RESULTS OF 1984 BUREAU OF MINES SITE SPECIFIC MINERAL INVESTIGATIONS IN THE VALDEZ CREEK MINING DISTRICT, ALASKA

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Donald P. Hodel, Secretary

BUREAU OF MINES

Robert C. Horton, Director

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft	foot
lb	pound
oz	ounce
ppm	parts per million
$st_{}$	short ton
yd^3	cubic yard

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ABSTRACT

During 1984, the Bureau of Mines conducted site specific mineral investigations in the Valdez Creek Mining District, Alaska. This study included a literature search and reconnaissance level field investigations. The literature search identified 243 mines, prospects, and occurrences within the Valdez Creek Mining District. During the field reconnaissance, 19 samples were collected from 5 deposits: Denali Copper Prospect, Valdez Creek Placer Mine, Black Creek Gold Mine, Windy Creek Placer Prospect, and Timberline Creek Gold Mines.

Based upon preliminary Bureau of Mines studies a four year mining district study is recommended in order to determine the mineral development potential of the Valdez Creek Mining District.

INTRODUCTION

During 1984, the Bureau of Mines (Bureau) conducted a literature search and reconnaissance level site specific studies of the mineralization occurring within three mining districts in South-central Alaska. These were the Yentna, Willow Creek, and Valdez Creek districts. This report contains a compilation of references available for the Valdez Creek Mining District, summarizes Bureau work completed in the district during 1984, and gives reasons why additional studies are warranted.

ACKNOWLEDGMENTS

The author wishes to acknowledge the cooperation of the following miners in the Valdez Creek Mining District for allowing Bureau personnel to visit their mine sites: Leo Mark Anthony, Denali Copper Prospect; Lightfoot Mining Company, Black Creek; and Denali Mining Company, Valdez Creek.

LOCATION AND ACCESS

The Valdez Creek Mining District encompasses the area drained by the Susitna River above the mouth of the Talkeetna River and the area drained by the Chulitna River and its tributaries (fig. 1). The area comprises approximately 6 million acres. Road access is provided by

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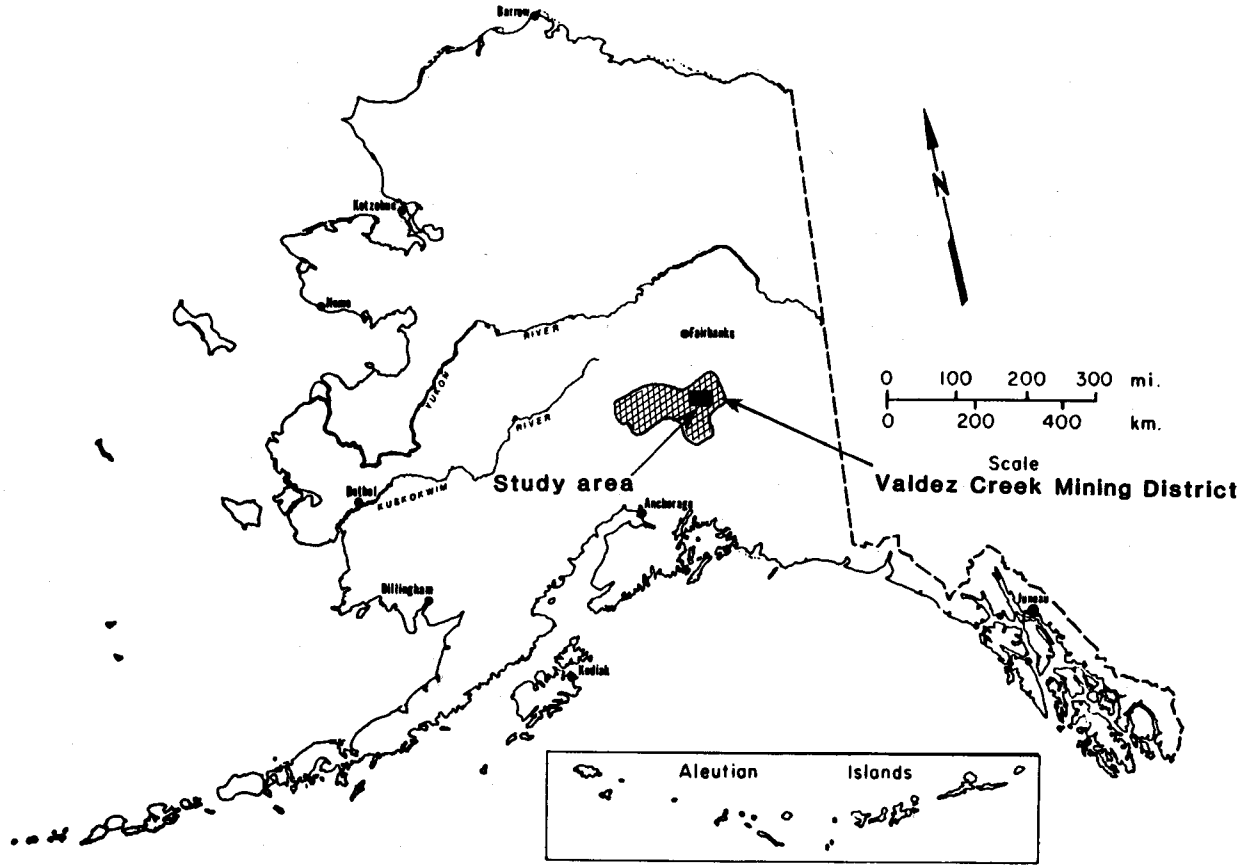

