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DGGS geothermal drilling program defects 195°F water on Seward Peninsula

In a DGGS exploratory study to determine the geothermal potential of the Pilgrim Hot Springs area, about 50 miles north of Nome, two wells were drilled. Each well, drilled to a depth of about 150 feet, turned out to be artesian, or flowing, and had a discharge of more than 200 gal/min and a temperature of more than 90°C (195°F). The hot-water aquifer in both wells, now capped, was found at about the 90-foot level.

The salinity of the water, according to DGGS geologists Jeffrey T. Kline and Thomas R. Williams, is about one-fifth that of normal seawater. The water, which has a high silica content and a sulfur smell, was found in the upper 20 feet of a tightly cemented coarse-grained conglomeratic sandstone.

These holes are the first of four 'test-pattern' wells initially planned to define the hottest temperature in the area so that a large-diameter 500-foot-deep well can be located there to provide the area with a geothermal energy source—one that could use the subsurface high-

temperature water reservoir for agriculture, heating, electrical generation, or aquaculture. The 500-foot drillhole is planned by the State for next spring.

The Alaska Division of Energy and Power Development indicated that the two wells could heat up to 200 standard-sized houses or 15 commercial greenhouses. The holes, 4 to 6 inches in diameter, were drilled by Vic Mitash, an Anchorage contractor.

Because of the potential hazard of a sudden release of steam or other gases, a special permit to drill the Pilgrim Hot Springs area is required by the state Oil and Gas Conservation Commission.

The springs are typical of others in the Seward Peninsula, being associated with granite terrain and tending to occur within 1 km of contacts between plutons and country rock. Most of the springs on the peninsula are thought to be largely the result of circulation of meteoric water in through deep-seated fractures in the granite plutons.

Geothermal Program

The drilling project is the second part of a series of two-phase geothermal evaluations being

conducted around the state by DGGs. The study, a 3-year, is being funded by the U.S. Department of Energy.

The first phase consists of cooperative reconnaissance and geologic mapping by both DGGs and the UA Geophysical Institute to investigate the bedrock structure by geophysical methods, to evaluate surface deposits, and to make models of the geology in the vicinity.

In addition to Pilgrim Hot Springs, other Seward Peninsula geothermal areas tested during the 1979 Phase I summer investigations include Serpentine Hot Springs, which had the highest rate of flow (265 gal/min) and a temperature of 77°C (170°F), and Clear Hot Springs, which registered a temperature of 65°C (150°F).

Regional sites selected for subsequent phase I studies include Goddard Hot Springs near Sitka, Unalaska on the Alaska Peninsula, several areas in the Southeastern panhandle, and an area near Fairbanks, possibly Manley Hot Springs. The studies are being conducted by DGGs geologists Roman J. Motyka and John W. Reeder, assisted by Mary A. Moorman.

A final DGGs report describing drillhole and temperature data and sample analyses will be published on completion of the Pilgrim Hot Springs drilling project. Information from this and final reports on other hot-spring areas will be compiled to produce a DGGs geothermal atlas of Alaska.

DGGs geologist writes guidebook to McKinley Park

DGGs geologist Wyatt G. Gilbert has written a guidebook to Mt. McKinley National Park. Written for the Alaska Natural History Association in cooperation with the U.S. National Park Service, 'A geologic guide to Mount McKinley National Park,' the 52-page digest was published this fall.

The guidebook is divided into two sections—a geologic evolution of the park and a hiking guide of 10 separate tours—also has a multicolored map enclosed in the back pocket.

The map (1 inch equals 4 miles) was drafted by DGGs geologic assistant Gregory M. Laird. The book also has a glossary, references, and a table for converting metric terms.

Part II, Road Guide and Geologic Hikes, has numerous photos showing prominent features of the

park. It also has maps for the hikes, which will enable the reader to study the natural features and attractions of the park at his own leisure. Included in the treks, which can be completed within a few hours or 1 day at the most, are Triple Lakes, Igloo and Cathedral Mountains, Tatler Creek, and Polychrome Overlook.

The guidebook costs \$3.50 (\$4.50 postpaid) and is available from the UA Bookstore, University of Alaska, Fairbanks, 99701.

Mining-claims total hits 3,596 for quarter

The number of new mining claims filed in Alaska continues to climb at a steady rate—from 1,406 in June to 2,760 in September, to 3,596 for the current 3-month period ending November 30. This quarter's total is still far below the all-time high of 9,668 registered last year at this time, however.

Nearly one-third of the claims were filed in the Seward Peninsula: Nome had 639 and Kotzebue checked in with 496. Manley Hot Springs, in the Interior, was also surprisingly active, with 474 new claims recorded. The totals by recording district are:

	Sept.	Oct.	Nov.
Fairbanks	227	195	394
Barrow	0	0	47
Manley H. Spr.	183	190	101
Nulato	375	0	14
Mt. McKinley	9	46	21
Nenana	15	5	5
Rampart	1	0	67
Fort Gibbon	11	15	3
Kotzebue	62	272	162
Talkeetna	71	108	122
Palmer	9	33	93
Nome	261	355	23
Seward	0	0	3
Juneau	43	5	49
Haines	19	0	0
Petersburg	0	19	21
Wrangell	0	0	1
Ketchikan	253	34	67
Sitka	0	0	35
Anchorage	56	0	15
Cordova	4	0	0
Chitina	0	12	0
Glenallen	4	0	0
Valdez	0	0	11
Bethel	3	0	0
Kuskokwim	207	9	29

DGGS enters planning, remote-sensing fields

DGGS is beginning to get its feet wet in the remote-sensing field. Assigned the role of DNR 'data gatherer' in last summer's reorganization by Commissioner Robert E. LeResche, DGGS has one new employee aboard to fill that role. James R. Anderson, the new planner (p. 11), briefly described some of the projects he is embarking on. His position is fully funded by the federal government.

DGGS is collating the data it collected to help build a geographic-base information system that will be able to produce information on land capability and suitability within the Susitna River basin.

DGGS is also developing, with the DNR Division of Technical Services, an orthophoto base-mapping project that uses NASA high-flight photography for all quadrangle areas (at an inch-to-mile scale) covered in the proposed 1981 land disposal areas. There is hope that this project, along with a photo base-mapping program that the BLM is now involved in, will lead to a commitment to produce orthophoto base maps of the entire state as the high-flight photography becomes available.

On a similar note, DGGS is cooperating with DTS and the Division of Planning and Classification in developing a preplanning project for all 1981 land-disposal areas. This effort would use both new high-altitude resource color infrared photography and existing resource data to identify those areas with the highest potential for land disposal.

Under a grant from the National Aeronautical and Space Administration, DGGS is helping several other agencies and groups put together a Tanana Valley remote-sensing demonstration program. When completed, the program will be able to transfer remotely sensed data to state, federal, and local government personnel.

DGGS staff hits 'rubber-chicken' circuit

DGGS geologists have been unusually 'talkative' this fall. In the last 3 months, they have given presentations to UA students, to Alaskan miners, to Canadian geologists and, in one instance, to a prestigious group of earth scientists in Nevada. The papers are summarized below.

