				ND	0.5	34	12	19	ND	ND	Limonite stained argillite
	1310	G				ND	0.5	48	18	21	ND	ND	Limonite stained argillite
	1311	G				ND	0.5	44	12	13	ND	ND	Limonite stained argillite
	1312	G				ND	0.5	74	12	18	5	ND	Limonite stained argillite
	1313	G		0.012									300 lb. sample collected for beneficiation tests
	1315	RC		0.05		1690	0.5	0.12%	14	127	775	20	Silicified intrusive

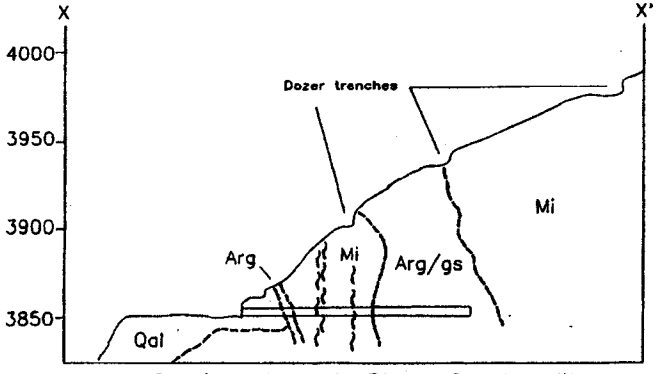
TABLE A50 (CONT.) - ANALYTICAL RESULTS - BLACK CREEK LODE

Map no.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
15	1316	CC	1.3			715	0.5	70	16	35	250	ND	Quartz vein
	1324	RC				115	0.5	450	14	47	40	ND	Silicified argillite limonite stain
	1325	RC				75	0.5	113	14	59	40	ND	Altered intermediate intrusive
	1365	G				ND	0.5	105	4	13	40	ND	
	1366	G				250	0.5	83	2	34	40	ND	Altered argillite
	1367	CC	3.0			ND	0.5	44	6	30	ND	ND	Quartz carbonate vein
	1368	RC				90	0.5	155	6	44	ND	10	Sheared argillite trace pyrite
	1369	RC				190	0.5	56	10	38	ND	10	Sheared intrusive
	1370	RC				20	0.5	60	4	82	15	ND	Slate with calcareous interbeds
	1375	G				ND	0.5	74	ND	33	ND	ND	Altered argillite trace pyrite
	1376	G				ND	0.5	54	10	35	5	ND	Silicified argillite
	1377	RC				ND	0.5	92	ND	28	ND	ND	Altered argillite trace hematite pseudomorphs
	1378	CC	7.0			2400	0.5	7	12	3	ND	ND	Quartz lens 50 ft. strike length

TABLE A50 (CONT.) - ANALYTICAL RESULTS - BLACK CREEK LODE

Map no.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
	1379	S				2500	0.5	34	44	7	15	ND	Vein quartz float near no. 1378
	1877	S				530	3.5	300	82	910	0.15%	ND	Quartz stringer-bearing argillite
	1878	CC	5.0	0.04		1410	ND	34	22	281	675	10	Quartz stingers in intrusive





X–Section through Black Creek adit
All underground workings projected to plane of x–section

LEGEND

- Qal — Alluvial cover
- Arg — Argillite/phyllite
- gs — Graphitic schist
- Mi — Metamorphosed intermediate intrusive
- Shear zone, showing dip
- Shear zone with quartz veinlets
- Quartz vein, showing dip
- Quartz float
- Strike and dip of foliation
- Contact, showing dip, dashed where approximate
- Trench
- Bulldozer cut
- Cribbing and backfill
- Projection of underground workings
- 15 Sample site

Figure A50. - Black Creek Lode, showing geology and sample sites

NAME(S): Lucky Top Prospect
Lucky Claims

Map Location No. A51
MAS No. 0020670126
Kardex No. 67-22, 186

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy A1
SW 1/4 Sec: 7 T: 20S R: 3E Meridian: Fairbanks
NW 1/4 Sec: 18 T: 20S R: 3E
Geographic: On west side of ridge 1500 ft. north of Lucky Hill.
Elevation: 5100 ft.
Access: Jeep road up Lucky Gulch from Valdez Creek.

PRODUCTION: Unknown.

HISTORY:

1936 - Lucky Top vein discovered.
1987 - Numerous claims staked by Evolution Gold Resources.
1989 - 1500 ft. reverse circulation drilling done by Canalaska 2500 ft. south of Lucky Top.

WORKINGS AND FACILITIES:

One caved adit estimated to be less than 80 ft. long, plus some trenching.

GEOLOGIC SETTING:

Wallrock at the prospect consists of calcareous argillite/phyllite. Copper staining occurs locally, along with pyrite and iron staining on fracture surfaces. The vein is described as varying from a few inches to one ft. wide, composed of banded quartz with in well-defined slate walls containing slickensides and fault gouge. Arsenopyrite and galena occur in the quartz, and free gold was common. One piece the size of a teacup contained almost two ounces of free gold (336). Float from the vein was traced for several hundred feet down the mountain. Numerous other rock samples collected by the Bureau on Lucky Hill are not listed here, but are tabulated in a separate Bureau open-file report (177).

BUREAU INVESTIGATION:

Examination of the prospect showed the workings to be caved or sloughed, and only vein quartz float could be located for sampling. It appears that most of the previously reported high grade gold-bearing quartz has been removed over the years. A sample of vein quartz float piled near the caved adit entrance contained 0.03 oz/ton gold (Table A51, no. 1031).

RESOURCE ESTIMATE:

The gold values are very low, and it appears that the high grade material has been worked out. Tuck (336) mentioned that an adit was being driven at a depth of 300 ft. below the discovery outcrop and hoped to intersect the vein at depth. This could not be determined by the Bureau as the adit was caved. Tuck also mentions that the vein could persist down the west slope of Lucky

Hill and that the gold values will continue to depth. It does not appear that the vein has been tested in this direction.

The State of Alaska Department of Geological and Geophysical Surveys, under with the Bureau of Mines, mapped the geology of the Lucky Hill area (353, 354, 355). Canalaska Resources Ltd. holds a large block of claims that cover the Lucky top Prospect. In 1989 rotary drilling by this company in the saddle south of the summit of Lucky Hill is reported to have hit zones up to 15 feet wide containing 0.811 oz/ton gold. This work resulted in an inferred reserve of 1.5 million tons grading between 0.25 and 0.50 oz/ton gold. The company plans more drilling for 1990 (107).

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Trenching across the projected vein extension to determine its true extent and drilling to test the vein at depth.

REFERENCES: 107, 268, 303, 336, 353, 354, 355, 356

TABLE A51 - ANALYTICAL RESULTS - LUCKY TOP PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1030	G				ND	0.5	18	2	7	10	Vein quartz float
1031	S		0.03			0.5	48	6	31	0.20%	Gold-bearing vein quartz piled near caved adit
1032	G				ND	0.5	10	4	10	25	Vein quartz float
1033	S				30	0.5	32	4	95	370	Quartz carbonate vein float piled near caved adit
1034	S				90	5	0.18%	6	73	45	Copper stained calcareous argillite float

NAME(S): Roosevelt Creek Placer

Map Location No. A52
MAS No. 0020670114
Kardex No. 67-8, 309

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 7 & 8 T: 20S R: 3E Meridian: Fairbanks
Geographic: Lower Roosevelt Creek.
Elevation: 3500 ft.

PRODUCTION: Minor

HISTORY:

1938 - Some mining prior to this date (303).
1956 - Record of claims staked on creek.
1986 - Claims still active.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Lower Roosevelt Creek is a broad braided stream channel, filled with both Quaternary alluvium and glacial deposits (303).

BUREAU INVESTIGATION: No samples were collected along the Roosevelt Creek drainage.

RESOURCE ESTIMATE:

This drainage occupies a glacial valley and any economic concentrations of gold may have been dispersed by late Wisconsin glaciation (336).

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Systematic sampling of drainage with a placer drill.

REFERENCES: 263, 303, 336

NAME(S): Lucky Gulch Placer
Lucky Gulch Claims

Map Location No. A53
MAS No. 0020670118
Kardex No. 67-21, 38, 140, 199, 261
Mineral Survey No. 2308

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 12 T: 20S R: 2E Meridian: Fairbanks
Geographic: Length of Lucky Gulch, a southern tributary to Valdez Creek.
Elevation: 3500 - 4400 ft.
Access: Road up Valdez Creek from the Denali Highway.

PRODUCTION:

1915 - 1958 - 2155 oz gold, 59 oz silver (340). Greatest production year, 1923, when 802 oz gold were produced at an average value of 0.04 oz/yd^3 gold (340). Several large nuggets, weighing from 32-52 oz have been found (213).

HISTORY:

1904 - Gold discovered on Lucky Gulch (106).
1907 - Gold nugget weighing 44 oz found in Lucky Gulch (see fig. 4).
1908 - Placer mining on Lucky Gulch reported to yield $40/man per day (214).
1923 - 802 oz gold produced (340).
1981 - 1500 yds gravel produced 7 oz gold, or 0.005 oz/yd^3.
1987-1989 - Placer mining near mouth of Gulch (218).

WORKINGS AND FACILITIES:

Placer tailings from old operations run almost the entire length of the gulch. Early mining used boom dams to impound water for placering operations. Some drift mining on the lower gulch was done in the 1930s (106). Recent mining activity is concentrated near the mouth of the gulch, where several cabins and mining equipment are located (218). A 25 foot deep shaft was sunk to bedrock just west of Lucky Gulch in 1987. A drift off the shaft extended for 9 feet along the bedrock surface. No significant placer gold was found in the drift (330).

GEOLOGIC SETTING:

The active stream channel is narrow and bedrock is quite shallow beneath the gravels in Lucky Gulch. The bedrock is composed mainly of phyllite. Trenching midway up the gulch exposed phyllite bedrock 2-6 ft beneath the surface. Locally the phyllite is limonite-stained due to disseminated pyrite and contains quartz lenses.

The east side of the gulch is reported to contain fine-grained siliceous intrusive rock with quartz, pyrite, galena, and sphalerite (356). The gravel in the upper portion of the gulch is mainly phyllite that is very angular. Some quartz float and a little diorite occurs with the phyllite. The gold is coarser than anywhere else in the district, and nuggets are in general rough, sometimes containing pieces of quartz. It appears that the gold has not travelled far from its source. The large diorite boulders found in the Valdez

Creek do not occur in upper Lucky Gulch, indicating that the gulch may not have been glaciated during the most recent ice advance (213).

The lower portion of the gulch does contain diorite boulders, indicating that it may have been within the ice-marginal zone of reworked till and colluvium on Valdez Creek (247). Most of the gold lays on shallow bedrock in a fairly narrow zone within the creek bottom. It appears that the gold source has been for the most part worked out. Colluvium movement downslope into the gulch bottom has shifted the stream course in several places, possibly covering remnants of the gold-bearing channel.

BUREAU INVESTIGATION:

With the generous loan of mechanized equipment from the current mine owners, a series of placer samples were collected on bedrock in the narrow portion of the gulch approximately 1.3 miles above its junction with Valdez Creek. This site was upstream from obvious placer tailings, but some hand-sharpened wooden poles were found on the edge of one of the cuts. A sample from midstream taken down to bedrock 5 feet below the surface contained 0.004 oz/cy gold (Table A52, no 1197). A sample of mixed colluvium and stream gravel (no. 1198) contained 0.003 oz/yd^3 gold.

A sample collected from a recent cut in an active operation 0.6 miles above the stream mouth contained 0.012 oz/cy of coarse gold (no. 1336). A sample collected just downstream in the wall of another cut, just above bedrock and adjacent to timbers from a collapsed underground drift mine, contained 0.31 oz/cy gold (no. 1338).

A short distance southwest of this spot, on the west side of the gulch, a shaft has been sunk 25 feet through colluvium and stream gravel to bedrock. A drift extended for 9 feet along the bedrock surface. The operators did not appear to have found significant placer gold on the bedrock. Placer gold samples averaged 847 fine.

A sample (no. 1339) of concentrate obtained from the current operators contained 2.7 oz/ton silver which may be attributed to hessite, a silver tellurite previously noted in Lucky Gulch (356). Native bismuth has also been reported associated with galena, but though the above mentioned sample contained over 0.10% lead, it did not contain detectable bismuth. Sample no. 1197 contained 83 ppm bismuth.

RESOURCE ESTIMATE:

Sampling on upper Lucky Gulch did not locate economic amounts of placer gold. Old tailings and wood cribbing indicate that most of the near-surface gold-bearing gravel may have been mined out. Downslope movement of colluvium on the banks of the Gulch has probably caused shifts in the stream channel, possibly covering gold-bearing gravels. Extremely high grade placer gold values were found in the lower part of the gulch, but the yardage containing them is quite small. It appears that the bedrock surfaces beneath the alluvial fan formed where the creek leaves the gulch has not been thoroughly tested by drilling. Placer gold may occur here, if concentrated in preglacial bedrock channels, protected from dispersal by previous glacial advances on Valdez Creek. Ice-marginal deposits that formed in this area adjacent to glacial ice during a stage of advance may have concentrated economic amounts of gold (246). The depth of alluvial material here is unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for deep buried placer.

RECOMMENDATIONS:

1) A systematic gridded drilling program on the alluvial fan below the mouth of Lucky Gulch to test for gold-bearing gravels in buried bedrock channels and/or ice-marginal glacial deposits.

2) Systematic drilling or trenching through lobes of colluvium on the inside of stream bends in the upper gulch to test for possible covered gold-bearing gravels.

REFERENCES: 106, 107, 213, 214, 218, 246, 340, 356

TABLE A53 - ANALYTICAL RESULTS - LUCKY GULCH PLACER

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		oz/yd³	ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Au	Ag	Cu	Pb	Zn	As	Bi	
1197	P				0.004		0.5	150	8	114	50	8	Mixed colluvium and stream gravel on bedrock
1198	P				0.003		0.5	163	10	112	75	4	Stream gravel
1199	P				0.0001		0.5	163	18	90	90	2	Stream gravel
1200	P				0.0001		0.5	108	18	113	10	6	Bank run gravels and colluvium on bedrock
1334	P				0.00008		0.5	86	6	118	10	2	Taken above sample no. 1200
1335	S					320	1.0	19	30	4	390	ND	Vein quartz pile near cabin
1336	P				0.31		0.5	124	26	90	115	ND	Collected in cut 3-4 ft above bedrock in active mine
1337	S		0.11				33	50	1425	10	25	2	Galena-bearing quartz gobbles near sluice box
1338	P				0.012		0.5	104	18	88	115	ND	On bedrock in active workings
1339	S		7.0	2.71				72	1020	85	370	ND	Placer concentrate from active mine
1905	RC					60	ND	82	4	43	310	ND	Limonite stained argillite diss. pyrite
1919	S					220	ND	84	8	80	585	4	Quartz-carbonate vein float at head of placer cut

NAME(S): Yellowhorn Lode Prospect
Gold Hill, Accident Claim,
Lucky Claims

Map Location No. A 54
MAS No. 0020670117
Kardex No. 67-26, 46, 117

Deposit Type: Quartz veins
Commodities: Gold

LOCATION: Quadrangle: Healy A1
SW 1/4 Sec: 11 T: 20S R: 2E Meridian: Fairbanks
Geographic: North slope of Gold Hill, 0.5 miles west of Lucky Gulch.
Elevation: 3850 ft.

PRODUCTION: 2 oz gold (330)

HISTORY:

1906 - Yellowhorn Prospect discovered (336)
1921-23 - A few feet of tunnel driven (336)
1930-31 - Property restaked
1984 - Lucky Claims staked over prospect (330)
1987 - Colluvium mined for placer gold (330)

WORKINGS AND FACILITIES:

Some cavedadits and trenches. Placer washing plant and pole cache.

GEOLOGIC SETTING:

Exposures in the prospect area are poor, consisting mainly of tan weathered quartz muscovite phyllite/schist and vein quartz rubblecrop. The underground workings were caved, but previous examiners had access to the underground workings and described the schist as striking N75°W, and dipping 18°N. A 4-ft wide mineralized zone was exposed in one of the adits and which paralleled schistocyte. Small amounts of pyrite, galena and some gold were seen in the quartz. Samples of the mineralized zone carried up to 0.1 oz/ton gold. Free gold has been panned from the soils and weathered rock in the area.

BUREAU INVESTIGATION:

The workings described above were caved, but some samples were collected of vein quartz float found in the surface rubblecrop and on old dumps (Table A54). Samples of quartz float contained up to 410 ppb gold (no. 1351). Sample no. 1351 was collected from the dump of a prospect pit 0.3 miles southwest of the main prospect area.

A placer sample collected from soil and colluvium on schist bedrock contained 0.028 oz/yd^3 gold (no. 1343). The gold was very angular and fresh looking, indicating a short transport distance. This is the same location where 2 oz. of placer gold was reportedly mined in this cut (330). A sample collected of the bedrock contained 1.6 ppm gold (no. 1344) but this value may be in part due to contamination by gold-bearing clayey soil clinging to the rock fragments. The quartz vein exposure located on the Accident Claim (213), reported to lie a few hundred yards east of the Yellowhorn, was not located.

The State of Alaska Department of Geological and Geophysical Surveys, under contract with the Bureau of Mines, mapped the geology of the Gold Hill - Lucky Hill area and conducted an orientation soil survey at the Yellowhorn Prospect (353, 354, 355). The data from this study indicated a possible gold source further up Gold Hill from the Yellowhorn Prospect and another below the prospect.

Numerous random rock samples were collected by the Bureau on Gold Hill, most of which are not listed here. See (177) for these results.

RESOURCE ESTIMATE:

Samples of quartz vein float do not contain significant gold. The gold-bearing soil and weathered bedrock may not be a significant source of gold, but may indicate the presence of disseminated or vein stockwork-type deposits up slope from the Yellowhorn.

MINERAL DEVELOPMENT POTENTIAL:

Moderate development potential for small vein-type gold deposit and colluvial placer. Unknown potential for large low grade disseminated or stockwork-type gold deposits.

RECOMMENDATIONS:

Surface trenching to expose the Yellowhorn vein. Detailed soil and rock geochemical survey to determine source of colluvial gold on north side of Gold Hill.

REFERENCES: 177, 213, 330, 336, 353, 354, 355, 356

TABLE A54 - ANALYTICAL RESULTS - YELLOWHORN PROSPECT LODE

Sample no.	Type	Sample Length (feet)	Analysis							Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)					
			Au	Au	Ag	Cu	Pb	Zn	As	
1341	S			510	1	32	14	15	ND	Vein quartz float off dump
1342	S			ND	0.5	17	12	140	10	Vein quartz float
1343	P		0.028		10	121	4760	677	20	Sample from soil on bedrock
1344	RC			1600	0.5	54	66	514	5	Tan weathering schist bedrock on which no. 1343 was collected
1349	G			30	0.5	36	34	27	5	Vein quartz float
1350	S			5	1.0	21	14	9	ND	Vein quartz on dump
1351	G			410	1.5	24	22	126	20	Vein quartz on dump

NAME(S): Upper Valdez Creek Placer
G.G. Claims, Blue Sky Claims,
Hot Air Claims, Rusty Assoc.

Map Location No. A55

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 1, 2, 8, 9, 10 T: 20S R: 2-3E Meridian: Fairbanks
Geographic: Upper 6.5 miles of Valdez Creek above Show Me Creek.
Elevation: 3200 - 3700 ft.
Access: Road up Valdez Creek

PRODUCTION: Unknown.

HISTORY:

1904 - Claims staked in area and some mining done intermittently until present.
1989 - Shaft begun on G.G. Claims to test bedrock 70-80 ft beneath the surface.

WORKINGS AND FACILITIES:

Numerous tailings piles and remains of several washing plants, mainly along the stretch of Valdez Creek between White Creek and Lucky Gulch. A shaft was begun in 1989 as a result of 1988 drilling, which is hoped to intercept bedrock at 120 ft. The shaft was down 85 ft. in July of 1990.

GEOLOGIC SETTING:

The upper portion of Valdez Creek consists of a broad glaciated deep valley and the braided stream has cut a postglacial channel in its bottom. Bedrock is along this stretch of creek, which has made sampling and mining difficult. Drilling and shaft sinking indicates bedrock to be 70-100 ft between the surface. The upper Valdez Creek valley may have been too intensely glaciated to allow for the survival of preglacial gold-bearing bedrock channels. Gold concentrations supplied by tributary streams such as Lucky Gulch may have survived if their preglacial channels were not too deeply eroded (336).

BUREAU INVESTIGATION:

A series of placer samples were collected along the upper portion of Valdez Creek, both from its main channel and some side tributaries. A sample collected near bedrock on Fox Creek (Table A55, no. 1188) contained 0.002 oz/yd^3 gold. A sample collected above the junction of Valdez Creek with Roosevelt Creek junction (no. 1191) contained 0.002 oz/yd^3 gold. Sample no. 1907 was collected from an existing 25 ft. deep hydraulic cut in the bench gravels on the south side of Valdez Creek. It contained 0.017 oz/yd^3 gold. A larger 0.31 yd^3 bank run sample (no. 1884) was collected at this same location averaged 0.007 oz/yd^3 gold. A size fraction analysis was done on the sample and the results are shown in figures A55 and A56. The majority of the gold is in the +14 mesh fraction.

RESOURCE ESTIMATE:

If economic amounts of placer gold exist in the main drainage of upper Valdez Creek, they are probably in preglacial bedrock channels now buried by approximately 100 ft. of postglacial stream gravels. Samples of active stream gravel in the main Valdez Creek channel do not contain significant amounts of gold. Bench gravel on the margins of the present stream channel locally contain highly significant amounts of placer gold. These may have formed from the reworking of placer gold contained in medial moraine material formed down valley from the Lucky-Gold Hill area (246).

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for placer gold in preglacial bedrock channels buried deeply by postglacial stream gravel. Potential also exists in bench gravel above the present channel of Valdez Creek.

RECOMMENDATIONS:

Systematic drilling program to test bedrock surfaces for placer gold.

REFERENCES: 336, 246

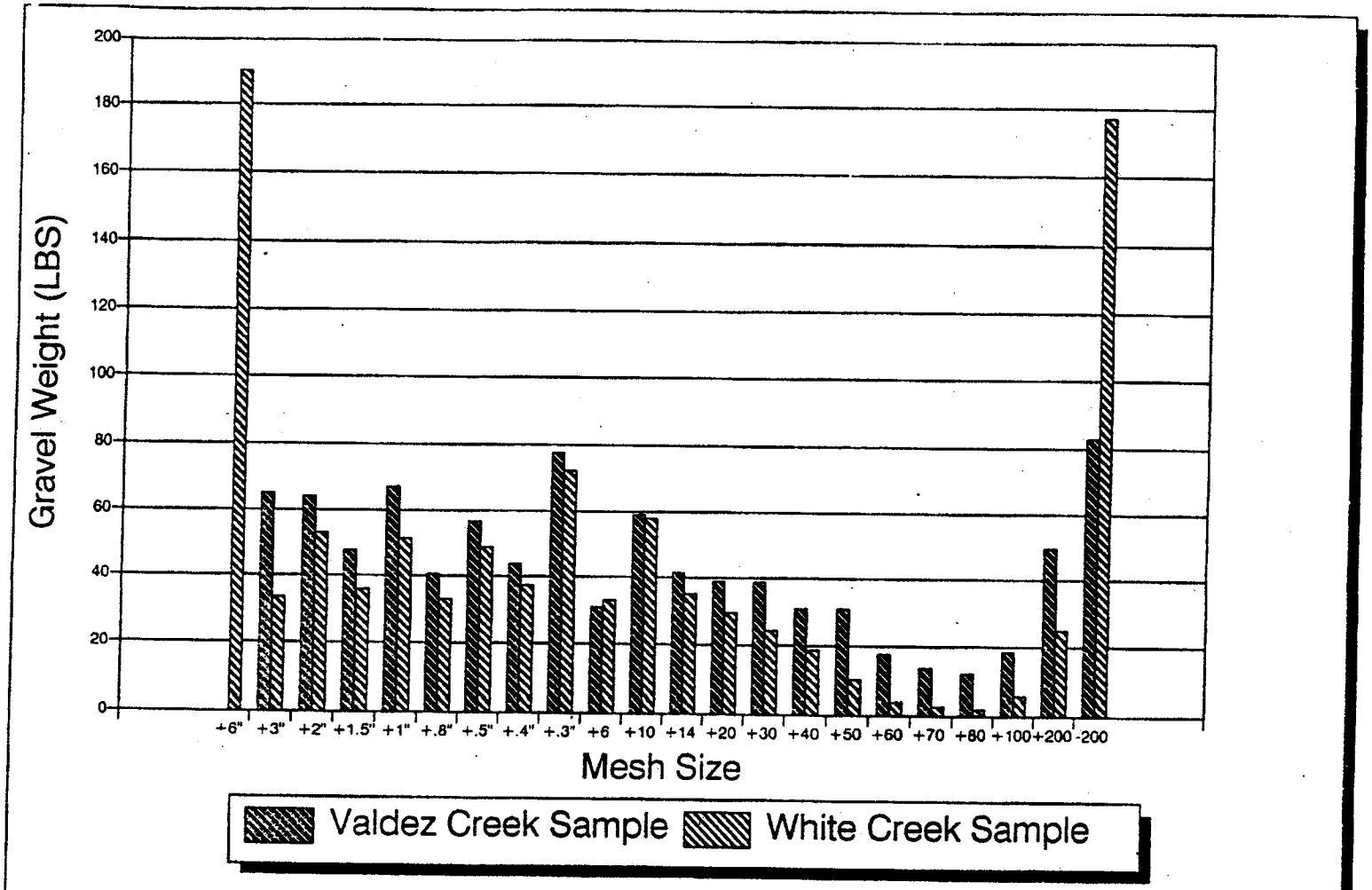


Figure A55. - Gravel size distribution analysis for samples collected in Upper Valdez Creek and White Creek

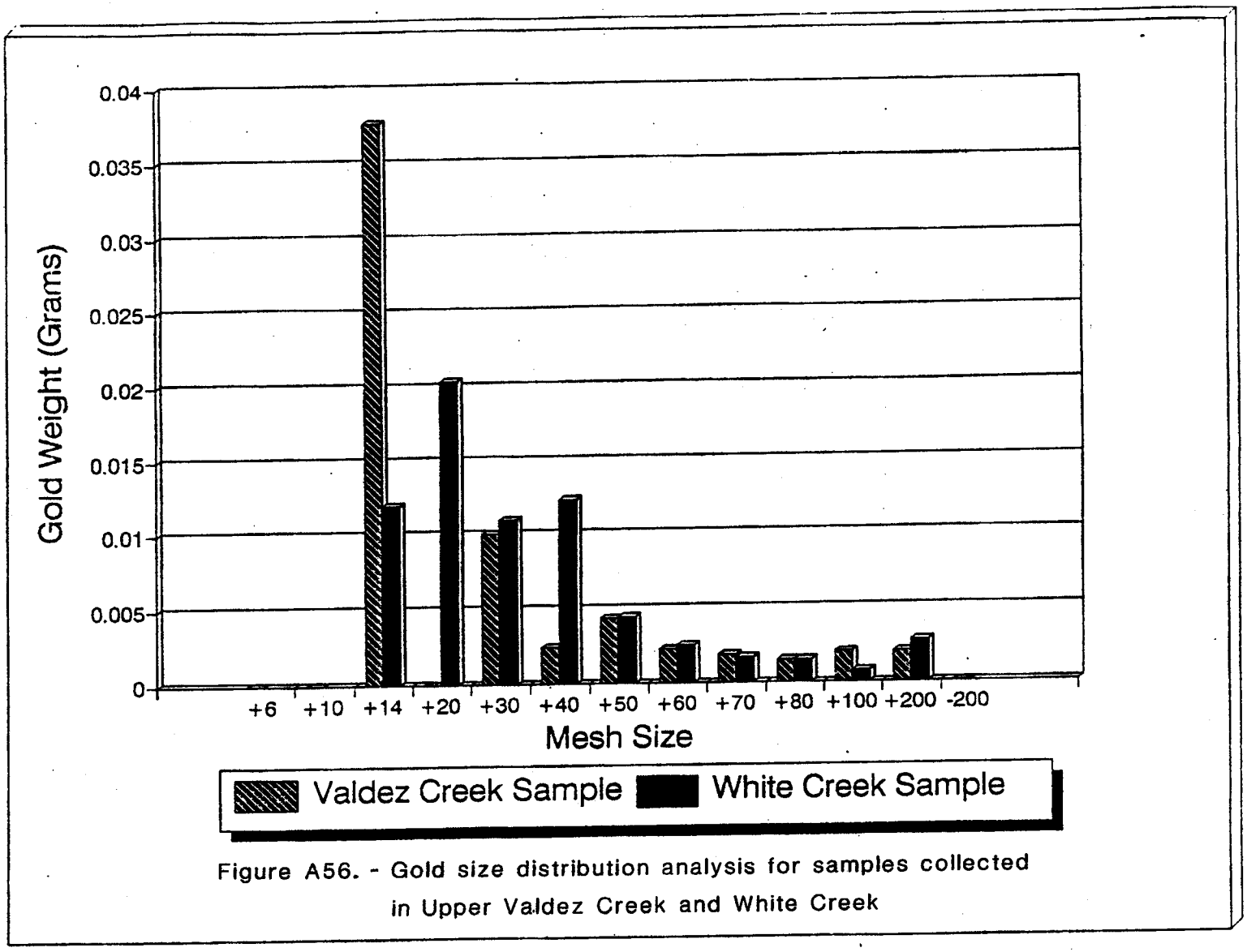


Figure A56. - Gold size distribution analysis for samples collected in Upper Valdez Creek and White Creek

TABLE A55 - ANALYTICAL RESULTS - UPPER VALDEZ CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)						
			Au	Au	Ag	Cu	Pb	Zn	W	As	
630	P			300	0.5	113	ND	58	110	ND	Collected on bedrock 1 coarse, 1 fine, 7 v. fine gold frags.
631	P		0.0002		0.5	20	16	52	70	ND	Not on bedrock
1185	P			10,000	1	14	ND	67	110	ND	Gold not recovered for weighing 2 v. fine gold frags.
1186	P		0.0004		0.5	24	10	70	70	ND	Active stream gravels abundant garnet
1187	P		0.0002		0.5	16	10	69	110	ND	Active stream gravels 1 coarse, 2 fine gold frags.
1188	P		0.0006		0.5	21	16	67	60	ND	Collected 3 ft. above bedrock 2 fine gold frags.
1189	P		0.0001		0.5	60	14	53	ND	ND	Active stream gravels 20+v. fine gold frags.
1190	P		0.0006		0.5	10	8	59	30	ND	Active stream gravels 10 v. fine gold, abundant garnet
1191	P		0.002		0.5	17	16	62	80	ND	Bottom of channel 100+v. fine gold frags.
1883	P			3000	ND	42	4	103	50	5	Bench gravel from wall of old hydraulic cut
1884	P		0.007		ND	45	10	150	ND	30	0.31 yd³ sample

TABLE A55 (CONT.) - ANALYTICAL RESULTS - UPPER VALDEZ CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)						
			Au	Au	Ag	Cu	Pb	Zn	W	As	
1906	P			2600	0.5	23	2	105	80	ND	Bench gravels south side Valdez Creek 4 v. fine gold frags.
1907	P			17	ND	9	2	103	90	ND	Old hydraulic cut in bench gravels 1 v. coarse, 3 coarse
1908	S			ND	ND	69	6	6	ND	15	Quartz cobble in placer tailings

NAME(S): Lower Valdez Creek Placer
Denali Placer Mine
Valdez Creek Mining Co.

Map Location No. A 56
MAS No. 0020670007,
0020679007,
0020670177
Kardex No. 67-139, 185
Mineral Survey No. 2320

Deposit Type: Placer
Commodities: Gold, Silver

LOCATION: Quadrangle: Healy A1
Sec: 7, 8, 18 T: 20S R: 2E Meridian: Fairbanks
Sec: 13, 23, 24 T: 20S R: 1E Meridian: Fairbanks
Geographic: From 1.0-4.0 miles up Valdez Creek from junction with Susitna River.
Elevation: 2500 - 3100 ft.
Access: Gravel road from Denali Highway.

PRODUCTION:

TABLE A - VALDEZ CREEK PLACER GOLD PRODUCTION (246) (343)

Year	Number of Mines	Employment	Volume of Gold (oz)	Volume of Silver (oz)	Total Bullion Value ($ at time of sale)
1904-1906	4	--*	7,862	1,164	165,102
1907	1	--	1,007	131	21,147
1908	1	--	4,837	677	101,577
1909	2	--	2,418	314	50,778
1910	-*	--	1,451	195	31,000
1911	-	--	1,451	195	31,000
1912	1	--	387	50	8,127
1913	1	--	290	24	6,050
1914	1	--	193	39	4,100
1915	4	--	1,186	155	24,906
1916	3	--	1,468	190	30,828
1917	5	--	1,601	208	33,621
1918	4	--	286	38	6,006
1919	-	--	94	9	2,000
1920	-	--	475	62	10,000
1921	3	--	958	124	20,100

TABLE A (CONT.) - VALDEZ CREEK PLACER GOLD PRODUCTION

Year	Number of Mines	Employment	Volume of Gold (oz)	Volume of Silver (oz)	Total Bullion Value ($ at time of sale)
1922	5	--	1,376	178	28,896
1923	4	--	970	128	20,370
1924	5	--	352	46	7,392
1925	5	--	261	34	5,481
1926	3	--	396	51	8,316
1927	2	--	357	47	7,497
1928	4	--	693	89	14,553
1929	3	--	1,168	157	24,528
1930	5	--	1,879	244	39,459
1931	5	--	1,597	207	33,537
1932	4	--	1,148	149	24,108
1933	2	--	195	26	4,095
1934	3	--	674	89	23,594
1935	3	--	1,323	172	46,305
1936	1	--	984	128	34,440
1937	3	--	1,031	138	36,085
1938-1940	-	--	-----*	---*	-------*
1941	1	15	44	6	1,540
1942	3	10	520	68	18,200
1943-1946	-	--	-----	---	------
1947	2	4	143	19	5,005
1948	2	2	24	2	840
1949	2	2	26	3	900
1950	-	--	-----	---	------
1951	1	1	18	2	630
1952-1956	-	--	-----	---	------

TABLE A (CONT.) - VALDEZ CREEK PLACER GOLD PRODUCTION

Year	Number of Mines	Employment	Volume of Gold (oz)	Volume of Silver (oz)	Total Bullion Value ($ at time of sale)
1957	1	1	19	2	675
1958	3	6	69	10	2,415
1959	1	1	3	---*	105
1960-1961	-*	--*	------*	---	------
1962	1	--	3	333	105
1963-1976	-	--	-----	---	------
1977	2	--	250	35	39,000
1978-1983	-	--	-----	---	------
1984	1	70	19,627	2,551	6,967,585
1985	1	105	29,833	3,937	9,606,226
1986	1	136	24,996	3,250	9,498,480
1987	1	150	21,068	2,823	9,585,940
1988	1	155	44,494	8,467	18,909,950
1989	2	175	62,403	9,568	22,980,500
TOTALS:	--	---	**243,908	36,201	78,523,094

* Data are not available; some minor placer gold production is known for the periods 1963-1976 and 1978-1983, but mine records are not available.

** Includes minor production from Lucky Gulch and White Creek.

HISTORY:

1903 - Gold placer deposits discovered on August 15 by Peter Monahan, J.S. Smith, J.M. Johnson, and J.C. Clarkson (213). 100 oz. of gold was mined in two weeks (194).
1904 - The Tammany Bench was discovered and mining done (263).
1905 - A minor rush occurred with as many as 150 miners in the area (250).
1906 - Rich placer ground discovered with a $1,000 nugget reported and very coarse gold found (35).
1907 - Discovery of rich placer ground on benches of Valdez Creek (35).
1908 - Gold production totals reported to be between $175,000 to $200,000 (214). Mining restricted to Discovery claim. A hydraulic plant was installed below Willow Creek. Mining done with 120 men employed, 20 stayed the winter (214).

TABLE A (CONT.) - VALDEZ CREEK PLACER GOLD PRODUCTION

1909 - About 100 men were employed on 10 claims, with the gold output valued between $50,000 to $75,000 (37).

1910 - Mining done on Valdez Creek and assessment work done on claims not mined (218). Total gold production through 1910 was estimated to be about $275,000 (213). Claims under control of the Valdez Creek Placer Mines Co. (216).

1911 - Mining and assessment work done (216).

1912 - A few small plants operated with several claims worked in previous years being idle pending the launching of a larger mining enterprise (39). Most placer ground consolidated under one company (263), the Valdez Creek Placer Mines (250). The Tammany Channel has been drift mined up to 1912 with a total of 1450 ft. of workings. 35 men employed (356).

1913 - A hydraulic plant was installed and completed before the end of the summer. Some sluicing was done. Several small operations on Valdez Creek and it's tributaries were mined (29). About 25 men were employed (216). A small amount of gold produced (216).

1914 - A larger hydraulic plant was installed to replace the smaller plant (216). Some sluicing was done (30).

1915 - The hydraulic plant was operated (31).

1916 - Valdez Creek was one of the most productive placer mines (300). The hydraulic plant was operated (32).

1917 - Hydraulic mining done (263). Platinum was reported in the concentrates but had not been confirmed (191).

1918 - Hydraulic mining done (263).

1919 - Mining done

1920 - Some mining done and plans were under way for re-operating the hydraulic plant which was idle for several years (33).

1921 - The hydraulic plant was in operation working bench gravels (34).

1922 - The hydraulic plant was in operation (41).

1923 - The hydraulic plant was in operation (213). The McKinley Placer Mining Co. suspended it's hydraulic operation early in the fall (356).

1924 - The hydraulic plant was in operation (263). Drift mining started during winter months (356).

1925 - Idle. Production to date is approximately $400,000 (356).

1926 - Mining was done on the property of the McKinley Gold Placers Co. Construction work was done on a ditch to bring water to the bench claims near the mouth of Valdez Creek. A little productive mining was in progress (263).

1927 - The Rich Folk Claim was discovered by natives (263). Mining was done on the bench claims on the north side of the creek by up to 5 men, who recovered more than a few hundred dollars worth of gold (284).

1928 - Mining by hydraulic methods in the valley, mining on the bench claims, and some drift mining. Somewhat larger output than past years (284).

1929 - Hydraulic mining in the valley, mining on the bench claims, and some drift mining (284).

1930 - Hydraulic mining, mining on the beach claims (290). Total production through 1930 was about $560,000 (about 27,000 fine oz. of gold)(263). The Tammany Channel to date has processed 500,000 yds^3 of material, yielding approx. 6,750 oz. of gold ($236,000 at $35/oz) (263).

1931 - Hydraulic mining, the largest output from the properties was mined by John E. Carlson and associates. 8 to 10 men were employed (290). Official post office opened at townsite of Denali (248).

1932 - Hydraulic mining by John E. Carlson and associates, with 10 to 15 men employed. A larger amount of gold was recovered than in the past 10 years (290).

1933 - Hydraulic mining done by John E. Carlson and associates with 10 to 15 men employed. More gold was recovered than in 1932 (290).

1934 - Hydraulic and drift placer mining. Wallace Fairfield and Dan Ohman with 6 others were hydraulicking; Ole Nicola with 4 others were mining by hand, and Fred Bucke with 6 others sank a shaft 140 ft., with considerable drifting on bedrock (291).

1935 - Hydraulic and drift mining. Wallace Fairfield and Dan Ohman with 8 others were hydraulic mining, Ole Nicola with 3 others were mining by hand, and Fred Bucke with 4 others during the winter and 6 others during the summer did considerable drifting and sluicing (292).

1936 - Production to date is approx. 34,900 oz. gold ($720,000) (336).

1937 - Hydraulic and drift mining. The principle producing camps were those of Carlson, Fairfield and Ohman, and Bucke. The highest output of gold recovered since the deposits were discovered but a few thousand dollars less than the boom year of 1908 (296).

1938 - Hydraulic and drift mining. Fewer camps were operated, the largest was that of John E. Carlson and associates. The gold production was higher than in 1937. Some nuggets weighed an ounce or more (294).

1939 - Hydraulic and drift mining. The principle outfits were Carlson and associates and Tunnell Mining Co. (Fairfield and associates). Several native Indians mined a claim, making a good living (296).

1940 - Hydraulic and drift mining. The principle outfits were Carlson and associates, and Fairfield and associates. Gold recovered on the Folk claim was unusually coarse (297).

1953 - Two men hydraulic mining along left limit of Valdez Creek (218).

1956 - Renewed interest in area with numerous claims staked (154).

1964 - Placer production from the Valdez Creek district (immediate vicinity of Valdez Creek) was more than $500,000 (172).

1968-1969 - As part of a heavy minerals program the USGS undertook a seismic exploration program (306).

1973 - Valdez Creek had the most significant mining activity in the Valdez Creek district since WWII (70).

1979-1982 - Denali Mining Limited consolidated their claims, and large scale mining was attempted (25). A large washing plant was assembled and put into operation processing Tammany Channel gravel (359).

1983 - Property acquired by a joint venture group of six companies led by Camindex Mines Limited of Toronto. A large scale drilling program delineated reserves of 56,000 ounces of gold (25).

1984-1988 - Mine placed in production by the joint venture with SUM Resources, a subsidiary of Sullivan Mines as operator (25).

1989 - Continued production management, by Camboir joint venture until mine closed in October (150).

1990 - Work begun in August by Camboir Alaska ditch to divert Valdez Creek around mine workings (343).

WORKINGS AND FACILITIES: Early mining at Denali consisted of hand sluicing, hydraulic mining, and underground drift mining. A total of 5000 ft. of drifting was done before underground mining ceased in 1942. A camp near the gold-bearing placers on Valdez Creek, (later Denali), boasted a population of 120 men 1908, and it had its own post office from 1915-1942. It is interesting to note that Valdez Creek is one of the few mining areas in Alaska where Natives placer mined successfully on their own (106), (303).

Large scale open pit mining begun in 1979 and continued into fall, 1989. Stripping and mining were accomplished by large hydraulic shovels and dirt was hauled to the washing plant by 25 yd^3 capacity trucks. In 1988 this method

averaged 1747 cy of gold-bearing gravel mined per day, containing 0.127 oz/cy gold, and with a stripping ratio of 14:1. In some areas over 200 ft. of glacial till overburden was removed to exposed the lower 5-10 ft. of gold-bearing gravel in bedrock channels. The sluicing system accommodated 2,000 yd^3/day in 1987. The operation employed up to 170 people and worked year-round with a camp on site. Drilling and blasting were used to loosen the compacted and sometimes frozen gravels. In order to continue mining upstream on the buried channels, the current Valdez Creek drainage needs to be diverted for a length of approximately 10,000 ft. (150).

The current operators hope to begin this project in Spring 1990 (343).

GEOLOGIC SETTING:

Bedrock exposed in lower Valdez Creek consists of Jurassic argillite and Cretaceous spotted phyllite. The general strike of the metasediments is slightly north of east, and the prevailing dip is to the north. A small body of Late Cretaceous quartz monzodiorite in contact with hornfelsed argillite was exposed by placer mining in 1989. Associated quartz veining is mainly confined to the intrusive and the body may be associated with the Timberline stock exposed an intrusive body 1 mile to the east (343).

During the Sangamon (mid-Pleistocene) interglacial time period the first of a series of superimposed straight to meandering v-cut channels were incised into bedrock by ancestral Valdez Creek, and gold-bearing fluvial gravels were deposited in them. The main channels from oldest to youngest are: B channel, A channel, and the Tammany Channel. The channel system was later buried during late Wisconsin glaciation by a mantle of boulder-rich glacial till from 60 to over 200 feet thick. Since the channels were deeply incised, cutting up to 80 ft. into bedrock, the preglacial placer gold concentrations were protected from the dispersing effects of the four glacial advances that affected the area. The Tammany Channel was discovered in 1904 and mined by hydraulic and underground methods, while the A and B channels were discovered by drilling in the 1980s. Valdez Creek tributaries, such as White and Timberline Creeks, probably did not contain preglacial channels, and placer gold concentrations there were dispersed by glacial advances. The fluvial gravels average 10-12 feet thick and contain well sorted sand to cobble-size gravels, silt/clay layers, and locally large boulder lag (246).

Placer gold occurs throughout the fluvial gravel but is concentrated in the lower 5 to 9 ft of the channels. Both smooth flake and round nuggety gold occur with larger pieces averaging 0.1 oz in weight. To date the largest recorded nugget found weighs 7 oz. The gold averages 852-fine. During 1989 the average grade mined was 0.127 oz/yd^3 gold (25), (150), (303).

BUREAU INVESTIGATION:

A sample of placer concentrate, less the recoverable gold, was donated by the mine owners and was analyzed (Table A56, no. 889). Its anomalous arsenic content probably comes from arsenopyrite-bearing quartz veins and intrusive rocks in the area. Quartz on Lucky Hill and in Timberline Creek contain arsenopyrite, and a sample of quartz monzodiorite bedrock in the active mining area on Valdez Creek contained 40 ppm arsenic (no. 2778).

A 0.24 yd^3 sample of gold-bearing gravel and underlying bedrock (no. 888) was collected from the A channel and a size fraction analysis done (figures A57 and A58). The majority of the gold occurs in the +14 mesh fraction, but a significant amount occurs up to, and including, the +50 mesh fraction.

Bureau of Mines Spokane Research Center conducted tests at the Denali Mine in 1988 to determine the feasibility of underground drift mining in the gold-bearing buried channel gravels. The project goals were to:

1. Conduct a literature search concerning past and current techniques for underground mining of frozen and unconsolidated gravels;

2. Review civil tunneling projects in underground gravel;

3. Review current sampling and in situ testing methods for gravel; and

4. Review computer codes used to evaluate and/or design tunneling or mining concepts in gravel.

An unpublished progress report is available (14) with a final report on the research is pending.

The Bureau supported a geology graduate student at the University of Alaska Fairbanks studying supergene gold transport in placers, using the Denali Mine as a study site. The publication of his thesis "SEM and Statistical Analysis of the Weathering of Placer Gold from Valdez Creek, Alaska" is pending (327).

The major source of the placer gold probably has its source in the Lucky-Gold Hill area approximately 1.5 miles upstream, where gold-bearing quartz veins occur and colluvium contains placer gold. Other lesser sources include White Creek and its tributaries, and Timberline Creek. The higher grade metamorphic rocks on the north side of Valdez Creek do not appear to be a bedrock source of gold (213), (246).

RESOURCE ESTIMATE:

Denali Mine (343)

Reserve Category	Ore Volume (Bank Cubic Yards)	Grade (oz/cy)	Raw Gold (oz)	Silver (oz)
Measured	2,122,564	0.086	182,226	26,969
Indicated	1,784,239	0.072	127,658	18,893
Inferred	11,708,921	0.038	446,653	66,105
Total Reserves	15,615,724	0.048	756,536	111,967

MINERAL DEVELOPMENT POTENTIAL:

Moderate to high development potential for placer gold.

RECOMMENDATIONS:

A shallow low-grade source of placer gold may exist in the alluvial fan produced by Valdez Creek where it enters the Susitna River drainage. This resource may be recoverable with a dredge. A drilling program would be needed to adequately test this ground.

Production costs need to be lowered to make the operation more profitable. An underground mining method may be one option.

REFERENCES:

14, 25, 30, 31, 32, 35, 37, 39, 41, 42, 44, 70, 106, 150, 153, 172, 191, 194, 213, 214, 215, 217, 246, 248, 250, 263, 268, 284, 285, 289, 290, 291, 292, 294, 296, 297, 301, 304, 307, 327, 328, 336, 343, 356, 359

TABLE A56 - ANALYTICAL RESULTS - DENALI PLACER MINE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)								
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sn	Hg	Co	
889	P			0.88	*AD	30	60	44	72	1270	11	2	41	Placer concentrates less recoverable gold
2778	G					ND	82	8	60	40	NA	ND	11	Quartz monzodiorite, diss. pyrrhotite

* Above detection limit

NAME(S): Rusty Creek Lode Occurrence Map Location No. A57

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy A1
N 1/2 Sec: 22 T: 20S R: 2E Meridian: Fairbanks
Geographic: On west wall of Rusty Creek, 1.8 miles above its mouth. Elevation: 3970 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the area consists of Jurassic greenstone and lithic tuffs. Locally quartz veins cut the volcanic rocks (303).

BUREAU INVESTIGATION:

A sample of quartz vein-bearing float was collected from talus beneath an outcrop of volcanic rock (Table A57, no. 1917) contained 0.03 oz/ton gold. Two other float samples collected in the vicinity contained no significant gold, but were anomalous in arsenic (no.'s 1915 - 1916).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Low potential for gold-bearing quartz veins.

RECOMMENDATIONS: Sampling of outcrops above gold-bearing float sample site.

REFERENCES: 303

TABLE A57 - ANALYTICAL RESULTS - RUSTY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	W	As	
1915	S				ND	ND	162	2	4	ND	105	Quartz float near trench, trace chalcopyrite, malachite
1916	S				5	0.5	172	2	62	10	605	Quartz-carbonate vein float, arsenopyrite
1917	S		0.03		1060	ND	114	10	21	ND	35	Vein quartz float

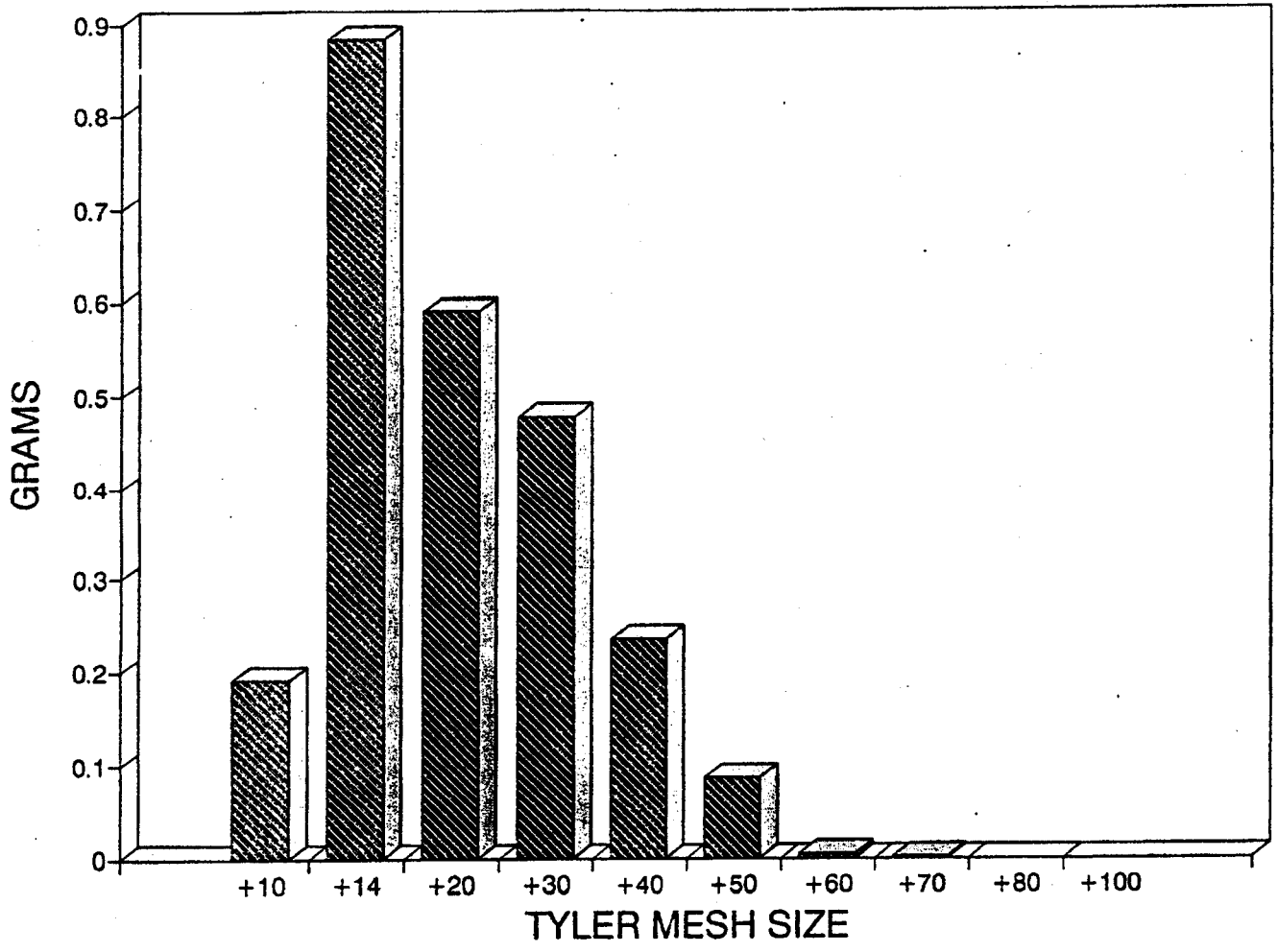


Figure A57. - Gold size distribution in bedrock, A Channel, Denali Placer Mine

NAME(S): White Creek Placers, Big Rusty Creek Little Rusty Creek, Rusty Creek, White Creek Claims, Rusty Assoc., White Gold Claims, Rustler Claims

Map Location No. A 58
MAS No. 0020670124
Kardex No. 67-33, 42, 114, 145, 214, 281

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 10, 11, 13, 14, 15 T: 20S R: 2E Meridian: Fairbanks
Geographic: South tributary to Valdez Creek, 7 mi. above its junction with the Susitna River.
Elevation: 3200-4200 ft.
Access: Road up Valdez Creek from the Denali Highway.

PRODUCTION: 500-600 oz. (303).

HISTORY:

1908-1910 - Small-scale placer operations on White and Rusty Creeks (1). Near the mouth of Rusty Creek a cut several hundred feet long and 25 feet deep was excavated. A boom dam was built and used to excavate the cut (213).

1931 - Hydraulic cut mined on the east side of White Creek, on the slope of Gold Hill (262).

1936 - Alaska Central Mining and Exploration Company placer drilling conducted above and below hydraulic cuts mined in 1931. Bedrock averaged 20 feet deep (336).

1987 - Placer drilling by Ashton Exploration parallel to lower White Creek, near junction with Valdez Creek (186).

1988-1989 - Active mining in bench gravel on east side of White Creek downstream from hydraulic cut. Placer drilling across drainage in upper White Creek (186).

WORKINGS AND FACILITIES:

A variety of washing plants, bulldozers, buildings, and trailers. Hydraulic tailings on the east side of White Creek on the slope of Gold Hill and a recent large placer mining cut is located just downstream from the old workings near the junction of Big Rusty and White Creeks. The remains of a boom dam can still be seen on lower Rusty Creek.

GEOLOGIC SETTING:

The majority of the White Creek drainage is composed of Jurassic argillite cut by dikes of intermediate composition (303, 355). Hydraulic workings in bench gravel on the east side of the creek cut into phyllite bedrock. A diorite exposed by the hydraulic workings contained trace galena, and galena pebbles recovered during sluicing contained native bismuth. Native arsenic and hessite, a silver tellurite, were also noted. The galena pebbles assayed 1.90 oz/ton gold and 283.6 oz/ton silver (356). Realgar, orpiment, and native copper were also found in placer concentrates. The gold is rough and shows little evidence of flattening, suggesting that it may not have been transported far from its source (356).

BUREAU INVESTIGATION:

A series of placer samples was collected along the length of White Creek from surface gravel, recent placer workings, and test pits (Table A58). A bulk placer sample (no. 1880) collected from an active mining cut in bench gravels above bedrock just downstream from the old hydraulic workings contained 0.007 oz/cy gold with the majority occurring in the +20 mesh fraction (appendix figures A55 and A56). The gold recovered was both ragged and rounded. This may indicate two sources: one nearby on the slopes of Gold Hill and another source further up the White Creek drainage. Sample no. 1881, collected from a 15 ft. deep test pit in bench gravels 50 ft. vertically above the present stream channel contained 8 coarse and 10 fine pieces of gold. The pit was on the same side and 500 ft. down stream from where no. 1880 was collected. The gold was not recovered for weighing and bedrock was not observed in the bottom of the pit. Placer samples collected on upper White Creek as well as on Big Rusty Creek contained no significant gold. Sample no. 1882 collected from bank gravel below the remains of the boom dam contained 2 coarse and 12 fine gold flakes. Gold-bearing quartz lenses and veinlets on the slopes of Gold Hill may be the source of the placer gold (262).

RESOURCE ESTIMATE:

Bureau sampling indicates highly significant gold values in bench gravel on the east side of lower White Creek. These may be ice-marginal or medial morainal deposits formed during an episode of glacial advance (247).

MINERAL DEVELOPMENT POTENTIAL:

A moderate potential for placer gold in bench gravel on White Creek.

RECOMMENDATIONS:

Examine data from Ashton Exploration drill program . Drill testing of bench gravel on the east side of White Creek below Lucky Hill and buried bedrock channels beneath the White Creek alluvial fan.

REFERENCES: 186, 213, 246, 262, 303, 336, 355, 356

TABLE A58 - ANALYTICAL RESULTS - WHITE CREEK PLACERS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd³	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	W	As	
1879	P				0.001	4.0	55	4	108	70	15	From bench gravel in active mining cut
1880	P				0.007	1.0	126	6	136	ND	30	0.33 yd³ bulk sample from same location as no. 1880
1881	P				ND	3.0	41	6	110	50	15	15 ft deep trench in bench gravel 8 coarse 10 fine gold
1785	P				0.014	ND	80	8	118	30	ND	Sample from plunge pool no visible gold
2021	P				0.004	ND	80	4	115	30	5	Active stream gravel no visible gold
2022	P				2.2	ND	68	20	110	30	5	Active stream gravel 7 v. fine gold
1786	P				0.110	ND	68	2	111	30	ND	Active stream gravel
1882	P				ND	ND	54	6	108	30	10	Bank run from old placer cut below boom dam. 2 coarse, 12 fine gold

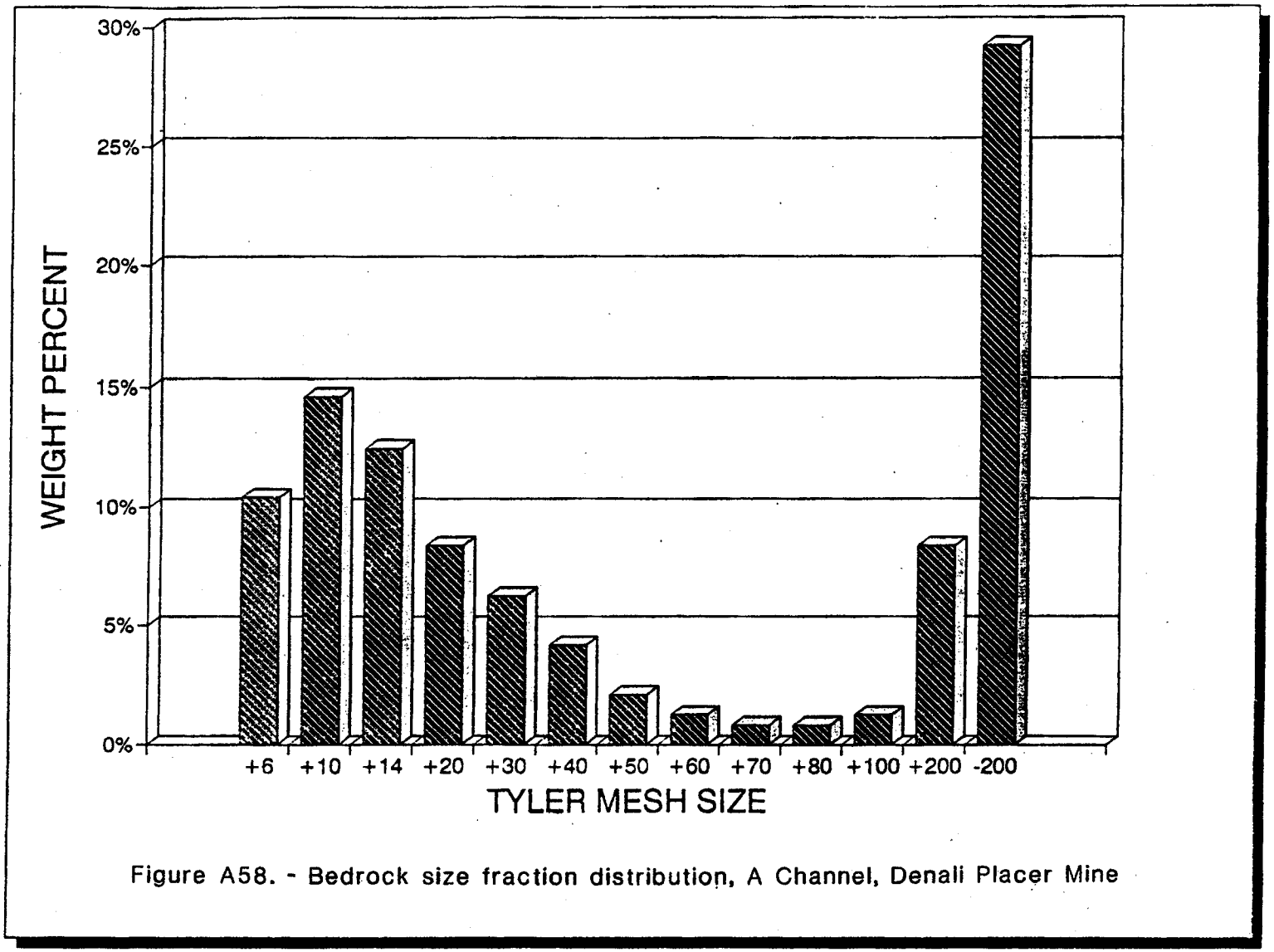


Figure A58. - Bedrock size fraction distribution, A Channel, Denali Placer Mine

NAME(S): Sunny Gulch Lode Prospect, Upper Timberline Creek Lode Occurrence, Jess Claims, Denali Lode, Campbell and Boedeker, Camel Creek, Daisy Claims

Map Location No. A59
MAS No. 0020670120
Kardex No. 67-116, 132

Deposit Type: Vein/disseminated
Commodities: Gold

LOCATION: Quadrangle: Healy A1
NE 1/4 Sec: 20 T: 20S R: 2E Meridian: Fairbanks
Geographic: Ridges along both sides of Sunny Gulch, a tributary to Timberline Creek.
Elevation: 3600-4500 ft.
Access: Road up Timberline Creek from Valdez Creek.