FIGURE 1. -- Location map of Valdez Greek Mining District, Alaska

the Parks, Richardson, and Denali Highways. Much of the district is accessible only by aircraft. The Clearwater Mountain area is in the northeastern portion of the district and includes the Valdez Creek and Windy Creek drainages (fig. 2). Access to these drainages is provided by poorly maintained mining roads which can be traversed by 4-wheel drive vehicles during drier portions of the summer season.

PHYSIOGRAPHIC SETTING

The Valdez Creek Mining District is within six Physiographic Provinces: (1) the Central and Eastern Part of the Alaska Range; (2) the Broad Pass Depression; (3) the Talkeetna Mountains; (4) the Clearwater Mountains; (5) the Gulkana Upland; and (6) the Copper Mountain Lowland (190)[2/]. The area ranges from a broad glaciated

2/Underlined numbers in parentheses refer to items in reference section at end of this report.

lowland with rolling morainal topography and outwash plains to rugged glaciated ridges up to 8,000 ft in elevation. Vegetation includes extensive stands of spruce, willow, and alder in the lowlying areas; stands of spruce and alders, and ground cover of tundra vegetation on the hillslopes; stunted spruce, lichen, and dwarf alpine vegetation on the rounded ridge crests; and lichen covered rocks on the ridges and peaks.

LAND STATUS

The Valdez Creek Mining District contains Federal, State, and private lands. The majority of the district is managed by the Bureau of Land Management (BLM). To determine current land status the Master Title Plats (MTP) can be reviewed at the BLM state office located in the Federal Building in Anchorage, Alaska.

MINING HISTORY

The first mineral discovery in the Valdez Creek Mining District occurred on August 15, 1903, when the Monahan Party discovered placer gold in the gravel deposits on Valdez Creek in the Clearwater Mountains (6). This discovery sparked an influx of prospectors to the area during the next several years. Valdez Creek has been the largest placer gold producer in the district (table 1). Several lode gold deposits in the Valdez Creek area, including the Timberline and Black Creek lodes, were discovered around 1906.