Geochronological evidence for Paleozoic magmatism and orogenesis in the southern Brooks Range

By J.T. Dillon (given at Penrose conference on mid-Paleozoic tectonism in western North America, Elko, NV, Sept. 15, 1979)

U-Pb zircon dates from metagneous rocks of the central Brooks Range yield pre-Mesozoic ages for the crystallization of magmas formerly thought to be of Cretaceous age. Eight slightly discordant U-Pb ages on euhedral zircons from central Brooks Range plutons and from metavolcanic rocks from the southern Brooks Range schist belt define a chord that intersects concordia at 365 ± 15 m.y. and 6 ± 120 m.y. Assuming episodic lead loss, the upper intercept is interpreted as the age of magmatic crystallization and the lower as the time of cessation of lead loss due to metamorphism. The Middle Devonian crystallization age is supported by a Rb-Sr whole-rock isochron of 373 ± 25 m.y. Contrasting Cretaceous K-Ar mineral dates from the southern Brooks Range provide a minimum age for the metamorphic event that the author attributes to northward overthrusting during the Cretaceous. Six zircon separates from the Ernie Lake and Sixtymile plutons of the south-central Brooks Range give various Late Proterozoic U-Pb and Pb-Pb ages.

From these new data and other geologic criteria the author hypothesizes 1) many Brooks Range plutons and some volcanic rocks of the schist belt were formed during middle Paleozoic time, 2) the middle Paleozoic magmatic rocks, with adjacent coeval marine carbonate and clastic rocks and syngenetic ore deposits, constituted an ensialic island arc or submerged continental margin magmatic belt, and 3) amphibolite-facies metamorphic aureoles of the Paleozoic plutons commonly include early Paleozoic and Late Proterozoic(?) rocks that formed the basement of a middle Paleozoic magmatic belt.

Deformation, metamorphism, and intrusion during this time cannot be directly related to the Antler Orogeny, since we do not know for sure if the Brooks Range was attached to western North America during the middle Paleozoic.

Surficial geology of the Pilgrim Hot Springs vicinity

By Jeffrey T. Kline, Richard D. Reger, and Rena M. McFarlane (given at Alaska Science Conference, Fairbanks, Sept. 19, 1979)

Surficial geologic mapping in the Pilgrim (Hot) Springs area by DGGs in support of a geothermal exploration program by the UA Geophysical Institute disclosed an interesting and complex Quaternary history in the Pilgrim River valley which may provide some insights into the age and characteristics of Pilgrim Springs.

Changes in regional base level, rates of sedimentation, and climate have combined to produce at least three major episodes of terrace formation since Sangamon time. Evidence that relatively rapid subsidence has recently been occurring in the vicinity of Pilgrim Springs includes: 1) the apparent burial of older terraces by modern alluvium upstream from the springs, versus relatively well-preserved terraces downstream from the springs, 2) major changes in the course of the Pilgrim River, as indicated by abandoned river channels whose flow direction was significantly different, 3) the relative absence of thaw lakes and thermokarst features in a 5-sq-mi area upstream from and including the thermally disturbed area, 4) apparent grading of old alluvial and outwash fans to a level higher than the present valley floor, 5) the presence of abrupt scarps at the toes of alluvial and outwash fans derived from the Kigluak Mountains, 6) mudflows and springs occurring along the outwash scarps, 7) a significant steepening of stream gradient just upstream from the area of maximum apparent subsidence, and 8) the presence of lacustrine and estuarine clay, silt, and very fine sand beneath 1.5 and 4.5 m of modern floodplain alluvium.

Stratigraphic transect of the Skajit Formation, Wiseman B-5 Quadrangle, central Brooks Range

By Mitchell W. Henning (given at Alaska Miners Association Convention, Anchorage, October 26, 1979)

Studies of composition, texture, and sedimentary structures in the Skajit Formation demonstrate that it is dominantly a shallow-water marine sequence of intertidal and supratidal facies. Field evidence suggests that the Skajit was deposited unconformably on a sequence of

calc-schists, greenschists, and orthoquartzites, and represents an older Paleozoic terrane.

Field investigations west of the John River in the Wiseman B-5 Quadrangle have identified 11 distinct lithologies as mappable units within the presently defined Skajit Formation. These units are: 1) massive to thin-bedded gray laminated marble, 2) carbonate lithoclastic conglomerate, 3) thin-bedded gray marble, 4) graphitic-quartz-muscovite schist, 5) siliceous oolitic peckstone to wackstone marble, 6) ferruginous calc-schist, 7) micaceous marble, 8) medium-bedded white marble, 9) calc-schist with interbeds of orthoquartzite, 10) metagraywacke, and 11) orthoquartzites.

Sedimentary structures identified include ooids, distorted ooids, stromatoporoids, cut-and-fill structures, graded bedding, algal laminations, and mud cracks. The Skajit Formation is interpreted as a carbonate sequence deposited during major upward shoaling around a regional high during Late Devonian.

Geology of the McGrath-Ophir area, upper Kuskokwim region

By Thomas K. Bundtzen (given at Alaska Miners Association Convention, Anchorage, (Oct. 26, 1979)

DGGs completed 1:63,360-scale mapping of about 1,200 square miles in the western McGrath, northeastern Iditarod, and southeastern Ophir Quadrangles to provide data on an area of predominantly state-selected and patented lands for the DNR resource-assessment program.

The oldest rock unit recognized in the study area are small discontinuous lenses and pods of banded buffaceous cherts, limestone, and quartz-rich sandstone exposed in the core of a regional anticline east of Ganes Creek. Megafossils indicate only an upper Paleozoic age, but abundant radiolaria were recognized and collected for identification.

The most abundant rock lithology consists of lithic to sublithic, light- to dark-gray shale, siltstone, sandstone, and conglomerate of the Kuskokwim Group. Abundant pelecypod and plant assemblages indicate an upper Cretaceous age. The Kuskokwim Group north of the Takotna River is roughly 8,000 ft thick (2,500 m) and grades from marine lithic sands and shale at the base to locally quartz rich sublithic coarse sandstone and siltstone near the top.

Intruding and overlying the layered rocks are late Cretaceous and early Tertiary plutons, extrusive basalt piles, and dike swarms. Two monzonite plutons east of the Takotna River are ringed by intrusive-extrusive piles of basalt and andesite. Field evidence indicates that the monzonite intrusives thermally altered the basaltic rocks.

Most of the area was not glaciated during late Pleistocene time; however, higher mountains massifs above 3,000 ft (950 m) have supported valley glaciers up to 10 miles long. Much of the lowlands has been blanketed by eolian loess and subsequently reworked by water processes.

The area has a substantial history of placer-gold production from bench gravels in the Innoko mining district, the Candle Hills, and the Vinesale Mountain area. Total production exceeds 500,000 ounces. Other heavy minerals contained in the stream concentrates include scheelite, cinnabar, and chromite. Heavy-mineral placers have not migrated far from lode sources and probably have been forming since late Tertiary time.

