STATE OF ALASKA

Department of Natural Resources

Division of Geological & Geophysical Surveys

MINES & GEOLOGY BULLETIN

Vol. XXIX | March 1980 | No. 1

P.O. Box 80007 | Published Quarterly | College, Alaska 99708

Joy S. Hammond—Governor | *Robert E. LeResche — Commissioner* | *Ross G. Schaff—State Geologist*

*Pouch M, Juneau, AK 99811** | *941 Dowling Rd, Anchorage, AK 99502** | *3001 Porcupine Drive, Anchorage, Alaska 99501* | *P.O. Box 80007, College, Alaska 99708** | *P.O. Box 7438, Ketchikan, Alaska 99901**

IN THIS ISSUE

**Mining information office.*

Strategic and selected critical minerals in Alaska summarized

By Thomas K. Bundtzen, Gilbert R. Eakins, and John T. Dillon, DGGS mining geologists

Introduction

Since the turn of the century, Alaska has added significant amounts of so-called 'strategic' and 'critical' materials to United States domestic mineral production during the First, Second, Korean, and Vietnam Wars as well as during times of unusual shortages caused by technological change or disruption of critical foreign sources. Alaska's contribution includes tin, tungsten, platinum-group metals, antimony, mercury, chromium, and minor amounts of asbestos (table 1). This paper defines what strategic and critical minerals are, summarizes Alaska's past strategic-minerals contribution and known reserve base, and discusses strategic and critical minerals availability with respect to lands open or closed to mineral entry and development.

'Strategic' vs 'Critical'

Not all mineral experts agree on the definitions of both 'strategic' and 'critical minerals,' and many view the two terms as synonomous. The best available general definitions have been provided by Thrush (1968):

> 'Strategic minerals are those commodities essential to the national defense for the supply of which, during war, we are wholly or in part dependent upon sources outside the national boundaries of the United States, and for which strict measures controlling conservation and distribution are necessary.
>
> 'Critical minerals are those essential to the national defense, the procurement of which in war, while difficult, is less serious than those of strategic minerals (because they can either be

domestically produced or obtained in more adequate quantities from reliable foreign sources) and for which some conservation measures may be necessary for nondefense uses.'

It follows that a 'strategic' mineral is one in which a chronic domestic shortage exists. On the other hand, potentially economic reserves of 'critical' minerals may be relatively abundant within the United States, but for social, economic, environmental, or political reasons, the country relies heavily on foreign sources of raw ore. Conservation and recycling of mineral materials could help alleviate the minerals supply problem and may reduce our dependence on foreign sources of materials in future years, but the United States has not been able to provide an adequate supply for defense. Also, many mineral uses are 'dissipative' and thus industrial consumption must always, to some degree, be supplemented by primary mineral extraction.

The lists for 'strategic' and 'critical' minerals have changed over time. In 1941, 'strategic' minerals were aluminum, antimony, chromium, manganese, optical mica, platinum, nickel, mercury, tin, and tungsten. Minerals important to space-age technology such as cobalt, niobium, cesium, and various rare-earth elements have been added to the list since World War II.

The 1975 Conference on Strategic and Critical Minerals held in Farley, Virginia listed 29 'critical' minerals, of which 17 are designated 'strategic' according to the definitions of Thrush (1968) adopted here. They are:

Optical mica	Asbestos
Niobium	Chromium
Cesium	Tin
Manganese	Fluorine
Tantalum	Nickel
Cobalt	Mercury
Bauxite	Tungsten
Platinum-group metals	Antimony
	Selenium

Fourteen of the 17 are found in varying amounts in Alaska. Also found in the 49th State are significant reserves and resources of seven selected critical minerals---cadmium, zinc, barium, titanium, gold, silver, and gypsum (table 2).

Established Reserves of Strategic Minerals Listed

Since World War II, private industry and limited federally subsidized exploration have delineated economic or 'near'-economic reserves of 10 of the 17 strategic minerals defined here: cobalt, nickel, tin, platinum-group metals, asbestos, mercury, fluorine, tungsten, antimony, and chromite. Of the rest, promising resources of selenium, optical mica, niobium, and tantalum are found in mineralized regions in Alaska; however, commercially viable reserves of bauxite (aluminum), manganese, and cesium are not known to exist anywhere in the state. Estimated reserve bases of strategic and critical minerals are summarized in tables 1 and 2; approximate locations of selected deposits are shown in figure 1.

A 63-million-lb proven reserve of cobalt metal contained within four deposits in the Southeastern Panhandle ---Brady Glacier, Yakobi Island, Mirror Harbor, and Funter Bay (52, 53, 54, 57; table 1)---amounts to about 3 years of annual U.S. cobalt consumption. If the inferred reserve---another 55 million lb---is included, the total would amount to 5-1/2 years of present U.S. consumption. The same four deposits contain an estimated 1.12-billion-lb (561,000-ton) proven reserve of nickel, equal to 2.1 years of current U.S. consumption; adding the inferred reserve increase the total amount to about 4 years of present domestic consumption.

Proven and inferred reserves of 938,000 oz of platinum-group metals at Goodnews Bay, Brady Glacier, Yakobi Island, and Salt Chuck (36, 52, 53, 67; table 1) amount to about 6 months at present rates of U.S. consumption. Except for the Stillwater-complex resources in Montana, Alaska has the largest economic reserves of platinum-group metals in the U.S.

