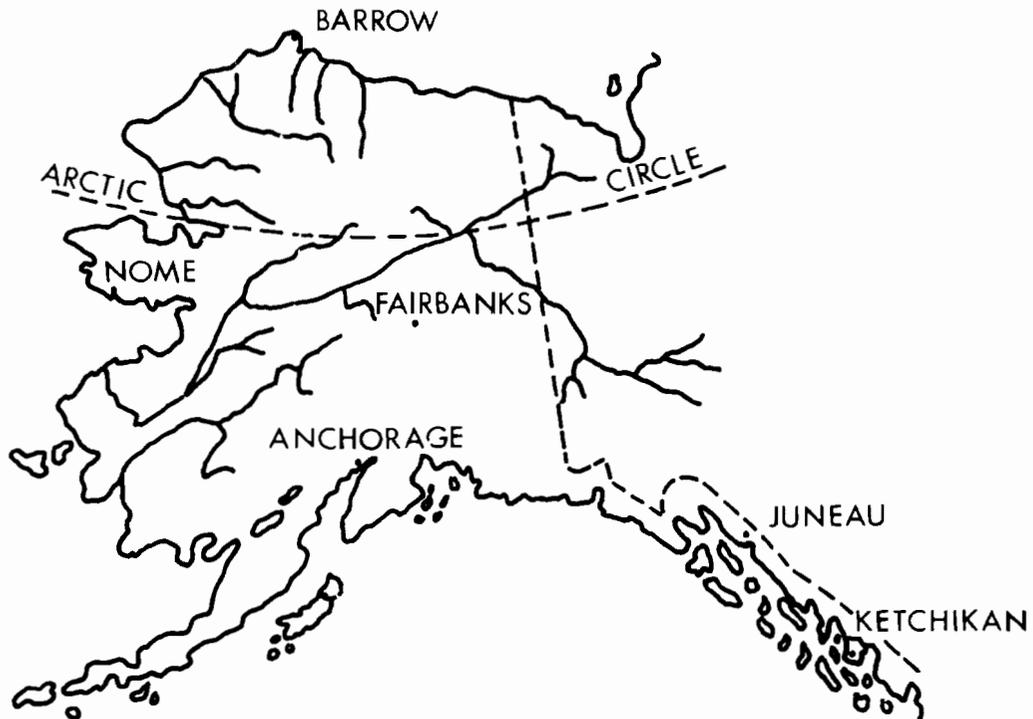


STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES



DIVISION OF MINES AND GEOLOGY

REPORT
FOR THE YEAR

1968

COLLEGE, ALASKA

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STATE OF ALASKA

Keith H. Miller – Governor

DEPARTMENT OF NATURAL RESOURCES

Thomas E. Kelly – Commissioner

DIVISION OF MINES AND GEOLOGY

James A. Williams – Director

REPORT
FOR THE YEAR
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Keith H. Miller - Governor

STATE OF ALASKA

D I V I S I O N O F M I N E S A N D G E O L O G Y S T A F F

DECEMBER 31, 1968

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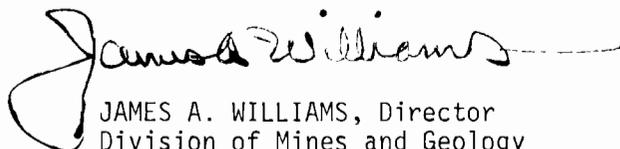
Dear Sir:

It is a pleasure to transmit to you this Annual Report of the Division of Mines and Geology covering the calendar year 1968. The report summarizes mining production, exploration, and developments during the year. The activities and accomplishments of the Division are outlined; our geological investigations and laboratory work are briefly described, and details on information and services available to the public are included.

Mining exploration work by major companies and private individuals is increasing, and interest in Alaskan mining possibilities continues to grow. However, we should by all possible means expand our geological work, institute new programs, provide incentives, disseminate useful and favorable information, and otherwise do all we can to encourage accelerated exploration and create an image of stable economic conditions. Following discovery of an ore body, several years of exploration and development are usually required to bring it into production. This requires the industry to look many years ahead when making decisions on where to spend exploration money.

This Division will continue to foster and assist the growth of the mining industry in the best interests of the State.

Respectfully submitted,

A handwritten signature in cursive script that reads "James A. Williams". The signature is written in black ink and is positioned above the typed name and title.

JAMES A. WILLIAMS, Director
Division of Mines and Geology
Box 5-300, College, Alaska 99701

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F O R E W O R D

For convenience the State has been divided into six arbitrary units (fig 1). The boundaries of these units are based on bedrock geology, topography, parallels of latitude, and meridians of longitude. The five units are as follows:

1. Arctic Alaska, including the Brooks Range and other parts of the State north of the Arctic Circle.
2. Interior Alaska, including that part of the State south of the Arctic Circle, north of the Alaska Range, and east of meridian 153° W.
3. Western Alaska, including the Seward Peninsula, Pribilof Islands, and other parts of the State south of the Arctic Circle, northwest of the Alaska Range, and west of meridian 153° W.
4. Southwestern Alaska, including the Aleutian Islands, Kodiak Island, and the Alaska Peninsula south of parallel 59° N.
5. South-Central Alaska, including the Alaska Range, adjacent mountainous terrain, and intermediate lowlands.
6. Southeastern Alaska, including all of the State east of meridian 141° W.

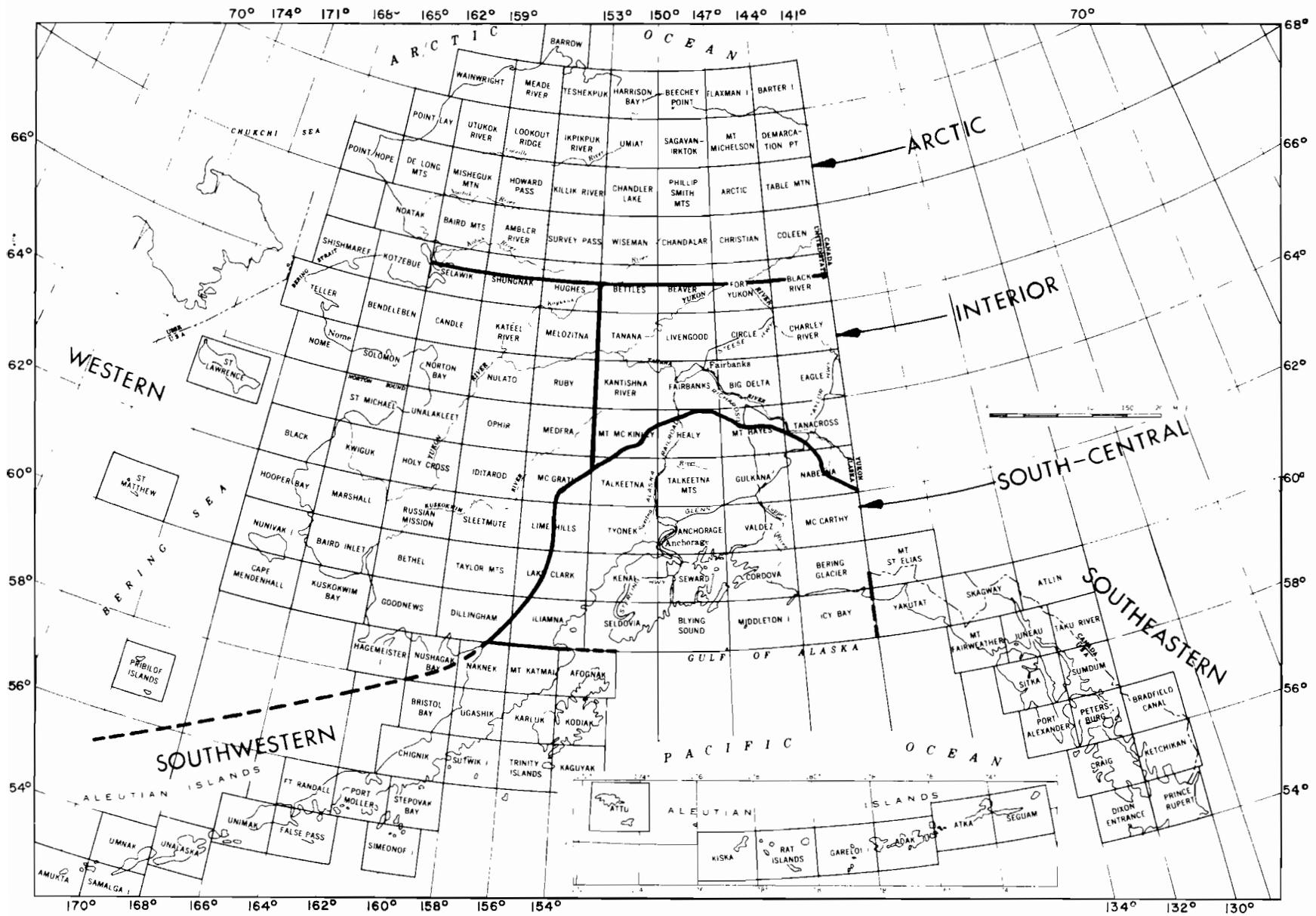


Figure 1

DIVISIONS OF ALASKA, AS USED IN THIS REPORT

THE MINING INDUSTRY

MINERAL PRODUCTION

Table 1 presents a comparison of mineral production in 1967 and 1968. Total mineral production is estimated at \$218.6 million in 1968 versus \$134.6 million in 1967. Oil and gas production increased from \$95.5 million to \$187.9 million with the Cook Inlet area being the predominant producer. Production of coal, stone, sand and gravel, silver, and gold all decreased in 1968. There was no copper production in 1968. The cumulative total mineral production of Alaska is now \$1,967,328,000 of which \$759,853,000 has been in gold.

After only ten years, the value of petroleum production in Alaska is rapidly approaching 2/3 of the ninety year total of gold production values; it passed the half way mark in 1968.

Table 1
Mineral Production in Alaska

	1967		1968(1)	
	Quantity	Value (Thousands)	Quantity	Value (Thousands)
Antimony---short tons antimony content	10	W		
Coal-----thousand short tons	930	7,178	812	5,034
Gold-----troy ounces	22,948	803	21,000	814
Natural Gas-----million cubic feet	39,927 (2)	7,269	49,326 (?)	8,400
Petroleum, Crude-----thousand barrels	28,917 (3)	88,187	66,148 (3)	179,500
Sand and Gravel----thousand short tons	22,370	26,248	17,585	20,729
Silver-----thousand troy ounces	6	9	3	6
Undistributed (4)		<u>4,924</u>		<u>4,117</u>
Totals		134,628		218,600

(1) Figures for 1968, except petroleum and natural gas, are preliminary and subject to revision.

(2) Includes only gas sold.

(3) Includes only oil sold. Additional small amounts were produced during testing of new wells.

(4) Includes barite, gem stones, lead, mercury, peat, platinum group metals, stone, and tin.

W Withheld and included under "Undistributed" to avoid disclosing individual company confidential data.

Note: The above statistics were prepared under a cooperative agreement for the collection of mineral data between the Bureau of Mines, United States Department of the Interior, and the Division of Mines and Geology, Department of Natural Resources, State of Alaska. Figures for coal, petroleum, natural gas, and undistributed commodities are presented on authority of the Division of Mines and Geology only.

Table 2
Production of Major Commodities since 1949
Dollar Value (Thousands)

Year	Gold	Mercury	Coal	Oil and Gas	Total all Production (Millions)
1950	\$ 10,125	\$	\$ 3,033	\$	\$ 17.9
1951	8,387		3,767		19.5
1952	8,420	6	5,779		26.3
1953	8,882	8	8,452		24.3
1954	8,699	277	6,442		24.4
1955	8,725	12	5,759		25.4
1956	7,325	853	6,374		23.4
1957	7,541	1,349	7,296		30.2
1958	6,525	774	6,931		20.9
1959	6,262	851	6,869	311	20.5
1960	5,887	940	6,318	1,496	21.9
1961	3,998	816	5,868	17,776	34.7
1962	5,784	711	6,409	31,657	54.2
1963	3,485	76	5,910	33,760	67.8
1964	2,045	95	5,008	35,490	66.1
1965	1,479	104	6,095	35,614	83.2
1966	956	101	6,953	50,418	86.3
1967	803	79	7,178	95,455	134.6
1968	814	78 (1)	5,034	187,900	218.6
	<u>106,142</u>	<u>7,130</u>	<u>115,475</u>	<u>489,877</u>	<u>1,000.2</u>

(1) Estimate - no data available 1968.

Table 3
Physical Volume of Alaska Mineral Production (1)

Mineral	Quantity	Years
Total gold-----troy ounces	29,944,000	1880-1968
Total silver-----troy ounces	19,075,000	1906-1968
Copper-----short tons	690,011	1880-1967
Coal-----short tons	20,631,000	1951-1968
Sand and gravel-----short tons	171,530,000	1958-1968
Crude petroleum-----42 gal bbls	159,714,917 (2)	1958-1968
Natural gas-----million ft ³	266,935	1948-1968
Stone-----short tons	10,893,000 (3)	1921-1966
Mercury-----760 lb flasks	34,999 (4)	1902-1968
Tin-----short tons	2,400 (3)	1902-1966
Chromite--(approx. 45%CR ₂ O ₃)--long tons	29,000	1917-1957
Tungsten-----short ton units WO ₃	7,000	1916-1958
Antimony--(approx. 53% Sb)---short tons	3,443 (4)	1928-1968
Lead-----short tons	25,014	1906-1968

- (1) Except platinum, uranium, barite, and other commodity figures which are confidential. 1968 production estimated and included in total.
- (2) Only other crude petroleum recorded production was from the Katalla area. From 1901 to 1932, 154,000 barrels of oil were produced there.
- (3) Production data, if any, withheld in 1967 and 1968.
- (4) Estimate - no data available 1968.

Precious Metals

Gold production continued to decline, but at a slower rate than in recent years. The value of gold produced showed an increase over 1967 as a result of higher gold prices on the free market. The United States Smelting Refining and Mining Company's last operating gold dredge worked on Hogatza River; it is expected to continue operating next year. The increasing price of gold has increased gold prospecting, and to some extent, mine development. A small increase in gold production is expected in 1969.

Platinum from the Goodnews Bay Mining Company remains the only major source of this precious metal in the United States. Exploration continued for platinum placer deposits in the Salmon River area. At least two major companies were searching for a lode source in the area.

Silver production declined by 50% from 1967. During 1968 silver was produced only as a by-product of gold operations. Several possible silver discoveries in south-central Alaska are encouraging for future silver production, though several years of exploration and development will be required before production begins.

Base Metals

Mercury production is reported to be less than 200 flasks. Robert Lyman operated his mine at White Mountain, and development and production of the old Shaffer property on Cinnabar Creek was undertaken by Diamond Alkali Company. Holloway and Rehard continued exploration and development in the Sleetmute area. Hope for increased production rests on the active exploration underway in the State.

Tin was mined by Richard Lee in a small placer operation at Tin City on the Seward Peninsula which accounted for the total production in the State.

Wrangell Consolidated Mining Company shipped small amounts of copper from reworked dumps at the Kennecott property at McCarthy to Japan via Vancouver B. C. over the Alaska Highway in 1967, but was idle in 1968.

Coal

Coal production suffered a setback with the May closure of the Evan Jones Mine in the Matanuska coal field, due to natural gas conversion at the military bases in the Anchorage area. Paul Omlin, operating the Premier Mine on a small scale, remains the only coal operator in the Matanuska field.

Coal production in the Nenana coal field on Healy Creek increased slightly from 1967. The 10 percent increase resulted from the growing power demands in the Fairbanks area as well as increased military demands. Production comes from two companies operating open pit mines. Usibelli Coal Mining Company produced 61% of the coal from the Nenana field, mostly from Center Pit and Apex Pit. Vitro Minerals Corp. produced the balance of the coal from one mine, the West Pit. Golden Valley Electric Association began operating its mine-mouth power plant during the summer. The power plant is located at Healy because it is cheaper to transport electricity than coal. According to G.V.E.A.'s Chief Engineer, utilizing coal at the mine location is expected to give them better cost per B.T.U. used than is enjoyed in Anchorage, where natural gas is the source of fuel.

Coal prices to the military bases in the Fairbanks area range from \$6.00 to \$6.33 per ton FOB Suntrana. Vitro contracted to mine and process 225,334 tons of coal for \$1,426,364 FOB and Usibelli contracted to mine and process 194,940 tons of coal for \$1,169,640 FOB.

Cortella Coal Corp. of Cordova shipped four tons of coal samples from the Bering coal field to Japan for testing.

Nonmetallics

Sand and gravel production decreased by 21 percent and stone production decreased by 31 percent of the 1967 figures as a result of decreased highway construction.

Barite, formerly shipped to Texas, is being processed in Alaska Barite Company's new plant at the mouth of the Kenai River. The barite is shipped from the company's mine at Castle Island near Petersburg to a new barge-mounted plant where drilling mud for the oil industry is produced.

Peat was produced in small quantities for use in local markets.

Jade production came from Jade Mountain and Cosmos Hills near Shungnak. Producers include Gene Joiner and Bill Munz. Alaska jade is purchased by jewelers and lapidary enthusiasts throughout North America and Europe. B and R Tug and Barge Company established a jade-cutting operation in Kotzebue. Native workers are employed.