Mineral deposits in the Chulitna River area which is in the western portion of the district, were first discovered in 1907 with the discovery of placer gold (131). Lode copper deposits were discovered in the same area in 1911. The Golden Zone Mine was the sole metal

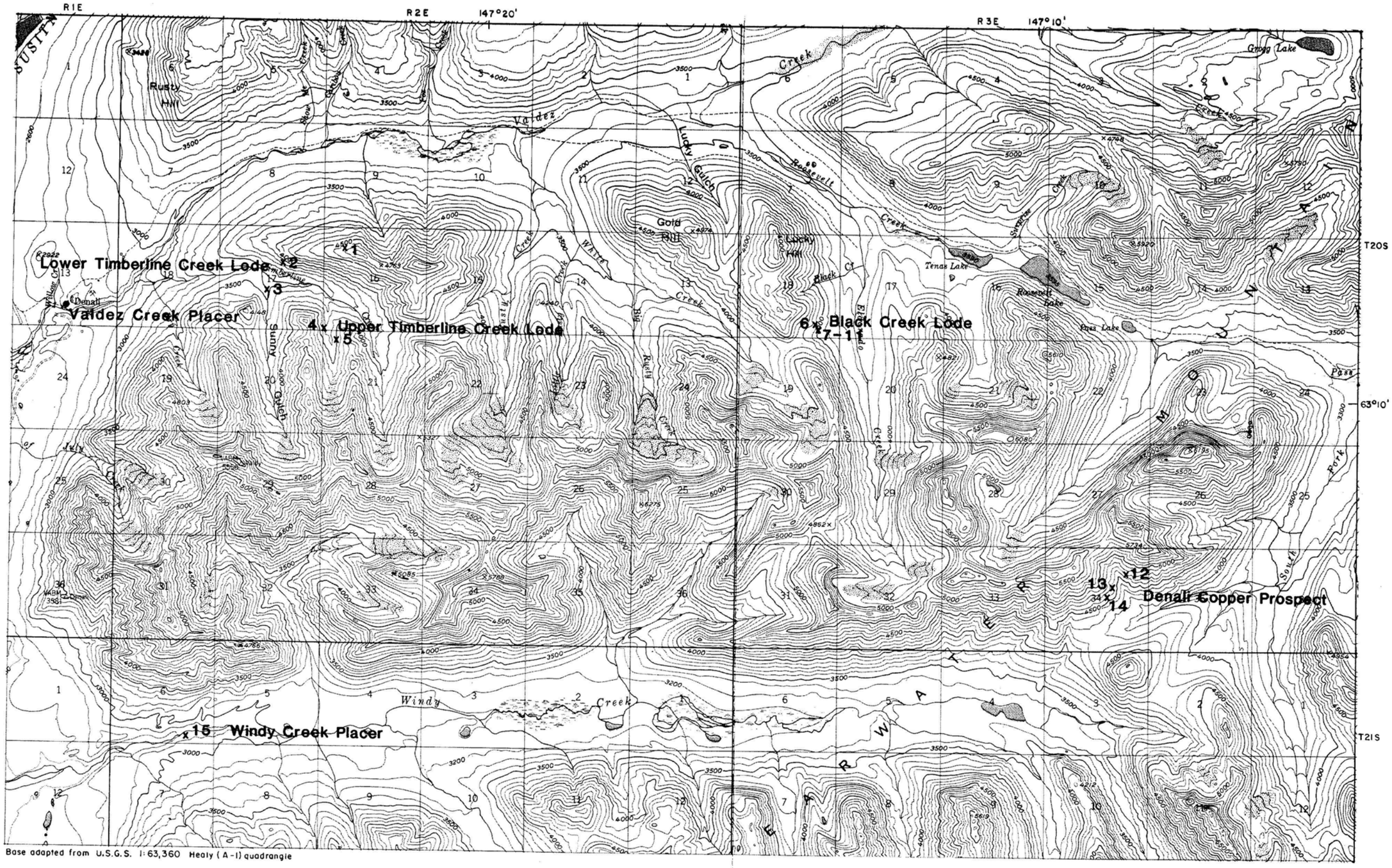

FIGURE 2. -- Sample location map of Clearwater Mountains study area in the Valdez Creek Mining District, Alaska

producer (table 1), with several other prospects undergoing development work shortly after their discoveries. The Dunkle Coal Mine produced a limited quantity of coal between 1940 and 1954 (table 1).

Lode copper deposits in the Maclaren River area, in the eastern portion of the district, were first discovered in 1918. None of the deposits have had recorded production, though several deposits have undergone significant development work.