The most obvious land-use conflict

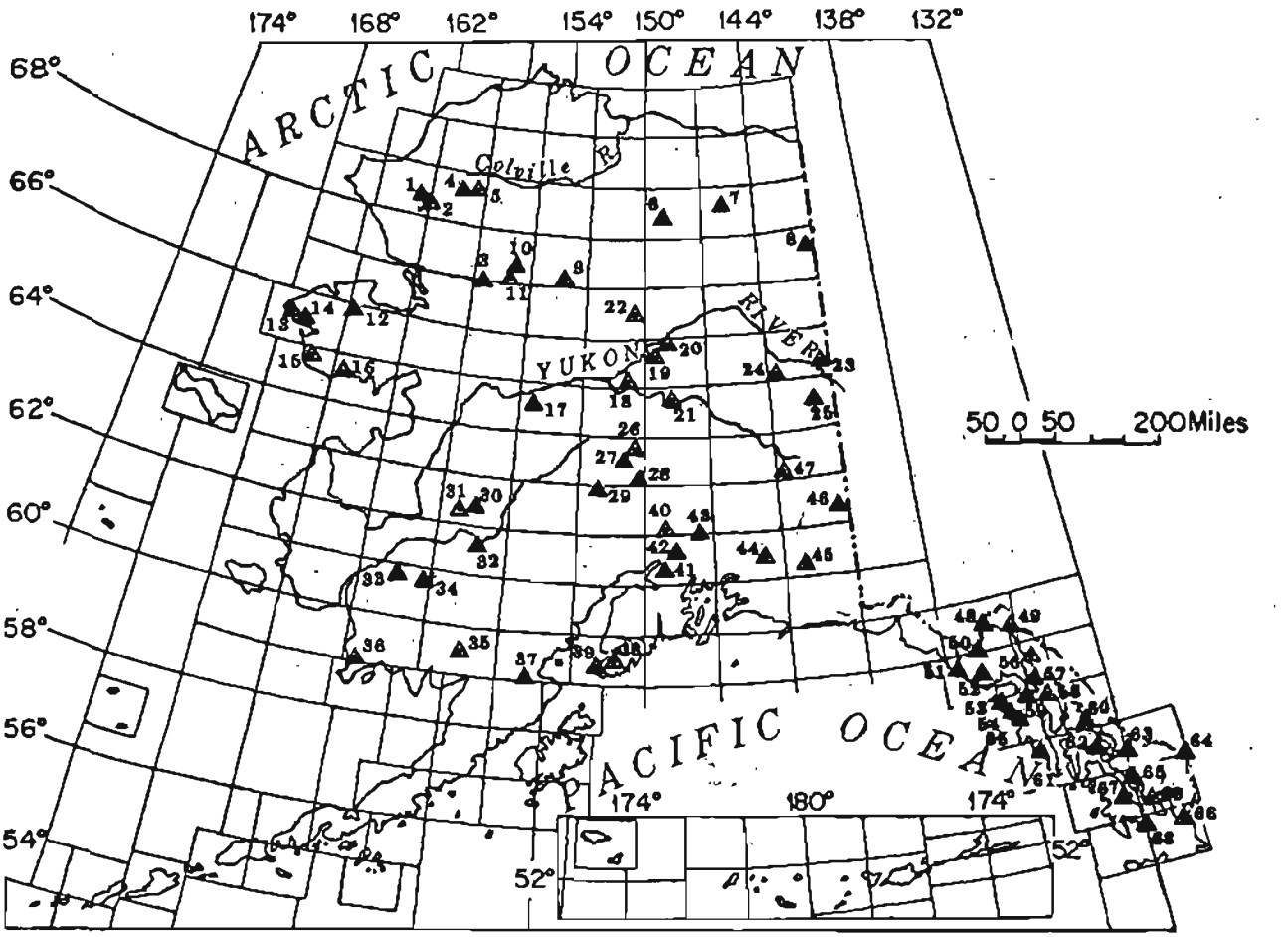

Figure 1. Locations of selected strategic and critical mineral deposits in Alaska

with respect to strategic minerals in Alaska is found in the nickel-cobalt-copper-platinum group metal deposits of the Southeastern Panhandle. Ninety-eight and one-half percent of the Alaska's cobalt reserves (equivalent to one-sixth of U.S. reserve base), 99.4 percent of Alaska's nickel reserve (equivalent to one-fifth of the U.S. reserve base) and 50 percent of Alaska's platinum-group metal reserve (one-fourth of the nation's known economic platinum reserves) are located either in Glacier Bay National Monument or section 204 withdrawals in the Tongass National Forest (West Chichagof-Yakobi Wilderness proposal). Insufficiently evaluated reserves at Spirit Mountain (45, table 1) and Bornite (11, table 1) are in Wrangell National Monument and on state-selected lands, respectively.

Alaska has 131 million lb (66,500 tons) of proven and inferred reserves of tin in deposits on the western Seward Peninsula, in the Manley-Tofty area, and at the Purkey Pile prospect in the southern Alaska Range (13, 14, 18, 29, table 1), which are the largest known reserves of primary tin in the U.S.; this amounts to about 1 year of current U.S. usage. Most of Alaska's known tin reserves are outside existing national monuments or lands withdrawn from mineral entry, but three promising tin belts---the Chulitna, Sithylemenkat, and the Old Crow-Bear Mountain areas (28, 8, 22, table 1)---lie partly within Denali National Monument, in a small portion of Lake Clark National Monument, in southern additions to the Arctic National Wildlife Refuge, and in part of the proposed Kanuti National Wildlife Refuge.

Inferred reserves of antimony in the Fairbanks and Kantishna districts (21, 26, 27, table 1) amount to about 55,000 tons of metal (contained in low-

Table 1. Production and reserve base of selected strategic minerals in Alaska[1]

Mineral	1979 U.S. net import reliance (%)	Major foreign source	Past production	Proven reserve	Inferred reserve	Major Alaskan deposits or districts with past production, reserves, or promising resources[2]	Remarks	Major industrial uses[3]
Columbite (niobium)	100	Brazil, Canada, Thailand, Malaysia	- - -	- - -	- - -	Bokan Mt. (68), Rapid River (8), Lost River (14), Tofty Tin Belt (18), and Ruby (17) contain potentially recoverable niobium	- - -	MHD generators; energy converters, biological research
Optical and sheet mica	100	India, Brazil, Madagascar	- - -	- - -	- - -	Promising resources at Sitkan Island (66), Silver Bay (61), and general Seward Peninsula	- - -	Electronics
Manganese	98	Gabon, Brazil, Australia, S. Africa	- - -	- - -	- - -	Sinuk deposits (15), Nation River area (23), central Alaska Range all contain unevaluated manganese resources	Not now important	Steel alloys, batteries, chemicals
Tantalum	96	Thailand, Canada Brazil, Malaysia	- - -	- - -	- - -	Tofty Tin Belt (18), Lost River (14), Bokan Mtn. (68), Rapid River (8), Ruby placers (17) all contain unevaluated resources	Tantalum could be recovered at Tofty today	Electronics, miscellaneous machinery, alloys
Cobalt	90	Zaire, Zambia	- - -	63,600,000 lb	55,703,400 lb	Brady Glacier (52), Yakobi Island (53), Mirror Harbor (54), Funter Bay (57), Spirit Mtn. (45), Bornite (11)	18% of U.S. reserve base; potential for reserve-base expansion in Panhandle deposits and at Bornite	Aerospace, electrical, catalysts, classified military uses
Chromium	90	S. Africa, USSR, Turkey	36,849 tons (38%-42% Cr_2O_3) 1944-58, 1976?	215,570 tons (23%-42% Cr_2O_3)	127,950 tons (12%-38% Cr_2O_3)	Red Mtn. (38), Claim Point (39), Bernard Mtn (44), Kanuti River (22), De Long Mts (4), Ekiutna (41-42), Union Bay (63)	Potential nationally significant resources statewide; present reserve not important	Metallurgical industry, construction, refractories, transportation
Platinum-group metals	89	S. Africa, USSR	569,500 oz (dominantly platinum) (1928-76)	760,000 oz	171,895 oz	Goodnews Bay (36), Brady Glacier (52), Salt Chuck (67), Yakobi Is (53), Mirror Harbor (54), zoned mafic-ultramafic rocks in SE and SW AK, misc. placer camps statewide (as by-product of gold mining)	Past production largest in the U.S.; 50% of U.S. recoverable reserves found in Alaskan deposits (except for platinum resource of Stillwater complex). Potential for significant reserve-base expansion in Panhandle deposits	Catalysts, electronics, dental, chemical
Asbestos	85	Canada, S. Africa, Turkey	3,000 lb tremolite asbestos (1942-44)	Not released	Not released	Doyon's Slate Creek (25), Shungnak (3), Nyac (33), Eastern Alaska Range (47)	Doyon's Slate Creek asbestos deposit one of the largest in the U.S.	Fireproof cement, friction products, gaskets, textiles