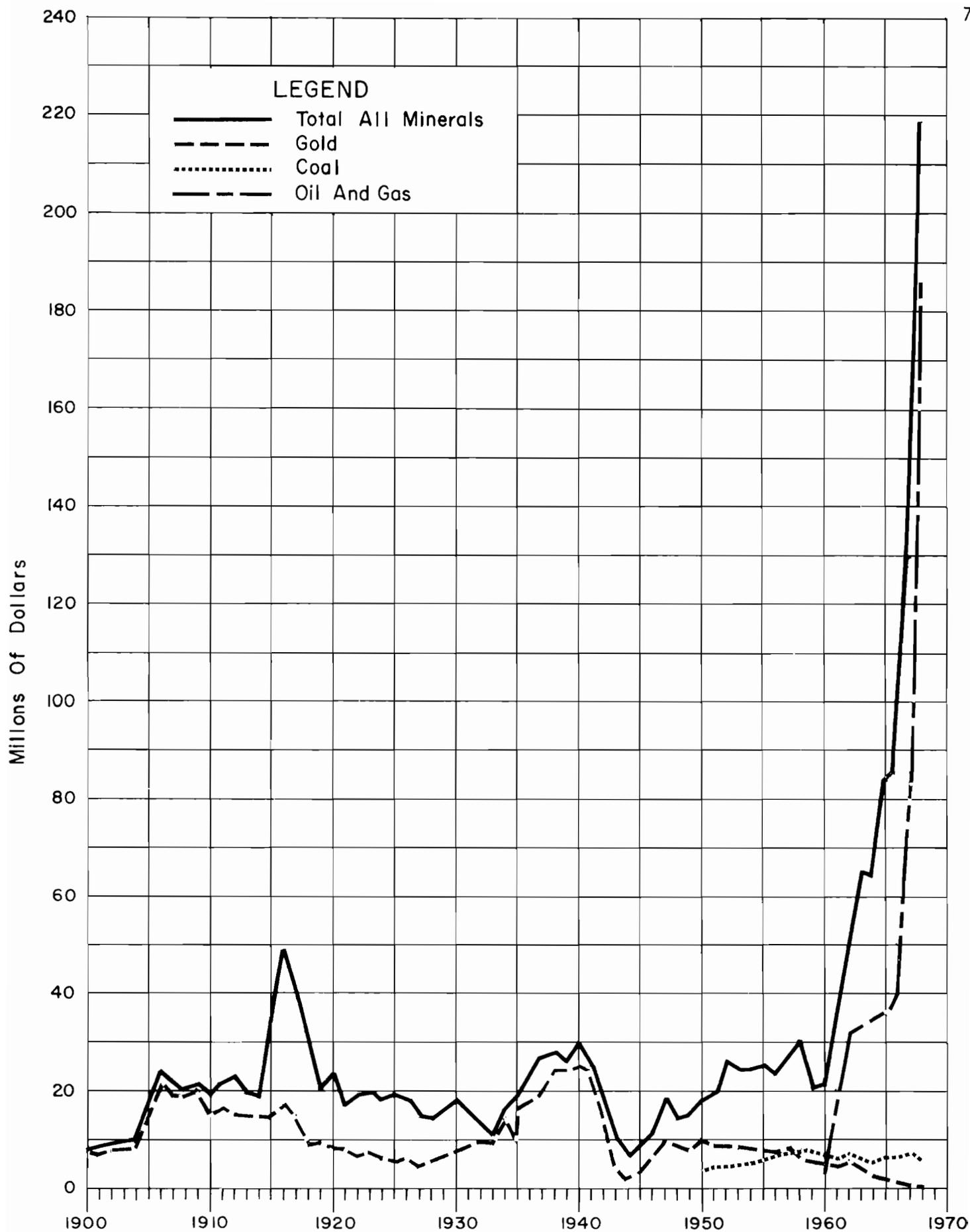


Figure 2

ANNUAL MINERAL PRODUCTION IN ALASKA, 1900-1968

PROSPECTING AND EXPLORATION

Arctic Alaska*

Funds spent in Arctic Alaska for exploration probably totaled about \$706,700. Most of the 4,561 new claims staked in Interior, Western and Arctic Alaska (fig 3) are north of the Arctic Circle.

Development of the Chandalar gold mining and milling facilities began early in 1968 by investigating, purchasing, and shipping mine and mill equipment. Frank Birch, manager of Chandalar Gold Mining Co., reported that a seven-man crew moved into Chandalar in late March and cleared an airstrip on lake ice. During April and May, 730,000 pounds of equipment were flown to Chandalar and were moved by tractor and sled to the mine site at Tobin Creek. House trailers and steel buildings were erected. They will serve as living quarters, shop, assay lab, office, and other facilities at the mine site. Other work included road improvement and maintenance, further trenching, airstrip construction, millsite preparation, stripping, construction of a mill tailing ditch, pouring concrete floors for steel buildings, and clearing ice from underground workings. Plans for 1969 include completion of an airstrip that will accommodate C-82 and C-46 aircraft. Millsites were leveled to grade this year and mill construction will continue next year. Ore from the Little Squaw and Mikado mines will be processed. In spite of a late spring and early fall, much progress was made during 1968.

Newmont Mining and U.S.S.R.&M. explored under a joint venture agreement in the Noatak River area. This was their second season in that vicinity.

The Kennecott Copper Corp. has turned its Bornite copper property back to Bear Creek Mining Co. for further evaluation. It is understood that Bear Creek will continue drilling there. Bear Creek also drilled in at least one other site in the Kobuk country in 1968. The company pursued intensive reconnaissance prospecting with a large crew in that area and elsewhere along the southern flanks of the Brooks Range.

Reed Mineral Exploration Co. of Pennsylvania extensively investigated a property long considered promising in the area of Wild River in the Bettles country.

The proposed railroad to the Arctic would help accelerate mining development as well as oil. This was pointed out by Natural Resources Commissioner Thomas E. Kelly in his address to the NORTH Commission. His report contained the following information:

"A long tectonic boundary between the Brooks Range geanticline and the Colville geosyncline is an excellent possibility for hardrock exploration. Several major faults have been mapped along it, more are probably hidden, and a number of granitic intrusives are known to exist along its general route.

"A radioactive anomaly exists in the Mt. Michelson granitic intrusive. Similar granitic intrusives exist along the north side of the Brooks Range which may be regarded as possible source rocks for uranium deposits which may exist in the north slope sediments.

"Oil shale is contained in the Triassic rocks which mostly make up the southern section of the Arctic Foothills Province. This feature runs from the coast to the vicinity of Mt. Michelson. The U. S. Geological Survey reports that "oil shale is common in an almost continuous belt of Triassic rocks exposed along the north slope of the Brooks Range."

"Six phosphate locations are known, some in the region from the headwaters of the Colville River to Anaktuvuk Pass and some in the Mt. Michelson area. Additional phosphate deposits may exist in any of the limey metamorphosed sediments north of the Brooks Range.

* See Figure 1 for designation of geographical divisions.

"Large areas of the North Slope are underlain by coal. Any of the Cretaceous rocks are likely to be coal-bearing. Coal reserves of northern Alaska total 19 billion tons of bituminous and 100 billion tons of lower grade coals. Some of the bituminous has been found by the USBM to have coking qualities when mixed with as little as 15% Utah coal."

Interior Alaska

Exploration expenditures in Interior Alaska during 1968 are estimated at \$119,400. The number of claims staked is not available; the data are combined with Western and Arctic Alaska (fig 3).

Busty Belle Mines, Inc., worked on developing its property in the Fox area. Limited underground drifting and cross-cutting was done. Surface prospecting consisted of trenching with a bulldozer. Work was started on a planned 50-ton-per-day mill.

Throughout the Interior, increased activity by individual prospectors was notable, probably caused by the promise of a rising gold price.

Pacific Construction Co. did extensive bulldozer trenching and rotary drilling on a large group of claims between Pedro and Fox Creeks.

Hanna Mining Corp. continued examining prospects and prospecting by geochemical methods.

Ed Hudson and Bill Ferguson continued exploration of their respective lode deposits near Livengood and on Ester Dome. Boyd Blair was again active at his property in the Bonfield.

Placer prospectors active during the year included Ernest Wolff, Dan Coben, and Ed Farrell on separate creeks in the Manley Hot Springs district.

Companies showing interest in the region's possibilities by at least preliminary investigations included American Exploration, International Mineral and Chemical, Hecla, Phelps Dodge, American Metals Climax, and International Mine Service of Whitehorse.

Western Alaska

Offshore prospecting was again noteworthy in the Nome area. A 1967 study by the U. S. Geological Survey, the U. S. Bureau of Mines and the University of Washington included offshore geophysical studies, bottom sampling and offshore drilling. Several valuable conclusions have been drawn as a result. In an abstract of this work, David M. Hopkins, U. S. Geological Survey Menlo Park, reported:

"Placer concentration of gold or tin may exist where beaches and streams have crossed these (glacial) drift areas during past intervals of low sea level."

Personnel of the U. S. Bureau of Mines research ship VIRGINIA CITY reported that gold was found in samples from each of the 49 holes drilled in 1967 in undersea placer deposits off the beaches of Nome.

Rowan Drilling Co. of Houston, Texas, was engaged by Ocean Science and Engineering to perform offshore exploration for gold in the Norton Sound area on permits totaling 85,000 acres. Offshore prospecting permits in the Nome region formerly controlled by Alaska Exploration Corp. of Anchorage were also being investigated by Rowan Drilling Co. The area is reported to aggregate some 100,000 acres.

Shell Oil and American Smelting and Refining are drilling this winter on leases held by Shell. The drilling is being done from sea ice.

Amerada Oil and Occidental Oil hold offshore permits, and are planning future work. Global Marine is also involved in offshore work in the area.

Newmont and U.S.S.R.&M. were associated in reconnaissance prospecting on the Seward Peninsula.

Humble Oil (Mining Division) investigated prospects on Seward Peninsula.

Mercury prospecting in the lower Kuskokwim area increased. Alaska Mines and Minerals is re-examining the Red Devil Mine for more ore. Holloway and Rehard prospected and did some drilling on two or three well-known mercury prospects. Diamond Alkali expended considerable effort on the old Shaffer property on Cinnabar Creek. Out of the Kuskokwim district, near Dillingham, Clayton Rasmussen and partner did development work at the Red Top mercury property on Marsh Mountain.

Consultant James Wylie was active in the field on a number of prospects in various locations.

Rhinehart Berg was reported to be pursuing work with a crew, a drill, and a bulldozer at the old Independence property on the Kugruk River.

It is estimated that the total amount spent on exploration in Western Alaska is \$1,243,000. The number of new claims staked in Western Alaska alone is not known but the total is probably small, because much of the exploration involved offshore prospecting permits and leases.

Southwestern Alaska

This part of Alaska was relatively quiet, according to reports. There was continued interest in the Unalaska sulfur deposits near and in Makushin Volcano. The Division received many requests for information on this sulfur during the year. No direct reports of 1968 investigations were received, but at least one field party visited the area in late 1967.

Sinclair Oil Co. was reported active with a hard rock crew on the Alaska Peninsula doing reconnaissance exploration.

Truman Emberg prospected Alaskan Peninsula beach sands.

Expenditures for the region probably totaled in the neighborhood of \$52,000.

South-Central Alaska

This was the second most active part of Alaska in exploration, though the offshore work at the Nome area beaches may have caused greater expenditures of money in the Western division. Largely responsible for the increased activity in south-central Alaska were announcements by the U. S. Geological Survey of lead-zinc-silver mineralization of possible commercial interest found during the course of its heavy metals program the previous summer. These discoveries were in the Alaska Range southwest of Mt. McKinley National Park and west of the Talkeetna district. Exploration expenditures for this part of Alaska in 1968 are estimated at \$848,700. Figure 3 shows that 1,267 new mining claims were staked in south-central and southwestern Alaska during 1968. Most of this activity was in south-central Alaska.

A great deal of staking and prospecting activity was evident in the areas described above. As mentioned, this was largely brought on by U. S. Geological Survey Circulars 559 and 569. St. Eugene Mining Co., Alaskamin Co., and others were the most active. Possibilities for future developments in this new area are excellent. St. Eugene continued development of its property in the Kasna Creek area south of Lake Clark, as well.

Bear Creek Mining Co. pursued extensive reconnaissance work in the Alaska Range in addition to its work in Northern Alaska.

Anchorage geologist Kirk Stanley kept a large crew of men busy drilling two properties in the Slana district with reported favorable results. One property is in a new area. Work by Stanley there resulted from earlier geological and geochemical work reported in a publication by a Division of Mines and Minerals geologist.

Alaskan Yukon Minerals, Inc. of Anchorage continued development of properties in the Copper River area.

Renewed interest was seen in the McCarthy district following earlier geophysical examinations and recent geochemical findings reported by the U. S. Geological Survey in their 1968 Circular 604.

Alaska coal production suffered a setback with the closing of the Evan Jones Mine near Palmer. However, the future of Alaska coal looks encouraging. Substantial renewed interest is being shown in the Beluga Coal Field, west of Anchorage, by a number of major companies. Evidence of drilling or channel sampling was observed from the air in several places.

Cortella Coal Corporation of Cordova announced that several tons of coal samples were shipped to Japan for testing by five of Japan's leading coal importers. Cortella has leases in the Bering River Coal Field, which it drilled and trenched during the year. Further information on this is included elsewhere in this publication. In a news release, Victor H. Rhine, President of Cortella Coal, announced that the summer's exploration disclosed eight million tons of recoverable coal. The company hopes to begin production soon with an ultimate goal of one million tons per year. Geologists and engineers from the Sumitomo Shoji Corp. of Japan worked actively with Cortella in the exploration activities for part of the summer.

Duval Corp. of Vancouver and others participated in a drilling program at Orange Hill, in the Nabesna area. This is a copper-moly porphyry possibility that has intrigued mining geologists for many years. Longyear was the drilling contractor.

Leo Mark Anthony supervised a prospecting crew doing reconnaissance work in south-central Alaska and other parts of Alaska as usual. This party has been active under Tennessee Corp. and its predecessors for more than ten years.

Wallace McGregor of Salt Lake City continued reconnaissance work with a crew of geologists in this and Interior regions.

Clyde Wetherell of Anchorage formed the Alvenco Company and was active in south-central as well as southeastern Alaska in reconnaissance work and claim staking.

"Rick" Richards continued prospect development work of a lead-zinc-silver prospect in the Slana district.

Gordon Burdick continued development of two copper properties in the McCarthy country. Old-timer Martin Radovan reportedly had a Florida metallurgical firm interested in one or two of his prospects on Glacier Creek in the same district.

Companies showing interest in various prospects in this part of Alaska included American Smelting and Refining, Bunker Hill, Hanna, Phelps Dodge, American Metals Climax, American Exploration, and Guggenheim.

Southeastern Alaska

From all reports, southeastern Alaska was the busiest region by a wide margin in 1968. One delighted prospector reported that there was a "mining company man behind every tree". Local helicopter services were used to capacity. Exploration expenditures for the region total an estimated \$1,544,000. The records section of the Division of Mines and Geology indicates that 1,540 new claims were staked in southeastern Alaska during 1968 (fig 3).

Newmont Exploration, Ltd. and Kendrick Bay Mining Co. entered into a joint venture agreement which provides for the future development and mining of the Kendrick Bay uranium holdings on Bokan Mountain on Price of Wales Island. Newmont and USSR&M Co. together engaged in field investigations of a number of promising areas on Prince of Wales Island and elsewhere. Newmont with another partner drilled its patented nickel property beneath Brady Glacier in Glacier Bay National Monument. This deposit is reported to be similar to the famous Sudbury, Ontario nickel deposit.

An Anchorage syndicate known as Alvenco, under the direction of Clyde Wetherell, prospected and actively staked claims.

John Brockway diamond-drilled his copper prospect on Baker Peak on Chichagof Island.

Global Marine did some offshore prospecting with marine seismic work and bottom sampling in the Gastineau Channel and Stephens Passage near Juneau.

Humble Oil was active in southeastern Alaska. Geophysical and geological reconnaissance were done over a large area.

Superior Oil Co. drilled the Muir Inlet "Nunatak" molybdenum prospect in Glacier Bay National Monument; Longyear Drilling Co. was the contractor. This property has interesting "Climax-like" geology.

In general, nickel prospecting in southeastern Alaska has become very active.

American Smelting & Refining Co. investigated prospects, took an option on two and did some drilling.

Prospector Jim Walper of British Columbia put in his usual energetic season supervising a prospecting crew in southeastern Alaska and was instrumental in raising company interest in at least one additional prospect. Exploration continued at McLean Arm where Walper found a prospect earlier. It may be a copper porphyry.

Utah Construction and Mining Company returned to its Mount Andrew copper-iron prospect on Prince of Wales Island for renewal of exploration work after an absence of several years.

A resumption of talks between U. S. Steel and Japanese interests regarding possible development of the Klukwan iron deposit was reported. This deposit has received no significant attention since 1959. New blast furnace techniques now enable the Japanese to cope with the titanium content. The deposit is estimated to contain some 800 million tons of ore, much of it in an alluvial fan.

International Nuclear Corp. did some preliminary investigations in preparation for field reconnaissance work in 1969.

Bill Huff and associates of Ketchikan had a very busy season developing prospects in several areas and negotiating with various companies for possible options.

Cambridge Mining Corp. started drilling on a copper show on Gravina Island late in the season.

American Metals Climax Corp. investigated some prospects. Phelps Dodge and Cyprus were both in the region with one or two men.

Prospectors Oscar Newlun, Paul Pieper, Don Ross, John Worthington, Alan McCay, John Ballard, James Mardis, Herman Kloss, and others were active on an individual basis.

General

International Nuclear Corporation announced that it has entered the hardrock exploration field in Alaska. Phil R. Holdsworth has been named Alaska office manager for the company; his address is 1009 Mendenhall Apartments, Juneau, Alaska. Mr. Holdsworth, a mining engineer, was formerly the Commissioner of the Department of Natural Resources. He stated that International Nuclear is an "across the board" natural resources company. Early inquiries and preliminary studies by a number of other companies and syndicates not before active indicate increased exploration in 1969 over that of 1968.