Problems of Paleozoic correlation in central Alaska

By Waytt G. Gilbert (given at Seventh Geoscience Forum, Whitehorse, YT, Dec. 2, 1979)

The oldest rocks in central Alaska occur in two contrasting geologic provinces. The Yukon Crystalline Terrane in east-central Alaska is mainly composed of multiple-deformed, metamorphosed pelitic and volcanic rocks, whereas west-central Alaska is largely underlain by weakly to moderately deformed carbonate-rich assemblages. The boundary between these two provinces is sharp and probably represents an important geologic suture.

Within the carbonate province, at least four subprovinces are recognized and the Farewell fault juxtaposes two coeval but dissimilar Ordovician to Carboniferous sequences.

Preliminary correlations suggest that these terrains represent a southeast-facing (present-day) continental margin which has been modified by post-Paleozoic thrust and strike-slip faulting.

Slush flows—A widespread natural hazard in alpine northern and western Alaska

By Richard D. Reger (given at Alaska Science Conference, Fairbanks, Sept. 19, 1979)

Slush flows are a unique type of wet-snow avalanche which was first recognized in the central Brooks Range during preconstruction geotechnical investigations for the Trans-Alaska Pipeline System. Later observations indicate these flowing slurries of meltwater, snow, and debris are also common in the Kigluaik Mountains of the Seward Peninsula. They pose a considerable hazard in narrow, moderately to steeply sloping stream valleys and on debris fans where increased velocities and large flow masses produce large momentums.

Slush flows, which commonly occur during rapid spring breakup in alpine regions, need an adequate snow accumulation and a saturation of the snowpack.

Saturation reduces snowpack stability by 1) decreasing intergranular stresses and thus lowering the snow shear strength, 2) reducing friction (by free-water lubrication) between layers within the snowpack or between it and the underlying surface, and 3) adding mass to the snowpack. The slush-flow season generally occurs from mid-May to mid-June and coincides with the period of maximum spring thaw, when meltwater production in the snowpack exceeds the rate of percolation.

The widespread threat of slush flows must be considered when planning the development of alpine areas in northern and western Alaska. Experience in Spitsbergen demonstrates that this process is capable of causing great damage to property, major disruption of human activity, and considerable injury or loss of life.

DGGS publications vary widely in scope

DGGS information has been disseminated in various publications during past quarter. The Survey has printed one new open-file report, updated an information circular, and had two articles written by staffers printed in national publications. In addition, DGGS geologist Wyatt G. Gilbert wrote a guidebook for the Alaska Natural History Association (p. 2). Now available are:

.AOF-116, 'General geology of the central Alaska Range between the Nanana River and Mount Deborah,' by K.W. Sherwood and Campbell Craddock. The open-file report con-

sists of 22 pages of text (including four appendixes) and three plates---two 1:63,360 maps and one sheet of cross sections. AOF-116 costs \$7 (\$6 in person).

Information Circular 20, 'State of Alaska aeromagnetic surveys,' has been revised. The 8-page digest contains the status of the latest aeromagnetic-mapping efforts conducted by the state. It is free.

DGGS Mining Engineer Cleland N. Conwell has had another article printed in *The Western Miner*, a Canadian magazine. This one, 'Mineral commodity trends and the Alaskan mining industry,' was initially printed in the *M&GB* (Sept. '79).

Geologist John T. Dillon was a coauthor of an article in the *Canadian Journal of Earth Sciences*. Together with D.L. Turner and R.B. Forbes of the UA Geophysical Institute, Dillon wrote a 15-page piece entitled 'K-Ar geochronology of the southwestern Brooks Range, Alaska.'

Copies of both papers may be examined in any DGGS mining office.

Miners unearth ancient bison

(from *UA's Now in the North*, Oct. 1979)

During the first half of this century, miners of the gold-rush era uncovered portions of several woolly mammoth and giant bison carcasses from the frozen muck around Fairbanks. Although a few mummies have since been found in Siberia, none have occurred in Alaska for several decades---until this past July.

Walter Roman, a miner working north of Fairbanks, was using his "giant," a large hydraulic hose, to wash away the frozen organic silt overburden to reach gold-bearing gravels below, when he noticed an unusual shape emerging from the wall of frozen muck. Hooves appeared, then legs, and finally the head and horns of an ancient bison.

Roman alerted Dan Eagan, manager of Alaska Gold Company, from whom Roman was leasing the mining area, and Eagan contacted the University of Alaska. Dr. Dale Guthrie, a vertebrate paleontologist who specializes in Alaska's extinct fauna, excavated the bison and placed the carcass in a large freezer at the university, where it awaits further study.

Guthrie reported that the carcass "was mostly intact but clogged with silt and decayed." He classified the discovery as a "major find which will allow the study of several new aspects of the Ice Age environment of Alaska."

The bones of giant bison, woolly mammoth, horses, camels, tiaga antelope (the small antelope of the south Russian steppes), short-faced bears, and llons are occasionally found in Alaska and Siberia, said Guthrie.

"These animals seemed to have lived in a grassland quite unlike anything in the North today. But mummies, particularly an entire carcass such as this bison, are very unusual. Less than a dozen large mammal mummies have ever been found and this is the first occasion in North America where a frozen carcass of a large Ice Age animal has been carefully excavated and can be studied using modern analytical techniques."

This exciting find will allow scientists to look at the Pleistocene environment in more detail, said Guthrie. Because portions of the bison's stomach and its contents were preserved, new microscopic techniques can be used to examine these materials, he said. Tiny plant fragments will be identified to see what the ancient animal was eating.

The newly discovered bison, or "buffalo" mummy, was said to be a member of the same animal species which occurs in cave paintings in France and Spain and it was common all across Europe and Alaska during the Ice Age. According to Guthrie, "This bison was larger than modern bison and had large, stout horns, each about a meter long; it didn't have the heavy hair 'cap' of modern bison but had two shoulder humps, each set off in contrastingly colored black hair. It was this species of bison that early peoples hunted when they came to Alaska from Siberia."

Guthrie is submitting samples of the bison for radiocarbon dating, but from the stratigraphic position of the animal he estimates the carcass will date from between 20,000 and 40,000 years before present. "It is an old bull that probably died in late winter and was scavenged slightly and then buried in the spring mud at the bottom of the valley," he said. Walter and Ruth Roman are the operators of the Lucky Seven Mining Company, where the bison was found. Roman has mined in the Fairbanks area since the 1930s and says this is the first time he has ever uncovered such a carcass. The Romans and Alaska Gold Company have generously donated the bison to the University of Alaska.

The university's new museum at Fairbanks, now under construction and scheduled for completion next year, will be the future home of the bison. When scientific work on it is completed, the mummy will become a unique part of the

museum's Alaskan collection of Pleistocene mammals and available for public viewing.

DGGS geologists play a part in Beaufort Sea lease sale

DGGS petroleum geologists Bill Lyle, Gar Pessel, and Don McGee started preparing for the billion-dollar Beaufort Sea oil lease sale months in advance. They produced numerous maps for the tract evaluations and reviewed the computer printouts before the sale.