PRODUCTION: None.

HISTORY:

1936 - Campbell and Boedeker prospecting and driving an adit in next gulch east of Sunny Gulch (Camel Creek) (336).
1962 - Denali Lode claims staked.
1988 - Core drilling on east side Camel Creek (112).

WORKINGS AND FACILITIES: Caved adit and numerous trenches.

GEOLOGIC SETTING:

An east-west trending contact between altered quartz diorite and argillite extends for 1 mile across lower Sunny Gulch. Faults within the argillite run parallel to the intrusive contact and have been traced at least 5 miles east to the Black Creek Lode Prospect. Near the contact, the argillite is sheared and limonite stained. Locally, the sheared argillite contains disseminated pyrite. The rocks near this contact are reported to be anomalous in gold and arsenic (306).

BUREAU INVESTIGATION:

Sheared siliceous argillite and quartz lenses along the argillite-diorite contact were sampled between Sunny Gulch and Camel Creek. The argillites contained up to 20 ppb gold and 1 ppm silver (Table A59, no. 1449). A piece of vein quartz breccia float contained 0.13 oz/ton gold and 0.17% arsenic (no. 1333).

On the west side of Camel Creek a caved adit was driven into sheared diorite and quartz near its contact with argillite. Gold could be panned from the adit dump, but a select rock sample, also from the dump, only contained 225 ppb gold. In 1988 this shear zone was drilled just down stream on the east side of Camel Creek. The hole was discontinued at 75 feet due to poor drilling conditions (4). A sample collected from the sheared chloriodized diorite (no. 1331) contained 410 ppb gold. The diorite does not extend east of Camel Creek, but a sheared contact between tuffaceous (?) volcanic rocks and argillite can be traced over the ridge to the east. The argillite shows signs of shearing and contains discontinuous quartz-carbonate veins. Quartz float near some prospect trenches contained visible galena and chalcopyrite

(no. 1792) and assayed 0.39 oz/ton Ag, 0.24% lead, and 325 ppm arsenic. The silver minerals are probably associated with the galena.

The volcanic rocks are limonite-stained, siliceous, and contain finely disseminated sulfides. One sample (no. 1450), collected near a trench, contained 40 ppb gold and 10 ppm arsenic. This quartz vein-bearing volcanic unit may extend as least as far east as the Rusty Creek drainage where similar occurrences exist (map no. A57).

RESOURCE ESTIMATE:

Th gold and silver values in the quartz-carbonate veins do not represent any significant tonnage. Larger tonnages of low grade gold/silver-bearing rocks may exist along extensions of the sheared silicified rocks at the contact of the diorite and argillite. Also the silicified tuffaceous volcanic rocks may contain low grade resources of silver and gold.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for low grade gold deposits.

RECOMMENDATIONS:

Drilling of the diorite/argillite contact and silicified volcanic rocks to evaluate the precious metal content at depth.

REFERENCES: 112, 303, 306, 336

TABLE A59 - ANALYTICAL RESULTS - SUNNY GULCH LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Hg	As	
664	RC				5	1	88	6	98	ND	5	Argillite near contact w/diorite diss. pyrite
665	G				5	0.5	32	10	4	ND	5	Vein quartz rubble crop
1446	S				10	0.5	8	10	10	1	45	Carbonate vein float in pit
1447	G				ND	0.5	55	ND	89	0	10	Limonite-stained argillite
1448	G				15	0.5	123	ND	90	ND	10	Limonite-stained vuggy vein quartz float
1449	G				20	1	62	ND	94	ND	15	Limonite-stained argillite near diorite contact
1500	S				100	1	72	6	15	ND	ND	Limonite-stained quartz-carbonate float
1329	P				9360	18	570	0.12%	551	ND	490	Gravel on altered intrusive bedrock
1330	G				225	0.5	77	20	59	ND	10	Limonite-stained sheared diorite pyrite
1331	RC				410	0.5	73	14	69	ND	5	Sheared chloriodized intrusive rocks
1332	S				10	0.5	79	14	38	ND	15	Vein quartz float trace pyrite
1333	S		0.13	0.15	4500	0.5	683	14	39	ND	1655	Limonite-cemented quartz breccia
1498	G				ND	0.5	27	ND	59	ND	ND	Diorite on edge of trench

TABLE A59 (CONT.) - ANALYTICAL RESULTS - SUNNY GULCH LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Hg	As	
1499	G				ND	0.5	45	ND	109	ND	45	Diorite
1792	G		NA	0.39	95	13.5	0.11%	0.24%	38	ND	325	Quartz-carbonate float, galena, chalcopyrite
1793	G				105	10.5	337	0.32%	4	ND	245	Quartz-carbonate vein float in trench
1794	RC				ND	0.5	52	4	83	ND	5	Limonite-stained siliceous volcanic rocks
1795	RC				ND	0.5	80	36	20	ND	165	Limonite-stained siliceous volcanic rocks
1796	RC				ND	0.5	72	14	52	ND	10	Limonite-stained siliceous volcanic rocks
1913	S				ND	0.5	ND	108	ND	ND	ND	Quartz-carbonate veinlets in argillite
1914	S				ND	ND	140	44	11	ND	5	Quartz-carbonate vein float
1450	S				40	0.5	62	4	10	ND	10	Silicified bleached float near trench

NAME(S): Timberline Creek Lode Prospect
Alaska Exploration and Mining Company
Timberline Claims
Caribou Veins

Map Location No. A60
MAS No. 0020670127
Kardex No. 67-28

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy A1
NE 1/4 Sec: 17 T: 20S R: 2E Meridian: Fairbanks
Geographic: Ridge on north side of Timberline Creek, 1.5 miles above junction with Valdez Creek.
Elevation: 3650-4400 ft.
Access: Road up Timberline Creek from Valdez Creek.

PRODUCTION:

A few tons of ore milled in 1934, but gold production unknown. Pocket mining by hand methods reported to produce 1 oz gold per day (106).

HISTORY:

1925 - Lode gold discovered on north side of Timberline Creek (106).
1926-1927 - Some surface work on Big and Little Caribou veins. Claims abandoned shortly afterwards (336).
1931-1933 - Claims restaked and surface exploration. Claims acquired by Alaska Exploration Co. (336).
1934 - Small mill installed on Timberline Creek and surface work undertaken on the veins. Mill equipment consisted of jaw crusher, ball mill, classifier, and amalgamating plates. A few tons of ore milled, and gold recovery reported to be satisfactory (336).
1935-1936 - Tunnel started to intersect caribou veins 200 feet below outcrops; Big Caribou vein intersected at that time. The Little Caribou vein was intersected later, and tunneling stopped at 550 ft (336)
1987 - Trenching done with bulldozer.

WORKINGS AND FACILITIES:

Two caved adits, numerous trenches, mill building and bunkhouse.

GEOLOGIC SETTING:

Wallrocks in the prospect area consist of argillite and phyllite that have been intruded by a late Cretaceous quartz diorite stock. All of these rocks have undergone low grade metamorphism, and the metasediments have been hornfelsed along the diorite contact. A series of shears and faults cut all rock types and probably were the result of the latest regional metamorphic event. A conjugate set of N80°W to east-west and N50°E high angle faults form the main mineralization controls. Offset of the diorite-metasedimentary contact indicates left-lateral strike slip displacement along the N80°W set. The altered quartz diorite stock is the main host for mineralization, which consists of gold-bearing quartz-carbonate veins formed in the dilettante zones of the shears and faults. The country rocks are chloriodized adjacent to the veins. The veins contain gold arsenopyrite, pyrite, pyrrhotite, and minor chalcopyrite. The quarts veins are discontinuous, steeply dipping and lens-

like within the faults which show on the surface as shallow depressions over 1000 feet long. Underground workings have intersected the veins in fault zones up to 200 feet beneath the surface. Veins vary from a few inches to two feet in width and the associated alteration envelopes are up to 8 feet wide.

BUREAU INVESTIGATION:

A geologic map was made and a series of rock samples collected from the surface workings (fig. A60, Table A60). Gold-bearing quartz veins contained up to 3.71 oz/ton gold (no. 1281), and averaged 0.30 oz/ton gold. The values are very spotty and the veins lens-like and discontinuous. The veins sampled averaged 2.5 ft in width.

None of the underground workings were accessible. Previous underground sampling indicated very low gold values at depth in the Big and Little Caribou fault zones. The sheared diorite on the vein selvedges does not contain significant gold.

Quartz monzodiorite was uncovered in 1989 during placer mining on Valdez Creek, 1 mile west of the Timberline lode prospect. A sample collected by the Bureau contained 40 ppm arsenic (no. 2778; Table ___). Another sample of the same rock type collected by Alaska State Geological Survey Geologists contained 2 ppb gold (344). The monzodiorite may be related to the Timberline stock.

RESOURCE ESTIMATE:

Sampling by the Bureau and previous workers indicate that the gold values in the quartz veins are spotty and that the veins themselves are discontinuous and lens-like. The Little Caribou fault is cut 350 ft. on its down dip extension from the surface by the lower adit and does not contain gold values (304).

Previous mining consisted of a few tons of ore mined from small high grade pockets in quartz veins (6). These appear to have been exhausted. Quartz veins carrying significant gold are mostly confined to the quartz diorite.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for gold in pockets in quartz veins beneath the ridgetop north of Timberline Creek.

RECOMMENDATIONS: Core drilling to evaluate the quartz veins at depth.

REFERENCES: 106, 143, 303, 304, 335, 343

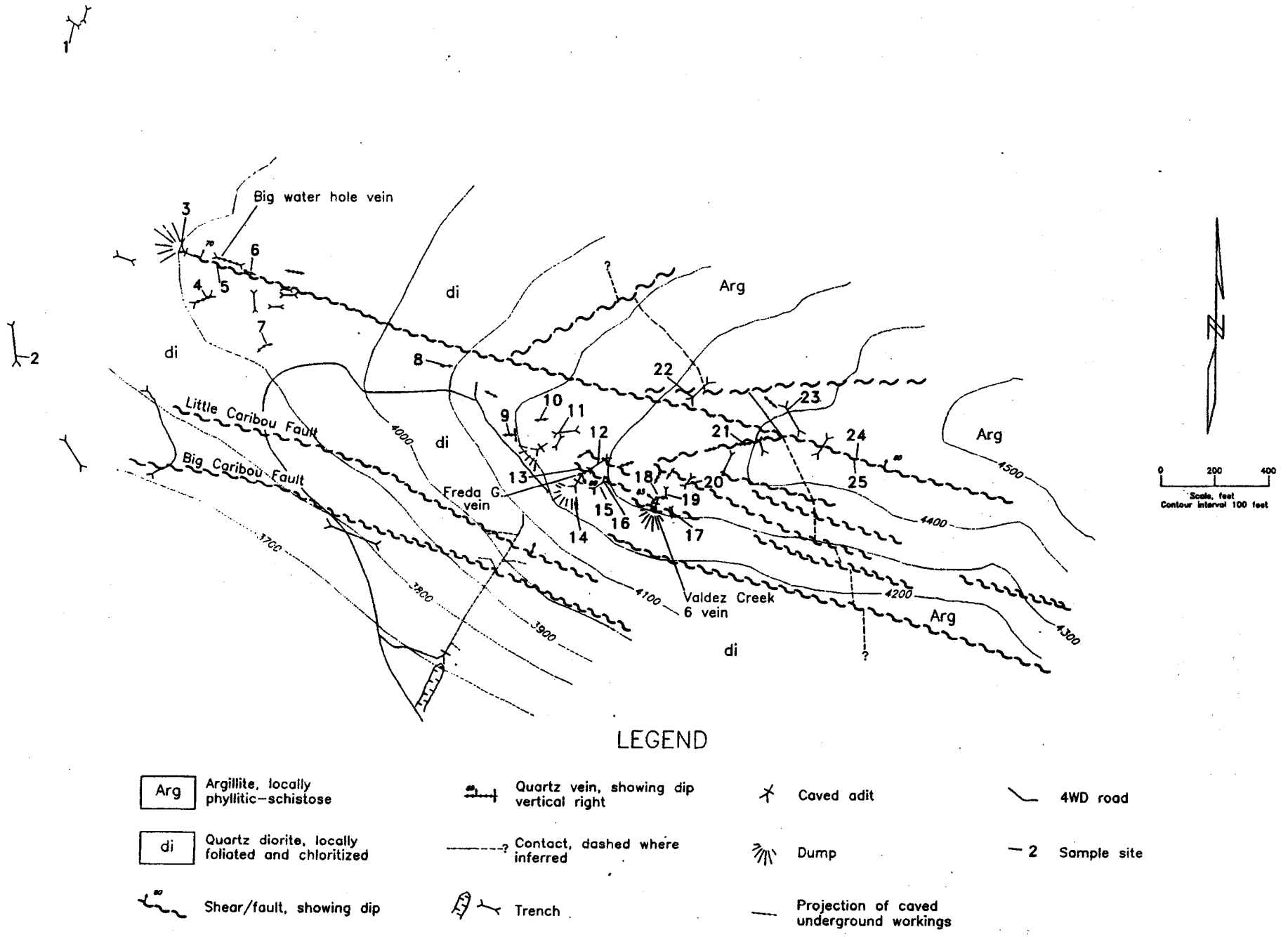


Figure A60. - Timberline Creek Lode, showing geology and sample sites

(Geology and topography after Herzberg, 1980)

TABLE A60 - ANALYTICAL RESULTS - TIMBERLINE LODE PROSPECT

Map No.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1	1260	G				ND	0.5	14	12	103	ND	30	Altered quartz diorite float in trench
3	1261	G				ND	0.5	21	12	20	ND	ND	Vein quartz float in trench
3	1262	CR				30	0.5	33	10	132	ND	10	Sheared, altered quartz diorite
5	1263	S				560	0.5	76	18	47	ND	ND	Vein quartz float pyrite pseudomorphs
6	1264	CC	0.8			ND	0.5	17	12	21	ND	ND	Quartz vein in diorite exposed in trench
4	1266	CH	4.0			15	0.5	105	14	50	ND	ND	Quartz vein exposed in trench
4	1267	CH	3.2			ND	0.5	145	12	11	ND	ND	Quartz vein in diorite exposed in trench
4	1268	CH	2.5			225	1.0	55	10	27	ND	ND	Quartz vein in diorite exposed in trench
4	1269	CH	2.9			ND	1.0	59	8	20	5	ND	Quartz vein in diorite exposed in trench
8	1273	G				10	1.0	218	10	10	ND	ND	Quartz float near trench
9	1274	CC	2.3			5	0.5	173	12	6	ND	ND	Vuggy quartz vein in diorite
14	1275	S		0.684	0.13			34	16	4	ND	ND	Vein quartz float
13	1276	CC	2.6	0.312	0.15			56	20	3	ND	ND	Quartz vein in diorite exposed in trench

TABLE A60 (CONT.) - ANALYTICAL RESULTS - TIMBERLINE LODE PROSPECT

Map No.	Sample no.	Type	Sample Length (feet)	Analysis									Description
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
				Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
15	1277	SC	3.0	0.15	0.07			41	12	20	10	ND	Quartz vein stock work in diorite
16	1278	G		0.292	0.12			31	18	5	ND	ND	Vein quartz float near trench
18	1279	CC	1.5			165	1.0	317	10	9	190	ND	Vuggy quartz vein in diorite
16	1280	CC	1.7			75	0.5	20	14	28	5	ND	Quartz with diorite inclusions
17	1281	G		3.712	0.10			141	24	8	25	ND	Vein quartz float from trenches
19	1282	G				85	1.0	26	10	5	20	ND	
20	1283	G				85	0.5	19	12	5	ND	ND	Vein quartz float in trench
21	1284	CC	3.0			5	0.5	12	14	2	ND	ND	3.0 ft wide quartz vein in diorite
23	1285	G				15	0.5	31	10	28	ND	ND	Vein quartz float in trench
25	1286	S		0.06	0.5			59	18	129	165	10	2.0 ft. wide limonite-stained zone in chlorite schist
24	1287	G				10	1.0	36	16	69	15	ND	Meta-argillite near shear zone
22	1288	G				130	1.0	55	10	6	5	ND	Vein quartz float in trench
10	1289	CC	6.0			386	3.0	77	14	12	ND	ND	Quartz vein in altered diorite
11	1290	S				25	0.5	10	8	10	ND	ND	Vein quartz float from trench
12	1291	S		0.314	0.13			9	12	8	ND	ND	Vein quartz float from trench
2	1292	S				40	0.5	23	6	12	ND	ND	Vein quartz float from trench
7	1293	CC	0.7			5	0.5	7	8	17	5	ND	Quartz vein in diorite

NAME(S): Timberline Creek and Tributaries Placers
Timberline Placer Claims No.(s) 1-6
Sunny Gulch
Susie Q

Map Location No. A61
MAS No. 0020670122
Kardex No. 67-2, 134

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 16-18, 20, 21 T: 20S R: 2E Meridian: Fairbanks
Geographic: South tributary to Valdez Creek, 2.5 mi. above junction with Susitna River.
Elevation: 2800-3500 ft.
Access: Road from Valdez Creek.

PRODUCTION: Minor.

HISTORY:

1912 - First report of prospecting on creek.
1924 - Rich pocket on a bench overlooking Timberline Creek yielded 10 oz. coarse gold (303).
1933 - Report of one or more boomers installed with disappointing results.
1936 - No mining on Timberline Creek.
1937-Present - Several attempts at placer mining (106).

WORKINGS AND FACILITIES: Placer tailings and abandoned sluice boxes.

GEOLOGIC SETTING:

The Timberline drainage cuts Jurassic argillite and lesser Cretaceous spotted phyllite. Intruding these rocks is a cretaceous quartz diorite stock that has been regionally metamorphosed. The diorite, has been cut by shear faults that locally contain gold-bearing quartz veins (see map no. A59-60). These veins provide a source of placer gold similar to those in Lucky Gulch, but Timberline has been extensively glaciated, dispersing preglacial placer gold concentrations. Reworking of the gravel by postglacial streams has not concentrated the gold into economic placers. An unsubstantiated report mentions 10 oz of coarse gold collected from bench gravel (303).

BUREAU INVESTIGATION:

Three placer samples were collected along the course of Timberline Creek and its tributaries (Table A61).

A sample collected from a previously worked cut on the next gulch east of Sunny Gulch (Camel Creek) contained 0.0007 oz/yd^3 gold. Placer sample no. 1329 collected off sheared, chloriodized diorite bedrock contained no visible gold, but lab analysis showed it to contain 9.4 ppm gold, 551 ppm lead, and 490 ppm arsenic. The galena is therefore probably auriferous or the gold may exist as a tellurite mineral (143). A rock sample (no. 1331, map no. A59) contained 410 ppb gold. A sample of placer gold from Timberline Creek was 974 fine.

RESOURCE ESTIMATE:

One of three placer samples contained significant gold. Glaciation probably dispersed economic concentrations of gold that lay near surface. Post glacial streams may have reworked and concentrated some gold (336).

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Placer drilling across the stream drainage to test for concentrations of gold.

REFERENCES: 143, 213, 262, 303, 336

TABLE A61 - ANALYTICAL RESULTS - TIMBERLINE CREEK AND TRIBUTARIES PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	Cu	Pb	Zn	As	W	
1327	P		0.00002		0.5	40	10	94	5	10	Active stream gravel
1328	P		0.0007		0.5	51	18	97	ND	20	Bank run gravel near old sluice box, 2 coarse gold flakes
1329	P			9400	18	570	0.12%	551	490	180	Collected from weathered bedrock near stream, no visible gold

NAME(S): Dry Creek Placer

Map Location No. A62
MAS No. 0020670125
Kardex No. 67-7, 39

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
SW 1/4 Sec: 18 T: 20S R: 2E Meridian: Fairbanks
Geographic: South tributary to Timberline Creek.
Elevation: 2900 ft.
Access: Road from Valdez Creek.

PRODUCTION: 318 oz. gold (340).

HISTORY: 1933 - Mining on creek (340)

WORKINGS AND FACILITIES: Placer tailings.

GEOLOGIC SETTING:

Dry Creek drains upper Jurassic argillite, siltstone, and graywacke (303).

BUREAU INVESTIGATION:

A placer sample collected near the mouth of Dry Creek contained 0.0001 oz/yd^3 gold (Table A62, no. 663).

RESOURCE ESTIMATE: The gold content of the sample was not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 303, 340

TABLE A62 - ANALYTICAL RESULTS - DRY CREEK AND FOURTH OF JULY CREEK PLACERS

Sample no.	Type	Sample length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd³	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Hg	
663	P				0.0001	0.5	86	12	113	ND	2	Active stream gravel
2032	P				0.0002	2.0	1	2	104	20	ND	Bank gravel

NAME(S): Fourth of July Creek Placer
Denali Bench, Forget-Me-Not
Bean Blossom, Ramjet

Map Location No. A63
MAS No. 0020670112
Kardex No. 67-213

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 25&26 T: 20S R: 1E Meridian: Fairbanks
Geographic: Tributary to Susitna River 2 miles south of Denali.
Elevation: 2550 ft.
Access: Road to Valdez Creek off Denali Highway.

PRODUCTION: 4 oz. (340).

HISTORY: 1929 - Gold mined on creek (340).

WORKINGS AND FACILITIES: Placer tailings.

GEOLOGIC SETTING:

The creek drains upper Jurassic argillites (303).

BUREAU INVESTIGATION:

A sample taken just above where Fourth of July Creek crosses the road to the Denali Camp contained 0.0002 oz/cy gold (Table A62, no. 2032).

RESOURCE ESTIMATE:

The gold content of the placer sample was below background level.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 303, 340

NAME(S): Lower Windy Creek Placer
Timberline Mine, Lower Windy
Susitna

Map Location No. A64
MAS No. 0020670171
0020670176
Kardex No. 67-151,305

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 11-12 T: 21S R: 1E Meridian: Fairbanks
Geographic: Length of Windy Creek.
Elevation: 2500-3100 ft.
Access: Road from Denali Highway

PRODUCTION: Unknown.

HISTORY:

1967 - Five claims located.
1978-82 - Restaking and assessment work.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Lower Windy Creek cuts through alluvial material and some argillite bedrock (303).

BUREAU INVESTIGATION:

One placer sample was collected at the east end of the claims on Windy Creek (Table A65, no. 1184) contained 0.0016 oz/yd^3 gold.

RESOURCE ESTIMATE: There is significant gold in the one placer sample collected.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Trench sampling with a backhoe.

REFERENCES: 303

NAME(S): Upper Windy Creek Placer Occurrence

Map Location No. A65
MAS No. None
Kardex No.

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 2-6 T: 21S R: 2E Meridian: Fairbanks
Geographic: Upper Windy Creek.
Elevation: 2700 - 2900 ft.
Access: Road up Windy Creek from the Denali Highway.

PRODUCTION: None.

HISTORY:

1986 - 224 (WC) claims located.
1988-89 - Reverse circulation drilling across valley bottom.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The Windy Creek drainage comprises a variety of rock types, predominated by Late Jurassic argillite and Middle Jurassic basalt flows (303). It is similar to Valdez Creek, 5.5 miles north. Some workers believe that Windy Creek may contain buried gold-bearing Paleochannels similar to those currently being mined at Valdez Creek (268).

BUREAU INVESTIGATION:

A series of placer samples was collected along the length of the drainage (Table A65). Sample no. 15 contained 0.0027 oz/yd^3 gold. Six of the ten samples, including this high value, averaged greater than 0.005 oz/yd^3 gold.

RESOURCE ESTIMATE:

Placer samples collected along the Windy Creek drainage contain significant gold.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS:

Placer drilling to search for gold-bearing Paleochannels similar to those at Valdez Creek.

REFERENCES: 268, 303

TABLE A65 - ANALYTICAL RESULTS - UPPER WINDY CREEK PLACERS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			ppb		oz/yd³	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
15	P				0.0027	--	--	--	--	--	--	Active stream gravel Upper Windy Creek Placer
628	P				0.000065	0.5	52	10	81	0	30	Active stream gravel Unnamed Placer
2823	P				0.036	ND	127	ND	94	ND	50	Active stream gravel Unnamed Placer
624	P				0.000027	0.5	98	2	94	50	30	Active stream gravel Upper Windy Creek Placer
625	P				0.000002	0.5	151	4	92	10	40	Active stream gravel Upper Windy Creek Placer
626	P				0.000001	0.5	70	2	93	10	40	Active stream gravel Upper Windy Creek Placer
627	P				0.000002	0.5	134	2	99	20	50	Active stream gravel Upper Windy Creek Placer
1180	P		10,000			0.5	98	10	83	145	70	Active stream gravel Upper Windy Creek Placer
1182	P		7,600			3.5	122	0	72	0	40	Active stream gravel Upper Windy Creek Placer
1183	P				0.00079	0.5	79	0	110	0	80	Active stream gravel Upper Windy Creek Placer
1184	P				0.0016	0.5	42	500	137	0	40	Collected on bedrock Lower Windy Creek Placer

TABLE A65 (CONT.) - ANALYTICAL RESULTS - UPPER WINDY CREEK PLACERS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			ppb		oz/yd^3	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
2958	P				0.004	ND	101	ND	88	ND	ND	Active stream gravel Upper Windy Creek Placer
2970	P				0.004	ND	126	ND	94	ND	ND	Bank run gravel Upper Windy Creek Placer
2971	P				0.004	ND	66	ND	90	25	ND	Active stream gravel Upper Windy Creek Placer

NAME(S): Unnamed Placer Occurrence
Windy Creek Tributary
Timberline Placer

Map Location No. A66
MAS No. 0020679007
Kardex No.

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A1
Sec: 7 T: 21S R: 2E Meridian: Fairbanks
Geographic: First tributary into lower Windy Creek from the south.

PRODUCTION: Unknown.

HISTORY:

1980 - Claim located
1981 - Assessment work done. 400 yd^3 mined by sluicing
1982 - 250 yd^3 sluiced
1983-84 - 400 yd^3 sluiced
1985-86 - 70 yd^3 mined with an 8 inch suction dredge

WORKINGS AND FACILITIES: Placer mining cuts.

GEOLOGIC SETTING:

In this area the stream cuts through glacial morainal deposits (303).

BUREAU INVESTIGATION:

Two placer samples were collected in the claim area (Table A65). One sample (no. 628) contained 0.000065 oz/yd^3 gold.

RESOURCE ESTIMATE: The gold content of the samples was not significant.

MINERAL DEVELOPMENT POTENTIAL: Low development potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 303

NAME(S): VABM Gate

Map Location No. A67

Deposit Type: Lode
Commodities: Copper

LOCATION: Quadrangle: Healy A1
SW 1/4 Sec: 18 T: 21S R: 2E
Meridian: Fairbanks
Geographic: Ridge 1 mile east of Susitna Lodge.
Elevation: 3250 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None

GEOLOGIC SETTING:

Malachite-stained float was found in an area of andesitic to basaltic volcanic rocks. The float contained disseminated bornite and chalcocite. The lode source was not found due to snow cover (172). Several other occurrences have been reported in the area (123, 303).

BUREAU INVESTIGATION: The occurrence was not visited.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Prospecting in area after snow cover is gone.

REFERENCES: 123, 172, 303

NAME(S): Greathouse Prospect

Map Location No. A68
MAS No. 0020670109
Kardex No. 67-120, 173, 223, 271

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Healy A1
SE 1/4 Sec: 20 T: 21S R: 2E Meridian: Fairbanks
Geographic: On Windy Creek tributary, one mile northeast of VABM Gate.
Elevation: 4800 ft.

PRODUCTION: None.

HISTORY:

1957 - Original discovery made by Clarence Greathouse (268)
1970-1976 - Claims relocated by various operators

WORKINGS AND FACILITIES: A few shallow open cuts.

GEOLOGIC SETTING:

Rocks in the area consist of altered Triassic basalt. The rocks are cut by a N45°W-trending shear zone, dipping 75° SW, which is traced for approximately 1000 feet along strike. Portions of the shear are covered by talus in steep gullies between narrow ridges. Locally within the shear zone quart-epidote veins containing bornite, with lesser amounts of covellite, chalcocite, tetrahydrate, malachite, and azurite occur. The veins are up to 0.5 ft wide. The shear zone has been described as 1-6 ft. wide, traceable for 0.75 miles along strike, and he noted that the veins within it vary from 0.1-2.5 ft wide (267).

BUREAU INVESTIGATION:

Steep terrain made this prospect difficult to examine. A series of samples (Table A68) was collected from discontinuous outcrop along the approximately 1000 ft. strike length of the shear zone. No mineralization was observed along the shear zone, but a select sample (no. 1317) contained 12.2% copper and 1.6 oz/ton silver. Chip samples collected across veins that average 0.4 ft wide averaged 2.3% copper and 7.2 ppm silver.

RESOURCE ESTIMATE:

The veins contain very significant copper and silver values, but they are narrow and discontinuous.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS:

Drilling to test extension of veins beneath the surface and in talus-covered areas.

REFERENCES: 123, 172, 173, 267, 303

TABLE A68 - ANALYTICAL RESULTS - GREATHOUSE PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Sb	
1317	S			1.6	55	56.5	12.2%	ND	425	5	10	Vein quartz float bornite, tetrahydrate (?) chalcocite, malachite
1318	S			0.29	10	10.0	2.23%	12	92	5	5	Vein quartz float bornite, tetrahydrate (?) chalcocite, malachite
1319	CC	0.5			ND	0.5	629	10	69	ND	5	Shear zone, malachite stain
1320	CC	0.3			ND	0.5	2.4%	16	59	ND	10	Shear zone, malachite stain
1321	CC	4.0		0.58	10	20.5	4.31%	6	214	ND	5	Shear zone, bornite, tetrahydrate, chalcocite, malachite
2815	G				ND	ND	633	ND	22	ND	5	Quartz vein
2816	G				5	ND	58	ND	104	5	5	Amygdaloidal basalt
2817	G				ND	0.2	0.02%	ND	36	ND	5	Epidote-bearing quartz vein
2818	G				ND	ND	86	ND	92	ND	5	Basalt limonite stain
2819	G				5	ND	0.58%	ND	76	ND	5	Vein quartz rubble crop, malachite, azurite, chalcocite
2820	G				10	ND	24	ND	98	ND	5	Basalt
2821	G				ND	ND	320	ND	82	ND	ND	Basalt
2822	G				ND	ND	104	ND	86	ND	5	Basalt

NAME(S): Nowater Creek Placer Occurrence

Map Location No. A69
Kardex No. 67-173, 223

Deposit Type: Placer
Commodities: Pd

LOCATION: Quadrangle: Healy A1
NW 1/4 Sec: 33 T: 21S R: 2E Meridian: Fairbanks
Geographic: On Nowater Creek just above where it passes under the Denali Highway.
Elevation: 2750 ft.

PRODUCTION: None.

HISTORY: 1974-1975 - Bonanza 1-4 claims located.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

The Nowater Creek drainage is underlain by Triassic volcanoclastic sedimentary rocks intercalated with basalt and basaltic andesite (303).

BUREAU INVESTIGATION:

A placer sample collected on Nowater Creek just above the Denali Highway (no. 2030) contained 8 ppb palladium and 15 ppm arsenic.

RESOURCE ESTIMATE: The palladium content of the sample is significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for palladium in mafic rocks.

RECOMMENDATIONS: Bedrock sampling in the headwaters of Nowater Creek.

REFERENCES: 303

TABLE A69 - ANALYTICAL RESULTS - NOWATER CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	ppb Au	Ag	Cu	Zn	As	Pt	Pd	
2030	P				ND	ND	90	100	15	ND	8	Bank run gravels
2961	CR				ND	ND	164	56	20	NA		Epidote-rich greenstone
2962	CR				ND	ND	224	40	ND			Hydrothermally altered greenstone
2963	CR				ND	ND	3937	114	ND			Epidote-rich greenstone, copper stain

NAME(S): Little Eva Lode Prospect

Map Location No. A70
MAS No. 0020670170

Deposit Type: Lode
Commodities: Copper

LOCATION: Quadrangle: Healy A1
NE 1/4 Sec: 11 T: 21S R: 2E Meridian: Fairbanks
Geographic: South side Windy Creek, 4 miles northeast of VABM Gate.

PRODUCTION: None.

HISTORY: 1966 - Workings described (173).

WORKINGS AND FACILITIES: Some shallow hand dug trenches (1).

GEOLOGIC SETTING:

Several shallow hand diggings follow a N60°W trench across a hogback and expose secondary copper mineralization in an altered serpentine host. Another series of pits follows a N50°-70E trend near a volcanic limy sediment contact. Here copper minerals are spotty and concentrated in small pods.

An irregular 0.25 inch bornite-chalcocite vein in a narrow zone of secondary copper minerals is traceable for a few feet (1).

BUREAU INVESTIGATION:

The area was not visited during this study. Samples collected by Kimball averaged 2.7% copper and 0.34 oz/ton silver.

RESOURCE ESTIMATE:

The copper values are very significant, but the mineralization is poddy.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 123, 173, 303

NAME(S): Raft Creek Lode Occurrence Map Location No. A71

Deposit Type: Vein
Commodities: Copper, Gold

LOCATION: Quadrangle: Healy A1
SE 1/4 Sec: 25 T: 21S R: 2E Meridian: Fairbanks
Geographic: One mile upstream from where Raft Creek crosses the Denali Highway.
Elevation: 3500 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

A small diorite pluton is exposed in Raft Creek. Chalcopyrite, pyrite, and malachite occur in quartz veinlets up to 0.25 ft. wide of unknown length (303).

BUREAU INVESTIGATION:

The prospect was not visited during this study. A placer sample, collected approximately two miles downstream from the occurrence, contained 2800 ppb gold (no. 2031).

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Sample veins for precious metals.

REFERENCES: 303

TABLE A71 - ANALYTICAL RESULTS - RAFT CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
2031	P				2800	ND	36	4	115	25	50	Bank-run gravels

NAME(S): Ben French Creek Placer Occurrence
Maclaren River Claims (no. 1-2)

Map Location No. A72
MAS No. 0020770001
Kardex No. 77-20

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Gulkana D6
Sec: 24 T: 13N R: 9W Meridian: Copper River
Geographic: Stream on north side of Maclaren River, 5 miles south of VABM Round.
Elevation: 2500 ft.

PRODUCTION: None.

HISTORY: 1954-76 - Claims staked and assessment work done.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION:

It is reported that a person named Ben French had a cabin in this area and always brought out a little gold, never revealing where he obtained it. On a return trip to the area he was caught in a severe snowstorm near Dickey Lake and apparently perished. His sled was found by searchers, but his body was never located (106).

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Prospecting in area.

REFERENCES: 106

NAME(S): Pettyjohn Creek Placer Occurrence

Map Location No. A73
Kardex No. 68-210

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Mt. Hayes B6
Sec: 5, 15 T: 19S R: 5E Meridian: Fairbanks
Sec: 29 & 32 T: 18S R: 5E Meridian: Fairbanks
Geographic: West tributary to west fork Maclaren River.
Elevation: 3200-4500 ft.

PRODUCTION: None.

HISTORY: 1979-83 45 claims staked by Tammany Gold Mining Co.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek drains pre-Cretaceous schist amphibolite and phyllite (225).

BUREAU INVESTIGATION:

A series of placer samples was collected along the length of Pettyjohn Creek. None contained significant gold.

RESOURCE ESTIMATE: Background gold values in the gravels.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 225, 339

TABLE A73 - ANALYTICAL RESULTS - PETTYJOHN CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Mo	W	
1040	P				60	0.5	12	2	80	ND	15	50	Active stream gravel
1041	P				50	0.5	14	8	78	ND	10	50	Active stream gravel
2914	P				440	ND	30	6	74	30	ND	10	Active stream gravel
3011	P				740	ND	36	ND	164	5	ND	ND	Active stream gravel
3012	P				870	ND	60	8	214	35	10	100	Active stream gravel

NAME(S): West Fork Susitna Glacier Lode
Cub Claims

Map Location No. A 74
MAS No. 00206700173
Kardex No. 67-176

Deposit Type: Massive Sulfide
Commodities: Copper, Zinc, Silver

LOCATION: Quadrangle: Healy B2
Sec: 5 T: 17S R: 1E Meridian: Fairbanks
Geographic: On stream 1.2 miles west of west fork Susitna Glacier 1.5 miles south of VABM fork.
Elevation: 4150 ft.

PRODUCTION: None.

HISTORY:

1976-76 - U.S. Steel staked claims.
1977-80 - Dome Exploration Ltd. and Cities Service core drilled and laid out soil grid (27, 339).

WORKINGS AND FACILITIES:

Located three core drill hole collars and remains of old camp.

GEOLOGIC SETTING:

Rocks consist of Paleozoic calcschist, muscovite schist, and argillite. The schists contain siliceous massive sulfide-rich zones containing pyrite, chalcopyrite, and sphalerite. The massive sulfide zones form limonite-stained gossaneous outcrops on the west side of a gully intersecting the main stream drainage from the south. One mile upstream from the main prospect quartz veins cut the schistose rocks. Sulfur isotope studies indicate that the sulfides are plutonic in origin (224).

BUREAU INVESTIGATION:

Samples of the gossaneous outcrops were sampled (Table A74) and contained up to 1.82% copper (no. 1923), 1.0% zinc (no. 1926) and 0.55 oz/ton silver (no. 1930). A 3 ft. wide chip sample across a sulfide-rich zone contained 0.39% copper and 0.74% zinc. The quartz veins did not contain significant metal values.

RESOURCE ESTIMATE:

Copper, zinc, and silver values are significant, but extent of mineralized zones is unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for copper, zinc, and silver.

RECOMMENDATIONS: Review results of previous drilling.

REFERENCES: 27, 80, 224, 339

TABLE A74 - ANALYTICAL RESULTS - WEST FORK SUSITNA GLACIER LODE PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1797	RC			0.16	ND	5.5	0.10%	82	0.14%	ND	
1922	RC				ND	2.5	1.44%	10	0.11%	80	Calc schist massive sulfides, malachite
1923	S			0.12	ND	4.0	1.82%	28	854	55	Calc schist massive sulfides, malachite
1924	RC			0.36	ND	12.5	0.28%	32	576	95	Calc schist massive sulfides, malachite
1925	RC				200	2.0	0.21%	44	396	190	Calc schist gossan
1926	CC	2.0		0.54	510	18.5	1.0%	144	0.25%	.16%	Calc schist gossan
1927	CC	2.0			ND	1.5	0.86%	26	0.10%	110	Calc schist gossan
1928	S			0.51	230	17.5	0.40%	810	1.0%	ND	Muscovite schist chalcopyrite, sphalerite, pyrite
1929	CC	4.0		0.26	45	9.0	414	110	306	125	Muscovite schist chalcopyrite, sphalerite, pyrite
1930	CC	3.0		0.55	250	19	0.39%	780	0.74%	.62%	Muscovite schist chalcopyrite, sphalerite, pyrite
1931	CC	4.5			10	1.0	104	26	145	80	Argillite sulfide veinlets
1932	CC	6.0		0.15	15	5.0	0.20%	124	0.11%	50	Graphitic schist chalcopyrite, sphalerite
1933	CC	6.5			ND	1.0	0.08%	14	0.01%	60	Graphitic schist chalcopyrite, sphalerite

TABLE A74 (CONT.) - ANALYTICAL RESULTS - WEST FORK SUSITNA GLACIER LODE PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1934	CC	2.0			5	ND	61	6	23	10	Quartz vein
1935	CC	0.5			10	3.0	473	44	316	75	Quartz vein salvage
1936	CC	0.3			ND	1.0	203	12	382	ND	Quartz vein
2044	S				ND	ND	0.03%	22	21	15	Quartz-bearing shear zone
2680	RC				ND	ND	ND	ND	4	10	Quartz vein
2790	P				110	2.0	55	8	130	30	Active stream gravel
3023	S				ND	0.6	423	6	234	5	Gouge zone
3024	CC				280	8.6	0.95%	48	0.20%	.27%	Schist quartz, pyrite, chalcopyrite
3025	P				2500	27.0	89	32	130	35	Bank run gravels
3026	S				110	7.0	278	160	222	155	Carbonaceous argillite

NAME(S): VABM 5756 Fork Lode Occurrence
Cub Claims

Map Location No. A75
MAS No. 0020670086
Kardex No. 67-269

Deposit Type: Vein
Commodities: Silver

LOCATION: Quadrangle: Healy B2
Sec: 32 T: 16S R: 1E Meridian: Fairbanks
Geographic: On ridge 1 mile south of VABM 5756 Fork.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY: 1976-77 - U.S. Steel Co. staked claims.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Folded Paleozoic limestone, calcschist and carbonaceous schist cut by quartz vein and stringer zones.

BUREAU INVESTIGATION:

Sample no. 1894 (Table A75) was collected from a 10 ft. wide zone of vein quartz rubble.

RESOURCE ESTIMATE:

Vein quartz rubble contains high silver values, but not enough to be presently economic.

MINERAL DEVELOPMENT POTENTIAL: Low potential for silver.

RECOMMENDATIONS:

Trenching of surface rubble to locate in-place quartz, and determine strike length of vein.

REFERENCES: 339

TABLE A75 - ANALYTICAL RESULTS - VABM 5756 FORK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
					ppb						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1891	G				ND	ND	11	42	133	5	Vein quartz float
1892	G				ND	ND	41	22	122	10	Black calcareous schist
1893	G				ND	1.0	101	6	114	ND	Calcareous schist, limonite stain
1894	G			1.0	145	34.5	15	0.21%	596	ND	Vein quartz float zone 10 ft. wide
2043	RC				ND	0.5	181	10	112	10	Black limestone/carbonaceous schist

NAME(S): Nenana Claims (numbers 1-40) Map Location No. A76

Deposit Type: Lode
Commodities: Copper, Zinc

LOCATION: Quadrangle: Healy B2
SW 1/4 Sec: 30 T: 16S R: 1E Meridian: Fairbanks
Geographic: In Nenana River drainage, 1.5 miles southwest of VABM Fork.
Elevation: 4900 ft.

PRODUCTION: None.

HISTORY:

1976 - Nenana claims staked
1978 - Assessment work done
1986 - Claims declared null and void

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Rocks consist of Late Triassic calcschist and marble, locally stained with copper oxides (181, 182).

BUREAU INVESTIGATION:

A sample of altered schist contained 0.56% zinc (Table A76, no. 2051). A breccia outcrop, copper stained over a 20 ft^2 area, contained 0.33% copper and 0.31% zinc.

RESOURCE ESTIMATE:

Base metal values are significant, but the extent of the mineralization appears to be small.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and zinc.

RECOMMENDATIONS: Further prospecting to determine extent of mineralization.

REFERENCES: 181, 182

TABLE A76 - ANALYTICAL RESULTS - NENANA LODE CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise stated)							
					ppb							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	Hg	
2051	S				25	2.5	0.10%	176	0.56%	0.12%	6	Altered schist
2052	S				ND	1.0	0.33%	168	0.31%	10	1	Breccia zone, copper oxides

NAME(S): Hess Mountain Lode Occurrence

Map Location No. A77
MAS No. 0020670075
Kardex No. 67-119

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Healy C1
NE 1/4 Sec: 14 T: 15S R: 3E Meridian: Fairbanks
Geographic: Ridge running to the southeast from Hess Mountain.
Elevation: 8000 ft.

PRODUCTION: None.

HISTORY: 1951 - one claim staked (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Rocks consist of late Devonian Yanert Fork Sequence Carbonaceous-siliceous mudstone, slate, phyllite, and schist. Also includes impure quartzite, metachert, metavolcanic rocks, marbles and gabbro dikes and sills (181, 182).

BUREAU INVESTIGATION:

An aerial reconnaissance was made and abundant reddish-stained rocks observed. Landing places were not found in this rugged terrain.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Make a ground investigation.

REFERENCES: 181, 182, 339

APPENDIX B

NAME(S): Wickersham Discovery Placer Occurrence Map Location No. B1
No. 1 below Wickersham Discovery Claim MAS No. 0020670104

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
NW 1/4 Sec: 16 & 21 T: 21S R: 1E Meridian: Fairbanks
Geographic: One mile northwest of Snodgrass Lake
Elevation: 2700 ft

PRODUCTION: None.

HISTORY:

1975 - Claims located on Mary Helen Creek.
1979-1986 - Assessment work.
1987 - Assessment not filed and claims declared null and void.

WORKINGS AND FACILITIES: Test pits.

GEOLOGIC SETTING: The stream is underlain by Quaternary glacial drift (307).

BUREAU INVESTIGATION: The claims were not examined.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 307

NAME(S): Lower Butte Creek Placers
Nelson Discovery No. 1
Butte Creek Discovery
Butte Creek
Golden Three

Map Location No. B2
MAS No. 002670099
Kardex No. 67-158

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
Sec: 28-30 T: 21S R: 1E Meridian Fairbanks
Geographic: From mouth to 3.5 miles up Butte Creek
Elevation: 2450-2700 ft.

PRODUCTION: None.

HISTORY:

1903 - Placer gold discovered in Butte, Gold, and Wickersham Creeks by the Monahan party, but not in sufficient enough amounts to justify mining (213).
1967 - Claims located on creek.
1978 - Present claims staked on Butte Creek.
1981-1986 - Assessment work done. Bedrock(?) sluiced with a five inch suction dredge.

WORKINGS AND FACILITIES: Test holes.

GEOLOGIC SETTING:

Butte Creek winds through glacial till. No bedrock exposed in the stream bed.

BUREAU INVESTIGATION:

Three placer samples were collected on lower Butte Creek (Table B2). Sample no. 1322 contained 0.003 oz/yd^3 gold. The gold in the sample was 868 fine. A second sample (no. 1323) collected nearby contained 0.0001 oz/yd^3 gold. One sample (no. 2017) contained 4 ppb palladium.

RESOURCE ESTIMATE:

The gold values are significant, but sampling indicates spotty values. The palladium value is also significant.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: Closer-spaced sampling with backhoe along creek.

REFERENCES: 213

TABLE B2 - ANALYTICAL RESULTS - LOWER BUTTE CREEK PLACERS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	Elements in ppm (unless otherwise stated)				ppb		
			Au	Ag	Au	Ag	Cu	Ni	Cr	Pt	Pd	
2017	P				0.001	ND	34	51	312	ND	4	Bank-run gravel
1322	P				0.003	0.5	16	28	635	NA	NA	Stream gravel
1323	P				0.0001	0.5	23	46	726	NA	NA	Stream gravel

NAME(S): Nelson Discovery No. 2 Placer Claim Map Location No. B3

Deposit Type: Placer
Commodities: Gold, Chromium, Palladium

LOCATION: Quadrangle: Healy A2
Sec: 1 T: 22S R: 1W Meridian: Fairbanks
Geographic: 2.5 miles up unnamed tributary to Butte Creek.
Elevation: 3650 ft.

PRODUCTION: None.

HISTORY:

1980 - Claim located.
1981-1986 - Assessment work done

WORKINGS AND FACILITIES: Test holes.

GEOLOGIC SETTING:

The stream drainage is underlain by upper Triassic basaltic metavolcanic rocks (307). Ultramafic(?) float was found in the stream bottom.

BUREAU INVESTIGATION:

Two placer samples were collected in the stream. Neither sample contained visible gold (Table B3). One sample contained 12 ppb palladium (no. 2015) and the other 0.11% chromium (no. 2016).

RESOURCE ESTIMATE:

Gold values are extremely low, but the anomalous chromium and palladium values are significant. Troctolitic gabbros and pyroxenite in this area contain anomalous palladium and chromium (map No. B3).

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Find source of ultramafic float found in stream, and sample for platinum-group metals and chromium.

REFERENCES: 307

TABLE B3 - ANALYTICAL RESULTS - NELSON DISCOVERY No. 2 PLACER CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Pd	Pt	Ag	Cu	Cr	Ni	
2015	P				4	12	ND	ND	131	ND	80	Bank run gravel
2016	P				24	10	ND	ND	150	0.11%	272	Stream gravel

NAME(S): Tammany Creek Placer Occurrence
Tennigkett No. 1
Wall No. 1-2

Map Location No. B4
Kardex No. 67-41, 44

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
Sec: 13 & 24 T: 21S R: 1W Meridian: Fairbanks
Geographic: North tributary to Butte Creek, 4 miles above its mouth. Unofficially named Tammany Creek.
Elevation: 2700-3000 ft.

PRODUCTION: None.

HISTORY: 1956 - Claims staked on creek

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The upper portion of stream cuts into lower Cretaceous to upper Jurassic silty argillite, siltstone, and graywacke. The lower stretches drain Quaternary glacial till (307).

BUREAU INVESTIGATION:

One placer sample collected from the creek contained 0.002 oz/yd^3 gold (Table B4).

RESOURCE ESTIMATE: The gold value is significant.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: More placer sampling and trenching.

REFERENCES: 307

TABLE B4 - ANALYTICAL RESULTS - TAMMANY CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	W	Zn	
1045	P				0.002	0.5	ND	16	10	60	119	Stream gravel

NAME(S): Nay Nadeli Placer
Camp Creek

Map Location No. B5

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
Sec: 1,2 T: 21S R: 1W Meridian: Fairbanks
Geographic: East tributary to Wickersham Creek. 4.5 miles above its junction with Butte Creek.
Elevation: 3750 ft.

PRODUCTION: Minor.

HISTORY:

1981 - Claim located
1982-1983 - 650 yd^3 of gravel sluiced
1984 - 400 yd^3 of gravel sluiced
1985 - 70 yd^3 of gravel sluiced with 8 inch suction dredge
1986 - Prospecting done in area

WORKINGS AND FACILITIES:

Several placer mining cuts have been excavated along the stream bed, and numerous test pits lie over a 1.2 mile stretch of stream bed. Two sluice boxes and an 8-inch floating suction dredge on site.

GEOLOGIC SETTING:

The stream drainage is underlain by lower Cretaceous to upper Jurassic slaty argillite, siltstone, and graywacke, which is phyletic in places.

BUREAU INVESTIGATION:

Two samples were collected in the vicinity of the old placer workings (Table B5). One (no. 1909) contained 0.013 oz/yd^3 gold while the other had 0.0053 oz/yd^3 gold (no. 1043). The gold was 834 fine.

RESOURCE ESTIMATE:

The gold values are highly significant, and at least 1000 yd^3 of unmined gravel may still be present.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS:

Detailed sampling to locate pay streaks and sample upstream in the glacial till to determine whether it or the phyllite is the source of the gold.

REFERENCES: None.

TABLE B5 - ANALYTICAL RESULTS - NAY NADELI CLAIM

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1043	P				0.0053	0.5	33	8	128	15	90	Stream gravel, phyllite bedrock nearby
1909	P				0.013	0.5	33	10	125	25	50	Stream gravel, phyllite bedrock nearby

NAME(S): Wickersham Creek Placer
Wickersham Claims

Map Location No.B6
MAS No.0020670101
Kardex No.67-11, 111
196, 203, 298, 316

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
Sec: 14&23 T: 21S R: 1W Meridian: Fairbanks
Geographic: Length of Wickersham Creek.
Elevation: 2900-3500 ft.

PRODUCTION: None.

HISTORY:

1903 - Gold discovered on Wickersham Creek by Monahan party (212).
1913 - Attempts to mine gold on Wickersham Creek do not turn out profitably (213).

WORKINGS AND FACILITIES: Old placer tailings.

GEOLOGIC SETTING:

As with Tammany Creek on the east, Wickersham Creek drains lower Cretaceous to upper Jurassic silty argillite, siltstone, and graywacke. A small body of quartz monzonite is exposed on the west side of the creek midway up (307). Hornfelsed sediments containing disseminated pyrrhotite were found in the vicinity of the intrusive. These were limonite-stained, highly fractured, and sheared.

BUREAU INVESTIGATION:

One placer sample collected on Wickersham Creek (Table B6, no. 1044) contained 0.0002 oz/yd^3 gold. Limonite-stained hornfelsed sediments near the sample site were sampled. One sample (no. 1912) contained 10 ppb gold. The placer gold recovered from Wickersham Creek was 999 fine.

RESOURCE ESTIMATE:

The placer values were insignificant, and the lode gold values were very low.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Collect more samples near the mouth of Wickersham Creek to fully test the drainage.

REFERENCES: 212, 213, 307

TABLE B6 - ANALYTICAL RESULTS - WICKERSHAM CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis									Description
			oz/yd³		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1044	P		0.0002			0.5	27	14	107	40	40	Stream gravel near bedrock
1910	RC				ND	ND	89	6	64	5	10	Limonite-stained hornfels, diss. pyrrhotite
1911	RC				ND	ND	93	4	70	15	ND	Limonite-stained hornfels, diss. pyrrhotite
1912	RC				10	0.5	149	2	137	15	10	Limonite-stained hornfels, diss. pyrrhotite
1787	G				ND	ND	72	ND	89	10	ND	Limonite-stained hornfels, diss. pyrrhotite
1788	RC				ND	ND	0.01%	ND	54	5	ND	Limonite-stained hornfels, diss. pyrrhotite
1789	RC				ND	ND	95	6	67	ND	ND	Limonite-stained hornfels, diss. pyrrhotite
1790	RC				5	ND	74	ND	56	15	ND	Limonite-stained hornfels, diss. pyrrhotite

NAME(S): Su Claims Lode Prospect
Gold Hill
Wickersham Lode

Map Location No. B7
MAS No.0020670106
Kardex No. 67-218, 229, 232

Deposit Type: Disseminated
Commodities: Molybdenum, Copper, Gold

LOCATION: Healy A2
Sec: 9, 10, 15, 16 T: 21S R: 1W Meridian: Fairbanks
Geographic: Ridge west of Wickersham Creek and south of Gold Creek.
Elevation: 4000-4800 ft.

PRODUCTION: None.

HISTORY:

1973 - Claims staked by Cities Service Co. (321).
1976-79 - Approximately 10,000 ft. of core and rotary drilling by Cities Service and Dome Mining (163, 321).
1983 - GCO minerals located claims.
1988 - Amax Exploration lease property. Soil geochemistry, VLF, and reverse circulation drilling (27).
1989 - Property returned to GCO Minerals. Only assessment work done (27).

WORKINGS AND FACILITIES:

Trenches, 22 diamond drill hole collars, 21 rotary holes, 50-300 ft. and 21 rotary drill holes (27, 162, 321).

GEOLOGIC SETTING:

The high point of the ridge between Butte and Gold Creeks known as Gold Hill (unofficial name) is underlain by upper Jurassic siltstone and sandstone, with varying volcanic components. The sediments were intruded and hornfelsed by a Tertiary quartz monzonite stock(s) that has been locally propylitically altered. Alteration is reported to extend as far as two miles from the stock, and locally some phyllic alteration is seen. Molybdenum and copper values are associated with a quartz-vein stockwork peripheral to the stock. One drill hole averaged 0.05% molybdenum over 536 feet, with 150 feet averaging 0.09% molybdenum.

Gold occurs in the metasediments and intrusive and peripheral to the stockwork zone. Drill samples contain up to 0.39 oz/ton gold over a 10-foot interval. Diabase dikes cut both the intrusive and metasediments near the top of Gold Hill. Surface trenching returned gold values of up to 410 ppb over 230 feet.

A geophysical survey outlined several anomalies in the area. Soil geochemistry studies revealed anomalies on both the north and south sides of the hill.

A proposed mineralization model defines epithermal gold mineralization in dilettante zones associated with a sulfide-rich quartz monzonite stock. The gold mineralization may extend into permeable or reactive metasedimentary units (162)(321).

BUREAU INVESTIGATION:

Numerous rock samples were collected during reconnaissance traverses across the top of Gold Hill. Anomalous samples collected from the altered siltstone contained up to 265 ppb gold, averaged 76 ppb gold and contained up to 60 ppm molybdenum (Table B7).

RESOURCE ESTIMATE:

The majority of the early work in the property was oriented toward a porphyry molybdenum model and gold received only incidental attention. Analysis of gold from soil samples produced several anomalies which have not yet been thoroughly tested. A gold-bearing halo in metasediments and intrusive rocks peripheral to the quartz stockwork zone may exist. In some producing porphyry deposits in the American southwest, a gold-bearing halo exists outside the main ore body in a low-pyrite shell (130). Discovery of such a deposit will require a systematic drilling program to delineate, due to extensive tundra cover and few outcrops.

Several of the creeks draining the prospect are anomalous in gold (map nos. B8, B10) and gold-bearing veins cut intrusive rocks two miles to the west (map no. B9).

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for gold.

RECOMMENDATIONS:

Examine data from previous drilling, geophysics, and soil geochemistry followed by systematic drilling of anomalous zones.

REFERENCES: 27, 130, 162, 307, 321

TABLE B7 - ANALYTICAL RESULTS - SU CLAIMS LODE PROSPECT

Sample no.	Type	Sample Length (feet)	oz/ton		ppb	Elements in ppm (unless otherwise stated)							Description
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	W	As	
1345	RC				65	0.5	81	8	71	ND	ND	5	Altered siltstone, diss. pyrite
1346	RC				0	0.5	17	14	92	ND	ND	ND	Dibasic dike, diss. pyrite
1347	RC				10	1	74	12	49	ND	ND	ND	Altered siltstone, trace pyrite
1348	RC				115	1	65	12	48	ND	ND	ND	Altered siltstone, trace pyrite
1352	G				245	0.5	23	14	41	ND	ND	ND	Altered siltstone, trace pyrite
1353	RC				5	0.5	37	2	14	1	ND	ND	Altered siltstone, trace pyrite
1354	RC				0	0.5	74	0	30	60	ND	10	Altered siltstone, pyrite stringers
1355	RC				0	0.5	117	8	19	11	ND	ND	Altered siltstone, pyrite stringers
1417	G				25	0.5	31	8	31	0	10	15	Altered siltstone, stringer and diss. pyrite
1418	G				55	0.5	24	14	23	0	10	20	Altered siltstone stringer and diss. pyrite

TABLE B7 (CONT.) - ANALYTICAL RESULTS - SU CLAIMS LODE PROSPECT

Sample no.	Type	Sample Length (feet)	oz/ton		ppb	Elements in ppm (unless otherwise stated)							Description
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	W	As	
1419	G				65	0.5	31	4	26	ND	ND	ND	Altered siltstone stringer and diss. pyrite
1420	G				265	0.5	47	6	26	ND	10	5	Altered siltstone stringer and diss. pyrite
1421	G				0	0.5	24	4	0	ND	ND	5	Vein quartz
1422	G				20	0.5	237	10	19	4	30	10	Limonite stained altered argillite
1423	G				0	0.5	57	10	15	6	10	15	Limonite stained altered argillite
1424	G				15	0.5	52	8	13	31	ND	ND	Altered siltstone diss. pyrite
1428	G				0	0.5	23	6	18	1	ND	10	Altered siltstone diss. pyrite
1429	G				0	0.5	25	4	14	1	ND	15	Altered siltstone diss. pyrite
1430	G				0	0.5	21	6	17	0	ND	25	Altered siltstone diss. pyrite
1431	G				0	0.5	50	8	16	20	10	ND	Altered siltstone diss. pyrite
1432	RC				0	0.5	11	14	42	0	ND	ND	Altered siltstone diss. pyrite

TABLE B7 (CONT.) - ANALYTICAL RESULTS - SU CLAIMS LODE PROSPECT

Sample no.	Type	Sample Length (feet)	oz/ton		ppb	Elements in ppm (unless otherwise stated)							Description
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	W	As	
1433	G				0	0.5	5	14	81	ND	10	ND	Altered siltstone
1434	G				30	0.5	40	20	159	ND	ND	ND	Altered siltstone
1435	S				ND	0.5	8	14	6	1	ND	ND	Vein quartz float
1436	G				0	0.5	14	18	172	ND	10	ND	Altered siltstone

NAME(S): Gold Creek (East) placer
Gold Creek Claims

Map Location No. B8
MAS No. 0020670107
Kardex No. 67-297

Deposit Type: Placer
Commodities: Gold, Tungsten

LOCATION: Quadrangle: Healy A2
Sec: 8 & 18 T: 21S R: 1W Meridian Fairbanks
Sec: 13 - 15 T: 21S R: 2W Meridian Fairbanks
Geographic: East tributary to Upper Butte Creek
Elevation: 3050-3900 feet

PRODUCTION: Minor.