Mineral	1979 U.S. net import reliance (%)	Major foreign source	Past production	Proven reserve	Inferred reserve	Major Alaskan deposits or districts with past production, reserves, or promising resources[2]	Remarks	Major industrial uses[3]
Tin	81	Canada, S. Africa, Indonesia, Bolivia	4,556,157 lb (1905-79)	125,973,000 lb	5,046,000 lb	Western Seward Pen (13, 14), Tofty belt (18), Boulder Creek (Purkey Pile) (29), Rapid River (8), Chuitna belt (28), Sithylemenkat (22)	80% of U.S. reserve base; excellent chance for reserve-base expansion at Lost River (14). General Alaskan tin potential is excellent	Containers, electronics, construction, solder, bronze
Fluorine	81	Mexico, S. Africa, United Kingdom, Italy, Spain	- - -	4.94 million tons	- - -	Lost River (14), Porcupine Lake (7), Groundhog-Glacier Basin (63), Sinuk deposits (15),	25% of U.S. reserve base; excellent chance for reserve-base expansion at Lost River	Steel industry, hydrofluoric acid
Nickel	77	Canada, Norway, New Caledonia, Dominican Rep.	- - -	1,123 million lb	950,561,500 lb	Brady Glacier (52), Yakobi Is (53), Mirror Harbor (54), Hunter Bay (57), Spirit Mtn (45)	20% of U.S. reserve base (one of the largest nickel-sulfide reserves in U.S.)	Electroplating, batteries, stainless steel
Mercury	62	Algeria, Spain, Italy, Canada	2,300,000 lb (1942-74)	Unknown	1,500,000 lb	Red Devil (32), Cinnabar Cr (34), White Mtn, De Coursey Mtn (31), numerous other prospects in SW Alaska	During 1950s, Alaskan miners contributed 10% of U.S. production; reserves difficult to block out in mercury deposits, Alaskan production could resume with high prices.	Scientific control instruments, batteries, chloro-alkali industry, medicine
Tungsten	59	Canada, Rep. Korea, Bolivia	276,000 lb WO_3 (1916-38, 1977-79)	19,345,560 lb WO_3	34,008,000 lb WO_3	Lost River(14), Gilmore Dome (21), Hyder (64), Big Hurrah (16), Chichagof (55), Majorie Glacier (50, Kanuti River, Upper Hodzana (22), Golden Horn (30); misc. placer districts (by-product), Charley River-Circle area (24), Willow Creek (40), Chuitna (28)	20% of U.S. reserve base. By-product production from Lost River very significant; Upper Hodzana-Kanuti River, Charley River and Circle areas are important tungsten provinces	Nuclear, space, and aircraft 'super alloys,' electronics, tool steel
Antimony	43	China, Mexico, Bolivia, Yugoslavia	10,493,360 lb (1915-79)	Not released	110 million lb	Scrafford (Treasure Cr (21), Stampede (26), Slate Cr (27), Sawtooth Mtn (19), Stibnite Cr (47), Wiseman, and Nome areas, Chuitna (28), Red Devil (32).	Past production = 18% of all historical U.S. production. Inferred reserves (30% of U.S. reserve base) are largely low-grade ores	Fire retardant, babbitt, solder, batteries, refractories

[1]Proven and inferred reserves and resources based on definitions supplied by Thrush (1968, p. 578, 872, 914). Reserves for each commodity have been lumped to avoid disclosure of confidential information derived from unpublished private-industry data. Other strategic minerals---cesium, bauxite, and selenium---are judged not to be significant in Alaska.
[2]Numbers in parentheses denote locations in fig. 1.
[3]Uses derived from USBM 'Commodity Summary - 1980' and 'Metals Week.'

grade ores) and represent about 14 months of U.S. consumption. Roughly one-third to one-half of Alaska's potential antimony resources are contained in mines in Denali National Monument (Kantishna Hills); the Fairbanks deposits are largely on lands where mineral development is permitted.

The proven and inferred reserves of tungsten at Lost River, Big Hurrah, Hyder, Gilmore Dome, and Majorie Glacier (14, 16, 64, 21, 50, table 1) amount to about 1 year of annual U.S. consumption of WO_3. Most of Alaska's known economic[1] tungsten reserves are on lands open to mineral development; however, areas showing promise of being important tungsten provinces are in withdrawn areas such as the upper Hodzana River–Kanuti River trend, the Charley River drainage in the Yukon-Tanana Uplands, and the Old Crow–Bear Mountain area in east-central Alaska.

The inferred reserve of high-grade chromite ore and concentrates in deposits near Seldovia, equal to about 300,000 tons of 28 percent Cr_2O_3 (38, 39, table 1), amounts to about 6 weeks of present U.S. consumption. These reserves are on state and federal lands open to mineral entry; however, most of the remaining Alaskan chrome resources have been withdrawn from mineral entry. We judge that the best potential chromite belts in Alaska, besides the Seldovia-Eklutna trend, are, in descending order: 1) the Caribou Mountain occurrences (part of Kanuti National Wildlife Refuge proposal), 2) the Bernard Mountain trend (partly in Wrangell National Monument), and 3) the Baranof Island occurrences in Southeastern Alaska (partially in a section 204 withdrawal) (22, 44, 58, table 1). Although the De Long Mountain deposits (Noatak National Monument) are judged to be too remote to be viable today, the potential chrome resources there appear to be very large (4, table 1).

The most promising Alaskan asbestos deposit is on lands explored by Doyon, Inc. near Eagle (25, table 1), and is open to development. Many other asbestos occurrences in the state are also on lands where development is allowed.

Alaska's 4.94 million tons of fluorite, contained mainly in high-grade ores on the Seward Peninsula (14, table 1), amounts to 5 years of present U.S. consumption. The possibility of expanding Alaskan fluorite reserves, which represent one-fourth of the U.S. reserve base, is excellent. The fluorite prospects on the Seward Peninsula are primarily on lands open to mineral entry. However, significant fluorite shows to the east of the Pipeline Haul Road, near Porcupine Lake in the eastern Brooks Range (7, table 1), are located in proposed additions to the Arctic National Wildlife Refuge.

There are almost no areas of conflicts regarding Alaska's mercury reserves or resources; none of the significant past producing mines in the Kuskokwim River region (31, 32, 34, table 1) are in federal conservation units.

Much of the state's known potential for optical and sheet mica is included in the Misty Fiords National Monument and in a section 204B withdrawal in the Tongass National Forest, both in the Southeastern Panhandle of the state (61, 66, table 1).

Significant niobium and tantalum resources exist at Bokan Mountain in Southeastern Alaska, in the Manley-Tofty district, in the Ruby mining camp, and at Lost River on the Seward Peninsula; all are open to mineral development (68, 18, 17, 14, table 1). Two areas with reported niobium anomalies have been withdrawn from mineral entry: Serpentine Hot Springs (Bering Land Bridge National Monument) and the Old Crow area (proposed addition to the Arctic National Wildlife Refuge) (12, 8, table 1).

On the basis of present geological knowledge, the potential for development of the remaining strategic commodities---cesium, manganese, bauxite, and selenium---are judged to be not affected by federal lands withdrawn from mineral entry.

[1] Majorie Glacier by-product tungsten reserve in Glacier Bay National Monument is judged to be subeconomic.