The sale, conducted in Fairbanks Dec. 11, netted \$456 million for the state and \$24 million for the federal government. Another \$467 million is tied up in litigation over boundary lines—mainly over whether a tiny island, Dinkum Sands, exists (even though DNR officials landed a helicopter there last summer, planted a state flag, and posed for pictures).

The DGGS trio made structure maps of the top of the Endicott Group, the Lisburne Group, the Saganivaniirktok ('Sag') Formation, and a Cretaceous unconformity. They also completed isopach maps on the Kekiktuk River (gross and net sandstone), Lisburne Group (upper limestone, middle dolomite, lower limestone, and net porosity), the Sadlerochit and Sag Formations, and the Cretaceous and Tertiary stratigraphic sections.

In the sale, bidders had to agree to a percentage-of-profits agreement with the state, which will have the result of stretching out the wealth to fill the state's coffers when the Prudhoe Bay oil field starts to decline, probably 10 to 20 years from now.

There are several lawsuits pending in the lease, however. Native and environmental groups are to appear in Washington, DC Jan. 3 to argue their cases against issuing the leases.

The day after the sale, the 20-percent down payment paid by the successful bidders began earning a daily interest for the state of about \$40,000. The state will soon decide which bids to accept, and the winning bidders will then have to plunk down their remaining 80 percent.

DGGS helps monitor Coastal Zone Management program

Alaska's coastline, which is as long as that of the entire continental United States, is affected by many geologic hazards. Alaska's southern coast is located in one of the most seismically active areas in the world, and thus

is very susceptible to tsunamis and to mechanical and thermal erosion. Other prevalent hazards include volcanoes, avalanches, landslides, and flooding. The Alaska Coastal Zone Management Act, which was passed in 1977, requires that these hazards be identified and evaluated so that life, property, and the resources of the 49th State can be protected.

CMZ Defined

The Act evolved from the federal CMZ Act of 1972, which enables states to set up programs designed to use coastal resources while protecting natural systems and cultural values. Although the Act excludes federal land in the coastal zone from jurisdiction under state programs, it does state that federal actions must be 'consistent' with the programs of the states involved.

The Alaska Coastal Management Program relies primarily on existing state and local controls and authorities for implementation of the Alaska Coastal Management Act. The Act requires local governments to formulate district plans and establishes a Coastal Policy Council to approve these plans and to develop specific standards and guidelines for managing coastal uses. The Program is designed for cooperation at all levels in managing our coastal resources. District programs are now being formulated.

The DGGS Role

In the CMZ program, DGGS is concerned with a number of facets, including land and water use through the approved standard for geophysical hazard areas. This standard states:

- "(a) Districts and state agencies shall identify known geophysical hazard areas and areas of high development potential in which there is a substantial possibility that geophysical hazards may occur.
- (b) Development in areas identified under (a) of this section may not be approved by the appropriate state or local authority until siting, design, and construction measures for minimizing property damage and protecting against loss of life have been provided."

Implementation of this standard is twofold: DGGS is charged with identifying hazardous areas in developed or potentially developable places through ongoing and new research; and at the same time DGGS must conduct consistency reviews of development proposals to determine if they are consist-

ent with the approved Geophysical Hazards standard. Gail Davidson, a geologist in the DGGG Anchorage office, (p. 11), has prime responsibility for coordinating between coastal districts and DGGG, reviewing development proposals, and evaluating geologic hazards in the coastal zone through research and mapping. All requests for information and assistance should be directed to her at 279-1433.

DGGG, USGS cooperate on North Slope oil-and-gas report

The geological surveys of the U.S. and the state wrote a preliminary report on petroleum source-rock and reservoir-quality data from outcrop samples east of the Prudhoe Bay oil field.

The report, prepared for release prior to the Dec. 11 Beaufort Sea lease sale (p. 7), contains raw data from outcrop samples from onshore North Slope east of the present producing fields. USGS Open-file Report 79-1634, written by L.F. Palmer, J.E. Bolm, and Lawrence Maxey of the U.S. Geological Survey and Bill Lyle of DGGG, has 52 pages of text and 14 plates showing locations, stratigraphic sections, porosity and permeability data, geochemistry, paleontology, and palynology of the area.

The data are based on outcrop samples and geochemical data taken July, when a joint USGS-DGGG field party reconnoitered the onshore area near the Beaufort Sea.

A more extensive document is planned for later. OFR 79-1634 may be examined at the USGS Public Inquiries office, 508 2nd Avenue in Anchorage, and at the DGGG information offices in College and Anchorage.

USGS and DOE directed to stop surveys in park lands

(from *Engineering & Mining Journal*, Sept. 1979)

A directive first issued in April banning uranium exploration in national parks was reaffirmed by the director of the National Park Service, William J. Whalen, in a recent interview with the Denver Post. Primarily, the ban affects studies by the U.S. Geological Survey and the Department of Energy, including DOE's extensive National Uranium Resource Evaluation (NURE).

Aimed at preventing development of all resources on park service lands, including non-uranium minerals, the directive is part of a NPS

decision to withdraw approval for four proposed government surveys:

- A DOE program to stimulate development of geothermal energy.

- The USGS mineral resources assessment program.

- A mineral survey recommended by the Presidential policy committee on nonfuels minerals.

- Environmental studies by the USGS related to coal development in southern Utah.

In justifying the action Whalen said: "We are meeting mining threats to our national parks by resisting resources exploitation to the limit of our ability. When action is necessary to protect the resources against adverse effects, we will do everything within legal means to stop, discourage, or mitigate actions causing the threat." Whalen acknowledged that as yet there has been no direct pressure to allow mining in the parks.

He added: "At present there are no mineral surveys considered acceptable to the National Park Service. Methods of mineral surveys will be acceptable if they do not involve resource damage and result only in an inventory of park resources and not the potential for exploitation."

Prior to issuance of the April directive, work conducted by NURE on 62 park service units involved water and sediment sampling and radiometric surveys flown at low levels on 3- to 5-mi centers.

The prohibition affects 320 park service units, including national reserves, monuments, seashores, and 39 parks. More than a dozen park service units are located in Alaska. The National Park Service is part of the Department of the Interior.

(Farther north, ALASKA Magazine (Dec. '79) said the Park Service was having problems enforcing regulations in the 13 national monuments that are under its jurisdiction.

"A Cassia 185 leased from Troy Air of Anchorage to patrol Wrangell-St. Elias was severely damaged in a fire at the Tazlina airstrip and inspectors later determined that the fire had been deliberately set. The rangers were working out of Tazlina because they had been refused lodging and gasoline in Glennallen. Rangers also moved from a base camp in Bettles after state officials determined such use was a violation of a lease. The state land had been leased to the Bureau of Land Management for its

activities, principally firefighting.

"Rangers also were accused of harassing people in the monuments, including one incident in which Park Service personnel allegedly landed at a camp in a helicopter, disembarked carrying shotguns and surrounded a tent. The Park Service admitted that the rangers had been carrying guns, because of threats made in protests, but said that the rangers were there to enforce rules, not to harass monument users."---Ed. note.)