HISTORY:

1903 - Monahan party discovered gold on Gold Creek (213).
1980 - Some mining done.

WORKINGS AND FACILITIES:

Placer workings and test holes scattered along creek. A small floating suction dredge lies 3.5 miles above the creek mouth.

GEOLOGIC SETTING:

Gold Creek cuts a variety of rock types. Intrusive rocks range from quartz monzonite to diorite in composition. Sedimentary rocks consisting of slaty argillite, siltstone, and graywacke. Locally, sulfide-bearing quartz veins cut the intrusives.

BUREAU INVESTIGATION:

Six placer samples were collected along the stream drainage (Table B8). One sample (no. 1364) contained 0.010 oz/yd^3 gold. No gold was detected from no. 1362 in the lab, but field examination prior to submittal showed it to contain 6 coarse gold flakes from 1-2mm in size. Lab analysis of no. 1361 showed it to contain 0.0001 oz/yd^3 gold, but previous field examination showed it to contain 5 coarse gold flakes, 1-2mm in size. Sample no. 1042 contained 0.19% tungsten.

RESOURCE ESTIMATE:

Even though the lab results don't indicate it, Gold Creek contains highly significant placer gold value and one sample is highly anomalous in tungsten and arsenic. The tungsten anomaly may be due to the weathering of hydrothermal tungsten mineralization located on the margins of the porphyry system 2.5 miles to the southeast (map no. B7) Numerous trenches indicate that previous workers found the drainage interesting enough to warrant mechanized sampling. The results of this work are unknown.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for placer gold. Unevaluated lode tungsten potential.

RECOMMENDATIONS:

Pit sampling and/or placer drilling the length of the stream and follow up to discover the source of the high tungsten value.

REFERENCES: 213, 307

TABLE B8 - ANALYTICAL RESULTS - GOLD CREEK EAST PLACER

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd³	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	W	Zn	
1042	P				0.0002	1	2750	173	60	1890	116	Dioritic intrusive, bedrock nearby
1356	P				0.0007	0.5	55	83	60	40	96	Sample collected from dioritic bedrock
1361	P				0.0001	0.5	10	37	14	20	103	Old pit. Sample contained five gold flakes 1-2mm in size.
1362	P				ND	0.5	ND	18	20	30	98	Same site as no. 1361. Six gold flakes 1-2mm.
1363	P				0.005	1.5	15	33	10	20	85	Stream gravel
1364	P				0.010	2	10	31	22	40	87	Stream gravel

NAME(S): Gold Creek (East) Lode Occurrence Map Location No. B9

Deposit Type: Vein
Commodities: Gold, Silver

LOCATION: Quadrangle: Healy A2
NW 1/4 Sec: 18 T: 21S R: 1W Meridian Fairbanks
Geographic: Three miles up from junction with Butte Creek
Elevation: 3600 feet

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None

GEOLOGIC SETTING:

This portion of Gold Creek is underlain by altered Tertiary dioritic intrusives of intermediate composition (307). Locally the intrusive is intensely iron stained and fractured. A malachite-stained 1.5 foot wide silicified vein/fault zone trending N10°E and dipping 55°W cuts the intrusive. The zone contained calcite clots, chalcopyrite and tennantite(?) and is exposed on a 50 ft. high bluff face on the north side of Gold Creek. The extension to the north is tundra covered.

BUREAU INVESTIGATION:

A sample collected across the vein (Table B9 no. 1357) contained 0.26 oz/ton silver, 0.25 oz/ton gold, and 0.57% copper. Abundant arsenic was also present. A sample collected across a 2.5 ft. width of copper stained, intensely fractured intrusive on both sides of the vein (no. 1358) contained 0.18 oz/ton silver, 0.25 oz/ton gold, and 0.33% copper. Similar veins were not found along the rest of the drainage, but samples collected from a limonite stained argillite contained 10 ppb gold (no. 1360). A sheared contact between diorite and metasediments (no. 2019) contained 11 ppb gold.

RESOURCE ESTIMATE:

The vein contains anomalous copper, silver, and gold values, but due to its small size would have little potential as a copper source. The strike length is unknown as tundra covers the exposures above the bluff face. Samples collected from other locations along Gold Creek were slightly anomalous in gold. Two miles east of this location anomalous gold is associated with a hornfelsed-altered zone peripheral to a propylitized intrusive (B7). This vein may be part of the hydrothermal activity many times associated with porphyry system (130). A placer sample taken on the Upper Gold Creek was highly anomalous in tungsten (B8). The source of the tungsten may be hydrothermal mineralization associated with nearby intrusives. Tungsten mineralization has been noted on the margins of porphyry systems in other locations (254).

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for gold and silver.

RECOMMENDATIONS:

Trenching on bluff above vein exposure to determine vein strike length.

REFERENCES: 307, 130, 254

TABLE B9 - ANALYTICAL RESULTS - GOLD CREEK EAST LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1357	CC	1.5	0.25	0.26	8.5	9.0	0.57%	6	382	2720	30	Silicified gouge zone
1358	CC	2.5	0.11	0.18	3.88	6.0	0.33%	6	206	175	10	Copper-stained dioritic intrusive
1359	RC				0.530	0.5	807	6	104	55	0	Copper-stained dioritic intrusive
1360	RC				0.010	0.5	106	6	55	10	ND	Limonite-stained argillite
1784	RC				0.080	ND	19	6	17	410	ND	Limonite-stained quartz vein in dioritic intrusive
2018	CC				ND	ND	14	2	11	ND	ND	Altered metasediments
2019	CC	2.0			0.110	0.5	153	2	32	220	20	Sheared contact between diorite and metasediments

NAME(S): Upper Butte Creek Placer Occurrence Map Location No. B10

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A2
Sec 15,21,27,34T: 21S R: 2W Meridian Fairbanks
Geographic: Stretch of Butte Creek between Butte Lake and eastward bend in creek.
Elevation: 3000-3150 ft

PRODUCTION: None.

HISTORY:

1903 - Placer gold discovered on Butte Creek (213).
1985 - Discovery Claims staked.

WORKINGS AND FACILITIES: Test pits.

GEOLOGIC SETTING:

This portion of Butte Creek drains mainly slaty argillite, siltstone, graywacke, and phyllite. Several small quartz monzonite bodies located east of the stream.

BUREAU INVESTIGATION:

Four placer samples were collected along Upper Butte Creek (Table B10) No. 1425. contained 0.0053 oz/yd^3 gold.

RESOURCE ESTIMATE: One sample contained significant gold.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: Trench sampling to delineate extent of gold values.

REFERENCES: 213

TABLE B10 - ANALYTICAL RESULTS - UPPER BUTTE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			oz/yd³	Fire Assay oz/st	ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1425	P		0.005			1.5	45	14	104	10	120	Stream gravel
2834	P				480	ND	ND	8	154	30	90	Bank-run gravel
2857	P				860	ND	ND	8	174	30	170	Stream gravels abundant black sand
2858	P				4	ND	ND	8	148	55	70	Stream gravels abundant black sand

NAME(S): Butte Creek (Southwest) Lode Occurrence

Map Location No. B11
MAS No.0020670108
Kardex No. 67-226

Deposit Type: Vein
Commodities: Copper?

LOCATION: Quadrangle: Healy A2
SW 1/4 Sec: 4 T: 22S R: 2W Meridian: Fairbanks
Geographic: 1.5 miles west of Butte Creek near where its flow direction changes from east-west to north-south.
Elevation: 3600 Ft.

PRODUCTION: None.

HISTORY: 1975 - Enchantment Claims No. 1-16 located in the area.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The occurrence is underlain by lower Cretaceous argillite and lithic graywacke, and it lies near a contact with Eocene granodiorite (307).

BUREAU INVESTIGATION:

Two samples were collected in the area (Table B11), and neither contained anomalous metals. Limonite-stained basalt, not shown on geologic maps, contain anomalous copper values. One sample of metasiltstone contained 0.5 ppm silver (no. 2009).

RESOURCE ESTIMATE: Low metal values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and silver.

RECOMMENDATIONS: Prospect adjacent to intrusive contact.

REFERENCES: 307

TABLE B11 - ANALYTICAL RESULTS - BUTTE CREEK (SOUTHWEST) LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		Elements in ppm (unless otherwise stated)					
			Au	Ag	Ag	Cu	Pb	Zn	As	
1770	RC				ND	24	2	71	105	Limonite-stained basalt, diss. pyrite
2009	RC				0.5	38	12	64	ND	Metasiltstone, diss. pyrrhotite

NAME(S): Sweet Glory Placer Map Location No. B12

Deposit Type: Placer
Commodities: Bold, Platinum, Palladium

LOCATION: Quadrangle: Talkeetna Mountains D2, Healy A2
Sec: 7 & 18 T: 22S R: 1W Meridian: Fairbanks
Geographic: Southern tributary to Butte Creek, 9 miles above junction with Susitna River.
Elevation: 3000-3400 ft.

PRODUCTION: None.

HISTORY:

1982 - Sweet Glory claims staked
1988-1989 - Trenching and sampling

WORKINGS AND FACILITIES:

In 1988 a backhoe, sluice box, and spiral concentrator were brought onto the property. A 20 ft. deep, 60 ft. long trench had been dug in the stream gravels at the time of the Bureau visit. Two old, water-filled, cribbed shafts are located on the claims (129).

GEOLOGIC SETTING:

The stream crossing the Sweet Glory claims drains upper Triassic basaltic metavolcanic rocks in faulted contact with upper Jurassic sedimentary and volcanic rocks (93, 307). Gabbroic? and felsic intrusive float was found by the Bureau. Trenching down to 20 ft. did not hit bedrock.

BUREAU INVESTIGATION:

Five placer samples were collected from the drainage containing the Sweet Glory claims (Table B12). One sample taken from a 20 ft. deep trench contained 0.001 oz/yd^3 gold (no. 1600). The others did not contain significant gold values. The gold that was recovered was rough, indicating close proximity to its source. Placer samples also contained up to 10 ppb platinum and 6 ppb palladium.

RESOURCE ESTIMATE:

The gold values of Bureau samples were low and bedrock appears to be quite deep. Troctolitic gabbro and pyroxenite in this drainage are anomalous in platinum and palladium (map no. B12)

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

More trenching or drilling to test deep gravels. Prospect headwaters of drainage for ultramafic rocks, and sample for platinum and palladium.

REFERENCES: 93, 129

TABLE - B12 - SWEET GLORY PLACER

Sample no.	Type	Sample Length (feet)	Analysis										Description
			oz/yd³	ppb			Elements in ppm (unless otherwise stated)						
			Au	Au	Pd	Pt	Ag	Cu	Pb	Zn	As	W	
1758	P			70	ND	ND	ND	69	2	155	ND	60	Stream gravel
1759	P			16	6	ND	ND	174	2	132	ND	40	Abundant large boulders
1760	P			6	4	10	ND	69	2	125	ND	30	Bank-run gravel
1600	P		0.001		6	ND	0.5	74	64	141	35	30	From 20 ft. deep pit in gravel
1752	P			20			ND	73	4	118	15	30	Bank-run gravel

NAME(S): Peak 5532 Lode Occurrence Map Location No. B13

Deposit Type: Ultramafic
Commodities: Palladium, Platinum, Nickel

LOCATION: Quadrangle: Healy A2
Sec:31, T:21S, R1E, Meridian: Fairbanks
Sec: 1, 10, 15, 16 T: 22S R:1W Meridian: Fairbanks
Geographic: In vicinity of VABM Way in mountains on south side of Butte Creek. A 7.5 mile long stretch of terrain trending northwest from near VABM Way.
Elevation: 3900-5500 ft.

PRODUCTION: None.

HISTORY: 1963 - Magnetite-rich amphibolite found in area (172).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

A belt of mafic and ultramafic rocks trending N55°E extends for approximately 7.5 miles along strike. Irregularly-shaped dikes of mafic and ultramafic rocks intrude altered diorite and greenstone. Rock types identified within the belt included diorite, serpentinite, pyroxenite, troctolite(?), noritic gabbro, and dunite. Serpentinization is apparent along faulted margins of the ultramafic rocks. Apparent widths range from 3 to several hundred feet. Variably-altered pyroxenite is the most common ultramafic rock type. Locally serpentinization has formed massive magnetite. Troctolitic and dioritic gabbro are confined to dikes and sills that cut the larger diorite and greenstone masses. The gabbroic rocks contain pyrrhotite and minor chalcopyrite. Weathered ultramafic rocks are coated with limonite stain, making them conspicuous from a distance. The ultramafic belt is bounded by metabasalt on the north and by marble on the south (116, 307).

BUREAU INVESTIGATION:

Thirty-nine samples were collected along the trend of the ultramafic body (Table B13). Samples contained up to 140 ppb platinum (no. 3132) and 28 ppb palladium (no. 2213). The highest platinum values came from a troctolitic/gabbro(?), and pyroxenite carried the highest palladium values. The pyroxenites also contain up to 3525 ppm chromium and 908 ppm nickel.

RESOURCE ESTIMATE:

The ultramafic rocks contain anomalous values of platinum and palladium, but nowhere near presently economic amounts. Placer samples collected from streams draining this area are anomalous in platinum and palladium (Map nos. B3, B12). This lode occurrence lies at the southwest end of a proposed 120 mile long intermittently exposed arcuate belt of mafic-ultramafic rocks running through the central and eastern Alaska Range (116).

MINERAL DEVELOPMENT POTENTIAL:

Low development potential for platinum/palladium.

RECOMMENDATIONS:

Detailed mapping and sampling along the strike length of the ultramafic body.

REFERENCES: 61, 80, 116, 172, 307

TABLE B13 - ANALYTICAL RESULTS - PEAK 5532 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppb (unless otherwise stated)			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Pd	Pt	Ag	Cr	Ni	Cu	
2010	G				10	ND	10	0.5	215	339	167	Serpentinized pyroxenite
2011	S				200	6	ND	ND	334	189	35	Dunite
2012	CR				ND	ND	ND	ND	0.11%	148	86	Serpentinite
2013	S				ND	ND	ND	ND	6	72	18	Serpentinized dunite
2014	RC				ND	ND	ND	0.5	130	39	92	Serpentinized dunite
2208	G				ND	4	10	ND	0.17%	767	49	Gabbro
2209	G				ND	14	15	ND	2821	581	331	Serpentinized gabbro
2210	G				18	ND	10	ND	337	339	117	Serpentinized gabbro
2211	S				ND	6	ND	ND	334	189	35	Serpentinized gabbro
2212	G				ND	ND	ND	ND	13	73	39	Massive magnetite
2213	G				4	28	40	ND	609	737	203	Pyroxenite

TABLE B13 - ANALYTICAL RESULTS - PEAK 5532 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppb (unless otherwise stated)			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Pd	Pt	Ag	Cr	Ni	Cu	
2214	S				ND	ND	ND	ND	18	613	13	Serpentinite
2654	RC				ND	ND	ND	ND	164	61	230	Serpentinite
2655	CR				4	ND	ND	ND	0.18%	908	436	Pyroxenite
2656	G				ND	ND	ND	ND	0.17%	702	269	Pyroxenite
2657	G				ND	14	40	ND	0.30%	804	65	Pyroxenite
2658	S				ND	10	30	ND	0.31%	719	82	Limonite-stained gabbro
2659	S				ND	14	40	ND	0.33%	819	60	Magnetite- bearing gabbro
2660	CH				4	ND	10	ND	0.25%	328	275	Gabbro and pyroxenite
2661	RC				10	ND	5	ND	0.11%	244	292	Gabbro
2901	CR				ND	ND	ND	ND	98	11	26	Altered pyroxenite
2902	CR				ND	ND	ND	ND	196	52	114	Diorite breccia
2903	CR				ND	6	ND	ND	0.15%	748	116	Pyroxenite
2904	S				4	ND	ND	0.5	676	89	293	Altered diorite
2905	CR				ND	14	35	ND	0.35%	840	53	Pyroxenite

TABLE B13 - ANALYTICAL RESULTS - PEAK 5532 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppb (unless otherwise stated)			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Pd	Pt	Ag	Cr	Ni	Cu	
2906	S				2	14	50	ND	0.30%	762	59	Pyroxenite
2907	CR				6	4	ND	ND	0.30%	300	744	Gabbro pod in pyroxenite
2908	CR				4	4	20	ND	0.25%	482	51	Pyroxenite
3122	G				2	22	20	0.8	0.26%	389	475	Serpentinized pyroxenite
3123	RC				ND	ND	ND	ND	41	3	ND	Serpentinized diorite
3124	RC				16	4	ND	ND	0.35%	552	273	Serpentinized pyroxenite
3125	G				ND	ND	ND	ND	210	4	3	Altered diorite with quartz vein
3126	G				4	12	20	ND	0.25%	1070	65	Troctolite?
3127	RC				ND	10	ND	ND	0.10%	301	36	Troctolite?
3128	RC				6	6	ND	0.4	215	312	1465	Altered diorite
3129	RC				4	16	ND	ND	1780	365	129	Gabbro
3130	RC				4	18	ND	0.4	3320	501	163	Gabbro
3131	RC				6	ND	15	ND	1696	945	34	Troctolite
3132					ND	16	140	ND	1516	501	319	Troctolite

NAME(S): Shure Shot Claim

Map Location No. B14

Deposit Type: Vein
Commodities: Copper, Platinum, Palladium

LOCATION: Quadrangle: Healy A2
NW 1/4 Sec: 18 T: 22S R: 1E Meridian Fairbanks
Geographic: 1.5 miles south of VABM way.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1953 - Copper minerals found in the area (271).
1986 - Shure Shot placer claim declared null and void.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Rocks in the area are composed of basaltic metavolcanic rocks (307). Talus contains minor amounts of malachite and azurite associated with quartz and epidote in the metabasalt (271).

BUREAU INVESTIGATION:

A placer sample collected from a stream draining the area did not contain significant gold or copper. It was anomalous in platinum and palladium (Table B14). The area containing mineralized talus was not examined.

RESOURCE ESTIMATE:

Unevaluated. Ultramafic rocks to the north are anomalous in platinum and palladium (map no. B13)

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Locate and sample copper-stained rocks in area. Prospect for ultramafic rocks and sample for platinum and palladium.

REFERENCES: 271, 307

TABLE B14 - ANALYTICAL RESULTS - SHURE SHOT LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppb (unless otherwise stated)			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Pd	Pt	Ag	Ni	Cr	Cu	
2839	P				4	12	5	ND	73	199	153	Stream gravels

NAME(S): Butte Creek lode occurrence
Shadow Mt. Claims 1-46, Oscar 1-3,
Windy Draw Claims 1-2, Gossan 1-4,
Grey Boy 1-6, Claims
Lucky Linda Claims
Five Cards Missing Claims 1-7

Map Location No. B15
MAS No.0020670098
Kardex No. 67-53, 202

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Healy A2
Sec: 17 T: 22S R:1W Meridian: Fairbanks
Geographic: South of eastward bend in Butte Creek.
Elevation: Unknown.

PRODUCTION: None.

HISTORY:

1915 - Report of large chalcopyrite vein near Butte Creek (212).
1954 - Territorial Department of Mines does reconnaissance in area (271).

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Rocks in the area consist of interbedded volcanic flows and sedimentary layers (307).

BUREAU INVESTIGATION:

This area as described lies in the vicinity of the Sweet Glory claims investigated by the Bureau (see map no. B12). No chalcopyrite-bearing veins were found in the area by the Bureau. No samples were collected.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Further prospecting.

REFERENCES: 212, 271, 307

NAME(S): Sanjo Claims Placer
Seven Sisters Claims

Map Location No. B16

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D2
Sec: 26 T: 22S R: 1E Meridian Fairbanks
Geographic: On drainage four miles northwest of Coal Lake
Elevation: 2500 - 2900 ft.

PRODUCTION: Unknown.

HISTORY:

1980 - Claims located.
1981-1986 - Assessment work done.

WORKINGS AND FACILITIES: Test holes.

GEOLOGIC SETTING:

The stream drains Pennsylvanian and Early Permian basaltic and andesitic metavolcanic rocks (93).

BUREAU INVESTIGATION:

Two placer and one rock samples were collected from the stream on which claims had been staked (Table B16). no. 2841 contained 0.001 oz/yd^3 gold. Two samples were also slightly anomalous in palladium.

RESOURCE ESTIMATE: One placer sample contained significant gold.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS: More trench sampling with a backhoe.

REFERENCES: 93

TABLE B16 - ANALYTICAL RESULTS - SANJO CLAIMS

Sample no.	Type	Sample (feet)	Analysis								Description
			oz/yd³	Elements in ppb			Elements in ppm (unless otherwise stated)				
			Au	Au	Pd	Pt	Ag	As	Cu	Zn	
2840	P			340	4	ND	ND	25	13	148	Stream gravels
2841	P		0.001		4	ND	ND	15	21	160	Bank-run gravel
3028	G			ND	NA	NA	ND	35	78	162	Graphic schist stream float

NAME(S): VABM Watana Lode Occurrence Map Location No. B17

Deposit Type: Skarn
Commodities: Copper, Gold

LOCATION: Quadrangle: Talkeetna Mountains D2
SE 1/4 Sec: 36 T: 22S R: 2W Meridian: Fairbanks
Geographic: Vicinity of VABM Watana.
Elevation: 4200 - 5200 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The occurrence is underlain by Triassic metabasalts which includes subordinate amounts of metachert, argillite, metavolcaniclastic rocks and marble (93). Locally the limestone has been silicified and grades into garnet-epidote skarn. Silicified argillite or hornfels also occurs in the area. The skarn and hornfels contain varying amounts of bornite, covellite, and chalcopyrite.

BUREAU INVESTIGATION:

Numerous samples were collected in the area (Table B17). One sample (no. 1777) of skarn contained 20 ppb gold, 3.0 ppm silver, and 0.26% copper. A sample of silicified argillite (no. 1776) contained 0.16% copper.

RESOURCE ESTIMATE:

The copper-rich areas are small and are confined to small zones of skarn and hornfels.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS:

Map out extent of skarns and systematically sample for copper and gold.

REFERENCES: 93

TABLE B17 -- ANALYTICAL RESULTS- VABM WATANA LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Ni	Pb	W	Zn	
1597	S				ND	0.5	63	97	ND	ND	103	Limonite-stained diorite
1598	CC	2.0			ND	1.5	600	191	ND	30	72	Skarn, pyrrhotite/malachite
1599	S				ND	3.5	0.11%	615	6	20	90	Massive sulfides
1753	S				ND	0.5	604	25	ND	ND	82	Sheared gabbro, diss. pyrrhotite/chalcopyrite
1754	S				ND	0.5	193	42	ND	ND	72	Limonite-stained metabasalt
1755	S				ND	0.5	378	6	ND	ND	22	Sheared metabasalt, limonite stain
1756	CH	7.5			ND	1.0	995	317	ND	10	203	Siliceous limestone, chalcopyrite
1757	RC				ND	ND	ND	23	ND	10	47	Garnet-epidote skarn

TABLE B17 (CONT.) - ANALYTICAL RESULTS- VABM WATANA LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Ni	Pb	W	Zn	
1771	RC				10	3.5	500	38	ND	10	171	Siliceous metabasalt, pyrrhotite
1772	RC				ND	ND	138	19	ND	ND	73	Silicified metabasalt, diss. pyrrhotite
1773	RC				10	0.5	300	145	ND	20	112	Hornfels, diss. pyrrhotite
1774	RC				ND	ND	200	197	ND	10	52	Quartz vein
1775	S				ND	0.5	500	50	ND	ND	92	Hornfels, diss. pyrite/ pyrrhotite
1776	RC				ND	2.5	0.16%	798	ND	4	162	Hornfels, diss. pyrite/ pyrrhotite
1777	RC				20	3.0	0.26%	608	ND	ND	251	Skarn, bornite/ covellite
1778	RC				5	1.5	0.14%	450	ND	10	159	Skarn, pyrrhotite/ bornite

TABLE B17 (CONT.) - ANALYTICAL RESULTS- VABM WATANA LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Ni	Pb	W	Zn	
1779	G				10	1.5	0.15%	478	ND	ND	159	Skarn, pyrrhotite/ bornite
2689	G				ND	ND	141	32	ND	10	32	Metabasalt breccia
2690	CR				ND	ND	61	21	ND	10	52	Limonite-stained metabasalt, quartz/ calcite pods
2691	G				ND	ND	68	40	2	10	60	Conglomerate basalt clasts
2692	G				ND	ND	30	9	2	10	60	Conglomerate, basalt clasts
2771	RC				ND	ND	201	24	2	ND	60	Diorite pyrite/ chalcopyrite
2772	G				ND	ND	230	14	ND	30	88	Diorite pyrite/ chalcopyrite
2773	G				ND	ND	158	103	2	ND	58	Silicified metabasalt, diss. pyrite
2774	G				ND	ND	25	147	2	ND	82	Metabasalt

TABLE B17 (CONT.) - ANALYTICAL RESULTS- VABM WATANA LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Ni	Pb	W	Zn	
2775	G				20	ND	62	824	ND	ND	134	Magnetite-rich ultramafic
2776	G				ND	ND	84	44	4	30	82	Diabase
2777	G				ND	ND	236	50	2	60	118	Metabasalt
2793	RC				ND	ND	47	21	ND	ND	32	Metabasalt, epidote and calcite veins
2794	RC				ND	ND	94	15	ND	10	60	Quartz vein
2795	RC				10	2.4	98	74	40	10	152	Metabasalt, diss. pyrite
2796	RC				ND	ND	214	30	ND	20	98	Magnetite-rich ultramafic
2797	RC				ND	ND	80	28	ND	10	96	Silicified limestone
2798	RC				10	ND	83	36	ND	50	100	Quartzite
2799	RC				ND	ND	9	9	ND	ND	14	Quartz vein
2800	RC				ND	ND	297	59	ND	30	48	Altered gabbro, epidote/ calcite veinlets

NAME(S): Unnamed lode occurrence Map Location No. B18

Deposit Type: Vein
Commodities: Molybdenum (?)

LOCATION: Quadrangle: Talkeetna Mountains D2
SE 1/4 Sec: 34 T: 22S R: 2W Meridian: Fairbanks
Geographic: On ridge top 1.7 miles west of VABM Watana.
Elevation: 5200 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None

GEOLOGIC SETTING:

The area is underlain by Triassic metabasalt. Just west of this occurrence lies a faulted contact where the metabasalt has been thrust over upper Jurassic undivided sedimentary and volcanic rocks (93). The area is reported to be anomalous in molybdenum (92). The metabasalt is limonite stained and contains disseminated pyrite and quartz veins.

BUREAU INVESTIGATION:

Three samples were collected in the vicinity of the reported occurrence. None contained detectable molybdenum (Table B18).

RESOURCE ESTIMATE: No significant amounts of metals were detected.

MINERAL DEVELOPMENT POTENTIAL: Low potential for molybdenum.

RECOMMENDATIONS: None.

REFERENCES: 92, 93

TABLE B18 - ANALYTICAL RESULTS - UNNAMED LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Mo	Pb	Zn	
2956	CR				ND	ND	ND	193	ND	ND	52	Limonite-stained metabasalt
2957	CR				ND	ND	ND	6	ND	ND	6	Quartz vein in metabasalt
3031	CR				ND	ND	765	48	ND	2	52	Metabasalt, arsenopyrite, pyrite, malachite

NAME(S): Grizzly Bear Claims (No. 1-56)
lode occurrence

Map Location No. B19
MAS No. 0020760051
Kardex No. 76-46, 53

Deposit Type: Vein
Commodities: Copper, Zinc

LOCATION: Quadrangle: Talkeetna Mountains D2
Sec: 5-1/2 & 27 T: 22S R: 2W Meridian: Fairbanks
Geographic: Ridge on the east side of Butte Creek, 1.5 miles northwest of VABM Watana.
Elevation: 3700-4850 ft.

PRODUCTION: None.

HISTORY:

1915 - Mention of chalcopyrite veins in the area (212).
1954 - Territorial Dept. of Mines does reconnaissance (271).
1972-73 - Cities Service Minerals holds 96 claims in the area (339).
1974 - Northland Mines holds 18 claims in the area (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The mineralized area straddles the thrust-faulted contact between Upper Triassic basaltic metavolcanic rocks and Upper Jurassic undivided sedimentary and volcanic rocks (93). Sulfide mineralization consisting of pyrite, pyrrhotite, bornite, and chalcopyrite is concentrated in silicified limonite-stained metabasalt.

BUREAU INVESTIGATION:

One select sample of copper-stained metabasalt contained 5.17% copper, 360 ppb gold, and 550 ppm tungsten (Table B19, no. 2003).

RESOURCE ESTIMATE:

Copper is very localized, and only trace amounts of gold were found.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper and gold.

RECOMMENDATIONS: None.

REFERENCES: 93, 212, 271, 339

TABLE B19 - ANALYTICAL RESULTS - GRIZZLY BEAR CLAIMS LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	W	Zn	
1761	RC				ND	ND	15	0.01%	ND	ND	89	Metabasalt/skarn? limonite stain, calcareous
1762	RC				ND	ND	55	133	4	10	100	Pillow basalt
1763	RC				ND	ND	20	88	ND	ND	79	Metabasalt diss.
1764	RC				ND	ND	15	116	ND	ND	76	Metabasalt diss.
2001	CC	1.0			ND	0.5	10	176	12	20	49	Altered metabasalt, limonite stain
2002	CC	0.5			ND	ND	ND	36	10	ND	46	Felsic dike, diss.pyrite
2003	S				360	75	10	5.17%	18	550	392	Metabasalt bornite, chalcopyrite, malachite
2004	RC				ND	0.5	ND	67	10	ND	41	Silicified shear zone
2005	RC				ND	0.5	20	171	4	10	86	Calcareous volcanoclastics? limonite stain, carbonate veinlets
2006	CR				20	0.5	35	51	14	10	53	Silicified fault breccia

TABLE B19 (CONT.) - ANALYTICAL RESULTS - GRIZZLY BEAR CLAIMS LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	W	Zn	
2681	CR				ND	ND	5	59	6	10	186	Limonite-stained metabasalt, diss. pyrite
2682	RC				ND	ND	25	128	10	20	118	Limonite-stained metabasalt, diss. pyrite
2683	CC	2.1			ND	ND	35	221	30	20	1136	Sheared metabasalt diss.pyrite
2684	CC	2.0			ND	ND	70	194	36	20	740	Sheared metabasalt diss.pyrite
2835	G				10	ND	30	16	ND	10	52	Felsic intrusive
2836	G				ND	ND	5	55	ND	10	42	Felsic intrusive
2837	CC	10.0			ND	ND	5	51	ND	10	40	Metabasalt limonite stain
2953	P				350	ND	ND	81	ND	20	112	Bank run gravel

NAME(S): Unnamed lode occurrence
Watana Creek

Map Location No. B20
Kardex No. 76-46, 53

Deposit Type: Vein
Commodities: Zinc

LOCATION: Quadrangle: Talkeetna Mountains D3
E 1/2 Sec: 24 T: 22S R: 3W Meridian: Fairbanks
Geographic: Watana Creek headwaters, 4 miles east of Big Lake.
Elevation: 2910-3230 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The occurrence lies near the contact between Eocene granodiorite and lower Cretaceous argillite and lithic graywacke (93). Metabasalt was found in the area. Both the granite and metabasalt were locally silicified and enriched in pyrite.

BUREAU INVESTIGATION:

Several rubble exposures in the area were sampled. None contained anomalous gold or silver. One sample of silicified metabasalt contained 0.12% zinc (Table B20 no. 3106).

RESOURCE ESTIMATE: Metal values are low.

MINERAL DEVELOPMENT POTENTIAL: Low potential for zinc.

RECOMMENDATIONS: None.

REFERENCES: 93

TABLE B20 - ANALYTICAL RESULTS - UNNAMED LODE OCCURRENCE - WATANA CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1766	RC				ND	ND	25	13	2	55	Metabasalt, diss. chalcopyrite(?)
1767	RC				ND	ND	15	9	2	26	Metabasalt, silicified and bleached
1768	RC				ND	ND	20	21	ND	54	Metabasalt, diss. pyrite
1769	RC				ND	ND	5	8	4	63	Metabasalt, diss. sulfides
2007	RC				ND	0.5	125	34	10	60	Silicified granite, diss. pyrrhotite
2008	S				ND	0.5	20	40	4	112	Silicified granite, diss. pyrrhotite
2950	P				1500	ND	ND	ND	8	88	Bank-run gravels, 4 v. fine gold flakes
3105	G				ND	ND	20	61	14	140	Metabasalt, diss. pyrite
3106	G				ND	ND	ND	63	ND	0.12%	Silicified metabasalt, diss. pyrite
3107	RC				ND	ND	60	32	ND	824	Silicified, sheared, metabasalt
3108	RC				ND	ND	ND	31	6	92	Metabasalt, diss. pyrite
3109	RC				ND	ND	15	32	4	108	Metabasalt, diss. pyrite/pyrrhotite
3110	RC				ND	ND	10	35	8	48	Silicified metabasalt diss. pyrite

NAME(S): Big Lake Placer Occurrence

Map Location No. B21
MAS No.0020760050
Kardex No. 76-150

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D3
SE 1/4 Sec: 29 T: 22S R: 3W Meridian: Fairbanks
Geographic: 2 miles east of Big Lake.
Elevation: 2860 ft.

PRODUCTION: None.

HISTORY: 1977 - Two placer claims staked in area.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The stream is underlain by Lower Cretaceous argillite and lithic graywacke (93).

BUREAU INVESTIGATION:

One placer sample was collected at a poor site along a stream draining Big Lake. A visual field inspection showed trace amounts of gold (Table B21 no. 1765). Another sample collected closer to the lake also contained visible gold.

RESOURCE ESTIMATE: Low gold values make the area of little interest.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 93

TABLE B21 - ANALYTICAL RESULTS - BIG LAKE PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Ag	As	Pb	Zn	
1765	P				ND	ND	5	4	98	Stream gravel drains Big Lake
3111	P				620	ND	5	ND	90	Bank-run gravel
3112	P				790	0.6	ND	2	106	Bank-run gravel

NAME(S): Delusion Creek Placer Occurrence

Map Location No. B22
Kardex No. 76-181

Deposit Type: Placer
Commodities: Gold, Platinum, Palladium

LOCATION: Quadrangle: Talkeetna Mountains D3
NE 1/4 Sec: 18 T: 32N R: 7E Meridian: Seward
Geographic: Delusion Creek 3.7 miles above junction with Watana Creek.
Elevation: 2500 ft.

PRODUCTION: None.

HISTORY:

1979 - 18 placer claims staked on Delusion Creek.
1981 - Claims dropped.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Upper Delusion Creek is underlain by schist, migmatite, and granite.

BUREAU INVESTIGATION:

One sample (no. 2695)collected near the mouth of Delusion Creek contained 0.002 oz/yd^3 gold.

RESOURCE ESTIMATE:

The one sample collected contained significant gold and had elevated levels of palladium.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Sample Upper Delusion Creek to determine gold content of stream gravels.

REFERENCES: 93

TABLE B22 - ANALYTICAL RESULTS - DELUSION CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise stated)				ppb		
			Au	Ag	Ag	Cu	W	As	Pd	Pt	
2695	P		0.002		ND	7	160	45	4	ND	Stream gravel, abundant magnetite

NAME(S): Watana Creek Placer Occurrence Map Location No. B23

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains D3
Sec: 18-19 T: 32N R: 7E Meridian: Seward
Sec: 34 T: 33N R: 7E Meridian: Seward
Geographic: Lower portions of Watana Creek.
Elevation: 1650-2200 ft.

PRODUCTION: None.

HISTORY:

1979 - Claims staked on Upper Watana Creek
1981 - Claims abandoned

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Watana Creek follows the trace of the Talkeetna thrust fault, which has been mapped for 120 mile extent and appears to be a secondary branch of the larger Denali fault. The Talkeetna thrust fault marks the boundary between Kahiltna terrane flysch to the north and the Wrangellia terrane to the south (316). The creek drains a variety of rock types: the lower portion cuts mainly Tertiary fluviatile conglomerate, sandstone, and claystone; the upper portions drain mainly upper Triassic basaltic metavolcanic rocks, Lower Cretaceous argillite, lithic graywacke, and some Tertiary granodiorite (93).

BUREAU INVESTIGATION:

A series of placer samples were collected along the length of Watana Creek. The highest gold value was 0.0016 oz/yd^3 gold from the upper portion (Table B23, no. 2688). A sample collected from Watana Creek 2 miles upstream from the Susitna River contained 20 ppb platinum and 8 ppb palladium (no. 2696), which is anomalous. This area is underlain by Tertiary conglomerate similar in age to gold- and platinum-bearing conglomerates found in the Tyone River area 55 miles to the southeast.

A placer sample (no. 2951) collected from the west fork of Watana Creek, 11 miles above the Susitna River, contained 4 ppb palladium and 25 ppb platinum.

RESOURCE ESTIMATE: The drainage is anomalous in gold and platinum.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS:

Sample Tertiary conglomerate on Watana Creek to determine their potential as a source of placer gold and platinum.

REFERENCES: 93, 316

TABLE B23 - ANALYTICAL RESULTS - WATANA CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	Elements in ppb (unless otherwise stated)			Elements in ppm (unless otherwise stated)				
			Au	Au	Pd	Pt	Ag	Cu	W	As	
2687	P			310	4	ND	ND	33	100	ND	Stream gravel
2688	P		0.0016		ND	ND	ND	ND	180	55	Stream gravel on bedrock
2696	P			750	8	.020	ND	37	90	65	Gravel on bedrock, abundant magnetite
2695	P		0.0015		4	ND	ND	7	160	45	Stream gravel, abundant magnetite
2951	P			1800	4	.025	ND	9	ND	ND	Stream point bar
3032	P			8500	4	ND	ND	24	110	30	Bank-run gravel
3101	P			6200	ND	ND	ND	9	30	ND	Stream gravel, abundant black sand
3102	P			1800	6	ND	ND	36	20	30	Stream gravel
3111	P			0	ND	ND	ND	ND	ND	5	Bank run gravel

NAME(S): Fog Creek Placer Occurrence

Map Location No. B24
MAS No.0020760042
Kardex No. 76-162

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D3
Sec: 19 T: 31N R: 6E Meridian: Seward
Geographic: Near headwaters of Fog Creek, south of Fog Lake.
Elevation: 2310-2580 ft.

PRODUCTION: None.

HISTORY: 1978 - 1982 - 1 claim filed and assessment work done.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Above the claim area, Fog Creek is cut into Pennsylvanian and Early Permian metavolcanic rocks and upper Triassic basaltic metavolcanic rocks. The projected trace of the Talkeetna thrust crosses Fog Creek near this site (93).

BUREAU INVESTIGATION:

Two samples were collected from poor sample sites on Fog Creek in the reported vicinity of the claim (Table B24).

RESOURCE ESTIMATE: The gold values are not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: Look for better sample sites.

REFERENCES: 93

TABLE B24 - ANALYTICAL RESULTS - FOG CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
2697	P				6	ND	35	ND	80	5	Stream gravel, poor site
2698	P				6	ND	26	ND	98	ND	Stream gravel, poor site

NAME(S): Mt. Watana
Unnamed Lode Occurrence

Map Location No. B25

Deposit Type: Vein
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains C3
NW 1/4 Sec: 2 T: 30N R: 7E Meridian: Seward
Geographic: 0.5 miles southeast of summit of Mt. Watana.
Elevation: 5300 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Pennsylvanian and Early Permian basaltic to andesitic metavolcanic rocks (93).

BUREAU INVESTIGATION:

Mafic dikes and metavolcanic rocks contain disseminated sulfides. Two samples contained anomalous metal values (Table B25) sample no. 2059 contained 10 ppb gold and 402 ppm copper. A copper-stained float sample of metabasalt contained 220 ppb gold and 0.23% copper (no. 1900). Some ultramafic float was found to contain asbestos (no. 2056).

RESOURCE ESTIMATE: Metal values are low, and the exposures small.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 93

TABLE B25 - ANALYTICAL RESULTS - MT. WATANA - UNNAMED LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Ni	W	Zn	
1900	S				220	1.0	10	0.23%	74	40	74	Iron-stained metabasalt float copper stain
2053	G				ND	ND	15	43	6	20	131	Andesitic tuff diss. pyrite/ arsenopyrite
2054	CR				ND	ND	35	105	95	10	56	Mafic dike diss. sulfides
2055	CR				ND	0.5	20	156	28	20	59	Iron-stained mafic sill diss. pyrite
2056	S				ND	0.5	ND	104	51	10	25	Asbestos-bearing ultramafic float
2057	CR				ND	0.5	30	103	67	10	96	Chert diss. pyrite
2058	CC				ND	0.5	20	22	8	10	40	Silicified zone in marble diss. pyrite
2059	G				10	15	15	402	25	50	153	Podiform ultramafic(?) float
2060	CR				ND	ND	ND	33	68	10	56	Mafic dike diss. pyrite/ pyrrhotite
2201	CR				ND	ND	ND	58	22	ND	12	Quartz carbonate vein

TABLE B25 - ANALYTICAL RESULTS - MT. WATANA - UNNAMED LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Ni	W	Zn	
2202	ND				ND	ND	ND	32	17	ND	9	
2203	S				ND	ND	25	60	79	ND	30	Stockwork veinlets in metavolcanic rock
2204	G				ND	ND	ND	132	203	ND	48	Quartz-veinlet-bearing shear in metabasalt
2205	G				ND	ND	5	72	106	ND	43	Quartz-veinlet-bearing shear in metabasalt
2206	G				ND	ND	ND	81	96	10	35	Quartz-veinlet-bearing shear in metabasalt

NAME(S): Watana Rainbow placer occurrence
Watana Rainbow Claim

Map Location No. B26
MAS No.0020760047
Kardex No. 76-152

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains C2
SW 1/4 Sec: 33 T: 31N R: 8E Meridian: Seward
Geographic: On Kosina Creek, 4 miles above junction with Susitna River.
Elevation: 2200 ft.

PRODUCTION: None.

HISTORY: 1977 - Watana Rainbow claims filed (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The claim is located over a portion of the alluvium-concealed thrusted-faulted contact between lower to Middle Jurassic amphibolite and Pennsylvanian (?) and Early Permian basaltic to andesitic metavolcanic rocks (93). Kosina Creek in this area is filled with large granitic boulders, which made sampling difficult and would hinder mining.

BUREAU INVESTIGATION:

Placer samples collected at the reported claim location contained up to 0.0006 oz/yd^3 gold and abundant magnetite (Table B26). Another placer sample collected 2.75 miles upstream on Tisi Creek contained abundant magnetite and trace gold.

RESOURCE ESTIMATE: The gold values are at background levels.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 93, 339

TABLE B26 - ANALYTICAL RESULTS - WATANA RAINBOW PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)							
			Au	Au	Ag	Cu	Mo	W	V	Hg	As	
2964	P		0.001	140	ND	ND	18	350	1520	13	145	Abundant magnetite. Stream gravel 2 coarse gold flakes
2965	P		ND	34	ND	ND	17	330	1658	1	45	Abundant magnetite. Bank-run gravel 6 fine gold flakes.

NAME(S): Second Creek placer occurrence
Second Creek Placer Claim

Map Location No. B27
MAS No.0020760077
Kardex No. 76-134

Deposit Type: Placer
Commodities: Gold, Barium

LOCATION: Quadrangle: Talkeetna Mtns. D2-D3
Sec: 32 T: 32N R: 8E Meridian: Seward
Geographic: Mouth of Second Creek and 3.5 miles up drainage from junction with Susitna River. Second Creek is a local name only and is not used on topographic maps.
Elevation: 1700-2500 ft.

PRODUCTION: None.

HISTORY:

1976 - 1983 - Placer claim filed on and assessment work done.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Quaternary glacial and alluvial deposits.

BUREAU INVESTIGATION:

The placer sample collected at the reported claim site contained only trace gold (Table B27 no. 2947). Another sample collected at the mouth of Second Creek (no. 2946) contained 0.0002 oz/cy gold and over 1.0% barium.

RESOURCE ESTIMATE:

The gold values are not significant, but the barium value is very anomalous for this area.

MINERAL DEVELOPMENT POTENTIAL:

Low mineral development potential for gold. Undetermined mineral development potential for barium.

RECOMMENDATIONS:

Investigate anomalous barium value. Check for possible contamination in analytical results or at sample site.

REFERENCES: 93

TABLE B27 - ANALYTICAL RESULTS - SECOND CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	Cu	Pb	Zn	As	Ba	
2946	P		0.0002	0.0002	ND	33	8	142	10	1.0%	Bank-run gravel abundant magnetite and garnet
2947	P			0.026	ND	28	2	82	5	410	

NAME(S): August Claims No.'s 1-8

Map Location No. B28
MAS No.0020760049
Kardex No. 76-72

Deposit Type: Carbonate hosted
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains D2
NE 1/4 Sec: 22, T: 32N R: 8E Meridian: Seward
Geographic: North side of Susitna River, 5 miles north of mouth of Kosina Creek.
Elevation: 3900 ft.

PRODUCTION: None.

HISTORY:

Early 1970's - Leo Mark Anthony staked August Claims (27).
Mid 1970's - Cities Service Minerals Co. trenched and drilled property (27).

WORKINGS AND FACILITIES: Several trenches and drill pads.

GEOLOGIC SETTING:

The area is underlain by upper Triassic basaltic metavolcanic rocks with interbeds of argillite and marble (93). The mineralized zone appears to lie within the metabasalt near a contact with fossiliferous marble. Chalcopyrite, azurite, and malachite occur within a breccia zone (27). The mineralization may occur as a carbonate-hosted volcanogenic deposit similar to the Denali lode prospect (map no. A42).

BUREAU INVESTIGATION:

Four samples were collected from the mineralized zone in the greenstone. The samples contained up to 1.4% copper (Table B28 no. 1065).

RESOURCE ESTIMATE:

The grades of copper mineralization are encouraging, but its extent could not be determined. The Bureau observed numerous drill pads and other evidence of drilling. Data on the drilling may be available from the claim owners.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Review drill data.

REFERENCES: 27, 93

TABLE B28 - ANALYTICAL RESULTS - AUGUST LODE PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Ni	As	
1064	S				15	0.5	1.4%	ND	79	84		Greenstone chalcopyrite, azurite, malachite
1065	S				ND	0.5	1.4%	ND	69	105	ND	Greenstone chalcopyrite, azurite, malachite
1066	G				ND	0.5	0.26%	4	58	67	10	Greenstone chalcopyrite, malachite
1067	G				ND	1.5	0.33%	4	52	62	35	Greenstone chalcopyrite, malachite

NAME(S): Peak 5483 lode occurrence Map Location No. B29

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains D2
NW 1/4 Sec: 17 T: 32N R: 9E Meridian: Seward
Geographic: North side of Jay Creek, one mile southeast of peak 5483.
Elevation: 4200 - 4450 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: One 4 ft x 3 ft x 3 ft deep prospect pit.

GEOLOGIC SETTING:

The area is underlain by Pennsylvanian and early Permian mafic metavolcanic rocks (92, 93).

BUREAU INVESTIGATION:

A small prospect pit was located, and several samples were collected in the area. A sample of malachite-stained quartz contained 596 ppm copper and 130 ppm arsenic (Table B29 no. 1800).

RESOURCE ESTIMATE: The low copper values make the area of little interest.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 92, 93

TABLE B29 - ANALYTICAL RESULTS - PEAK 5483 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1798	RC				ND	ND	10	41	8	78	Mafic metavolcanics, diss. pyrrohite/pyrite
1799	RC				ND	ND	ND	66	ND	43	Mafic metavolcanics, diss. pyrrohite/pyrite
1800	RC				ND	ND	130	596	2	6	Quartz vein, malachite stain

NAME(S): Peak 4008 Lode Occurrence Map Location No. B30

Deposit Type: Stockwork vein/ disseminated
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains D2
Sec: 19 T: 32N R: 9E Meridian: Seward
Geographic: Near headwaters of Jay Creek tributary, 0.5 mile north of peak 4008.
Elevation: 3680 - 4080 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by intermediate to mafic metavolcanic rocks (93). Locally the metavolcanics are stained a tan-orange color and contain finely disseminated pyrrhotite and pyrite.

BUREAU INVESTIGATION:

Several of the stained areas were sampled. These samples contained up to 107 ppm copper (Table B30, no. 1943) and 10 ppb gold (no. 2940 & 2944).

RESOURCE ESTIMATE: The metal values are not significant.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for stockwork and disseminated copper and gold deposits.

RECOMMENDATIONS: None.

REFERENCES: 93

TABLE B30 - ANALYTICAL RESULTS - PEAK 4008 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1943	RC				ND	ND	ND	107	6	44	Felsic metavolcanics, diss. pyrite/pyrrhotite
1944	RC				ND	ND	5	92	10	46	Felsic metavolcanics, diss. pyrite/pyrrhotite
1945	RC				ND	0.5	ND	37	24	20	Colluvium cemented by iron oxides
1946	RC				ND	ND	5	10	24	20	Iron stained felsic dike
1947	RC				ND	0.5	20	3	10	95	Iron stained mafic metavolcanics
1948	RC				ND	0.5	10	1	4	38	Chlorite schist
2934	G				ND	ND	5	17	36	24	Iron stained vein quartz rubblecrop
2935	CR				ND	ND	10	45	4	118	Iron stained schist diss. pyrite
2936	CR				ND	0.4	ND	49	32	92	Limonite stained quartz veins, diss. sulfides
2937	RC				ND	ND	ND	38	8	80	Massive quartz veins gray colored metallic
2938	CR				ND	ND	ND	46	44	56	Ocher-stained, hematite-rich rock
2939	G				ND	ND	5	17	36	84	Limonite-stained quartz vein

TABLE B30 (CONT.) - ANALYTICAL RESULTS - PEAK 4008 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
2940	CR				10	ND	ND	100	10	212	Limonite-stained pyritic schist
2941	CR				ND	ND	10	52	12	70	Limonite-stained rock?
2942	G				ND	ND	15	124	12	46	Limonite-stained hematite-rich rock
2943	G				ND	ND	ND	97	ND	20	Limonite-stained quartz vein
2944	CR				10	ND	10	11	8	38	Sericite schist bleached area
2945	CR				ND	ND	15	11	16	70	Limonite-stained rock

NAME(S): Jay Creek Placer
Rainbow No. 1-7

Map Location No. B31
MAS No.0020760048
Kardex No. 76-129

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D2
Sec: 13&12 T: 31N R: 8E Meridian: Seward
Geographic: 0.5-1.0 up Jay Creek from junction with Susitna River
Elevation: 1670-1800 ft.

PRODUCTION: Minor.

HISTORY:

1920-1949 - Elmer Simco prospected and mined placer gold on Jay Creek.
1983 - Danny Thomas filed on Rainbow claims.
1987-1988 - Suction dredge used on creek.

WORKINGS AND FACILITIES:

Old placer tailings and test pits along Jay Creek up to one mile above the mouth. Present operator mines with an 8-inch floating suction dredge and a backhoe.

GEOLOGIC SETTING:

The lower portion of Jay Creek is underlain by Pennsylvanian and Early Permian basaltic to andesitic metavolcanic rocks. These rocks are part of a northeast-trending belt that runs across the center of the Talkeetna Mountains. The upper portion of the drainage is underlain by Cretaceous-Tertiary grandiorite and tonalite (93). At the upper end of the active claims, bedrock is 12 feet beneath the stream bottom.

BUREAU INVESTIGATION:

Placer samples were collected in the area of active workings and upstream to the creek headwaters. The highest gold values (0.001 oz/yd^3) were obtained from material 4 ft. beneath the active stream channel that was collected with a backhoe (Table B31 no. 1920). A placer concentrate collected by an 8-inch suction dredge contained 1075 ppm vanadium and 5.16% titanium (no. 1381). Placer samples collected further up Jay Creek contained up to 80 ppm tungsten (no. 1920).

RESOURCE ESTIMATE:

The gold content of placer samples collected on the creek is significant.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for placer gold.

RECOMMENDATIONS:

Divert Jay creek around gold-bearing gravels to make mining easier.

REFERENCES: 92, 93, 339

TABLE B31 - ANALYTICAL RESULTS - JAY CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	Pb	Ti	V	W	Zn	
1381	P			ND	1.5	62	5.16%	1075	20	233	Placer concentrate from mining operation
1382	P			55	0.5	18	3.76%	644	70	137	Gravel collected with backhoe from stream bottom
1920	P		0.001	0.001 oz/yd³	2.0	54	3.94%	602	80	136	Gravel collected with backhoe from stream bottom
1921	P			5	ND		2.28%	455	50	117	Active stream gravel
2847	P			100	ND		1.05	339	ND	106	Active stream gravel
2848	P			110		2	1.84	457		100	Active stream gravel
2966	P			44	0.4	4	1.20	395		100	Active stream gravel
2846	P			3300		6	0.70	344		84	Bank-run gravel
3029	P			4			1.04	368		78	Active stream gravel
3030	P			270			1.59	281		84	Bank-run gravels
3136	P			680			3.55	569		116	Active stream gravel

NAME(S): Unnamed lode occurrence

Map Location No. B32

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains D2
Sec: 18 T: 31N R: 9E Meridian: Fairbanks
Geographic: North side of Susistna River 1.5 mi. upstream from Jay Creek.
Elevation: 1800 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of lower Permian metavolcanic rocks. Minor chalcopyrite and pyrite occur in a small quartz vein (92, 93).

BUREAU INVESTIGATION: The site was not visited.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Search for vein along north side of river.

REFERENCES: 82, 92, 93

NAME(S): Jay Creek lode occurrence Map Location No. B33

Deposit Type: Shear zones
Commodities: Copper, Gold, Tungsten

LOCATION: Quadrangle: Talkeetna Mountains D2
NW 1/4 Sec: 5 T: 31N R: 9E Meridian: Seward
Geographic: On ridge 0.5 mi southeast of Jay Creek, 4 miles above junction with Susitna River.
Elevation: 3150 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by andesitic metavolcanic rocks (93). Sulfides consist of disseminated pyrite, pyrrhotite, and minor bornite within iron-stained silicified shear zones. The zones are randomly oriented with widths of up to 7 ft., exposed for up to 50 feet along strike.

BUREAU INVESTIGATION:

The iron staining was first noticed during a helicopter reconnaissance of the area. A series of samples were collected from the mineralized zone with on sample containing 104 ppm copper and 80 ppm tungsten (Table B33, sample no. 1937). Sample no. 1941 contained 25 ppb gold. A second iron stained area was observed on the east side of Jay, were it forms a gorge. That site was not sampled, as access was very difficult.

RESOURCE ESTIMATE:

The low metal values make this occurrence of little interest.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 92, 93, 94

TABLE B33 - ANALYTICAL RESULTS - JAY CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise stated)							
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
1937	RC				ND	ND	104	2	25	ND	80	Metamorphosed intrusive, trace bornite
1938	CC	3.5			ND	ND	35	6	19	10	10	Metamorphosed intrusive
1939	RC				ND	ND	2	4	2	ND	ND	Metamorphosed intrusive, silicified
1940	RC				ND	ND	5	6	28	10	10	Metamorphosed intrusive, quartz veinlets
1941	RC				25	ND	20	2	24	10	ND	Metamorphosed intrusive
1942	RC				ND	ND	36	4	10	15	ND	Metamorphosed intrusive, diss. pyrite

NAME(S): Jay Creek Headwaters Lode Occurrence Map Location No. B34

Deposit Type: Porphyry(?)
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains D2
NW 1/4 Sec: 24 T: 32N R: 9E Meridian: Seward
Geographic: Headwaters of Jay Creek near divide with Coal Creek.
Elevation: 3500 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by foliated granitic rocks, chlorite schist, and greenstone.

BUREAU INVESTIGATION:

A sample of the malachite-bearing quartz contained 161 ppm copper (Table B34, no. 3104).

RESOURCE ESTIMATE: The copper values are not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 92, 93

TABLE B34 - ANALYTICAL RESULTS - JAY CREEK HEADWATERS LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
3103	G				ND	ND	19	2	22	ND	ND	Quartz float fluorite, epidote
3104	G				ND	ND	16	2	16	ND	ND	Quartz, malachite-stain
3133	RC				ND	ND	5	ND	42	5	ND	Silicified greenstone
3134	RC				ND	ND	1	ND	30	5	ND	Limonite-stained chlorite schist
3135	RC				ND	ND	18	ND	64	10	ND	Limonite stained greenstone

NAME(S): Coal Creek Placer Occurrence Map Location No. B35

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D1-D2
SW 1/4 Sec: 13 T: 32N R: 10E Meridian: Seward
NE 1/4 Sec: 6 T: 32N R: 11E Meridian: Seward
Geographic: On coal creek 1.7 miles southwest of Coal Lake.
Elevation: 2770 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Upper Coal Creek drains Cretaceous and/or Tertiary granitic rocks (93).

BUREAU INVESTIGATION:

Both of the major forks of Coal Creek were sampled. A higher gold value (0.0008 oz/yd^3) was obtained on the south fork (Table B35 no. 2042).

RESOURCE ESTIMATE: One placer sample contained significant gold value.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: Closer-spaced sampling on Coal Creek with a backhoe.

REFERENCES: 93

TABLE B35 - ANALYTICAL RESULTS - COAL CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		oz/yd^3	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	W	
2042	P				0.0008 oz/cy	ND	5	4	103	15	ND	Stream gravel poor sample site
3137	P				0.0005 oz/cy	ND	6	8	144	10	50	Stream gravel

NAME(S): Lichen Prospect
Amphitheater Claims (No. 1-25)

Map Location No. B36
MAS No.0020760053
Kardex No. 76-104, 105, 109

Deposit Type: Volcanogenic Stratabound
Commodities: Copper, Silver, Gold

LOCATION: Quadrangle: Talkeetna Mountains D1
Sec: 1 & 2 T: 32N R: 11E Meridian: Seward
Geographic: South side of Coal Creek, 1.5 miles SE of VABM Coal
Elevation: 3090 ft.

PRODUCTION: None.

HISTORY:

1975 - Public announcement of mineral discovery by State of Alaska.
1975-1976 - 145 claims staked by Seraphim Engineering and Cities Service Co. Trenching and soil geochemical sampling performed.
1988 - Claims staked by Cominco Alaska Exploration.
1989 - Claims dropped by Cominco.

WORKINGS AND FACILITIES: Two small trenches.

GEOLOGIC SETTING:

The area is underlain by upper Paleozoic to Cretaceous intermediate to mafic lavas with interbedded sediments, pyelitic sedimentary rocks, and a variety of igneous intrusive bodies. Host rocks for mineralization consist of metavolcanic rocks, minor detrital sediments, and banded quartzite. Sulfides are either disseminated or concentrated in small quartz-feldspar-epidote veinlets, averaging less than 0.4 inches thick. The sulfides are restricted to a zone about five feet wide in a single, near-vertical volcanic horizon that strikes N60°W for at least 3,000 ft. Sulfides consist of chalcopyrite and bornite. A conspicuous, bright-orange lichen grows on the sulfide-bearing rocks, from which the prospect name was derived. The sulfides appear to be volcanogenic (308).

BUREAU INVESTIGATION:

The Bureau collected ten samples in the area (Table B36). The samples contained up to 3.71% copper and 66 ppm silver (no. 2037) in metabasalt. One sample (no. 2038) of quartz stringers in metabasalt contained 475 ppb gold.

RESOURCE ESTIMATE:

Bureau sampling shows the occurrence to contain very high copper values plus anomalous silver and gold values. Previous sampling (308) showed copper values of up to 4.5% copper and 16 ppm gold along a 5 foot-wide zone of undetermined strike length. Smith concluded that the occurrence may represent the distal edge of a larger deposit. There is a considerable amount of surficial cover in the area that may conceal the full extent of the mineralization.

MINERAL DEVELOPMENT POTENTIAL: Moderate.

RECOMMENDATIONS: Drilling to determine extent of mineralization under cover.