Two officials of the U. S. Bureau of Indian Affairs talked with various mining authorities throughout Alaska on preliminary plans for opening certain Native reservations for mining. They were David Jones, Valuation Engineer, of Washington, and Charles H. Jones, Realty Officer, of Juneau. They explained that prospecting permits and leases on Indian reservations in the South 48 have been very successful and that Alaskan reservations should be made available for development without further delay. An announcement of details is expected early in the year so that exploration on the reservations can proceed during the 1969 field season.

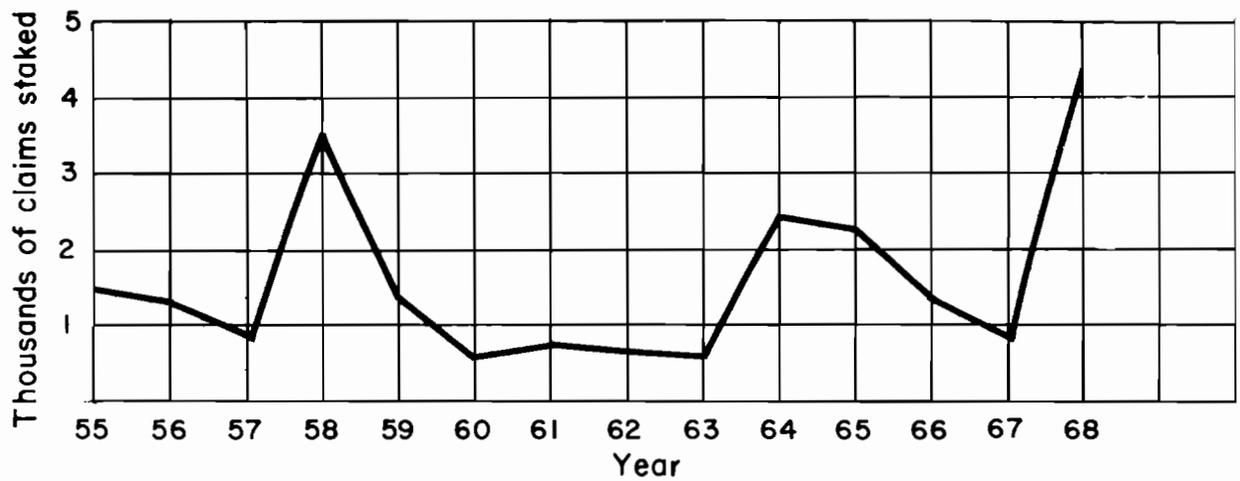
Possibilities being considered for this new activity include one-year nonexclusive prospecting permits to be effective in 1969, followed by competitive bidding for exclusive prospecting permits with options to lease. The exclusive prospecting permits would be of longer duration--perhaps five years--and would probably be renewable at least once. Bidding would be on one of the following or a combination of straight bonuses, rentals, royalties, or work to be performed. Tracts would be large--up to 100,000 acres or more. Reservations being considered for opening include Akutan, Annette Island, Diomed Island, Karluk, Klukwan (parts not already under lease), Unalakleet, Venetie-Chandalar, and Wales.

The U. S. Bureau of Mines was active in various parts of Alaska on mining and seismic studies and research. Underground experimental work on frozen gravels was proceeding near Fairbanks at the close of the year.

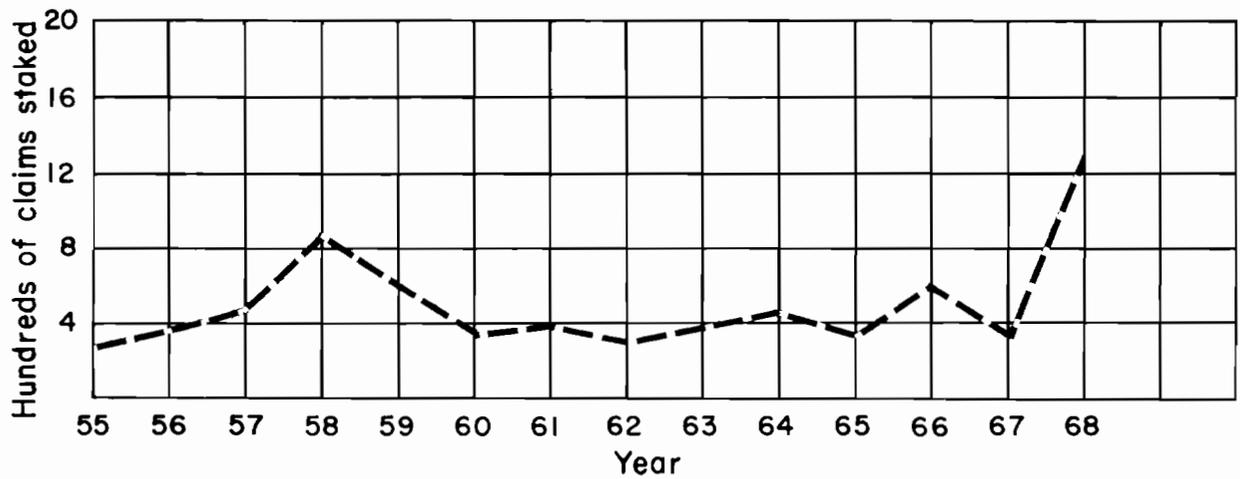
The U. S. Geological Survey continues to be active throughout the State. Most of its field parties had both fixed wing aircraft and helicopter support, which gave easy access to areas otherwise unreachable and generally increased the efficiency of their field operations.

Total estimated exploration expenditure for 1968 is \$4,513,800. According to our records at the College office, 7,368 new mining claims were located during the year.

INTERIOR, WESTERN AND ARCTIC



SOUTH-CENTRAL AND SOUTHWESTERN



SOUTHEASTERN

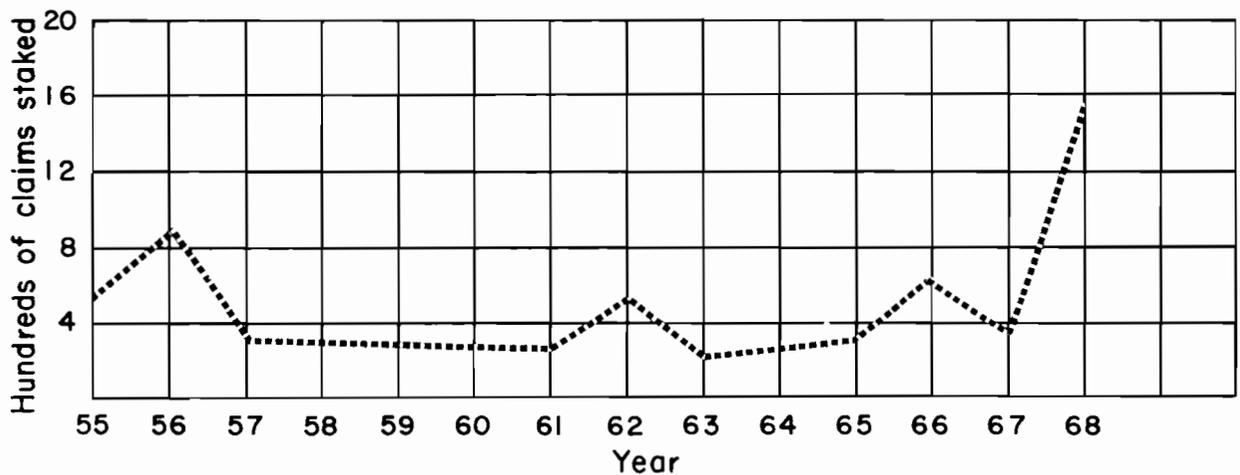


Figure 3

BAROMETER OF EXPLORATION ACTIVITY IN ALASKA
BY NUMBER OF CLAIMS STAKED

PROSPECTING COSTS

The costs presented below are based on a six-year average of expenditures by participants in the State Prospector Assistance Program. The prospecting programs used in the calculation represent a broad range of activities from reconnaissance prospecting by one man with minimal equipment to a crew of men utilizing heavy equipment for stripping overburden. Consequently the cost for any individual prospecting venture may vary considerably from the average depending on the scale of the program.

The average expense is \$22.06 per man day. In the six-year period total expenditures were \$111,580 covering 5,059 man days. The total cost to the State during this period was \$78,649.14 or about 71 percent of the total.

Average costs for the program are given below:

	<u>Average Cost Per Man Day</u>	
	<u>1963-1967</u>	<u>1963-1968*</u>
Transportation	\$ 8.61	\$ 7.68
Food	3.97	3.87
Equipment and Supplies	10.01	10.61**

*Data for the year 1968 are incomplete; only those programs reported by participants as of January 13, 1969 are included in the average.

**Includes cost of heavy equipment operation.

Transportation includes aircraft, tracked vehicles, rubber tired equipment, and boats used to travel to and from prospecting areas and to transport supplies and equipment. Food includes groceries and other staple consumable items. Supplies include tools, camping equipment, prospecting equipment, fuel, and general supplies. Each year more heavy equipment is used to explore claims staked under the program than in previous years; thus there is a general increase in the cost of equipment and supplies.

Travel is mainly by charter aircraft. Small fixed-wing aircraft are available for charter in most Alaskan towns. Charter rates for a Piper Cruiser range from \$20 to \$40 per hour; charter rates for a Cessna 180 range from \$40 to \$60 per hour. Helicopters are available in Ketchikan, Juneau, Anchorage and Fairbanks; charter rates range from \$100 to \$135 per hour with a minimum guaranteed flying time of three hours per day.

G O V E R N M E N T A C T I V I T I E S D U R I N G 1 9 6 8*

AREAS STUDIED

Arctic Alaska

Ipewik-Kukpuk (USGS)	Oil shale study and geologic mapping
Peters-Schrader Lake (USGS)	Oil shale study and geologic mapping
Tukuto Lake (USGS)	Oil shale study and geologic mapping
Ipewik Lake (USGS)	Oil shale study and geologic mapping
Kelley River (USGS)	Geologic mapping
Cosmos Hills-Shungnak (DM&G)	Geologic & Geochemical study

Interior Alaska

Yukon-Tanana Upland (USGS)	Heavy metals project
Eagle Quadrangle (USGS)	Stream sediment and bedrock sampling
Fairbanks District (USGS)	Heavy metals investigations and geologic mapping
Fish, Goldstream Creeks, Fairbanks District (USBM)	Seismic studies to determine depth of overburden
Fox (USBM)	A study underway to develop methods and systems for underground mining in frozen ground as part of the heavy metals program
Livengood quadrangle (USGS)	Regional geologic mapping and study of mineral deposits
Crazy Mountain-White Mountain (USGS)	Correlation of volcanic rocks

Western Alaska

Hogatza Project (USGS)	Heavy metals reconnaissance and regional mapping
Seward Peninsula (USGS)	Geologic mapping, search for lode sources of placer along several drainages, fossil studies
Seward Peninsula-Sinuk area, Solomon quadrangle (DM&G)	Geologic mapping and geochemical study
St. Lawrence Island (USGS)	Heavy metal investigation and regional mapping
Nunivak Island (USGS)	Study of volcanic explosion craters
Bering Sea (USGS)	Offshore sampling, seismic and magnetic reconnaissance

* State of Alaska, Division of Mines and Geology (DM&G); U. S. Geological Survey (USGS); U. S. Bureau of Mines (USBM).

Southwestern Alaska

Wood River-Tikchik Lakes (DM&G)	Geochemical investigation
Sitkinak Island (DM&G)	Coal outcrop investigation
Unga Island (DM&G)	Petrified forest investigation

South-Central Alaska

Nixon Fork District (USGS)	Test geophysical and geochemical techniques in locating buried mineralized zones.
Eastern Alaska Range (USGS)	Geological mapping and geochemical studies in the Nabesna River drainages.
Talkeetna-Central Alaska Range (USGS)	Geological and geochemical studies in the northern Talkeetnas, Valdez Creek and Reindeer Hills
Diana Lakes-Talkeetna Mountain B5-B6 quadrangle (DM&G)	Geological and geochemical study
Little Falls Creek-Talkeetna Mountains, B3-B4-C3-C4 quad. (DM&G)	Geological and geochemical study
Central Alaska Range (USGS)	Placer studies in the Yentna, Nelchina, Valdez, Eureka, Chistochina, Ahtell and Chisana mining districts
Nuka Bay (USGS)	Offshore study of bottom sediments
Bering River Coal Field (DM&G)	Coal investigation in Carbon Creek area

Southeastern Alaska

Yakutat area (USGS)	Geologic mapping and heavy metals investigation
Juneau Project (USGS)	Regional structure, metamorphic stratigraphy and detailed geologic mapping of the Juneau gold district
Cholmondeley Sound (DM&G)	Geochemical investigation
Sumner Strait Project (USGS)	Geologic mapping in the southern part of area, Silurian and Devonian limestones studied in a number of locations
Hyder Area (USGS)	Heavy metals study started
Annette Island (USGS)	Geologic mapping completed

General

Alaska-general (DM&G)	Uranium study and investigations
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REPORTS PUBLISHED BY USGS AND USBM DURING 1968

The USGS and USBM publications listed below were released in 1968. Open file reports are usually available for study at the various USGS, USBM and Division of Mines and Geology offices in Alaska. Copies of open file reports can usually be obtained at private expense. USGS numbered bulletins and professional papers may be purchased from the U. S. Government printing office or over the counter at the USGS Public Inquiry Office in Anchorage. USGS circulars are free. USBM information circulars and reports of investigations may be purchased from the Publication Distribution Office, U. S. Bureau of Mines, Pittsburgh, Pa. Division publications are listed elsewhere in this report.

USBM Open File Reports

Soil sampling at the Egnaty Creek mercury prospect, Kuskokwim River Basin, Alaska, by R. P. Maloney

USGS Open File Reports

- Metallic mineral resources map of the Chandalar quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Wiseman quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Healy quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Mount Hayes quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Bendeleben quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Candle quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Solomon quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Seward and Blying Sound quadrangles Alaska, compiled by Edward H. Cobb
- Platinum deposits of Alaska, by John B. Mertie, Jr.
- Geology of the Iliamna quadrangle, Alaska, by Robert L. Detterman and Bruce L. Reed
- Metallic mineral resources map of the Nome quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Teller quadrangle Alaska, compiled by Edward H. Cobb and C. L. Sainsbury
- Bering Sea shelf seismic reflection records, 1967 (R/V Thompson) by David W. Scholl and David M. Hopkins
- Geology of the Golden Zone mine area, Alaska, by C. C. Hawley, Allen L. Clark and J. Alan Benfer
- Alaskan gravity base station network, by David F. Barnes
- Metallic mineral resources map of the Skagway quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Mount Fairweather quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Juneau quadrangle Alaska, compiled by Edward H. Cobb

- Metallic mineral resources map of the Sitka quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Sumdum quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Port Alexander quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Petersburg quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Craig quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Ketchikan quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Dixon entrance quadrangle Alaska, compiled by Edward H. Cobb
- Geological interpretation of reconnaissance aeromagnetic survey of northeastern Alaska, by W. P. Brosge, Earl E. Brabb and Elizabeth R. King
- Geochemical investigations of Antimony Creek antimony prospect northern Talkeetna Mountains, Alaska, by C. C. Hawley, A. L. Meier and R. L. Miller
- Metallic mineral resources maps of nine Alaska quadrangles (Holy Cross, Kotzebue, Melozitna, Norton Bay, Nulato, Prince Rupert, Survey Pass, Taku River, Unalakleet) compiled by Edward H. Cobb
- Miscellaneous geologic Investigation Map I-530, Regional geologic map of the Selawik and southeastern Baird Mountains quadrangles, Alaska by W. W. Patton Jr. and T. P. Miller
- Reconnaissance geologic map of the Tanacross quadrangle Alaska, by Helen L. Foster
- Preliminary geologic map of the Eagle B-1 and C-1 quadrangles Alaska, by Helen L. Foster and Terry C. Keith
- Geology and lode gold deposits of the Nuka Bay area, Kenai Peninsula, by Donald H. Richter
- Results of stream-sediment sampling between Windy Fork and Post River, southern Alaska Range, by Raymond L. Elliott and Bruce L. Reed
- Results of stream-sediment sampling in parts of the southern Alaska Range, by Bruce L. Reed and Raymond L. Elliott
- Reconnaissance geology, mineral occurrences and geochemical anomalies of the Yentna district, Alaska, by A. L. Clark and C. C. Hawley
- Metallic mineral resources map of the Baird Mountains quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Ambler River quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Shungnak quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Hughes quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Ruby quadrangle Alaska, compiled by Edward H. Cobb
- Metallic mineral resources map of the Ophir quadrangle Alaska, compiled by Edward H. Cobb

Metallic mineral resources map of the Iditarod quadrangle Alaska, compiled by Edward H. Cobb

Metallic mineral resources map of the Medfra quadrangle Alaska, compiled by Edward H. Cobb

Metallic mineral resources map of the McGrath quadrangle Alaska, compiled by Edward H. Cobb

Geochemical reconnaissance maps of granitic rocks, Coleen and Table Mountain quadrangles Alaska, by W. R. Brosge and H. N. Reiser

Gold gradients and anomalies in the Pedro-Cleary Summit area, Fairbanks district, Alaska, by R. B. Forbes, H. D. Pilkington and Daniel B. Hawkins

Description of the Ruth Creek, Lillian Creek, Griffin, Old Smoky, Sunshine No. 2, and Olive Creek lode prospects, Livengood district, Alaska, by R. L. Foster

USGS Circulars

No. 559, Lead, zinc, and silver deposits of Bowser Creek, McGrath A-2 quadrangle, Alaska, by B. L. Reed and R. L. Elliott

No. 564, Occurrences of gold and other metals in the upper Chulitna district Alaska, by C. C. Hawley and Allen L. Clark

No. 565, Cassiterite in gold placers at Humboldt Creek Serpentine-Kougarok area, Seward Peninsula, Alaska, by C. L. Sainsbury, Reuben Kachadoorian, Thomas F. Smith and William C. Todd

No. 593, Distribution of gold and some base metals in the Slana area, Eastern Alaska Range, Alaska, by Donald E. Richter and Neal A. Matson, Jr.