Annual miners meeting held on a note of hope for the future

(from Alaska Business News Letter, Nov. 2, 1979)

An atmosphere of hope rather than confidence dominated the Alaska Miners Association convention held in the Anchorage Westward Hilton Hotel during the last weekend of October. The board of directors met and decided to push for new and more realistic state legislation on hard-rock mining, coal and uranium, and a clear state policy on state lands on which there are valid mineral claims. The board agreed to continue a "wait and see" policy on the Senate version of d-2 legislation.

In papers presented to the convention, a spokesman for U.S. Borax said Quartz Hill known reserves have been raised to a billion tons of 1.5 percent molybdenum ore through additional drilling. One hole by Diamond Drilling Contractors this year went to 2,999 feet. The deposit was originally found by stream-sediment sampling, as there is very little outcropping of the porphyritic quartz ore rock and that is mostly leached out to a depth of about 2 inches. More drilling is needed as the ore-body limits have been defined only on "two and one-half sides." Future development of the property is still clouded by the conservation-land-withdrawal dispute.

A representative of Anaconda Copper Co. outlined for the group the background of its lawsuit against the President, seeking to nullify the massive national-monument withdrawals following failure of d-2 legislation last year. The suit is to protect the company's investment of some \$10 million exploration cost in threatened mining properties, particularly the BT lead-zinc prospect in the Ambler district and claims on Admiralty Island. Noranda, Kennecott, and others are also affected by the Gates of the Arctic withdrawal in the Ambler district but elected not

to sue the federal government, although the state and Bristol Bay Native Corp. have entered separate lawsuits. Anaconda and Atlantic Richfield Co. have completed a consent decree with the Federal Trade Commission relative to the Arco acquisition of Anaconda which requires disposition of some mining properties, but none of the Alaska holdings are affected.

DGGS begins studying Alaska's water resources

Water-resources investigations and data collection have historically been organized into surface water, ground water, and coastal water. Probably the most consistent source of good hydrologic data has been the Water Resources Division of the U.S. Geological Survey.

USGS Efforts

In Alaska, the USGS began collecting water data as early as 1906, when streamflow measurements were taken in the Nome area to measure the water supply for gold-mining operations, particularly placer mining. Stream gaging in the Yukon-Tanana area began in the next year, and stream measurements were taken from the Copper River and Prince William Sound region in 1913. In Southeastern, a stream gage was installed by a private party in 1909 to determine the hydroelectric power potential of Ketchikan Creek.

After World War II, the USGS started a comprehensive program and installed water-data recording devices throughout Alaska, concentrating primarily on obtaining data related to hydroelectric power, municipal water supplies, sewage disposal, and construction of highways, railroads, and bridges.

One peculiar requirement and policy of the USGS Water Resources Division is that they must work with cooperative programs with other states. Most states, including Alaska, have a cooperative Water Resources program with the USGS. The State Survey has begun to fulfill that requirement.

DGGS Hydrology Section Formed

The DGGS Water Resource Investigation section was formed during the summer of 1977, when Senate Bill 58 passed. This bill amended Alaska Statute 41.08 by adding sections which "declare hydrologic data to be of public interest, necessary to the orderly domestic and industrial development of the state." More specifically, the bill mandated that DGGS shall:

- "1) Collect, record, evaluate, and distribute data on the quantity,

- quality, and location of underground, surface and coastal water of the state;
- 2) publish or have published data on the water of the state;
 - 3) require the filing with it of the results and findings of surveys of water quality, quantity, and location;
 - 4) require of water well contractors, the filing with it of basic water and aquifer data normally obtained, including but not limited to well location, estimated elevation, well driller's logs, pumping tests and flow measurements and water quality determinations;
 - 5) accept and spend funds for the purposes of this section and §§ 17 and 35 of this chapter and enter into agreements with individuals, public or private agencies, communities, private industry, state agencies and agencies of the federal government."

The DGGGS Water Resources Section is manned by three personnel—a surface-water hydrologist, a ground-water hydrologist, and a hydrological assistant (p. 11). These three work closely with the USGS on most aspects of a fairly comprehensive set of programs designed to gather statewide water facts, figures, and information. Most of the program budget for the last 2 years has been put into the cooperative programs with the USGS. Collecting data for this and programs concerning with other state, federal, and local agencies continues to be an important part of the DGGGS efforts.

Surface Water

Stream data are collected at 188 stations throughout Alaska; of these, 102 are continuous-record stations. However, most of the stations are located near population or activity centers such as the Trans-Alaska Pipeline; consequently, much of Alaska is not adequately covered by the stream-station network. For instance, there are only three lake-stage stations despite the countless lakes in Alaska.

Samples from streams are taken for water-quality testing at 125 surface-water stations. Water-quality data have been available from most of these stations since 1947. Surface waters are variously analyzed for temperature, specific

conductance, pH, sediment, inorganic and organic constituents, pesticides, minor elements, radiochemical components, and biological data.

Ground Water

Wells provide the primary and most important ground-water information. Of the 125 observation wells established to document water-level fluctuations—mostly near centers of population—36 are continuously recording, 54 are measured monthly, and 35 semiannually. More ground-water data are needed for a more adequate understanding of subsurface Alaskan waters, especially in the widespread smaller villages. Unfortunately, these data are difficult to obtain because drilling is expensive. However, the many domestic wells already drilled are an excellent source of ground-water data.

Alaskan drillers are now required by statute to submit water-well data to DGGGS. Unfortunately, only a few drillers have complied with the law. When more drillers cooperate with the DGGGS water-well data program, the amount of useful ground-water information will increase markedly—and the information gained can be, among other things, rechanneled back to the driller in a more usable form.

Quality samples are taken at all gaging sites and also at nongage sites throughout the state. Simple quality measurements are made in the field and more complex analyses are done on samples taken to the lab, especially if field analysis indicates unusual sample conditions.

Data Storage

Alaskan data for surface water, ground-water, and water quality are stored in a USGS computer program named WATSTORE. These data can be used to generate printouts for either small or large areas. Also, the data are published each year by the USGS in cooperation with DGGGS in a publication called "Water Resources Data for Alaska - Water Year 19__."

The DNR is putting together a computer system that will aid, among others, the Water Resources Investigations section. When ALARS (for Alaskan Resources Computer System) becomes operational, water-resources data will be stored for ready access to Alaskan users of water data.

DCED offers free mining report

'What you never thought to ask about mining,' prepared by the Alaska Division of Economic Enterprise, describes the problems and potential

of mineral development and the benefits of a healthy minerals industry to Alaska. The 28-page manual, prepared by E.O. Bracken, a minerals development specialist with the Department of Commerce and Economic Development, is free.

Contained in the report are chapters devoted to resource products, land use in mining, and subsequent costs and revenues from five hypothetical mining ventures.

To obtain a copy, contact the Division of Economic Development, Pouch EE, Juneau, AK 99811 or any DGGG mining-information office.

DGGG lists new employees

DGGG brings in the new decade with some of the old and some of the new. The 'old' is rehired Geochemist Milton A. Wiltse, who worked with the Survey from 1974-76. The 'new' consists of a geologist, a resource planner, and a geological assistant. Also, one employee left the Survey.