REFERENCES: 2, 92, 92, 189, 308, 339

TABLE B36 - ANALYTICAL RESULTS - LICHEN PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
1890	S				10	ND	105	4	68	ND	Metabasalt, quartz veinlets, pyrite
2033	CR				ND	ND	57	2	54	10	Gabbro adjacent to mineralized metabasalt
2034	S				10	10	1.04%	2	126	10	Shear zone in metabasalt, malachite stain
2035	RC				ND	7.0	0.71%	2	102	ND	Metabasalt, malachite stain
2036	S				ND	4.0	0.40%	2	85	20	Quartz vein, bornite, malachite
2037	S				340	66.0	3.71%	48	327	50	Metabasalt, chalcopyrite, malachite
2038	S				475	15.0	1.77%	2	173	5	Quartz vein, breccia chalcopyrite, bornite, copper stain

TABLE B36 - ANALYTICAL RESULTS - LICHEN PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
2039	S				ND	ND	74	4	6	5	Quartz vein
2040	CR				55	4.0	0.73%	2	113	20	Metabasalt with quartz stringers
2041	CR				90	4.5	0.74%	2	120	5	Fractured metabasalt, copper stain

NAME(S): Unnamed Occurrence
Lower Tyone River

Map Location No. B37

Deposit Type: Vein
Commodities: Zinc

LOCATION: Quadrangle: Talkeetna C1
S 1/2 Sec: 32 T: 10N R: 10W Meridian: Copper River
Geographic: West side of hill, 3015.
Elevation: 3000 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of small felsic volcanic dikes cutting Jurassic greenstone. Pyrite reported, and sample anomalous in zinc (92, 93).

BUREAU INVESTIGATION: Not visited by Bureau.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Prospecting in area.

REFERENCES: 92, 93

APPENDIX C

NAME(S): Busch Creek Placer
Pearly Claim #1, Busch Creek Claims 1-18,
Got-cha, Golden Goose Claims 1-4

Map Location No. C1
MAS No.0020760052
Kardex No. 76-56, 166

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains B2, C2
Sec: 24, 26, 33, & 34 T: 28N R: 9E Meridian: Seward
Geographic: Headwaters of Busch Creek.
Elevation: 3500-3900 ft.

PRODUCTION: 1988 - 150 oz gold.

HISTORY:

Early 1900s - Mr. Busch prospected in the area. Shaft reportedly put down in Busch Creek and short adits driven to locate lode mineralization in upper Pearly Creek.
1977 - Present operator began working on Busch Creek.
1978 - U.S. Geological Survey reported gold/platinum-bearing gravels and claims on Busch Creek (92).
1984 - Last year mining done on Pearly Creek.
1987 - Jig plant brought into property and set up.
1988 - Mined for 80 days using jig plant.
1989 - No mining activity.

WORKINGS AND FACILITIES:

In 1988, an average of 1000 yd^3/day bank-run gravel was processed through a seven jig concentrating plant. The concentrate was then amalgamated and the amalgam retorted. The concentrate contained high concentrations of magnetite, and the gold was fine and flat. Mining was done with a dozer and bucket loader. The operation employed 18 men working two shifts/day.

GEOLOGIC SETTING:

Upper Busch Creek drains the contact between a middle-upper Jurassic granodiorite migmatitic border zone and an upper Jurassic trondhjemite (oligoclase-biotite-quartz diorite) (91). The area has been glaciated and the Busch Creek drainage cuts till of unknown thickness. No bedrock was observed in the stream drainage in the vicinity of the active mine site. A clay-rich zone containing angular rock fragments is cut by lower Pearly Creek, but this may be false bedrock or what the local miners term gumbo.

BUREAU INVESTIGATION:

Numerous placer samples were collected to determine the extent of gravel in the drainage audits gold and platinum content. The best sample contained 0.012 oz/yd^3 gold (Table C1, no. 1706) and was collected from a pit recently excavated into the stream bank by an active mining operation. The samples all have a high magnetite content, and separating the gold was difficult. The values are much lower than indicated by visual field checks. This is probably due to gold loss during lab separation of gold from the magnetite-rich placer concentrates. Gold values dropped off abruptly above the Pearly Creek-Busch

Creek junction. Pearly Creek bank-run gravel contained up to 0.003 oz/yd^3 gold indicating that the Pearly Creek drainage may be a major contributor of gold to the Busch Creek Drainage. Glacial till lies approximately 50 feet above and between the Busch-Pearly Creek drainages.

The present stream drainages were sampled to determine the gold contents. The best sample contained 0.001 oz/yd^3 and was collected from clay-rich till, not stream gravels. A field visual check of the sample showed a very coarse gold fragment (less than 2 mm), 6 coarse (1-2 mm), and 25 fine colors (0.5-1.0 mm). The actual amount of gold recovered is too low for this count, indicating that some gold was lost during the lab recovery process.

The high bench gravels are distinctively different from those on a bench slightly lower in elevation on the north side of Busch Creek. The upper bench has a much higher clay content and greater variety of cobble composition, including felsic intrusive, gneiss, and basalt. The composition difference indicates that the upper tills have a different source. The Pearly Creek till may be older judging from its more weathered appearance. The gold content of the upper till makes it of interest as a bench placer target and its source, if locatable, is worthy of exploration for precious metals.

Discussions with local miners and Bureau sampling indicate that the gold is randomly distributed throughout the till, with the clay-rich variety containing somewhat more gold. Post glacial stream action along the Busch Creek and Pearly Creek drainages have reworked and concentrated the gold in the active streams. A series of placer samples collected along Busch Creek for 2.5 miles below the active mine site contained significant gold.

Platinum-group minerals have previously been reported in the area, and Bureau sampling substantiated this. A magnetite-rich placer concentrate sample (no. 1386) contained 1060 ppb platinum and 120 ppb palladium. One bench gravel placer sample (no. 1630) contained 480 ppb platinum. A 0.15 mm long grain recovered from bank-run gravel on Busch Creek (no. 1716) (fig. 19) was identified as isoferroplatinum (188).

RESOURCE ESTIMATE:

Bank-run gravel along the Busch Creek drainage is a source of placer gold and minor platinum-group metals. Bureau sampling indicates that the upper bench gravel, especially between Busch and Pearly Creeks, is anomalous in placer gold but needs further testing to define an additional resource. The gold is all very fine and flat. Gravity concentrates contain abundant magnetite, making gold recovery difficult. Recent use of jig-type processing plants has improved recovery. A test run of a centrifuge-type processing plant was set up on the property late in 1988 with good results.

Miners on Busch Creek indicate that gold values average 0.025 oz/yd^3 gold. Miners report finding native mercury attached to placer gold in virgin gravels. A Bureau sample collected from what appeared to be unworked bank-run gravel contained a gold flake covered with what appeared to be mercury. Native mercury is reported to occur in association with gold in some placers (24).

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for gold and platinum-group metals in bank-run and glacial till bench gravels.

RECOMMENDATIONS: Systematic trenching and placer drilling of bench gravels.

REFERENCES: 2, 15, 16, 23, 91, 177, 188

TABLE C1 - ANALYTICAL RESULTS - BUSCH CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		oz/yd^3	ppb			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Au	Pd	Pt	Ag	Cu	Pb	Zn	
1385	P				0	3400	NA	NA	0.5	ND	ND	141	
1386	P				0	990	120	160	0.5	ND	ND	125	
1502	P				0.007	800	ND	ND	ND	6	2	268	Bench gravel
1502B	P				0.007	7000	ND	ND	0.5	3	ND	103	Magnetic concentrate
1562	P				trace	680	ND	ND	ND	ND	2	177	Bench gravel
1563	P				0.001	AD	ND	ND	ND	8	2	139	Bench gravel
1620	P				0	AD	ND	ND	ND	4	2	126	Bank-run gravel
1621	P				0	AD	ND	ND	ND	3	2	115	Bank-run gravel
1622	P				0.001	4600	ND	ND	ND	ND	2	154	Point bar
1623	P				0.001	AD	ND	ND	ND	1	2	142	Bank-run gravel
1630	P				trace	AD	ND	480	ND	ND	2	185	Bench gravel
1677	P				NA	1700	ND	ND	0.5	8	ND	67	Bank-run gravel
1678	P				NA	2500	ND	ND	0.5	15	ND	110	Placer concentrate, less easily (?) recoverable gold
1679B	P				0.003	300	ND	ND	ND	4	2	262	Magnetic concentrate
1680	P				0.003	AD	ND	ND	ND	4	2	103	Bank-run gravel
1680B	P				0.003	24	16	680	ND	4	2	251	Magnetic concentrate

TABLE C1 - ANALYTICAL RESULTS - BUSCH CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		oz/yd^3	ppb			Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Au	Pd	Pt	Ag	Cu	Pb	Zn	
1702	G				0.002	NA	ND	ND	0.5	143	6	108	Basalt cobbles from mine tailings
1703	P				0.002	AD	ND	ND	ND	4	2	79	Bank-run gravel
1703B	P				0.002	4600	ND	ND	ND	8	2	252	Magnetic concentrate
1704	P				0.006	AD	20	12	ND	3	2	243	Bank-run gravel same as 1703
1704B	P				0.006	AD	ND	ND	ND	4	2	87	Magnetic concentrate
1705	P				0.012	4000	ND	ND	ND	2	2	102	Same site as 1703 but lower in cut
1705B	P				0.012	86	ND	ND	ND	4	2	252	Magnetic concentrate
1706	P				0.012	1300	ND	ND	ND	3	2	262	Bank-run gravel
1706B	P				0.012	8000	ND	ND	ND	ND	2	97	Magnetic concentrate
1716	P				0.006	AD	ND	ND	ND	ND	2	167	Bank-run gravel
1717	P				0.001	AD	ND	ND	ND	1	2	141	Bank-run gravel
1718	P		2.45		NA	AD	ND	ND	0.5	10	ND	141	Placer concentrate less easily recoverable gold
1805	P				0.001	AD	ND	.015	ND	95	2	207	Bank-run gravel
1806	P				trace	140	ND	ND	ND	ND	2	207	Bank-run gravel

NAME(S): Lower Black River Placer Occurrence

Map Location No. C2
Kardex No. 76-115

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B2
Sec: 35 T: 28N R: 10E Meridian: Seward
Geographic: On Black River 3.5 miles above junction with Oshetna River.
Elevation: 2970 feet

PRODUCTION: None.

HISTORY: 1975-79 Activity in area.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Quaternary alluvium consists of granitic and minor gneissic stream cobbles. There is no bedrock exposed.

BUREAU INVESTIGATION:

One placer sample, collected from the Lower Black River (Table C2 no. 1548) contained 0.001 oz/yd^3 of fine flood gold. The other samples collected from the occurrence contained minor fine gold (Table C2).

RESOURCE ESTIMATE:

The small size of the placer gold particles makes gold recovery difficult.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 16, 339

TABLE C2 - ANALYTICAL RESULTS - LOWER BLACK RIVER PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis											Description
			Fire Assay oz/st		oz/yd^3	ppb	Elements in ppm (unless otherwise stated)							
			Au	Ag	Au	Au	Ag	As	Cu	Mo	Pb	W	Zn	
1548	P				0.001	AD	ND	ND	3	ND	2	ND	187	Fine flood gold
1637	P				trace	1200	ND	<5	24	ND	2	60	108	
2611	P				0	1000	ND	65	9	<1	<8	1234	146	
2711	P				0	400	ND	5	9	2	ND	ND	168	
2722	P				0	ND	ND	25	ND	ND	8	ND	88	
2723	P				0	ND	ND	<5	21	2	8	ND	94	
2802	P				0	960	ND	105	ND	ND	ND	ND	206	2 fine gold flakes
2803	P				0	6	ND	135	ND	ND	ND	ND	186	
2804	P				0	240	ND	100	ND	ND	ND	ND	138	

NAME(S): Lucky Strike Claim No. 1 Lode Occurrence

Map Location No. C3
MAS No.0020760079
Kardex No. 76-163

Deposit Type: Vein
Commodities: Copper

LOCATION: Quadrangle: Talkeetna Mountains B2
N 1/2 Sec: 24 T: 27N R: 8E Meridian: Seward
Geographic: 1.5 miles northeast of Black Lake.
Elevation: 4560 ft.

PRODUCTION: None.

HISTORY:

1978 - Claim staked by James Gibbon and associates (340).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Area is underlain by a magmatic border zone of middle to upper Jurassic granodiorite, and consists of intermixed contact schist, amphibolite, and small dikes and veinlets of granodiorite (92).

BUREAU INVESTIGATION:

Iron-stained basalt was observed near its contact with granodiorite. It appears that the staining is the result of the granodiorite intrusion. The basalt was sampled (Table C3). A placer sample was collected in the gully below the stained area (no. 2610), but contained no anomalous values.

RESOURCE ESTIMATE: Metal values are not significant.

MINERAL DEVELOPMENT POTENTIAL: Low potential for copper.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 92, 339

TABLE C3 - ANALYTICAL RESULTS - LUCKY STRIKE CLAIM NO. 1 LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	W	Zn	
2610	P				10	ND	ND	ND	ND	20	214	Bank-run gravel, abundant black sand
2712	RC				ND	ND	10	39	ND	10	86	Metabasalt
2713	RC				ND	ND	5	60	ND	20	134	Metabasalt

NAME(S): Old Gold claims

Map Location No. C4
MAS No.0020760080
Kardex No. 76-164

Deposit Type: Altered diorite.
Commodities: Gold (?)

LOCATION: Quadrangle: Talkeetna Mountains B2
Sec: 3&10 T: 26N R: 8E Meridian: Seward
Geographic: South side Black River, 3 miles southwest of Black Lake.
Elevation: 5600 ft.

PRODUCTION: None.

HISTORY: 1978 - Two claims located (339)

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Area is underlain by Jurassic granodiorite (92).

BUREAU INVESTIGATION:

Iron-stained, altered quartz diorite is exposed in a saddle near the ridge top. Nine samples were collected (Table C4).

RESOURCE ESTIMATE: Samples contained no significant metal values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for gold.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 16, 92, 339

TABLE C4 - ANALYTICAL RESULTS - OLD GOLD CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sn	Zn	
1514	CR				ND	0.5	ND	2	2	NA	30	Biotite quartz diorite iron stained
1515	CR				20	0.5	ND	11	8	NA	30	Biotite quartz diorite clay alteration
1516	CR				ND	0.5	ND	6	2	NA	15	Biotite quartz diorite
1517	CR				90	0.5	ND	4	2	NA	13	Aplite
1809	G				ND	0.5	20	5	4	NA	49	Quartz diorite
1810	G				ND	0.5	ND	10	4	NA	60	Quartz diorite
1811	G				ND	0.5	ND	10	2	NA	55	Quartz diorite
1812	G				ND	0.5	5	ND	2	NA	26	Quartz diorite
1813	G				ND	0.5	5	1	2	NA	28	Weathered quartz diorite

NAME(S): Unnamed Placer Occurrence
Kosina Creek

Map Location No. C5

Deposit Type: Placer
Commodities: Palladium

LOCATION: Quadrangle: Talkeetna Mountains B3
Sec: 15&16 T: 27N R: 7E Meridian: Seward
Geographic: West tributary to Kosina Creek, 4 mi. south of John Creek.
Elevation: 3650-4000 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The stream drains undifferentiated plutonic and metamorphic rocks (93).

BUREAU INVESTIGATION:

Placer samples collected on this drainage contained up to 24 ppb palladium and 100 ppm arsenic.

RESOURCE ESTIMATE: The palladium content of the sample is anomalous.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer or lode palladium.

RECOMMENDATIONS: Prospecting and sampling in drainage.

REFERENCES: 15, 93

TABLE C5 - ANALYTICAL RESULTS - KOSINA CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Cr	Pd	Pt	
2742	P				ND	ND	100	22	163	24	ND	Active stream gravel, abundant black sand
2743	G				6	ND	10	40	277	4	ND	Banded gneiss
2744	G				4	ND	20	813	180	ND	ND	Intrusive rock
2745	G				ND	ND	ND	271	309	ND	ND	Banded gneiss

NAME(S): Upper Black River lode occurrence Map Location No. C6

Deposit Type: Porphyry
Commodities: Copper, Molybdenum, Gold, Tungsten

LOCATION: Quadrangle: Talkeetna Mountains B3
Sec: 1 & 11 T: 25-26N R: 7-8E Meridian: Seward
Geographic: Near head of Black River drainage, 24 mi. above junction with Oshetna River.
Elevation: 3900-5100 ft.

PRODUCTION: None.

HISTORY: Unknown

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The majority of the Black River headwaters area is underlain by Middle-upper Jurassic granodiorite (93). The granodiorite is cut by narrow northeast-trending shear zones and is intruded by andesitic(?) dikes. Basalt float was encountered in the river bottom.

BUREAU INVESTIGATION:

Several traverses were made around the headwaters area of the Black River. A sample of chalcopyrite-bearing granitic float (no. 1541) contained 0.69% copper, 150 ppb gold and 30 ppm tungsten (Table C6). Another float sample (no. 2629) contained 0.22% copper, 446 ppm molybdenum, and 180 ppm tungsten. A placer sample collected just downstream from the above samples (no. 1635) contained 110 ppm tungsten. A placer sample collected 5 miles downstream contained 1200 ppb gold (no. 1637, 15). A placer sample taken from a tributary on the east side of Black River (no. 1546) contained anomalous lead and zinc values.

RESOURCE ESTIMATE:

The copper- and molybdenum-bearing granitic float indicate that porphyry-type deposits may exist in the area.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for porphyry copper, molybdenum, and gold deposits.

RECOMMENDATIONS:

Prospect the entire drainage basin where Samples no. 1541 and 2629 were collected to search for source of chalcopyrite and molybdenite-bearing float.

REFERENCES: 15, 16, 93

TABLE C6 - ANALYTICAL RESULTS - UPPER BLACK RIVER LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)							
			Au	Ag	Au	Ag	As	Cu	Mo	Pb	Zn	W	
1541	S				150	5.5	ND	0.69%	4	2	41	30	Granitic dike, chalcopyrite, pyrite
1542	S				75	0.5	ND	323	8	2	69	ND	Homeblende gabbro
1543	P				70	ND	ND	21	1	4	215	90	
1544	CC	3.0			15	0.5	ND	6	2	2	12	ND	Breccia zone w/calcite, quartz matrix
1545	RC				ND	0.5	ND	6	1	2	24	ND	Shear zone in granitic rocks adjacent to #1544
1546	P				140	ND	ND	31	3	152	283	ND	
1547	G				25	0.5	ND	26	1	2	24	ND	Metamorphosed granitic? rock
1633	S				ND	0.5	ND	19	3	2	102	10	Basalt float
1634	G				ND	0.5	220	26	15	28	32	ND	Altered granitic rock limonite stain
1635	P				26	ND	ND	52		2	118	110	
2626	Ch	1.5			ND	ND	10	5	ND	2	30	ND	Gouge zone at granodiorite-andesite dike contact, same site as 1544
2627	CC	1.5			ND	ND	ND	31	ND	2	34	10	Altered andesite dike, same site as 1544

TABLE C6 (CONT.) - ANALYTICAL RESULTS - UPPER BLACK RIVER LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)							
			Au	Ag	Au	Ag	As	Cu	Mo	Pb	Zn	W	
2628	G				ND	ND	10	11	ND	ND	36	ND	Unaltered andesite dike, same site as 1544
2629	S				ND	ND	135	2240	446	ND	90	180	Limonite stained granodiorite float, molybdenite, pyrite
2630	G				ND	ND	ND	27	ND	4	100	ND	Green stained andesite
2724	P				ND	ND	55	69	5	16	170	ND	Active stream gravel, abundant black sand

NAME(S): Nowhere Creek Placer

Map Location No. C7
Kardex No. 76-178

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-2
Sec 27-29 T 25N R 8E Meridian Seward
Geographic: Tributary of Oshetna River.
Elevation: 4000 feet

PRODUCTION: None.

HISTORY: 1979 - Amend Mining Co. staked claims (340).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The south side of the drainage has Tertiary volcanic and fluviatile conglomerate exposed (125). Jurassic volcanic rocks, sandstone, and argillite of the Talkeetna Formation plus quartz diorite and Quaternary glacial deposits crop out on the north side of the creek (125). The stream valley is from 50 to 300 feet wide. The thickness of the alluvial gravel ranges from 5 feet to greater than 40 feet. The stream gradient varies from 100 to 300 feet/mile. The stream is braided in the wider sections of the valley.

BUREAU INVESTIGATION:

The Bureau collected three placer samples (1727, 1807-08) and 2 select samples (1725, 1726). The placer samples contained from trace to 0.001 oz/yd^3 gold (Table C7). Sample 1727 contained 35 ppm mercury and crystalline free gold particles.

RESOURCE ESTIMATE:

There are an estimated 3 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Needs more sampling to determine resources and possible lode sources.

REFERENCES: 15, 16, 114, 125, 339

TABLE C7 - ANALYTICAL RESULTS - NOWHERE CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis					Description
			Fire Assay oz/st		ppb	oz/yd^3	ppm	
			Au	Ag	Au	Au	Hg	
1725	S				10	NA	ND	Conglomeratic material
1726	S				5	NA	ND	Conglomeratic material
1727	P				8600	trace	35	
1807	P				650	0.001	5	
1808	P				3500	0	ND	

NAME(S): Upper Oshetna River placer occurrence Map Location No. C8

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A2
Sec: 3, 9, 17 T: 24N R: 8E Meridian: Seward
Geographic: 3.5 miles north of divide with Chickaloon River.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY:

1906 - Placer gold discovered and claims staked near the headwaters of Mazuma Creek 5 miles to the southeast (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The drainage headwaters are underlain by Tertiary felsic to mafic subaerial volcanic rocks and related shallow intrusives (3).

BUREAU INVESTIGATION:

A series of placer samples and one rock sample were collected in the area (Table C8). Sample no. 1819 was above the 10,000 ppb detection limit, but no visible gold was recovered by the lab. The samples contained high values of zinc (up to 851 ppm, Table C8).

RESOURCE ESTIMATE: One sample was anomalous in gold.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Re-sample anomalous site.

REFERENCES: 15, 16, 93

TABLE C8 - ANALYTICAL RESULTS - UPPER OSHETNA RIVER PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1816	P				ND	ND	ND	64	2	851	Active stream gravel, 1 coarse gold flake
1817	P				ND	ND	ND	45	2	601	Active stream gravel
1818	G				ND	ND	ND	61	2	61	Basalt
1819	P				AD	ND	ND	16	8	742	Active stream gravel
1820	S				ND	0.5	ND	8	ND	79	Greenish stained tuff
2621	P				8	ND	120	ND	ND	590	Abundant black sand
2622	P				ND	ND	110	ND	ND	738	Stream gravel, black sand
2623	P				18	ND	20	7	8	324	Stream gravel
2624	P				4	ND	55	18	ND	94	Stream gravel, black sand
2725	P				ND	ND	35	4	ND	296	Bench gravel
2726	P				390	ND	35	21	ND	164	Stream gravel, garnet, black sand
2727					2	ND	85	9	ND	542	Bench gravel

*AD= above detection limit.

NAME(S): Landslide Creek Placer Occurrence

Map Location No. C9
Kardex No. 76-284

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1, A-2
Sec: 18, 19, 30, 32 T 25N R 9E Meridian Seward
Geographic: Trib of the Oshetna River.
Elevation: 3550 - 5000 ft.

PRODUCTION: None.

HISTORY: 1982 - 25 Claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The headwaters of the drainage is comprised of Tertiary volcanic rock and Quaternary landslide deposits. The lower section of the drainage is comprised of volcanic rock, sandstone (?), and argillite of the Jurassic Talkeetna Formation, Tertiary fluviatile conglomerate, a Jurassic intrusive, and Quaternary landslide and glacial deposits (125). The valley widths range up to 400 feet. The thicknesses of the alluvial gravel ranges from 20 to 40 feet in the lower sections. The gradient of the drainage is 300 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected one 0.1 yd^3 placer sample (2990). The sample contained no detectable gold.

RESOURCE ESTIMATE: There are an estimated 1.5 million yd^3 of alluvial material.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Detailed sampling using a backhoe or drill is needed to properly evaluate the drainage.

REFERENCES: 2, 15, 114, 339

TABLE C9 - ANALYTICAL RESULTS - LANDSLIDE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis				Description
			Fire Assay oz/st		ppb	ppm	
			Au	Ag	Au	Cu	
2990	P		ND		NA	43	Alluvium

NAME(S): Roaring Creek Placer Occurrence

Map Location No. C10
MAS No.0020760019

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-2
Sec 14 T 25N R 8E Meridian Seward
Geographic: Tributary of Oshetna River.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1914 - Placer gold found along creek (57).
1976 - Black Creek Mining Co. staked claims (2).
1978 - Amend Mining Co. staked 17 claims (2).

WORKINGS AND FACILITIES: Prospect pits.

GEOLOGIC SETTING:

The creek drains a Jurassic quartz diorite at the headwaters, Jurassic volcanic rocks, sandstone, and argillite of the Talkeetna Formation, Tertiary volcanic rocks and fluviatile conglomerate, and Quaternary glacial deposits (125). The creek valley is from 100 to 200 feet wide. The thicknesses of the alluvial gravel are from 0 to 20 feet. Stream gradient ranges from 150 to 500 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected one 0.1 yd^3 placer sample (1511). The sample contained 0.001 oz/yd^3 gold (Table C10). Reconnaissance rock samples were collected in the drainage but did not contain any economic metal values (15).

RESOURCE ESTIMATE:

There are an estimated 500,000 yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: More sampling is needed.

REFERENCES: 2, 15, 16, 57, 58, 78, 92, 114, 125, 185, 280, 339

TABLE C10 - ANALYTICAL RESULTS - ROARING CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis						Description
			Fire Assay oz/st		oz/yd^3	ppm			
			Au	Ag	Au	Ag	Cu	Zn	
1511	P				0.001	0.5	29	115	Alluvium

NAME(S): Granite Creek Lode Occurrence

Map Location No. C11
MAS No.0020760059
Kardex No. 76-67

Deposit Type: Silicified shear zone
Commodities: Copper, Zinc, Silver, Gold

LOCATION: Quadrangle: Talkeetna Mountains B2
SE 1/4 Sec: 34 T: 26N R: 8E Meridian Seward
Geographic: Headwaters of Granite Creek, 5.1 mi. above junction with Oshetna River.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY:

1914 - Mention of placer gold in Granite Creek (57)
1971 - 27 claims staked in area by Leo Mark Anthony after follow-up of a 135 ppm copper stream sediment anomaly on Granite Creek. Grid laid out and three trenches dug across a mineralized diorite dike. One trench cut a 15 ft wide mineralized zone containing 0.14% copper. Claims dropped due to limited extent of mineralization (2, 189, 339).

WORKINGS AND FACILITIES:

No workings or claim posts located. Remains of a prospecting camp were found.

GEOLOGIC SETTING:

Sulfides occur within a siliceous gouge zone in igneous rocks near the contact between upper Jurassic diorites and pyroclastic/tuffaceous volcanic rocks of the lower Jurassic Talkeetna formation.

BUREAU INVESTIGATION:

The Bureau found no evidence of workings or claim stakes in the area. A series of traverses were made in the area and two iron stained zones were located on the cut banks of streams draining the area. The best metal values occurred within a 350 ft long iron-stained zone exposed on the north side of a stream. A continuous chip sample collected from a 3.5 ft wide zone at the west end of the stained area contained 0.87% zinc and 0.16% copper (no. 1611 Table C11). A select sulfide-rich siliceous float sample found nearby contained 1.5 oz/st silver, 5.8% copper, and 2.4% zinc (no. 1612, Table C11). This material occurred in a colluvium covered slope on the stream cutbank. The highest gold content of the samples was 120 ppb. The mineralization appears to be hydrothermal and concentrated in a narrow silicified N20°E trending 70°W dipping gouge zone at the faulted contact between the diorites and tuffaceous rocks.

Gold mineralization has been discovered within the Talkeetna Formation on the Alaska Peninsula, 220 miles to the southwest. The Johnson River prospect is a gold-zinc-copper-lead deposit consisting of a discordant quartz-sulfide stockwork in subaqueous tuffs in faulted contact with quartz monzonite (317).

The Granite Creek occurrence has geologic similarities to the Johnson River Prospect, but lacks the high gold values.

RESOURCE ESTIMATE:

The silver, copper, and zinc values are significant. The mineralized zone may be too narrow to be of interest as a copper-zinc deposit, but does have potential as a precious metals target.

MINERAL DEVELOPMENT POTENTIAL: Low potential for precious metals.

RECOMMENDATIONS:

Trenching in the area where the sulfide-rich float was found is needed to locate the bedrock source.

REFERENCES: 2, 15, 16, 57, 189, 317, 339

TABLE C11 - ANALYTICAL RESULTS - GRANITE CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1503	RC				NA	0.5	ND	119	6	136	Fine-grained altered intrusive iron-stained diss. pyrrhotite/pyrite
1504	RC				NA	0.5	80	61	6	173	Pyrrhotite/pyrite
1505	CC	1			ND	0.5	40	75	20	85	Silicified tuff
1506	CH	1			ND	0.5	20	28	14	74	Iron-stained tuff
1507	CC	1			ND	0.5	ND	44	ND	36	Silicified tuff
1512	RC				40	0.5	ND	33	2	136	Breccia zone
1605	RC					0.5	ND	4	10	75	Silicified tuff breccia
1606	RC				ND	0.5	115	46	10	57	Silicified iron-stained tuff, 2-5% pyrite/pyrrhotite
1607	RC				ND	0.5	10	ND	8	81	Silicified diorite? 2-5% pyrrhotite/pyrite
1608	RC				ND	0.5	5	ND	10	43	Silicified breccia
1609	RC				85	0.5	10	28	80	293	Silicified tuff breccia
1610	RC				95	0.5	30	26	30	0.01%	Siliceous diorite?
1611	CC	3.5			75	5.0	15	0.16%	154	0.87%	Gouge zone in siliceous diorite? sphalerite, bornite

TABLE C11 (CONT.) - ANALYTICAL RESULTS - GRANITE CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1612	S			1.5	120	51.5	30	5.75%	110	2.36%	Silicified iron-stained float, chalcopyrite/sphalerite/ bornite
1613	RC				15	1.5	35	654	66	289	Silicified tuff breccia with pyrrhotite
1615	RC				10	0.5	ND	17	14	30	Fine-grained altered intrusive
2607	RC				50	ND	75	30	16	20	Tuff with pyrite
2608	RC				ND	ND	ND	31	20	82	Andesite with pyrite
2609	RC				ND	ND	40	74	2	50	Silicified tuff pyrite
2719	G				ND	ND	20	241	ND	176	Greenstone pyrite, ilmenite, chalcopyrite
2720	RC				ND	ND	ND	61	ND	86	Graywacke with pyrite
2728	RC				ND	ND	15	4	ND	36	Granite, iron-stained
2729	G				ND	ND	35	6	6	36	Greenstone, iron-stained
2730	G				ND	ND	25	29	2	96	Altered granite
2731	RC				ND	ND	ND	8	2	16	Silicified basalt
2732	RC				ND	ND	10	17	ND	64	Greenstone with pyrite
2733	G				ND	ND	ND	3	6	28	Silicified tuff
2734	RC				ND	ND	ND	3	ND	118	Silicified basalt, magnetite
2735	RC				ND	ND	25	31	4	256	Iron-stained conglomerate

TABLE C11 (CONT.) - ANALYTICAL RESULTS - GRANITE CREEK LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
2736	P				84	ND	75	3	16	106	
2737	RC				ND	ND	20	5	94	64	Silicified greenstone, with pyrite
2738	RC				ND	ND	25	7	40	44	Continuation of sample no. 2737
2739	RC				ND	ND	40	32	142	514	Greenstone, with pyrite
3001	RC				ND	ND	10	2	4	30	Silicified iron-stained tuff

NAME(S): Granite Creek Placer Occurrence

Map Location No. C12
MAS No.0020760020
Kardex No. 76-38, 151

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-2
Sec 31 T 26N R 9E Meridian Seward
Geographic: Tributary of Oshetna River.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1914 - Placer gold found along creek (57)
1976 - Black Creek Mining staked 34 claims (2)
1977 - Gary Wright staked 2 claims (2)

WORKINGS AND FACILITIES: Minor placer workings.

GEOLOGIC SETTING:

Bedrock in creek comprises Tertiary volcanic rocks, Jurassic volcanic rocks, sandstone, and argillite of the Talkeetna Formation, Quaternary glacial deposits, and a Jurassic intrusive that outcrops at the head of the creek (125). A copper-gold lode property is also located at the headwaters. The stream valley is from 50 to 250 feet wide. The thicknesses of the alluvial gravel is from 0 to 15 feet. The gravel contains large (up to 10 ft. wide) boulders. Stream gradient ranges from 150 to 300 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected 2 placer samples (1508, 1510) from the drainage in 1988. The samples contained trace and 0.0002 oz/yd^3 gold.

RESOURCE ESTIMATE:

Creek drainage contains greater than 500,000 yd^3 of alluvial material.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Additional sampling is needed.

REFERENCES: 2, 15, 16, 57, 58, 77, 92, 114, 185, 280, 339

TABLE C12 - ANALYTICAL RESULTS - GRANITE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis						Description
			Fire Assay oz/st		oz/yd^3	ppm			
			Au	Ag	Au	Ag	Cu	Zn	
1508	P				0.0002	ND	11	329	Alluvium
1510	P				trace	0.5	21	227	Alluvium

NAME(S): Gold Creek Placer
William K. Defrang
Jeffrey Bettis

Map Location No. C13
MAS No.0020760021
0020769007
0020769009
Kardex No. 76-37, 87, 117, 1 42-45

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains B-2, A-2
T 25-26N R 9E Meridian Seward
Geographic: Tributary of Oshetna River.
Elevation: 3200 - 4800 feet.

PRODUCTION: None.

HISTORY:

1900 - 5 claims staked (2).
1914 - Prospectors on Gold Creek found coarse gold, but had difficulty getting to bedrock on account of high ground water levels (57).
1974 - 2 claims staked (2).
1975 - Suction dredging occurred (249).
1976 - Small mining operation - 34 claims staked (2).
1979 - 3 claims staked (2).
1980 - 26 claims staked (2).

WORKINGS AND FACILITIES:

Mining cuts at 4500 ft and 3200 ft elevation. Diversion ditches and cabins.

GEOLOGIC SETTING:

The bedrock in the Gold Creek drainage is predominantly volcanic rock, sandstone, and argillite of the Jurassic Talkeetna Formation. The divide to the west of the creek is capped by Tertiary volcanic rocks, which overlie Tertiary fluviatile conglomerate (125). The gradient ranges from 100 to 200 feet/mile. Gravel depth is from 0 to 50 feet, with an average of 15 feet.

BUREAU INVESTIGATION:

The Bureau took eight 0.1 yd^3 placer samples (1518-19, 1521-22, 1814-15, 2716-17, Table C13) and one rock sample (1520, Table C13). The placer samples contained from trace to 0.0043 oz/yd^3 gold (Table C13). Fineness values for the gold were from 770 to 850 fine (114). The samples contained from less than 5 to 3100 ppb platinum (Table C13).

The DGGS mapped geology and collected samples in this drainage (65, 66).

RESOURCE ESTIMATE:

There are an estimated 1 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Moderate for a small operation.

RECOMMENDATIONS:

Drilling in section just upstream of confluence with Oshetna River. Backhoe trenching is also needed.

REFERENCES: 2, 15, 16, 57, 58, 65, 66, 77, 92, 114, 185, 280, 339

TABLE C13 - ANALYTICAL RESULTS - GOLD CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis						Description
			Fire Assay oz/st		Elements in ppb (unless otherwise stated)			Fineness	
			Au	Ag	Au oz/yd^3	Pd	Pt	Au	
1518	P				0.0020	ND	ND	850	Alluvium
1519	P				0.0025	26	3100	770	Alluvium
1521	P				0.0043	ND	200	820	Alluvium
1522	P				0.0001	ND	15	ND	Alluvium
1814	P				0.0001	8	10	ND	Alluvium
1815	P				0.0002	ND	10	ND	Alluvium
2716	P				Trace	ND	ND	ND	Alluvium
2717	P				Trace	ND	ND	ND	Alluvium

NAME(S): Oshetna River Placer Occurrence

Map Location No. C14
MAS No.0020760055
Kardex No. 76-80, 115

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains
T 26N R 11E Meridian Seward
Geographic: Tributary of Susitna River.
Elevation:

PRODUCTION: None.

HISTORY: 1973 - Claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The lower half of the Oshetna River drains volcanic rock, sandstone, and argillite of the Jurassic Talkeetna Formation (93). In the vicinity of Roaring Creek, Tertiary fluviatile conglomerate is exposed (124, 125). Above the Roaring Creek confluence with the Oshetna Tertiary volcanic rock and Quaternary landslide and glacial deposits have been mapped (124, 125). The drainage contains extensive gravel deposits along the river. The river valley is between 100 and 1000 feet wide. The gradient ranges from 20 to 130 ft/mile. Gravel thicknesses are between 10 and 40 ft.

BUREAU INVESTIGATION:

The Bureau collected six 0.1 yd^3 placer samples (1549, 2625, 2631-32, 2718, 2721, Table C14) and three rock samples (1550, 1818, 1820) (15) in the Oshetna River. The placer samples were taken from alluvium and contained from non-detectable to trace gold. Sample 2631 contained 4 ppb palladium and 10 ppb platinum.

Sample 2718 was collected from a tributary of the Oshetna River. The tributary has the same geology as that of Granite Creek (i.e., Jurassic diorite in contact with Talkeetna Formation rocks and Tertiary volcanics). The presence of recoverable gold in this drainage may signify a lode occurrence similar to the one found in Granite Creek. The gold in sample 2718 was 663 fine.

RESOURCE ESTIMATE:

There are an estimated 50 million yd^3 of alluvial material in the river.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Additional sampling of the drainage using drills or backhoes. Prospect tributary of the Oshetna for lode gold.

REFERENCES: 2, 15, 16, 339

TABLE C14 - ANALYTICAL RESULTS - OSHETNA RIVER PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		oz/yd^3	ppb		ppm	Fineness	
			Au	Ag	Au	Pd	Pt	Zn	Au	
1549	P				Trace	ND	ND	256	NA	Alluvium
2625	P				Trace	ND	ND	264	NA	Alluvium
2631	P				0	4	10	62	NA	Alluvium
2632	P				0	ND	ND	280	NA	Alluvium
2718	P				Trace	ND	ND	144	663	Alluvium
2721	P				Trace	ND	ND	154	NA	Alluvium

NAME(S): Little Oshetna River Placer Occurrence
Black Creek Mining Co.

Map Location No. C15
MAS No.0020760054
0020769003
Kardex No. 76-135

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-2, B-1, B-2
T 24-26N R 9-11E Meridian Seward
Geographic: Tributary of Oshetna River.
Elevation: 3000 - 5500 ft.

PRODUCTION: None.

HISTORY:

1976 - 26 claims staked by Black Creek Mining Co. (2).
1982 - 1 claim staked by Ron Swavely (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The Little Oshetna River predominantly cuts through volcanic rocks, sandstone, and siltstone of the Jurassic Talkeetna Formation (124, 125). Jurassic sandstone, cobble and boulder conglomerate of the Naknek Formation are present to the south, near the head of the river, and they overlie conglomerate of the Chinitna Formation (124, 125). At the head of the river there are Tertiary volcanic rocks. Minor outcrops of Tertiary fluviatile conglomerate underlie the Tertiary volcanic unit. The gradient of the river averages 100 feet/mile, but in the lower sections the gradient is only 50 feet/mile. The depth of the gravel ranges from 0 to 50 feet. Valley widths are from 50 to 2000 feet. The lower half of the river has extensive gravel accumulations.

BUREAU INVESTIGATION:

The Bureau collected ten 0.1 yd^3 samples from the Little Oshetna River drainage (1708-10, 2605-06, 2707-09, 2714, 2991, Table C15). The samples were collected from alluvium along the river. The samples contained from 0 to 0.001 oz/yd^3 gold. A fineness value for gold was 764 in sample 2707. Sample 1708 contained 880 ppb platinum.

RESOURCE ESTIMATE:

There are an estimated 60 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Drilling or backhoe trench sampling is needed for a proper evaluation of the river.

REFERENCES: 2, 15, 16, 114, 339

TABLE C15 - ANALYTICAL RESULTS - LITTLE OSHETNA RIVER PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis				Description
			oz/yd³	ppb		Fineness	
			Au	Au	Pt	Au	
1708	P		0.0003	AD*	800	NA	Alluvium
1709	P		0.0002	3000	ND	NA	Alluvium
1710	P		0.001	1400	ND	NA	Alluvium
2605	P		Trace	2500	ND	NA	Alluvium
2606	P		0	4	ND	NA	Alluvium
2707	P		Trace	280	ND	764	Alluvium
2708	P		0	ND	ND	NA	Alluvium
2709	P		Trace	6	ND	NA	Alluvium
2714	P		Trace	80	ND	NA	Alluvium
2991	P		Trace	360	ND	NA	Alluvium

*AD - Above detection limit.

NAME(S): Joe Creek Placer Occurrence

Map Location No. C16
Kardex No. 76-205, 274, 298

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-1
T 25-26N R 11E Meridian Seward
Geographic: Tributary of Sanona Creek.
Elevation: 3300 to 4400 ft.

PRODUCTION: None.

HISTORY:

1980 - 26 claims staked (2).
1982 - 3 claims staked (2).
1983 - 8 claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Joe Creek cuts Jurassic rocks. In the headwaters there is siltstone, shale, and cobble and boulder conglomerate of the Naknek Formation (124). The middle portion of the creek cuts sandstone, siltstone, and a conglomerate unit (124). This unit is in fault contact with volcanic rocks, sandstone, and argillite of the Talkeetna Formation (124). Some of the ridges in upper Joe Creek are capped by Tertiary fluviatile conglomerate.

The width of the stream valley is between 50 and 800 feet. The gradient is between 60 and 150 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected three 0.1 yd^3 placer samples (1631-1632, 1719, Table C16). The samples were from gravel bars along the creek. They contained from trace to 0.0014 oz/yd^3 gold.

RESOURCE ESTIMATE:

There are an estimated 10 million yd^3 of alluvial material in the creek.

MINERAL DEVELOPMENT POTENTIAL: Low potential for place gold.

RECOMMENDATIONS:

Drilling or backhoe sampling is recommended to properly evaluate the property.

REFERENCES: 2, 15, 16, 114, 339

TABLE C16 - ANALYTICAL RESULTS - JOE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			Au oz/yd^3	Ag ppm	Au ppb	
1631	P		0.0002	ND	2000	Alluvium
1632	P		0.0014	ND	AD	Alluvium
1719	P		Trace	ND	820	Alluvium

NAME(S): Red Creek Placer Occurrence
Earl Krinke

Map Location No. C17
MAS No.0020769001

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-1
Sec: 3, 10, 15 T 26N R 11E Meridian Seward
Geographic: Tributary of Yacko Creek.
Elevation: 3500 to 4300 ft.

PRODUCTION: None.

HISTORY: 1980 -12 claims staked (2).

WORKINGS AND FACILITIES:

Placer plant and camp at mouth of creek. Prospect pits and cuts along length of creek.

GEOLOGIC SETTING:

The hills around Red Creek are overlain by Tertiary fluviatile conglomerate. The creek drains cobble and boulder conglomerate, siltstone, and shale of the Jurassic Naknek Formation; sandstone, siltstone, and shale, and volcanics, sandstone, and siltstone of the Talkeetna Formation (124). The stream valley is from 50 to 500 feet wide. Stream length is 5 miles, and its gradient ranges from 70 to 170 feet/mile. Alluvial gravel thicknesses are from 6 feet near the headwater to greater than 40 feet at the mouth.

BUREAU INVESTIGATION:

The Bureau took eight 0.1 yd^3 placer samples (418, 419, 421-25, 1714, Table C17) from alluvium. The samples contained from 0.0001 to 0.002 oz/yd^3 gold. A sample of concentrate (1713) from the mine at the mouth of the creek and a placer sample (440) from the Naknek Formation were also collected.

RESOURCE ESTIMATE:

There are an estimated 3 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Drilling or backhoe pit sampling is recommended to properly evaluate the creek.

REFERENCES: 2, 15, 16, 124, 339

TABLE C17 - ANALYTICAL RESULTS - RED CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis			Description
			Fire Assay oz/st		oz/yd^3	
			Au	Ag	Au	
418	P		NA		0.0019	Alluvium
419	P		NA		0.0003	Alluvium
421	P		NA		0.0020	Alluvium
422	P		NA		0.0005	Alluvium
423	P		NA		0.0004	Alluvium
424	P		NA		0.0001	Alluvium
425	P		NA		0.0004	Alluvium
440	P		NA		Trace	Jurassic conglomerate
1713	S		2.312		NA	Mineral concentrate
1714	P		NA		0.0006	Alluvium

NAME(S): Yacko Creek Placer
Nelchina Mines

Map Location No. C18
MAS No. 0020760022, 0020769004, 0020769014
Kardex No. 76-4, 6, 7, 9, 10, 12, 17, 110, 123, 126, 133, 138, 139, 147-149, 185, 317

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains A-1, B-1
T 24-26N R 11E Meridian Seward
Geographic: Tributary of Sanona Creek.
Elevation: 3300 - 4000 ft.

PRODUCTION: 1,000 oz (estimated).

HISTORY:

1914 - Several men prospecting (57).
1954 - 19 claims staked (2) - Churn drilling occurred.
1976 - 56 claims staked (2) - Suction dredging.
1977 - 12 claims staked (2).
1979 - 6 claims staked (2).
1983 - 2 claims staked (2).
1984 - Mining by Nelchina Mines, Inc. occurred (109).
1989 - Prospecting in Upper Yacko Creek.

WORKINGS AND FACILITIES:

Trail down creek, mining camps located at
3500 feet elevation,
3780 feet elevation, and
3860 feet elevation - some pits - prospect trenching in 1989.

GEOLOGIC SETTING:

Rocks in the Yacko Creek drainage include Quaternary alluvial and glacial deposits, Tertiary fluviatile conglomerate, siltstone, shale, and cobble and boulder conglomerate of the Jurassic Naknek Formation, middle Jurassic sandstone, siltstone, and conglomerate, and lower Jurassic volcanic rocks, sandstone, and argillite of the Talkeetna Formation (124).

The creek valley is from 100 to 600 feet wide. The thickness of the gravel ranges from 6 to 50 feet.

BUREAU INVESTIGATION:

The Bureau conducted a detailed examination of Yacko Creek. The Bureau collected twenty-seven 0.1 yd^3 placer samples (333-34, 344-45, 347-48, 401-04, 408-09, 448-51, 1530-31, 1533-35, 1537-40, 1715, 1720, Table C18). The samples contained from trace to 0.0032 oz/yd^3 gold. The heavy mineral concentrates from the placer samples contained up to 8 ppb palladium and 220

ppb platinum. The gold was from 770 to 890 fine, and averaged 822 fine. Two pan samples (335, 1532) of alluvial material were also collected. The heavy mineral concentrate from sample 1532 contained 56 ppb palladium and 9600 ppb platinum. Renshaw (114) stated that during his sampling of Yacko Creek he recovered 3 ounces of platinum for every 97 ounces of gold.

In Yacko Creek, rocks of the Talkeetna Formation are comprised of south-dipping volcanic rocks (pillow basalt, andesite, and tuff), which were overlain by a biotite-rich sandstone, which were overlain by conglomerate and shale. The ridges on the west side of Yacko Creek are capped by Tertiary conglomerate that contains gold (sample no. 346). The ridge between Yacko and Walker Creeks is capped by a Quaternary glacial deposit. Two placer samples (410-411), taken from the deposit contained trace and 0.001 oz/yd^3 gold.

Most of the operations on Yacko Creek are at the confluence of creeks that drain Tertiary conglomerate.

RESOURCE ESTIMATE:

There are an estimated 12 million yd^3 of alluvial material in the creek.

MINERAL DEVELOPMENT POTENTIAL: High.

RECOMMENDATIONS:

Testing above 3500 feet elevation on Yacko Creek is recommended.

REFERENCES: 2, 15, 16, 57, 58, 77, 92, 109, 114, 124, 185, 249, 280, 339

TABLE C18 - ANALYTICAL RESULTS - YACKO CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis				Description
			oz/yd³	ppb		Fineness	
			Au	Pd	Pt	Au	
333	P		Trace	2	ND	NA	Alluvium
334	P		Trace	8	5	NA	Alluvium
335	S		NA	4	100	822	Mineral concentrate
344	P		Trace	4	10	NA	Alluvium
345	P		Trace	ND	ND	NA	Alluvium
347	P		Trace	ND	15	NA	Alluvium
348	P		Trace	ND	5	NA	Alluvium
401	P		Trace	ND	5	NA	Alluvium
402	P		0.0020	ND	ND	770	Alluvium
403	P		0.0020	ND	ND	NA	Alluvium
404	P		Trace	ND	ND	NA	Alluvium
408	P		0.0002	ND	ND	NA	Alluvium
409	P		0.0015	4	ND	NA	Alluvium
410	P		0.0010	4	ND	NA	Alluvium
411	P		Trace	ND	ND	NA	Alluvium
448	P		0.0032	ND	ND	NA	Alluvium
449	P		0.0011	ND	45	NA	Alluvium
450	P		0.0026	4	220	NA	Alluvium
451	P		0.0002	ND	ND	NA	Alluvium

TABLE C18 (CONT.) - ANALYTICAL RESULTS - YACKO CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis				Description
			oz/yd³	ppb		Fineness	
			Au	Pd	Pt	Au	
1530	P		Trace	ND	ND	NA	Alluvium
1531	P		0.0003	ND	ND	770	Alluvium
1532	G		Trace	56	9600	NA	Alluvium
1533	P		Trace	ND	25	NA	Alluvium
1534	P		0.0005	ND	890	NA	Alluvium
1535	P		Trace	ND	ND	NA	Alluvium
1537	P		Trace	ND	ND	NA	Alluvium
1538	P		0.0002	ND	ND	NA	Alluvium
1539	P		Trace	ND	ND	NA	Alluvium
1540	P		0.0001	ND	860	NA	Alluvium
1715	P		0.0005	ND	ND	NA	Alluvium
1720	P		0.0001	ND	ND	NA	Alluvium

NAME(S): Walker Creek Placer Occurrence

Map Location No. C19
MAS No.0020760056
Kardex No. 76-136

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-1
T 25-26N R 11E Meridian Seward
Geographic: Tributary of Sanona Creek.
Elevation: 3300 to 4000 ft.

PRODUCTION: None.

HISTORY: 1976 - 21 claims staked (2).

WORKINGS AND FACILITIES: Dozer cuts.

GEOLOGIC SETTING:

Walker Creek drains Jurassic rocks (124). The rocks at the headwaters are siltstone and shale of the Naknek Formation (124). The creek flows through the boulder and cobble conglomerate of the Naknek Formation (124). The rocks of the lower portion are volcanic, sandstone, and argillite of the Talkeetna Formation (124). The gradient of the stream ranges from 70 to 250 feet/mile. The creek valley is between 50 and 400 feet wide. The gravel is between 10 and 50 feet thick.

BUREAU INVESTIGATION:

The Bureau collected four 0.1 yd^3 placer samples (1711-12, 1528-29, Table C19). The samples contained from 0 to 0.0001 oz/yd^3 gold. Sample 1711 contained high lead, zinc, and tungsten values in the concentrate. A sample of the conglomerate (1527) contained 10 ppb gold, 98 ppm copper, and 8 ppb palladium.

RESOURCE ESTIMATE:

There are an estimated 4 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Further exploration using a drill or backhoe. The area around sample site 1711 should be investigated for its lode potential.

REFERENCES: 2, 15, 16, 114, 339

TABLE C19 - ANALYTICAL RESULTS - WALKER CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb		Elements in ppm (unless otherwise stated)					
			Au	Au	Pd	Ag	Cu	Pb	W	Zn	
1527	CC		NA	10	8	0.5	98	2	ND	77	Jurassic conglomerate
1528	P		ND	600	ND	ND	36	0.19%	NA	436	Alluvium
1529	P		Trace	80	ND	ND	10	0.11%	NA	385	Alluvium
1711	P		0.0001	5000	ND	1.0	62	500	140	0.27%	Alluvium
1712	P		Trace	820	ND	ND	33	930	NA	514	Alluvium

NAME(S): Sanona Creek Placer Occurrence

Map Location No. C20
Kardex No. 206, 213, 297

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-1
T 26N R11-12E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3000 to 3300 ft.

PRODUCTION: None.

HISTORY:

1980 - 33 claims staked (2).
1983 - 1 claim staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Sanona Creek is a slow-moving, meandering creek. The average gradient is less than 40 feet per mile. It is estimated that gravel thicknesses are greater than 50 feet. Valley widths range from 400 to 800 feet. Bedrock along the creek consists of volcanic rock, sandstone, and argillite of the Jurassic Talkeetna Formation (124).

BUREAU INVESTIGATION:

The Bureau collected one 0.1 yd^3 placer sample (Table C20, no. 2801). The sample contained trace amounts of gold.

RESOURCE ESTIMATE:

There are an estimated 30 million yd^3 of alluvial material in the upper section of the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

The best exploration targets are near the confluences of Joe, Yacko, Walker, and Fourth of July Creeks, but drilling is needed to properly evaluate the creek.

REFERENCES: 2, 15, 114, 124, 339

TABLE C20 - ANALYTICAL RESULTS - SANONA CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	oz/ yd^3	Description
			Au	
2801	P		Trace	Alluvium

NAME(S): Fourth of July Creek Placer, Lucky Shot, Sellick Creek

Map Location No. C21
MAS No.0020760023
Kardex No. 76-36, 122, 137

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains B-1
T 25 & 26N R 12E Meridian Seward
Geographic: Tributary of Sanona Creek.
Elevation: 3500 ft.

PRODUCTION: None.

HISTORY:

1900 - Claims staked (2).
1914 - Two prospectors worked and reported fine colors of alluvial gold (57).
1976 - 21 claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek drains Jurassic rocks. Its headwaters it drains boulder and cobble conglomerate of the Naknek Formation (124). A sandstone, siltstone, and conglomerate unit underlies the Naknek Formation (124). The lower section of the creek drains volcanic rocks, sandstone, and argillite of the Talkeetna Formation (124). The creek's gradient is from 100 to 180 feet/mile. The creek valley is from 50 to 150 feet wide. Gravel depth is from 10 to 40 feet. Sellick Creek, a tributary of Fourth of July Creek, drains the Talkeetna Formation (124).

BUREAU INVESTIGATION:

The Bureau collected three 0.1 yd^3 placer samples (1524-26, Table C21) from Fourth of July Creek and two samples (1801-02, Table C21) from Sellick Creek. The samples contained from 0 to 0.0001 oz/yd^3 gold. Sample 1524 contained 2500 ppb platinum. A rock sample (1523) of the conglomerate of the Naknek Formation contained 8 ppb palladium.

RESOURCE ESTIMATE: There are an estimated 2,500,000 yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Drilling is recommended to better define reserves.

REFERENCES: 2, 15, 16, 57, 58, 77, 92, 114, 185, 280, 339

TABLE C21 - ANALYTICAL RESULTS - FOURTH OF JULY CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis					Description
			oz/yd³	ppb			ppm	
			Au	Au	Pd	Pt	Ag	
1523	CR		NA	5	8	ND	0.5	Jurassic conglomerate
1524	P		0.0001	ND	22	2500	ND	Alluvium
1525	P		ND	ND	ND	ND	ND	Alluvium
1526	P		ND	ND	ND	ND	ND	Alluvium
1801	P		0.0001	ND	ND	ND	ND	Alluvium
1802	P		ND	ND	ND	ND	ND	Alluvium

NAME(S): Tyone Creek Placer

Map Location No. C22
MAS No.0020760036
Kardex No. 76-14, 119, 120, 124, 125, 128, 132, 140, 153, 155, 159

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1, B-1
T24-25N R 11-12E T 5-6N R 9-10W Meridian Copper River
Geographic: Tributary of Lake Louise.
Elevation: 2700 - 4100 ft.

PRODUCTION: None.

HISTORY:

1907 - Gold nuggets reportedly worth between 1 and 5 cents a piece found on Tyone Creek (237).
1976 - 121 claims staked (2).
1977 - 17 claims staked (2).
1978 - 28 claims staked (2).
1983 - 4 claims staked (2).

WORKINGS AND FACILITIES:

Cabins present along stream. Mining activity has been restricted to the area above the confluence of Tyone and Red Fox Creeks. Approximately 30,000 yd^3 of placer material have been mined.

GEOLOGIC SETTING:

Upstream of the confluence of Buchia Creek, the creek drains siltstone, shale and cobble and boulder conglomerate of the Jurassic Naknek Formation (124). Downstream from the confluence of Buchia Creek, the creek drains Cretaceous sandstone, siltstone, and claystone, Quaternary glacial deposits, and Tertiary fluviatile conglomerate (124). Tertiary fluviatile conglomerate is also present in the headwaters of the drainage. Tyone Creek is a shallow meandering creek. The gradient averages 50 feet/mile. The stream valley is between 100 and 1000 feet wide. Gravel depth ranges from 6 to greater than 50 feet.

BUREAU INVESTIGATION:

The Bureau collected forty-two 0.1 yd^3 placer samples from alluvial gravel in Tyone Creek and its tributaries (340-41, 360, 362-63, 370-76, 383, 385-87, 389-93, 395-98, 400, 457-58, 1384, 1554-55, 1561, 1616-18, 1625, 1721-22, 1734, 1737, 1803-04). The samples contained from 0 to 0.0032 oz/yd^3 gold (115). The gold ranged from 683 to 868 fine, with an average of 807. The heavy mineral concentrates from the placer samples contained up to 280 ppb palladium and 4100 ppb platinum.

Six rock samples (361, 394, 1556, 1626-27), a 2-pan sample (384), and two samples of mineral concentrate (1619, 1624) from mining operations were also collected in the drainage.

For more detailed analyses, see Balen (15).

RESOURCE ESTIMATE:

There are estimated 20 million yd^3 of alluvial material in the upper section of Tyone Creek.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Detailed sampling using a drill or backhoe.

REFERENCES: 2, 15, 16, 114, 177, 237, 339

TABLE C22 - ANALYTICAL RESULTS - TYONE CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis						Description
			oz/yd³	ppb			ppm	Fineness	
			Au	Au	Pd	Pt	Ag	Au	
340	P		0.0001	18	ND	40	ND	828	Alluvium
341	P		0.0011	10	ND	10	ND	ND	Alluvium
360	P		Trace	790	ND	45	ND	ND	Alluvium
361	P			4	6	ND	0.4		Sandstone
362	P		0	490	ND	ND	ND	ND	Alluvium
363	P		0.0003	99999	4	ND	ND	ND	Alluvium
370	P		Trace	82	ND	ND	ND	ND	Alluvium
371	P		0.0004	NA	ND	ND	ND	ND	Alluvium
372	P		0.0001	9900	ND	10	ND	ND	Alluvium
373	P		Trace	12	ND	ND	ND	ND	Alluvium
374	P		0.0001	6	4	15	ND	ND	Alluvium
375	P		0	1500	ND	ND	ND	ND	Alluvium
376	P		Trace	99999	ND	10	ND	ND	Alluvium
383	P		0.0032	14	ND	10	ND	868	Alluvium
384	2 Pans		ND	4	4	15	ND	829	Alluvium
385	P		Trace	4	ND	ND	ND	ND	Alluvium
386	P		0.0005	16	ND	10	ND	847	Alluvium

TABLE C22 (CONT.) - ANALYTICAL RESULTS - TYONE CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis						Description
			oz/yd³	ppb			ppm	Fineness	
			Au	Au	Pd	Pt	Ag	Au	
387	P		0.0003	2700	ND	10	ND	ND	Alluvium
389	P		Trace	3500	ND	5	ND	ND	Alluvium
390	P		Trace	4400	ND	10	ND	ND	Alluvium
391	P		0.0001	8	ND	20	ND	ND	Alluvium
392	P		Trace	4	ND	ND	ND	ND	Alluvium
393	P		Trace	730	ND	ND	ND	ND	Alluvium
394	S			ND	4	ND	0.4	ND	Alluvium
395	P		Trace	10	ND	ND	ND	ND	Shale/siltstone
396	P		0.0014	2500	4	820	ND	866	Alluvium
397	P		0.0001	1000	ND	ND	ND	ND	Alluvium
398	P		0.0006	42	ND	ND	ND	795	Alluvium
400	P		Trace	14	4	90	ND	ND	Alluvium
457	P		0.0008	180	2	ND	ND	799	Alluvium
458	P		0.0005	1800	10	1900	ND	683	Alluvium
1384	P		Trace	10	ND	ND	0.5	ND	Alluvium
1554	P		0.0003	2100	ND	ND	ND	ND	Alluvium
1555	P		0.0006	AD	4	250	ND	ND	Alluvium
1556	RC		ND	10	2	ND	ND	ND	Tertiary conglomerate

TABLE C22 (CONT.) - ANALYTICAL RESULTS - TYONE CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis						Description
			oz/yd³	ppb			ppm	Fineness	
			Au	Au	Pd	Pt	Ag	Au	
1561	P		0.0002	AD	ND	ND	ND	ND	Alluvium
1616	P		0.0010	9800	ND	ND	ND	770	Alluvium
1617	P		0.0007	AD	ND	ND	ND	ND	Alluvium
1618	P		0.0001	AD	60	ND	ND	ND	Alluvium
1619	S		Trace	AD	32	120	186.5	ND	Mine concentrate
1624	S		Trace	AD	32	ND	107.8	ND	Mine concentrate
1625	P		0.0002	AD	ND	ND	ND	ND	Alluvium
1626	RC		ND	5	ND	ND	0.5	ND	Conglomerate
1627	RC		ND	ND	ND	ND	0.5	ND	Conglomerate
1721	P		0.0016	AD	280	4100	ND	ND	Alluvium
1722	P		0.0010	AD	ND	15	ND	ND	Alluvium
1734	P		Trace	12	ND	ND	ND	ND	Alluvium
1737	P		0.0002	7000	ND	ND	ND	ND	Alluvium
1803	P		0	1000	ND	ND	ND	ND	Alluvium
1804	P		0	100	ND	ND	ND	ND	Alluvium

NAME(S): Red Fox Creek Placer
Bonanza Mining Co.