No. 592, Interpreting pan-concentrate analyses of stream sediments in geochemical exploration for gold, by R. P. Fischer and F. S. Fisher

No. 570, Suggested areas for prospecting in the Central Koyukuk River region, Alaska, by Thomas P. Miller and Oscar J. Ferrians, Jr.

No. 590, Potential for lode deposits in the Livengood gold placer district, east-central Alaska, by R. L. Foster

USGS Bulletins

No. 1246, Metalliferous lode deposits of Alaska, by Henry C. Berg and Edward H. Cobb

No. 1249, Geology of the Johnson River area, Alaska, by G. William Helmes and Helen L. Foster

No. 1236, Geology of the Lake Peters area Northeastern Brooks Range, Alaska, by Bruce L. Reed

USGS News Releases

Copper-silver-zinc deposits east of Farewell and north of Shellabarquer Pass.

A B S T R A C T S O F F I E L D A N D L A B O R A T O R Y R E P O R T S

GEOLOGICAL AND GEOCHEMICAL STUDY OF PART OF THE COSMOS HILLS,
SHUNGNAK D-2 QUADRANGLE, ARCTIC ALASKA

Crawford E. Fitts, Chief Mining Geologist
Division of Mines and Geology

Detailed geologic mapping of bedrock and geochemical sampling of stream sediments were undertaken in a 50-square-mile area about 5 miles southeast of Bornite, Alaska, approximately 300 miles northwest of Fairbanks. The field work was part of a proposed 2- or 3-year study of the entire Cosmos Hills window. This geologic structure includes the encouraging show of copper mineralization at Bornite now being explored by the Bear Creek Mining Company.

The Cosmos Hills window is about 20 miles long and 8 miles wide. It extends east southeastward across the boundary between the Ambler River and Shungnak quadrangles. Mapping was begun in the Shungnak D-2 quadrangle of the 30-minute series, because this area offered 1) the best topographic base map, 2) the widest variety of lithologies, 3) the most complex geologic structure, and 4) the best opportunity to study the relationship between the emplacement of granite and the deformation, metamorphism and possible mineralization of adjacent strata.

Bedrock in the mapped area consists mainly of a thick sequence of pelitic rocks (slate, phyllite and schist), dolomitic limestone, extrusive and intrusive greenstone, intrusive serpentinite, and conglomerate, sandstone and mudstone. These rocks range in age from Devonian to Cretaceous. Pelitic rocks near the Kogoluktuk River have been intruded and metamorphosed by medium-grained gneissic granite of probable early Cretaceous age, which forms a nearby circular pluton about 1 mile in diameter. The metamorphosed strata are characterized by porphyroblasts of garnet and albite, which decrease in abundance away from the granite.

Structural features include 1) a dome surrounding the granite pluton, 2) a horst 6 miles wide containing the dome and pluton, and bounded by northeast-trending, high-angle faults of large throw, 3) at least one northwest-trending fault within the window, 4) at least two south-dipping thrust faults of unknown displacement, which post-date the horst and form the southern edge of the window, and 5) several high-angle faults of moderate to large displacement, which post-date the thrusts. The thrust faults are indicated clearly by marked discordances in the attitude of bedding on opposite sides of these fractures, especially in the vicinity of Ferguson Peak, Inerevuk Mountain, and an unnamed peak 2 miles northeast of the Dahl Creek airfield.

A new fossil locality was found on the north side of Ferguson Peak. Numerous moderately well preserved parts of crinoid stems were found in blocks of light-gray limestone derived from similar limestone exposed near the mountain summit. This rock appears to be interlayered with greenschists bounded by the two main thrust faults. The crinoid stems are the only fossils found so far in the map area. Crinoids have not been reported from other parts of the Cosmos Hills.

Geochemical work involved 124 samples collected from 10 main streams and their tributaries. The samples were analyzed by the U.S. Geological Survey in Denver. A table of analyses was prepared in Fairbanks. No conspicuous anomalies were found. Thus no direct relationship between granite emplacement and copper mineralization can be shown at present. However, the data at hand indicate a definite relationship between the chemical composition of sediments in some of the stream valleys in the map area and the chemical composition of the predominant bedrock exposed in the respective drainage basins.

Small-scale placer mining for gold has been done along Dahl, California and Lynx Creeks. Placer workings apparently were most productive in the upper parts of the Dahl Creek and California Creek valleys, which are underlain by phyllite cut by numerous quartz veins. The veins presumably yielded gold, which the streams carried into the placer deposits. Today, placer claims along Dahl Creek are being reworked for the popular "Alaskan jade", which is obtained from boulders derived from numerous small bodies of serpentinite exposed in tributary valleys inside the window.

PROGRESS REPORT ON MAPPING IN THE SINUK AREA, SEWARD PENINSULA, ALASKA

Gordon Herreid, Mining Geologist
Division of Mines and Geology

Investigations were continued in the Sinuk area, 25 miles northwest of Nome. A number of critical areas were mapped in detail, and mapping was extended west of the Sinuk River to include the American Lode. Previous work in the area by the author was reported in Division of Mines and Minerals Reports 24 and 29.

The marble masses that cap the hills in parts of the area appear to have been thrust over the schist. The marble is cut by many steep reverse faults having moderate throw.

At the American Lode the thrust contact between the marble and the underlying schist is better exposed than elsewhere. Gossan deposits are localized along the thrust near steep faults which offset the marble as much as a few hundred feet.

Detailed mapping around the Monarch gossan shows that it may represent a hydrothermal leakage above a horizontal thrust 300 feet below the surface.

The gold placer on Oregon Creek heads in a linear zone of thrusting several miles long, which contains scattered basic dikes and small plugs. Silicification and dolomitization of the wall rocks and minor sulfide mineralization are present near some of the intrusive basic rocks. The mineralization associated with the basic rocks in this zone is the probable source of gold in the placer.

During the mapping in 1966 a zone of zinc, lead, and minor copper at least 7000 feet long was discovered along Aurora Creek. Additional work in 1968 indicates that the source of mineralization was probably a basic dike that cuts across the deposit in Aurora Creek.

Geochemical work at the American Lode shows only moderate zinc and lead anomalies in parts of the gossan. A line of samples across the Monarch gossan disclosed an anomaly averaging 500 ppm zinc along the east margin over a distance of 600 feet. About 400 geochemical stream sediment and soil samples have been taken in the Sinuk map area.

GEOLOGY AND GEOCHEMISTRY NEAR SITHYLEMEKAT LAKE, BETTLES QUADRANGLE, ALASKA

Gordon Herreid, Mining Geologist
Division of Mines and Geology

An area of 44 square miles was mapped and 140 geochemical samples were taken across a linear belt of intrusive ultramafic rocks extending along the eastern margin of the Koyukuk basin.

Rocks in the area include two belts of typical alpine ultramafic intrusive rocks containing serpentized peridotite, altered gabbro, and pyroxenite. One belt is located at the margin of the Koyukuk basin. The other is intrusive into schist, 5 miles southeast of the other belt. The remainder of the area is underlain by schist and diabase and an intrusive granite batholith that extends far east of the map area.

Sulfides (pyrite and pyrrhotite) were found in the area only in minute amounts in mafic rocks peripheral to the peridotite. A scattering of geochemical stream sediment samples were anomalous in nickel, containing as much as 5000 ppm. The near lack of pyrite in and around the peridotite suggests a low sulfur content during crystallization, with no early liquid sulfide phase formed. As a result, nickel in the intrusive is probably contained in the silicate minerals. The strong serpentization indicates a high water content subsequent to crystallization. The water could be expected to have moved any sulfides in the ultramafic rock outward into adjacent rocks. In the map area only a few sulfide grains were seen in such locations.

The presence of tourmaline in some of the granite in the area gives hope of tin deposits in the region. Geochemical samples from several streams in the area are anomalous in tin, containing as much as 70 ppm.

URANIUM IN ALASKA

Gilbert R. Eakins, Mining Geologist
Division of Mines and Geology

This report attempts to summarize all available information on uranium exploration in Alaska. In view of the new uranium boom, it is hoped the information will encourage and guide those who are interested in the search for uranium ore. Much of Alaska remains unexplored.

A map of the State accompanying the report shows 179 areas that have been investigated. A table summarizes the geology, mineralization and results of radiometric surveys in each area. The table also includes the quadrangle in which mineralization is located, and appropriate references.

The most interesting localities have been indicated on the map and are briefly discussed. These are: 1) the Bokan Mountain uranium-thorium area on Prince of Wales Island; 2) the Hyder district in southeastern Alaska; 3) the Salmon Bay area on Prince of Wales Island; 4) a zone near the town of Skagway in southeastern Alaska; 5) Nome Creek and Hope Creek in the Fairbanks district; 6) Rampart area on the Yukon River in interior Alaska; 7) the Brooks Mountain and Cape Mountain areas on the Seward Peninsula; and 8) a broad area in northwestern Alaska bordering the Selawik Basin, this area includes the mountains south of Selawik Lake, the Zane Hills, and the copper deposits at Bornite.

Limited investigations of Tertiary sediments for uranium also were conducted by the writer during the summer.

ADDITIONAL GEOCHEMICAL SAMPLING OF THE WOOD RIVER-TIKCHIK LAKES AREA, SOUTHWESTERN ALASKA

Gilbert R. Eakins, Mining Geologist
Division of Mines and Geology

Geochemical investigations for mercury revealed anomalies in the Wood River Lakes area during the summer of 1967. Follow-up sampling was done in the vicinities of the Red Top Mercury Mine and Lake Aleknagik during the 1968 field season. Laboratory analyses of the samples are not available at this time. The results will be published when the data are received.

A PETRIFIED FOREST ON UNGA ISLAND, ALASKA PENINSULA

Gilbert R. Eakins, Mining Geologist
Division of Mines and Geology

Petrified logs and stumps large and numerous enough to rival any of those in the well known National and State parks are present over a distance of six miles along the northwest coast of Unga Island. The best specimens are between Unga Spit and Bay Point. Many of the stumps are well exposed in an upright position, and are as much as five or six feet in diameter. At least two stumps are nine feet across. At some locations, dozens of fossil logs are visible on the beach between low and high tide. Most are between 18 inches and four feet in diameter.

A brief report, accompanied by photographs, has been prepared to suggest that the State of Alaska consider creating a State park to protect the coastal area where the best specimens are located.

GEOLOGY AND GEOCHEMISTRY OF PART OF THE SOLOMON QUADRANGLE,
SEWARD PENINSULA, ALASKA

Roderick R. Asher, Chief Mining Engineer
Division of Mines and Geology

Six weeks were spent mapping 60 square miles in the northwest part of the Solomon C-5 quadrangle on the Seward Peninsula, 40 miles east of Nome. The Big Hurrah Mine, the only lode gold mine with a production record on the Seward Peninsula, is at the east edge of the map area. Approximately 450 stream sediment samples were taken from all drainages in the quadrangle; consequently stream sampling covers an area larger than the mapped area. In addition, approximately 150 soil and rock samples were taken across the outcrop area of the Hurrah Slate.

Schist, limestone and slate are the predominant rock types. The schist is dark brownish black to light silvery gray mica schist. Some schist outcrops are calcareous and lenses of recrystallized limestone are common within the schist. The Hurrah Slate is a dense, black, fissile rock that may be a facies of the schist. The relation between the two rock types is not clear, but at places the contact appears to be gradational. Light gray to white recrystallized limestone forms steep bluffs in large, irregular outcrop patterns. The position of the limestone is probably the result of extensive thrust faulting.

High angle faults are common, but they seem to have had little influence on the localization of metallic minerals. Copper minerals are evident near schist-limestone contacts, where they are localized in silicified zones 10 to 15 feet thick. No economic occurrences of copper were found. Gold occurs in the Hurrah Slate at the Big Hurrah Mine in veins and in silicified shear zones. Antimony-bearing veins are also known in the Hurrah Slate. The Hurrah Slate was sampled extensively and possibly other areas that contain anomalous concentrations of gold or antimony will be indicated when the results are available.

Stream sediments were taken at one quarter mile intervals on streams throughout the quadrangle. The samples were analyzed for 30 elements by spectrographic techniques and for gold, copper, lead and zinc by atomic absorption. The sample data have not been studied completely at this time and no conclusions can be drawn.

A GEOCHEMICAL INVESTIGATION AT CHOLMONDELEY SOUND,
CRAIG QUADRANGLE, SOUTHEASTERN ALASKA*

Theodore Vance, Mining Engineer
Division of Mines and Geology

Summary and Conclusions

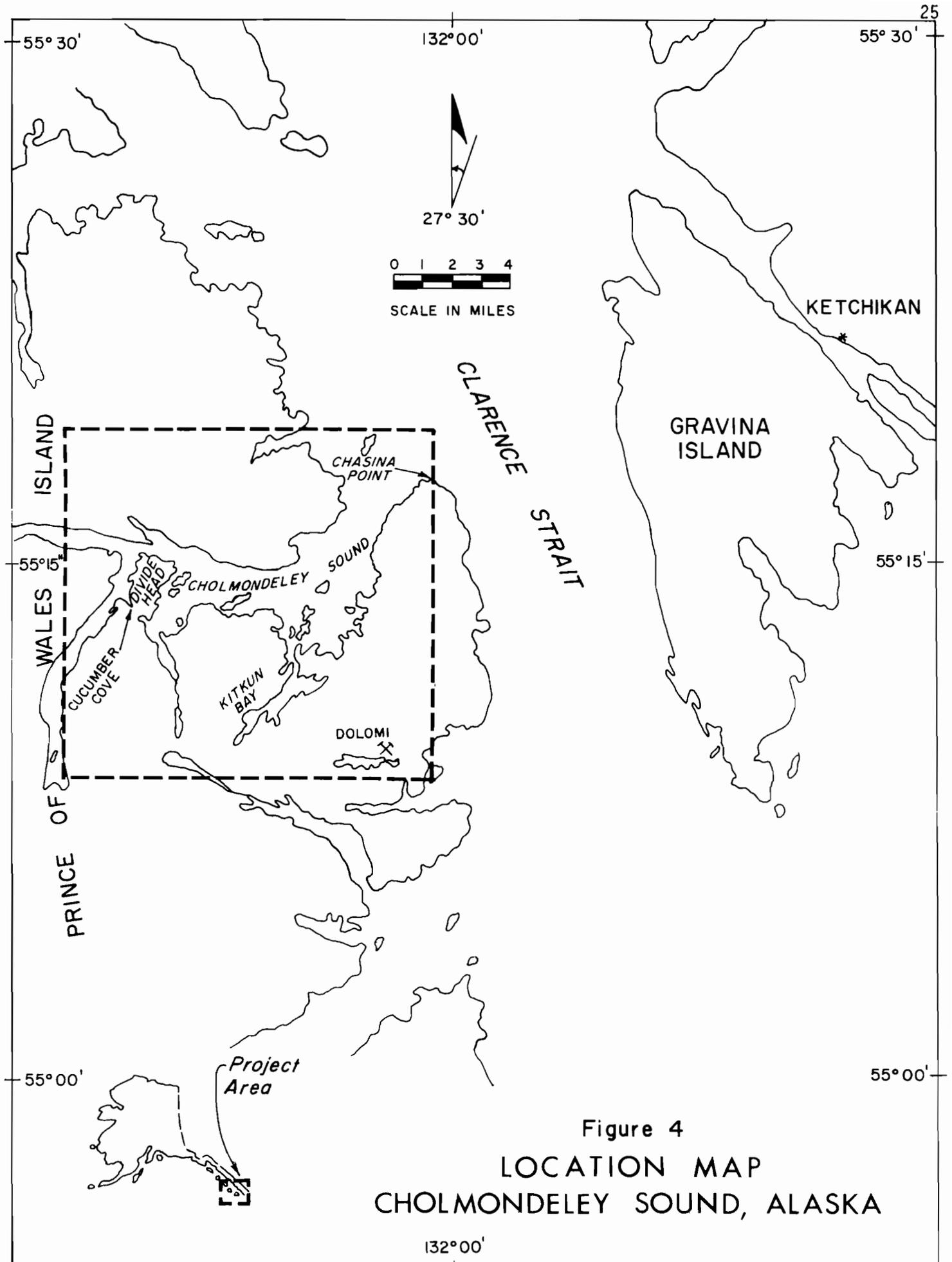
A geochemical investigation was conducted on part of Cholmondeley Sound because of a possible mineralized belt that extends from Dolomi northwestward to Hollis. The area has been extensively prospected in the past, but dense forest cover restricted exploration.

A piece of quartz float assaying 2.92% copper was found on Divide Head in 1948 by H.M. Fowler, engineer of the Alaska Territorial Department of Mines. He reported the occurrence of numerous quartz stringers, but he found none that contained chalcopyrite.

Sediment samples from all streams on Divide Head were collected by the author in 1968. A strong field anomaly was detected in a stream flowing into Cucumber Cove. Heavy metal content increased in strength upstream to a point where the stream issued from the tundra. A search of the surrounding area revealed little because heavy forest and moss obscure outcrops.