Tabld 2. Production and reserve base of selected critical minerals in Alaska

Mineral	1979 U.S. net import reliance (%)	Major foreign source	Past production	Proven reserve	Major deposits or districts with past production, reserve base or promising resources	Remarks	Major industrial uses
Rutile or ilmenite (titanium)	100	Australia, Japan, India	- - -	- - -	Lituya Bay (beach placers) (51), Klukwan (49), Snettisham (60), Kemuk Mtn (35)	Millions of tons, titanium metal in low-grade iron ore are potential nationally significant resource. Lituya Bay placers contain significant by-product platinum and gold as well	Jet engines, airframes, classified missile uses
Zinc (includes cadmium)	62	Canada, Honduras, Mexico, Spain, Germany	520,000 lb zinc metal (intermittently since WW · majority as a by-product	6,900,000 tons zinc metal	Mahoney Creek (69), Lik (1), Red Dog (2-3), Arctic (10), Sun (9), Mo & Udall (20), Greens Creek (58), Glacier Creek (48), Kantishna (26-27), Alaska Range, numerous areas statewide	15% of U.S. reserve base; significant by-product cadmium production possible. Alaskan zinc potential very large	Galvanization, alloys, brass, electrical equipment
Gold	56	Canada, USSR	30,150,336 oz (1867-1979)	1,500,000 oz	Greens Creek (58), Berners Bay (56), Fairbanks (21), Willow Creek (40), Ambler mineral belt (9-11), Iliamna Belt (37), Chulitna (28), numerous camps statewide	Current reserve 2% of U.S. reserve base; 1979 production of 65,000 ounces was 6% of U.S. production	Electronics, dental, jewelry, arts
Silver	45	Canada, Mexico, Peru, U. Kingdom	20,084,510 oz	192,500,000 oz	Greens Creek (58), Ambler mineral belt (9-11), Noatak deposits (1-2), Kantishna (26-27), Ruby (18), other camps statewide	13%-15% of U.S. reserve base. Alaskan mines could account for 30% of current U.S. production by 1992	Electronics, electroplating, solder, photography, brazing alloys
Barite	40	Mexico, Peru	750,000 tons (1915-16; 1964-79)	- - -	Petersburg (62), Lime Point (69), Red Dog (2), Atigun (6), Glacier Creek (48)	'Millions of tons' of barite in western Brooks Range	Well-drilling mud, numerous other uses
Gypsum	33	Canada, Mexico, Jamaica	510,000 tons (1905-26; 1950s)	650,000 tons 25% ($CaSO_4 \cdot 2H_2O$)	Iyoukeen Cove (59), Sheep Mtn (43), Baultoff (16)	Past production significant; however, present reserves <0.5% of U.S. reserve base	Portland cement, various agricultural uses

Selected Critical Minerals in 49th State

Significant reserves and resources of seven critical minerals---titanium, zinc, cadmium, barium, gold, silver, and gypsum---are known to in Alaska.

Although there are no measured titanium reserves in Alaska, resources in low-grade titanium-iron deposits in the Southeastern Panhandle and in southwestern Alaska (49, 60, 35, table 2) and in beach placers at Lituya Bay (51, table 2) contain an in-place resource of millions of tons of titanium metal. The latter placers are in Glacier Bay National Monument, whereas the former deposits are both inside of and outside of federal conservation units.

Economic and near-economic reserves of zinc metal in Alaska exceeds 6.9 million tons, equivalent to about 15 percent of the U.S. reserve base. Several copper-zinc deposits in the Ambler mineral belt in the western Brooks Range (3, 10, 11, table 2) are outside federal withdrawals, but one major deposit in this belt, the Sun (Picnic) ore body (9, table 2), is partially within the Gates of the Arctic National Monument. Large zinc reserves at the Lik deposit north of Kotzebue are outside of federal conservation withdrawals, but the highly regarded Red Dog and Drenchwater deposits are in proposed additions to Noatak National Park (1, 7, 5, table 2). The zinc reserve at Greens Creek is in Admiralty Island National Monument. An unmeasured but significant by-product reserve of cadmium could be recovered from many of the zinc deposits.

Significant barite reserves in the Southeastern Panhandle (including a producing mine near Petersburg) are on lands where mineral development is permitted. There are also large resources of barite in the western Brooks Range, but they are mostly within areas that are not only withdrawn from mineral entry and development, but extremely remote (62, 69, 1, 2, 48, table 2).

Many promising and productive gold-silver mining regions throughout the state are on lands where mineral

development is permitted. Notable exceptions include the metal reserves at Greens Creek (Admiralty Island National Monument), which amounts to more than 20 million oz of gold-silver bullion; parts of the Chulitna and all of the Kantishna gold-silver mineral belts (Denali National Monument); the newly discovered Iliamna mineral belt (part of proposed addition to Katmai National Monument and Iliamna National Wildlife Refuge of HR39); and the major reserve of silver at the Sun deposit in the Ambler Mineral Belt, on the western boundary of Gates of the Arctic National Monument (58, 28, 26, 27, 37, 9, table 2). The Stanford Research Institute (Staff, 1978) included the Greens Creek and Sun deposits in their evaluation and calculated in their mine development model that Alaska could annually produce over 12 million ounces of silver and 90,000 oz of gold by 1992, equal to about 31 percent and 9 percent of current U.S. annual production, respectively.

Unmeasured but significant resources of former producing gypsum deposits on Chichagof Island (59, table 2), in the Southeastern Panhandle are on lands open to mineral development. An estimated 650,000 tons of 25- to 30-percent gypsum ore grade at Sheep Mountain west of Glennallen are partially within state lands classified for critical Dahl sheep habitat. An unevaluated gypsum occurrence at Baultoff in the northern Wrangell Mountains (46, table 2) is within Wrangell National Monument.

Discussion

It has been said many times and is worth saying again---Alaska has not been adequately explored for mineral resources.

Moreover, recent public land classifications in Alaska have not only withdrawn nationally significant reserves of strategic and critical minerals but have also discouraged or prohibited mineral entry and development in several promising mineral belts throughout the state.

According to a University of Alaska Mineral Industry Research Laboratory report (Metz, et al. 1978), only 17 percent of the public domain in Alaska (federal, state, and municipal) is open to mineral entry. Other strategic and critical mineral deposits on lands open to mineral entry could not be developed during a national emergency or critical shortage in less than the better part of a decade.

Strategic and critical mineral production should be encouraged on lands where economic development is permitted. Additionally, it would be prudent to inventory all Alaskan strategic and critical mineral deposits in terms of the national interest---even within federal conservation units---as well as on state and federal lands open to mineral entry.

Bibliography[2]

Metz, P.A., Pearson, R.W., and Lynch, D.F., 1978, Compilation of the data on the land withdrawals in Alaska: Univ. Alaska Mineral Industry Research Lab Rept. 40, 17 p. (updated through 1979).

Thrush, P.W. (ed.), 1968, A dictionary of mining, mineral, and related terms: U.S. Dept. Interior, Bureau of Mines, 1269 p.

Staff, 1978, Impact on mining of the withdrawal of Alaskan federal lands: Stanford Research Institute (SRI International), project 7001, 192 p.

Staff, 1980, Mineral Commodity Summary, 1980: U.S. Bureau of Mines Summary Rept., 191 p.

[2]Editors note: This paper is a condensed version of a DGGS individual report on Strategic and Critical Minerals in Alaska written for John Katz's use in the state's position on D-2 lands legislation. In that report the authors used 78 publications from both government and private sources that deal with strategic and critical mineral deposits in Alaska. This bibliography is available from the DGGS editor.

"The country is moving toward a system....in which business is flogged by government officials and regulators until it proves itself innocent---by reason of failure."---George Gilder, Harper's Magazine, Nov. 1979.

Three open files, two ICs printed during quarter

DGGS published three open-file reports and updated two popular Information Circulars during the quarter. The open-file reports are:

. AOF-122 - 'Survey of mineral activity in Alaska - 1977,' by G.R. Eakins and C.L. Daniels. This 32-page tabulation lists the names and addresses of all the mine companies and operators that were active in Alaska in 1977. It costs $1.