Wiltse returns to DGGG as the head of both the minerals laboratory and the Geothermal Investigations section. He has degrees in geology and geochemistry from Pennsylvania (B.S.) and Indiana Universities (M.S., Ph.D.). Before coming to Alaska in 1974, he taught at Colorado School of Mines. Wiltse and his wife, Flora, have a young son, Nathan. Milt enjoys cross-country skiing and running to and from work (but mostly 'from').

DGGG has also hired a geologist to coordinate its participation in geologic-hazards investigations with boroughs that are preparing coastal-zone-management plans and to direct its review of proposed construction projects that must comply with the Coastal Zone Management Act.

Gail Davidson, a former DGGG geological assistant, will be working out of the Anchorage office. Her position is funded by the federal government for the next 18 months.

Miss Davidson has a B.A. degree from Middlebury (VT) College and a M.A. in Geology (glaciology) from Dartmouth College. During her previous employment with DGGG she worked on various geophysical programs in the Brooks Range and on snow avalanche studies in south-central Alaska. Gail's hobbies include weaving, climbing, and skiing.

DGGG now has a planner to coordinate with various federal and state agencies in implementing the new, 'data-gathering' charter given DGGG

by Natural Resources Commissioner R.L. LeResche (M&GB, Sept. '79).

James R. Anderson, 45, will coordinate with state, federal, and local agencies in obtaining and implementing remote-sensing programs (such as high-altitude aerial photography) that will benefit all agencies in terms of overall information at a fraction of the cost of individual programs. Anderson, whose position is also fully funded by the federal government (National Aeronautical and Space Administration), is putting together a remote-sensing project in which a wide spectrum of information will help address the day-to-day problems of land and resource management for participating agencies at various levels of government. (p. 3).

A mechanical engineer, Anderson came to DGGG from the Land Use Planning Commission, where he coordinated computer systems and aerial photography with resource information programs. He is a member of the Committee on the Natural Resource Information Management and is chairman of the Remote Sensing Task Force. Jim and his wife Darlene have two grown children and live in Anchorage. He lists his interests as hunting, fishing, and gun making.

The new geologic assistant is Roger D. Allely, who will work primarily on ground-water projects. His major task will be to acquire and maintain well-log data, which are subsequently supplied to the USGS WATSTORE computer system, a ground-water monitoring system. Allely has a B.S. Degree from the University of Oregon. He and his wife, Kathy, who works for the Japanese Consulate, are expecting a little cheechako in July. Both enjoy music and outdoor activities.

In another personnel-related move, Anchorage mining-information clerk Ona McBride has accepted a position as a Land Management Officer in the DNR Division of Land, Forest and Water Management. Of the move, effective December 1, Ona said she will be able to devote part of her work day to performing some of her former duties as a DGGG information specialist, but only on an 'as-available basis.' The cutback in funds by the recent Legislature precludes hiring another clerk to replace her.

Lastly, congratulations are in order for DGGG geologist (and long-time bon vivant) Mitchell W. Henning, who will be married December 28 (just in time to get a tax writeoff). Mitch's bride will be Christine A. Uhlig, whom he

met at grad school at the University of Idaho last year. They will reside in Wasilla.

DGGS inspects debris avalanches near Wrangell

DGGS was requested by the Alaska Division of Emergency Services to inspect some landslides that had occurred last Oct. 9, temporarily closing the Zimovia Highway about 1 mile south of Wrangell. No one was injured in the slides.

The landslides were of a type called debris avalanches, or debris slides. With sources at elevations between 1,000 and 1,500 feet, the slides involved unconsolidated debris (probably weathered bedrock and glacial till) and trees. The landslide, a wet mixture of debris and trees, was initiated on steep bedrock slopes and did not stop until it had moved several hundred yards across gently sloping ground beyond the foot of the steep slope.

Causes

Several factors apparently contributed to the Wrangell debris avalanches: 1) ice-smoothed bedrock slopes in the source area are steep, usually 45° or more; 2) soil debris in the source area is thin (less than 1 or 2 feet in many places); 3) many large trees on the slopes had their tops broken off or were uprooted by high winds that had occurred a year earlier, thereby negating much of the anchoring effect of the soil to bedrock; and 4) the probable 'trigger,' which was the 4.5 inches of rain that had fallen during the previous 24 hours.

During the intense rainfall, soil moisture could not drain away fast enough and the soil probably became saturated. Because of increased unit weight and decreased strength in the saturated state, the soil blanket could not resist gravitational forces any longer, and the soil began its inexorable move atop the bedrock surface. Uprooted trees and other moving debris gained enough momentum on the steep slopes to continue across the gentle slopes.

In one place the moving debris crossed the highway; other lobes of debris stopped short of or bypassed dwellings located adjacent to the highway.

Such debris avalanches and debris slides are not uncommon in Southeastern Alaska. Older debris landslides are indicated by accumulations of debris at the base of steep slopes or as tracks of alders or relatively young trees through older forests.

Recording fees to rise

Recording fees will rise on January 1, according to Charles R. Webber, Commissioner of the Department of Commerce and Economic Development, which sets the rates.

In a new schedule of recording fees, the cost for recording the first page of all documents, be it a location notice or a tax lien, will be \$8. For each additional page, the fee will be \$3. This is an increase from the old fees of \$5 and \$2, respectively. This category includes those papers for recording and indexing under mining laws, namely, location notices, notices of intention to hold, affidavits of annual labor and miscellaneous documents. However, the miner will get somewhat of a 'break.' The fee for indexing each name over six costs \$1; the old fee was \$1 for each name over four.

Judy Brenner, district recorder at Fairbanks, says that if the correct fees are not submitted after January 1, she will have to return both the fees and the documents submitted. When they are resubmitted with the correct amounts, she will be allowed to record them.

In a related issue, Robert B. Sanders, mining manager of the Division of Minerals and Energy Management, says that no longer does DMEM require the miner to file 'recorded' documents. He says that DMEM will accept any copy of the document, although he would prefer a copy showing it has been recorded. This pertains to claims on state land only.

Also effective January 1, the new address for the Bethel and Kuskokwim recording districts will be 941 4th Avenue, Anchorage 99501.

For further information regarding recording fees, contact your nearest recorder. For information on recordation on state lands contact Mr. Sanders at 703 W. Northern Lights Blvd., Anchorage 99503 (phone 263-2249).

New fiscal system helps DNR set new course in sailing 'choppy' budget seas

Last July, because of the substantial increase in demands made on the DNR, Commissioner Robert E. LaResche reorganized the department. Coincidental with this, he set up a departmental budgetary process unique to Alaska state government. This was necessary, he said, 'because the DNR's structure and method of conducting busi-

ness, as it had been since Statehood, was incapable of successfully assimilating all of these duties simply as add-ons to the Department's agenda.'

In the reorganized Department, nine new co-equal divisions, each with specific Departmental responsibilities, were established. Each division then set up subprograms of its own to accomplish various predetermined tasks during the next fiscal year. In a 1-1/2-day meeting in September, these subprograms were grouped by LeResche into four categories he called, 'A: Those that we absolutely must do, B: What we very definitely ought to do, C: What would be beneficial but not critical to do, and D: What is not worth doing.' The subprograms were further delineated in the 'pecking order' by a priority number based on overall benefit to the public.