It is recommended that further exploration in this area be conducted by extensive soil sampling of the watershed to locate concealed mineralization.

* These reports are not published for distribution, but are available on request.



Location and Access

Cholmondeley Sound is a deep ocean inlet on the east side of Prince of Wales Island (fig 4). The Sound may be reached by seaplane from Ketchikan, the nearest city, 20 air miles to the east. The Sound also is accessible by ocean-going boats sufficiently large to navigate Clarence Strait. Kitkun Bay lies on the south side of Cholmondeley Sound and is connected to it by a narrow, rocky passage, which can only be entered at high slack tide. Strong currents with eddies are encountered in the passage at other times because of 20-foot tides.

History

Although thousands of people passed by on their way north, the mineral deposits of Prince of Wales Island were ignored until 1897. In that year, prospectors returning from the Klondike discovered the copper-iron outcrops at Kasaan. Smelters, constructed at Hadley and Hetta Inlet, operated intermittently until World War I. Bufvers (1967) describes the extensive prospecting around Cholmondeley Sound and Kitkun Bay. Many veins were explored by tunnels and trenches, and much time and effort were expended. However, the average grade of ore proved to be less than \$5.00 per ton and all operations were finally suspended.

Geology

Condon (1961) described the geology of the area in U.S.G.S. Bulletin 1108-B. The country rock consists of greenstone schists interbedded with limestone and marble. Diorite, granodiorite, and quartz diorite intrude the schists and limestones, which are Paleozoic in age. Major faults strike northward to northwestward and indicate a complex structural history.

Mineral Deposits

The prospects within the Cholmondeley Sound - Kitkun Bay area are mineralogically complex. Wright and Wright (1908, p 166-171) described these deposits as consisting of copper, lead, zinc, and silver with some free gold. The deposits occur as veins or replacements along shear zones and fissures and are closely related to regional faulting. Those veins which occupy northwestward-striking faults tend to contain the higher values. The gangue minerals are predominantly quartz and calcite.

Geochemistry

One hundred ninety-six stream sediment samples collected on the south side of Cholmondeley Sound from Divide Head were tested in the field for heavy metals (copper, lead, and zinc) by methods described by Hawkes (1963). The samples were later analyzed in the laboratory and results compared with those obtained in the field. The field and laboratory data did not agree in all samples, which was to be expected because of the inherent problems in field preparation of reagents and procedures. In some watersheds there are known veins in limestone, but stream sediment samples do not contain anomalous values in heavy metals. It is suspected that abundant limestone, being chemically reactive, prevents migration of metallic ions and the development of anomalies.

An anomaly was detected on the west side of Divide Head (fig 4) in a stream flowing into Cucumber Cove. Additional sampling upstream confirmed the anomaly, but a search failed to reveal outcrops in the dense forest.

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DIANA LAKES, TALKEETNA MOUNTAINS, SOUTH-CENTRAL ALASKA

Robert E. Anderson, Mining Engineer
Division of Mines and Geology

Geologic mapping and geochemical sampling were done in the Talkeetna Mountains B-5 and B-6 quadrangles between Iron Creek and Sheep River west of Rainbow Lake. In the map area, greenstone, which has been intruded by mafic and granitic rocks, is the predominant rock type. At three places in the area studied, iron oxide is apparent as intensive staining. No copper minerals were identified in the stained zones. A 60 square mile area was studied.

In the area 73 stream sediment samples were taken. Spectrographic analyses of the samples reveal that several contain anomalous amounts of metals, but the data have not been completely evaluated at this time. No previous geologic studies of the map area have been published.

PRELIMINARY GEOLOGIC AND GEOCHEMICAL REPORT ON LITTLE FALLS CREEK,
TALKEETNA MOUNTAINS QUADRANGLE, SOUTH-CENTRAL ALASKA

Robert E. Anderson, Mining Engineer
Division of Mines and Geology

Anomalous amounts of copper were noted in stream sediment samples collected in an area of meta-sedimentary rocks in the Talkeetna Mountains C-3, C-4, B-3 and B-4 quadrangles. In the area is a bed of pyritic phyllite that is up to 1,000 feet thick; it is exposed for over six miles as a highly iron-stained linear belt. Samples from three streams that cross the phyllite contain anomalous amounts of copper, but there are at least two lines of evidence to suggest that the phyllite is not the source of copper in the stream sediments: 1) Samples that contain anomalous copper were collected both above and below the phyllite, 2) Rock samples collected throughout the area are too low in copper to account for the anomalies. Float, which contains copper-rich vein material, occurs in the area, it probably contributes the anomalous copper to the sediment samples. No copper-bearing veins were found in place, but 90% of the area is covered by talus.

In the west-central part of the map area, rock samples contain anomalous amounts of gold. The gold concentrations are at least double the amount that would be expected in the rock types sampled.

STIKINAK ISLAND COAL, SOUTHWESTERN ALASKA*

Robert E. Anderson, Mining Engineer
Division of Mines and Geology

Sitkinak Island, which is off the southwest tip of Kodiak Island in the Trinity Islands C-1 quadrangle, was investigated for commercial coal occurrences between August 14 and August 18, 1968. Several earlier reports discuss coal on Sitkinak Island, one of these reports mentions a 25-foot coal seam southeast of Sitkinak Dome. The authors of that report were unable to reach the probable area of occurrence because of adverse weather.

In 1968 all of the areas where continental sediments are reported to crop out on Sitkinak Island were examined to determine if the sediments contain coal seams of economic importance. There are coal seams interbedded with the continental sediments, but no coal seams were found that are thick enough to warrant development or mining. The area around Sitkinak Dome was also investigated, but no coal seams were found. The rocks in the vicinity of the dome are marine sediments.

BERING RIVER COAL FIELD, SOUTH-CENTRAL ALASKA

Robert E. Anderson, Mining Engineer
Division of Mines and Geology

A four-day examination of coal beds near the head of Carbon Creek in the Bering River Coal Field, Cordova B-1 quadrangle, was made in June 1968. At the time of the visit the Cortella Coal Corporation had an exploration camp in the area. Activity consisted of drilling and trenching along Carbon Ridge.

Several coal beds have been exposed by the exploratory work; the largest bed exposed at the time of the visit is 35 feet thick. Most of the beds strike N40E to N60E and dip steeply northwest. Several faults, which strike northwest, occur northeast of the camp. The coal beds appear to have been offset about 1500 feet northwest by the faults. One normal fault, which strikes northeast and dips 20 to 30 degrees northwest, nearly parallels the bedding in the area and probably intersects the coal beds on the southeast. Consequently the coal beds nearby are limited in depth, as they would terminate along the dip of the fault.

Samples of coal exposed by drilling and trenching have a free swelling index of 2.5 to 4.0. The minimum free swelling index for coking coal is 6.0.

ANALYSES OF COPPER, LEAD AND ZINC BY ATOMIC ABSORPTION SPECTROGRAPHY*

Namok Cho, Assayer Chemist;
Paul L. Anderson, Laboratory Supervisor
Division of Mines and Geology

A study of the operating parameters, limits of detection, anion interference, and precision and accuracy of the analysis of copper, lead, and zinc by atomic absorption spectrophotometry are described. Defining the limit of detection as 3 above background fluctuation (rather than the more conventional 1% absorption) and defining precision as the coefficient of variation, the following data were obtained using a hot aqua regia leach of 10 or less grams of sample:

Element	Limit of Detection (amount in sample)	Coefficient of Variation	Amount of Element in the Sample
Cu	1.0 ppm	3.6%	0.25 wt%
Pb	10.0 ppm	4.2%	0.42 wt%
Zn	1.0 ppm	4.2%	0.58 wt%

The above precision values include total variation including sampling. The method described is rapid and well suited for the analyses of ores in a geological laboratory in which metallic and matrix elements vary widely.

The method of standard addition as applied to AAS also was investigated. The method is well adapted to analyses of occasional samples and is recommended for those instances.

RAPID RADIOMETRIC ANALYSIS FOR EQUIVALENT URANIUM*

Michael Mitchell Jr., Geochemical Analyst;
Paul L. Anderson, Laboratory Supervisor
Division of Mines and Geology

The laboratory of the Alaska State Division of Mines and Geology is undertaking a program of routinely checking for radioactivity virtually all samples submitted by the public for identification or analytical work. This report describes the routine radioactivity test. It shows that a 5-second test in our lead shielded, end-window, laboratory geiger counter has a

minimum detection limit of 0.05% equivalent uranium. (The term equivalent uranium implies that this is a broad spectrum radioactivity test and is not specific for uranium.) A semiquantitative radiometric analysis which has an analytical range between 0.01% and 2.0% equivalent uranium, also is described. The semiquantitative analysis uses about 3 grams of powdered rock sample pressed at 12 tons per square inch gage pressure into a 1-1/4 inch pellet. The sample's radioactivity is determined directly from this pellet. The radioactivity from the sample is compared to that from analyzed standards. The precision of the analysis was found to be 10% to 15% of the value when taking 100 to 200 total counts, which requires about 1 minute counting time of a 0.1% analyzed uranium ore sample.

LABORATORY NOTES - SHORT PAPERS

The following are laboratory notes and short papers dealing with limited subjects prepared by the laboratory staff of the Division of Mines and Geology. These papers are not published for distribution but are available on request.

Laboratory Notes No. 1 - Precision and accuracy of the gold-silver analysis by atomic absorption on a quartz-type rock.

Laboratory Notes No. 2 - Laboratory test of zinc in water and ice.

Laboratory Notes No. 3 - AAS analyses of gold and silver in high antimony samples.

Laboratory Notes No. 4 - Digestion of heavy sulfide ores for AAS analyses.

Laboratory Notes No. 5 - Suggested reporting procedures for atomic absorption silver and gold analyses.

Laboratory Notes No. 6 - Improved mercury analyses by XRS.

Laboratory Notes No. 7 - Molybdenum analyses by atomic spectroscopy.

Laboratory Notes No. 8 - An investigation of the 2833A° AAS lead line.

Laboratory Notes No. 9 - Interference by calcium, magnesium, and iron on lead, zinc, and silver by AAS analyses.

S P E C I A L R E P O R T S

RESULTS OF EXPLORATION INQUIRY

James A. Williams, Director
Robert E. Anderson, Mining Engineer
Division of Mines and Geology

Summary

A letter asking the mining industry to comment on how Alaska can best encourage expansion of exploration for ore deposits was sent to 65 companies. Thirty-eight answers containing comments on one or more subjects in 13 general categories were received.

Twenty-three companies made encouraging statements to the effect that Alaska mineral possibilities are good, the Division is doing valuable work, and/or exploration will increase. Thirty-six (95%) of the answers contained constructive suggestions on the need for tax and other incentives, better economics, better transportation, more information and promotional activity, fewer labor problems, relaxed immigration restrictions, more geologic, geochemical, and geophysical work by the State, improved policies and business climate, and/or improved claim staking regulations.

Coming from active companies, these statements are strong and authoritative commentaries on what Alaska should do if it wishes to attract venture capital to establish an industry to properly utilize the hard mineral resources now lying dormant and provide more jobs and a healthier economy.

General

Last spring we sent the following letter to 65 of the larger mining and oil companies who are active in hard mineral exploration in the United States and Canada:

"The State of Alaska needs your advice.

"Though we are expecting the greatest mineral exploration activity in recent years during 1968, it will still be a small fraction of the exploration activity across the line in Yukon Territory and British Columbia. During the past several years both the U.S.G.S. and the Alaska Division of Mines and Minerals have done extensive preliminary geological exploration throughout the State and have discovered many areas of possible ore bodies. However, these have not drawn the interest, which we had naturally hoped for, from the major mining and exploration organizations.

"In your opinion, how can we best encourage expansion of exploration activities by private industry in Alaska?

"Since you know better than anyone what is needed for such encouragement, your opinions will be very helpful to us and much appreciated. Source of the opinions and recommendations will be kept confidential.

"We are looking forward to hearing from you. Thanks very much."

Of the 65 letters sent out, 42 were answered and one was returned because of a wrong address. Thirty-eight of the 42 answers had comments or suggestions, making a total of 58% of the companies queried who answered our letter with helpful ideas. A study of the letters received indicates that the results can best be viewed if the comments are grouped into 13 categories under two general headings, 1) Encouragement and 2) Suggestions for Changes. The actual comments are appended, grouped by categories for the reader's benefit (Appendix I).

A list of the companies written to is also appended (Appendix II). Desiring to contact those in the companies who have the greatest control over company policies and activities, we addressed the letters to company presidents. Many of the letters were referred to lesser authorities for answer, and the answers were weighted accordingly. A comment concerning the economics of exploration or a company's attitude toward a tax situation is of greater importance when coming from a president than from a staff geologist.

For additional information of the reader, Appendix III contains some pertinent Alaska laws in connection with subjects commented on, a few of our own observations, and some quotes from authoritative publications.

The question as stated was nondirective, asking industry: "In your opinion, how can we best encourage expansion of exploration activities by private industry in Alaska?" Since many of the companies made more than one point or suggestion, the total number of comments is greater than the number of letters received. Some of the comments are repeated under different categories. Comments and suggestions were for the most part very well thought out, and we are grateful to those who wrote them for taking the time to do so.

Encouragement

The question did not ask for encouragement so it was particularly gratifying to find that 23 companies, or 61% of those who answered, made one or more favorable statement. Most went on to offer suggestions as well. Only one company offered a discouraging comment. The encouraging comments were as follows:

<u>No. of Comments</u>	<u>Category</u>	<u>Average Weight*</u>
10	Mineral or discovery potential is good	3.0
7	Division is doing valuable work	3.0
6	Predict that general exploration will increase	3.5
5	Company will continue its present exploration	3.6
4	Company hopes to increase its exploration	2.8

Since the purpose of this report is to point out the needs of mining, the above favorable comments will not be dwelled upon. One letter pointed out that

".....there are many advantages to be gained in Alaska because it is, in fact a part of the U.S. While many companies are going far afield in search of minerals, many are finding the instability of foreign countries very difficult areas in which to operate."

This is borne out by Zambia's actions in April 1968 when she expropriated and nationalized the American and other copper mines there.

Suggestions for Changes

All but two of the answering companies, i.e., 36 or 95%, made at least one suggestion or comment under this heading, and most had several points to offer. As noted in the tabulation below, the most comments in any category were on taxes, where 23, or 61% stated that changes would be helpful.

The order of the following list of categories under this heading is not necessarily representative of importance. They are all important subjects for consideration. Note the weighting of the answers, which was explained earlier.

* Weights were assigned as follows: President 4, Vice President 3, Chief Geologist 2, Staff Geologist 1.

<u>No. of Comments</u>	<u>Category</u>	<u>Average Weight</u>
23	Tax incentives, advantages, or reductions needed	3.0
18	Economics, investments, and incentives	2.7
10	More information and promotion needed	3.1
9	Better transportation needed	3.1
9	Labor	3.4
6	More field investigations needed	3.7
4	Good policy, stability, and climate needed	3.7
4	Improvement of claim staking regulations needed	3.3

Summaries of the comments in the above categories follow. See Appendix I for verbatim quotes from the letters.

Taxes - The largest group of letters points out again and again the effect of taxes on mining, how Canada's tax incentives have accelerated mining there, and how tax incentives should be established in Alaska. One letter specifically recommended the elimination of our mining license tax.

Economics - The need for lower costs and financial assistance by various means is emphasized. Specific suggestions are made to accomplish these things. Subsidies and Securities Exchange Commission problems are discussed.

Information and promotion - The need for more information on opportunities and problems in Alaska is expressed, and we are advised that we should go into promotional activities of various kinds.

Transportation - Attention is called to Canadian road programs which assist mining development, and advice is given that transportation difficulties are holding Alaska back.

Labor - The difficulties of obtaining experienced exploration people in Alaska and of bringing them from elsewhere, and the high cost of Alaskan labor are cited. Cutting labor costs by tax deductions is suggested.

Field investigations - Six companies stress the need for government field work and reports in Alaska. Results of more geologic, geochemical, and geophysical surveys are needed. An aeromagnetic survey of the State should be made.

Policy, stability and climate - Be careful about further increases in oil taxes, develop a conducive exploration climate, don't allow severance taxes, and prevent land withdrawals are the messages received under this heading.

Claim staking regulations - The need for easier acquisition of larger claim blocks and better claim recording facilities is expressed.

Additional Information

For brevity appendices mentioned above are omitted from the report printed here. Persons interested in further information are invited to write to the Division of Mines and Geology for copies of the appendices. The additional information includes:

- 1) Specific encouraging comments from companies contacted.
- 2) Specific suggestions for changes.
- 3) Names of companies contacted.
- 4) Observations by Division personnel and others.

MINING INCENTIVES

James A. Williams, Director
Division of Mines and Geology

Division Comments on Programs for Mining

A sound geological basis exists for our belief that Alaska has as much hardrock mineralization per square mile as B.C. and the western mining states. This means that many ore bodies are yet to be discovered, and that we have produced only about 1/60 of our hard mineral potential.

An article from a recent issue of our monthly Mines and Petroleum Bulletin is attached. Perhaps you have already seen it, but if you are interested in the development of mining in Alaska, it is worth a second thought.

The article outlines Canada's successful programs to accelerate discovery and production. Relatively little exploration is going on in Alaska, and base-metal production here is practically nonexistent. If we want significant Alaska mining production in the near future, we should follow Canada's example. To be sure, these programs will be expensive and are not essential for Alaska's day-to-day operations. But shouldn't we be looking ahead and acting now to help create industry and jobs that will improve our economic base and alleviate our welfare problems in the future?

Keep in mind that mineral exploration itself is an industry which brings in money. Everytime an exploration party loads up with groceries or charters a plane or helicopter for a trip into the bush, new money is being put into circulation. One of the larger parties spent \$600,000 on Alaskan exploration last summer.