. AOF-123 - 'Survey of mineral activity in Alaska - 1978,' by G.R. Eakins and C.L. Daniels. This 14-page list, similar to AOF-122, costs $1.

. AOF-126, - 'Reconnaissance geology of the Nelchina Glacier deposit, north-central Chugach Mountains,' by M.W. Henning and G.H. Pessel. This 5-page report costs $1.

Two Information Circulars were updated, one of which is probably the most popular one ever printed. IC-1, 'Proper claim staking,' has been revised into an easy-to-read 17-page digest that includes a flow-sheet foldout depicting the steps involved in filing a mining claim.

The other Information Circular is IC-16, 'Alaska map information,' which lists the different types of maps of the 49th State and where they may be obtained. Both ICs are free.

A free publication is also available from U.S. Borax. A multicolored 15-page brochure describing the conceptual plan for developing the Quartz Hill molybdenum project near Ketchikan may be obtained from U.S. Borax, 3075 Wilshire Blvd, Los Angeles, CA 90010. (Do not write DGGS.)

'Mining inquiries up,' says State Geologist

The Alaska State Geological and Geophysical Surveys distributed a record number of publications during January and February of this year. State Geologist Ross G. Schaff accords the dramatic increase to the record prices of gold and silver on the London and New York Exchanges. 'We are also attracting an unusually large number of mining-related inquiries from the public,' he said.

The DGGS Information Circulars, a series of free booklets containing general information on various aspects of mining and prospecting, have also been very popular. In January and February, with gold at about four times the price it was a year and a half ago, DGGS gave out nearly 2,000 circulars. 'Eighteen months ago, when gold was about the $200 an ounce, DGGS gave out about one-fifth that amount---and that was during the tourist visitor season," Schaff said.

Carole Stevenson, a DGGS mining-information technician, says 'The phone has been ringing off the hook. During the winter---normally our slack time ---we used to get five or ten calls regarding mining claims a day. This year we have been getting many more. In the last 11 days we've received 288; she said. 'Many Outsiders are interested in prospecting, too,' she added. 'We've had calls from about 15 states, some from as far away as Louisiana and Florida, asking about mining.' The beleaguered Stevenson said she was 'not exactly looking forward to the summer tourist season.'

The Technical Information section plays a vital role in the State Geological Survey operation in addition to the mining offices, Schaff said. 'Our goal is to continue providing the public with the results of our resource investigations as quickly and succinctly as possible,' he added.

There are four offices throughout the state where the visitor may obtain mining information---information on Kardex files or microfilm that goes back 'at least a generation,' Schaff said. 'And these files are for claims on both state or federal land. I believe Alaska is the only state to offer this service to its public,' he added.

DGGS offices are at 941 Dowling Road in Anchorage, the UA Physical Plant Building in Fairbanks, and the State Office Buildings in Juneau and Ketchikan.

The State Survey is not the only agency that has been fielding questions from the public since the price of gold skyrocketed. Alan Townsend, habitat biologist for the Department of Fish and Game in Fairbanks, said he too has received numerous long-distance calls regarding mining. 'Many were from tourists who want to spend their summer in The Last Frontier, prospecting for gold and fishing,' he said. Most of the questions asked concerned the size of suction dredges allowed, panning, and the various mining and fishing rules and regulations.

Townsend said the Chena River, Fortymile, Central, and Livengood areas appeared to hold the most interest for the prospective miners.

Alaska has oil, gas, and coal

By Don L. McGee, DGGS petroleum geologist

PETROLEUM

Oil was first produced commercially in Alaska in 1904, when the small Katalla field, near Cordova, was located in the midst of a seepage area. The field produced only 154,000 barrels---mostly for local marine use---over the next 3 decades. The refinery was partially destroyed by fire in 1933 and the wells never produced again.

The first important production was obtained with the discovery of the Swanson River oil field in 1957 and the Kenai gas field in 1959. There are six oil fields and four gas fields producing in the Upper Cook Inlet province; through 1977 they produced 926 million barrels of oil and 1.3 trillion cubic feet of natural gas.

The Prudhoe Bay oil field, located on the North Slope, was discovered in 1968. The largest oil field in North America, with an estimated 9.6 billion barrels of recoverable oil, Prudhoe Bay delivered its one-billionth barrel of oil in January 1980. The field annually accounts for nearly 18 percent* of present U.S. production.

The Arctic Slope province, in which the Prudhoe Bay oil field is located, consists of about 100,000 square miles. In it lies another large area, the 37,000-sq-mile Naval Petroleum Reserve-Alaska (NPRA). Lying between the southern Brooks Range and the Arctic Ocean, NPRA was set aside in 1923 by Pres. Warren G. Harding. An extensive exploration program was begun in 1944 by the U.S. Navy and continues today under the USGS. So far, seven oil fields and four gas fields have been discovered on the North Slope.

Exploration is continuing outside NPRA, both eastward toward the Prudhoe Bay area and west of NPRA. Prime exploratory areas include the northern part of the Arctic National Wildlife Range, where exploration is presently restricted, and offshore along the Beaufort Sea coastline from Point Barrow to the Canadian border.

Extent of Sedimentary Basins

There are about 283,000 sq mi (181.4 million acres) of offshore sedimentary basins---larger than France and England. This estimated size of Alaskan offshore basins was limited by using a 200-m water depth and a 1.5-km sediment thickness based on regional reconnaissance geophysical data. An additional, 176,000 sq mi (112.6 million acres) of sedimentary basin areas are covered with more than 200 m of water and contain at least 1.5 km of sediment fill. However, the depth of water presents serious technological constraints to offshore drilling today.

The onshore sedimentary basin area is somewhat smaller---231,900 sq mi, or 148.4 million acres.

The areal figures presented here do not in anyway represent the oil and gas potential of the subsurface. They simply represent areas where oil and gas may have been generated and trapped.

Potential Petroleum-Bearing Areas

Brief descriptions of Alaska's potential oil- and gas-producing basins are listed below.

Copper River Lowland. This basin is underlain by a extensive series of

*'Oil/Gas Journal' Production Report, Mar. 14, 1980.

Mesozoic rocks that are locally covered with a thin veneer of Tertiary fluvial sands and gravels. Although several test wells drilled in the province have found oil and gas shows, the rocks encountered by drilling bits lack good reservoir characteristics. Success in hydrocarbon exploration will depend on local development of permeable reservoir rocks.

Bristol Bay-Nushagak Lowland. Tertiary volcanic and marine sediments at least 13,000 ft thick lie under this area. The petroleum possibilities of the Bristol Bay Tertiary province include a thick sequence of interbedded and intertonguing marine and nonmarine Tertiary rocks. Porous and permeable sandstone reservoirs are suspected to be in the region.

Bering Sea Shelf. This area, which extends off the southwestern Alaska coast for 300 mi, covers an area of 180,000 square mi and is probably underlain by Mesozoic sediments and Tertiary rocks to the southeast. Petroleum-bering intervals within the sedimentary sequence are considered relatively favorable in parts of the area.

Pacific Coast Tertiary Province. Petroliferous Tertiary sedimentary rocks are exposed along the Pacific coast from Icy Point in southeastern Alaska to Cherikof Island in southwestern Alaska; they may extend offshore along the entire Pacific margin of Alaska. Along the Gulf of Alaska these rocks contain many oil and gas seeps, including the Katalla oil field. More than 20 test wells have been drilled in the 5,200-sq-mi Gulf of Alaska onshore area since 1954 without commercial success, apparently because of the lack of suitable reservoir rocks. In the 18,000-sq-mi offshore area, seismic exploration reportedly revealed broad open folding in the thick Tertiary sections; numerous well tests of these favorable structures apparently have proved to be of noncommercial status. Petroleum-accumulation possibilities in the Kodiak area are poorly known. The petroleum indicators of the exposed rocks are fair to poor, mainly because of the severe deformation in the Oligocene-early Miocene outcrops and the lack of oil and gas seeps in the area.