Map Location No. C23
MAS No.0020769002

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains A-1, B-1
Sec: 10, 11, 16-18 T 24N R 11E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3700 - 4500 ft.

PRODUCTION: 200 ounces (estimated).

HISTORY:

1977 - 11 claims staked (2).
1978 - 17 claims staked (2).
1979 - 9 claims staked (2).
1982 - 11 claims staked (2).
1983 - Mining license granted.

WORKINGS AND FACILITIES:

Cabin with minor workings at mouth of creek. Test cuts and stream diversions along length of creek. Bonanza Mining Co. camp in section 13 T 24N R10E. mined approximately 10,000 yd^3.

GEOLOGIC SETTING:

The creek flows through siltstone, shale, and cobble and boulder conglomerate of the Jurassic Naknek Formation (124). Cliffs of conglomerate are prominent in the lower section of the creek. The creek occupies a large valley up to 500 feet wide. The average gradient is 120 feet/mile.

At the mining cuts near the head of the creek, gravel is 10 feet thick. The creek occupies a 100 foot wide valley. Glacial till is present on the south side of the mining cut. Bedrock of the mining cut is shale.

BUREAU INVESTIGATION:

The Bureau collected twenty-three 0.1 yd^3 placer samples (336-37, 339, 349-59, 377-80, 399, 1628-29, 2601, 2603, Table C23) and one 2-pan concentrate sample (338, Table C23). Most of the samples were collected from alluvial gravel and contained trace amounts of gold. Samples 336-39, 354, 378-79, and 2603 were collected from the Bonanza Mining Co. workings in the upper section of the creek. The samples contained from trace to 0.0212 oz/yd^3 gold (Table C23). The gold ranged from 799 to 893 fine. PGM grains (ferroplatinum) were recovered from sample numbers 337, 354, 355, and 2603. Heavy mineral concentrates from the placer samples contained up to 28 ppb palladium and 7,000 ppb platinum.

Samples 352-53, 356-59, and 380 were collected from a weathered Jurassic conglomerate of the Naknek Formation. Channel placer samples (357-59, 352-53) were collected down the outcrop. The samples contained 1 grain of gold per

0.1 yd^3 at the top and 4 grains of gold per 0.1 yd^3 at the base. The heavy mineral concentrates from the placer samples contained from 5 to 10 ppb platinum.

RESOURCE ESTIMATE:

There is an estimated 500,000 yd^3 of alluvial material in the upper portion of the creek (near the Bonanza Mining Co. workings) and 2 million yd^3 of alluvial material in the lower portion of the creek.

MINERAL DEVELOPMENT POTENTIAL:

Moderate for small (< 500 yd^3/day) operation in upper portion of creek.

RECOMMENDATIONS: Better define resources using backhoe.

REFERENCES: 2, 15, 16, 114, 339

TABLE C23 - ANALYTICAL RESULTS - RED FOX CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis				Description
			oz/yd³	ppb		Fineness	
			Au	Pd	Pt	Au	
336	P		Trace	ND	ND	ND	Alluvium
337	P		0.0082	ND	20	865	Alluvium
338	2 pans		0.0018	ND	ND	873	Alluvium
339	P		0.0083	ND	10	893	Glacial material
349	P		Trace	4	ND	ND	Jurassic conglomerate
350	P		Trace	ND	30	ND	Alluvium
351	P		Trace	ND	15	ND	Alluvium
352	P		Trace	ND	15	ND	Jurassic conglomerate
353	P		0.0001	ND	5	ND	Jurassic conglomerate
354	P		0.0005	4	810	799	Alluvium
355	P		Trace	ND	40	ND	Alluvium
356	P		Trace	ND	10	ND	Jurassic conglomerate
357	P		Trace	ND	5	ND	Alluvium
358	P		Trace	ND	10	ND	Alluvium
359	P		0	ND	5	ND	Alluvium
377	P		0	ND	5	ND	Alluvium
378	P		Trace	ND	20	ND	Alluvium
379	P		Trace	ND	ND	ND	Alluvium
380	P		Trace	ND	10	ND	Jurassic conglomerate

TABLE C23 (CONT.) - ANALYTICAL RESULTS - RED FOX CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis				Description
			oz/yd³	ppb		Fineness	
			Au	Pd	Pt	Au	
399	P		ND	4	25	ND	Alluvium
1628	P		0.0003	ND	ND	ND	Alluvium
1629	P		0.0001	ND	ND	ND	Alluvium
2601	P		Trace	ND	ND	ND	Alluvium
2603	P		0.0212	28	7000	884	Alluvium

NAME(S): Buchia Creek Placer Occurrence Map Location No. C24

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1
Sec: 23, 27-29 T 24N R 11E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3600 to 4200 ft.
Access: Trail up the creek.

PRODUCTION: None.

HISTORY:

1979 - 1 claim staked (2).
1980 - 34 claims staked (2).
1983 - 4 claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The main creek flows through siltstone, shale, and cobble and boulder conglomerate of the Jurassic Naknek Formation (124). Tertiary fluviatile conglomerate is present on a ridge near the headwaters. Two small creeks drain White Hill. White Hill is a folded and faulted complex consisting of Cretaceous sandstone, siltstone, claystone, and Nelchina limestone.

The main creek is a wide, meandering stream. The small tributary creeks are narrow and are incised in muck. The average gradient for the drainage is 400 feet/mile. Gravel depth is from 0 to 15 feet.

BUREAU INVESTIGATION:

The Bureau took eight 0.1 yd^3 samples (342-43, 368-69, 381-82, 1557, 2602, Table C24). The samples from the main creek contained from 0 to 0.0015 oz/yd^3 gold and trace amounts of platinum (up to 50 ppb). The samples from the tributaries that drain White Hill (343, 369) contained from 0.0001 to 0.0015 oz yd^3 gold. The gold ranged from 826 to 858 fine.

RESOURCE ESTIMATE:

There are an estimated 1 million yd^3 of alluvial material in the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Detailed sampling using a drill or backhoe is recommended.

REFERENCES: 2, 15, 114, 116, 339

TABLE C24 - ANALYTICAL RESULTS - BUCHIA CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis		Description
			oz/yd^3	Fineness	
			Au	Au	
342	P		ND	ND	Alluvium
343	P		0.0001	ND	Alluvium
368	P		Trace	ND	Alluvium
369	P		0.0015	826	Alluvium
381	P		0.0014	858	Alluvium
382	P		Trace	ND	Alluvium
1557	P		Trace	ND	Alluvium
2602	P		Trace	ND	Alluvium

NAME(S): Nicolie Creek Placer Occurrence

Map Location No. C25
MAS No.0020760078
Kardex No. 76-78

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1
Sec 11, 14, 23 T 24N R 12E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3400 ft.

PRODUCTION: None.

HISTORY:

1973 - 3 claims staked (2).
1982 - 1 claim staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Nicolie Creek drains cretaceous sandstone, siltstone, and claystone (124). The surrounding hills are comprise Tertiary fluviatile conglomerate (124). The creek is about 4 miles long and has an average gradient of approximately 100 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected two 0.1 yd^3 placer samples from the creek (388, 1553, Table C25). Both samples contained 0.0003 oz/yd^3 gold. The gold fineness from sample 388 was 643. Sample 388 also contained 130 ppb platinum.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Drilling or backhoe sampling is needed to delineate the resource.

REFERENCES: 2, 15, 16, 114, 339

TABLE C25 - ANALYTICAL RESULTS - NICOLE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			oz/yd^3	ppb	Fineness	
			Au	Pt	Au	
388	P		0.0003	130	643	Alluvium
1553	P		0.0003	ND	ND	Alluvium

NAME(S): White Sand Creek Placer Occurrence Map Location No. C26

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1
T 24-25N R 12E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3250 - 4000 ft.

PRODUCTION: None.

HISTORY:

1978 - 8 claims staked (2).
1980 - 4 claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The headwaters of White Sand Creek drain cobble and boulder conglomerate, siltstone, and shale of the Jurassic Naknek Formation (124). Cretaceous sandstone, siltstone, and shale and Tertiary fluviatile conglomerate are present on the ridges of the drainage (124). The lower portion of the creek cuts Quaternary glacial deposits. Prominent white cliffs, from which the name of the creek is derived, are composed of loess. The creek is slow-moving and meandering. Very few gravel bars are present. The average gradient is 150 feet/mile. Gravel depth is unknown.

BUREAU INVESTIGATION:

The Bureau collected three 0.1 yd^3 placer samples (332, 365-66, Table C26). The samples contained trace to 0.0008 oz/yd^3 gold. The gold fineness from sample 332 was 839.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Drilling or sampling with a backhoe is recommended to properly evaluate this creek.

REFERENCES: 2, 15, 114, 339

TABLE C26 - ANALYTICAL RESULTS - WHITE SAND CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis		Description
			oz/yd^3	Fineness	
			Au	Au	
332	P		0.0008	839	Alluvium
365	P		Trace	ND	Alluvium
366	P		Trace	ND	Alluvium

NAME(S): Sally's Big Nugget Placer Occurrence

Map Location No. C27
MAS No.0020760067
Kardex No. 76-158

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains A-1
Sec: 27, 34-35 T 25N R 12E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3300 ft.

PRODUCTION: None.

HISTORY: 1978 - 10 claims staked (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek drains cobble and boulder conglomerate, siltstone, and shale of the Jurassic Naknek Formation, Tertiary fluviatile conglomerate, and Quaternary glacial deposits (124). The average stream gradient is 228 feet/mile.

BUREAU INVESTIGATION:

The Bureau examined the drainage. No alluvial gravel was noted; therefore, no placer samples were collected.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: Sampling using a backhoe or drill is recommended.

REFERENCES: 2, 15, 114, 339

NAME(S): Daisy Creek Placer
Grizzly Creek

Map Location No. C28
MAS No. 0020760024
0020760075
Kardex No. 76-8, 18-20; 24, 84, 91, 121, 127

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains B-1
T 6N R 10W Meridian Copper River
T 25N R 12E Meridian Seward
Geographic: Tributary of Tyone Creek.
Elevation: 3000 to 3500 ft.

PRODUCTION: None.

HISTORY:

1914 - Mining done at several places along creek. A drill was brought onto the property (57).
1954 - 34 claims staked (2).
1976 - 40 claims staked (2).

WORKINGS AND FACILITIES:

Pits, dragline excavator hydraulic giants, pipe, sluice boxes.

GEOLOGIC SETTING:

The upper valley is wide and flat. Tertiary fluviatile conglomerate, Jurassic Naknek Formation siltstone and shale, and Jurassic sandstone, siltstone, and conglomerate are exposed in the upper valley (124). The middle section of the creek flows through a canyon comprising Jurassic Talkeetna Formation volcanic and sedimentary rocks (124). Tertiary fluviatile conglomerate and Quaternary glacial deposits are present in the lower section of the creek (124). The gravel is from 5 to 12 feet deep. The gradient averages 80 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected six 0.1 yd^3 placer samples (1383, 1551-52, 1602, 1604, 1736, Table C28). The samples were from prospect pits. The samples contained from trace to 0.001 oz/yd^3 gold. The gold fineness from sample 1604 was 750. Sample 1604 contained 480 ppb platinum. One 0.1 yd^3 placer sample (1735) from upper Grizzly Creek was collected from the Tertiary conglomerate unit. The samples contained 0.0002 oz/yd^3 gold. Sample 1601 was a rock sample collected from the Naknek Formation sandstone.

RESOURCE ESTIMATE:

There is an estimated 1.5 million yd^3 of alluvial material in the drainage (ref).

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Detailed sampling using a backhoe or drill is recommended to fully evaluate the property.

REFERENCES: 2, 15, 17, 57, 58, 77, 78, 79, 92, 114, 177, 185, 339

TABLE C28 - ANALYTICAL RESULTS - DAISY CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis			Description
			oz/yd³	ppb	Fineness	
			Au	Pt	Au	
1383	P		Trace	ND	ND	Alluvium
1551	P		Trace	ND	ND	Alluvium
1552	P		Trace	ND	ND	Alluvium
1601	CC		ND	ND	ND	Sandstone
1602	P		Trace	ND	ND	Alluvium
1604	P		0.0009	480	750	Alluvium
1735	P		0.0002	ND	ND	Alluvium
1736	P		0.0002	10	ND	Alluvium

NAME(S): Pumicite Placer Occurrence

Map Location No. C29
MAS No.0020760066
Kardex No. 76-14

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains B-1
Sec 16, 17, 18 T 6N R 10W Meridian Copper River
Geographic: Tributary of Tyone Creek.
Elevation: 2900 to 4000 ft.

PRODUCTION: None.

HISTORY:

1955 - 4 claims staked (2).
1956 - Proof of Labor filed (153).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek drains volcanic rock, sandstone, and argillite of the Jurassic Talkeetna Formation (124). Tertiary fluviatile conglomerate is located on the south side of the creek (124). The creek is less than 2 feet wide, and the surrounding ground is swampy. The gradient is approximately 300 feet/mile.

BUREAU INVESTIGATION:

The Bureau collected one 0.1 yd^3 placer sample (1733, Table C29). The sample contained 0.0001 oz/yd^3 gold. The sample also contained 10 ppb platinum.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Drilling or backhoe sampling is recommended to properly evaluate the property.

REFERENCES: 2, 15, 16, 92, 114, 153, 339

TABLE C29 - ANALYTICAL RESULTS - PUMICITE 1-12

Sample no.	Type	Sample Length (feet)	Analysis		Description
			oz/yd^3	ppb	
			Au	Pt	
1733	P		0.0001	10	Alluvium

APPENDIX D

NAME(S): Coal Creek Coal (West)
Accolade Mines, Inc.

Map Location No. D-1
MAS No. 0020670130
Kardex No. 67-047

Deposit Type: Lode
Commodities: Coal

LOCATION: Quadrangle: Healy B-5
E 1/2 Sec: 23 T: 19S R: 9W Meridian: Fairbanks
Geographic: One half mile east of Broad Pass station.
Elevation: 2400 ft.

PRODUCTION: 2600 tons.

HISTORY:

1920- 21- W.A. Havner mined 1,185 tons (19).
1941- A tunnel was started but abandoned because of a weak roof.
1943- A mine entry 35 ft. long was driven (12).
1944- The Bureau of Mines opened 10 trenches and mapped the area (19).

WORKINGS AND FACILITIES:

500 foot tunnel, and 600 tons of coal strip-mined from an outcrop on the north bank of the south fork of Coal Creek. Also, a 14 foot deep shaft was reportedly sunk from the floor of the tunnel.

GEOLOGIC SETTING:

A Tertiary sedimentary sequence containing lignite. Tertiary rocks unconformably overlie a tightly folded series of slate, cherty limestone, graywacke and greenstone. Barren quartz veins are reportedly abundant.

BUREAU INVESTIGATION:

The Bureau of Mines mapped, trenched, and sampled the area in 1944. The coal field is nearly 4 miles long and 2 to 2.5 miles wide (12). The coal analyses showed that the coal has from 6995 to 11915 BTU/lb., 10-32% moisture, 33-63% volatile matter, 21-43% fixed carbon, and 7-14% ash (12). In 1944, the Bureau concluded after the examination that: "the coal was not of a very high quality and this coal can probably only be mined and sold during an emergency" (12).

The Bureau reexamined the area during this study and took 4 samples (Table D1). The results were similar to those in 1944.

RESOURCE ESTIMATE:

13.5 million tons inferred resources (19). Indicated resources of 986,000 tons (12).

MINERAL DEVELOPMENT POTENTIAL: Low mineral development potential.

RECOMMENDATIONS: None.

REFERENCES: 2, 12, 15, 19, 177, 339

TABLE D1 - ANALYTICAL RESULTS - COAL CREEK COAL -SAMPLE

Basis	Sample No.	Sample Length (feet)	Analysis						
			Results in weight percent (unless otherwise stated)						
			Total Moisture	Residual Moisture	Ash	Volatile Matter	Free Carbon	Sulfur	BTU/lb
As received	798	8.5	25.2						6753
Air dry				8.97	18.07	39.50	33.46	0.23	8217
Dry					19.86	43.39	36.75	0.26	9027
As received	799	7.2	28.5						6569
Air dry				9.04	16.72	40.26	33.98	0.18	8352
Dry					18.38	44.26	37.36	0.20	9182
As received	800	6.5	28.4						6830
Air dry				13.92	15.97	38.61	31.50	0.18	8208
Dry					18.56	44.85	36.59	0.21	9536
As received	1121	3.0	32.3						6653
Air dry				10.20	14.33	39.65	35.82	0.18	8832
Dry					15.95	44.16	39.89	0.20	9835

NAME(S): Caribou Placer

Map Location No. D2
MAS No. 002076004
Kardex No. 076-052

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-4
NW 1/4 Sec: 26 T: 19S R: 7W Meridian: Fairbanks
Geographic: Tributary of Middle Fork of Chulitna River
Elevation: 3580 ft.

PRODUCTION: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The rocks in the drainage are Cretaceous-Jurassic argillite, graywacke, conglomerate, and minor limestone, which are overlain by Tertiary volcanics.

BUREAU INVESTIGATION:

A 0:1 yd_3 placer sample (2324, Table D2) was taken from the creek. No gold was recovered from the sample.

RESOURCE ESTIMATE: Low gold content in sample. No resource estimate made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: More sampling is needed.

REFERENCES: 2, 15, 339

TABLE D2 - ANALYTICAL RESULTS - CARIBOU PLACER

Sample no.	Type	Sample Length (feet)	Analysis						Description
			oz/yd^3	ppb	Elements in ppm (unless otherwise stated)				
			Au	Au	Ag	Cu	Pb	Zn	
2324	P	N/A	0.00	300	ND	28	20	167	Bank run gravel

NAME(S): VABM ALF Map Location No. D-3

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-4
Sec: 18, 19 T: 20S R: 7W Meridian: Fairbanks
Geographic: Four miles due north of VABM ALF.
Elevation: 3250 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Felsic volcanic rocks, tuffs, flows, porphyry dikes, and basalt. Rocks highly fractured and altered. Abundant pyrite and clay alteration.

BUREAU INVESTIGATION:

The Bureau examined this area in 1988 and 1989. In 1988, the Bureau took a 0.1 yd^3 placer sample (2320, Table D3) that contained 0.003 oz/yd^3 gold. In 1989, the Bureau reexamined the area and took two 0.1 yd^3 placer samples (3066-67, Table D3) from the creek. The samples contained from 0 to trace amounts of gold. Rock samples (1988, 1989, 2321-23, 3064-65, 3068-70, Table D3) were also taken in the area from some volcanic units. The samples contained no anomalous values.

RESOURCE ESTIMATE: Unknown

MINERAL DEVELOPMENT POTENTIAL: Low mineral development potential.

RECOMMENDATIONS: Reexamine area for source of placer gold.

REFERENCES: 15, 16

TABLE D3 - ANALYTICAL RESULTS - VABM ALF

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Elements in ppm (unless otherwise indicated)								
			Au (oz/yd^3)	Ag	Au	Cu	Pb	Sn	W	Zn	
1988	G		NA	ND	ND	6	4	ND	ND	45	Basalt.
1989	G		NA	1.0	ND	4	6	NA	ND	13	Minor sulfides.
2320	P		0.003	0.5	44	29	26	110	30	169	Very few heavy minerals.
2321	S		NA	1.0	ND	8	20	2	30	171	Altered, brecciated felsic rock
2322	RC		NA	2.0	ND	-99	16	2	10	ND	Pyrite clots, clay alteration.
2323	CR		NA	1.5	ND	6	4	1	30	60	Altered porphyry dike.
3064	S		NA	ND	ND	23	8	NA	ND	82	Gray volcanic ash.
3065	S		NA	ND	ND	36	12	NA	ND	86	Ash, rust-colored.
3066	P		Trace	ND	360	14	8	24	60	182	Five v. fine gold grains.
3067	P		?	ND	4	5	24	NA	ND	128	In lavas, no visible gold.
3068	S		NA	ND	ND	48	6	NA	10	222	Red and yellow tuff, gypsum.
3069	S		NA	ND	ND	82	4	NA	10	42	Volcanic tuff and breccia.
3070	S		NA	ND	ND	31	4	NA	ND	48	Volcanic tuff, bentonite?

NAME(S): Green Spike Map Location No. D4

Deposit Type: Lode
Commodities: Copper, Silver, Zinc

LOCATION: Quadrangle: Healy A4
Sec: 10, 15 T: 21S R: 7W Meridian: Fairbanks
Geographic: Three miles east of VABM Alf.
Elevation: 3500 - 4500 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The Green Spike property is located in a large Tertiary pluton (64). The pluton is granite in composition and is similar to the plutons described by Reed and Nelson (243).

BUREAU INVESTIGATION:

The Bureau found this site in 1988. The area contains stained granite with disseminated chalcopyrite, pyrite, and sphalerite. The Bureau took three rock samples (2266-68, Table D4). The samples contained from 0.15 to 0.48% copper, 5.5 to 13.5 ppm silver, and 124 to 819 ppm zinc. More sampling is needed to define the limits of the mineralized granite.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Further exploration and geochemical sampling is warranted in this area.

REFERENCES: 15, 16

TABLE D4 - ANALYTICAL RESULTS - GREEN SPIKE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay (oz/st)		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Mo	Sn	Zn	
2266	S				ND	9.5	55	3818	25	10	819	Fresh granite containing disseminated sulfides
2267	RC				5	5.5	20	1548	2	5	124	Fresh granite containing disseminated sulfides
2268	S				ND	13.5	30	4780	2	13	192	Fresh granite containing disseminated sulfides

NAME(S): Tsusena Creek Prospect
Diana Veins

Map Location No. D5

Deposit Type: Lode Vein Disseminated Stockwork
Commodities: Silver, Copper, Lead, Tin, Zinc

LOCATION: Quadrangle: Healy A-4
1/4 Sec: 15 T: 22S R: 6W Meridian: Fairbanks
Geographic: Between drainages of Portage and Tsusena Creeks.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1973 - Anomalous silver values reported from stream geochemistry sampling.
1979 - Resource Associates of Alaska (RAA) staked 66 claims. Possible ruby silver noted on some rock surfaces.
1981 - Magnetometer survey, rock and geochem sampling. Noted anomalous Cu, Ag, Pb, Sn, Zn in analytical results.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

A thick sequence of Tertiary andesitic to dacitic agglomerates, tuffs, and flows overlie a Triassic(?) schist-gneiss terrane. Biotite-hornblende quartz-diorite to granodiorite rocks intrude the volcanic rocks. Rhyolite porphyry to quartz latite dikes intrude the volcanic rocks and the larger intrusive bodies. Faulting in the area primarily trends northwest to east-west.

BUREAU INVESTIGATION:

The Bureau examined the property in 1988. Forty-seven rock samples (1636, 1993-1999, 2147, 2149-2155, 2326, 2330-2339, and 2427-2447, Table D5) were collected. Sample 2330 contained 26.5 oz silver/st, 0.14 oz gold/st, 1.21% lead, and 0.28% zinc. Sample 2430 contained greater than 1000 ppm tin, and samples 2432-2434 contained as much as 0.55% tin. Samples found to be especially high in tin were all of sulfide-rich quartz veins containing arsenopyrite and chalcopyrite.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential.

RECOMMENDATIONS:

Any further evaluation of this property should include diamond drilling to establish grade and continuity of mineralization at depth.

REFERENCES: 15, 16, 251

TABLE D5 - ANALYTICAL RESULTS - TSUSENA CREEK PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cu	Pb	Sn	Zn	
1636	S				0.5	5	ND	40	2	ND	31	
1993	G				1.5	15	ND	9	352	6	727	Altered felsic dike.
1994	G				11.0	25	ND	0.08%	106	26	5.45%	5% sulfides in felsite, 525 ppm Cadmium.
1995	G				0.5	ND	ND	42	18	ND	806	Arsenopyrite + pyrite=5%
1996	G				ND	ND	ND	18	18	ND	377	Molybdenum (less than 1%) in granite.
1997	G				ND	ND	ND	471	2	ND	185	Gneiss.
1998	CR				1.5	50	ND	425	14	NA	122	Felsite.
1999	CR				56.0	235	ND	0.54%	10	330	105	
2147	RC				ND	5	ND	1	20	ND	103	Andesite
2149	RC				ND	15	ND	6	20	ND	67	Sandstone.
2150	RC				ND	5	ND	1	16	ND	113	Greenstone.
2151	RC				ND	10	ND	ND	12	ND	94	Basalt
2152	RC				ND	10	ND	26	10	ND	97	Schist.
2153	RC				ND	5	ND	7	10	ND	112	Greenstone.
2154	RC				2.0	85	ND	2	18	ND	233	Greenstone, iron-stained
2155	RC				5.0	ND	ND	255	460	7	537	Greenstone, iron-stained

TABLE D5 (CONT.) - ANALYTICAL RESULTS - TSUSENA CREEK PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cu	Pb	Sn	Zn	
2330	CC	1		26.5		2255	140	1525	1.21%	120	0.28%	Quartz breccia vein.
2331	CC	1			19.0	125	ND	300	1440	9	1106	Quartz breccia vein.
2332	CC	.5			4.0	10	ND	171	136	10	1220	Silicified volcanic rock
2333	RC	1.25			25.0	1265	ND	140	380	5	602	Silicified rhyolite.
2334	S				4.5	215	30	62	46	2	257	Vein, float.
2335	S				304	3340	ND	182	3800	25	165	Breccia zone.
2336	RC				10.5	80	ND	108	326	7	436	Breccia.
2337	RC				8.0	55	ND	13	92	ND	115	Felsic dike.
2338	RC				1.0	25	ND	14	22	ND	37	Rhyolitic tuff
2339	RC				0.5	10	ND	6	20	NA	60	Felsic dike.
2427	G			0.32		45	ND	14	8	ND	90	Intermediate dike with 7% sulfides.
2428	G				6	25	ND	28	26	NA	27	
2429	S				42	65	ND	1990	550	60	2664	Silicified andesite, shearzone.
2430	S			2.85		AD	ND	2146	392	0.13%	2263	Quartz-sulfide vein, arsenopyrite.
2431	S				26	205	ND	100	700	120	324	Slightly brecciated.
2432	S				104	6700	ND	749	>1%	0.18%	9517	Arsenopyrite.

TABLE D5 (CONT.) - ANALYTICAL RESULTS - TSUSENA CREEK PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cu	Pb	Sn	Zn	
2433	S				42.0	1960	ND	256	3000	0.14%	3321	Arsenopyrite.
2434	S				124.0	9625	15	313	2800	0.55%	563	Altered andesite.
2435	S				12.5	AD	ND	21	200	75	396	Silicified andesite.
2436	S				10.5	AD	ND	22	172	58	408	Silicified andesite.
2437	CC				102.0	AD	20	2086	4800	0.16%	1.49%	Silicified andesite.
2438	SC				21	7850	ND	1209	56	9	81	Altered andesite with sulfides.
2439	SC				34.5	6710	ND	1493	26	4	65	Altered andesite with sulfides.
2440	SC				11.5	1185	ND	904	14	6	40	Altered andesite with sulfides.
2441	SC				5.0	950	ND	472	18	6	50	Altered andesite with sulfides.
2442	SC				1.5	145	ND	91	10	2	69	Altered andesite with sulfides.
2443	SC				48.0	AD	ND	973	12	2	87	Altered andesite.
2444	G				10.0	40	ND	289	10	860	148	Tuff.
2445	SC				152.0	2275	ND	7073	34	29	149	Altered andesite.
2446	SC				124	200	ND	6593	18	17	119	Altered andesite.
2447	G				3	155	ND	323	14	2	27	Altered andesite.

NAME(S): Portage Creek Head

Map Location No. D6
MAS No. 0020670128
Kardex No. 67-246

Deposit Type: Lode
Commodities: Tin, Silver, Tungsten

LOCATION: Quadrangle: Healy A4
S 1/2 Sec: 15 T: 22S R: 6W Meridian: Fairbanks
Geographic: On divide between Tsusena and Portage Creeks.
Elevation: Unknown.

PRODUCTION: None.

HISTORY: 1975-83 - Staked by R.A.A.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The occurrence is in Tertiary volcanic flows, pyroclastics, and subvolcanic intrusives. The compositions of the rocks include rhyolite, basalt, andesite, dacite, and latite.

BUREAU INVESTIGATION: This property was not examined by the Bureau.

RESOURCE ESTIMATE: None.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 2, 251, 339

NAME(S): Lake Placid

Map Location No. D7
MAS No. 0020760060
Kardex No. 76-66

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D-3
Sec: 23 T: 22S R: 5W Meridian: Fairbanks
Geographic: Tributary to Deadman Creek.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1971 - Staked by Lela Lloyd, Mary Carey, and Carl Gleason (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek drains Tertiary to Cretaceous intrusive rocks of varying composition.

BUREAU INVESTIGATION:

The Bureau collected a 0.1 yd^3 placer sample 3120 (Table D7) from a tributary to Deadman Creek on The Lake Placid claims. No visible gold was noted and a minor amount of black sand was collected.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 92, 339

TABLE D7 - ANALYTICAL RESULTS - LAKE PLACID

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Elements in ppm (unless otherwise stated)								
			Au (oz/yd^3)	Au (ppb)	Ag	As	Cu	Pb	W	Zn	
3120	P		ND	680	ND	ND	10	4	ND	112	

NAME(S): Deadman Creek Map Location No. D8

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D-3
Sec: 35 T: 33N R: 5E Meridian: Seward
Geographic: On Deadman Creek 6.5 miles above junction with Susitna River.
Elevation: 2540 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area in the vicinity of the Bureau sample site is underlain by schist, migmatite and granite of metamorphic and intrusive ages and upper Paleocene biotite granodiorite (93).

BUREAU INVESTIGATION:

One placer sample was collected 6.5 miles upstream from the Susitna River junction. It contained trace amounts of gold (Table D8). Two samples, one collected at the mouth of Deadman Creek and the other 6 miles upstream from the anomalous site, did not contain significant gold.

RESOURCE ESTIMATE:

The sample is only marginally anomalous and no others were collected nearby to establish the extent of the placer gold. Samples collected both up and downstream carried only trace amounts of gold.

MINERAL DEVELOPMENT POTENTIAL: Low.

RECOMMENDATIONS: Collect more samples in the vicinity of the anomaly.

REFERENCES: 15, 93

TABLE D8 - ANALYTICAL RESULTS - DEADMAN CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Mo	Pb	Sn	Zn	
3034	P		Trace	400	ND	ND	ND	2	ND	98	
3119	P		Trace	110	ND	ND	3	8	15	116	
3207	P		Trace	200	ND	ND	ND	ND	19	164	

NAME(S): Fog Lake Placer Occurrence

Map Location No. D9
Kardex No. 76-201

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D4
W 1/2 Sec: 9 T: 31N R: 5E Meridian: Seward
Geographic: Between the western-most two Fog Lakes.
Elevation: 2230 ft.

PRODUCTION: None.

HISTORY: 1979-1980 two claims staked and assessment work done.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock geology here is covered by Quaternary glacial and alluvial deposits, none of these deposits were visible at the property.

BUREAU INVESTIGATION:

The Bureau visited the site, but no alluvial material was present, so a sample could not be taken.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Low.

RECOMMENDATIONS:

REFERENCES: 2, 339

NAME(S): Moose Horn
Stephan Lake Adventure

Map Location No. D-10
MAS No. 20760041
Kardex No. 76-69

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D-4
Sec: 23 T: 31N R: 3E Meridian: Seward
Geographic: 2 miles north of Stephan Lake.
Elevation: 1300 ft.

PRODUCTION: None.

HISTORY: 1971-82 - Nick Botner, Stephan Lake Adventures (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The bedrock geology is covered by Quaternary glacial and alluvial deposits.

BUREAU INVESTIGATION: Site was located but due to unsafe access, was not visited.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS:

The gradient of the creek is very steep, and based on aerial observation, there is little likelihood for the existence of a placer deposit in the present day stream valley. No further work recommended.

REFERENCES: 2, 92, 339

NAME(S): Devils Canyon Occurrence

Map Location No. D-11

Deposit Type: Placer
Commodities: Gold, Platinum

LOCATION: Quadrangle: Talkeetna Mountains D-5.
T: 31N R: 2-3E Meridian: Seward
Geographic: Area near and around southern tributaries to Susitna River in Devil's Canyon area.
Elevation: 1000 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The drainages flow through Tertiary intrusive rocks that are similar to those described by Reed and Nelson (243).

BUREAU INVESTIGATION:

The Bureau collected samples 2374 and 2468-2471 in 1988, and samples 2898, 3060 and 3061 in 1989. All samples were collected south of the Susitna River where it flows through Devil's Canyon. Placer sample 2374 was collected from a gravel bar on a north flowing tributary to the Susitna River. The sample contained 0.002 oz/yd^3 gold and was anomalous in silver and tin (Table D-11). Rock sample 2469 was collected at the mouth of a tributary to the Susitna River. The sample consisted of sulfide bearing schist collected from a gravel bar deposited by the tributary, and was anomalous in gold, arsenic, copper, molybdenum, lead and zinc (Table D-11). Sample 2471 was collected from an erosionally recessive dike. Sample material was quartz rich gneiss, and was anomalous in silver, copper, molybdenum and zinc. Placer sample 3061 was collected from gravel lying on top of bedrock in a Susitna River tributary. The sample contained 1 coarse, 1 fine and 1 very fine gold flakes, and was also anomalous in platinum and palladium. Placer sample 3060 had an anomalous tin value.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL:

Low mineral development potential, until further sampling is conducted.

RECOMMENDATIONS: Follow up anomalous placer samples.

REFERENCES: 15, 16

TABLE D-11 - ANALYTICAL RESULTS - DEVILS CANYON OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Comments
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	Sn	Zn	
2374	P		0.002	92	120	155	41	136	180	125	
2468	P		ND	120	ND	130	4	14	13	262	
2469	S		NA	ND	10.5	180	278	264	17	2121	11 ppm molybdenum
2470	S		NA	ND	1.5	ND	183	10	2	134	
2471	S		NA	15	13.5	41	2882	4	3	302	7 ppm molybdenum
2898	P		ND	6	0.6	25	20	40	NA	94	
3060	P		ND	ND	0.4	15	ND	12	31	282	4 ppb palladium, 860 ppb platinum
3061	P		Trace	830	ND	ND	4	8	13	142	

NAME(S): Devil's Canyon Dike Map Location No. D-12

Deposit Type: Lode
Commodities: Silver

LOCATION: Quadrangle: Talkeetna Mountains D-5
NE 1/4 Sec: 32 T: 32N R: 1E Meridian: Seward
Geographic: Above entrance to Devil's Canyon.
Elevation: 1020 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by a Jurassic to Cretaceous flysch sequence (64). The sequence is comprised of dark-gray to black orgillite, lithic graywacke, polymictic pebble conglomerate, and a few thin beds of chert and limestone (64).

BUREAU INVESTIGATION:

The Bureau examined the area in 1988. An iron-stained rhyolite dike that cuts a silicified argillite was noted. Six rock samples (2368-73, Table D12) were taken from the dike and the argillite. The samples contained from 1 to 2 ppm silver and minor amounts of gold, copper, and zinc.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 15, 16

TABLE D12 - ANALYTICAL RESULTS - DEVIL'S CANYON DIKE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Bi	Cu	Mo	Zn	
2368	S				ND	1.0	4	11	1	75	Chert float
2369	CR				25	2.0	4	209	5	126	Hornfelsed argillite with pyrite
2370	CR				ND	1.5	4	12	6	62	Rhyolite dike in argillite
2371	CR				ND	1.5	6	24	ND	205	Hornfelsed argillite
2372	CR				ND	1.0	10	4	3	114	Rhyolite dike
2373	S				ND	1.5	11	20	4	50	Rhyolite dike

NAME(S): Ihly
Panky, Ray
Callahan, John

Map Location No. D13
MAS No. 020760001
Kardex No. 76-30

Deposit Type: Lode
Commodities: Gold, Silver, Lead

LOCATION: Quadrangle: Talkeetna Mountains C-6
1/4 Sec: 36 T: 31N R: 2W Meridian: Seward
Geographic: Located in Gold Creek

Elevation: 3000 ft.

PRODUCTION: None.

HISTORY:

1919 - Capps (52) reported large gold nuggets in the coarse angular slide material on the high benches of El Dorado Creek, just below the dikes described below.
1952 - Owners reported 0.02 to 0.06 oz gold/st and 0.28 to 1.98 oz silver/st (148).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Jurassic to Cretaceous flysch sequence (148). The property contains north-striking vertical felsic dikes that contain mineralized quartz veins. One dike is 5 ft. wide, strikes N20°E and dips steeply to the northwest (148). The dike is conformable with the bedding planes of the argillite (148). Another dike is 7 ft wide, strikes north and dips steeply east (148). Both dikes have been fractured and the fractures are filled with quartz that contains galena, pyrite, and chalcopyrite (148). The fractures vary from 0.5 to 8 in wide. Two samples taken by the State of Alaska contained up to 0.5 oz silver/st and 0.43-0.49% lead (148).

BUREAU INVESTIGATION:

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: The property should be examined.

REFERENCES: 2, 21, 52, 55, 77, 92, 148, 171, 339

NAME(S): Gold Creek Placer
Susitna River

Map Location No. D-14
MAS No. 020769008,
D&O Ventures
Kardex No. 76-25, 27, 28, 30, 77, 110

Deposit Type: Placer
Commodities: Gold.

LOCATION: Quadrangle: Talkeetna Mountains D-6
Sec: 21 T: 31N R: 2W Meridian: Seward
Geographic: Tributary of the Susitna River
Elevation: 1,000 to 3,000 ft.

PRODUCTION: None.

HISTORY:

1909- Claims staked on Gold Creek.
1919- Capps (52) report that "a small amount of gold has been recovered, but no ground rich enough to yield a profit to the miners has been found." Some gold was also taken from the bars of the Susitna River near Gold Creek.
1978- Mining on the lower part of Gold Creek.
1981- Assessment work included a 100 ft by 150 ft open cut.
1982- Assessment work included a 12 ft by 75 ft open cut.
1983- Assessment work included a 4000 ft drainage ditch and a 3500' road.
1984- 8500 ft of road constructed.
1985- 500 ft of road and a 25 ft X 1500 ft open cut.
1986- Assessment work included a 200 ft and a 2000 ft drainage ditches.

WORKINGS AND FACILITIES:

14,500 ft of road , 4500 ft of drainage ditches, and 3500 ft of open cuts. The open cuts are from 25 ft to 60 ft wide.

GEOLOGIC SETTING:

Bedrock in Gold Creek consists of a Jurassic to Cretaceous flysch sequence (64). The rocks in the flysch sequence consist of argillite, lithic graywacke, conglomerate, and a few thin beds of chert and limestone. The thickness of the alluvial material is unknown.

BUREAU INVESTIGATION:

The Bureau took six 0.1 yd^3 placer samples from the creek (951-956, Table D14). The samples contained from trace to 0.018 oz gold/yd^3.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL:

Unknown, but the samples that were taken by the Bureau contained high values and may indicate the presence of ore grade alluvial material in the creek.

RECOMMENDATIONS: More detailed sampling is needed.

REFERENCES: 2, 15, 40, 52, 78, 177, 339

TABLE D14 - ANALYTICAL RESULTS - GOLD CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis								Comments
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Hg	Mo	Zn	
951	P		Trace	N/A	0.5	ND	18	10	11	74	
952	P		0.001	N/A	0.5	15	34	38	7	109	
953	P		0.000	N/A	0.5	ND	23	ND	ND	84	
954	P		0.018	N/A	2.0	100	82	45	18	132	
955	P		0.001	N/A	0.5	35	54	37	9	119	
956	P		0.000	N/A	0.5	55	76	42	8	137	

NAME(S): Indian Mountain Claims 1-6

Map Location No. D-15
MAS No. 0020760069
Kardex No. 76-051

Deposit Type: Lode
Commodities: Silver, Lead, Gold, Copper, Bismuth

LOCATION: Quadrangle: Talkeetna Mountains
Sec: 11 T: 32N R: 2W Meridian: Seward
Geographic: On a 'bench' overlooking Indian River.
Elevation: 1500 ft.

PRODUCTION: None.

HISTORY: 1962, 63- Claud Winand, Thomas Mely, and W.P. Watkins (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by a Tertiary granite stock that is in sharp contact with argillite. Quartz veins and pegmatite dikes are present in the granite.

BUREAU INVESTIGATION:

The Bureau examined the area in 1988. Seven samples (2352-54,2511-14, Table D15) of the rocks in the area were taken. One quartz vein contained 0.01% copper (Table D15).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

It is likely that this property was not found during the examination; therefore, this property should be reevaluated.

REFERENCES: 2, 15, 16, 339

TABLE D15 - ANALYTICAL RESULTS - INDIAN MOUNTAIN

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)				
			Au	Ag	Au	Ag	Bi	Cu	Pb	
2352	CR				ND	ND	4	1	16	Pegmatite dike.
2353	CC				ND	ND	2	ND	10	Quartz vein in granite.
2354	CR				ND	1.0	4	18	4	Granite.
2511	G				10	1.0	2	11	20	Basalt.
2512	G				ND	1.0	2	1	8	Granite.
2513	CH				ND	ND	2	4	8	Vein quartz.
2514	G				-99	1.0	6	0.01%	16	Vein quartz, trace chalcopyrite.

NAME(S): Mint Mine
Portage Creek
Cheechako Moose 1-5, 7-30

Map Location No. D16
MAS No. 020760002
Kardex No. 76-11,22,35,61

Deposit Type: Lode
Commodities: Silver, Gold

LOCATION: Quadrangle: Talkeetna Mountains D-5
NW 1/4 Sec: 18 T: 32N R: 01W Meridian: Seward
Geographic: Nine miles east of Chulitna Station, on Portage Creek
Elevation: 1290 ft.

PRODUCTION:

No recorded production, but according to Capps and Short (55), a small amount of ore was shipped.

HISTORY:

1923 - Brooks (28) reported ruby silver discovered on Portage Creek. Mint Mine discovered by Arthur Moose Johnson and Harry Wertz.
1926 - A 40 lb. select sample assayed 117.9 oz Silver/st (55).
1927 - P. Smith reports 150 ft driven in adit (283).
1955-57 - Chulitna Silver Mining (2).
1969-83- Geo. Thomas, Fred Byant (2).

WORKINGS AND FACILITIES:

240 ft long adit, near creek level. 15 ft long adit, 10 ft above the creek. 17 ft long adit, 100 ft above the creek. Open cut, 230 ft above creek.

GEOLOGIC SETTING:

At the Mint Mine, the country rock consists of a blocky slate, which strikes north to N30°E and dips 20°-80° west (55). The slate is cut by a andesite dike that is from 5-12 ft wide that strikes N20°W and dips 75° SW (55). The dike contains sericitized orthoclase in a groundmass of altered feldspar laths (55). The dike and country rock are cut by quartz veinlets that contain minor sulfide minerals (pyrargyrite, miargyrite, arsenopyrite, chalcopyrite, galena, tennantite, and pyrite) and ruby silver (55).

BUREAU INVESTIGATION:

In 1924 Harry Townsend of the Bureau made a sketch map and took some samples (55). The Bureau reexamined the property during this study. Samples 817 and 944 were taken from a silicified argillite. The samples contained 0.29-0.49% arsenic, 1-7.8 oz silver/st, and 0.006-0.075 oz gold/st (Table D16). Sample 2325 was a 5 ft long chip sample that was taken from a shear zone above the 240 ft long adit. The sample contained 0.47% arsenic, 2.88 oz silver/st, and 0.003 oz gold/st (Table D16). Samples 2418-2425 were taken from the discovery outcrop, which is located approximately 230 ft above the creek. The samples contained from 0 to 0.088 oz gold/st (Table D16).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential.

RECOMMENDATIONS:

Better geologic data (e.g., drilling) are required in order to properly evaluate the property.

REFERENCES:

2, 15, 16, 21, 28, 55, 93, 171, 177, 185, 252, 280, 283, 286, 287, 292, 299, 339, 350

TABLE D16 - ANALYTICAL RESULTS - MINT MINE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Sb	As	
817	G				2600	39	9	10	20	4870	Bleached argillite.
944	RC	3.0			210	270	26	10	20	2910	Granitic dike. Visible sulfides.
2325	CC	5.0		2.88	970	100	2	20	20	4705	Shear zone breccia. 5% pyrite, arseno pyrite.
2418	CH	3.5		0.03	ND	1.5	27	26	55	285	Gouge.
2419	CH	11.0		0.07	15	2.5		2	60	455	Silicified felsic dike.
2420	G			56.60	1350	AD	49	42	815	AD	Silicified argillite.
2421	S			4.49	665	156	32	28	170	5365	Silicified, oxidized argillite w/chalcopyrite, pyrite
2422	CH	0.3		0.32	ND	11	21	10	5	260	Gouge, footwall of ore zone.
2423	CH	3.0		28.00	425	AD	35	18	280	4835	Argillite w/ruby silver in quartz stringer
2424	S			53.40	3030	AD	57	20	620	AD	High-graded.
2425	G			80.0	315	80	36	2	60	3830	
2426	G				20	ND	25	14	ND	ND	Felsic intrusive.

NAME(S): Treasure Creek
Silver Dome Mining Co.
Molly 1-18; Caribou 1-59
Cheechako Moose 1-21

Map Location No. D17
MAS No. 0020760005
Kardex No. 76-045

Deposit Type: Lode
Commodities: Molybdenum, Copper, Zinc, Tungsten, Silver

LOCATION: Quadrangle: Talkeetna Mountains D-5
SE 1/4 Sec: 8 T: 32N R: 01E Meridian: Seward
Geographic: One mile North of Treasure Creek.
Elevation: 1500 ft.

PRODUCTION: None.

HISTORY:

1956-83 - James Hulbert, George Fennimore, Fred Bryant, James Davis, Alvin MacKay; Silver Dome Mining Co. staked 154 claims (2).
1984-85 - Assessment work. William Elam (owner, Silver Dome Mining Co.) (2).

WORKINGS AND FACILITIES:

Very shallow, very small diameter drill holes did not penetrate into the intrusive. Caved adit exists on the property.

GEOLOGIC SETTING:

There are three mineralized zones at the Treasure Creek property (21). The first is located about 1 mi above the mouth of Treasure Creek, the second is about 1 mi SW of the first, and the third is about 0.75 mi NE of the first.

The first mineralized zone is known as the Treasure Creek lode. The country rock consists of a Tertiary quartz monzonite is altered to argillite and there are sulfide minerals in a 200 to 300 ft wide fault zone (21). The fault zone occurs along the contact of the quartz monzonite with the argillite. Sulfide minerals consist of arsenopyrite, molybdenite, sphalerite, and chalcopyrite (21). There is minor fluorite and epidote.

The second mineralized zone consists of quartz-rich shear zones, which are up to 2.5 ft wide and contain lenses, bugs, and masses of molybdenite, sphalerite, chalcopyrite, and pyrite (21).

The third zone consists of fractures in a brownish to gray siliceous hornfels that contain small grains of molybdenite and chalcopyrite (21).

BUREAU INVESTIGATION:

The Bureau sampled the property during this study. The samples are plotted on figure D17. Three samples (1, fig. D17) were grab samples that were taken from the northeast mineralized zone. The samples contained from 27 ppm to greater than 1% molybdenum, 82 ppm to 2.65% zinc, 0 to 0.42% tungsten, and 0.1 to 1.7 oz silver/st (Table D17).

Two samples were taken from the northwest of the Treasure Creek lode (2, fig. D17). The samples contained 0.06-0.1% copper and no detectable molybdenum (Table

Two samples were taken from the northwest of the Treasure Creek lode (2, fig. D17). The samples contained 0.06-0.1% copper and no detectable molybdenum (Table D17).

Four samples were taken near the Treasure Creek lode (3 & 4, fig. D17). The samples contained minor quantities of molybdenum and zinc (Table D17).

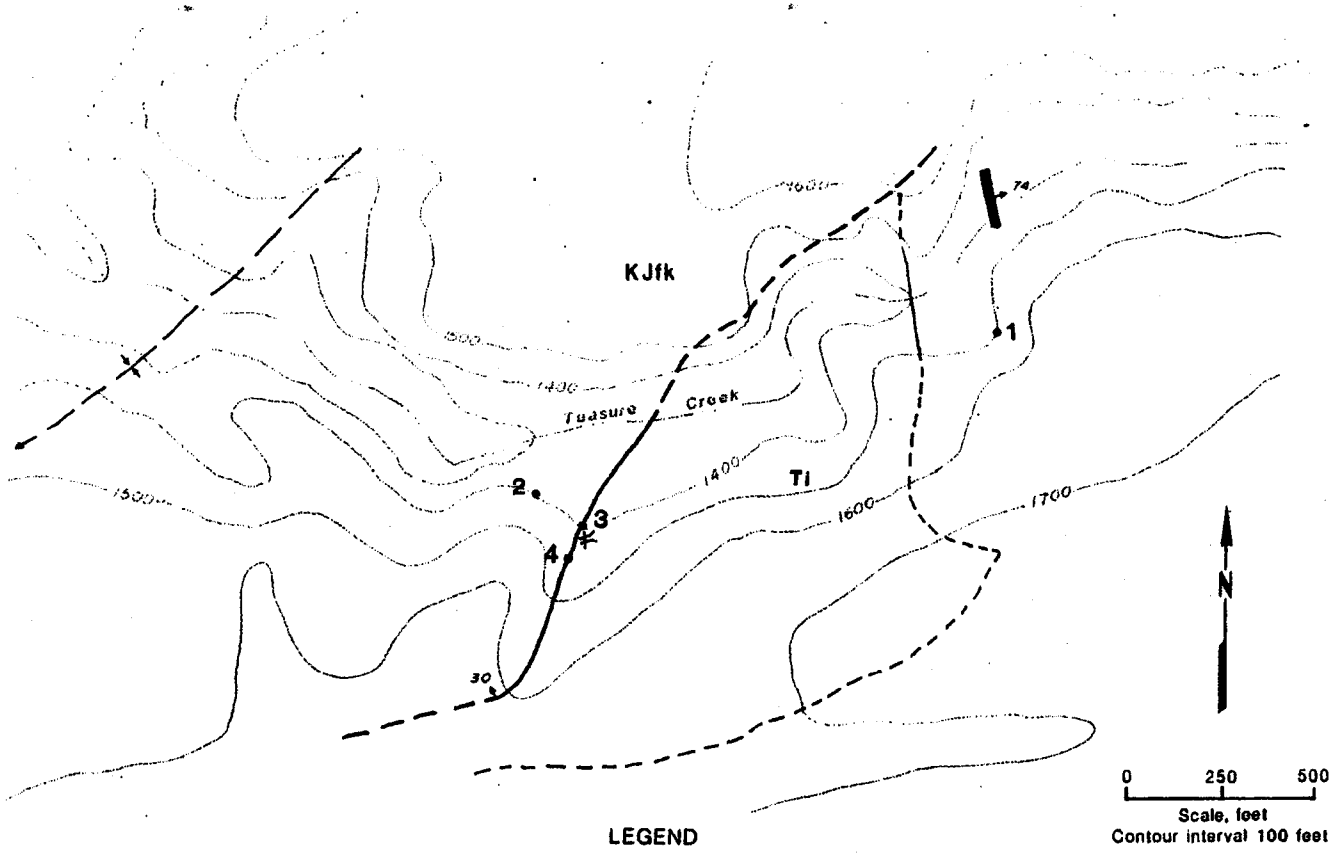
RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for porphyry molybdenum.

RECOMMENDATIONS:

This property deserves a closer examination and possible core drilling. Alteration descriptions and geochemical results suggest a porphyry Mo-W-Sn(?) system.

REFERENCES: 2, 15, 16, 21, 252, 339



LEGEND

Tl	Quartz monzonite
KJfk	Graywacke
74	Rhyolite porphyry dike, showing dip
	Axis of syncline, showing plunge
	Contact, dashed where concealed
30	Fault, showing dip, dashed where approximate
	Caved adit
•4	Sample site

Figure D17. - Treasure Creek Prospect, showing geology and sample sites (Topography after USGS Talkeetna Mts. D5 quadrangle)

TABLE D17 - ANALYTICAL RESULTS - TREASURE CREEK

Map no.	Sample no.	Type	Sample Length (feet)	Analysis										Comments
				Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)							
				Au	Ag	Au	Ag	Bi	Cd	Cu	Mo	Zn	W	
1	2159	G				650	58.5	1796	114.5	58	74	2.65%	90	>10,000 ppm arsenic
1	2160	G				10	3	84	1.5	5	27	409	ND	3,445 ppm arsenic
1	2161	G				160	13	66	ND	179	ND	82	4220	Pod of molybdenum-bearing granite >10,000 ppm arsenic
2	2458	S				330	3	24	ND	661	ND	41	ND	
2	2459	S				340	2.5	100	1.0	1011	ND	264	ND	
3	2460	G				10	0.5	24	ND	15	1	31	ND	Granite
3	2461	G				ND	1.0	4	ND	3	2	19	ND	Limonite-stained granite
3	2462	G				ND	0.5	ND	ND	ND	5	16	ND	Limonite-stained granite
4	2463	CH				40	2.0	12	2.0	9	22	566	ND	Altered granite 395 ppm arsenic

NAME(S): Portage Creek Map Location No. D-18

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D-5
Sec: 35 T: 33N R: 1E Meridian: Seward.
Geographic: On Portage Creek 10 miles above junction with Susitna River.
Elevation: 1500 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The bedrock of Portage Creek consists of a Jurassic to Cretaceous flysch sequence, that is comprised of argillite, lithic graywacke, conglomerate, and minor chert and limestone beds (64). Tertiary felsic intrusives are present in the drainage. Upper Portage Creek contains a broad (up to 3 mi wide) mantel of Quaternary undivided alluvial and glacial deposits.

BUREAU INVESTIGATION:

The Bureau sampled the creek in 1988. Two 0.1 yd^3 placer samples (2510 & 2876) contained 0 to 0.002 oz gold/yd^3 (Table D18).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Area needs additional reconnaissance placer exploration.

REFERENCES: 15, 16

TABLE D18 - ANALYTICAL RESULTS - PORTAGE CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Comments
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	W	Zn	
2510	P		0.002	1600	ND	25	41	6	70	120	
2876	P		ND	AD	ND	15	16	6	50	98	

NAME(S): Unnamed Occurrence

Map Location No. D-19

Deposit Type: Lode
Commodities: Gold, Silver

LOCATION: Quadrangle: Talkeetna Mountains D-4
SW 1/4 Sec: 1 T: 32N R: 3E Meridian: Seward.
Geographic: Eight miles southwest of Tsusena Butte.
Elevation: 3900 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Scattered pyrite is present in a micro schist adjacent to a Tertiary granite intrusion (92).

BUREAU INVESTIGATION:

The Bureau took four rock samples (2883-85,2896) near the occurrence. The samples contained no anomalous values (Table D19).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: More evaluation of the area is needed.

REFERENCES: 15, 92

TABLE D19 - ANALYTICAL RESULTS - UNNAMED OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	W	Zn	
2883	G			ND	ND	5	5	12	ND	108	Mica schist
2884	G			ND	ND	ND	2	12	ND	108	Granite
2885	G			ND	ND	ND	56	8	ND	170	Mica schist
2896	CR			ND	ND	5	1	12	ND	128	Quart monzonite

NAME(S): Unnamed Occurrence Map Location No. D-20

Deposit Type: Lode
Commodities: Molybdenum, Lead

LOCATION: Quadrangle: Talkeetna Mountains D-4
SE 1/4 Sec: 33 T: 22S R: 7W
Meridian: Fairbanks.
Geographic: Headwaters of Devil Creek.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The geologic setting at the occurrence consists of Jurassic to Cretaceous argillite that has small quartz veins (92).

BUREAU INVESTIGATION:

The Bureau collected samples 3058 and 3062 near the occurrence. No anomalous metal values were observed from any of the Bureau's samples (Table D20). No quartz veins were found.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 15, 16, 92

TABLE D20 - ANALYTICAL RESULTS - UNNAMED OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Comments
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	W	Zn	
3058	RC			ND	ND	10	196	12	ND	106	Aplite dike
3062	RC			80	ND	110	76	12	10	72	Limonite chert

NAME(S): Honolulu Creek Map Location No. D-21

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-5
T: 22S, 21S R: 9W, 10W Meridian: Fairbanks
Geographic: Honolulu Creek upstream from the Parks Highway.
Elevation: 3180 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The bedrock of Honolulu Creek consists of a Jurassic to Cretaceous flysch sequence, that is comprised of argillite, lithic graywacke, conglomerate, and minor chert and limestone beds (64). Tertiary felsic intrusives are also present in the drainage. Lower Honolulu Creek contains a mantel of Quaternary undivided alluvial and glacial deposits from its mouth upstream for approximately 4 mi.

BUREAU INVESTIGATION:

The Bureau collected thirteen 0.1 yd^3 placer samples along the length of Honolulu Creek. Generally, higher gold values were found in samples collected closer to the headwaters. In particular, it appears that gold is being worked into the drainage from the north flowing headwater tributaries. Sample 3056 contained the highest level of placer gold (0.010 oz/yd^3 Table D21). Most samples collected in the drainage were anomalous in tin and/or tungsten. Samples 2873 and 2273 were anomalous in gold, tin, tungsten, arsenic, and platinum. Table D21 discusses the most significant results.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

This creek and its headwaters deserve further placer and lode exploration.

REFERENCES: 15, 16, 177

TABLE D21 - ANALYTICAL RESULTS - HONOLULU CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	Sn	W	
3057	P		Trace	2100	ND	40	29	8	40	40	
3055	P		ND	4	ND	5	34	14	NA	ND	
2874	P		ND	8	ND	10	35	8	N/A	120	
2983	P		ND	2	0.4	20	96	ND	N/A	276	
2310	P		0.001	8600	0.5	80	88	32	N/A	192	
3056	P		0.010	8100	ND	25	73	8	0.39%	170	
1979	P		ND	500	0.5	120	44	16	205	174	
2308	P		Trace	AD	1	60	108	18	400	158	
1969	P		ND	180	ND	45	43	10	125	151	
1968	P		Trace	6000	2.5	395	37	16	640	131	
2274	P		ND	6	ND	60	40	26	115	138	
2273	P		Trace	2400	0.5	425	64	16	350	166	20 ppb platinum
2873	P		ND	2100	ND	5	27	6	N/A	134	10 ppb platinum

NAME(S): Honolulu Lode

Map Location No. D-22
MAS NO. 0020670129
Kardex No. 67-250

Deposit Type: Lode
Commodities: Silver, Gold, Copper, Lead, Zinc,

LOCATION: Quadrangle: Healy A-4, A-5
Sec:3,4, & 10 T: 22S, R: 10W Meridian: Fairbanks
Geographic: Ridge above Honolulu Creek. Six miles south of VABM Antimony
Elevation: 4300 ft.

PRODUCTION: None.

HISTORY: 1976 - Staked by Cities Services (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Massive sulfide vein along contact of sedimentary rocks with granitic intrusive. Possible skarn (?) or sulfide vein system.

BUREAU INVESTIGATION:

Three samples (2259-61) were collected at this prospect. Sample 2259 was collected from a small discontinuous sulfide vein hosted in altered granite, and located near a granite/hornfels contact. Sample 2260 was collected across a 60 foot wide exposure of altered granite. No sulfides were visible in the exposure. The sample contained 31.2 oz/st silver, 2851 ppm copper, 3.32% lead and 1.73% zinc. The sample was collected as a spaced ship across the 60 foot exposure. Sample 2261 was collected from massive galena float found in the creek bed. The sample contained 141.7 oz/st silver. Table D22 lists the significant results for these samples.

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Prospect deserves further exploration.

REFERENCES: 2, 15, 16, 339

TABLE D22 - ANALYTICAL RESULTS - HONOLULU LODE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise stated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sn	Zn	
2259	S		0.032	NA	1020	37.5	5	1.55%	56	250	197	Discontinuous sulfide vein
2260	SC	60.0	NA	31.2	30	7500	190	2851	3.32%	525	1.73%	Altered granite
2261	S		NA	141.7	105	7500	325	2.3%	6.33%	795	6.04%	Massive galena float

NAME(S): Brush Battle Map Location No. D-23

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
Sec: 6 & 8 T: 22S, R: 10W Meridian: Fairbanks
Geographic: Little Honolulu Creek.
Elevation: 2400 ft.

PRODUCTION: None.