Furthermore, mining production is a labor-intensive industry. It requires men, machinery, and supplies to excavate, crush, concentrate, and transport the ore.

Item 1) in Mr. Price's "pattern of development" is discovery. He doesn't mention it, but extensive geological and aerial geophysical surveys have led to most of the major discoveries in Canada. Aerial geophysical surveys provide the greatest coverage and are the quickest means of stimulating private exploration for minerals. These surveys have been very successful in Canada. We submit that such work is long overdue in Alaska and should be started without further delay. Geological work is proceeding, but much too slowly. In conjunction with the aerial surveys, the assistance programs described by Mr. Price should be instituted for incentive to develop discoveries into producing mines.

The programs listed by Mr. Price are applicable in northern Canada and are administered by the Canadian federal government. He also mentions tax benefits. We have added information on geological, geochemical, and geophysical surveys. For your easy comparison and further information we have prepared the attached two-page tabulation showing 1) the Canadian federal programs, 2) similar programs on the Canadian provincial level, 3) comparable programs which are, or should be, carried out by the U.S. federal government, and 4) those which are, or should be, carried out by the State of Alaska.

We hope you will think about this. Once the mining industry is well on its way it will continue like the oil industry. But also like the oil industry, incentives are needed to encourage its start. Otherwise most mining companies will continue looking elsewhere.

If you have questions, we would be most pleased to hear from you.

Mining Incentives in Northern Canada

One of the talks given to the recent meeting of the Alaska State Chamber of Commerce at Fairbanks was on the development of minerals in Northern Canada and how this development is being

facilitated and fostered by the Canadian federal government. The speaker was Edmond E. Price, Consul and Trade Commissioner for Canada, Canadian Consulate, Seattle. In listing the incentive programs, Mr. Price did not include the extensive geological and aerial geophysical surveys initiated and wholly financed by the Canadian federal government. Excerpts from his written text follow:

"The development of Canada's north will follow the historic pattern of development which formed Canada as a nation. It will depend upon:

- 1) the discovery of desirable mineral in economic quantity,
- 2) the provision of economic transportation to markets,
- 3) development of technology to enable economic extraction under condition of severe climate and high transit costs."

"To stimulate development in the North.....the Government of Canada has over recent years introduced a number of resource development assistance programs.

"Before outlining these programmes -- which -- additional to the various tax concessions, benefits and write-offs that mining companies enjoy under the Income Tax Act -- I should point out that these programmes apply to Crown land in Northern Canada, which is administered by the federal Department of Indian Affairs and Northern Development."

"The programmes include:

- 1) The Northern Mineral Exploration Assistance Programme
Up to 40% of an approved exploration programme (including geological, geophysical and geochemical examinations, aerial mapping, surveying, surface examination and drilling) in search of minerals or oil can be provided by the government. If the program is successful, the grant is repayable over a 10 year period commencing when production starts. If unsuccessful, the grant is not repayable.
- 2) The Prospectors Assistance Program
Provides grants on a first-come first-served basis of up to \$900 per year to stake an individual prospector. It provides \$30,000 in each territory to assist prospectors.
- 3) Northern Roads Program
Provides for assistance or resurface projects up to:
 - a) 50% of the construction cost for a tote trail but not to exceed \$20,000;
 - b) 50% of actual road cost for initial access roads to a yearly limit of \$100,000 if the project is exploratory in nature, and \$500,000 if the project is primarily development;
 - c) 2/3 of the cost of construction of permanent access roads, but not exceeding 15% of actual capital invested by the company prior to commencement of commercial production or exploitation;
 - d) 100% of the construction and maintenance costs for resource development and network roads, to link resource-potential areas with established road networks.
- 4) Northern Resource Airports Program
Provides for financial assistance up to 50% of the cost of airports in support of exploration operations to a maximum contribution of \$20,000, and pre-production operations, to a maximum federal contribution of \$100,000.
- 5) Economic Feasibility Studies
In some cases, the Federal Government will finance economic feasibility studies of proposed northern primary production operations.
- 6) Northern Canada Power Commission
A Crown corporation which plans (and in some cases operates) power operation facilities in Northern Canada. It provides power to mining operations in Pine Point and Yellowknife.

7) Canadian National Railroad

This Crown corporation may also become involved, as it did through the \$80 million extension of its line from Gringshaw, Alberta, 432 miles north to the Pine Point lead-zinc deposits.

8) Other Assists

These include: financial support for Chambers of Mines; subsidized assay services; strategically located Mining Recorders offices; the provision of serviced lots for sale in "open" toursite developments, etc."

"In the mining field (northern Canada), industry has spent \$260 million on new mine development in the past 4 - 5 years, supported by \$140 million in Federal Government expenditure.

"In addition to actual development of new mines -- such as Anvil, Cassiar, New Imperial and Pine Point -- exploration activity is at a \$12 million annual level, with 36,000 claims recorded in the Yukon and Northwest Territory in 1967 -- up from 5,800 in 1963."

"Value of production (northern Canada) should reach \$150 million this year."

Program	Canadian Federal	Provincial	U.S. Federal	Alaska
Geologic and geochemical	Very extensive and usually economic-oriented	Extensive, work usually economic-oriented	Large program. Not usually economic-oriented. May be reduced.	Small economic-oriented. Should be larger program.
Aerial geophysical, mostly magnetic	Very extensive. Many millions of dollars spent.	Frequent	Occasional. Mostly not suited for mining exploration	None. Should initiate a continuing program.
Tax benefits	3½-year exemption from start of production, no capital gains tax, special write-offs.	3½-year exemption in some provinces.	None except depletion allowance. Should have 3½-year exemption and no capital gains tax like Canadian federal gov't for undeveloped areas.	None. Should abolish Mining License Tax and allow 3½-year exemption from corporate profits tax.
Exploration assistance	Up to 40% matching money for all types of exploration including geological, aerial, drilling, etc.	At least one province provides matching money for exploration.	OME program of partial reimbursement for exploration of specific properties. Funds limited and administration cumbersome. Improvements needed.	None. Could supplement federal OME program to help prospectors explore or develop specific prospects.
Prospector assistance program	Up to \$900 per year per prospector	Several provinces provide similar assistance	None	Up to \$2000 per year per prospector
Road assistance	50 to 100% participation depending on type of road needed	B.C. provides partial to 100% financing, depending on circumstances	None. Should provide money for access roads into remote areas for mineral development	50% reimbursement for roads to promising prospects. Funds presently not available
Airport assistance	Up to 50% participation to a maximum of \$20,000 if for exploration or \$100,000 if for production	Assistance given but not familiar with details	None for remote areas	50% reimbursement if road not feasible and airport will help development. Funds presently not available

Program	Canadian Federal	Provincial	U.S. Federal	Alaska
Economic feasibility studies	Occasional financing of feasibility studies of proposed production operations.	Don't know if provinces finance studies similar to those described by Mr. Price.	None. Some engineering and cost studies of "model" operations being made.	None. State could finance U of A to make studies of specific proposed operations.
Power	Crown corporation provides power to at least some of the producing operations.	B.C. gov't ready to extend power lines to new operations.	Alaska Power Administration is looking for mineral developments as justification for power developments.	None. State should promote power developments and assist with power transmission to developing properties.
Railroads	Crown corporation built 432-mile railroad to Pine Point deposits. More railroad in planning stages in Yukon.	Nothing on provincial level within our knowledge.	Federal should extend Alaska railroad to Seward Peninsula and east to connection with Canadian National.	State should continue urging federal extension of Alaska Railroad.
Other assists	Excellent recording and claim location map services, partial financing of chambers of mines for promotion and information assistance.	Excellent claim recording service and claim location maps available. Excellent Chamber of Mines for promotion and information partially financed by B.C. Gov't.	Claim locations should not be required to be filed with U.S. BLM as is proposed because that agency is not basically working for mineral development. The records would be for internal use rather than public service.	Present recording services not sufficient. Complaints are numerous. Good recording service for whole State could be provided by Div. of M&G at College. Claim mapping service now starting but will require some time to cover the State.

D I V I S I O N O F M I N E S A N D G E O L O G Y

GENERAL

The purpose of the Division of Mines and Geology is to aid and promote the mineral industry in Alaska. To accomplish this purpose Division personnel do everything possible to foster and encourage mineral exploration and new mineral production in the best interest of the State. These activities aid in the development of the basic industries needed so much in Alaska. Much of the work involves first collecting, assembling and interpreting many kinds of data, and then communicating this information to the mining industry and the general public. The authority and functions of the Division of Mines and Geology as delegated by the Commissioner of Natural Resources are found in Alaska Statutes, Title 27.

The Division of Mines and Geology provides a number of services to the citizens of Alaska. It is responsible for administering the laws pertaining to mineral production and is responsible for mine safety. The analytical laboratory stimulates discoveries and aids bona fide Alaskan prospectors and miners by providing a free assay and mineral identification service. Division personnel do geologic field mapping, geochemical sampling and other functions of a state geologic agency; geologic maps and reports are a principal product of the Division. Technical assistance in the field or in the office on prospecting and mining problems is freely given to those seeking advice. Another function is a continual survey of the mineral resources and operations in the state and the dissemination of this information to those interested in the development of Alaska's mining industry. Although the Division is required by law to foster and promote the best interests of the mining, mineral, and related industries of the State, it also has a responsibility to protect those who invest in these industries. An important phase of the Division's work is the maintenance of an active file or inventory of all known mineral deposits, mining claims, and mining claim owners in the State. The Division of Mines and Geology works closely with the Division of Lands by providing necessary technical help and advice on mineral leasing, prospecting permits, and related matters administered by the Division of Lands.

In 1968 the name was changed from Division of Mines and Minerals to Division of Mines and Geology. The new name more accurately describes the activities and functions of the organization in relation to the total economic development of the State. At the same time the Petroleum Branch of the Division of Mines and Minerals was established as a new Division of the Department of Natural Resources; it is now the Division of Oil and Gas with headquarters at 3001 Porcupine Drive in Anchorage.

After one year the staff of the Division of Mines and Geology is firmly settled in the headquarters at College. The move of the Division was made official by formal opening ceremonies, followed by an "open house" tour of the offices and laboratory facilities, on October 5, 1968.

Throughout the 1968 summer season the Division had six mapping teams in the field. The field staff now includes three engineers and three geologists; when one more geologist is hired the field staff will have its full complement of men. The charts on the following pages present a concise picture of the Division organization, personnel and functions, as well as a summary of work accomplished for 1968. Plans for the 1969 field season are presented on following pages.

Table 4
 Organization, Functions, and Costs - Division of Mines and Geology 1968

DIRECTOR			
ADMINISTRATION BRANCH	MINING BRANCH	LABORATORY BRANCH	GEOLOGY BRANCH
Authorized Personnel			
Administrative Assistant Secretary Clerk 3 Mining Information Specialists Draftsman	Chief Mining Engineer 2 Mining Engineers 3 Summer Assistants	Laboratory Supervisor-X-Ray Mineralogist Assayer Chemist Assayer Geochemical Analyst Clerk Typist	Chief Mining Geologist 3 Mining Geologists 4 Summer Assistants Clerk Typist
Locations			
College Juneau Anchorage	College	College	College
Functions			
Mineral records, information	Geologic mapping, geochem sampling, prospect examination and reports	Ore assaying, geochemical and other analyses	Ore province evaluation, geologic mapping, geochem sampling
Drafting of claim maps	Safety inspections, public inquiries	Mineral identification	Economic geology reports and maps
Publishing	Technical advice and help prospectors and miners	Ore testing and research	Ore deposit investigations
Budget, finance, property and personnel			
Costs (FY 68-69 Appropriations)			
\$104,900	\$78,600	\$74,000	\$117,700
Division Total: \$375,200			

Table 5

Summary Of Work Accomplished By Division Of Mines And Geology In 1968

DIRECTOR
Supervision and Administration of Division

ADMINISTRATION BRANCH

Accounting, budgeting, personnel and property administration; public information, published five professional reports and annual report, petroleum statistics, monthly bulletin (circulation-2300 per month); processed 7,368 claim location notices and 1,092 affidavits and other mining documents, 18,000 claims now on file; assisted 1,400 visitors, answered 2,936 requests for information, distributed or sold 2,059 professional reports, mailed 2,970 information circulars. Held formal opening ceremonies and open house of College facilities.

MINING BRANCH

Geological and geochemical investigations made in five areas; 70 square miles of geology mapped and 750 stream sediment samples taken; 37 coal mine safety inspections made; administered 19 Prospector Assistance Programs. Visited eight prospecting and exploration sites. Represented mining industry and traveled with team of State and Federal investigators studying water pollution associated with mining; conducted survey of mining industry to learn what is needed to encourage more exploration. Studied proposed legislation on conservation and mining reclamation. Prepared draft of information circular on sale and lease of mineral properties. Conducted research on coal use, presented talks to professional and civic organizations; visited with numerous prospectors and wrote many letters to persons in the mineral industry

GEOLOGY BRANCH

Geological and geochemical surveys made in six areas; mapped geology of 124 square miles, collected 596 stream sediment samples. Conducted radiometric surveys in a number of areas to collect data on the occurrence of radioactive ores. Assisted prospectors and visitors, furnished information to industry personnel through discussion and by mail; prepared maps and reports on previous year's investigations.

LABORATORY BRANCH

Received over 1,500 samples from the public, made determinations ranging from simple identification to X-ray spectrograph and diffraction analyses, heavy liquid and magnetic separation, atomic absorption quantitative analyses and fire assays for gold, silver, and other noble metals. Did research for broader application of atomic absorption unit. Installed several new instruments that increased the efficiency and latitude of laboratory activities. Performed research on Division geochemical samples for analysis by optical emission spectrograph and atomic absorption.

DIVISION PROGRAMS FOR 1969

To provide useful information to prospectors and mining companies interested in exploration, the Division of Mines and Geology selects areas for field work that are likely to contain an ore deposit of economic significance. The end product of such an investigation is a report that includes a discussion of the geology, a geologic map and a presentation of geochemical data that may indicate an exploration target. Thus, as in past years, the areas mentioned below were selected on the basis of economic potential. The amount of field work undertaken in 1969 will depend, in part, upon whether or not the Division has a full complement of field men during 1969. Other factors in the amount of field work that can be accomplished are appropriations received and other duties that the Division may be called upon to do.

Arctic Alaska

Cosmos Hills near Bornite (copper, gold, "jade"): Geological and geochemical investigations will be undertaken in the northern and western parts of the Cosmos Hills window to supplement similar work begun in the southeastern part of this geological structure in 1968. The window includes the encouraging copper deposit at Bornite that is being explored by the Bear Creek Mining Company. Placer deposits that were formerly worked for gold in the Cosmos Hills are being reworked for the popular "Alaskan jade".

Wiseman-Chandalar region (copper, gold): A new field project involving geological mapping and geochemical sampling in this mineralized region may be undertaken if the Division succeeds in hiring a new qualified mining geologist.

Interior Alaska

Fortymile Creek (asbestos): A reconnaissance in the Fortymile area near Eagle will be made to check reported occurrences of asbestos in the vicinity. Results will probably be published as an open-file report.

Western Alaska

Sinuk area (zinc, lead): Geological and geochemical investigations will be continued in critical parts of the Sinuk area on the Seward Peninsula in an effort to complete previous studies of lead-zinc mineralization in this district.

Selawik (uranium): Radiometric surveys in the vicinity of Selawik Lake, near Kotzebue, will be undertaken as part of a continuing program to delineate areas of known or possible uranium mineralization, about which we have had numerous inquiries in recent months.

Casadepaga River (copper, gold): Geological and geochemical investigations will be undertaken in the area north of the Solomon River on the Seward Peninsula. Copper deposits in the region are associated with limestone-schist contacts.

Mount Dixon (copper): Mt. Dixon is on the lower portion of the Casadepaga River, within a belt of copper deposits. A faulted limestone block shows copper mineralization. Mapping and sampling will be done to determine the economic potential of the area.

Southwestern Alaska

Stepovak Bay (sulfur): In response to numerous inquiries concerning sulfur in Alaska, field investigations will be undertaken in the vicinity of Stepovak Bay near the southwest end of the Alaska Peninsula to study the geologic setting of sulfur deposits in a volcanic environment.

South-Central Alaska

Lake Clark area (copper): Geological mapping and geochemical sampling in the vicinity of Lake Clark are planned as part of a study of a belt of copper deposits along the western flank of a large body of intrusive granite west of Cook Inlet.

Yellow Jacket Creek (copper, molybdenum, lead, zinc): An investigation started in 1968 to study gossans in the Talkeetna Mountains by geological and geochemical methods will be continued in 1969.

Iron Creek (silver, copper): Iron Creek is also in the Talkeetna Mountains and possible mineralized areas are indicated there by gossans. These will be investigated as part of the project to investigate gossans in the Talkeetna Mountains.

Tokun Lake (iron): Strong compass deflections are noted by pilots on every flight over an area near Tokun Lake in the Cordova region. A brief aerial magnetometer survey will be conducted followed by a ground magnetometer and geologic study.

Southeastern Alaska

Prince of Wales Island (copper, uranium, molybdenum, lead): Four field projects in parts of Prince of Wales Island are planned as parts of a continuing program involving investigations of environments interpreted as favorable for copper and uranium mineralization. These investigations are desirable in view of current industry interest in the area.

One of these projects is a geochemical-geological project at Nichols Bay and other bays and inlets in the same general area. A mineralized fault of regional proportions extends from Nichols Bay, northwest through Tah Bay.

Another promising area is in the vicinity of Shakan-Point Baker. Reconnaissance geochemistry and geologic mapping in selected areas may point out important occurrences of copper, lead, and molybdenum.