Placer mining activity occurred during 1984 and 1985 on Valdez Creek (Denali Mining Co.) and several of its tributaries. Lode gold mining occurred on Black Creek in 1984. Recent development work has taken place at the Denali Copper Prospect.

TABLE 1. - Mine production of Valdez Creek Mining District, Alaska through 1985

Mine	Gold (troy oz)	Silver (oz)	Copper (lbs)	Lead (lbs)	Coal (tons)	
Valdez Creek placer.	104,617	NP	NA	NA	NA	(1903-1985)
White Creek placer..	484	NP	NA	NA	NA	(up to 1931)
Canyon Creek placer.	9	1	NA	NA	NA	(up to 1920)
Golden Zone Mine....	1,581	8,617	40,648	2,976	NA	(1911-1942)
Dunkle Mine.....	NA	NA	NA	NA	64,000	(1940-1954)
Total	106,691	8,617	40,648	2,976	64,000	

NP No production records
NA Not appicable

PREVIOUS STUDIES

Numerous mineral studies have been conducted in the Valdez Creek Mining District by the U.S. Geological Survey (USGS), State of Alaska Territorial Department of Mines (TDM) and Division of Geological and Geophysical Surveys (DGGS), Bureau, private companies, and by graduate students.

The USGS first reported on the district as early as 1908 by Brooks (6). Since that time, Brooks (7-20), Capps (22-25), Cobb (33-44), Hawley (64-71), Moffit (109-114), Smith (147-163), Tuck (183-184), and many other authors have written reports. Alaska Mineral Resource Assessment Program (AMRAP) studies were published on the Talkeetna Mountains Quadrangle in 1978 (50-55, 116, 121-123, 176, 182), and on the Talkeetna Quadrangle in 1979 (46-49, 86, 97-108, 177).

The TDM began writing reports on the area as early as 1918 including those by Jasper (76-80), Joesting (81-83), and others (2, 56, 74, 91, 136-140, 144-145, 180, 191, 197). The DGGS began writing reports in 1964 by Kaufman (87) and later by Bundtzen (21), and others (57, 59, 127, 129-130, 141, 167-174, 179, 185).

The Bureau has written site specific reports including those by Rutledge (133-134), Wells (195), and Mulligan (115).

Several private reports have been written on the area by Renshaw (125-126), Thurow (181), and Salisbury and Dietz (135).

M.S. and Ph.D. dissertations have been written by Glavinovich (60) and Stevens (178).

PRESENT INVESTIGATION

From a detailed literature search, 243 mines, prospects, and occurrences were identified in the Valdez Creek Mining District. Of these, only 5 mines have had recorded production (table 1). During a 5 day field reconnaissance, 19 samples were collected from four lode mines and two placer deposits in the Clearwater Mountains area (fig. 2). The lode mines were the Denali Copper Prospect, Upper Timberline Creek, Lower Timberline Creek, and Black Creek Mine. The placer deposits were the Valdez Creek Mine and Windy Creek placer. Results for 15 of the samples are listed in the appendix. A grab sample taken from the Valdez Creek Placer Mine was processed at the Bureau's lab in Anchorage.

Samples collected from the Denali Copper prospect contained from 180 to 56,000 ppm copper, 15 to 25 ppm lead, 20 to 265 ppm zinc, 430 to 4,400 ppm manganese, and 750 to 3,400 ppm titanium. Upper Timberline Creek contained from 0.078 to 0.822 oz/st gold, 0.04 to 0.41 oz/st silver, 255 to 800 ppm copper, and 500 to 800 ppm arsenic. Lower Timberline Creek contained from 0.107 to 0.820 oz/st gold, 0.07 to 0.68 oz/st silver, 75 to 135 ppm copper, and 15 to 800 ppm lead. Black Creek lode contained from <0.003 to 0.169 oz/st gold, <0.01 to 0.33 oz/st silver, 50 to 750 ppm arsenic, 25 to 65 ppm copper, and 15 to 80 ppm lead.