Under this system, the Legislature will be allowed to appropriate monies at the subprogram level rather than at the program level, as in the past. Thus, there would be, in LeResche's words, 'Little likelihood of the need to move funds between the subprograms we have established—only within them. Appropriations would be made to the DNR by subprogram, with allocations to the projects desired within that subprogram.'

He added, 'The Governor and the Legislature will know exactly what the Department is expected to do, and at the end of the year, a performance summary can be easily compiled showing the Department's track record in graphic terms.'

DGGS field party finds promising gold, silver values

Last summer, a group of DGGS geologists found a deposit in south-central Alaska that has anomalous amounts of gold, copper, silver, and lead. Recent assay results from 10 grab samples show maximum values of 0.59 percent copper, 2.7 percent lead, 14 ppm gold, and 150 ppm silver.

According to author Mitchell W. Henning, 'This package of gneissic metasedimentary rocks and the occurrence of sulfides within it may suggest a new base-metal terrane, with new targets for exploration on state lands.'

Report on find to be released February

Miscellaneous Report 4, which details the location and the assay results of a group of grab samples from the deposit, will be released simultaneously throughout Alaska's time zones on Tuesday, Feb. 26. The report will be given out at 9 a.m. at the DGGS Anchorage main office (3001

Porcupine Dr.) and the College mining-Information office and at 11 a.m. at the Juneau and Ketchikan Information offices. (If the proposed time change for Southeastern Alaska takes effect in the meantime, the times there will be adjusted to coincide with Alaska Standard Time.)

The 'Miscellaneous Report' category is reserved for announcing results of DGGS field-party discoveries that appear promising to the public. DGGS geologists are not allowed to stake claims on sites found while working on state time and with state money.

The reports are free.

DGGS gets \$15,000 grant to begin evaluation of geothermal-energy sources for Unalaska Island

Next spring, the Division of Geological and Geophysical Surveys, acting on a \$15,000 contract from the Alaska Division of Energy and Power Development, will execute a detailed reconnaissance of geothermal energy systems on and near Unalaska Island in the Aleutian Chain. The purpose of these preliminary studies will be to acquire data to estimate the relative energy potential of various known hot springs and fumarole systems and to design the additional studies necessary to determine the economic feasibility of generating geothermal power on Unalaska.

Of special interest are the Makushin volcano and Sumner Bay systems. Makushin volcano may harbor a near-surface magma chamber or hot-rock source of energy as well as a hot-water or steam system.

These early studies should be completed in time to allow more detailed work to be planned and executed during the summer field season where early reconnaissance indicates additional study is warranted.

Although the technology and procedures used in investigating geothermal systems have been systematized over the past few years, large-scale evaluation projects remain costly and need to be carefully tailored to individual sites to avoid waste in both funds and personnel. Attempting advanced assessment studies without a firm knowledge of site geology, tectonics, and local logistical support would be to invite an added risk of failure or at least an increased cost for the project's goal of finding an exploitable source of geothermal energy on Unalaska.

The \$15,000 grant will enable DGGS to per-

form any advanced assessment studies with a firm knowledge that their efforts are focused on those sites having the greatest economic potential.

DGGS investigates hydrothermal resources of state under Alaska Energy Grant

DGGS geologists John W. Reeder and Roman J. Motyka are heading up the geothermal-energy part of the Alaska Energy Grant program for DGGS. One of Reeder's duties is to formulate a definitive state policy and plan for developing the geothermal energy resources of the state. Motyka is preparing an atlas of the state's geothermal sites, which will include an estimation of hot-water or steam reservoir temperatures.

Reeder and Motyka are placing priority on hydrothermal systems that are 'easier to develop,' they say, than hot-dry, molten-igneous, and geopressurized geothermal systems. Much of this plan is based on DGGS experience gained from the Pilgrim Hot Springs project (p. 1).

The plan calls for examining several priority areas, which include northern Unalaska Island; Sitka (Goodard Hot Springs); Eimons caldera, near Cold Bay at the end of the Alaska Peninsula; Manley; Circle; Tenakee; and Horner Hot Springs near Ruby; the northeastern part of Atka Island; Clear Creek; Kotzebue; the west side of Mount Drum, in the Wrangells; and Willow.

Unalaska and Umnak Islands will be among the more immediate targets for investigation. Both areas have a high hydrothermal energy potential. The city of Unalaska issued a formal resolution (No. 79-18) requesting assistance from the state in studying the possible use of geothermal energy.

Reeder says that the Grant Program specifies that he 1) develop a 5-year plan, including identifying priority sites for extensive investigations; 2) develop both basic and specific exploration and reservoir-assessment (site-specific) plans for the various geothermal sites; 3) gather extensive physical data; and 4) establish a geothermal data bank.

Survey of mineral activity in Alaska, 1977 and 1978

By DGGS geologists G.R. Eakins and C.L. Daniels

Alaska's resources have been an increasingly important issue during the past 3 years because of the d-2 lands debates and the land selections and disposals by the state. Important new metal

discoveries and efforts by industry to evaluate and develop these deposits during this time have intensified conflicts between the state and federal governments, industry, and environmental groups.

The explosion in exploration activity in Alaska since 1973 by major companies and the rise in the number of small gold-placer operations and prospectors have made it difficult to accurately inventory the activity. There is no single office or agency where complete minerals-activity information is recorded. DGGS may be the best single source because all claims and annual assessment work are filed into the College-office Kardex system. The U.S. Bureau of Mines and DGGS cooperate in collecting such information.

Questionnaires are usually mailed out each fall by DGGS to all active mining and exploration companies and to individual miners for whom we have addresses. The response, which has been fairly good, is extremely helpful in assessing the annual minerals picture in the 49th State. More specifically, the survey has four main purposes:

- 1) To compile information on the amount and location of mineral production and exploration and to maintain a listing of active companies and individuals; these data are incorporated into an annual report.
- 2) To provide such information to industry and the public when inquiries are received. The sharing of information on geology and resources is of mutual benefit to government and industry.
- 3) To supply other state agencies--especially those involved in land selections and classifications, land disposals, and highway construction--with up-to-date information regarding mining claims and the mineral potential of the lands in question.
- 4) To assist in determining the role of the mineral industry in Alaska's overall economy and in the nation's mineral supplies.