Interior Alaska. Large parts of the Yukon-Koyokuk Province are underlain by Cretaceous sedimentary rocks that may be petroliferous. However, the structural complexity and impermeability of these rocks render most of the many subbasins area poor prospects for new petroleum discoveries. Exploratory efforts east of Kotzebue Sound in the Selawik lowland have indicated no significant thicknesses of Mesozoic or Tertiary strata between the Quaternary alluvium and the suspected shallow igneous basement. A possible thick section of Cretaceous or Tertiary rocks may overlie the igneous basement along the north side of the Seward Peninsula.

The 30,000-sq-mi Lower Yukon basin is mainly underlain by Cretaceous sediments. Generally, the exposed Cretaceous rocks are so tightly folded and closely faulted they all but preclude petroleum accumulation throughout the region.

Aeromagnetic and seismic profiles across Norton Sound indicate a sedimentary section more than 5,000 ft thick that overlies magnetic and acoustic basement rocks. The sedimentary rocks may well be late Mesozoic or Tertiary and may have petroleum potential. A recently publicized discovery of a gas seep south of Nome by the U.S. Geological Survey lends credence to this. The extent of this basin is generally restricted to nearshore geophysical data.

As in Norton Sound, several thousand feet of Mesozoic to Tertiary sediments in the Chukchi Sea could be present and favorable for offshore petroleum accumulations.

The Kandik basin extends in a 40-mi-wide belt from the Yukon River northeastward across the Yukon-Porcupine area into Canada. The basin is underlain by an early Cretaceous sequence of argillite and graywacke. Permeability and porosity of exposed rocks is very low and their petroleum reservoir potential is considered low. Recent exploratory 'dry holes' support this conclusion.

Regional aeromagnetic profiles suggest that Paleozoic volcanic rocks exposed to the north underlie the Yukon

basin under a shallow cover of Quaternary alluvium. Only in the northeastern part, along the Lower Porcupine and Black Rivers, do aeromagnetic profiles indicate an appreciable thickness of nonmagnetic sediments.

Interior Lowlands. Regional aeromagnetic profiles over the Kuskokwim lowland suggest that a thin alluvial cover overlies nonmagnetic Paleozoic rocks, some of which are petroliferous. However, literature suggests several thousand feet of nonmarine Tertiary sediments exposed on the margins of the lowland. Petroleum prospects here are for gas generated from Tertiary coal-bearing rocks and for potential petroleum reservoirs derived from Paleozoic source rocks.

The Tanana lowland lies between the Tanana River and the northern foothills of the Alaska Range. This 7,000-sq-mi area is mantled by thick Quaternary deposits that probably overlie Paleozoic and Mesozoic rocks, but also has extensive exposures of nonmarine Tertiary rocks along its southern margin. The older rocks are considered to have fair petroleum possibilities; the Tertiary section may have gas and coal deposits.

COAL

Alaska has produced over 26 million tons of coal since mining first began in 1890. Most of the coal has been produced from two areas: the Matanuska Valley northeast of Anchorage and the Nenana fields south of Fairbanks. The former coal fields have been essentially inactive for much of the past 2 decades following the discovery and production of natural gas in the Cook Inlet basin south of Anchorage.

Coal reserves for the state approach 1-1/2 billion short tons. However, most of the coal areas have not been sufficiently explored to allow their classification as 'reserves.'

Very large hypothetical resources exceeding 2 trillion short tons seem possible from studies of relatively sparse and regional data. Most of the coal resources are in northern Alaska, but substantial accumulations occur in both the Beluga field and in the Matanuska-Susitna Valleys areas of the Cook Inlet region and the Nenana fields in the interior; both areas are either on or near the Alaska Railroad.

The only mining operation of any consequence is the Usibelli Mine in the Nenana region, a coal-stripping operation near Healy. This mine supplies 700,000 tons of subbituminous coal annually, mainly for a power-generation facility nearby and for use by the City of Fairbanks and several nearby military installations.

The high cost of liquid hydrocarbons has prompted increased interest by power-generating companies on the U.S. West Coast and in Japan to use Alaska's coal as a future energy source.

Investigate that claim before buying

Your lifelong dream has been to mine in Alaska? Well, at the risk of shattering a beautiful image, there are a few steps you should take and a few questions you should ask before plunking down your money to buy an existing mining claim, lest you find your dream has taken on nightmarish qualities.

Listed below are a few questions you should ask both the buyer and yourself. As a prospective claim buyer, you must remember that there is a renewed interest in mining, and that it is a seller's market. So, bear in mind the words 'caveat emptor,' which are Latin for 'Let the buyer beware.'

There are pitfalls in buying a mining claim just as surely as there are in buying a used car. The buyer is never above 'being taken.' Before you get this far, however, there are a few points you should perhaps ponder. For instance, did you know that:

. Only 17 percent of the public domain in Alaska (federal, state, and municipal) is open to mineral entry? (Prospecting or claimstaking is not permitted on the rest because of the numerous land withdrawals and classifications or transfers to Native ownership.)

. It is almost certain that easily accessible areas in Alaska with gold or other valuable minerals are already staked---and that many times the rule is 'trespasser beware'? (The 'unexplored frontier' syndrome, as applied to most placer-gold deposits in Alaska, is largely a myth.)

. Finally, realize that there is no occupation that man is so anxious to enter into with so little knowledge as mining.

If your spirits are not dampened by the above, the Division of Geological and Geophysical Surveys has listed a few tips for the prospective buyer in pursuing his dream.

Ask the seller:

1. Was the claim staked on ground open to mineral entry when it was located? (If not, the claim is worthless.)

2. Is the claim legitimate? (Was it staked according to law, with four corner posts and so forth, or was it just 'paper staked'?)

3. Is the claim filed with the BLM or the state? (If not, it is not legitimate.)

4. Was the claim based on a discovery?
   a. If so, what type? (Geochemical sample, panning, drilling, etc.) Prove it. ('Take me panning.')
   b. If not, it may well be caveat-emptor time. Buying a claim without a discovery merely gives the owner the right to work like a beaver to make the discovery needed to make the claim valid.

5. Have there ever been gold or other valuable minerals produced or found on the land? Ask the seller to produce evidence of same (for example, U.S. Geological Survey or DGGS documents or mining-engineering reports from industry.)

6. Was the land staked with a reasonable expectation of finding gold or because of some favorable geological or geographical conditions? (Or was it staked for nonmineral reasons---perhaps as a cabin site?)

7. Can I go on the land and prospect on my own? (If not, why?)

8. Are you a legitimate seller?
   a. How long have you lived in Alaska?
   b. What is your mining, prospecting, and geological background? (If none, what is the credibility of the claim?)

9. How is the land going to be transferred, by quit-claim deed or by warranty deed?
   a. In a quit-claim deed, the seller is selling you whatever interest he has in the claim, namely, the mineral rights to his unpatented claim. (But, if there has been no discovery or if the claim is not a legal one, the buyer will be buying nothing, since the seller's interest in the claim was zero to begin with.)
   b. In a warranty deed, the seller guarantees that he owns both the land and the mineral rights and that he is selling them fee simple, or outright, to the buyer. This can only happen with a patented claim. A patent is the deed given by the government, and your title is as good as it would be on a lot downtown. (But if he is selling unpatented land with a warranty deed, run.)