Windy Creek placer contained 0.0027 oz/yd^3 gold. A grab sample taken from the paystreak at the Valdez Creek Mine contained 0.3421 oz/yd^3 gold. The gold in the sample ranges from -6 to +60 mesh in size and has a flat or round character.

CONCLUSIONS

On the basis of available literature and a reconnaissance level site specific field investigation, it can be suggested that three significant areas of mineralization are included in the Valdez Creek Mining District. These areas are the Chulitna River-Broad Pass area, Clearwater Mountains area, and the Maclaren River-Glacier area.

Although a large number of references are available for the Valdez Creek Mining District, very little site specific work relating to mineral development potential has been completed. Most work of this nature was done without the benefit of modern exploration and mineral resource appraisal techniques.

Several operating placer mines and one active lode gold mine are present in the Clearwater Mountains. Several additional deposits are being developed.

These activities, previous mining history, lack of modern mineral data, and encouraging results provided by 1984 Bureau sampling suggest that the Valdez Creek Mining District has significant mineral development potential. Additional work is recommended to determine ore reserves, study beneficiation technologies, conduct economic feasibility studies, and address the economic, infrastructure, and legislative effects on mineral development in the Valdez Creek Mining District.

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APPENDIX - SAMPLE RESULTS FROM THE VALDEZ CREEK MINING DISTRICT, ALASKA

Explanation

Sample Number/Year : Refers to field sample numbers and year sample was taken. Sample locations are shown on figure 2.

Material Type : Refers to type of material collected at the sampling site. The following material types were collected.

- Stream Sed - Stream sediment
- SL/SS/CG - Slate, sandstone, conglomerate
- Maf Volc - Mafic volcanic rock
- Maf Plut - Mafic plutonic rock
- Fel Plut - Felsic plutonic rock
- Fel Plut Q - Felsic plutonic rock with quartz veins
- Sed Rk/Q - Sedimentary rock with quartz veins
- Placer - Concentrates from 1/10 cu.yd. of gravel run through a sluice box
- Calc - Calcite vein
- Sed/Volc - Sedimentary and volcanic rocks in area

Rock Type : Refers to rock types in the area of sampling as shown on 1:250,000 scale geologic maps. The rock types mapped as being present are:

- Qal - Unconsolidated deposits
- Meta Sed - Metasedimentary rocks, including all non-igneous rocks
- Maf Volc - Mafic volcanic rocks
- Fel Int - Felsic intrusive rocks

Rock Age : Refers to the geologic age of the underlying rock groups as shown on 1:250,000 scale geologic maps.

Quad 4 mile/1 mile : Refers to the 1:250,000 and 1:63,360 scale USGS quadrangle maps covering the area.

Sec/T/R/Mer : Refers to section, township, range, and meridian in which sample was collected.

Fbx - Fairbanks

APPENDIX - SAMPLE RESULTS FROM THE VALDEZ CREEK MINING DISTRICT, ALASKA - Continued

Location/Property	:	Refers to geographic location of sampling site and name of mine or claim.
KX/MAS/File	:	Refers to the Kardex number, Mineral Availability System (MAS) number, and Bureau file number.
Proj. No./Sub.	:	Refers to the project and/or subdivision the sample was taken for.
E. Sp.	:	Refers to semiquantitative emission spectrographic technique analysis. Results given in parts per million (ppm) unless otherwise noted.
AA/Wet (Geochem)	:	Refers to quantitative atomic absorption spectrophotometric technique analysis. Results given in parts per million (ppm).
Assay	:	Refers to fire assaying technique analysis. Results given in oz/st.