HISTORY:

1983- Staked by Mary Upton and Scott McCullough.
1984- Proof of annual labor filed.
1985- Proof of annual labor filed.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the headwaters of the creek consists of a Tertiary intrusion in contact with a Jurassic to Cretaceous flysch sequence (64).

BUREAU INVESTIGATION:

The Bureau collected a 0.1 yd^3 placer sample (2251) in 1988. The sample contained no significant values in the geochemical analysis (Table D23).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 15, 16

TABLE D23 - ANALYTICAL RESULTS - BRUSH BATTLE #1

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	Sn	Zn	
2251	P		ND	ND	ND	20	17	20	23	84	

NAME(S): Chulitna Forks
Paystreak No. 1-2 claims
Honolulu Station

Map Location No. D24
MAS No. 0020670132
Kardex No. 67-224, 304

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
Sec: 30 & 35 & 36 T: 21S R: 11W Meridian: Fairbanks
Geographic: 3/4 mile southwest of Alaska Railroad Honolulu Station.
Elevation: 1400 ft.

PRODUCTION: None.

HISTORY:

1979-82 - Alfred Agree, Randy Cox staked the Chulitna Forks claim.
1975, 1980 - Lance Litton and Lanny Teague staked the Paystreak 1-2 claims.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The drainage is covered by Quaternary undivided alluvial and glacial deposits (64).

BUREAU INVESTIGATION:

The Bureau collected seven 0.1 yd^3 placer samples (820, 821, 935, 936, 959, 1117, 1980)from this property. The samples contained from trace to 0.001 oz gold/yd^3 (Table D24).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: Sampling to bedrock using drills or heavy equipment is needed.

REFERENCES: 2, 15, 177, 339

TABLE D24 - ANALYTICAL RESULTS - CHULITNA FORKS

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	Sn	Zn	
820	P		Trace	N/A	0.5	30	26	22	N/A	94	
821	P		0.001	N/A	0.5	10	32	18	N/A	100	
935	p		Trace	10	1.0	30	29	12	N/A	51	Terrace gravels
936	P		Trace	20	0.5	15	21	10	N/A	54	Terrace gravels
959	P		ND	AD	3.0	55	60	48	N/A	172	
1117	P		Trace	ND	0.5	55	46	6	N/A	129	
1980	P		Trace	ND	ND	40	36	12	67	109	

NAME(S): Antimony Creek
North Carolina Group

Map Location No. D25
MAS No. 0020670135
Kardex No. 67-73, 171

Deposit Type: Lode
Commodities: Gold, Antimony

LOCATION: Quadrangle: Healy A-5
N 1/2 Sec: 14 T: 21S R: 10W Meridian: Fairbanks
Geographic: Headwaters of Antimony Creek.
Elevation: 3500 ft.

PRODUCTION: None.

HISTORY:

1919 - Reports two tunnels and some surface excavations. About 3 miles above the mouth of Antimony Creek, at 2700 ft. elevation, a 40 ft., timbered lagged tunnel follows the contact of a basic dike with shale, impure limestone, and graywacke country rock. Upper tunnel is 10 ft. long, and there were several tons of stibmite ore in dump at the time of Capps' visit (52).
1924 - Antimony lode consists of stibmite in quartz gangue (50).
1943 - Joesting (160) report 20 ft long tunnel, 3 tons sacked ore on the dump, and analysis of 37.5% antimony. Tunnel reported caved, being reopened by Howard Sparks of Livengood.

WORKINGS AND FACILITIES:

Two caved adits.
Cat track and old bulldozer cuts.

GEOLOGIC SETTING:

Rocks near the prospect consist of dark gray interlayered graywacke and argillite, and pale gray siliceous argillite (141). Light colored, fine-grained felsic dikes and a small pyroxenite plug cut the argillite (141). The felsic dikes strike northeast and dip steeply (141). Stibmite is found in quartz veins at the prospect. According to Hawley and others (141), massive stibmite occurred in a thin lense, about 8 in wide. Chemical analyses of large pieces of stibmite-rich and quartz-rich material collected from the area contained more than 0.18 oz gold/st and greater than 10,000 ppm antimony (141).

BUREAU INVESTIGATION:

The Bureau examined the property. Trenches were found on the property. A sample of argillite (914) and a high-grade sample of the quartz-stibmite vein (2416) were taken. The samples contained from 65 ppm to 28.5% antimony and minor amounts of gold and silver (Table D28).

RESOURCE ESTIMATE: Little evidence remains of the original ore bodies.

MINERAL DEVELOPMENT POTENTIAL: Low mineral development potential.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 16, 12, 50, 52, 61, 141, 177, 339, 350

TABLE D25 - ANALYTICAL RESULTS - ANTIMONY CREEK

Sample no.	Type	Sample Length (feet)	Analysis						Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)				
			Au	Ag	Ag	As	Au	Sb	
914	RC				0.5	105	0.025	65	Sheared argillite
2416	S				1.5	25	0.520	28.5%	Quartz stibmite vein

NAME(S): Hole Claims

Map Location No. D26
MAS No. 020670133
Kardex No. 197, 221

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A5
1/4 Sec: 34 T: 20S R: 10W Meridian: Fairbanks
Geographic: Chulitna River near Hardage Creek.
Elevation: 1800 ft.

PRODUCTION: None.

HISTORY:

1973-83 - Kenneth Umphenour, Earle Foster, Edward & Christie Holmberg, (2).
1974 - W. Herber, (2).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock in the area consists of a Jurassic to Cretaceous over thrust flysch sequence that consists of argillite, lithic graywacke, conglomerate, and thin chert and limestone interbeds (64).

BUREAU INVESTIGATION:

The Bureau took two 0.1 yd^3 placer samples (1118-1119) from the stream. The samples contained a trace amount of gold (Table D26).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 2, 15, 177, 339

TABLE D26 - ANALYTICAL RESULTS - THE HOLE CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	W	Zn	
1118	P		Trace	ND	0.5	5	47	4	ND	112	
1119	P		Trace	20	0.5	10	40	16	ND	113	

NAME(S): East Fork Chulitna River Map Location No. D27

Deposit Type: Placer
Commodities: Gold, Tin

LOCATION: Quadrangle: Healy A-4-5
Sec: 8,9,10,14,17,18 T: 20S R: 9W Meridian: Fairbanks
Geographic: Length of E. Fork Chulitna River.
Elevation: to 3500 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The Chulitna River flows through a broad valley that is covered by undivided Quaternary glacial and alluvial deposits (64).

BUREAU INVESTIGATION:

The Bureau collected eight 0.1 yd^3 placer samples (911, 2148, 2329, 2891, 2977, 3220-22) from the drainage. The samples contained up to 0.003 oz/yd^3 gold, 170.5 ppm silver, and 0.16% tin. Table D27 lists the most significant results.

RESOURCE ESTIMATE: Samples contain significant gold, silver, and tin.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for gold, silver, and tin.

RECOMMENDATIONS:

The area is worthy of additional prospecting for placer gold and lode tin.

REFERENCES: 15, 16, 177

TABLE D27 - ANALYTICAL RESULTS - EAST FORK CHULITNA RIVER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)						
			Au	Au	Ag	As	Cu	Pb	W	Zn	
911	P		trace	ND	2	5	31	22	NA	111	
2148	P		0.002	AD	4.5	125	40	34	NA	138	
2329	P		trace	AD	170.5	ND	37	14	NA	131	
2891	P		0.003	6500	2.4	120	44	480	0.16%	188	
2977	P		Trace	14	3.2	45	67	8	5	166	
3220	P		Trace	6700	ND	90	24	16	260	214	
3221	P		ND	74	ND	ND	9	10	NA	250	
3222	P		ND	4	ND	ND	7	6	ND	190	

NAME(S): Broad Pass Coal

Map Location No. D28
MAS No. 0020670131
Kardex No. 67-76,77

Deposit Type: Lode
Commodities: Coal

LOCATION: Quadrangle: Healy A-5
W 1/2 Sec: 27 T: 19S R: 9W Meridian: Fairbanks
Geographic: Chulitna River Valley, near confluence with Squaw Creek.
Elevation: 2400 ft.

PRODUCTION: Less than 100,000 short tons (195).

HISTORY:

1922 - Broad Pass Coal & Development Co. worked the mine from July to December; exact production figures unavailable, but less than 20,000 tons (28).
1951 - Hopkins (19) speculated that the area contains 13.5 million tons of lignite coal, if the 8-foot-thick coal bed that was encountered underlies the 1-1\2 square miles he examined.
1987 - Bureau collected one grab sample. Reported that mine is slumped and overgrown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Coal-bearing rocks unconformably overlie tightly-folded beds of slate and smaller amounts of graywacke and greenstone of Jurassic age. The coal-bearing formation consists of well-sorted pebble conglomerate and pebbly sandstone; includes smaller quantities of micaceous silty claystone and lignite. The coal-bearing units are generally unconsolidated.

BUREAU INVESTIGATION:

The Bureau collected loose pieces of coal from an old stockpile(?); submitted as sample 797. The coal is similar to that found in the Coal Creek coal property (D1).

RESOURCE ESTIMATE:

Identified resources are 50 million short tons; hypothetical resources are 500 million short tons (195).

MINERAL DEVELOPMENT POTENTIAL: Low mineral development potential.

RECOMMENDATIONS: None.

REFERENCES: 19, 28, 195, 339

TABLE D28 - ANALYTICAL RESULTS - BROAD PASS COAL

Basis	Sample no.	Sample Length (feet)	Elements in weight percent (unless otherwise stated)						
			Total Moisture	Residual Moisture	Ash	Volatile Matter	Free Carbon	Sulfur	BTU/Lb.
As received	797	Loose pieces	33.4						6039
Air dry				11.30	20.47	37.94	30.29	0.36	8046
Dry					23.08	42.78	34.14	0.40	9071

APPENDIX E

NAME(S): Triem Map Location No. E1

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B-6
Sec: 8,16-17, T: 19S R: 12W Meridian: Fairbanks
Geographic: Tributary to West Fork Chulitna River.
Elevation: 3000 ft.

PRODUCTION: None.

HISTORY:

1971 - Location date, August 1971.
1980 - Claims voided on 3/5/80 by BLM due to failure to file 1974 assessment. Located by Fred Triem, Box 55, Sitka, Ak., 99835.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION: None, because located in Denali National Park.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 2

NAME(S): The New Golden Zone Map Location No. E2

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B-6
Sec: 12-13, 15-16, J: 19S, R: 21W Meridian: Fairbanks
Geographic: Tributary to West Fork Chulitna River.
Elevation: 2300 ft.

PRODUCTION: None.

HISTORY:

1976 - Located by Fred Triem, Box 55, Sitka, Ak. 99835.
1980 _ BLM declared claims void.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION: None, because located in Denali National Park.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 2

NAME(S): Kathleen Map Location No. E3

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B-6
Sec: 12-13, T: 19S R: 12W Meridian: Fairbanks
Geographic: At junction with West Fork Chulitna River.
Elevation: 2500 ft.

PRODUCTION: None.

HISTORY:

1971 - Staked by Kathleen and Fred Triem.
1980 - Declared abandoned by BLM due to failure to file 1979 assessment.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION: None, because located in Denali National Park.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 2

NAME(S): Chulitna West, Jackpot Fraction
Chulitna River WF Trib., Money1-4

Map Location No. E4
MAS NoMA020670143
Kardex No. 67-200, 300

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B-6
NE 1/4 Sec: 19,23 T: 19S R: 11W Meridian: Fairbanks
Geographic: Northern tributary to west fork of Chulitna River.
Elevation: 2300 ft.

PRODUCTION: None.

HISTORY:

1974 - One placer gold claim staked by Kenneth Umphenuer(?).
1985 - Placer sampling conducted during Kantishna Study(266), Table A-4a, p. A145.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Main channel of the West Fork Chulitna River.

BUREAU INVESTIGATION:

Investigated during Bureau of Mines Kantishna Study. Table A-4a, p. A145 (266)

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 266

NAME(S): Black Bear 1-5

Map Location No. E5
MAS 0020670165
Kardex 67-206

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
Sec: 24 & 25 T: 19S R: 11W Meridian: Fairbanks
Geographic: Lode Creek 1/4 mile above confluence with West Fork Chulitna R.
Elevation: 2050 ft.

PRODUCTION: None.

HISTORY: 1974-1983 - Earle Foster, R.A. and R.J. Pellett (5 claims)

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION:

1987- Collected samples 878-880. Placer sample 879 was analyzed as a rock and contained 0.744 oz Au/ton.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

This property lies within Denali National Park which is presently closed to mineral exploration.

REFERENCES: 177

NAME(S): Colorado Creek 1-9

Map Location No. E6
MAS No. 0020670163
Kardex No. 67-69, 182

Deposit Type: Placer
Commodities: Gold, Silver

LOCATION: Quadrangle: Healy A-6
1/4 Sec: 19 & 30 T: 19S R: 10W Meridian: Fairbanks
Geographic: Junction Colorado Creek and west fork Chulitna River.
Elevation: 2100 ft.

PRODUCTION: None.

HISTORY:

1933 - Ross reports bismuthinite and marcasite in placer concentrates (262).
1971 - Earle Foster and Walter Yates stake claim.
1980 - Annual labor included 17 auger drill holes and a magnetometer survey.
Nov. 1980 - Yates quit claims to Foster.
1981-86 - Annual labor performed.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Unknown.

BUREAU INVESTIGATION:

Collected samples 932-934, 1115, 1116 in 1987. Placer sample 1115 contained 0.03 oz Au/yd^3.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for placer gold, however , the upper portion of Colorado Creek is within Denali National Park which is presently closed to mineral exploration and development.

RECOMMENDATIONS: None.

REFERENCES: 21, 52, 61, 136, 177, 262,265, 266

TABLE E6 - ANALYTICAL RESULTS - COLORADO CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis							Description
			oz/yd³		ppb	Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Ag	Bi	Cu	Sb	
932			0.004			5.5	ND	48		4 coarse gold flakes
933					115	1.5	ND	48	ND	Argillite breccia
934			0.005			3.5	56	45	ND	5 coarse gold colors
1115			0.035			4	216	133	100	
1116			0.011			1.5	20	113	10	7 coarse gold colors

NAME(S): Silver King

Map Location No. E7
MAS No. 46
Kardex No. 67, 68, 69, 182

Deposit Type: Lode
Commodities: Silver, Gold

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 30 T: 19S R: 10W Meridian: Fairbanks
Geographic: On the Northeast side of Colorado Creek, about 1 ½ miles above the mouth.
Elevation: 2360 ft.

PRODUCTION: None.

HISTORY: (266)

1917 - Colorado Creek and Center Star claims staked.
1931 - Claims staked on Colorado Creek, Silver King, Stibnite, Silver King Extension claims.
1971 - Area re-staked by Resource Associates of Alaska.
1984 - Included in extension of Denali National Park.

WORKINGS AND FACILITIES: Trenches.

GEOLOGIC SETTING:

Hornfels and skarn cut by small northeastward-trending dikes of quartz diorite porphyry.

BUREAU INVESTIGATION:

Sampled by Salisbury and Dietz under Bureau contract during the Kantishna-Dunkle Study (266).

RESOURCE ESTIMATE: Inferred 85,000 tons of up to 8.9 oz Au/ton, (266).

MINERAL DEVELOPMENT POTENTIAL:

Appendix G says the potential is low. Moderate mineral development potential for gold, however, the property lies within Denali National Park which is presently closed to mineral exploration.

RECOMMENDATIONS: None.

REFERENCES: 21, 52, 61, 136, 262, 265, 266

NAME(S): Liberty Prospect Map Location No. E8

Deposit Type: Lode
Commodities: Silver, Gold

LOCATION: Quadrangle: Healy B-6
S ½ Sec: 18 T: 19S R: 10W Meridian: Fairbanks
Geographic: 0.7 miles south of the Dunkle Mine.
Elevation: 2600 ft.

PRODUCTION: None.

HISTORY:

1933 -A N50°W-trending shear zone, reported to contain 0.14 oz Au/ton and 8.6 oz Ag/ton (262).
1983 - One select sample (CO12713) from a dump contained 0.046 oz Au/ton and 4.56 oz Ag/ton. Two other samples contained no detectable gold (266).

WORKINGS AND FACILITIES: A series of bulldozer trenches reported (266).

GEOLOGIC SETTING:

Consists of a sheared hornfels, containing disseminated pyrrhotite, pyrite and arsenopyrite.

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 262, 266

NAME(S): Dunkle Coal Mine
Costello Creek Mine

Map Location No. E9
MAS No. 0020670192
Kardex No. 67-048

Deposit Type: Lode
Commodities: Coal

LOCATION: Quadrangle: Healy B-6
NW 1/4 Sec: 17 T: 19S R: 10W Meridian: Fairbanks
Geographic: Camp Creek above confluence with Costello Creek.
Elevation: 2600 ft.

PRODUCTION: 64,000 tons.

HISTORY:

1911 - Frank and Lon Wells, Henry Stevens, W.E. Dunkle. Small quantity of coal mined for local use.
1929 - Prospecting permit issued to Henry Stevens and Lon Wells. Small quantity of coal mined for local use.
1939 - Coal prospecting permit issued to Henry Stevens.
1941 - Prospecting permit transferred to W.E. Dunkle.
1941-42 - 5,000 tons of coal mined and shipped on the Alaska Railroad.
1952-54 - 59,000 tons of coal produced by strip mining (19), pub. 1951.
1967 - Dunkle coal was used for heating, cooking, and other uses at the Golden Zone Mine (219).
1983 - Workings caved and inaccessible (266).

WORKINGS AND FACILITIES:

Entry No. 1 - main entry, several lateral entries, one room.
Entry No. 2 - driven in 1942 - main entry, counter entry, numerous rooms, and breakthrough.

GEOLOGIC SETTING:

Coal-bearing sediments lie in a small fault-bounded basin. Beds are gently folded, dips are (less than 20°); broken by high-angle reverse faults with displacements up to 10 ft. The coal is subbituminous and reportedly makes a good steam coal (264).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE:

380,000 tons of coal in three beds of 6 ft., 4 ft., and 4 ft. thickness respectively. Minable tonnage of 8400 short tons measured, 116,000 short tons indicated, and 68,300 short tons inferred (264, 266).

MINERAL DEVELOPMENT POTENTIAL:

Moderate mineral development potential, however, the deposit lies within Denali National Park which is not open to mineral exploration.

RECOMMENDATIONS: None.

REFERENCES: 19, 51, 52, 219, 262, 264, 266, 274

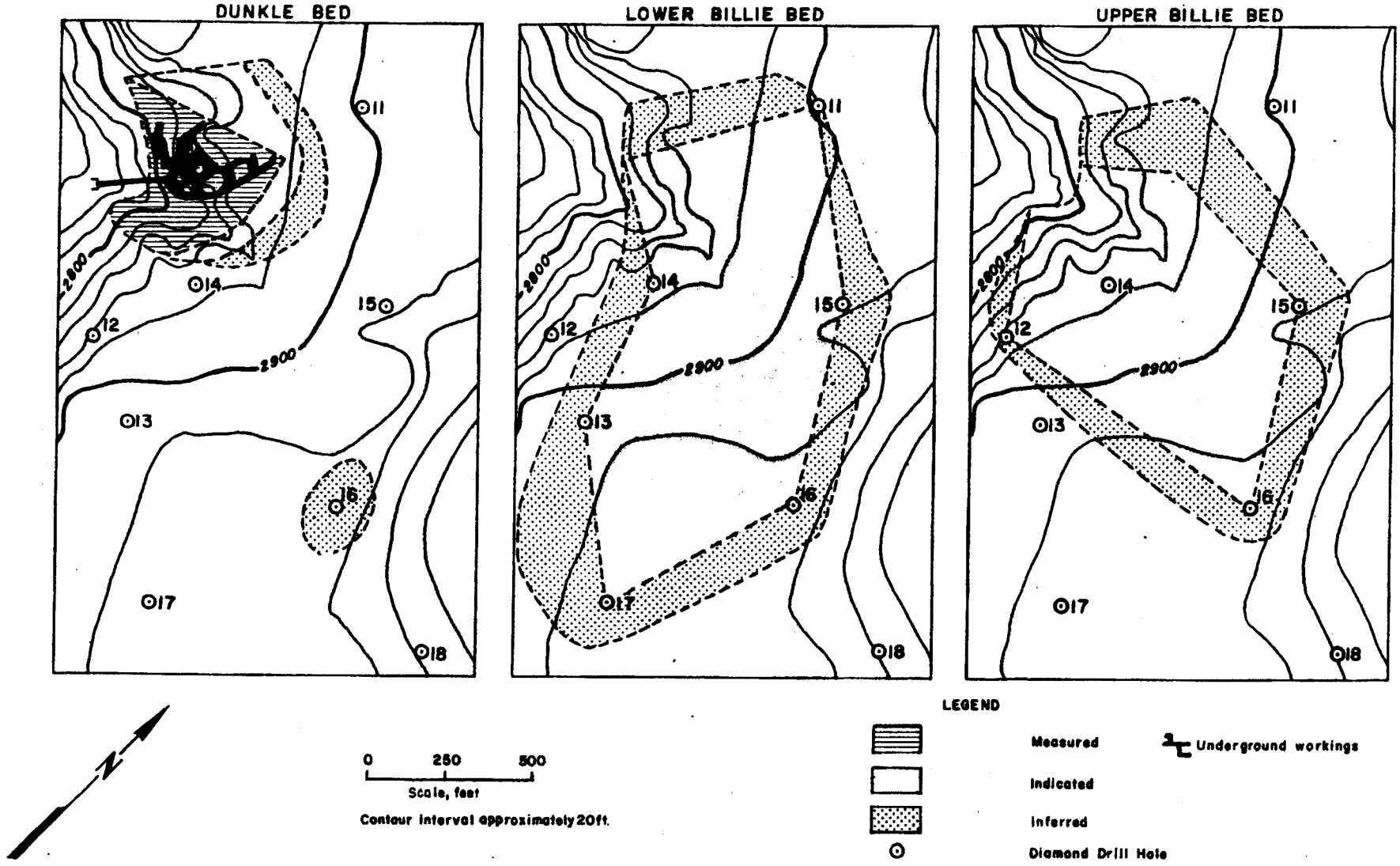


Figure E9. - Dunkle Mine Coal reserves. (After Rutledge, 1948)

NAME(S): Lucrata

Map Location No. E10

Deposit Type: Lode
Commodities: Gold, Silver

LOCATION: Quadrangle: Healy B-6
SE 1/4 Sec: 18 T: 19S R: 10W Meridian: Fairbanks
Geographic: West side of Costello Creek, 0.3 miles southwest of the Dunkle Mine.
Elevation: 2600 ft.

PRODUCTION: None.

HISTORY:

1917- Fifteen foot-long tunnel driven into a bluff on the west side of Camp Creek.

WORKINGS AND FACILITIES: A caved 15-ft. adit and 2 open cuts (262).

GEOLOGIC SETTING:

Sheared hornfels zone with irregular quartz-rich lenses and veinlets. Sulfides mostly in stringer veins, but locally massive.

BUREAU INVESTIGATION:

The bureau collected two samples that contained 6.56 oz/st silver each, up to 0.818 oz/st gold, and up to 0.75% copper.

RESOURCE ESTIMATE: Not Evaluated.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for gold and silver.

RECOMMENDATIONS: None.

REFERENCES: 52, 138, 177, 262, 266

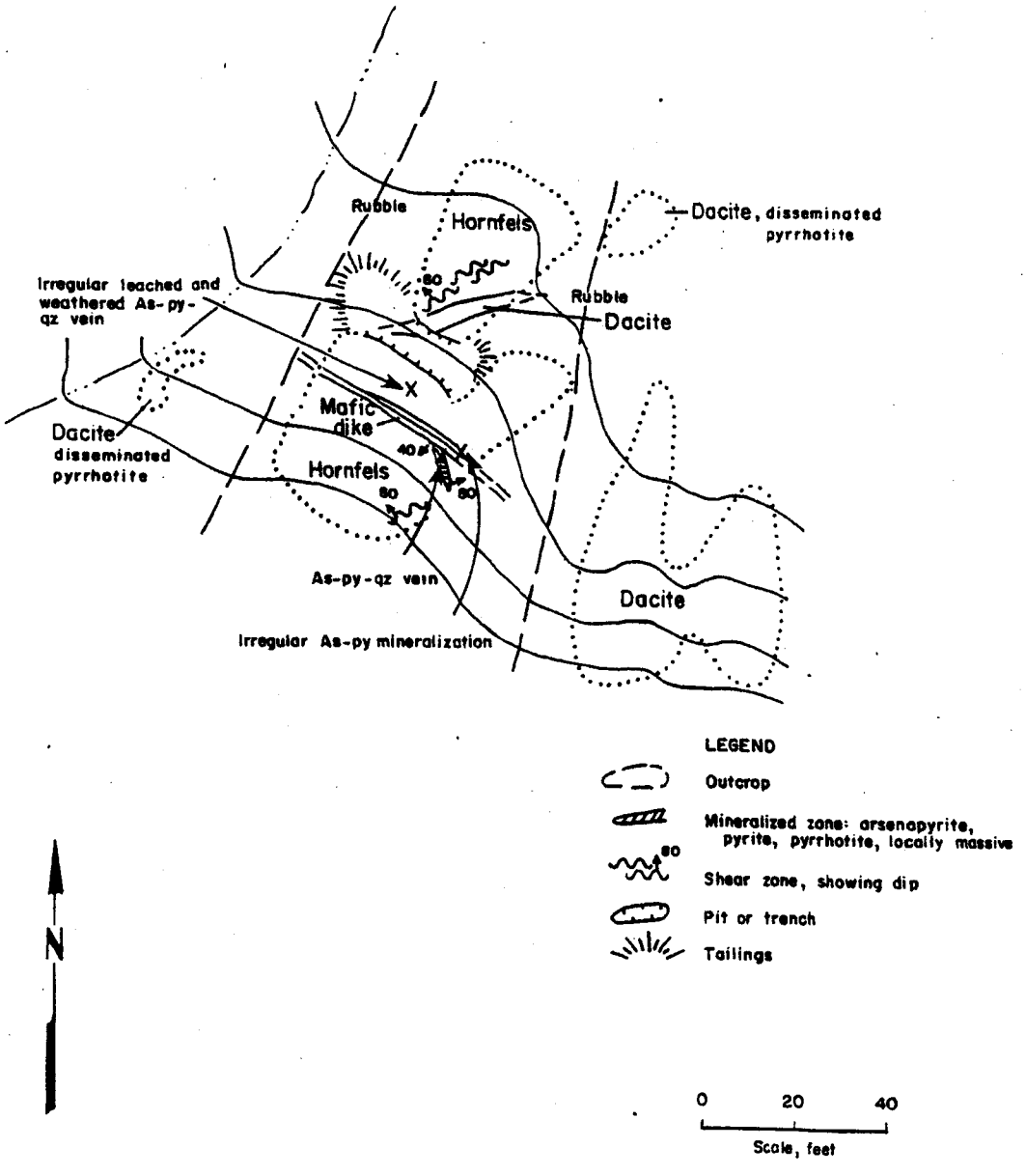


Figure E10. - Lucrata Prosepct, showing geology and sample sites (After Salisbury and Dietz, 1984)

NAME(S): Nim Prospect
Costello
Snoopy
Camp Creek

Map Location No. E11/12
MAS No. 0020670144
Kardex No. 182, 067-225

Deposit Type: Lode
Commodities: Gold, Silver, Copper, lead, garnet

LOCATION: Quadrangle: Healy B-5
Sec: 14-15, T: 19S R: 10W Meridian: Fairbanks
Geographic: Large area between Costello Creek and Bull River.
Elevation: 3000-3200 ft.

PRODUCTION: None recorded.

HISTORY: (266)

1971 - Staked by International Minerals Corp. and Placid Oil after soil sampling. 414 lode claims.
1972 - Shallow rotary drill holes.
1974 - No assessment filed on the claim block for 1974.
March 1975 - R&M Consultants re-stakes a block of 32 claims.
July 1975 - Low-level aeromagnetic survey.
November 1975 - Aeromagnetic survey flown over anomalous area northeast of geochemical anomaly.
March 1976 - 64 additional claims staked by R&M. Some trenching.
1980 - IP, VLF, ground magnetics surveys done. Thirty claims dropped.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Conglomerate, graywacke, and minor pelitic rocks. Near intrusives, the rocks are hornfelsed and silicified. Hornblende-diorite and andesite occupy northwesterly-trending belts along the margins of the intrusives. The andesites and diorites are hornfelsed, garnetiferous, and have been altered to tactites in the vicinity of the intrusives, (266).

BUREAU INVESTIGATION:

Bureau samples (Table E11) contained between 0 and 35 ppb gold, up to 2650 ppm copper (sample 868), and up to 200 ppm zinc, (no.868).

RESOURCE ESTIMATE:

100-120 million tons at the Nim; 500,000 to 2.5 million tons at the Snoopy, (266).

MINERAL DEVELOPMENT POTENTIAL:

Moderate mineral development potential, however the prospect is surrounded by Denali National Park lands.

RECOMMENDATIONS: None.

REFERENCES: 61, 136, 138, 177, 266

TABLE E11 - ANALYTICAL RESULTS - NIM PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Mo	Pb	Sb	Zn	
867	S				35	2.5	48	70	34	35	28	
868	S				15	7.5	2650	0	4	0	200	
869	S				05	1	163	31	18	0	31	
870	G				10	1.5	141	0	42	5	116	
871	G				5	1	151	0	20	0	108	
872	G				0	1	120	0	22	0	96	

NAME(S): Squaw Creek Placer
J. and S. Mining Claims

Map Location No. E13
MAS No. 0020679003

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy B-5
Sec: 16, 21 T: 19S R: 9W Meridian: Fairbanks
Geographic: Tributary to middle fork Chulitna River south of Broad Pass
Elevation: 2300 ft.

PRODUCTION: Unknown.

HISTORY: 1981 - Jesse G. Smith, owner J & S Mining: operator.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Reconcentrated glacial debris.

BUREAU INVESTIGATION:

Collected placer samples 1114 and 1120, 3219 (Table E13). Found rough cat trail and at least 9 prospect pits up to 6 ft. deep. Numerous prospect pits on J & S claims. Squaw Creek is a slow, meandering stream through glacial outwash.

RESOURCE ESTIMATE:

No estimate made. Placer samples contain only background gold values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 15, 16, 177

TABLE E13 - ANALYTICAL RESULTS - SQUAW CREEK PLACER

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st	oz/yd^3	ppb	Elements in ppm (unless otherwise stated)				
			Ag	Au	Au	Ag	As	Cu	W	
1114	P			trace	20	6.0	50	17	ND	Sample contained visible, but not weighable gold.
1120	P			0.0001	20	0.5	ND	24	ND	
3219	P			ND	10	ND	ND	32	ND	Sample contained no weighable gold.

NAME(S): Bull River
A and S Enterprises Claim No. 1

Map Location No. E14
MAS No. 0020670134
Kardex No. 67-195

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-5
NE 1/4 Sec: 08, 9 T: 20S R: 10W Meridian: Fairbanks
Geographic: Bull River above and below junction with Costello Creek.
Elevation: 1650 ft.

PRODUCTION: None.

HISTORY:

1959- present- Intermittent development by several Anchorage-based prospectors has occurred since 1959 (266).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is structurally complex. Although most of the structures trend northeast, a series of northwest-trending basaltic dikes crosscut the major structures. Brecciated areas are common (266).

BUREAU INVESTIGATION:

Placer samples were collected during this study on the Bull River, both above and below this junction with Costello Creek (Table E14). Sample no. 902 contained 0.004 oz/yd^3 gold (177) Samples collected during a previous study contained up to 0.01 oz/yd^3 gold and were anomalous in tin (266).

RESOURCE ESTIMATE:

550,000 yd^3 of duriferous gravel along river. Volume of minable material probably not large enough to warrant mining by heavy equipment (266).

MINERAL DEVELOPMENT POTENTIAL:

Moderate potential for placer gold.

RECOMMENDATIONS: Detailed sampling with backhoe along drainage.

REFERENCES: 52, 61, 159, 177, 266

TABLE E14 - ANALYTICAL RESULTS - BULL RIVER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st	oz/yd^3	ppb	Elements in ppm (unless otherwise stated)					
			Ag	Au	Au	Ag	As	Cu	Pb	Zn	
901	P			0.0004	1580	2	20	18	12	110	Above Costello Creek
902	P			0.004	45	2	110	29	184	115	Above Costello Creek
903	P			trace	30	0.5	10	27	16	95	Above Costello Creek
906	P			0.0009	ND	2	20	18	74	154	Above Costello Creek

NAME(S): Costello Creek
A and S Enterprises Claim No. 1

Map Location No. E15
MAS No. 0020670134
Kardex No. 67-195

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-5
NE 1/4 Sec: 8 T: 20S R: 10W Meridian: Fairbanks
Geographic: Mouth of Costello Creek.
Elevation: 1650 ft.

PRODUCTION: None.

HISTORY:

1959- present- Intermittent development by several Anchorage-based prospectors has occurred since 1959 (266).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is structurally complex. Although most of the structures trend northeast, a series of northwest-trending basaltic dikes crosscut the major structures. Brecciated areas are common (266).

BUREAU INVESTIGATION:

Placer samples collected by the Bureau on Costello Creek averaged 0.001 oz/yd^3 gold with one sample containing 0.003 oz/yd^3 (Table E15, no. 904) (15). Samples collected during a previous study contained up to 0.033 oz/yd^3 gold (266).

RESOURCE ESTIMATE:

Costello Creek contains 150,000 yd^3 of avriterous alluvial gravel and could support a small commercial operation of suction dredging (266).

MINERAL DEVELOPMENT POTENTIAL:

Moderate development potential for placer gold, however, the upper part of Costello Creek lies within Denali National Park which is not open to mineral exploration.

RECOMMENDATIONS: None.

REFERENCES: 15, 52, 61, 159, 177, 266

TABLE E15 - ANALYTICAL RESULTS - COSTELLO CREEK

Sample no.	Type	Sample Length (feet)	Analysis							Description
			oz/yd³	oz/ton	ppb	Elements in ppm (unless otherwise stated)				
			Au	Ag	Au	Ag	As	Cu	Pb	
904	P		0.003		5	0.5	15	37	20	
905	P		trace		ND	0.5	20	34	16	
937	P		trace		80	0.5	30	49	NA	
938			trace		ND	0.5	40	44	12	
939			trace		5	0.5	30	37	10	
940			trace		ND	0.5	90	40	16	
941			trace		5	0.5	40	36	16	
942	P		0.002		20	0.5	25	37	14	
943	P		0.001		1150	0.5	80	43	16	
2882	P		0.002		NA	2.4	65	36	96	

NAME(S): Lookout Mountain

Map Location No. E16
MAS No. 0020670162
Kardex No. 67-182D

Deposit Type: Lode Prospect
Commodities: Silver, Lead, Zinc

LOCATION: Quadrangle: Healy A-6
N 1/2 Sec: 1 T: 20S R: 11W Meridian: Fairbanks
Geographic: About 2 miles SE of Golden Zone mine. On south side of Lookout Mountain.
Elevation: 2800 ft.

PRODUCTION: None.

HISTORY:

1969 - Hawley and others report anomalous lead, silver, zinc.
1972 - 437 claims staked by R.A.A.
1976 - Anomalous metals reported in quartz porphyry and breccia. Mineralization is concentrated in a 1000 ft. X 1000 ft. area which may indicate the uppermost part of a buried intrusive stock. Magnetic survey inconclusive (135).

WORKINGS AND FACILITIES:

GEOLOGIC SETTING:

A small, poorly exposed, locally brecciated quartz porphyry body has been emplaced in intensely sheared argillite and quartzite shear zones and veins both within the porphyry and surrounding sediments contain copper, lead, zinc, and silver mineralization (135).

BUREAU INVESTIGATION:

A grab sample of altered argillite (sample 2409) contained 1.7 oz/ton silver, 2173 ppm copper, 6,722 ppm lead, 1,435 ppm antimony, and 5,004 ppm zinc. Some of the argillites contain disseminated sulfides and are highly brecciated and silicified. Table E16 lists the significant results for other Bureau samples collected at the occurrence.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL:

Low potential for gold and silver.

RECOMMENDATIONS: None.

REFERENCES: 15, 135, 137, 177

TABLE E16 - ANALYTICAL RESULTS - LOOKOUT MOUNTAIN PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Sb	Zn	
788	RC				ND	3	5	620	10	519	Rhyolite w/ disseminated py
789	RC				ND	1.5	24	38	15	39	Argillite
790	RC				ND	14	17	654	40	688	Rhyolite w/ disseminated Py, Asp, Sb
791	S				ND	11	21	370	25	494	Rhyolite porphyryce w/ disseminated Py, Asp, Gl, Sph.
1990	G				ND	ND	20	2	ND	85	Mafic phenocrysts in porphyry
1991	G				ND	2	5	850	120	749	Felsite intrusive
1992	RC				6	2.5	30	32	15	556	Felsite
2406	CR				ND	5	303	80	5	242	Siliceous argillite
2407	CR				ND	4	36	170	10	229	Siliceous argillite
2408	RC				ND	3	36	110	10	315	Siliceous argillite
2409	S		0.004		ND	59.5	2173	6722	1435	5004	Limonite vein in argillite
2410	G				ND	2	74	1260	55	752	Altered argillite
2411	G				10	54	17	2200	510	49	Silicified argillite
2412	G				60	28.5	177	392	10	93	Brecciated argillite
2413	G				20	17.5	133	384	10	113	Brecciated argillite

TABLE E16 (CONT.) - ANALYTICAL RESULTS - LOOKOUT MOUNTAIN PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Sb	Zn	
2414	G				6	42	22	204	30	168	Silicified argillite from hanging wall of fault
2415	G		0.002		ND	8.5	85	2792	945	2806	Brecciated argillite with sulfides
2417	G				28	5	49	376	3745	29	Cherty breccia with py

NAME(S): Bryn Mawr Creek placer
Copper King 1-11, 16-21, 8A
Copper King Discovery

Map Location No. E-17
MAS No. 0020670156
Kardex No. 067-062, 067-152

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
S 1/2 Sec: 04 T: 19S R: 11W
Meridian: Fairbanks
Geographic: Placer in upper creek.
Elevation: 2500 ft.

PRODUCTION: Minor.

HISTORY:

1907 - Staked by John Coffee (52)
1917 - Minor production (190,191)
1967 - Staked by Mark Ringstad, Egan & Ringstad

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Bryn Mawr Creek drains through the golden zone arsenical porphyry stock and assqciated Greccia pipe. The Greccia pipe contains gold, arsenopyrite, spualerite, chalcopyrite, malachite, stignite, galeum mineralization. Other amounts of elements include molybdenum, bismuth, cobalt, tin and cadmium.

BUREAU INVESTIGATION:

1987- Collected samples 875-877. Placer sample 876 contained 0.005 oz gold/yd^3 and 13.5 ppm silver, and placer sample 875 contained 0.007 oz gold/yd^3 and 16 ppm silver. Other significant sample analysis results are listed in Table E-17.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 15, 51, 52, 61, 78, 177, 190, 191, 219

TABLE E17 - ANALYTICAL RESULTS - BRYN MAWR CREEK

Sample no.	Type	Sample Length (feet)	Analysis							Description
			oz/yd³	ppb	Elements in ppm (unless otherwise stated)					
			Au	Au	Ag	As	Cu	Pb	Zn	
875	P		0.007	4220	16.0	>10000	636	996	134	
876	P		0.005	657	13.5	7440	511	484	173	
877	P		ND	2550	16.5	>10000	2050	172	683	

NAME(S): Riverside, Flaurier, Jumbo

Map Location No. E18
MAS No. 0020670155
Kardex No. 067-063, 067-064

Deposit Type: Lode
Commodities: Gold, Silver, Copper, Lead, Zinc

LOCATION: Quadrangle: Healy A-6
1/4 Sec: 26 T 19S R: 11W Meridian: Fairbanks
Geographic: 3000 ft upstream of confluence of Bryn Mawr Creek with west fork Chulitna River.
Elevation: 710 m.

PRODUCTION: None.

HISTORY: 1912 - Claim staked.

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

"Lode characterized by replacement along bedding. Limestone replaced by fine-grained silica and the development of silicates, particularly sericite, chlorite, epidote, and pyroxene. Locally, . . . beds have been more or less completely replaced by sulphides. The stratification has tended to guide replacement even down to microscopic details." (262)

BUREAU INVESTIGATION:

1987 - Attempts to sample foiled by brush and high water.
1988 - Samples 2327 and 2328 collected. No anomalous metals values.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown

RECOMMENDATIONS: None.

REFERENCES: 15, 16, 21, 50, 52, 61, 63, 262, 352

TABLE E18 - ANALYTICAL RESULTS - RIVERSIDE CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)				
			Au	Ag	Au	Ag	Cu	Pb	Zn	
2327	S				110	0.5	123	12	31	
2328	S				120	2.5	206	12	9	

NAME(S): Golden Zone Mine
Mayflower, Golden Bob 1-16
Bob 1-18, Sunset 1-2
Golden 1-8, Wells Brothers Prop.

Map Location No. E19
MAS No. 020670154
Kardex No. 67-014,006

Deposit Type: Lode
Commodities: Gold, Silver, Copper, Lead, Zinc, Bismuth

LOCATION: Quadrangle: Healy A-6
1/4 Sec: 34 T: 19S R: 11W Meridian: Fairbanks
Geographic: At the head of Bryn Mawr Creek.
Elevation: 3300 ft

PRODUCTION:

1941 - 780 short tons of ore contained 1464 oz gold, 8070 oz silver, 40,648 lb copper, and 2976 lb lead.
1942 - 88 short tons of ore contained 117 oz gold, 547 oz silver, 1.5 short tons zinc, and 2,011 lbs copper (219).

HISTORY:

1909 - Discovered by Wells brothers.
1925 - Mayflower 1-2 claims staked by W.H. Stevens. Property examined by J.G. Shepard of the USGS (277). Shepard reports a 15-ft shaft on the North Pole claim.
1941 - W.E. Dunkle mined 780 short tons of ore, produced 1,464 oz gold, 8,070 oz silver, 40,648 lbs copper, and 2,976 lb lead.
1942 - Mined 88 short tons of ore containing 117 oz gold, 547 oz silver, 2,011 lbs copper, and 2,011 lb lead. Mine closed by Emergency Order L-208 at start of World War II.
1949-51 - Diamond drilling program carried out by the Bureau. Discontinued due to lack of funding.
1952 - Metallurgical tests of Golden Zone ore carried out by BOM, Juneau (219).
1967 - OFR 9-67, by Mulligan and others, released: reports results of 1949-51 BOM drilling (219).
1968 - Hawley and others of the USGS report that the Golden Zone area deserves further exploration (139).
1979 - Assessment work includes trenching and sampling.
1980 - Geophysical survey (controlled-source audio frequency magnetotellurics) indicates 2 vein-like conductors at depths of 700-900 ft and 2000-3000 ft, respectively, in a shear zone on the Mayflower no. 1 claim.
1981 - Three drill holes totalling 690 ft on the Mayflower no. 1 claim.
1983 - 6,226 ft of drilling on Bob #2 claim and 459 ft of drilling on Bob #4 claim.
1984 - Enserch quitclaims to Gemco (C.C. Hawley). Gemco dissolved, becomes Golden Zone, Inc.
1986 - Assessment work includes 3500 ft diamond core drilling.
1988 - VLF survey (13,875 ft) conducted by On-Line Exploration. Structures at depth greater than 50 ft in this type of overburden are too deep for this exploration technique.

WORKINGS AND FACILITIES:

Bunk house, several framed tents, flotation mill, and garages and out buildings on the mine site. Approximately 2,800 ft of total workings at the surface, the 100-ft, and the 200-ft levels. About 2,000 ft of the workings are at the 200-ft level. Numerous drill holes and surface trenches.

GEOLOGIC SETTING:

Cretaceous quartz diorite porphyry stock intruding Pre-Permian sedimentary and volcanic rocks. Cylindrical volcanic breccia pipe 300 ft in diameter intrudes the stock. Pipe extends to at least 1,500-ft depth. The pipe is surrounded by a halo of quartz-veined, altered, and weakly mineralized rock. Major minerals within the alteration zone are arsenopyrite, sphalerite, chalcopyrite, malachite, stibnite, galena, gold, and silver. Analyses also indicate anomalous molybdenum, bismuth, cobalt, tin, and cadmium.

BUREAU INVESTIGATION:

1949 - Thorne and others did diamond drilling. Project terminated in 1951 due to lack of funding (219).

1952 - Metallurgical tests performed by R.R. Wells (351), BOM, Juneau report that the concentrate from upper level (100-ft level) ore contained 4.75% copper, 17.6% arsenic, 0.92 oz gold/ton, and 15.1 oz silver/ton. Ore from the lower mine level (200-ft level) recovered 0.92% copper, 29.0% arsenic, 0.98 oz gold/ton, and 4.2 oz silver oz/ton. Report states that 90% of the copper, 95% of the gold, and 80% of the silver were recovered in low-copper, high-arsenic concentrates that contained approximately 0.9 oz gold and 4 to 15 oz silver per ton. Also report several attempts to selectively float chalcopyrite from the bulk sulfide concentrates. The arsenopyrite was found to float rather slowly, but once floated could not be depressed without simultaneous depression of the chalcopyrite. Selective floatation of the upper-level ore resulted in a product containing 26.6% copper, 1.5% arsenic, 1.4% lead, and 2.8% zinc. This concentrate also contained 3.12 oz gold/ton and 59.9 oz silver/ton. Similar selective floatation of the lower-level ore yielded a concentrate containing 13.4% copper, 5.7% arsenic, 0.75% lead, and 0.55% zinc, in addition to 11.4 oz gold/ton and 53.2 oz silver/ton. The selective floatation of the upper-level ore yielded a 26 copper concentrate containing 80% of the copper, 57% of the gold, and 60% of the silver.

1967 - Mulligan and others report (219) that the longest of their 1951 drill holes obtained a depth of 1025 ft; only one of the other three holes reached it's intended depth.

1987 - Collected samples 876, 877, 881, 882, and 984-986. Placer sample 876 contained significant gold (0.005 oz gold/yd^3), and placer sample 877 contained 2.550 ppm gold. Samples of the "redbeds" above the mineralized breccia pipe contained no gold and only traces of other metals.

1988 - Collected samples 452, 453. Sample 452 contained greater than detection limit for gold, 57.5 ppm silver, 2,105 ppm copper, 90 ppm bismuth, 494 ppm lead, and 181 ppm zinc. Cyanide amenability tests were run by the Bureau's Salt Lake Research Center on ore from a bulk sample collected on the Golden Zone property. Results show that 21.95% of the gold is encapsulated in particles smaller than -325 mesh, indicating that some sort of pretreatment may be necessary to liberate the gold.

RESOURCE ESTIMATE:

1,720,000 tons grading 0.134 oz gold/ton, 0.54 oz silver/ton, and 0.13% copper.

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential.

RECOMMENDATIONS: None.

REFERENCES: 15, 16, 135, 138, 139, 177, 219, 277, 351

TABLE E19 - ANALYTICAL RESULTS - GOLDEN ZONE MINE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Ag	As	Au	Cu	Pb	Zn	
452	G				57.5	>10000	ND	2105	494	181	Fault gouge.
453	RC		0.0049		0.5	110	ND	92	12	55	Vein near skarn outcrop.
881	S				185.0	3450	4.050	1.76%	72	588	Breccia pipe, pyrite-chalcopyrite-malachite-tetrahydrate.
882	S				69.0	>10000	6.250	3710	544	1340	Breccia pipe vein, up to 50% arsenopyrite

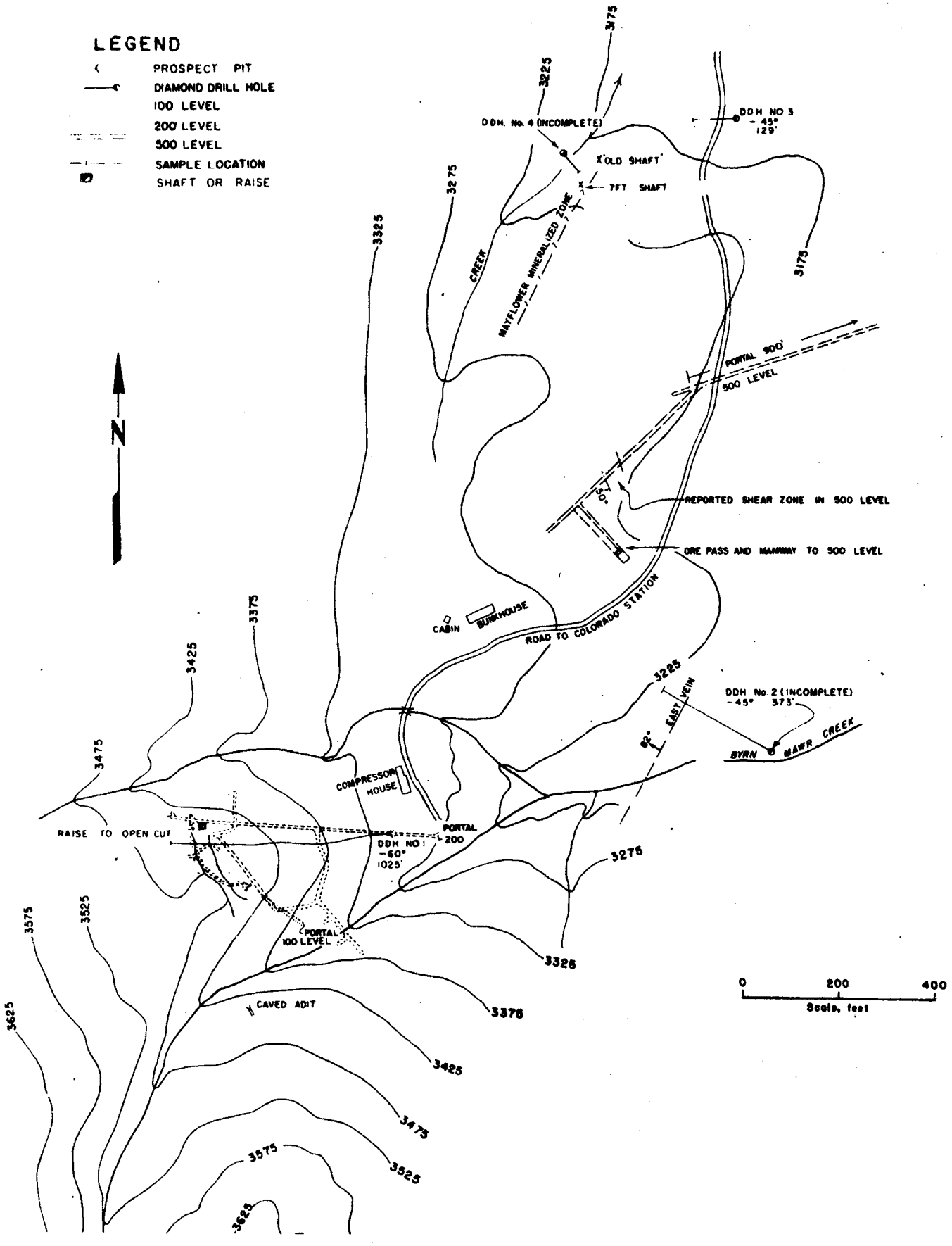
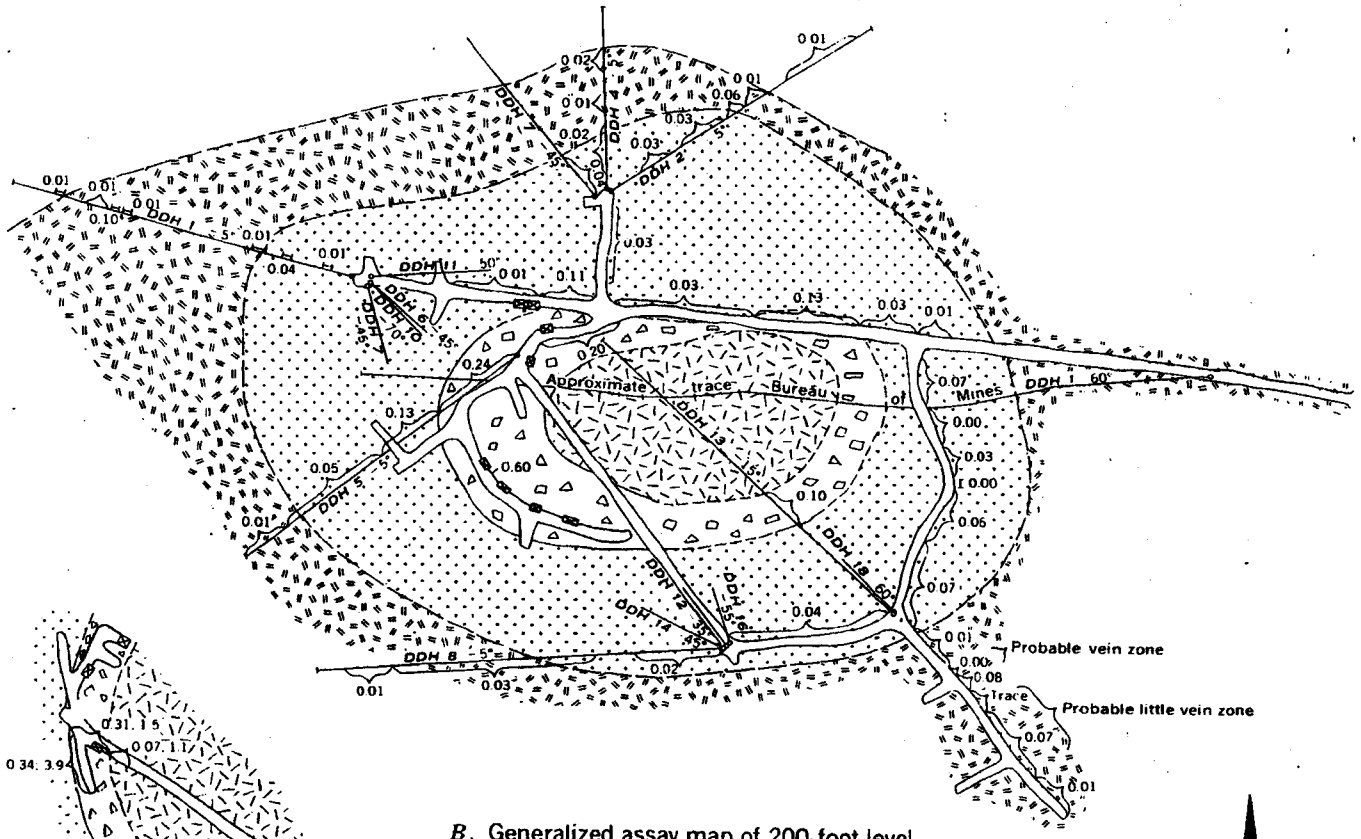
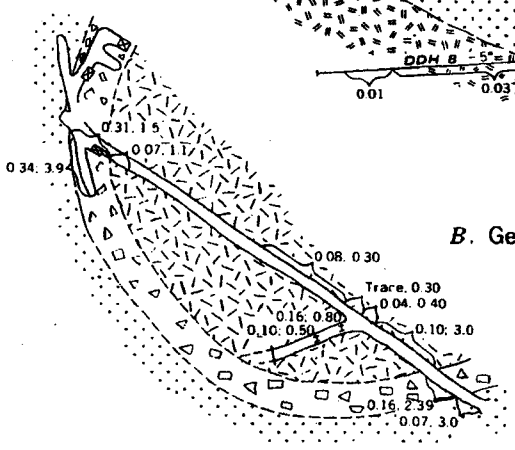


Figure E19. - Gold Zone Mine Area (After Hawley et al,1974)



B. Generalized assay map of 200-foot level



C. Generalized assay map of 100-foot level

LEGEND

ECONOMIC GEOLOGY

Siltstone, conglomerate, and argillite
Generally altered

Quartz diorite porphyry
Locally altered and mineralized

Porphyry
Pervasively altered and weakly mineralized

Breccia
Highly altered porphyry fragments cemented by sulfides and quartz

Shattered porphyry
Pervasively altered. Locally sulfide-bearing

Sharp contact of economic unit

Inferred or gradational contact of economic unit

Contact of porphyry in diamond-drill holes 1, 4, 5, and 7

Caved workings

Foot of raise

DDH 18 60°
Collar of moderate or high-angle diamond-drill hole, showing number and inclination

DDH 2 5°
Low-angle diamond-drill hole, showing number and inclination

Assay data used in compilation

0.04
Sample locality, showing gold in ounce per ton

0.10; 0.50
Sample locality, showing gold and silver, in order, in ounce per ton

0.01
Sampled interval, showing average concentration of gold in ounce per ton

0.08; 0.30
Sampled interval, showing average concentration of gold and silver, in order, in ounce per ton

Figure E19A. - Golden Zone Mine geology (After Hawlet et al, 1974)

NAME(S): Lindfors Prospect
Hilltop, Morning Glory
Lucky Strike, Peacock 1-4, Bob 1-5

Map Location No. E20
MAS No. 0020670157
Kardex No. 67-060

Deposit Type: Lode
Commodities: Gold, Copper, Zinc

LOCATION: Quadrangle: Healy A-6
SW 1/4 Sec: 3 T: 20S R: 11W Meridian: Fairbanks
Geographic: Adjacent to the Golden Zone Mine.
Elevation: 3950 ft.

PRODUCTION: None.

HISTORY:

1919 - This group was staked in 1913, and the developments consist of a series of cuts and strippings along both bluffs of Bryn Mawr Creek. Tuffs, marbles and dike rocks in different stages of alteration . . . all contain some disseminated sulfides. The mineralization was due to replacement of calcareous sediments by quartz and sulfides.", (52).
1933 - Mineralization of the Lindfors prospect is in stratified rock, and is obviously an extension of the Golden Zone." (262).
1968 - Steeply dipping veins strike NE and are parallel to biotite-quartz diorite porphyry dike.", (139).
1974 - Veins in shear zone, individual veins from .1 to 2 ft thick, contain to 14 ppm Au, plus Pb and Zn. Strongly anomalous Sb, trace Bi, Cd, Sn.", (138).

WORKINGS AND FACILITIES: Trenches and pits.

GEOLOGIC SETTING:

Quartz-diorite porphyry intruding argillite. Possible hornfels zone and skarn development. Disseminated gold, silver, copper, zinc in silicified argillite. It is unclear whether the anomalous metals originated during intrusion of the nearby quartz-diorite, or were deposited with the argillite.

BUREAU INVESTIGATION:

1987- BOM collected samples 981 through 992 from the Lindfors prospect. The highest Au values were 230 ppm and 180 ppm from an iron-stained 'redbed' (sample 984), and a brecciated argillite (sample 987), respectively. Table E-20 summarizes other significant Bureau sampling results.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 15, 21, 50, 51, 52, 61, 138, 139, 177, 262, 252

TABLE E20 - ANALYTICAL RESULTS - LINDFORS PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Ag	Au	Bi	Cu	Sb	Zn	
981	RC				1.0	6	0	114	0	50	Graywacke/argillite diss. cpy
982	G				9.0	32	0	114	10	58	Brecciated, iron-stained redbed
983	S				0.5	230	4	283	5	55	Brecciated, iron-stained redbed
984	G				0.5	4	0	122	0	72	Redbed
985	RC				0.5	4	0	24	0	7	Redbed limonite-stained
986	G				0.5	10	0	52	0	71	Redbed and brecciated argillite
987	G				0.5	180	2	1145	10	96	Brecciated argillite
988	G				0.5	18	0	99	0	48	Argillite disseminated py
989	G				0.5	-2	0	51	0	47	Mudstone
990	G				0.5	24	2	45	10	523	Limestone, redbed and argillite
991	G				0.5	6	0	160	0	48	Calcareous argillite
992	RC				0.5	-2	0	12	0	10	Silicified redbed brecciated

NAME(S): Copper King
Hector Group

Map Location No. E21
MAS No. 0020670153
Kardex No. 067-59, 067-65

Deposit Type: Lode
Commodities: Copper, Silver, Gold, Zinc

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 10 T: 20S R: 11W Meridian: Fairbanks
Elevation: 3700ft.

PRODUCTION: None.

WORKINGS AND FACILITIES: Trenches and prospect pits.

GEOLOGIC SETTING:

Quartz-diorite porphyry intruding argillite. Possible hornfels zone and Skarn development. Disseminated gold, silver, copper, zinc in silicified argillite. It is unclear whether the anomalous metals originated during intrusion of the nearby quartz-diorite, or were deposited with the argillite.

BUREAU INVESTIGATION:

1987 - BOM collected samples 965 through 980 from the Copper King prospect. Four of the fifteen samples were strongly anomalous in silver, gold, bismuth, copper, tungsten, and zinc. The highest values were from a sample of silicified argillite, sample 968, which contained 180 ppm Ag, 5.3 ppm gold, 8.3 % copper, 100 ppm tungsten, and 1,700 ppm zinc. Not all of the silicified argillite samples were anomalous, but no other rock types contained anomalous values of any economic minerals.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

This prospect deserves further evaluation including detailed microscopic study of the ores to determine controls on mineralization, and possibly drilling.