Other

In addition to the projects mentioned above, field personnel attempt to contact prospectors and miners by visiting towns and villages throughout the State. Technical help, including prospect examinations, is offered to those seeking advice.

As a supplement to the service offered the mining public through the system of claim data records, the Division plans to draft and publish upon request, claim location maps on published U. S. Geological Survey quadrangles. These sheets will be available to the public at a nominal cost. Plans are also being made to initiate a project that will make unpublished material in the Division's files more readily available to the public.

Research on further applications of the atomic absorption unit to the analysis of a wider variety of geologic materials will be continued in 1969 by laboratory personnel. Progressively more service will be provided to Division field men and the public through the development of rapid and efficient analytical techniques. At present the emphasis is on analysis of Division geochemical samples.

DIVISION REPORTS

Reports Published During 1968

Geologic Reports

- No. 26 Geological and Geochemical Investigations Southwest of Farewell, Alaska, by Gordon Herreid, July 1968. Price \$1.00
- No. 29 Progress Report on the Geology and Geochemistry of the Sinuk Area, Seward Peninsula, Alaska, by Gordon Herreid, July 1968. Price \$1.00

Geochemical Reports

- No. 13 Geochemical Investigations of Selected Areas in the Yukon-Tanana Region of Alaska, 1965 and 1966, by W. M. Burand, May 1968. Price \$1.00
- No. 16 A Geochemical Investigation of a Portion of the Fortymile District, Alaska, by W. H. Smith, June 1968. Price \$1.00
- No. 17 A Geochemical Investigation of the Wood River-Tikchik Lakes Area, Southwestern Alaska, by G. R. Eakins, May 1968. Price \$1.00

Reports To Be Published Soon

The reports listed below are in preparation by the geologists and engineers. The reports are based on the results of field work done in 1968; plans call for release of the reports before the beginning of the 1969 field season. The descriptions given under area refer only to the general location of the study site and are not necessarily the titles that will be used when the report is completed.

Geologic Reports

<u>No.</u>	<u>Area</u>	<u>Author</u>
33	Solomon River, Seward Peninsula, Western Alaska	Asher
34	Diana Lakes, Talkeetna Mountains, South-Central Alaska	Anderson
35	Kanuti River, Ray Mountains, Interior Alaska	Herreid
36	Sinuk River, Seward Peninsula, Western Alaska	Herreid
37	Cosmos Hills, Kobuk River, Arctic Alaska	Fritts

Geochemical Reports

18	Iron Creek, Seward Peninsula, Western Alaska	Asher
19	Little Falls Creek, Talkeetna Mountains, South-Central Alaska	Anderson
20	Tikchik Lakes, Southwestern Alaska	Eakins

Special Report

Uranium in Alaska

Eakins

Unpublished Reports

In addition to the reports mentioned above, several open-file property examination reports and mineral resources reports were prepared by Division engineers. Included are 1) a three day reconnaissance of the coal deposits on Sitkinak Island, 2) a brief reconnaissance of the Ber-nq River coal field, and 3) a number of prospect examination reports.

PROSPECTOR ASSISTANCE PROGRAM

The Division of Mines and Geology answered 43 requests for information concerning the Prospector Assistance Program in 1968. Twenty-two of the 43 who requested information responded with applications for assistance. The screening board rejected three applications for assistance, leaving a total of 19 programs. The three applications were rejected because the applicant had a poor record on the program in the past, was in poor physical condition, or lacked experience in comparison to other applicants. All the funds available were encumbered by the first eleven applications to be received and approved. Consequently, eight programs were placed on standby status, whereby the participant accepted the condition that he would be reimbursed only if funds were available after all the earlier programs were paid. Five of the 19 participants completed their programs and submitted the records necessary for reimbursement. Two participants did not spend 30 days in the field and were disqualified, and 12 programs are pending at the time of this writing.

Three of the five participants who submitted programs staked nine new mining claims. The total cost for the five programs was \$14,489.99 for 772 man days, or \$18.77 per man day. The reimbursement cost to the State was \$10,888.99 or \$14.11 per man day.

Members of the screening board for the 1968 programs were:

- Lawrence E. Heiner - Mineral Industry Research Laboratory, University of Alaska
- Dr. Donald Cook - College of Earth Sciences and Mineral Industries, University of Alaska
- Leo Mark Anthony - College of Earth Sciences and Mineral Industries, University of Alaska
- Theodore Vance - State Mining Engineer
- Gilbert R. Eakins - State Mining Geologist
- Gordon Herreid - State Mining Geologist
- Robert E. Anderson - State Mining Engineer

Table 6 on the following page presents data pertinent to the 1968 Prospector Assistance Programs submitted as of January 13, 1969.

The regulations covering the Prospector Assistance Program provide that submitted programs will be held confidential by the Division for a period of two years. Work is in progress to make programs through 1966 available to the public.

Table 6
 Prospector Assistance Program - 1968
 (Based on programs completed as of January 13, 1969)

Name	Locality Prospected	Man Days	Claims Staked	Samples Assayed	Actual Prospecting Expenditures					Reimbursed By State
					Travel	Food	Equipment & Misc.	Total Expense	Expense Per Man-Day	
Ed R. Farrell; Del Rainey; Tom Dagley	Manley Hot Springs, Boulder Creek	456	0	0	\$ 250.00	\$ 606.38	\$ 534.96	\$5,391.34	\$ 11.82	\$ 4,000.00
Arthur Smith	Matanuska River, Carpenter Creek	41	1	0	149.50	216.67	193.45	559.62	13.65	419.76
Ed R. Hudson; Richard Geraghty	Livengood	102	4	4	-0-	483.32	4,452.26	4,935.58	48.39	3,751.69
E. Ronald Anderson	Brooks Range, Wild River; Rampart, Minook River; Indian River, Utopia Creek; Fairbanks, Pedro Dome	32	4	1	264.00	160.00	348.00	772.00	24.13	594.00
James A. Wylie	Kuskokwim	141	0	0	1,009.35	1,096.68	725.42	2,831.45	20.08	2,123.54
Total		772	9	5	1,672.85	2,563.05	10,254.09	14,489.99		10,888.99
Averages per Man Day					2.17	3.32	13.28	18.77		14.11

C O M P A N I E S C O N S U L T A N T S M I N E R S P R O S P E C T O R S

COMPANIES*
(Interested in Alaska Mining Possibilities)

Alaskamin Inc.
525 Failing Building
Portland, Oregon
William P. Murray

American Exploration & Mining Co.
2300 Russ Building
San Francisco, California 94104
Robert G. Garwood

American Smelting & Refining Co.
504, 535 Thurlow Street
Vancouver 5, B. C. Canada
Thomas C. Osborne

American Metals Climax (AMAX)
601, 535 Thurlow Street
Vancouver 5, B. C. Canada
R. A. Barker

Anaconda American Brass
Brittania Beach, B. C. or
116, 744 West Hastings Street
Vancouver 1, B. C. Canada
Glenn Waterman

Asbestos Corp. (Explorations) Ltd.
814, 837 West Hastings Street
Vancouver 1, B. C.

Atlantic Refining Co.
Box 59, Anchorage, 99501
or Box 749, Dallas, Texas 75221

Atlas (or Dynasty) Exploration Co.
328, 355 Burrard
Vancouver, B. C. Canada
John Brock

Bear Creek Mining Co.
E. 7621 Sprague
Spokane, Washington
David M. Snyder

Bunker Hill Company
P. O. Box 29
Kellogg, Idaho 83837
Foster Howland

Canex (Placer Development, Ltd.)
800, 1030 West Georgia Street
Vancouver 5, B. C. Canada
A. G. Horton

Cities Service Oil Co.
360 K St., Room 302
Anchorage, Alaska 99501
William A. Hull

Conwest Exploration Co.
901, 675 West Hastings Street
Vancouver 2, B. C.
P. O. Hachey

Copper Range Exploration Co., Inc.
4401 Wallingford Avenue, N.
Seattle, Washington 98103
C. Phillips Purdy, Jr.

Cordero Mining Co.
131 University Avenue
Palo Alto, California
J. Eldon Gilbert

Cyprus Mines Corp.
822, 510 West Hastings Street
Vancouver 2, B. C. Canada
Donald W. Tully

Duval Corp.
506, 602 West Hastings Street
Vancouver 2, B. C. Canada
Robert Gale

Dynasty Exploration Ltd.
330, 355 Burrard Street
Vancouver, B. C.

Eagle Picher Industries, Inc.
Box 910
Miami, Oklahoma

Guggenheim Exploration Co. Inc.
4554 West 6th Avenue
Vancouver 8, B. C.
Gavin A. Dirom

Hanna Mining Co.
200, 1200 West Pender Street
Vancouver, B. C. Canada
Alex G. Jones

Hecla Mining Co.
1105, 900 West Hastings Street
Vancouver, B. C. Canada
Phil Conley

* Best company contact man listed where known.

Homestake Mineral Development Co.
504, 535 Thurlow Street
Vancouver 5, B. C. Canada
L. G. White

Humble Oil and Refining Co.
10624 Kensington
Spokane, Washington 99218
Neil N. Campbell

International Minerals & Chemical Corp.
5401 Old Orchard Road
Skokie, Illinois 60076
Peter O. Sandvik

International Nuclear Corp.
1009 Mendenhall Apts.
Juneau, Alaska 99801
Phil R. Holdsworth

International Mine Services Ltd.
Box 1052
Whitehorse, Yukon
John McMullin

J. R. Simplot Co.
Box 2777
Boise, Idaho 83701
George A. McHugh

Kerr McGee Oil Industries
Kerr McGee Building
Oklahoma City, Oklahoma 73102

Moneta Porcupine Mines Ltd.
420, 475 Howe Street
Vancouver 1, B. C. Canada
B. S. Imric

Newconex Canadian Exploration Ltd.
914, 525 Seymour Street
Vancouver 2, B. C.
Paul W. Richardson

Newmont Exploration, Ltd.
300 Park Avenue
New York, New York 10022
Robert B. Fulton

Pan American Petroleum Corp.
2601 Security Life Building
Denver, Colorado 80202
Roger Markl

Phelps Dodge Corp.
Box 991
Douglas, Arizona
Elmer A. Winter

Shell Canadian Exploration Co.
815 East Fourth South
Salt Lake City, Utah 84102

Shell Oil Co.
100 Bush Street
San Francisco, or 1008 Sixth
Los Angeles, California 90054

Sinclair Oil Co.
Box 521
Tulsa, Oklahoma 74102
Merril Nielson

Springer & Associates
502, 1200 West Pender Street
Vancouver 1, B. C. Canada
Karl J. Springer

St. Eugene Mining Corp.
(Falconbridge)
504, 1112 West Pender Street
Vancouver 1, B. C. Canada
Alex Smith

Superior Oil Co.
1 East First Street
Reno, Nevada

Tennessee Corp.
61 Broadway
New York, New York

Texas Gulf Sulphur Co.
701, 1281 West Georgia Street
Vancouver 5, B. C. Canada
J. Russell Lowdon

Utah Construction & Mining Co.
718, 510 West Hastings Street
Vancouver 2, B. C. Canada
E. S. Rugg, G. A. Noel

U. S. Steel Corp.
Box 510
Provo, Utah
J. K. Hayes

Union Oil Company of California
2805 Denali Street
Anchorage, Alaska 99503
Gary F. Player

U. S. Smelting Refining & Mining Co.
Box 1170
Fairbanks, Alaska 99701 or
235 East 42nd Street
New York, New York 10017

Vitro Minerals Company
 90 Park Avenue
 New York, New York 10016
 E. G. Hotchkiss, or
 600 West 33rd South St.
 Salt Lake City, Utah 84115
 Cecil Smith

White Pass & Yukon Route
 1318, 510 West Hastings Street
 Vancouver 2, B. C.
 Charles J. Brown

CONSULTANTS
 (Available for Work in Alaska)

Alaska Drilling & Construction Co.
 David McCrillus
 Box 742
 Ward Cove, Alaska

Charles F. Herbert
 Box 1464
 Anchorage, Alaska 99501

Alaska Geological Consultants
 2227 Spenard Road
 Anchorage, Alaska 99503

Wallace McGregor
 Box 6351
 Salt Lake City, Utah 84106

Alaska Mineral Lab (Assaying)
 2229 Spenard Road
 Anchorage, Alaska 99503

George A. Moerlein
 Box 40, Star Route A
 Anchorage, Alaska 99502

Alvenco
 Clyde Wetherell
 2805 Bering
 Anchorage, Alaska

William A. O'Neill
 505-8th Avenue
 Anchorage, Alaska

Eskil Anderson
 309 Radio Central Building
 Spokane, Washington 99204

Dan Renshaw
 1329 "S" Street
 Anchorage, Alaska 99501

Earl H. Beistline
 Box 148
 College, Alaska 99701

A. L. Renshaw, Jr.
 1850 Wickersham Drive
 Anchorage, Alaska 99502

Douglas Colp
 1101 Gillam Way
 Fairbanks, Alaska 99701

Robert H. Saunders
 P. O. Box 1801
 Fairbanks, Alaska 99701

Donald J. Cook
 Box 5-93
 College, Alaska 99701

R. H. Seraphim
 427-470 Granville
 Vancouver 2, B. C. Canada

Arthur F. Daily
 488 Fairbanks Avenue
 Oakland, California 94610

Ruth A. M. Schmidt
 1040 C Street
 Anchorage, Alaska 99501

Dickinson-Oswald & Assoc's (mineral surveying)
 433 West 9th Avenue
 Anchorage, Alaska 99504

Starkey A. Wilson
 852 Wilson Building
 Dallas, Texas

Lawrence E. Heiner
 Box 5-433
 College, Alaska 99701

Ernest Wolff
 320 East Plum Street
 Fort Collins, Colorado 80521

James R. Wylie
 Box 208
 Aptos, California 95003

MINERS AND PROSPECTORS ACTIVE DURING 1968

Mining and Prospecting Other Than Coal

Name and Address	Location of Mines & Recording Districts	Approx. Crew	Type of Operation
Agoff, S. E. Flat	Prince Creek Mt. McKinley	2	Nonfloat
Alaska Barite Co. 1112 So. Cushman Tacoma, Washington	Castle Island Petersburg	20	Open pit mine Barite production
Alaska Exploration Co. 506 6th Avenue Anchorage	Norton Sound Cape Nome	1	Offshore prospecting
Alaskamin 525 Failing Bldg. Portland, Oregon	Post River Bowser Creek	12	Exploration
Alaska Mines & Minerals, Inc. Ray Wolf Box 422 Anchorage	Red Devil Mine Kuskokwim	1	Development
Alaska Red Top Mine, Inc. C. T. Rasmussen 7933 Jewell Lake Road Anchorage	Marsh Mountain Bristol Bay	2	Prospecting
Alaska Yukon Minerals Co. 111 East 5th Avenue Anchorage	Copper River region Chitina	2	Prospecting
Almax, Ted Dillingham	Tikchik Lakes Dillingham	1	Prospecting
Alvenco (Alminex) Clyde Wetherell 2805 Bering Anchorage	Alaska general Several	3	Prospecting
Amax Exploration Inc. 601, 535 Thurlow Street Vancouver, B.C.	Alaska general Several	1	Investigations
Amerada Petroleum P.O. Box 2040 Tulsa, Oklahoma	Bering Sea Cape Nome	1	Offshore prospecting
American Exploration & Mining Co. Russ Building San Francisco, California	Alaska general Several	2	Investigations

American Smelting & Refining Co. Room 504, Phillips Building 535 Thurlow Street Vancouver, B. C.	Alaska general Several	6	Property exploration
Ames, Robert 1220 5th Fairbanks	Ready Bullion Creek Fairbanks	1	Small scale hand
Anderson, E. Ronald Aniak	Pedro Dome Fairbanks		Prospecting
Anderson, Red Manley Hot Springs	Glen Gulch Manley Hot Springs	2	Nonfloat
Asbestos Corp. Ltd. 814 - 837 W. Hastings Vancouver, B. C.	Alaska general Several	1	Exploration
Au Limited Henry Warner Box 674 College	Porcupine Creek Fairbanks	2	Placer development
Ballard, John D. Box 920 Sitka	Chichagof Island Sitka	3	Prospecting
Basey, Bill & Martin, Lloyd Box 1173 Ketchikan	George Inlet Ketchikan	2	Lode
Bear Creek Mining Co. E. 7621 Sprague Spokane, Washington	Kobuk region & Alaska Range Several	40	Drilling & Recon
Berg, Rhinehart Kobuk	Kugruk Fairhaven	4	Exploration
Blair, Boyd 320 Lakeview Trailer Court Fairbanks	Eva Creek Fairbanks	2	Gold lode development
Bliss, Patrick J. & Sons 129 E. 11th Anchorage	Ungalik Creek Cape Nome	3	Nonfloat
Boedecker, Bill & Joines, Evert Hollis	Hollis Ketchikan	2	Prospecting
Boese, Earl Wiseman	Linda Creek Fairbanks	2	Nonfloat
Bonanza Gold, Inc. E. 15 Walton Spokane, Washington	Prince of Wales Island Ketchikan	4	Development