Sample Number/Year	1 / 84	2 / 84	3 / 84
Material Type	Quartz	Quartz	Metased/Q
Rock Type	Metased	Metased	Metased
Rock Age	Triassic	Triassic	Triassic
Quad 4 mile/1 mile	Healy / A-1	Healy / A-1	Healy / A-1
Sec/T/R/Mer	16 / 20S/ 2E /Fbx	17 / 20S/ 2E / Fbx	17 / 20S/ 2E / Fbx
Location/Property	Timberline Creek	Timberline Creek	Timberline Creek
KX/MAS/File	11 / 121 / 121	11 / 121 / 121	11 / 121 / 121
Proj. no./Sub.	Valdez Creek	Valdez Creek	Valdez Creek
Sample Type			

Element	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay
Aluminum									
Antimony									
Arsenic		<10			10			60	
Barium									
Beryllium									
Bismuth									
Boron									
Calcium									
Cadmium									
Chromium									
Cobalt		15			5			15	
Columbium									
Copper		80							
Fluorine									
Gallium									
Germanium									
Gold			0.107			0.292			0.820
Hafnium									
Indium									
Iron		2.1			2.9			3.7	
Lanthanum									
Lead		20			15			800	
Lithium									
Manganese									
Magnesium									
Molybdenum									
Niobium									
Nickel									
Phosphorous									
Platinum									
Rhenium									
Scandium									
Silver			0.07			0.68			0.16
Silicon									
Sodium									
Strontium									
Tantalum									
Tellurium									
Thallium									
Tin									
Titanium									
Tungsten									
Vanadium									
Yttrium									
Zinc									
Zirconium									

Sample Number/Year	4 / 84	5 / 84	6 / 84
Material Type	Maf Volc / Q	Quartz	Quartz
Rock Type	Metased	Metased	Metased
Rock Age	Triassic	Triassic	Triassic
Quad 4 mile/1 mile	Healy / A-1	Healy / A-1	Healy / A-1
Sec/T/R/Mer	16/ 20S/ 2E / Fbx	21 / 20S/ 2E / Fbx	18 / 20S / 2E / Fbx
Location/Property	Timberline Ck/Campbell	Timberline Ck/Campbell	Black Ck/Black Ck Lode
KX/MAS/File	116/ 120 / 120	116 / 120 / 120	10 / 117 / 117
Proj. no./Sub.	Valdez Creek	Valdez Creek	Valdez Creek
Sample Type			

Element	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay
Aluminum									
Antimony									
Arsenic		550			800			50	
Barium									
Beryllium									
Bismuth									
Boron									
Calcium									
Cadmium									
Chromium									
Cobalt		30			30			<5	
Columbium									
Copper		225			800			35	
Fluorine									
Gallium									
Germanium									
Gold			0.882			0.078			0.169
Hafnium									
Indium									
Iron		8.2			10			1.2	
Lanthanum									
Lead		50			30			80	
Lithium									
Manganese									
Magnesium									
Molybdenum									
Niobium									
Nickel								<5	
Phosphorous									
Platinum									
Rhenium									
Scandium									
Silver			0.41			0.04			0.33
Silicon									
Sodium									
Strontium									
Tantalum									
Tellurium									
Thallium									
Tin									
Titanium									
Tungsten									
Vanadium									
Yttrium									
Zinc									
Zirconium									

Sample Number/Year	7 / 84	8 / 84	9 / 84
Material Type	Quartz	Quartz	Quartz
Rock Type	Metased	Metased	Metased
Rock Age	Triassic	Triassic	Triassic
Quad 4 mile/1 mile	Healy / A-1	Healy / A-1	Healy / A-1
Sec/T/R/Mer	18/ 20S/ 3E / Fbx	18 / 20S/ 3E / Fbx	18 / 20S / 3E / Fbx
Location/Property	Black Ck/Black Ck Lode	Black Ck/Black Ck Lode	Black Ck/Black Ck Lode
KX/MAS/File	10 / 117 / 117	10 / 117 / 117	10 / 117 / 117
Proj. no./Sub.	Valdez Creek	Valdez Creek	Valdez Creek
Sample Type			