REFERENCES: 15, 21, 50, 51, 52, 61, 138, 139, 177, 262, 352,

TABLE E21 - ANALYTICAL RESULTS - COPPER KING PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Ag	As	Au	Bi	W	Zn	
965	RC				1.0	10	0.004	0	0	66	Gray limestone.
966	RC				0.5	0	0.004	0	0	78	Gray limestone.
967	S				0.5	5	0.004	0	0	19	Argillite, interbedded w/limestone.
968	S				180.0	0	5.260	88	100	1705	Silicified argillite, 8.3% Copper
969	RC				1.5	5	0.026	0	0	53	Silicified argillite, Trace chalcopyrite, pyrite.
970	RC				1.0	30	0.010	0	0	48	Silicified argillite.
971	G				0.5	20	ND	0	0	63	Silicified argillite.
972	RC				0.5	0	0.002	0	0	63	Siltstone, redbed.
973	RC				0.5	32	ND	0	0	60	Argillite, trace chalcopyrite, pyrite.
974	G				6.5	240	0.220	2	0	115	Silicified argillite, redbeds.
975	G				0.5	5	0.006	0	0	45	Silicified limestone, trace pyrite.
976	G				12.0	15	2.000	2	40	145	Silicified argillite, to 1% pyrite.
977	RC				0.5	15	0.016	0	0	44	Highly silicified argillite.

TABLE E21 (CONT.) - ANALYTICAL RESULTS - COPPER KING PROSPECT

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)						
			Au	Ag	Ag	As	Au	Bi	W	Zn	
978	RC				1.5	20	0.038	0	0	32	Alaskite, trace molybdenum, chalcopyrite, pyrite.
979	S				74.0	200	2.800	14	30	270	Silicified argillite, 10% sulfides.
980	G				1.0	5	0.082	0	0	38	Silicified argillite/chert.

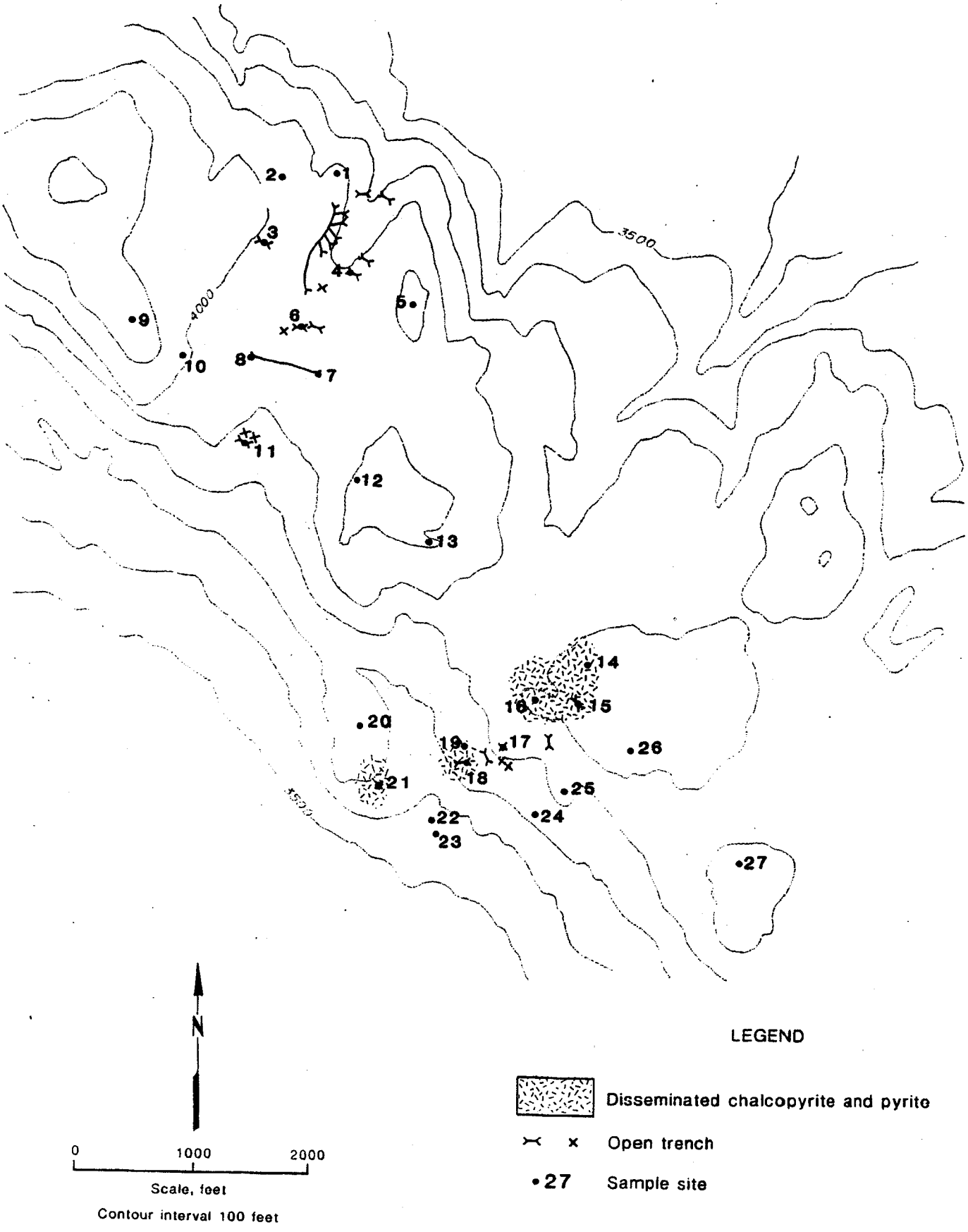


Figure E27. - Copper King Prospect, showing geology and sample sites (Topography after USGS Healy A6 quadrangle)

NAME(S): Blind Creek
Absolution

Map Location No. E22
MAS No. 0020670161
Kardex No. 67-274

Deposit Type: Vein
Commodities: Gold, Silver, Lead

LOCATION: Quadrangle: Healy
NE 1/4 Sec: 5 T: 20S R: 11W Meridian: Fairbanks
Geographic: One and a quarter miles west of the Golden Zone.
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY: 1977 - Staked by Park Cordasci.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Volcanic siltstone and conglomerate. A major northeast-trending strike-slip fault contains quartz veins and breccia zones over a 200 ft-wide area. The quartz is white, massive, sometimes opalescent, has coliform structure and contains pyrite.

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 15, 61, 136

NAME(S): Ohio Creek Tin Map Location No. E23

Deposit Type: Lode
Commodities: Tin, Tungsten, Zinc, Gold

LOCATION: Quadrangle: Healy A-6
T: 21S R: 12W Meridian: Fairbanks
Geographic: Along banks of Ohio Creek
Elevation: 2,000-6,000 ft.

PRODUCTION: None.

HISTORY:

1971 - Franklin Doyle located the Ohio Creek claims.
1979 - Chulitna Mining Co. performed drilling, trenching, and sampling.
1980 - removed ore for testing, set up ball mill.
1984-85 - Bedrock sampling and mapping carried out by BOM, (349).
1987 - BOM collected samples 816 and 957, (177).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Campsite intrusion with a core of moderately coarse-grained biotite granite and an outer zone of finer grained levcocratic muscovite granite. Tin mineralization, associated with silver, base-metal, and tungsten valves, occurs within the muscovite granite as cassiterite within both quartz-muscovite greisen and arsenopyrite veins (349).

BUREAU INVESTIGATION:

1984-85 - Bedrock sampling and mapping carried out by BOM (349).
1987 - BOM collected samples 816 and 957 plus two bulk samples for beneficiation studies. Metallurgical testing of the bulk samples showed recoveries of 27 % and 64% tin in the cleaner table concentrates: respective grades of concentrates were 39.4% and 72.2% tin.

RESOURCE ESTIMATE:

Inferred resources of 1,250,000 lb (625 tons) of tin metal contained in greisen-bordered arsenopyrite veins (349).

MINERAL DEVELOPMENT POTENTIAL:

Moderate mineral development potential, but the occurrence is within Denali National Park boundaries and is therefore closed to mineral exploration and development.

RECOMMENDATIONS: None.

REFERENCES: 15, 135, 137, 138, 140, 177, 262, 349

REFERENCES: 15, 135, 137, 138, 140, 177, 262, 349

NAME(S): Silver Kitty
Joanne Lode

Map Location No. E24
MAS No. 0020670149
Kardex No. 67-194

Deposit Type: Lode
Commodities: Copper, Chromium, Silver(?)

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 23 T: 20S R: 12W Meridian: Fairbanks
Geographic: At the head of Christy Creek.
Elevation: 5300 ft.

PRODUCTION: None.

HISTORY: 1973-83 - 63 claims staked by Myron Denson.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Country rock is basalt and limestone intruded by a small diorite body (140). The BOM noted sulfides (stibmite, chalcopyrite, pyrrhotite) in chart (15),(16),(177).

BUREAU INVESTIGATION:

1987 - Samples from the Silver Kitty contained up to 0.41 oz gold/st and 9300 ppm copper (sample 734, map no. 240 (177)).
1988 - Sample 2318 (map no. 262, (16), a sample of a biotite-quartz diorite float material, contained 0.11 oz gold/ton.
1989 - Collected samples 2877-2881 from rubblecrop. A chert sample (2879) contained 3.7 ppm gold, 13.9% antimony, 65 ppm cadmium, and 1.1% zinc. Another sample (2878) contained 56 ppm silver, 3.5 ppm gold, 264 ppm cadmium, 13.9% antimony, and 0.14% zinc. Anomalous samples contain visible disseminated po, chalcopyrite, stibmite (15).

RESOURCE ESTIMATE:

The high cadmium and zinc values suggest a possible vein deposit of these elements, associated with silver and gold. Rubble samples indicate that the postulated vein(s) are 4- to 6 in. wide.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Further mapping and sampling are required to identify and delineate the vein(s).

REFERENCES: 15, 16, 45, 177

TABLE E24 - ANALYTICAL RESULTS - SILVER KITTY

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cu	Pb	Sb	Zn	
730	S				0.5	15	0.450	636	ND	ND	18	Hornfels 2-3% pyrite
731	S				0.5	475	0.345	766	ND	ND	25	Hornfels 5-10% pyrite
732	S				1	40	1.000	3960	ND	15	26	Hornfels 30-40% pyrite
733	S				1	20	1.500	1485	ND	5	12	Sulfide-rich zone in hornfels
734	S		0.412		6	5	NA	9300	ND	ND	126	Limestone/basalt contact with pyrite, chalcopyrite
735	CC				4.5	ND	1.250	9300	ND	5	127	Limestone/basalt contact with pyrite, chalcopyrite
736	RC		0.340		8	ND	NA	1.84%	ND	5	204	Limestone/basalt contact with pyrite, chalcopyrite
1985	S				ND	20	ND	94	4	ND	31	
1986	S				ND	5	ND	10	2	ND	46	
2318	S		0.110		4.5	5170	3.925	0.01%	144	15	28	

TABLE E24 (CONT.) - ANALYTICAL RESULTS - SILVER KITTY

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cu	Pb	Sb	Zn	
2877	RC		.025	0.01	ND	30	0.740	58	ND	10	166	Chert, pyrite and chalcopyrite
2878	G				56	3290	3.300	449	7900	3.57%	1.08%	Chert high grade stibmite
2879	RC				9.4	>10000	3.700	106	1290	13.9%	1464	Antimony, chalcopyrite, po in chert
2880	RC				0.6	30	1.720	1673	10	90	84	Massive po, chalcopyrite in chert
2881	RC				ND	30	0.230	419	6	105	50	Massive po chalcopyrite in chert

NAME(S): Long Creek

Map Location No. E25
MAS No. 020670160
Kardex No. 67-130

Deposit Type: Lode
Commodities: Copper, Gold, Silver, Tin

LOCATION: Quadrangle: Healy A-6
NE 1/4 Sec: 16 T: 20S R:11W Meridian: Fairbanks
Geographic: Along a knoll on west side of Long Creek.
Elevation: 3800 ft.

PRODUCTION: None.

HISTORY:

1958 - Staked by Gladys Dunkle.
1968 - Examined by Hawley.

WORKINGS AND FACILITIES: Shallow trenches and prospect pits.

GEOLOGIC SETTING:

Hornfelsed argillite intruded by a small plug and dikes of quartz porphyry. Possibly some skarn formation, as indicated by epidote, pyrite, and high silica near contact of argillite and porphyry intrusions.

BUREAU INVESTIGATION:

1987 - Collected samples 786-787; 801-810; 851-853. Sample 853 contained 16 oz silver/ton and 25.6% arsenic, along with 6 ppm gold (Table E25).
1989 - Collected samples 2862-2864, 3053 Serpentinite and ultramafic rock, with interbedded chert and red chert conglomerate. Noted weak sulfur smell in confined gullies, but did not see any sulfur on the outcrops.

RESOURCE ESTIMATE: Samples contain significant silver and gold values.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for silver and gold.

RECOMMENDATIONS:

Detailed mapping, sampling, and (possibly) drilling, may define an economic poly-metallic resource here.

REFERENCES: 15, 16, 137, 140, 177, 262

TABLE E25 - ANALYTICAL RESULTS - LONG CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Bi	Cu	Sn	Zn	
786	RC				14	3	290	ND	124	2	117	
787	G				40	0.5	0	6	100	1	66	
801	S				380	77	1.61%	8	856	7	482	Silicified argillite w/arsenopyrite, chalcopyrite, pyrite, galena.
802	G				5	2	145	4	148	1	73	Green argillite, bleached.
803	G				50	5.5	1880	8	243	1	125	Green argillite.
804	S				3300	17	27.3%	140	1375	5	808	Fissure vein w/arsenopyrite, pyrite, galena, chalcopyrite, sphalerite.
805	G				15	1.5	1165	ND	81	1	95	Greenish-gray argillite.
806	S				ND	1.5	460	ND	42	1	110	Argillite breccia, less than 1% pyrite.
807	G				ND	2	390	ND	66	1	218	Green argillite.
808	G				25	3	1080	12	92	4	222	Green argillite.
809	G				160	4	2090	12	170	1	122	Argillite.

TABLE E25 (CONT.) - ANALYTICAL RESULTS - LONG CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Bi	Cu	Sn	Zn	
810	S				1700	40.5	4760	154	754	3	124	Quartz vein with sulfides.
851	CC			11.4	4240		26%	230	2700	74	4090	Quartz vein with sulfides.
852	RC				20	5.5	1410	6	176	1	138	Argillite.
853	G			16	5950		25.6%	350	4230	100	1230	Quartz-sulfide vein.
2862					ND	ND	5	ND	2	NA	32	Serpentinite.
2863					145	ND	ND	ND	1	NA	32	Serpentinite, disseminated sulfides.
2864					ND	ND	5	ND	1	NA	28	Ultramafic.
3053					ND	ND	ND	ND	385	NA	38	Serpentinite.

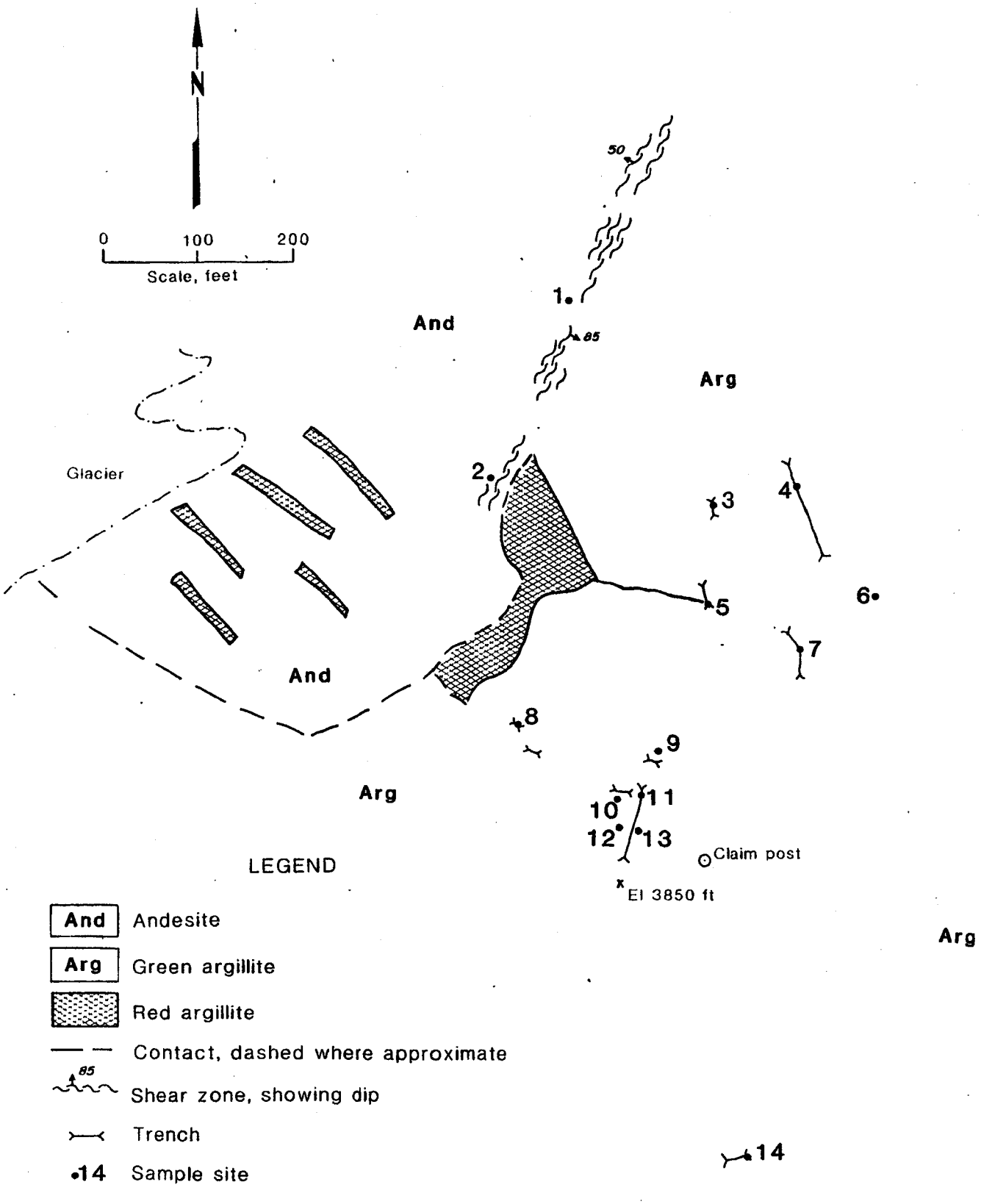


Figure E25. - Long Creek Prospect, showing geology and sample sites

NAME(S): Alaska Jupiter 1-21
Lower Long Creek

Map Location No. E26
MAS No. 0020670148
Kardex No. 67-130

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
S 1/2 Sec: 16 T: 20S R: 11W Meridian: Fairbanks
Geographic: On a ridge between Long and Copeland Creek
Elevation: 3600 ft

PRODUCTION: None.

HISTORY: 1958, 1960, 1961 - Gladys Dunkle

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Crystal tuff, argillite, chert, graywacke, and limestone (Late to Early Jurassic, possibly to Late Triassic)-Moderately deep to deep marine sequence, tightly folded and internally faulted, at least several thousand meters thick. Four-fifths of the sequence, tightly folded and internally faulted, at least several thousand meters thick. Four-fifths of the sequence is comprised of massive, cliff-forming crystal tuff, while the remaining rocks form only a narrow outcrop belt along the western margin of the unit. The contact between these two groups of rocks may be tectonic. The crystal tuff is light-to dark gray, locally with a greenish tint, and weathers to various shades of brown. It is massive with obscure rhythmic laminations and thin bedding (69).

BUREAU INVESTIGATION:

1987- Collected argillite sample 727. Also collected serpentinite samples 728-729 from ridge. Assume this is part of the Alaska Jupiter, also (Table E26).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: (15), (64), (177)

TABLE E26 - ANALYTICAL RESULTS - ALASKA JUPITER

Sample no.	Type	Sample Length (feet)	Analysis							Description
			Fire Assay oz/st		Elements in ppm (unless otherwise stated)					
			Au	Ag	Ag	Au	Cr	Cu	Ni	
727	S				0.5	ND	111	20	19	Argillite
728	G				0.5	ND	657	18	1694	Serpentine
729	G				0.5	ND	739	13	1768	Serpentine

NAME(S): Middle Fork Chulitna
Middle Fork Discovery #1

Map Location No. E27

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
NE 1/4 Sec: 32 A-6 T: 20S R: 10W Meridian: Fairbanks
Geographic: Middle Fork Chulitna River above Antimony Creek.
Elevation: 1,800 ft.

PRODUCTION: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

River flows through Quartuary glacial and fluvial gravel deposits.

BUREAU INVESTIGATION:

1987 - Collected four placer samples (nos. 1026-1029). All placer samples had only trace amounts of placer gold.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 15, 177

NAME(S): Copper Kitty

Map Location No. E28
MAS No. 020670151
Kardex No. 67-193

Deposit Type: Lode
Commodities: Chromium, Copper, Silver

LOCATION: Quadrangle: Healy A-6
1/4 Sec: 31 T: 20S R: 11W Meridian: Fairbanks
Elevation: 2500 ft.

PRODUCTION: None.

HISTORY:

1973 - Myron Denson, 63 claims.
1981 - Annual labor included stream sediment sampling and trenching.
1982 - State reports 125 claims on the Copper Kitty.
1985 - Assessment work performed by Sunrise Mining, Inc.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Crystal tuff, argillite, chert, graywacke, and limestone (Late to Early Jurassic, possibly to Late Triassic)-Moderately deep to deep marine sequence, tightly folded and internally faulted, at least several thousand meters thick. Four-fifths of the sequence is comprised of massive, cliff-forming crystal tuff, while the remaining rocks form only a narrow outcrop belt along the western margin of the unit. The contact between these two groups of rocks may be tectonic. The crystal tuff is light-to dark gray, locally with a greenish tint, and weathers to various shades of brown. It is massive with obscure rhythmic laminations and thin bedding (64).
Unknown.

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 15, 45, 64

NAME(S): Christy Creek Chromate

Map Location No. E29
MAS No. 0020670150

Deposit Type: Lode.
Commodities: Chrome, Nickel, Platinum

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 01 T: 21S R: 12W Meridian: Fairbanks
Geographic: Headwaters of Christy Creek.
Elevation: 400 ft.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Mafic to ultramafic stocks, sills and dikes, undivided-Plutonic rocks of varying mafic to ultramafic composition occurring in the Chulitna area, north of the Denali fault. In the Chulitna area they occur in a northeast trending belt that includes serpentinite, as well as gabbro, dunite, and clinopyroxenite (64). Locally talus blocks of serpentinite contain chromate. Serpentinite locally altered to quartz-carbonate rock.

BUREAU INVESTIGATION:

Albany Research Center conducted beneficiation studies of the chromate; they found that liberation is reasonably complete at 65 mesh. A very high purity, laboratory-produced chromate was produced . . . the chromate at a grade of 47.4% $Cr_2 O_3$ and a chrome:iron ratio of 2.5:1 is high chromium chromate.

RESOURCE ESTIMATE:

Not made, but the discontinuous nature of this sort of chromate occurrence will probably render the prospect sub-economic for the foreseeable future.

MINERAL DEVELOPMENT POTENTIAL: Low potential for chrome.

RECOMMENDATIONS: None.

REFERENCES: 15, 61, 64, 117, 138, 140, 177

TABLE E29 - ANALYTICAL RESULTS - CHRISTY CREEK CHROMATE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb		Elements in ppm (unless otherwise indicated)				
			Au	Ag	Pt	Pd	Cr	Ni	Au	Cu	
793	RC				ND	ND	1080	2045	ND	26	Serpentinite with chromate.
794	G				5	ND	946	2139	ND	32	Serpentinite float.
795	G				5	ND	609	2141	ND	15	Serpentinite float.
796	G				ND	ND	1160	2007	ND	14	Serpentinite.
883	S				ND	4	869	1460	ND	62	Silica-carbonate altered serpentinite.
884	S				ND	6	146	25	ND	204	Gabbro.
885	S				ND	4	9660	1348	ND	22	Altered serpentinite, 20% chromate.
886	S				ND	ND	51%	445	ND	14	Massive chromate in talus.

NAME(S): Ready Cash
Tip Top, Skyscraper,
Glacier Queen, Ohio Creek,
Denson 1-8, Canyon Creek

Map Location No. E30
MAS No. 020670141
Kardex No. 67-222, 179, 183, 184, 45, 299
Mineral Survey No. 1528

Deposit Type: Lode
Commodities: Tin, Gold, Silver, Lead, Copper

LOCATION: Quadrangle: Healy A-6
Sec: 8, 17, 21, 28 T: 20S R: 12W Meridian: Fairbanks
Geographic: 1 mile down stream along Ohio Creek from Denali: N.P. boundary.
Elevation: 2900 ft.

PRODUCTION: None recorded.

HISTORY:

1915 - Otto Tangle, J.P. Frisley, William Murray, J.H. McCallie, Vern Hughes; 9 claims.
1918 - F.L. Thurmond reported 183 oz silver/ton from high-graded galena, and 5-120 oz silver/ton from sulfide-rich samples.
1931 - Patent granted to J.H. McCallie: nine claims.
1971 - Joe Denson, Ohio Creek Mining Corp., Chulitna Mining Co.; 29 claims.
1971-83 - Lee P. Glad, Ohio Creek Mining Co., C. Hudson; 143 claims.
1978-82 - Joe Denson, Lee Glad; 8 claims.

WORKINGS AND FACILITIES:

Two adits exist on the property. One adit is 160 ft. long and cuts numerous zones of mineralization. The other adit crosscuts back 56 ft. before intersecting mineralization. Approximately 20 ft. of drifting occurred along the mineralized trend.

GEOLOGIC SETTING:

Basalt interlaced with limestone, and minor hornsfelsed argillite. Disseminated sulfides and quartz veins carrying chalcopyrite, arsenopyrite, pyrite, and tetrahydrate. Analyses indicate the presence of considerable tin. Some veins extend continuously for over ¼ mile, and exhibit semi-massive to massive sulfide mineralization consisting of chalcopyrite, galeum, and arsenopyrite.

BUREAU INVESTIGATION:

1984 - Brief visit. No clearly defined veins observed. Only a few samples showed slightly elevated values of tin.
1986 - Seven bulk samples from the Coal Creek, Ohio Creek, and Canyon Creek areas were analyzed by BOM Albany Research Center. The tin head analysis from Canyon and Ohio Creeks range from 0.17% to 0.45%. Average tin values 0.35%. Copper head analyses ranged from 0.40% to 0.63%.
1987 - One select sample from Ready Cash contained 0.39% tin.
1988 - Mapped and sampled adit #1. Adit approximately 170 ft long. Of 30 samples collected here in 1988, 4 high-graded samples of a quartz vein contained greater than 1000 ppm tin, and most contained strongly anomalous silver, gold, arsenic, lead and antimony.

contained greater than 1000 ppm tin, and most contained strongly anomalous silver, gold, arsenic, lead and antimony.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential.

RECOMMENDATIONS:

Electromagnetic geophysical methods could be employed to further delineate the sulfide veins. There are several easily identified drill targets that could also be investigated. Outcrop of sulfide veins occurred throughout the property, which should facilitate further explanation.

REFERENCES: 15, 16, 21, 52, 61, 70, 80, 137, 138, 177, 262, 271, 331, 350

TABLE E30 - ANALYTICAL RESULTS - READY CASH

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)								
			Au	Ag	Ag	As	Au	Cu	Pb	Sb	Sn	Zn	
2134	RC				35.0	>10000	0.165	1308	20	140	38	72	Quartz vein
2135	S				1.0	375	ND	790	ND	5	4	92	Quartz vein with arsenopyrite
2136	RC			0.09	31.6	>10000	0.062 oz/ton	1475	42	60	20	52	Iron-stained quartz vein
2137	G			0.25	8.0	1550	0.740	6094	ND	5	7	250	Quartz vein
2138	CC				65.0	>10000	0.140	1115	3662	250	670	529	Quartz vein
2139	RC			0.01	1.0	455	0.010	107	26	ND	11	55	Iron-stained dike
2140	CC			0.77	28.0	270	0.800	7915	14	5	11	296	Dike with sulfides
2141	RC			7.29		9905	0.240	8484	3232	35	640	2110	Dike and footwall
2142	RC			5.86		>10000	0.075	1362	>10000	325	>1000	2417	Quartz vein
2143	S			54.90		>10000	0.135	2.6%	>10000	475	>1000	9.19%	Quartz vein high grade
2144	CR			0.83		>10000	0.065	1209	1046	270	>1000	734	Quartz vein high grade
2145	RC			5.54		>10000	0.130	2826	8794	225	310	6240	Quartz vein high grade
2269	CC			1.87	59.0	>10000	0.028	2180	602	65	680	2818	Quartz breccia sulfide vein

TABLE E30 (CONT.) - ANALYTICAL RESULTS - READY CASH

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)								
			Au	Ag	Ag	As	Au	Cu	Pb	Sb	Sn	Zn	
2270	CC			3.50		>10000	0.016	0.14%	6920	25	300	881	Quartz breccia sulfide vein
2271					16.0	465	0.008	0.04%	764	ND	160	639	Quartz sulfide vein
2272	P				12.0	2915	0.050	350	760	5	NA	219	
2280	CC		.012	0.47	6.5	6170	0.410	0.1%	128	10	300	431	Vein with sulfides
2281				0.07	3.0	135	0.006	0.03%	56	ND	14	552	Vein with sulfides
2282			.032	0.08	2.5	1260	ND	0.02%	62	10	57	289	Main vein in under-ground workings
2283	CC		.014	1.14	39.5	>10000	ND	0.09%	1018	20	87	450	Main vein in under-ground workings
2284	CC				3.0	30	0.008	402	24	5	5	134	Shear zone
2285	CC				13.5	25	0.002	427	1420	ND	2	947	Shear zone
2286	CC				2.0	10	0.018	458	4	ND	3	140	Limonite stained metabasalt

TABLE E30 (CONT.) - ANALYTICAL RESULTS - READY CASH

Sample no.	Type	Sample Length (feet)	Analysis										Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)								
			Au	Ag	Ag	As	Au	Cu	Pb	Sb	Sn	Zn	
2287	RC				1.0	20	0.010	425	2	ND	ND	146	Limonite stained metabasalt
2288	CC				2.0	40	0.056	297	2	15	2	109	Shear zone with quartz stringers
2289	CC		.002	1.75	63.0	>10000	0.060	0.15%	3550	20	500	3514	Breccia with minor sulfides
2290	S		0.02	0.4	26	>10000	0.660	0.13%	166	ND	140	378	High grade ore
2311	G				1.5	ND	0.010	227	2	ND	ND	136	Ultra mafic
2312	CR				0.5	10	ND	51	4	ND	ND	42	Rhyolite dike
2313	S				3.5	15	0.110	0.89%	2	ND	3	362	Carbonate
2314	S				367.5	>10000	0.650	1820	>10000	1215	>1000	1425	Breccia with massive sulfides

NAME(S): McCallie Glacier Lode Map Location No. E31

Deposit Type: Lode
Commodities: Gold, Silver, Lead, Zinc

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 13 T: 21S R: 13W Meridian: Fairbanks
Geographic: Above the head of Christy Creek.
Elevation: 5400 ft.

PRODUCTION: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Silicified meta-volcanic rocks containing disseminated sulfide .

BUREAU INVESTIGATION:

Collected grab sample of float from McCallie Glacier. Sample no. 960 contained 0.6 oz gold/ton, 121 ppm oz/ton silver and 4.03% antimony.
Collected samples 1949-51, 2215-2230, 2892-2895, 2994-2997. Sample no. 2219 contained 0.8 oz gold/ton, 3.9 oz silver/ton, 1.25 % lead and 1.44% antimony.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Moderate potential for gold and silver.

RECOMMENDATIONS: None.

REFERENCES: 16, 177

TABLE E31 - ANALYTICAL RESULTS - McCALLIE GLACIER LODE OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Sb	Zn	
960	S		0.590			121	0.55%	>10000	4.03%	2.65	
964	P				1890		1790	26	10	122	
1949	S				115	2.5	4704	ND	ND	139	Hornfels(?)
1950	RC				10	0.5	280	6	ND	91	Metabasalt 2-5% po/py
1951	S		0.028			39.5	212	2246	1890	4991	Metabasalt 1-2% po/py
2215	G				5	0.5	355	4	ND	70	Metabasalt visible sulfides
2216	G				10	0.5	417	ND	5	92	Metabasalt
2217	S				50	1.0	93	ND	5	14	Metaquartz-pebble conglomerate
2218	S		0.286	1.58			150	3744	2620	2504	High grade sulfide-rich
2219	S		0.818	3.87			133	1.25%	1.44%	3512	Hydrothermal alteration in hornfels(?)
2220	G				350	4.8	304	94	130	365	Hornfels
2221	S		0.124			4.41	211	1.79%	1.64%	1.20%	Skarn? marble with sulfides
2222	RC				15	6.5	1033	6	5	234	Quartz breccia vein
2223	S				640	11.5	602	332	95	1532	Breccia vein 1-2% sulfides
2224	S		0.410	1.84			228	0.17%	2.37%	0.81%	High graded massive sulfide veins
2225	S				540	9.0	67	240	780	3034	Metaquartz pebble conglomerate
2226	G				70	2.0	55	72	80	269	Metabasalt 2% sulfides

TABLE E31 (CONT.) - ANALYTICAL RESULTS - McCALLIE GLACIER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Sb	Zn	
2227	G				15	0.5	23	8	5	31	Hornfels breccia
2228	S				ND	0.5	ND	2	10	20	Metasandstone
2229	G				ND	0.5	9	36	ND	12	Metasandstone
2230	G				ND	0.5	ND	2	ND	ND	
2892	CR				32	0.2	125	2	5	54	Limonitic stain sulfides
2893	CR				4	0.2	33	2	5	48	Pyrite on fracture surfaces
2894	CR				4	0.2	30	2	5	48	Silicified graywacke
2895	CR				2	0.2	14	4	5	64	Quartz pebble conglomerate
2994	G				34	0.6	443	2	5	88	Limonitic graywacke
2995	CR				2	0.2	31	6	5	76	Diorite dike
2996	G				20	0.2	293	2	5	86	5% py/po in diorite
2997	RC				2950	8.2	22	210	210	62	Quartz vein with sulfides

NAME(S): McCallie Creek Placer

Map Location No. E32
MAS No. 020670139
Kardex No. 190

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
SW 1/4 Sec: 10 T: 21S R: 12W Meridian: Fairbanks
Geographic: On McCallie Creek, one mile above junction with Ohio Creek.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY:

1975- Claims staked by A.J. Hanek and G.W. Wheeler.
1980-1986- Assessment work done. Total of 60 claims.

WORKINGS AND FACILITIES: Trenches and geochem surveys.

GEOLOGIC SETTING: Chert, silicified conglomerate, mudstone, sandstone.

BUREAU INVESTIGATION:

Collected placer sample midway between Shotgun Creek and McCallie Creek. Observed color anomalies on ridge between 2 glaciers above McCallie Creek, above claim block. Collected one placer sample on creek (Table E 31, no.964) which contained 1890 ppb gold. Observed scattered sulfide-rich float, collected placer sample 2982 (1500 ppb gold) from a moraine; got 3 fine and 20 v. fine grains of gold.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: None.

NAME(S): Metals Claim Group
McCallie Creek Mining Co. 1-22

Map Location No. E33
MAS No. 0020670139

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
Sec: 6 T: 21S R: 12W Meridian: Fairbanks
Geographic: On ridge above McCallie Creek.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY:

1975- Claims staked by A.J. Hanek and G.W. Wheeler
1980-1986- Assessment work done. Total of 60 claims.

WORKINGS AND FACILITIES: Trenches and geochem surveys.

GEOLOGIC SETTING: Chert, silicified conglomerate, mudstone, sandstone.

BUREAU INVESTIGATION: No mineralization observed in claim block.

RESOURCE ESTIMATE: Unevaluated.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 339

NAME(S): Partin Creek Lode

Map Location No. E34
MAS No. 0020670003
Kardex No. 67-168

Deposit Type: Lode
Commodities: Gold, Silver, Copper

LOCATION: Quadrangle: Healy A-6
NW 1/4 Sec: 25 T: 21S R: 13W Meridian: Fairbanks
Geographic: Ridge Northeast of Partin Creek
Elevation: 5500 ft.

PRODUCTION: None.

HISTORY:

1917 - Area probably discovered by Albert Partin.
1970-75 - C.C. Hawley, Inspiration Development.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Interlayered basalt and limestone faulted against redbeds, argillite and limestone to the east. Possibly a skarn.

BUREAU INVESTIGATION:

Samples were collected from fine-grained metabasalts containing disseminated pyrite, arsenopyrite and trace chalcopyrite (Table E 34). One sulfide bearing zone was up to 24 ft. wide. Locally arsenopyrite veins up to 0.5 in. wide and stained green by scorodite cut the metabasalt. Select samples contained up to 1.6 oz/ton gold and 22 oz/ton silver (no. 1010).

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential for gold and silver.

RECOMMENDATIONS: Detailed sampling and geologic mapping to outline extent of mineralization.

REFERENCES: 138, 339

TABLE E34 - ANALYTICAL RESULTS - PARTIN CREEK LODE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sb	Zn	
993	S				40	12	565	55	170	135	237	Argillite, 1" thick quartz vein w/arsenopyrite.
994	G				960	0.5	14.6%	1215	10	15	38	Argillite, trace chalcopyrite.
995	G				5	0.5	240	80	14	15	41	Argillite.
996	CC	1			3800	2	5110	90	16	50	120	Pyrite veinlets in argillite.
997	S				780	9.5	7200	3720	12	330	330	Chalcopyrite & pyrite in limestone.
998	G				90	9.5	170	4060	12	30	58	Argillite near intrusive contact.
999	S				5050	64	22.5%	1665	180	1195	90	Vein quartz w/arseno pyrite near intrusive.
1000	S				4450	3	12%	40	256	220	24	Vein quartz, up to 10% arsenopyrite.
1001	SC				3400	1.5	1.74%	380	28	15	34	Disseminated arsenopyrite & pyrite in quartz vein.
1002	G				60	1	495	218	32	5	38	Argillite, moderate iron staining.

TABLE E34 (CONT.) - ANALYTICAL RESULTS - PARTIN CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sb	Zn	
1003	CC	3			825	0.5	1055	1730	8	5	50	Argillite, moderate iron staining.
1004	S				1380	2	5120	664	24	5	38	Calcareous argillite in shear zone.
1005	RC				835	29	15.2%	6220	2	220	162	Silicified limestone from prospect pit.
1006	S				135	2.5	10000	1675	12	15	78	Skarn along diorite/ limestone contact.
1007	S				565	8	530	1.6%	4	10	114	Massive pyrite.
1008	S		0.46			2	31.1%	166	44	165	4	Quartz vein in argillite.
1009	S		0.876			220	27.5%	1.44%	144	2600	226	Arsenopyrite in quartz vein.
1010	S		1.602			500	21.8%	1.6%	660	8070	996	Arsenopyrite in quartz vein.
1011	S		0.816			150	24.9%	1.72%	616	5560	382	Iron-stained quartz vein.
1012	S		0.254			0.91	29.4%	1520	5080	1610	74	Arsenopyrite vein.
1958	RC				10	0.5	5	213	2	-5	83	Metabasalt.
1959	RC				2	1.5	390	1209	4	-5	84	Metabasalt.
1960	RC				2	0.5	155	250	2	-5	119	Metabasalt.

TABLE E34 (CONT.) - ANALYTICAL RESULTS - PARTIN CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sb	Zn	
1961	CC				16	0.5	1075	0.05%	2	-5	72	Trace chalcopyrite, pyrite in metabasalt.
1962	S				550	2	10000+	1091	2	100	36	1" thick arsenopyrite vein
1963	RC				2	1	4190	0.03%	2	-5	79	1-2% polonium in metabasalt.
1964	CC				1600	-0.5	10000+	0.04%	2	-5	45	Disseminated arsenopyrite, polonium in metabasalt.
1965	CC				410	-0.5	1900	0.04%	-8	-5	75	Metabasalt, locally massive arsenopyrite/polonium /chalco-pyrite
1966	S				5300	0.5	10000+	879	6	25	53	Arsenopyrite veinlets.
2231	S		0.002			12	2145	0.05%	122	35	199	2" arsenopyrite/pyrite/chalco-pyrite vein
2232	G		-0.001			0.2	270	53	18	15	86	Arkosics and stone.
2233	G		-0.001			0.5	130	66	10	20	44	Mudstone.
2234	S		0.038			83	10000	0.08%	628	560	425	Quartz vein with up to 20% sulfides.

TABLE E34 (CONT.) - ANALYTICAL RESULTS - PARTIN CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sb	Zn	
2235	G		-0.001			0.5	95	1396	8	5	65	Pyritiferous chert.
2236	S		0.32			21.5	10000+	505	188	830	35	Arsenopyrite-quartz vein.
2237	CR		0.012			0.5	1710	374	18	-5	40	Pyrite in skarn.
2238	G				26	0.5	160	555	6	-5	146	Metabasalt with 2% pyrite.
2239	G				4	0.5	105	5	18	-5	102	Bleached metabasalt.
2240	G				1	0.5	95	207	-8	-5	120	Calcareous metabasalt.
2241	S		0.786			147	95	1.44%	144	380	327	50% sulfides in quartz vein.
2242	G		0.004			0.5	10000+	392	-8	5	107	Black metabasalt.
2243	G				8	0.5	340	50	-8	10	38	Altered limestone.
2244	G				120	0.5	555	556	4	30	116	Metabasalt.
2245	S		1.35			171	>10000	8504	96	3865	302	Massive arsenopyrite.
2246	G		0.008			1.5	1655	92	16	25	16	Siliceous limestone.
2247	G		0.004			0.5	520	32	2	5	14	Calcareous conglomerate.
2248	G		0.006			0.5	285	42	-8	5	92	Metabasalt, 1-2% pyrite.

TABLE E34 (CONT.) - ANALYTICAL RESULTS - PARTIN CREEK

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Pb	Sb	Zn	
2249	G					0.5	95	7	20	-5	83	Chert.
2250	S		0.092			150.5	>10000	7763	196	1745	173	Quartz vein, 20% arsenopyrite.

NAME(S): Shotgun Creek Lode Map Location No. E35

Deposit Type: Lode
Commodities: Chromium, Nickel, Platinum, Palladium

LOCATION: Quadrangle: Healy A-6
SW 1/4 Sec: 27 T: 21S R: 12W Meridian: Fairbanks
Geographic: Near headwaters of Northern tributary to Shotgun Creek.
Elevation: 5000 ft.

PRODUCTION: None.

HISTORY: Unknown.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Serpentinite, basalt, and gabbro make up a proposed ophiolitic terrane (168).

BUREAU INVESTIGATION:

Samples were collected mainly from the serpentinized rocks, (Table 35). These contained up to 20 ppb platinum (no. 2081) and 2968 ppb chromium (no. 2118).

RESOURCE ESTIMATE: Low chrome, nickel, platinum and palladium values.

MINERAL DEVELOPMENT POTENTIAL:

Low mineral development potential for chromium and nickel.

RECOMMENDATIONS: None.

REFERENCES: 16, 61, 140, 168, 177

TABLE E35 - ANALYTICAL RESULTS - SHOTGUN CREEK LODE

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb			Elements in ppm (unless otherwise indicated)				
			Au	Ag	Au	Pt	Pd	Ag	Cr	Cu	Ni	
928	S				10	ND	6	1.5	69	2750	34	Serpentinite, malachite
929	CR				ND	ND	6	0.5	176	45	97	Serpentinized basalt
930	CR				ND	ND	12	1.0	967	34	2118	Serpentinite
1955	RC				ND	ND	4	ND	1945	10	818	Silicified, calcareous rock, malachite
1956	S				ND	10	2	ND	245	74	24	Gossoneous metavolcanic(?)
1957	RC				ND	NA	NA	ND	529	25	370	Silicified calcareous rock, fuchsite(?)
2069	CR				ND	ND	ND	0.5	574	28	671	Carbonate-cemented breccia
2070	CR				ND	10	ND	0.5	858	16	2178	Serpentinite
2080	S				ND	ND	4	0.5	579	759	270	Carbolate breccia
2081	G				ND	20	4	0.5	748	19	1370	Serpentinite
2082	S				ND	ND	4	0.5	605	31	1219	Serpentinite with quartz veinlets
2115	RC				ND	ND	4	0.5	1007	35	746	Quartz carbonate rock
2116	RC				ND	10	8	0.5	1616	17	632	Quartz carbonate rock, fuchsite(?)
2117	G				15	10	ND	4.5	1225	4.79%	1684	Serpentinite
2118	RC				ND	5	4	0.5	2968	961	1549	Quartz carbonate rock
2119	RC				5	ND	16	0.5	1404	49	974	Serpentinite
2120	G				ND	ND	ND	0.5	953	20	1235	Iron-stained carbonized rock

NAME(S): Shotgun Creek,
Little Shotgun Creek Placers

Map Location No. E36
MAS No. 0020670137
Kardex No. 67-55

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
T: 21, 22S R: 12W Meridian: Fairbanks
Geographic: West tributary to Ohio Creek
Elevation: 2500 ft.

PRODUCTION: None.

HISTORY: 1917- Prospecting reported in area (157, 191).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The creek's drainages cut sedimentary rocks that have been intruded by serpentinite, gabbro, and basalt (137).

BUREAU INVESTIGATION:

Placer samples were collected on both creeks (Table E36). Sample 783 contained significant gold (0.0008 oz/yd^3). Sample 2083 contained significant gold (0.003 oz/yd^3).

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL:

Low mineral development potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 16, 137, 157, 177, 191

TABLE E36 - ANALYTICAL RESULTS - SHOTGUN CREEK, LITTLE SHOTGUN CREEK PLACERS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			oz/yd³	Fire Assay oz/st	ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	As	Cu	Cr	Ni	Pt	Pd	
783	P		0.0008	1.0	25	15	90	650	106	NA	NA	Bank-run gravels
784	P		0.0000	1.0	255	50	51	234	61	NA	NA	
1018	P		0.0007	1.0	25	35	41	675	128	NA	NA	
1019	P		0.0004	1.0	290	225	233	2850	156	NA	NA	
1978	P		0.0004	2.0	6600	660	279	2037	139	ND	8	
2075	P		ND	ND	0068	15	102	10000	452	15	8	
2076	P		ND	0.5	1100	160	214	550	93	ND	10	
2083	P		0.003	1.0	ND	295	150	1865	120	10	8	

NAME(S): Partin Creek Chrome

Map Location No. E37
Kardex No. 76-57

Deposit Type: Lode
Commodities: Chrome, Nickel, Platinum, Palladium

LOCATION: Quadrangle: Healy A-6
Sec: 5, T: 22S R: 12W Meridian: Fairbanks
Geographic: Ridge between Little Shotgun and Partin Creeks.
Elevation: 4500 ft.

PRODUCTION: None.

HISTORY:

1968 - Two claims staked by John Kubek and Betz Fennimore for Billiton-Alaska Exploration.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

A 1200 ft. wide zone of serpentinized basalt and chert is exposed on a ridge top. The zone is an extension of the Shotgun Creek Lode (Table E35) 2.3 miles to the northeast.

BUREAU INVESTIGATION:

Collected nine samples (854-856, 915-920). Samples were all of carbonate-altered serpentinite, siltstone, or "intrusive rock". The rocks are commonly tan-weathering, and several contain disseminated bright green garnierite(?) (a nickel-rich mica) or fuchsite (?) (a chromium-rich mica). The highest chromium value was 0.10%; the highest nickel value was 0.18%. Two samples (no.'s 855 and 919) contained 8 ppb palladium.

RESOURCE ESTIMATE: Low Chrome and nickel values.

MINERAL DEVELOPMENT POTENTIAL: Low.

RECOMMENDATIONS: None.

REFERENCES: 177

TABLE E37 - ANALYTICAL RESULTS - PARTIN CREEK CHROME

Sample no.	Type	Sample Length (feet)	Analysis							Description
			ppb			Elements in ppm (unless otherwise indicated)				
			Au	Pd	Pt	Ag	Cr	Cu	Ni	
854	S		10	ND	ND	2.5	655		158	Tan intrusive rock with quartz veinlets.
855	S		ND	8	ND	2.0	762		1329	Serpentinite.
856	RC		ND	ND	ND	0.5	891		1620	Serpentinite.
915	G		ND	6	ND	0.5	273		158	Tan limestone.
916	S		ND	4	ND	0.5	885		1329	Tan rock with garnierite and chromate.
917	S		ND	ND	ND	0.5	225		90	Gray siltstone with pyrite.
918	CC	0.3	5	2	ND	0.5	165		18	Quartz-calcite vein.
919	G		ND	8	ND	0.5	953		1851	Serpentinite.
920	RC		ND	4	ND	0.5	1035		1475	10" chip across carbonate-altered serpentinite
2101	RC		ND	ND	ND	1.5	16	546	6	Slate and limestone, chalcopyrite
2102	G		20	ND	ND	14.5	36	9708	46	Slate and limestone, chalcopyrite, malachite
2103	RC		ND	ND	ND	0.5	315	193	141	Slate and limestone, pyrite, pyrrhotite
2104	RC		ND	ND	8	0.5	1006	51	1299	Serpentinite
2105	G		ND	ND	ND	0.5	152	43	58	Jasperoid

NAME(S): Golden Bell 1-10
Partin Creek Placer

Map Location No. E38
Kardex No. 67-198

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Healy A-6
NE 1/4 Sec: 01 T: 22S R: 13W Meridian: Fairbanks
Geographic: Partin Creek
Elevation: 2950 ft.

PRODUCTION: None recorded.

HISTORY: 1973, 75- Claim staked by Kenneth Umphenour and Earle Foster.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Bedrock is metasiltstone.

BUREAU INVESTIGATION: Collected placer sample 726 of gold (Table E38).

RESOURCE ESTIMATE: Insignificant gold in placer sample.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 177

TABLE E38 - ANALYTICAL RESULTS - GOLDEN BELL 1-10

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd^3	Fire Assay oz/st	ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	Cu	Pb	Zn	As	
726	P		0.0002		385	2	75	14	108	190	

NAME(S): Eldridge Coal Creek
Coal Creek 1-5
Rhodenite No. 1

Map Location No. E39
MAS No. 0020670136
Kardex No. 67-212

Deposit Type: Lode
Commodities: Gold, Manganese, Copper, Nickel

LOCATION: Quadrangle: Healy A-6
NE 1/4 Sec: 16 T: 22S R: 12W Meridian: Fairbanks
Geographic: Headwaters of Coal Creek
Elevation: 4000 ft.

PRODUCTION: None.

HISTORY:

1969-83- Claim holders; (339). John Kubek, George Fennimore, Richard Betz, and Danny Max Sides.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Serpentinite in marine sediments.

BUREAU INVESTIGATION: Site searched for in 1987 but not identified (177).

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 140, 177, 339

NAME(S): Coal Creek Tin
S & A Group
Coal 606, 1200-1704, etc.

Map Location No. E40
MAS No. 00206700063
Kardex No.

Deposit Type: Lode
Commodities: Tin, Copper, Silver, Zinc, Tungsten

LOCATION: Quadrangle: Talkeetna Mountains D-6
SW 1/4 Sec: 21 T: 22S R: 12W Meridian: Fairbanks
Elevation: 2900 ft.

PRODUCTION: None.

HISTORY:

1982- Claims staked by Houston Oil & Minerals.
1983- Drilling indicates a 5 million ton deposit grading better than 0.2 tin.

WORKINGS AND FACILITIES:

Several trenches and numerous diamond drill holes and drill pads.

GEOLOGIC SETTING:

Sheeted greisen veins above a cupola of aplite granite that has intruded a coarser, porphyritic granite. Minor copper staining. Small cassiterite crystals on altered granitic rock surfaces. Moderate to heavy iron staining, with silicification, tourmaline veinlets, and sericite (238).

BUREAU INVESTIGATION:

1984 - Visited by AFOC (Dean Warner(?), Fairbanks). Reported "locally excellent grades of tin."
1986 - Sample sent to Bureau for Albany Research Center beneficiation studies. Head analyses indicate up to 0.31% tin. Attempts to float the cassiterite unsuccessful (0.66% tin).
1987 - Reconnaissance sampling (Table E40, samples 921-924, 1101-1106). Sample 1104 contained 4.9% zinc, 500 ppm cadmium, and 140 ppm tungsten. Sample 1105 contained 65 ppm silver, and 5 of the samples collected by the Bureau contained 5 ppm or greater silver. Samples containing greater than 5 ppm silver were also strongly anomalous (greater than 2000 ppm) in arsenic. Sample 1105 contained 2.69% arsenic. Samples of granite porphyry, nos. 923 and 921, contained 680 ppm tin and 150 ppm tin,respectively. The other samples collected by the Bureau contained from 1 to 25 ppm tin.

RESOURCE ESTIMATE:

Approximately 5 million tons of material grading 0.2% tin, with accessory silver.

MINERAL DEVELOPMENT POTENTIAL: Moderate mineral development potential.

RECOMMENDATIONS: Await improvement in the tin market.

REFERENCES: 44, 177, 238, 240

TABLE E40 - ANALYTICAL RESULTS - COAL CREEK TIN

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		Elements in ppm (unless otherwise indicated)							
			Au	Ag	Ag	As	Au	Cd	Sn	W	Zn	
921	G				0.5	365	0	3	150	10	137	Granite porphyry
922	G				0.5	360	0.040	3	3	0	211	Dark gray thin bedded slate
923	G				0.5	0	--	1	680	0	5	Granite porphyry
924	G				1	85	0.025	2.5	25	0	105	A collection of rock types
1101	S				5	4590	0.520	4	1	0	230	Silicified argillite
1102	RC				8	6060	0.210	5	1	0	480	Iron-stained granitic rock
1103	S				50	3460	0.010	70	1	0	10000	Pyrite in granitic rock
1104	S				10.5	2030	0.320	500	1	140	4.86%	High-grade sample from trench
1105	S				65	2.69%	0.325	6	18	720	452	High-grade sample from trench
1106	G				1.5	500	0.005	5	1	0	184	Dark gray argillite

NAME(S): Unnamed Occurrence Map Location No. E41

Deposit Type: Lode
Commodities: Gold, Molybdenum, Silver

LOCATION: Quadrangle: Talkeetna Mountains D-6
NE 1/4 Sec: 19 T: 22S R: 12W Meridian: Fairbanks
Geographic: East of Partin Ck. One and a half miles east of Eldridge Glacier.

PRODUCTION: None.

HISTORY: None.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Bedrock consists of Jurassic argillite and chert (92).

BUREAU INVESTIGATION: Not visited.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 92

NAME(S): Unnamed Lode

Map Location No. E42

Deposit Type: Lode
Commodities: Molybdenum, Gold, Silver

LOCATION: Quadrangle: Talkeetna Mountains D-6
Sec: T: 22S R: 12W Meridian: Fairbanks

PRODUCTION: None.

HISTORY:

1978- Csejtey & Miller report sulfide-bearing alteration zone reported in felsic volcanic rocks (92).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 92

NAME(S): Sorefoot
Eldridge Glacier
Glacier View

Map Location No. E43
MAS No. 0020670002
Kardex No 67-018, 67-164

Deposit Type: Lode
Commodities: Chromium, Nickel, Copper

LOCATION: Quadrangle: Healy A-6
NE 1/4 Sec: 14 T: 22S R: 13W Meridian: Fairbanks
Geographic: At toe of Eldridge Glacier.
Elevation: 2600 ft.

PRODUCTION: None.

HISTORY:

1969- Hawley and others, 1969, (C 617). Serpentinite contains as much as 7.5 percent copper, 15 ppm silver, 0.1 ppm gold, 2000 ppm chrome, 1500 ppm nickel. 1974- Hawley and Clark, (P758-B): "epigenetic massive sulfide-type copper deposit in serpentinite".

WORKINGS AND FACILITIES: Unknown.

GEOLOGIC SETTING:

Irregular and veinlike masses of pyrite and chalcopyrite in serpentinite.

BUREAU INVESTIGATION:

At the claim owner's request, this property was not visited by the Bureau of Mines.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 61, 136, 140

NAME(S): Kubek claims
Fennimore, Betz; Partin Ck. 1-2
AG #1, Gayboy #1; Eldridge Glacier

Map Location No. E44
MAS No. 002070062
Kardex No. 76-57, 60, 62, 157

Deposit Type: Lode
Commodities: Gold, Silver, Iron

LOCATION: Quadrangle: Talkeetna Mountains D-6
Sec: 31 T: 22S R: 12W Meridian: Fairbanks
Geographic: At mouth of Partin Creek near east edge of Eldridge Glacier.
Elevation: 2,000 ft.

PRODUCTION: None.

HISTORY: (339).

1968-83 - John Kubek, Betz Fennimore staked 2 claims.
1969 - Al Gay staked 2 claims.
1970-78 - A.W. Smith staked 3 claims.

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Metasedimentary rocks with minor quartz veins.

BUREAU INVESTIGATION:

1987- Collected four samples of silicified metasedimentary rocks (Table E44). no. 1014 contained 105 ppb gold and 73 ppm zinc.

RESOURCE ESTIMATE:

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: Further prospecting and sampling in area.

REFERENCES: 177, 339

TABLE E44 - ANALYTICAL RESULTS - KUBEK PROSPECT CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis								Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)					
			Au	Ag	Au	Ag	As	Cu	Pb	Zn	
1013	S				30	2	15	138	24	25	Silicified metasediments.
1014	RC				105	1.5	5	62	6	73	Fault gouge, trace pyrite.
1015	S					1	5	71	8	33	Chert with trace sulfides.
1016	S				10	1.5	ND	168	0	39	Chert with trace sulfides.

NAME(S): Eldridge 1-3

Map Location No. E45
Kardex No. 76-62

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Talkeetna Mountains D-6
Sec: 22 T: 33N R: 4W Meridian: Seward
Geographic: West side Eldridge Glacier
Elevation: ?

PRODUCTION: None.

HISTORY: 1970-78 - A. W. Smith, Eldridge 1-3 claims (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of Jurassic brecciated chert and argillite. Pyrite mineralization occurs in a small zone (92).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 92, 339

NAME(S): Boedecker Claims 1-2

Map Location No. E46
MAS No. 0020750021
Kardex No. 75-78, 113

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Talkeetna D-1
Sec: 19 T: 33N R: 4W Meridian: Seward
Geographic: North side Hidden River.
Elevation: 4000 ft.

PRODUCTION: Minor.

HISTORY:

1930 - Roy and Elmer Boedecker and E.H. Bartholf stake 2 claims.
1935 - Gibson mill installed on property.
1937 - Minor production
1939 _ Mill dismantled

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Several small flat-lying quartz veins in a package of foliated slate, fine-grained schist, graywacke, and argillite. Country rock strikes roughly N30 E. Veins strike approximately N20 W and lie flat or dip 10 to 20 W.

BUREAU INVESTIGATION:

Collected seven samples of quartz vein material and phyllite (Table E46). One sample contained greater than about 1.3 ppm gold.

RESOURCE ESTIMATE:

The high grade gold-bearing quartz has apparently been mined out.

MINERAL DEVELOPMENT POTENTIAL: Low mineral development potential.

RECOMMENDATIONS: None.