Things the buyer should do:

1. If you are a novice at the mining game, you shouldn't plunge headlong into it. It can be financially risky. Find an oldtimer who is willing to part with some advice.

2. Acquaint yourself with the state and federal mining laws. (You may want to obtain a copy of 'Guide for the Alaskan Prospector,' by James A. Madonna, from 504 College Road, Fairbanks, AK 99701; the little $4.95 book is loaded with tips for the novice miner.)

3. Determine what type of mining you are going to do, placer or hardrock. Again, get the advice of somebody who has been there.
   a. If you are interested in a hard-rock mine, you are probably thinking in 'mega-bucks'---say enough to procure a 'Cat,' a loader, compressor, drills, trucks or ore cars, and maybe a small mill. You may want to examine the assays and metallurgical reports, and if the claim has been previouslv operated, the seller's books and past history of production.
   b. If placer mining is your game, you might get by in a small way with a suction dredge, but to make it pay or go bigger, you may need two Cats to open a couple of cuts. You will also need a large sluice box and a welding shop---to get started, that is. You will need to know if the ground is frozen or thawed, deep or shallow, and the percentage of boulders. Is the water supply adequate? Has the ground been tested? Is there a past history of production?

4. Check your claim status.
   a. Is it legitimate? (Or is it 'paper staked'?)
   b. Does it overlap another claim?
   c. Is it current? (Assessment work must be done annually, or the claim will lapse.)

5. If satisfied with the land status, take a trip to the claim with the seller. To quote Madonna (1977, p. 61),

   'You will be looking for two things. There should be a claim post at each corner of each claim. If all posts are not in place it may indicate a hasty stake job with only selling of the claims in mind. The second question which must be answered is, where is the discovery point? To be valid, each claim must have a discovery of valuable mineral. If the seller of these claims cannot show you a significant discovery on each claim, move away from this person like he has leprosy. If on the other hand, if a significant discovery is shown on each claim and the claims are properly staked and posted, you might want to spend a few days on the claims testing and sampling to be certain the claims meet what the government refers to as the "Prudent Man" rule. The rule is further defined: "Where minerals have been found and the evidence is of such character that a person of ordinary prudence would be justified in further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine." Many folks have taken this to mean that any show of mineral, or hope for a future discovery, is sufficient. This is not the case. There must be a real physical discovery of valuable mineral on each and every claim. Furthermore, this discovery must satisfy the "Prudent Man" rule; traces, isolated bits or minor indications are not sufficient.'

6. Before purchasing, offer to take the land on a lease-option. This way, you can

mine it for a specified period of time---say 1 year---before buying.

7. Hire a mining consultant to examine your claim for you. To quote Madonna (1977, p. 62) again,

> 'Certainly, if a group of claims are going to cost $15,000 it is worth the additional fee of an expert's evaluation to help eliminate the possibility of dumping your hard-earned cash into a piece of worthless ground.'

DGGS contributes to AEIDC's new Alaska map series

A seven-plate 1:1,000,000-scale color map series, 'Mineral terranes of Alaska,' is now available from the University of Alaska's Arctic Environmental Information and Data Center (AEIDC).

The maps show mineral-resource information gathered from both geologic mapping and mineral prospecting in Alaska. The mineral-bearing terranes shown are those environments where mineral deposit formation is known to have taken place and those where present knowledge indicates that deposits of minerals occur. The maps were prepared by AEIDC under contract to the Interior Department's Bureau of Mines and with contributions by DGGS, the UA Mineral Industries Research Laboratory, the U.S. Geological Survey, C.C. Hawley and Associates, Cominco American - Alaska, Resource Associates of Alaska, and Whitney & Whitney.

Strategic and critical metals---defined as those needed for defense, which have no reliable substitutes, and upon which the United States has more than a 25-percent net import reliance---are emphasized in the series. (For a more definitive breakdown of these metals, see the article beginning on p. 1.---Ed. note.)

The map series can be obtained from the AEIDC offices at 707 A St, Anchorage, 99501. The cost for the complete seven-plate series, including prepaid handling and book-rate postage, is $10; for shipment by first-class mail, $13.

20 percent of Alaska's gold miners 'rich'

(from Alaska Airlines 'Private Lines,' Jan.-Feb. 1980)

Approximately 20 percent of the gold miners in Alaska are coming out rich this year--some of them millionaires--according to a recent survey by Ernie Wolff, director of the University of Alaska's Mineral Industries Research Laboratory. Another 40 percent made a real good living, says Wolff, attributing the success to the huge increases in gold prices this year. He estimated that there were between 3,000 and 5,000 persons mining gold in the state during the summer. An estimated 300 to 400 used heavy equipment and an estimated 40 percent of those went broke, due to working poor ground, lack of experience, or being unable to meet expenses of up to $150,000 in obtaining and operating the equipment.

OSM gives $59K grant to UA

The federal Office of Surface Mining awarded a research grant of $59,637 to the University of Alaska. Named the principal investigators for the 1-year project were Paul A. Metz and Dr. Ernest N. Wolff of the UA Mineral Industry Research Laboratory. They will study, by enhanced satellite imagery, the large geologic features and trends that are associated with Alaskan mineral occurrences.

According to an OSM spokesman, the research grants are for 1 year only. Subsequent funding depends on satisfactory performance and availability of funds. There were 57 other grants awarded to state mining and mineral-resource institutes.

Tom Miller named USGS Alaska Branch chief

(from Alaska Business News Letter, Feb. 29, 1980)

Tom Miller was named the United States Geological Survey's chief of the Branch of Alaskan Geology effective Jan. 13, the same date the branch's headquarters was officially moved from Menlo Park, Calif. to Anchorage. The naming of Miller and the headquarters change marks the beginning of what will

be a 5-year process of transferring geologists from Menlo Park to Anchorage.

The Branch of Alaskan Geology has been in existence for more than 60 years, Miller said, but was located in Washington D.C. until 1956, when it was moved to Menlo Park. Miller joined the survey in 1961 and transferred to the Alaskan Branch in 1963. He is replacing Tom Ovenshine of Meno Park, who will continue working with the Survey in research.

Mining claims total 1,833

The number of new mining claims filed continued to dip, according to DGGS mining-information technician Mildred Brown. The total for the quarter (Dec.-Feb.), 1,833, is down from the 3,596 reported for the previous 3-month period. The totals for March 1979 and 1978 were 1,912 and 6,666, respectively. The totals by recording district are:

Fairbanks	389	Seward	9
Barrow	38	Juneau	82
Manley	20	Haines	6
Nulato	41	Petersburg	47
Mt. McKinley	7	Ketchikan	2
Nenana	30	Anchorage	311
Rampart	8	Iliamna	16
Fort Gibbon	12	Aleutian Is.	1
Kotzebue	2	Chitina	73
Talkeetna	349	Glenallen	8
Palmer	107	Valdez	9
Nome	266		

Senate delays Lands Bill debate, Interior locks up another 40 million acres

(from Alaska on Alaska, Mar 1980)

Under conditions of a recent Senate agreement, the Senate Energy Committee version of the Alaska lands bill will not be considered by the Senate until after its July 4th recess.