Element	E. Sp AA/Wet Assay	E. Sp AA/Wet Assay	E. Sp AA/Wet Assay
Aluminum			
Antimony			
Arsenic	750	500	420
Barium			
Beryllium			
Bismuth			
Boron			
Calcium			
Cadmium			
Chromium			
Cobalt	15	10	20
Columbium			
Copper	64	45	30
Fluorine			
Gallium			
Germanium			
Gold	0.133	0.013	0.006
Hafnium			
Indium			
Iron	3.5	3.1	4.8
Lanthanum			
Lead	30	15	20
Lithium			
Manganese			
Magnesium			
Molybdenum			
Niobium			
Nickel	<5	<5	5
Phosphorous			
Platinum			
Rhenium			
Scandium			
Silver	0.21	<0.01	<0.01
Silicon			
Sodium			
Strontium			
Tantalum			
Tellurium			
Thallium			
Tin			
Titanium			
Tungsten			
Vanadium			
Yttrium			
Zinc			
Zirconium			

Sample Number/Year	10 / 84	11 / 84	12 / 84
Material Type	Quartz	Mill Pr.	Maf Volc
Rock Type	Metased	Metased	Mafvol
Rock Age	Triassic	Triassic	Triassic
Quad 4 mile/1 mile	Healy / A-1	Healy / A-1	Healy / A-1
Sec/T/R/Mer	18/ 20S/ 3E / Fbx	18 / 20S/ 3E / Fbx	34 / 20S / 3E / Fbx
Location/Property	Black Ck/Black Ck Lode	Black Ck/Black Ck Lode	Windy Ck/Denali
KX/MAS/File	10 / 117 / 117	10 / 117 / 117	142 / 008 / 8
Proj. no./Sub.	Valdez Creek	Valdez Creek	Valdez Creek
Sample Type			

Element	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay	E. Sp	AA/Wet	Assay
Aluminum									
Antimony									
Arsenic		130			600				
Barium									
Beryllium									
Bismuth									
Boron									
Calcium									
Cadmium									
Chromium									80
Cobalt		20			5				10
Columbium									
Copper		25			65				180
Fluorine									
Gallium									
Germanium									
Gold			<0.003			0.008			
Hafnium									
Indium									
Iron		4.8			3.5				3.8
Lanthanum									
Lead		30			20				25
Lithium									
Manganese									4400
Magnesium									
Molybdenum									
Niobium									
Nickel		<5			<5				150
Phosphorous									
Platinum									
Rhenium									
Scandium									
Silver			<0.01			<0.01			
Silicon									
Sodium									
Strontium									
Tantalum									
Tellurium									
Thallium									
Tin									
Titanium									3400
Tungsten									
Vanadium									
Yttrium									
Zinc									265
Zirconium									

Sample Number/Year	13 / 84	14 / 84	15 / 84
Material Type	Maf Volc	Maf Volc	Placer
Rock Type	Mafvol	Mafvol	Qal
Rock Age	Permian-Triassic	Permian-Triassic	Cretaceous
Quad 4 mile/1 mile	Healy / A-1	Healy / A-1	Healy / A-1
Sec/T/R/Mer	34 / 20S/ 3E / Fbx	34 / 20S/ 3E / Fbx	6 / 21S/ 2E / Fbx
Location/Property	Windy Ck / Denali	Windy Ck / Denali	Windy Ck / Placer
KX/MAS/File	142/ 008 / 8	142 / 008 / 8	151 / 171 / 171
Proj. no./Sub.	Valdez Creek	Valdez Creek	Valdez Creek
Sample Type			

Element	E. Sp AA/Wet Assay	E. Sp AA/Wet Assay	E. Sp AA/Wet Assay
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Bismuth			
Boron			
Calcium			
Cadmium			
Chromium	10	120	
Cobalt	45	<5	
Columbium			
Copper	5.6 pct	370	
Fluorine			
Gallium			
Germanium			
Gold			0.0027 oz/cu.yd.
Hafnium			
Indium			
Iron	19	0.63	
Lanthanum			
Lead	15	15	
Lithium			
Manganese	2200	430	
Magnesium			
Molybdenum			
Niobium			
Nickel	10	<5	
Phosphorous			
Platinum			
Rhenium			
Scandium			
Silver			
Silicon			
Sodium			
Strontium			
Tantalum			
Tellurium			
Thallium			
Tin			
Titanium	750	1300	
Tungsten			
Vanadium			
Yttrium			
Zinc	215	20	
Zirconium			