Bonnell, Frank 1057 W. 80th Street Los Angeles, California	Kantishna District Fairbanks	1	Lode prospecting
Bookwalter, Vern Nome	Buster Creek Cape Nome	2	Nonfloat
Bradley, Carl Wrangell	S. E. Alaska Several	1	Prospecting
Brockway, John T. 1737 Glacier Avenue Juneau	Baker Peak Sitka	1	Copper development
Bruce, Farrell Box 10149 Klatt Station Anchorage	Chicken Fairbanks	1	Lead-silver development
Bunker Hill Box 29 Kellogg, Idaho	Alaska general Several	1	Investigations
Burdick, Gordon McCarthy	McCarthy McCarthy		Copper development
Burns, John Fairbanks	Poker Creek (40-mile) Fairbanks	1	Nonfloat
Busty Belle Mine Tury Anderson & Associates 101 E Street, Hamilton Acres Fairbanks	Fairbanks Fairbanks		Lode development
Cambridge Mining Corp. Ltd. 1130 Bay Street Toronto, Canada	Seal Cove Ketchikan	5	Drilling
Canyon Creek Mining Co. Jens Kvanne & Sons Akiak	Canyon Creek Kuskokwim	4	Hydraulic
Casto, Steve 33 Mile Haines	Porcupine Creek Haines	1	Small scale hand
Chandalar Gold Mining Co. Box 1332 Fairbanks	Chandalar District Fairbanks	10	Nonfloat and mill Construction
Chaplin, Larry D. Box 1455 Juneau	S. E. Alaska	2	Peat investigation
Coben, Daniel & Monroe, Gilbert Fairbanks	Boulder Creek Manley Hot Springs	2	Placer prospecting

College Road Peat Kushman Brothers 12 Timberland Dr. Fairbanks	College Road Fairbanks	2	Peat
Cortella Coal Corporation Box 745 Cordova	Bering Glacier Field, Carbon Creek	8	Coal development
Crane, Fred Nome	Steep Creek Cape Nome	1	Development
Cyprus 822-510 W. Hastings Street Vancouver, B. C.	Alaska general Several	2	Investigations
Davis, Bon Box 45 Nome	Eagle Creek Cape Nome	2	Nonfloat
Dayo, Stanley & Neubauer, Jack Manley Hot Springs	Cooney Creek Manley Hot Springs		Nonfloat
Diamond Shamrock Corp. 300 Union Commerce Bldg. Cleveland, Ohio	Cinnabar Creek Mt. McKinley	10	Mercury lode development
Duval 506-602 W. Hastings Street Vancouver, B. C.	Orange Hill Fairbanks	10	Drilling copper prospect
Dynasty Exploration Ltd. 330 - 355 Burrard Street Vancouver, B. C.	McLean Arm Ketchikan	8	Exploration
Edgecumbe Exploration Co. C. T. & G. H. Morgan Box 758 Sitka	Silver Bay Sitka	2	Gold lode maintenance
Egnaty, Jack Sleetmute	George River Kuskokwim	1	Exploration
Emberg, Truman E. Dillingham	Egegik Bay to Ugashik Bay Alaska Peninsula	4	Beach sand prospecting
Emerson, Fred Haines	Porcupine Creek Haines	1	Small scale hand
Empire Jade Co. Gene Joiner Kotzebue	Jade Creek Noatak-Kobuk	1	Jade recovery & cutting

Falconbridge (St. Eugene Mining Co.) 504, 1112 West Pender Street Vancouver, B. C.	Central Alaska Several	8	Recon exploration
Farrell, Ed & Rainey, Del Fairbanks	Boulder Creek Manley Hot Springs	2	Placer prospecting
Ferguson, Bill Box 985 Fairbanks	Ester Dome Fairbanks	2	Lode development
Foster, Willie Nome	Hannum Creek Fairhaven	3	Nonfloat & lode prospecting
Fullerton Brothers Flat	Willow Creek Mt. McKinley	5	Nonfloat
Gilbertson, George 314 Charles Street Fairbanks	Dan Creek McCarthy	2	Nonfloat
Global Marine 811 W. 7th St., Room 402 Los Angeles, California	S. E. Alaska Juneau		Offshore prospecting
Goodnews Bay Mining Co. 422 White Building, Seattle or Platinum	Salmon River & Tribs. Bethel	40	Platinum dredge
Guggenheim Exploration Co. Inc. G. A. Dirom 4554 West Sixth Avenue Vancouver, B. C.	Alaska general Several	1	Investigations
Hanna Mining Corp. 1300 Leader Building Cleveland, Ohio	Alaska general Several	7	Exploration
Hansen, Burnett F. Eagle	Ben Creek Fairbanks	1	Nonfloat
Hapeman, Fred Chicken	Fortyfive Pup (40-mile) Fairbanks	1	Nonfloat
Hassel Mining Co. Harold Hassel Box 1071 Fairbanks	Ready Bullion Creek Fairbanks	2	Nonfloat
Hawkins, W. A.; Eichner, Ken; and Lillie, Angus Ketchikan	S. E. Alaska Several	2	Prospecting
Hecla 1105-900 W. Hastings Street Vancouver, B. C.	Alaska general Several	1	Investigations

Heiner, Larry Petersburg	Southeastern Alaska Several	1	Prospecting
Hibberd, Bill 1723 A. Tongass Ketchikan, Alaska	S. E. Alaska Several	1	Prospecting
Hill, Howard 221 2nd Avenue Fairbanks	Platte Creek Nenana	2	Nonfloat
Hogendorn, Jack Deering	Inmachuck River Fairhaven	1	Hydraulic
Holloway, Dorr & Rehard, Robert Red Devil	KoImakof Property Kuskokwim	2	Mercury exploration & drilling
Homestake Mineral Development Co. 304, 535 Thurlow Street Vancouver, B. C.	Alaska General Several	1	Investigations
Hudson, Edwin & Wittrock, Wayne 817 Lakeview Trailer Court Fairbanks	Livengood Fairbanks	3	Prospecting
Huff, J. W. Box 837 Ward Cove	Groundhog Basin Wrangell	20	Prospecting
Humble Oil & Refining Co. P. O. Box 120 Denver, Colorado	S. E. Alaska General	5	Recon exploration
International Mineral & Chemical Corp. Old Orchard Road Skokie, Illinois	Alaska General Several	1	Investigations
International Nuclear Corp. Phil R. Holdsworth 1009 Mendenhall Apts. Juneau	S. E. Alaska Several	1	Investigations
International Mine Services, Ltd. Box 1052 Whitehorse	Alaska General Several	1	Investigations
Johnstone, Jack	Prince of Wales Island Ketchikan	2	Prospecting
Jurgeleit, Art & Jo Haines	Porcupine Creek Haines	1	Small scale hand
Kiwalik Mining Co. Nome	Kiwalik Cape Nome	2	Moving dredge

Kloss, Herman K & D Lode Sunset Cove	Sunset Cove Juneau	1	Prospecting
Lanning, Tony Manley Hot Springs	Thanksgiving Creek Manley Hot Springs	1	Nonfloat
Larsen, Clifford P. O. Box 1875 Fairbanks	McKinley Park Nenana		Prospecting
Larson, Ken Box 1388 Ketchikan	S. E. Alaska Several	1	Prospecting
Lee, Richard Nome	Tin City Cape Nome	13	Nonfloat
Leonard, Harry B. A. C. Mining Co. Wiseman	Vermont Creek Fairbanks	1	Small scale hand
Lindfors, Hugo Nome	Rocky Mtn. Creek Cape Nome	1	Development
Lucky Seven Mining Co. Walter E. Roman Box 141 Fairbanks	Fish Creek Fairbanks	7	Nonfloat
Lyman, Robert Lyman Mining Co. Red Devil	White Mountain Kuskokwim	4	Cinnabar production
McCanse, Al Ronde Valley Lumber Company P. O. Box 608 Union, Oregon	Klery Creek Noatak-Kobuk	4	Dredge
McCay, Alan Box 513 Wrangell	S. E. Alaska Several	2	Prospecting
McGee, L. 836 Lindley Way Reno, Nevada	Tofty Manley Hot Springs	5	Nonfloat
McGill, Fred Petersburg	Admiralty Island Petersburg	1	Prospecting
McGill, Robert H. Moser Bay	Lower Cash Inlet Seldovia	1	Prospecting
McGregor, Wallace Box 6351 Salt Lake City, Utah	Alaska General Several	7	Recon exploration

Mardis, James E. General Delivery Anchorage	Glacier Bay Juneau	1	Prospecting
Marvel Creek Mining Co. Awe, Charles Aniak	Marvel Creek Bethel	4	Dredge
Meldrum, Billy Chicken	Chicken Creek (40-mile) Fairbanks	1	Stripping
Miettunen, Ray 332 Dunbar Fairbanks	Alder Creek (40-mile) Fairbanks	1	Nonfloat
Mills, Levy A. Kotzebue	Noatak River Noatak-Kobuk	1	Prospecting
Mineral Basin Mining Corp. Moa, Arthur Box 126 Hyder	Mt. View Property Ketchikan	2	Lode development
Miscovich, Andrew 779 8th Fairbanks	Porcupine Creek Fairbanks	2	Nonfloat
Miscovich, John Otter Dredging Co. Flat	Otter Creek Mt. McKinley	2	Nonfloat
Moore, Norman 326 Baranof Street Fairbanks and Dohney, Edward Box 604 College	Chistochena River Chitina	2	Lode gold exploration
Munz, William Nome	Dahl Creek Noatak-Kobuk	1	Jade recovery
Newlun, O. H. Box 623 Ketchikan	Prince of Wales Island Ketchikan	1	Prospecting
Newmont Exploration Ltd. 300 Park Avenue New York	Alaska General Several	30	Drilling nickel prospect and recon exploration
North American Dredge Co. John Stevens Flat	Otter Creek Mt. McKinley	1	Dredge
Northland Mines Charles W. Monroe Box 876, Big Delta	Nowitna Mt. McKinley	1	Prospecting

Occidental Minerals	Bering Sea Cape Nome		Offshore prospecting
O'Carroll, Michael J. 14615 - 25th S. W. Seattle, Washington	Long Creek Nulato	3	Nonfloat
Ocean Science & Engineering 4905 Del Ray Avenue Washington, D. C.	Norton Sound Cape Nome	9	Offshore prospecting
Olive Creek Mines Carl Parker Box 552 Fairbanks	Amy Creek Fairbanks	4	Nonfloat
Olson, Henry T. "Tiger" Taku Harbor	Juneau & Admiralty Districts	1	Prospecting
Ott, Martin H. 332 N. Boundary Fairbanks	Chicago Creek Manley Hot Springs	1	Nonfloat
Pacific Construction Co. Lundgren, Jim 707 Steese Fairbanks	Steamboat Creek Fairbanks	3	Prospecting
Pannick, Harry General Delivery Fairbanks	Flume Creek Fairbanks	2	Nonfloat
Parker, Albert Box 289 Juneau	Glacier Bay Juneau	2	Gold lode maintenance
Parker, Fred Deering	Inmachuck River Fairhaven	4	Nonfloat
Pedersen, Steve Council	Ophir Creek Cape Nome	2	Dredge
Phelps Dodge Corp. Box 991 Douglas, Arizona	Alaska general Several	1	Investigations
Pieper, Paul Box 1294 Ketchikan	S. E. Alaska Several	1	Prospecting
Price, Stan Box 1262 Juneau	Admiralty Island Juneau	1	Prospecting
Prospector John Box 271 Skagway	Skagway Skagway	1	Small scale hand

Radovan, Martin McCarthy	Glacier Creek McCarthy	1	Copper lode prospecting
Rainbow Mining Co. Ed Dalton Box 990 North Pole	Fairbanks Fairbanks	2	Prospecting
Rambaud, John Chicken	Fortymile River Fairbanks	1	Nonfloat
Redstone Mining Co. Carl Heflinger 409 Clara Street Fairbanks	Livengood Creek Fairbanks	4	Nonfloat
Reed Mineral Expl. Co. William Ehrich Box 485 Rosemont, Pa.	Michican Creek-Wild River Fairbanks	4	Lead, silver, gold lode exploration
Rhode Island Creek Mines A. W. Pringle Manley Hot Springs	Rhode Island Creek Manley Hot Springs	3	Nonfloat
R. S. Richards & Associates Box 1817 Anchorage	N. Fork Kashwitna River & Alaska Peninsula area Several	3	Copper, iron & gold prospecting
Roberts, Don O. Box 1700 Fairbanks	Brooks Range Noatak-Kobuk	1	Prospecting
Robinson, George F. Chicken	Wade Creek (40-mile) Fairbanks	1	Stripping
Ross, Don Box 2307 Ketchikan	S. E. Alaska	1	Prospecting
Rowan Drilling Company, Inc. 3023 Humble Building Houston, Texas	Bering Sea Cape Nome	10	Offshore prospecting
Ruby Mining Co. Al Kangus Ruby	Long Creek Nulato	2	Nonfloat
Rusaw, Max Route 2, Box 371 Nampa, Idaho	Rusaw Creek Palmer	1	Prospecting
Shell-Asarco Shell Bldg; 100 Bush Street San Francisco, California	Bering Sea Cape Nome	10	Offshore prospecting

Sinclair Oil Co. Box 584 Anchorage	Alaska Peninsula Several	6	Prospecting
Sirilo, Julius Box 625 Bethel	Aniak district Kuskokwim	1	Prospecting
Smith, Arthur W. Box 3-252, Eastchester Branch Anchorage	White River McCarthy		Prospecting
Smith, Lauren F. Gakona	Mankoman Lake Chitina		Prospecting
Stanley, Kirk W. 7003 Mink Place Anchorage	Slana district Chitina	25	Drilling
Stout, Al Kobuk	Dahl Creek Noatak-Kobuk	2	Nonfloat
Sume, Ron K. General Delivery Anchorage	Knik Glacier Palmer		Prospecting
Superior Oil Company 1 East 1st Street Reno, Nevada	Muir Inlet Juneau	10	Drilling molybdenum prospect
Tennessee Corp. 61 Broadway New York	Alaska general Several	8	Recon exploration
Thomas, Joe Sitka	Chichagof Mine Sitka	2	Development
Totem Exploration Co. Joe Blazek 317 Dock Street Ketchikan	Southeastern Alaska Several	1	Prospecting
Trumpey, Charlie General Delivery Fairbanks	Omega Creek Manley Hot Springs	1	Nonfloat
Tweet, N. B. & Sons Teller	Kougarok River Cape Nome	6	Nonfloat
Tweiten, Oscar Box 162 Fairbanks	Chatham Creek Fairbanks	1	Small scale hand
U. S. Steel Corp. 525 William Penn Place Pittsburgh, Pa.	Alaska general Several	2	Development

U.S.S.R. & M. Co. Box 1170 Fairbanks	Hogatza River Nulato	20	Gold dredge and Alaska exploration general
Utah Construction & Mining Co. 718-510 W. Hastings Street Vancouver, B. C.	Alaska general Several		Exploration
Vetter, Rudy & Adolph 1425 Ash Street Fairbanks	Cleary Summit Fairbanks	1	Gold lode development
Vogler, Joe (Joseph E.) Box 7 Fairbanks	Deadwood Creek Fairbanks	2	Nonfloat
Walper, James A. 25212 12th Avenue RR 3 Alder Grove, B. C.	Southeastern Alaska Ketchikan	6	Prospecting
Walsh, Pearce Nome	Seward Peninsula Cape Nome	1	Mining promotion
Warwick, Bill (William W.) 315 5th Avenue Fairbanks	Fortymile Fairbanks	1	Mercury development
Weston, Dave (David M.) Box 1938 Fairbanks	Dome Creek (40-mile) Fairbanks	1	Nonfloat
Wigger, Walter 900 Park Drive Fairbanks	Eva Creek Fairbanks	2	Nonfloat
Wilkey, Jack Fairbanks	Canyon Creek (40-mile) Fairbanks	1	Nonfloat
Wilson, Starkey A. 852 Wilson Building Dallas, Texas	Alaska general Several	1	Investigations
Wolff, Ernest Colorado State University Fort Collins, Colorado	Boulder Creek Manley Hot Springs	2	Prospecting
Woodman, I. N. Box 573 Valdez	Tonsina Lake area Valdez	1	Prospecting
Worthington, John Ketchikan	Prince of Wales Island Ketchikan	1	Prospecting
Wylie, James R. Box 208 Aptos, California	Kuskokwim Kuskokwim	5	Prospecting
Wright, Virgil J. Box 980, Sitka	Herbert Groves Island Sitka	1	Prospecting

"Nonfloat" indicates mechanical placer gold operation using draglines and/or bulldozers to transport gravel to nonfloating washing plant, bedrock sluiciboxes, or elevated sluices.

"Hydraulic" indicates placer gold operation in which gravel is excavated and transported to sluiciboxes solely by water jets from hydraulic nozzles.

"Small scale hand" indicates placer gold operation in which gravel excavation and transportation is accomplished by hand or ground sluicing.

Coal Mining

Name and Address	Location of Mines & Coal Field	Type of Operation	Approx. Crew
Alaska Matanuska Coal Co. (Paul Omlin) Box 13, Palmer	Premier Mine Matanuska Field	Strip	2
Evan Jones Coal Co.* Box 619, Anchorage	Jonesville Matanuska Field	Strip	85
Usibelli Coal Mines, Inc. Usibelli	Healy Creek Nenana Field	Strip	45
Vitro Minerals Corp. Box 1070, Fairbanks	Healy Creek Nenana Field	Strip	37

Note: Above data from DM&G records.

* Evan Jones was active at Jonesville until April, at which time the mine was closed.

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- *Report of cooperation between the Territory of Alaska and the United States in making mining investigations and in the inspection of mines for the biennium ending March 31, 1929.
- *Report of cooperation between the Territory of Alaska and the United States in making mining investigations and in the inspection of mines for the biennium ending March 31, 1931.
- *Mining Investigations and Mine Inspection in Alaska, biennium ending March 31, 1933.
- *Report of the Commissioner of Mines to the Governor, biennium ending December 31, 1936.
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Alaska's New Mining Law for State Lands, by James A. Williams, Director, State Division of Mines and Minerals, December 1961 (Reprinted from Mining Engineering Magazine).

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