REFERENCES: 21, 61, 177, 286, 287, 335

TABLE E46 - ANALYTICAL RESULTS - BOEDECKER CLAIMS

Sample no.	Type	Sample Length (feet)	Analysis						Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)			
			Au	Ag	Au	Ag	Pb	Zn	
857	CC	0.6			0	1.0	12	10	Quartz vein.
858	CC	0.6			1320	0.5	8	17	Quartz vein.
859	RC				ND	0.5	10	98	Phyllite wallrock.
860	SC				ND	0.5	2	7	Quartz vein.
861	RC				ND	0.5	ND	7	Quartz vein.
862	RC				ND	0.5	ND	51	Quartz vein.
863	SC				ND	0.5	ND	5	Quartz vein

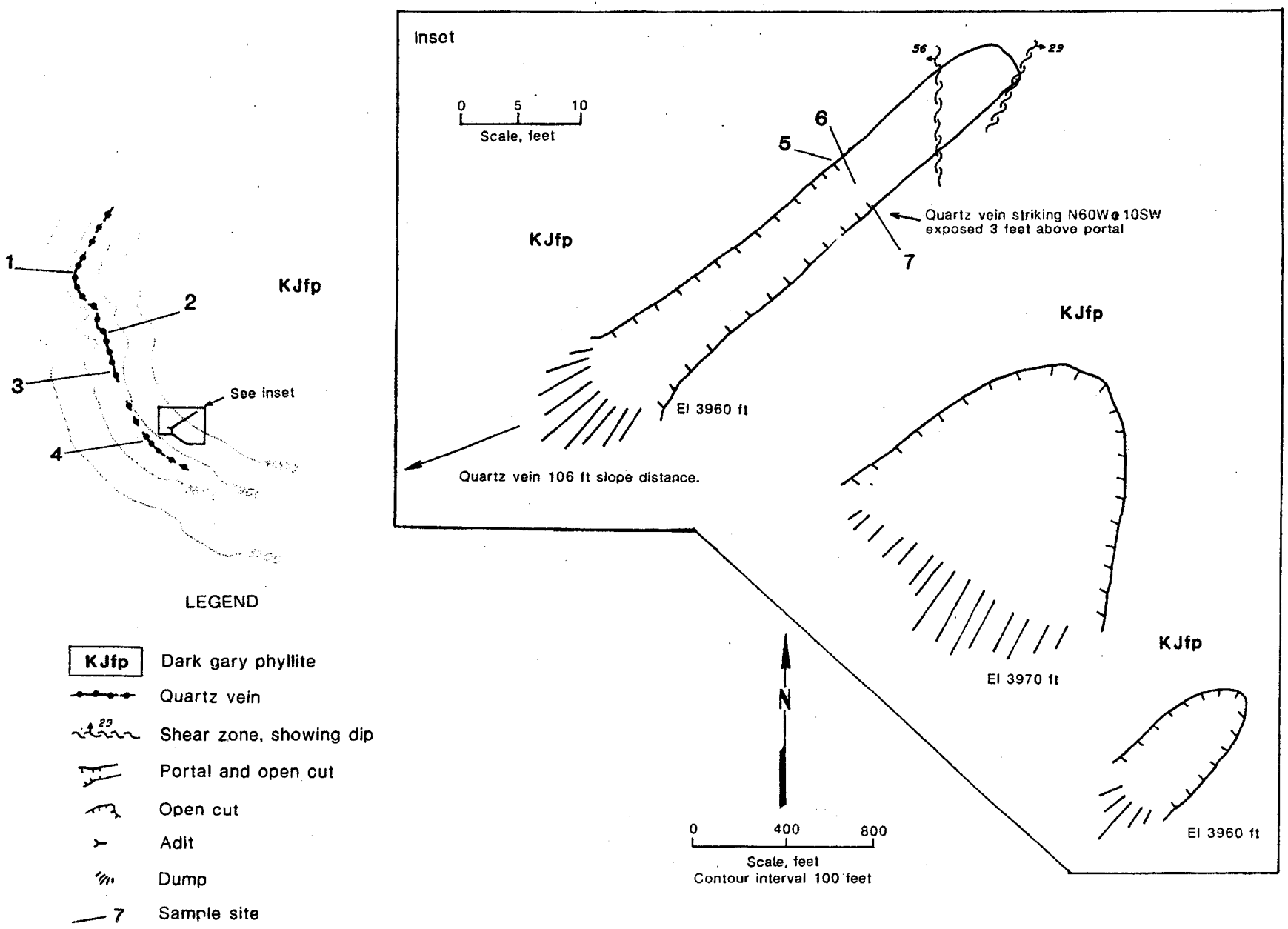


Figure E46. - Boedecker Prospect, showing geology and sample sites

APPENDIX F

NAME(S): Whistler Creek Map Location No. F1

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Talkeetna D-2
NW 1/4 Sec: 36 T: 32N R: 7W Meridian: Seward
Geographic: Whistler Creek, four miles E. of the Ruth Glacier.
Elevation: 2,600 ft. (?)

PRODUCTION: None.

HISTORY:

1915- Quartz float with gold discovered on the upper part of Whistler Creek. Attempts to locate the source have been so far unsuccessful (335).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: The area is underlain by Tertiary intrusive rocks (64).

BUREAU INVESTIGATION: Not visited.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 64, 137, 242, 244, 335

NAME(S): Bluff Creek 1-4
Crown Bluff 1-7
Crown Minerals

Map Location No. F2
MAS No. 020750036
Kardex No. 75-197

Deposit Type: Lode
Commodities: Coal

LOCATION: Quadrangle: Talkeetna C-2
1/4 Sec: 23 T: 30N R: 7W Meridian: Seward
Elevation: 2000 ft.

PRODUCTION: None.

HISTORY:

1900- Bluff Creek claims located.
1967- Stream sed samples contain no gold or silver, 700-1000 ppm (63). manganese, 200-1000 ppm zircon.
1976, 1979- Crown Minerals, James Seward, 14 claims (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Miocene and Pliocene fluvial sedimentary rocks (64).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated mineral development.

RECOMMENDATIONS: None.

REFERENCES: 63, 64, 242, 243

NAME(S): Tokositna River

Map Location No. F3
Tokosha 3-5
MAS No. 0020750047
Kardex No. 47, 70, 117, 200, 379

Deposit Type: Placer
Commodities: Gold, Silver

LOCATION: Quadrangle: Talkeetna C2
Sec: 23 -24 T: 30N R: 6W Meridian: Seward
Geographic: Tributary of the Chulitna River
Elevation: 500 to 1000 ft.

PRODUCTION: None

HISTORY: (339).

1971 - 3 claims staked
1976 - 869 claims staked
1984 - 7 claims staked

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The Tokositna River starts at the Kanikula and Tokositna Glaciers. The river is braided and occupies a valley that is from 0.5 to 3 miles wide in its upper reaches. The valley bottom is comprised of Quaternary alluvium. The average stream gradient is approximately 30 ft/mile. The thickness of the alluvium is unknown. The Tokositna River and its tributaries drain Cretaceous to Jurassic sedimentary rocks, Tertiary intrusives and conglomerate, and Quaternary glacial deposits (242).

BUREAU INVESTIGATION:

The Bureau took four 0.1 yd^3 placer samples from the Tokositna River (Table F3). The samples contained from 0 to 0.0008 oz/yd^3 gold. Fineness values of the gold particles ranged from 921 to 989.

RESOURCE ESTIMATE:

Unknown, but there is a large quantity of alluvial material within the drainage.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS:

Sampling to bedrock is needed to properly evaluate the property.

REFERENCES: 15, 177, 242, 339

REFERENCES: 15, 177, 242, 339

TABLE F3 - ANALYTICAL RESULTS - TOKOSITNA RIVER

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)						
			Au	Au	Ag	Cu	Pb	Zn	As	W	
706	P		ND	NA	0.5	14	16	164	115	10	
753	P		ND	NA	0.5	6	18	67	ND	ND	
757	P		ND	NA	0.5	9	6	76	15	ND	
759	P		0.0008	NA	0.5	19	18	88	15	ND	

NAME(S): Chulitna River

Map Location No. F4

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-1
Sec: 4,7,29,32 T: 30N R: 5W Meridian: Seward
Elevation: 600 ft.

PRODUCTION: None.

HISTORY:

1934 - Tuck reports some gold recovered periodically from the bars of the Chulitna River (335).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Undifferentiated Quaternary Alluvium (64).

BUREAU INVESTIGATION:

1987 - Collected five placer samples (760-764) from bars above the Susitna River. The best sample, #760, contained 0.00029 oz/yd^3 gold.

RESOURCE ESTIMATE: Background gold values.

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS:

Gravel bars of the Chulitna may provide opportunity for recreational placer mining.

REFERENCES: 64, 84, 177, 335

TABLE F4 - ANALYTICAL RESULTS - CHULITNA RIVER AND TROUBLESOME CREEK

Sample no.	Type	Sample Length (feet)	Analysis								Description
			oz/yd³	Elements in ppm (unless otherwise indicated)							
			Au	Au	Ag	Cu	Pb	Zn	As	W	
760	P		0.00029	NA	0.5	22	16	72	20	ND	
761	P		0.00010	NA	0.5	28	20	82	25	ND	
762	P		0.00008	NA	0.5	18	22	75	60	ND	
763	P		0.00007	NA	0.5	21	24	64	20	ND	
764	P		0.00019	NA	0.5	22	18	72	20	ND	
832	P		0.0002	NA	0.5	12	12	64	5	ND	
842	P		0.00007	NA	0.5	5	14	51	ND	ND	

NAME(S): Buster & Gomphonema
Troublesome Creek

Map Location No. F5
MAS No. 0020750045

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-1
SW 1/4 Sec: 04 T: 29N R: 5W Meridian: Seward
Geographic: At confluence of Troublesome Creek and Chulitna River.
Elevation: 650 ft.

PRODUCTION: None.

HISTORY: 1969-72 - Mary Carey, Leonard Freese (2 claims).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Undifferentiated Quaternary Alluvium (64).

BUREAU INVESTIGATION:

1987 - Collected two placer samples at the confluence of Troublesome Creek and Chulitna River (Table F4). Sample no. 832 contained 0.000223 oz/yd^3, respectively.

RESOURCE ESTIMATE: The samples did not contain significant gold.

MINERAL DEVELOPMENT POTENTIAL: Low Mineral Development Potential.

RECOMMENDATIONS: None.

REFERENCES: 64, 177, 242, 244

NAME(S): Lookout 1-2

Map Location No. F6
MAS No. 0200750054

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-1
Sec: 35 T: 30N R: 5W Meridian: Seward

PRODUCTION: None.

HISTORY: 1975- E.C. Foster (2 claims).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: The area is underlain by flysch sedimentary rocks (64).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 64, 242, 244

NAME(S): Curry

Map Location No. F7
MAS No. 0020750022

Deposit Type: Lode
Commodities: Molybdenum, Building Stone

LOCATION: Quadrangle: Talkeetna C-1
N 1/2 Sec: 21 T: 29N R: 4W Meridian: Seward
Geographic: About 1.5 mi south of Curry on the Alaska Railroad (ARR).
Elevation: 650 ft.

PRODUCTION: Not available.

HISTORY:

During construction of the ARR, granitic rock encountered here was crushed and used as rip-rap and road metal. The site continued to be exploited into the 1940's, when the rock quarry was finally abandoned due to safety concerns about the steepness of the working face. Trace amounts of molybdenum were reported to occur in small quartz veins associated with the intrusive (348).

WORKINGS AND FACILITIES:

A short railroad siding was installed when the quarry was active (348).

GEOLOGIC SETTING:

Large quartz-diorite body intruding black slate and schist. Trace molybdenum reported in quartz veins associated with the quartz-diorite (348).

BUREAU INVESTIGATION:

Three samples were collected at the sight (Table F7). These contained up to 1225 ppm molybdenum.

RESOURCE ESTIMATE: Molybdenum values are low.

MINERAL DEVELOPMENT POTENTIAL: Low potential for molybdenum.

RECOMMENDATIONS: None.

REFERENCES: 61, 177, 282, 348

TABLE F7 - ANALYTICAL RESULTS - CURRY

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	Cu	Pb	Zn	Mo	W	
750	S				70	0.5	73	370	80	1225	ND	
751	RC				15	0.5	7	28	135	11	ND	
752	RC				ND	0.5	35	18	109	1	ND	

NAME(S): McKinley View 1-14

Map Location No. F8
MAS No. 0020750042

Deposit Type: Unknown.
Commodities: Unknown.

LOCATION: Quadrangle: Talkeetna C-1
1/4 Sec: 03 T: 28N R: 5W Meridian: Seward
Geographic: West end of Blair lake.
Elevation: 1000 ft.

PRODUCTION: None.

HISTORY: 1968 - Mt. McKinley View Ent., Inc. (14 claims).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Undifferentiated Quaternary alluvium (64).

BUREAU INVESTIGATION: Not visited.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 339

NAME(S): Starlite Mine

Map Location No. F9
MAS No. 020750088
Kardex No. 75-241

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna B-1
Sec: 20 T: 27N R: 4W Meridian: Seward
Geographic: About 2 miles ESE of VABM Chase.
Elevation: 500 ft.

PRODUCTION: None.

HISTORY: 1977 - Wayne Henderson Jr. (1 claim) (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Undifferentiated Quaternary alluvium (64).

BUREAU INVESTIGATION:

One sample was collected which contained no detectable gold.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 177, 339

NAME(S): Susitna River

Map Location No. F10

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-1
Sec: 14, T: 26N R: 5W Meridian: Seward
Geographic: Susitna River near junction with Chulitna River
Elevation: 350 ft.

PRODUCTION: None.

HISTORY:

1900 - Eldridge notes that gold is widely distributed along Susitna River (111).
1911 - Brooks reports gold on gravel bars along the main valley of the Susitna River. He notes that gold is coarser above the mouth of the Chulitna River (40).
1972 - Cobb notes that most of the bars of the Susitna River below Gold Creek carry minor concentrations of flour gold at the surface (77).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING: Undifferentiated Quaternary alluvium (64).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated.

RECOMMENDATIONS: None.

REFERENCES: 40, 64, 77, 84, 111, 335

NAME(S): Bunco Creek

Map Location No. F11
MAS No. 002070083
Kardex No. 119, 139, 225, 236, 253, 328

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C2
1/4 Sec: T: 28N R: 7-8W Meridian: Seward
Geographic: Tributary of Tokositna River. Drains the southeast side of the Peters Hills.
Elevation: 600 - 3000 ft.

PRODUCTION:

HISTORY:

1971 - 1 claim staked (Kx 119)
1973 - 6 claims staked (Kx 139)
1977 - 20 claims staked (Kx 225, 236)
1978 - 17 claims staked (Kx 253)
1980 - 29 claims staked (Kx 328)

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bunco Creek drains the southeast slope of the Peters Hills. The Peters Hills are is comprised of Cretaceous to Jurassic marine sedimentary rocks (slate and graywacke). These rocks are unconformably overlain by the Tertiary Tyonek Formation. The formation is comprised of 80% sandstone, 20% siltstone and claystone, and less than 1% conglomerate, coal, and volcanic ash (Reed and Nelson). The unit occurs in repetitive cycles 20 to 70 feet thick that grade upward from conglomerate or coarse sandstone to finer grained sandstone to interbedded silt and clay with coal to bony coal (242).

Quaternary glacial deposits overlie the older rocks. Drift of the Eklutna Glaciation (Illinoian) is found at the highest elevations. Drift of the Naptowne Glaciation, which includes end, lateral, and ground moraines, postglacial alluvial, pond, and swamp deposits, is present at lower elevations (242).

Bunco Creek is 9 miles long. The creek has an average gradient of 250 feet per mile in its upper 4 miles, and an average gradient of 40 feet per mile in its lower 5 miles. Depth of the stream gravels is unknown.

BUREAU INVESTIGATION:

The Bureau took ten 0.1 yd^3 samples (704, 709-11, 714-17, 2365, 2516) from alluvial material in Bunco Creek in 1987. The samples contained from trace to 0.0022 oz/yd^3 gold. Fineness of the gold particles ranged from 704.6 to 989 gold, with an average of 900 gold. Four rock samples (2357-59, 2515) from quartz veins were also taken. The rock samples contained no detectable gold (16).

RESOURCE ESTIMATE: Unknown.

MINERAL DEVELOPMENT POTENTIAL:

Unknown. Not enough work was conducted to evaluate this property.

RECOMMENDATIONS:

Further sampling is needed to properly evaluate the property.

REFERENCES: 16, 114, 177, 242

TABLE F11 - ANALYTICAL RESULTS - BUNCO CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			ppb	oz/yd^3	Elements in ppm (unless otherwise indicated)	
			Au	Au	Ag	
704	P		NA	0.001	0.5	Alluvium
709	P		NA	trace	0.5	Alluvium
710	P		NA	trace	0.5	Alluvium
711	P		NA	trace	0.5	Alluvium
714	P		NA	0	0.5	Alluvium
715	P		NA	trace	0.5	Alluvium
716	P		NA	trace	0.5	Alluvium
717	P		NA	0.002	1.5	Alluvium
2357	G		<5	NA	<0.5	Quartz
2358	G		<5	NA	<0.5	Quartz
2359	G		<5	NA	0.5	Quartz
2365	P		2800	trace	0.5	Alluvium
2515	G		<5	NA	<0.5	Quartz
2516	P		1500	0	<0.5	Alluvium

NAME(S): Canyon Creek, Long Creek
Divide Creek, E.L. Claims

Map Location No. F12
MAS No. 0020750009
Kardex No. 74, 75, 121, 157, 166, 175

Deposit Type: Placer
Commodities: Gold, Silver

LOCATION: Quadrangle: Talkeetna C-2
Sec: 16, 21, 22 T: 29N R: 8W Meridian: Seward
Geographic: Tributary of Tokositna River
Elevation: 1500-3000 feet

PRODUCTION: Up to 1933: 244 oz. gold, 9 oz. silver

HISTORY:

1908 - Three men mined (54).
1910 - Groundsluicing occurred (54).
1911 - Minor production (Capps, B520, 534), and claims staked (339).
1917 - One man mined a 600 foot long cut (B692), and 29 claims staked (339).
1927 - Mining occurred (284).
1929 - Mining reported (286).
1932 - Mining reported (289).
1971 - Area staked by Inlet View Mining (339).
1974 - Area staked (339).
1977 - Hawley examined the area (63).

WORKINGS AND FACILITIES:

Prospect pits at 2000 foot elevation on Long Creek. Canyon Creek has been mined from its headwaters to 2100 foot elevation (cabins present in lower creek). Divide Creek has been mined from approximately 2250 foot to 2400 foot elevations.

GEOLOGIC SETTING:

The oldest rocks in the area are Cretaceous to Jurassic age marine sedimentary rocks (slates and graywackes). These rocks have been folded into various attitudes, but in general have steep dips. South of the area, gold-bearing veins have been found in the slates and graywackes unconformably overlain by Tertiary age conglomerate and sandstone of the Tyonek and Sterling Formations and Quaternary glacial deposits (244).

The Tyonek Formation is exposed in Cottonwood and Bunco Creeks. The formation is comprised of 80% sandstone, 20% siltstone and claystone, and less than 1% conglomerate, coal, and volcanic ash. The unit occurs in repetitive cycles 20 to 70 feet thick that grade upward from conglomerate or coarse sandstone to finer grained sandstone, to interbedded silt and clay with coal or bony coal (244).

The Sterling Formation is an orange, light-tan, or light-gray, massive bedded conglomerate, distinguished from the conglomerate in the Tyonek Formation by its color, relative coarseness, and clast lithology. Clasts are well rounded and equal and average 2 to 5 inches in diameter. The conglomerate is poorly to moderately well indurated with a clayey matrix . In the Poorman drainage, the thickness of the conglomerate exposed in the headwaters is approximately 20 feet and unconformably overlies slates and graywackes. Maximum thickness measured for the formation is 2300 ft. (244).

20 feet and unconformably overlies slates and graywackes. Maximum thickness measured for the formation is 2300 ft. (244).

Glacial deposits of drift from Eklutna and Naptowne Glaciation are present in the Long, Canyon, and Cottonwood Creek valleys. The deposits include lateral and ground moraines, and alluvial, swamp, marsh, and bog deposits (244).

BUREAU INVESTIGATION:

The Bureau examined the drainage in 1988 and 1989. Nineteen 0.1 yd^3 placer samples of alluvial gravel were collected in the Long Creek drainage during this evaluation (Table F12, no.'s 305-317, 320-321, 459-461, 463, 705, 2364). Conglomerate occurs at the heads and along much of the upper sections of the creeks in the area. The creeks in the upper sections of the drainages have incised more than 10 feet into the underlying slates and graywackes, forming canyons. The canyons are approximately 75 feet wide, with alluvial material about 6 feet thick. The canyons open up into wider (500 feet wide) sections with the alluvial material being greater than 15 feet thick. Canyon and Divide Creeks have been mined in the past using hand mining techniques mainly in the canyon sections and mechanized mining in the wider sections. Although recorded production from the drainage has only been 244 oz of gold, the amount of disturbed ground would suggest that the figure should be closer to 5,000 ounces. Placer concentrates consist of gold, magnetite, ilmenite, garnet, zircon, cassiterite, specularite, and quartz. A few small grains of platinum group metals were recorded from Canyon and Poorman Creeks. Uranium values have been reported from Canyon Creek.

Bureau placer samples contained from 0 to 0.0069 oz/yd^3 gold (Table F 12). The best samples were from small areas of the creek where no mining has occurred. These areas are very rare. The finenesses for the gold particles were from 580 to 854 gold (114). No PGM grains were noted in any of the samples. One sample (313) contained 800 ppb platinum; however, the heavy mineral concentrate from the sample (463) that was taken from the same spot the following year contained 5 ppb platinum (15).

The Bureau took eight 0.1 yd^3 placer samples from conglomeratic material of the Sterling Formation (308-09, 318, 323-324, 362, 464-465). The formation is approximately 50 feet thick in upper Canyon Creek. The samples contained from trace to 0.007 oz/yd^3 gold, with an average value of 0.001 oz/yd^3 gold (Table F12). No PGM was found in any of these samples.

RESOURCE ESTIMATE:

Unknown, but it is inferred that there is in:

Long Creek - 750,000 yd^3 of unmined alluvial material
Canyon Creek - 100,000 yd^3 of unmined alluvial material
Divide Creek - 1,000,000 yd^3 of unmined alluvial material

It is inferred that there are 21,000,000 yd^3 of conglomeratic material in this portion of the Valdez Creek Mining District that are gold-bearing, but subeconomic at this time.

MINERAL DEVELOPMENT POTENTIAL:

High for suction dredge operation in the canyon areas. Low for mechanized mining operation of alluvial material. Low for mining of conglomerate. A rating of low was assigned because minable grades were not found during the examination.

RECOMMENDATIONS:

More exploration, using drills or backhoes, is needed to increase reserves and grade.

REFERENCES:

16, 19, 42, 62, 63, 79, 84, 114, 135, 137, 176, 185, 197, 244, 255, 284, 286, 289, 339

TABLE F12 - ANALYTICAL RESULTS - CANYON CREEK - LONG CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			ppb	oz/yd^3	Elements in ppm (unless otherwise indicated)	
			Au	Au	Ag	
305	P		8	trace	0.5	Alluvium
306	P		ND	0.001	<0.5	Alluvium
307	P		ND	0.001	<0.5	Alluvium
308	P		ND	0.001	<0.5	Tertiary conglomerate
309	P		6600	0.004	0.5	Tertiary conglomerate
310	P		2200	0.007	0.5	Alluvium
311	P		14	0.001	0.5	Alluvium
312	P		2000	0.001	0.5	Alluvium
313	P		2000	trace	<0.5	Alluvium
314	P		2500	0.002	<0.5	Alluvium
315	P		2200	trace	<0.5	Alluvium
316	P		30	0.001	<0.5	Alluvium
317	P		4	0.001	<0.5	Alluvium
318	P		8	0.003	<0.5	Tertiary conglomerate
320	P		1500	0	<0.5	Alluvium
321	P		480	trace	0.5	Alluvium
323	P		18	0.001	0.5	Tertiary conglomerate

TABLE F12 (CONT.) - ANALYTICAL RESULTS - CANYON CREEK - LONG CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			ppb	oz/yd^3	Elements in ppm (unless otherwise indicated)	
			Au	Au	Ag	
324	P		960	trace	<0.5	Tertiary conglomerate
459	P		2500	0.001	<0.8	Alluvium
460	P		630	trace	<0.8	Alluvium
461	P		84	0.001	<0.8	Alluvium
462	P		1700	trace	<0.8	Tertiary conglomerate
463	P		66	trace	<0.8	Alluvium
464	P		140	trace	<0.8	Tertiary conglomerate
465	P		<2	trace	<0.8	Tertiary conglomerate
705	P		ND	0	0.5	Alluvium
2361	P		2000	trace	0.5	Alluvium

NAME(S): Felsite 1-2
Gopher Gulch
Wonder Gulch
Golden Lux 1-5

Map Location No. F13
MAS No.0020750063
Kardex No. 212

Deposit Type: Lode
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C2
1/4 Sec: 20 T: 29N R: 08W Meridian: Seward
Geographic: Headwaters of Dandy Gulch, Divide Creek, Canyon Creek, and Wonder Gulch.
Elevation: 2500-3000 ft.

PRODUCTION:

HISTORY: (339).

1976 - James P. Conway (7 claims)
1977 - Hawley sampled felsic dike (OFR 24-78)

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The claims are underlain by the Tertiary Sterling Formation. The formation is an orange, light-tan, or light-gray, massive-bedded conglomerate. Clasts are well rounded, equal, and average 2 to 5 inches in diameter. The formation also contains some coal beds, which are approximately one foot thick. The formation lies unconformably on a Jurassic-Cretaceous slate. The slate strikes east-northeast. The slates are cut by northwest-striking felsic dikes (114,242).

BUREAU INVESTIGATION:

The Bureau sampled the area in 1988, and a report was written that summarizes the findings (114). Placer samples were taken from the creeks. The conglomerate was also sampled using a placer technique. Gold was found in the Tertiary conglomerate. The samples from the conglomerate averaged 0.001 oz/yd^3 gold. A felsic dike was also sampled (327) in Dandy Gulch. Nothing significant was noted in the sample (Table F13). Another dike was found at 2680 ft. elevation. It was sampled by Hawley in 1977 and contained 0.03 ppm gold (135).

RESOURCE ESTIMATE:

There is an estimated 21 million yd^3 of conglomerate material in the district.

MINERAL DEVELOPMENT POTENTIAL: Low, because of low grades.

RECOMMENDATIONS:

More prospecting is needed in order to define minable grades.

REFERENCES: 16, 63, 114

TABLE F13 - ANALYTICAL RESULTS - FELSITE 1-2 PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis			Description
			ppb	oz/yd^3	Elements in ppm (unless otherwise indicated)	
			Au	Au	Ag	
327	S		88		0.5	Felsic dike

NAME(S): Ramsdyke Creek
Wonder Gulch
Wolf Creek

Map Location No. F14
MAS No.0020750077
Kardex No. 69, 184, 202, 231-33

Deposit Type: Placer
Commodities: Gold, Silver

LOCATION: Quadrangle: Talkeetna C2
Sec: 4, 17, 20 T: 29N R: 8W Meridian: Seward
Geographic: Tributary of the Tokositna River
Elevation: 1500-3000 ft.

PRODUCTION:

HISTORY:

1921 - 5 oz. gold
1922 - 2.85 oz. gold
1900? - 2 claims staked (339).
1916 - Richard Richardson operated (300).
1927 - One man produced a little gold (285).
1935 - Prospecting reported (P.Smith, 1937), and 3 claims staked (339).
1968 - USGS sampled creek (139).
1975 - 4 claims staked (339).
1976 - 1 claim staked (339).
1977 - 1 claim staked (339).
1977 - Hawley examined the area (139).

WORKINGS AND FACILITIES:

Evidence of mining at the headwaters of Wonder Gulch. Records show that 340 yd^3 were processed (340).

GEOLOGIC SETTING:

The oldest rocks in Ramsdyke Creek are Cretaceous to Jurassic age marine sedimentary rocks (slates and graywackes). These rocks have been folded into various attitudes, but in general have steep dips (244).

A small intrusive is present in the headwaters of Wonder Gulch. The intrusive is deeply weathered and is overlain by glacial deposits. It was uncovered during mining of the creek. The intrusive may be similar to the small Tertiary to Cretaceous age intrusive in Bear Creek. Gold has been reported in quartz veins that are associated with dikes in Bird Creek (137).

The Sterling Formation is present in the headwaters of Wonder Gulch, on the southeast side of the gulch. The Sterling Formation is an orange, light-tan, or light-gray, massive bedded conglomerate. Clasts are well rounded and equal and average 2 to 5 inches in diameter. The conglomerate is poorly to moderately well indurated with a clayey matrix (244).

BUREAU INVESTIGATION:

The drainage was examined in 1988 by the Bureau. The Ramsdyke Creek valley is

BUREAU INVESTIGATION:

The drainage was examined in 1988 by the Bureau. The Ramsdyke Creek valley is narrow. Much of the creek flows in slate and graywacke walled canyons. The upper sections of the drainage are broader. The thickness of the alluvial gravel is unknown, but where tested is less than 6 feet. Production data indicated that the tenor of the mined gravel was 0.023 oz/yd^3 gold (340).

The Bureau took three 0.1 yd^3 placer samples (707,2166, 2167) from Ramsdyke Creek. Trace and 0.0005 oz/yd^3 gold were recovered. Three placer samples (2163-65) were taken from alluvial gravel in Wonder Gulch. The samples contained from 0.001 to 0.0015 oz/yd^3 gold. The analyses of the heavy mineral concentrates of sample 2163 showed 10.5 ppm silver and sample 2164 showed 40 ppb platinum. A placer sample (319) was taken from glacial material and contained only trace quantities of gold. A rock sample (2162) taken from the Sterling Formation contained 0.002 oz/st gold.

RESOURCE ESTIMATE:

Unknown, but there is an estimated 300,000 yd^3 of alluvial gravel in the drainage.

MINERAL DEVELOPMENT POTENTIAL:

Moderate in the canyon areas of Wonder Gulch for a suction dredge. Low for a mechanized mining operation because of narrow working area and apparent lack of suitable minable reserves.

RECOMMENDATIONS:

More exploration using a backhoe or drill is needed to determine reserves.

REFERENCES: 16, 63, 78, 114, 135, 137, 284, 300, 339

TABLE F14 - ANALYTICAL RESULTS - RAMSDYKE CREEK PLACER OCCURRENCE

Sample no.	Type	Sample Length (feet)	Analysis					Description
			Fire Assay oz/st	ppb			Elements in ppm (unless otherwise indicated)	
			Au	Au	Pd	Pt	Ag	
319	P		NA	ND	<2	<5	0.5	Glacial
707	P		NA	NA	NA	NA	<0.5	Alluvium
2162	G		0.002	NA	NA	NA	<0.5	Tertiary conglomerate
2163	P		NA	ND	<2	<5	10.5	Alluvium
2164	P		NA	ND	<2	40	<0.5	Alluvium
2165	P		NA	ND	<2	<5	<0.5	Alluvium
2166	P		NA	5,000	<2	<5	0.5	Alluvium
2167	P		NA	ND	<2	<5	1.0	

NAME(S): Bear Creek Mining
Eddie D. Koontz, Midas I
Crown Bear, Wild Horse
Arnold Bear, Crown Wild Horse

Map Location No. F15
MAS No. 020750076
Kardex No. 75-63, 155

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-2
NE 1/4 Sec: 9 T: 29N R: 9W Meridian: Seward
Geographic: Upper Bear Creek.
Elevation: 2300 ft.

PRODUCTION: Minor.

HISTORY:

1927 - Three parties of a single man each produced a little gold from Bear Creek (284).
1968 - Rock samples contained 0.2 to 0.4 ppm gold, to 1500 ppm manganese, and to 0.5 ppm silver (135,137).
1974-83 - Carl Anderson (16 claims) (139).
1975-83 - Crown Minerals, Gladys Arnold (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of Mesozoic graywacke and argillite with hydrothermal alteration (242).

BUREAU INVESTIGATION:

1988- Collected placer samples 2465 and 2466. Analyses revealed background gold values only.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 16, 135, 137, 240, 284

TABLE F15 - ANALYTICAL RESULTS - BEAR CREEK MINING, SECOND CREEK

Sample no.	Type	Sample Length (feet)	Analysis						Description
			oz/yd³	ppb	Elements in ppm (unless otherwise indicated)				
			Au	Au	Pb	Zn	Ag	As	
758			0.00002						Second Creek
2465	P		trace	66					Bear Creek
2466	P		ND	1000					Bear Creek

NAME(S): Bear Creek
Midas I, Crown Bear
Wild Horse, Arnold Bear
Crown Wild Horse

Map Location No. F16
MAS No. 020750076
Kardex No. 75-63,155,192

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-2
NE 1/4 Sec: 03 T: 29N R: 9W Meridian: Seward
Geographic: Lower Bear Creek
Elevation: 2300 ft.

PRODUCTION: None.

HISTORY:

1927 - Three parties of a single man each produced a little gold from Bear Creek (284).
1968 - Rock samples contained 0.2 to 0.4 ppm gold, to 1500 ppm manganese, and to 0.5 ppm silver (137).
1974-83 - Carl Anderson (16 claims) (339).
1975-83 - Crown Minerals, Gladys Arnold (83 claims) (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

Bedrock consists of Mesozoic graywacke and argillite with hydrothermal alteration (137,242).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 16, 63, 114, 135, 136, 137, 240, 242, 284, 339

NAME(S): Eddie Koontz

Map Location No. F17
MAS No. 20759028

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-2
1/4 Sec: 02 T: 29N R: 9W Meridian: Seward
Geographic: South Tributary to Bear Creek
Elevation: 2,400 ft

PRODUCTION: None.

HISTORY:

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain mainly by flysch rocks and minor Tertiary intrusive (64).

BUREAU INVESTIGATION: Not visited.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unknown.

RECOMMENDATIONS: None.

REFERENCES: 64, 242, 244

NAME(S): Second Creek

Map Location No. F18
MAS No. 002070059
Kardex No. 75-198

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-2
1/4 Sec: 33 T: 30N R: 7W Meridian: Seward
Elevation: 1000 ft.

PRODUCTION:

HISTORY:

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Tertiary intrusive rocks and flysch (64).

BUREAU INVESTIGATION:

A sample collected on Second Creek contained 0.00002 oz\yd^3 gold (Table F15, no. 758).

RESOURCE ESTIMATE: Sample contains background gold values..

MINERAL DEVELOPMENT POTENTIAL: Low potential for placer gold.

RECOMMENDATIONS: None.

REFERENCES: 64, 242, 244

NAME(S): Crown First 1-5

Map Location No. F19
MAS No. 020750085
Kardex No. 75-199

Deposit Type: Placer
Commodities: Gold

LOCATION: Quadrangle: Talkeetna C-2
Sec: 29 T: 30N R: 7W Meridian: Seward
Geographic: First Creek
Elevation: 2200 ft.

PRODUCTION: None.

HISTORY:

1968 - Minor amounts of gold recovered . . . along First Creek (63).
1976 - Crown Minerals (339).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

The area is underlain by Tertiary intrusives & flysch (64).

BUREAU INVESTIGATION: None.

RESOURCE ESTIMATE: Not made.

MINERAL DEVELOPMENT POTENTIAL: Unevaluated 64, 242, 244, 339

RECOMMENDATIONS: None.

REFERENCES: 63

NAME(S): Rocky Cummins
Tokachitna 1-8
Tokositna

Map Location No. F20
MAS No. 020750020
Mineral Survey No. 2397
Kardex No. 75-012

Deposit Type: Lode
Commodities: Gold, Bismuth

LOCATION: Quadrangle: Talkeetna C-2
1/4 Sec: 5&6 T: 30N R: 8W Meridian: Seward
Geographic: West Side of Tokositna Glacier.
Elevation: 3100 ft.

PRODUCTION: None.

HISTORY:

1953 - Larry Cummins, Don Sheldon, Robert V. Young, John Jacobsen, Levak Renshaw, Jr (339).
1968 - Sample collected (63).

WORKINGS AND FACILITIES: None.

GEOLOGIC SETTING:

A quartz vein that strikes N76°W and dips steeply, is about 2.5 ft. wide, and is traceable for at least 800 ft contains free gold, minor pyrite, arsenopyrite, and white mica (63).

BUREAU INVESTIGATION:

Collected samples 2000, 2157-2158, 2340-2349, 2448-2457, 2501-2507 (Table F20). A grab sample (no. 2158) of quartz containing 3.158 oz gold/ton was collected from an old ore dump at the prospect. Three of the thirty rock samples collected by the Bureau at this prospect contained greater than 0.1 oz gold/ton.

Most of the Rocky Cummins Claim block is covered with vegetation, and/or glacial till. Bedrock has been exposed in several areas as a result of trenching and/or blasting. In the SE¼ of Sec 6, T: 30N, R: 8W is a swarm of randomly oriented micaceous quartz veins. The highest grade sample collected from the swarm contained 0.064 oz/st gold and 78 ppm silver (no. 2346, Table F30).

The most intensely mineralized area that was observed is located in the north west ¼ of the southwest ¼ of section 5, T: 30N, R: 8W. The mineralized zone consisted of a quartz vein extending up to 3.0 feet into the host rock. The highest grade sample was collected from a 0.5 ft wide gouge zone on the hanging well of the quartz vein (sample 2452).

RESOURCE ESTIMATE: The prospect contains significant gold values.

MINERAL DEVELOPMENT POTENTIAL: Low Mineral Development Potential.

RECOMMENDATIONS:

An effort should be made to identify whether or not sufficient tonnage exists at this prospect.

REFERENCES: 16, 62, 63, 70, 137, 242, 244

TABLE F20 - ANALYTICAL RESULTS - ROCKY CUMMINS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Bi	Sb	Zn	
2000	G				0145	3	30	NA	40	ND	18	Quartz vein.
2157	G					0.5	1085	57	ND	1085	42	Quartzite.
2158	S		3.158		ND	4	640	81	30	5	50	Visible gold in quartz from ore dump.
2340	RC				ND	ND	50	26	ND	ND	82	Slate.
2341	RC				255	0.5	35	14	ND	ND	80	Graywacke.
2342	RC				ND	ND	65	21	ND	ND	66	Thin-bedded slate.
2343	RC				245	8.0	5000	295	198	5	19	Vein quartz.
2344	RC				20	4.0	340	41	36	ND	5	Vein quartz.
2345	RC		0.048		ND	4.5	445	53	6	ND	6	Quartz-micavein.
2346	RC		0.064		2420	78.0	55	273	358	5	10	Quartz-micavein.
2347	RC				5	1.0	ND	9	10	ND	3	Quartz vein.
2348	RC				170	7.0	425	23	124	5	2	Quartz vein.
2349	S				50	6.0	5990	463	32	5	9	Altered arkose.
2448	CH	1.3			275	8.0	765	238	238	5	13	Quartz vein.
2449	CC	1.5			44	2.5	935	133	38	5	15	Quartz vein.
2450	S		0.042		ND	1.5	10,000	44	32	20	13	Quartz from ore dump.
2451	S		0.004		ND	0.5	695	80	ND	5	17	Brecciated quartz from ore dump.

TABLE F20 (CONT.) - ANALYTICAL RESULTS - ROCKY CUMMINS

Sample no.	Type	Sample Length (feet)	Analysis									Description
			Fire Assay oz/st		ppb	Elements in ppm (unless otherwise indicated)						
			Au	Ag	Au	Ag	As	Cu	Bi	Sb	Zn	
2452	CH	0.5	0.490			1.5	1695	46	28	15	10	Gouge zone.
2453	CH	1.0	0.006			ND	715	44	ND	5	7	Quartz vein.
2454	CH	1.3	0.004			0.5	190	52	2	10	42	Altered metavolcanic.
2455	CH	0.7	0.103			1.0	445	53	6	5	21	Gouge zone.
2456	CH	0.7	0.020			1.0	2005	69	8	5	18	Gouge zone.
2457	CH		0.004			ND	3320	24	ND	10	7	Gouge zone.
2501	G				3500	1.5	25	28	150	ND	2	Quartz.
2502	G				510	2.5	15	84	72	ND	3	Quartz.
2503	G				645	1.5	35	34	68	ND	6	Quartz.
2504	G				635	2.5	3770	97	102	ND	10	Quartz.
2505	G				555	2.0	35	46	102	ND	10	Quartz.
2506	G				490	8.0	50	291	80	ND	18	Quartz.
2507	G				ND	ND	5	93	ND	ND	63	Gneiss.

APPENDIX G

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A1	Unnamed Placer Occurrence, East Fork Susitna River	Placer gold	Tungsten	Gneissic intermediate intrusives	Unknown
A2	Unnamed Placer Occurrence, East Fork Susitna River	Placer gold	Cobalt	Gneissic intermediate intrusives	Unknown
A3	Lamb Claims, Lode Occurrence	Copper and molybdenum in metamorphosed dikes and sills	Tungsten	Biotite gneiss and pegmatite	Low
A4	Unnamed Placer Occurrence, West Fork Maclaren River	Placer gold	Tungsten, arsenic, molybdenum	Schist, amphibolite, slate	Low
A5	Falling Rock Occurrence, West Fork Maclaren River	Gold in quartz-carbonate veins	Tungsten	Argillite, schist, amphibolite	Unknown
A6	Unnamed Lode Occurrence, East Side Maclaren Glacier	Silver and gold in quartz-carbonate veins	Antimony	Schist, argilliate, shale	Low
A7	Unnamed Lode Occurrence, Eureka Glacier	Nickel and platinum/palladium in ultramafic rock	Copper, cobalt, chromium	Serpentinite, gabbro	Unknown
A8	Unnamed Lode Occurrence, East Fork Maclaren River	Nickel in ultramafic rocks	Platinum/ palladium, chromium	Serpentinete	Moderate
A9	Maclaren Glacier Lode Occurrence	Copper and nickel in iron-rich skarn	Iron, chromium	Limestone, argillite	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A10	Cathedral Creek Lode Occurrence	Copper porphyry, skarn	Tungsten	Quartz monzonite, limestone	Low
A11	Two Plate Creek Lode Occurrence	Copper in quartz veins		Greenstone	Low
A12	Spray Creek Lode Occurrence	Copper in quartz-carbonate veins	Silver, tungsten, antimony, mercury	Greenstone	Low
A13	Kathleen-Margaret Prospect	Copper in quartz vein	Silver, gold, tungsten, arsenic, antimony	Greenstone	Moderate
A14	East Fork Maclaren River Placer Occurrence	Placer gold	Platinum, palladium	Greenstone, monzonite, serpentinite	Low
A15	Mary Joe Placer Occurrence	Placer gold	Unknown	Greenstone	Unknown
A16	Cottonwood Creek Lode Occurrence	Copper in quartz veins	Silver	Greenstone	Low
A17	Snowstrike Lode Occurrence	Copper in quartz veins		Greenstone	Low
A18	Viking Lode Occurrence	Copper-bearing magnetite veins	Iron, gold, silver	Greenstone	Moderate
A19	Cottonwood Creek Placer Occurrence	Placer gold			Low
A20	Lakeview Prospect	Copper-bearing quartz veins	Silver	Greenstone	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A21	Sunshine Claims	Copper-bearing quartz veins		Greenstone	Low
A22	Greenstone Lode Occurrence	Copper-bearing quartz veins	Silver	Greenstone	Low
A23	Richards Claims Lode Occurrence	Copper-bearing? quartz veins		Greenstone	Unknown
A24	Boulder Creek Placer Occurrence	Placer gold			Low
A25	West Fork Maclaren River Placer Occurrence	Placer gold			Moderate
A26	Zackly Lode Prospect	Gold-bearing skarn	Copper, silver, mercury	Limestones, metavolcanics	Moderate
A27	VABM Little Lode Occurrence	Copper in quartz veins	Silver	Greenstone	Moderate
A28	Honey Creek Lode Occurrence	Copper and silver in veins, skarns, and breccia zones	Tungsten	Greenstone, limestone quartz breccia	Low
A29	Mensim Lode Occurrence	Copper and molybdenum in veins in dikes	Silver	Acidic instrusive	Unevaluated
A30	Unnamed Lode Occurrence, West Fork Maclaren River	Zinc in breccia zone		Schist	Low
A31	Mex Claims Lode Prospect	Silver and gold polymetallic veins sedimentary-hosted precious metals, skarn	Silver, gold, antimony, mercury, tungsten	Metasediments, limestone, felsic dikes	Moderate

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A32	Little Clearwater Creek Placer Occurrence	Placer gold	Tungsten, mercury		Moderate
A33	Clearwater Creek Placer Occurrence	Placer gold			Low
A34	Jack L. Dees Claims	Placer gold			Unevaluated
A35	Corkscrew Creek Placer Occurrence	Placer gold			Low
A36	Little Clearwater Creek Lode Occurrence	Copper in quartz veins	Silver	Greenstone	Low
A37	Yukon Claim Group	Copper in quartz veinlets	Silver	Greenstone	Low
A38	Coal Creek East Occurrence	Coal in seams		Sandstone and shale	Unevaluated
A39	Gossan Lode Occurrence	Disseminated gold in calcareous metasedimentary rocks and polymetallic vein	Copper, arsenic, Mercury, antimony, tungsten	Argillite, dolomite, limestone	Moderate
A40	Pass Creek Lode Occurrence	Copper in quartz veins		Greenstone	Low
A41	Unnamed Lode Occurrence, Pass Creek	Copper in quartz veins	Silver	Greenstone	Low
A42	Denali Lode Prospect	Copper in sediment-hosted deposit	Silver, gold	Calcareous sediments	Moderate

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A43	Pass Creek Lacer Occurrence	Placer gold			Low
A44	Pass Lake Lode Occurrence	Gold in disseminated deposits		Argillite	Low
A45	Surprise Creek Lode Prospect	Gold in quartz-carbonate veins		Schist	Low
A46	Grogg Creek Placer	Placer gold	Platinum, palladium		Moderate
A47	Eldorado Creek Placer Lode Occurrence	Platinum/palladium in disseminated deposits	Nickel	Gabbro, pyroxenite	Low
A48	Eldorado Creek Placer	Placer gold			Low
A49	Black Creek Placer Claims	Placer gold			Moderate
A50	Black Creek Lode Prospect	Gold in quartz veins	Silver	Intermediate intrusive graphic schist	Moderate
A51	Lucky Top Prospect	Gold in quartz veins		Calcareous arigllite/phyllite	
A52	Roosevelt Creek Placer	Placer gold			Unevaluated
A53	Lucky Gulch Placer	Placer gold			Moderate
A54	Yellowhorn Lode Prospect	Gold in quartz veins, stockworks and disseminated		Schist, phyllite	Moderate

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A55	Upper Valdez Creek Placers	Placer gold			Moderate
A56	Lower Valdez Creek Placers (Denali Mine)	Palcer gold	Silver		High
A57	Rusty Creek Lode Occurrence	Gold in quartz veins	Arsenic, copper	Greenstone, tuff	Low
A58	White Creek Placers	Placer gold	Silver, tungsten		Moderate
A59	Sunny Gulch Lode Prospect	Gold in veins and disseminated	Silver, lead	Diorite, argillite, siliceous volcanic rocks	Moderate
A60	Timerline Creek Lode	Gold in quartz veins	Silver, copper	Diorite	Moderate
A61	Timberline Creek Placers	Placer gold			Low
A62	Dry Creek Placer	Placer gold			Low
A63	Fourth of July Creek Placer	Placer gold			Low
A64	Lower Windy Creek Placer Occurrence	Placer gold			Unknown
A65	Upper Windy Creek Placer Occurrence	Placer gold			Moderate
A66	Unnamed Placer Occurrence, Windy Creek Tributary	Placer gold			Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
A67	VABM Gate Lode Occurrence	Copper in veins?		Greenstone	Unevaluated
A68	Greathouse Lode Prospect	Copper in quartz veins	Silver		Low
A69	Nowater Creek Placer Occurrence	Palladium placer			Low
A70	Little Eva Lode Prospect	Copper in quartz-epidote veins		Greenstone serpentine	Low
A71	Raft Creek Lode Occurrence	Copper in quartz veintets		Diorite	Unevaluated
A72	Ben French Creek Placer Occurrence	Placer gold			Unevaluated
A73	Pettyjohn Creek Placer Occurrence	Placer gold			Low
A74	West Fork Susitna Glacier Lode Prospect	Copper in silicified zones	Zinc, silver	Muscovite schist, argillite	Moderate
A75	VABM 5756 Lode Occurrence	Silver in quartz veins		Schists, limestone	Low
A76	Nenana Lode Claims	Zinc in altered schist	Copper	Calcschist marble	Low
A77	Hess Mountain Lode Occurrence	Gold in veins(?)		Siliceous mudstone	Unevaluated

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
B1	Wickersham Discovery Placer Occurrence	Placer gold			Unknown
B2	Lower Butte Creek Placer Occurrence	Placer gold			Moderate
B3	Nelson Discovery Placer Claims	Placer gold	Chrome, palladium		Low
B4	Tammany Creek Placer Occurrence	Placer gold			Moderate
B5	Nay Nadeli Placer	Placer gold			Moderate
B6	Wickersham Creek Placer	Placer gold			Low
B7	Su Claims Lode Prospect	Gold in quartz vein stockwork	Molybdenum	Quartz monzonite siltstone	Moderate
B8	Gold Creek (East) Placer	Placer gold	Tungsten		Moderate
B9	Gold Creek (East) Lode Occurrence	Gold in silicified fault zones	Silver	Intermediate intrusives	Moderate
B10	Upper Butte Creek Placer Occurrence	Placer gold			Moderate
B11	Butte Creek (Southwest) Lode Occurrence	Veins	Copper, silver	Greenstone, metasiltstone	Low
B12	Sweet Glory Placer	Placer gold			Low
B13	Peak 5532 Lode Occurrence	Platinum and palladium in mafic-ultramafic rocks	Chrome, nickle, copper	Troctolitic gabbro, pyroxenite	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
B14	Shure Shot Claim	Copper in quartz veins	Platinum palladium	Greenstone	Unknown
B15	Butte Creek Lode Occurrence	Copper in veins		Greenstone Metasediments	Unknown
B16	Sanjo Claims Placer Occurrence	Placer gold	Palladium		Moderate
B17	VABM Watana Lode Occurrence	Copper-bearing skarn	Gold	Limestone	Low
B18	Unnamed Lode Occurrence	Copper-bearing veins	Molybdenum?	Greenstone	Low
B19	Grizzly Bear Claims Lode Occurrence	Copper-bearing veins	Gold, tungsten	Greenstone	Low
B20	Unnamed Lode Occurrence, Watana Creek	Zinc-bearing veins	Arsenic	Greenstone	Low
B21	Big Lake Placer Occurrence	Placer gold			Low
B22	Delusion Creek Placer Occurrence	Placer gold			Low
B23	Watana Creek Placer Occurrence	Placer gold	Platinum		Moderate
B24	Fog Creek Placer Occurrence	Placer gold			Low
B25	Mt. Watana, Unnamed Lode Occurrence	Copper-bearing veins	Gold	Greenstone	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see fig. (10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
B26	Watana Rainbow Placer Occurrence	Placer gold			Low
B27	Second Creek Placer Occurrence	Placer gold	Barium		Low
B28	August Lode Prospect	Copper-bearing carbonates		Limestone, greenstone	Unknown
B29	Peak 5483 Lode Occurrence	Copper-bearing veins	Gold	Greenstone	Low
B30	Peak 4008 Lode Occurrence	Copper-bearing veins	Gold	Greenstone	Low
B31	Jay Creek Placer	Placer gold	Vanadium, titanium, tungsten		Moderate
B32	Unnamed Lode Occurrence Susitna River	Copper-bearing quartz vein		Greenstone	Unknown
B33	Jay Creek Lode Occurrence	Copper-bearing shear zone	Gold, tungsten	Metaintrusive	Low
B34	Jay Creek Headwaters, Lode Occurrence	Copper-bearing quartz veins	Zinc, arsenic	Foliated granites	Low
B35	Coal Creek Placer Occurrence	Placer gold			Low
B36	Lichen Lode Prospect	Copper in stratabound quartz stringer zone	Gold, silver	Greenstone	Moderate
B37	Unnamed Lode Occurrence, Lower Tyone River	Zinc in Felsic dikes (?)		Greenstone	Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
C1	Busch Creek Placer	Placer gold	Platinum, palladium		Moderate
C2	Lower Black River Placer Occurrence	Placer gold			Low
C3	Lucky Strike Claim No. 1, Lode Occurrence	Disseminated copper		Greenstone	Low
C4	Old Gold Claims Lode Occurrence	Gold in altered diorite		Quartz diorite	Low
C5	Unnamed Placer Occurrence Kosina Creek	Palladium placer			Low
C6	Upper Black River Lode Occurrence	Copper in porphyry-type intrusive	Molybdenum, gold, tungsten	Granodiorite	Low
C7	Nowhere Creek Placer	Placer gold			Unknown
C8	Upper Oshetna River placer Occurrence	Placer gold			Unknown
C9	Landslide Creek Placer Occurrence	Placer gold			Unknown
C10	Roaring Creek Placer Occurrence	Placer gold			Unknown
C11	Granite Creek Lode Occurrence	Silver, and copper in silicified shear zone	Zinc, gold	Diorite	Low
C12	Granite Creek Placer Occurrence	Placer gold			Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
C13	Gold Creek Placer	Placer gold	Platinum		Moderate
C14	Oshetna River Placer Occurrence	Placer gold			Unknown
C15	Little Oshetna River Placer Occurrence	Placer gold			Unknown
C16	Joe Creek Placer Occurrence	Placer gold			Low
C17	Red Creek Placer Occurrence	Placer gold			Unknown
C18	Yacko Creek Placer	Placer gold	Platinum		High
C19	Walker Creek Placer Occurrence	Placer gold			Unknown
C20	Sanona Creek Placer Occurrence	Placer gold			Unknown
C21	Fourth of July Creek Placer	Placer gold	Platinum		Unknown
C22	Tyone Creek Placer	Placer gold			Unknown
C23	Red Fox Creek Placer	Placer gold	Platinum		Moderate
C24	Buchia Creek Placer Occurrence	Placer gold			Unknown
C25	Nicolie Creek Placer Occurrence	Placer gold			Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
C26	White Sand Creek Placer Occurrence	Placer gold			Unknown
C27	Sally's Big Nugget Placer Occurrence	Placer gold			Unevaluated
C28	Daisy Creek Placer	Placer gold	Platinum		Unknown
C29	Pumicite Placer Occurrence	Placer gold			Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
D1	Coal Creek Coal (West)	Lignite		Tertiary sediments	Low
D2	Caribou Placer	Placer gold			Unknown
D3	VABM ALF	Placer gold			Low
D4	Green Spike	Polymetallic	Copper, zinc, silver	Intrusive rocks	Unknown
D5	Tsusena Creek Prospect	Polymetallic	Gold, tin, copper, lead, zinc, silver	Tertiary volcanic rocks	Moderate
D6	Portage Creek Head	Polymetallic	Tin, silver, tungsten, copper, lead, zinc	Tertiary volcanic rocks	Unevaluated
D7	Lake Placid	Placer gold			Unknown
D8	Deadman Creek	Placer gold			Low
D9	Fog Lake Placer Occurrence	Placer gold			Low
D10	Moose Horn	Placer gold			Unevaluated
D11	Devil's Canyon Occurence	Placer gold	Platinum		Low
D12	Devil's Canyon Dike	Polymetallic	Tungsten, silver, gold	Argillite, graywacke	Unknown
D13	Ihly	Silver-bearing quartz veins	Argentiferous galena	Slate	Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
D14	Gold Creek	Placer gold			Unknown
D15	Indian Mountain	Gold-silver quartz veins	Copper, lead, bismuth	Argillite, felsic dike	Unknown
D16	Mint Mine	Ruby silver in silicified argillite	Gold, antimony	Argillite, felsic dike	Moderate
D17	Treasure Creek	Porphyry molybdenum	Copper, tungsten, silver, lead	Quartz diorite	Moderate
D18	Lower Portage Creek	Placer gold			Unknown
D19	Unnamed Occurrence	Gold-silver lode		Schist, granite	Unevaluated
D20	Unnamed Occurrence	Lode			Unknown
D21	Honolulu Creek placer	Placer gold			Unknown
D22	Honolulu Lode	Silver-sulfide veins	Gold, copper, lead, zinc, arsenopyrite	Granite	Unknown
D23	Brush Battle	Placer gold			Low
D24	Chulitna Forks	Placer gold			Low
D25	Antimony Creek	Stibnite in quartz	Gold	Argillite	Low
D26	Hole Claims	Placer			Unknown
D27	East Fork Chulitna River	Placer gold	Tin		Moderate
D28	Broad Pass Coal	Lignite		Conglomerate and sandstone	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
E1	Triem	Placer gold			Unevaluated
E2	New Golden Zone	Placer gold			Unevaluated
E3	Kathleen	Placer gold			Unevaluated
E4	Chulitna West	Placer gold			Unknown
E5	Black Bear	Placer gold			Unknown
E6	Colorado Creek	Placer gold	Bismuthinite		Moderate
E7	Silver King	Gold skarn	Gold, silver, garnet	Diorite	Moderate
E8	Liberty Prospect	Shear zone	Gold, silver, copper, molybdenum, nickel	Hornfels	Unknown
E9	Dunkle Coal Mine	Subbituminous coal		Sedimentary rocks	Moderate
E10	Lucrata	Shear zone	Gold, silver	Hornfels	Moderate
E11	Snoopy	Gold sharn	Gold, silver, copper, lead, garnet	Andesite and diorite	Moderate
E12	Nim Prospect	Gold skarn	Gold, silver, copper, lead, garnet	Diorite and andesite	Moderate
E13	Squaw Creek	Placer gold			Low
E14	Bull River	Placer gold			Moderate

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
E15	Costello	Placer gold			Moderate
E16	Lookout Mountain	Silver breccia	Silver, lead, copper, antimony, zinc	Quartz porphyry	Low
E17	Bryn Mawr Creek	Placer gold	Gold, silver, copper		Unknown
E18	Riverside	Limestone replaced by silicates (skarn)	Gold, silver, copper, lead	Limestone	Unknown
E19	Golden zone	Breccia pipe	Copper, lead	Quartz diorite	Moderate
E20	Lindfors	Disseminated gold	Lead, zinc, antimony, bismuth	Quartz diorite and argillite	Unknown
E21	Copper King	Gold in argillite	Silver, copper, tungsten, zinc	Silicified argillite	Unknown
E22	Blind Creek	Breccia	Lead, silver	Siltstone and conglomerate	Unevaluated
E23	Ohio Creek	Tin greisen	Arsenopyrite	Quartz diorite	Moderate
E24	Silver Kitty	Gold in quartz veins in chert	Copper, antimony, zinc	Chert	Unknown
E25	Long Creek	Polymetallic vein	Gold, copper, silver, tin	Argillite	Moderate

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
E26	Alaska Jupiter	Disseminated	Gold, serpentine	Argillite	Unknown
E27	Middle Fork Chulitna	Placer gold			Unknown
E28	Copper Kitty	Unknown	Copper, silver		Unevaluated
E29	Christy Creek	Chromite in serpentinite	Nickel, plantinum-group minerals	Serpentinite	Low
E30	Ready Cash	Tin in quartz veins	Gold, silver, lead, zinc, copper	Basalt, limestone, argillite	Moderate
E31	McCallie Glacier Lode	Silicified polymetallic veins	Gold, silver, lead, antimony	Metavolcanic rocks	Moderate
E32	McCallie Placer	Placer gold			Unknown
E33	Metals Claim Group	Gold in silicified chert	Silver	Conglomerate	Unknown
E34	Partin Creek	Polymetallic	Gold, silver, copper, zinc	Basalt and limestone	Moderate
E35	Shotgun Creek Lode	Chromite in serpentinite	Nickel	Serpentinite	Low
E36	Shotgun Creek-Little Shotgun Creek Placers	Placer gold			Low
E37	Partin Creek Chrome	Chromite in serpentinite	Nickel, platinum-group minerals	Serpentinite	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
E38	Golden Bell	Placer gold			Low
E39	Eldridge Coal Creek	?	Manganese. copper, nickel	Marine sediments	Unevaluated
E40	Coal Creek Tin	Tin greisen	Silver, tungsten, zinc	Granite	Moderate
E41	Unnamed Occurrence Partin Creek	Gold in argillite		Argillite and chert	Unevaluated
E42	Unnamed	Gold in altered volcanic rocks	Silver, molybdenum	Felsic volcanic rocks	Unevaluated
E43	Sorefoot	Massive sulfide in serpentinite	Nickel, copper, chrome	Serpentinite	Unevaluated
E44	Kubek	Gold in metasedimentary rocks	Silver	Metasedimentary rocks	Unknown
E45	Eldridge	Gold in shear zone		Chert and argillite	Unevaluated
E46	Boedecker	Gold in quartz vein		Schist	Low

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
F1	Whistler Creek	Gold in quartz			Unevaluated
F2	Bluff Creek	Coal	Manganese, zirconium	Sedimentary rocks	Unevaluated
F3	Tokositna	Placer gold	Silver		Unknown
F4	Chulitna River	Placer gold			Low
F5	Buster and Gomphenema	Placer gold			Low
F6	Lookout 1-2	Placer gold			Unevaluated
F7	Curry	Molybdenite in granite		Granitic rock	Low
F8	McKinley View	Unknown			Unknown
F9	Starlite Mine	Placer gold			Unknown
F10	Susitna River	Placer gold			Unevaluated
F11	Bunco Creek	Placer gold			Unknown
F12	Canyon Creek	Placer gold	Silver		High
F13	Felsite	Gold in conglomerate	Platinum, palladium	Conglomerate	Low
F14	Ramsdyke Creek	Placer gold	Silver	Slate and graywacke	Moderate
F15	Bear Creek Mining	Placer gold			Unknown
F16	Bear Creek	Placer gold			Unknown
F17	Eddie Koontz	Placer gold			Unknown

APPENDIX G - NUMERICAL LISTING OF MINES, PROSPECTS, AND MINERAL OCCURRENCES -- Continued

Map No. see (fig. 10)	Name	Mineralization Type	Associated Elements	Host Rocks	Mineral Development Potential
F18	Second Creek	Placer gold			Low
F19	Crown First	Placer gold			Unevaluated
F20	Rocky Cummins	Gold in quartz veins	Arsenopyrite	Vein quartz	Low

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