Alaska Sen. Mike Gravel said the agreement means he and Sen. Ted Stevens will have more leverage to get the kind of bill they want. Under the agreement, Gravel will be given a work seat beside Stevens on the conference committee set up to work out a compromise between the House and Senate measures. Previously, only Stevens was assigned to the committee.

Interior Secretary Cecil Andrus, unhappy with the delay, announced he was closing 40 million acres of federal Alaskan land to mining and other commercial uses for 20 years. The 40 million acres were designated as wildlife refuges and natural resource areas for 20 years under provisions of the 1976 Federal Land Policy Management Act.

Alaska Gov. Jay Hammond said he would direct Alaska's attorney general to take every step possible in the courts to stop implementation of the land orders. Hammond said that some of the 40 million acres designated by Andrus affects areas Alaska has under consideration for state selection.

Juneau Planning Commission endorses Admiralty Island mine

(from Alaska Business News Letter, Jan. 18, 1980)

By a vote of 6-2 the Juneau Borough Planning Commission has endorsed development of the projected Noranda mine on Admiralty Island, along with an access road from Young Bay on the east side of the island to the work site at Greens Creek on the west of the island, even though no formal applications for road or mine development have yet been made to the U.S. Forest Service.

A Noranda spokesman in Juneau, Joe Drechlser, said a crew of about 20 workers is carrying out a diamond drilling program at present to futher evaluate the property while preliminary environmental studies are being done. Formal application for a package of permits is now planned for late summer or early autumn when the work is finished, he added. (Noranda completed a 4,200-foot-long exploration adit last year.——Ed. note.)

Based on the initial surface sampling done 2 years ago, Noranda established the presence of a large body of high-grade zinc-lead ore with smaller quantities of copper, silver, and gold. The ore averaged 8-10 percent zinc, 2.5 percent lead, and 0.5 percent copper. It also contained about 10 ounces of silver and 0.1 ounce gold per ton.

Our Gangue....

By Frank Larson, editor

Ever sat in a room alone and laughed aloud?...And then get caught at it? Did people look askance at you?.. (Then again, did you even care?)... Whenever I am caught laughing aloud while alone---usually by one of the kids, who just sigh and wander off, sadly shaking a head---I immediately remember reading the wacky opening scene of Joseph Heller's 'Catch-22' some years back and going into hysterics at 6 a.m., waking up a roommate, who thought either I was being molested or had finally gone completely around the bend...In the novel, you may recall, the protagonist, Yossarian, is lying in a an Army hospital bed during WW II censoring mail. After a while, he realizes that the life of the enlisted man on a dusty airstrip in North Africa is, if anything, even more boring than his own. So he starts playing little games with the letters---games like 'Death to All Articles,' in which he censors out all the an's, the's, and a's. Emboldened, he starts inking out modifiers, suppressing all adverbs and adjectives for The War Effort. The chapter culminates with Yours Truly rolling on the floor while Yossarian plays 'Death to the Body of the Letter,' blotting out all but the salutation and the valedictory, and appending the name of the censoring officer, either Maj. Washington Irving or Maj. Irving Washington, depending on his whim at the time---heady stuff.... Moving tenuously along, we find we have to 'uncensor' the last issue of the M&GB, which stated that Quartz Hill, near Ketchikan, had reserves of a billion tons of 1.5% molybdenum ore. That should have read 0.15%.....Also in Ketchikan, an unstable rock cliff represents danger to at least three dwellings there. Rocks have fallen off the cliff along Park Avenue (what else?) and have broken some windows. In the meantime, blasting for a proposed new hotel site nearby could cause further rock slides...Also in Southeastern, Omni Resources reports a potentially major moly find on the Alaska-BC border 40 mi east of Juneau. The concentrations, first noted in 1961 by the Canadian Geological Survey, were exposed by a retreating glacier 2 years ago...Farther north, a giant snowslide swept a pickup truck and an automobile off the Seward Highway south of Anchorage, derailed a freight train, and closed both the highway and the railroad for 3 days. The Jan. 22 slide was triggered by unseasonably heavy snowfall and rising freeze-line levels along Turnagain Arm. A DGGSer says this section of the Seward Highway is considered to have the highest potential snow-avalanche hazard along any transportation route in the state.... Mining offices in Anchorage fared 50-50 last week, with one opening for business and another closing its doors. Union Carbide transferred its Alaska operations to Missoula, MT, but will 'continue at the same level,' according to a company spokesman. Denali Mining opened shop and will reportedly work a placer property along the Denali Highway...The 1980 USGS budget was cut about $22 million overall, to $628 million. The petroleum exploration program in Alaska was cut by $55 million,..The proposed U.S. Fish & Wildlife Service regulations for mining in the Becharof and Yukon Flats Nat'l Monuments are considerably more stringent than those of the BLM. They call for 'different rules' in the assessment work and USFWS prior approval of all of 'reasonably foreseeable operations.' Copies may be obtained from their Anchorage office....The BLM lost a decision on navigable waterways. The Alaska Native Claims Appeal Board ruled in favor of the state and Doyon, Inc. when they appealed a BLM ruling that two rivers in NE Alaska were nonnavigable. Both the state and the Natives appealed because the navigable waterbeds, including the mineral rights, belong to the state and are not charged against Native entitlements. (Until now, all past attempts by state and BLM officials at agreement of the definition of a navigable stream have been unsuccessful.)...Since both of Heller's subsequent novels have been, errrrr, rather lackluster, perhaps he could untrack himself by having Yossarian quit his job (he is now a respected senior regulations writer in Our Nation's Capital, you know) and bring his mining pick and his manic aura to Alaska. Certainly the red-tape environment here today is as surrealistic as his zany bomber squadron of thirty-odd years ago.....Cheers.

Metals Market

	March 7, 1980	3 Months Ago (11/30/79)	1 Year Ago (2/23/79)
Antimony metal per lb, NY dealer	$ 1.52	$ 1.48*	$ 1.35
Barite (drilling-mud grade per ton)	$ 24-47	$ 24-47	$ 31.00
Beryllium ore, stu	$ 75-85	$ 60-65	$ 50-55
Chrome ore per long ton (Transvaal)	$110.00	$ 54-58	$ 54.00
Copper per lb. (MW-prod.)	$ 1.19	$ 1.00	$ 0.92
Gold per oz.	$628.70	$419.10	$251.00
Lead per lb.	$ 0.50	$ 0.57	$ 0.44
Mercury per 76-lb flask	$490.00	$335.00	$208.00
Molybdenum conc. per lb. (Climax)	$ 10.31	$ 8.84	$ 5.86
Nickel per lb. (cathode)	$ 3.10	$ 3.00	$ 2.10
Platinum per oz.	$985.00	$545.00	$423.00
Silver, New York, per oz.	$ 34.71	$ 18.77	$ 7.85
Tin per lb., NW composite	$ 8.75	$ 8.12	$ 7.19
Titanium ore per ton (ilmenite)	$ 55.00	$ 50.00	$ 50.00
Tungsten per unit (GSA domestic)	$129.49	$127.44	$120.00
Uranium per lb., MW US spot oxide	Not quoted	Not quoted	$ 43.25
Zinc per lb. (MW-US PW)	$ 0.378	$ 0.37	$ 0.36

* - Metals Week has discontinued quoting antimony ore.

Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys
P.O. Box 80007
College, AK 99708

Bulk Rate
U.S. Postage Paid
Permit No. 39
Fairbanks, Alaska

RETURN POSTAGE GUARANTEED