Our survey of 1979 activity is still in progress. Over 500 questionnaires were mailed during early November, and it will be several weeks before the results of this mailing can be tabulated. Unfortunately, the surveys are never complete; many mailing addresses become out of date during the year and many people simply give the

Mining complaints - 1977, 1978

In reference to:	Placer		Lode	
	1977	1978	1977	1978
Federal government				
1. EPA	9	8	}	-- 10
2. BLM	3	2		
3. OSHA	1	--		
4. MESA	1	--		
5. U.S. Forest Service	1	2	1	--
6. Regulations-permitting	13	14	20	21
7. Uncertainty regarding future	4	2	--	--
8. Duplication	1	4	--	--
9. Land reclassification	4	8	19	22
State government				
1. Permitting-regulations	12	14	25	19
2. Interagency duplication-lack of coordination	1	5	4	7
3. Lack of support for mining	1	8	9	4
4. Uncertainty regarding future	4	2	4	1
5. DEC	1	7	1	--
6. Fish & Game	1	5	--	--
Finances				
1. Cost of Alaskan operations	5	6	18	5
2. Financing	1	3	4	4
General				
1. Access to land	7	6	14	15
2. Logistics	5	6	13	2
3. Shortage of experienced help	--	2	--	--
4. Weather-shortness of season	--	1	9	6
5. Water supply	4	4	--	--
6. Equipment breakdowns	--	5	--	--
7. Environmental (terrain-permafrost-overburden)	--	5	6	4
8. Claim jumpers	1	--	4	0

Reported mining expenditures by region, 1977 and 1978
(in thousands of dollars)

	Placer		Lode		Coal-Stone	
	1977	1978	1977	1978	1977	1978
Northern	--	50	6,750	3,140.7	--	--
Western	135	430.2	1,738.8	435	10	--
Interior	1,315	1,031.8	3,120	4,326	--	--
Southwestern	--	--	--	250	--	--
Alaska Peninsula and Kodiak	--	--	--	1	--	--
South-central	372	331.8	1,786.7	697.7	630.5	--
Southeastern	7.5	400	6,125.4	6,477.5	--	--
Total	\$1,829.6	2,243.8	19,520.9	15,327.9	640.5	--

questionnaire the old 'deep six.'

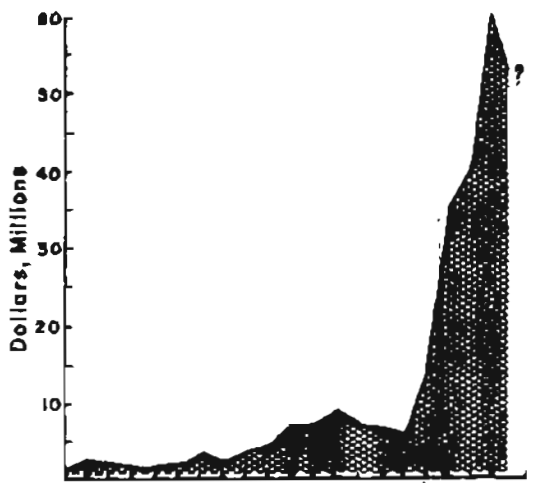
Those engaged in any mineral-related ventures in Alaska are urged to notify the DGGG College office of any change of address and to cooperate in replying to the questionnaires. Confidential information will be respected.

A tabulation of these surveys, giving operator names and other data, will be published in early 1980 as an open-file report. The amount spent by each and incomes are withheld.

Generally, most of the major companies responded. The results of the 1977 and 1978 surveys, which provide a good indication of overall activity and a sampling of plans, opinions, and complaints, are presented in the following tables and graphs.

Man-hours per mining operation (1978)

	Placer	Lode	Coal-Stone
High	200,000	120,000	No Informa-
Low	60	70	tion given
Avg	6,706	10,428	



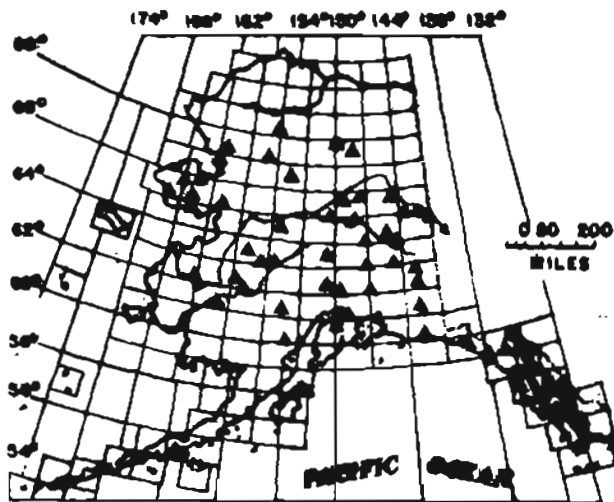
Mineral exploration in Alaska, 1959-79

Number of days in field

	1977		
	Placer	Lode	Coal-Stone
High	360	350	71
Low	7	2	10
Avg	88	94	43
	1978		
	Placer	Lode	Coal-Stone
High	210	360	360
Low	5	9	- -
Avg	80	152	360

Employees (1977)

	Placer	Lode	Coal-Stone
High	32	100	15
Low	1	1	1
Avg	4.5	13	6



Gold-mining districts of Alaska

They said it....

"Most of the larger national monuments offer good systems of hiking trails, and all have modern visitor centers."--Luxury In a Tent, p. 53.

"When a driver fills up the gas tank of his car he knows the fuel came out from an oil well, but he never thinks that most of the car came out of a hole in the ground, too."--Editorial, World Mining, Nov. 1979.

Our Gangue....

By Frank Larson, editor

Fate, also known as Our Lady of the Dice, has had a marked influence on all our lives. For instance, where would we be now if Lelf Ericsson had turned left at Newfoundland? Of if Paul Revere's horse, George III, had dropsy? What would have happened if The Father of Our Country had an expensive, down-filled sleeping bag on Christmas night, 1776? He may have decided to have a Tom and Jerry and turn in, rather than go to Trenton that fateful night.....To take the hypothesis of Fate a step further, what would have happened if Washington's namesake, George

Washington Carmack, had a hard-core bigot for a mother? Would she have raised hell and sent him packing for home? (George, as you know, took a comely Indian lass for a bride and, together with his new brothers-in-law, Skookum Jim and Tagish Charlie, found lots of greasy yellow metal on Rabbit Creek, which was later named Bonanza Creek, which flowed into the Klondike, which---well, you get the general drift)....Old Mother Fate had a fortuitous hand in the founding of Fairbanks, too. The revered founder, E.T. (Cap'n) Barnette, literally had his ship come in one moonlit night around the turn of the century when Dame Destiny blew a wet one in his ear and said, "Load a barge full of beans, bacon, and booze, Honey, and sweet-talk a riverboat captain into taking you as far up the uncharted Chena River as he dare go. When he won't go any farther, offload and set up shop." So Barnette did, and one of his first customers was an Italian immigrant named Felix Pedro who staggered into the new outpost and plopped down a gunnysack of gold he had mined a mere 12 miles north. "Zowieee. Empire-building time," you cry? Did the Cap'n and Felix get filthy rich and live happily after, you ask?....Alas, 'twas not to be. Poor Felix, who had always been sort of consumptive anyway, died shortly thereafter from his long, wet exertions, never to enjoy the fruits of his labors...And the pioneering Cap'n, you ask? Did he use his incredible luck to become a land baron, found a dynasty, and rule the interior of Alaska with an iron hand, as in a romantic novel? Well, in a way. But the Saga of Cap, Tycoon of the North, did not quite have your typical Hollywood ending. Rather, its ending was more in line with one by O. Henry. About 10 years after founding Fairbanks (which for some inexplicable reason was named after an obscure Indiana Senator), the beloved Cap'n Barnette, who served as mayor, barrister, leading civic booster, and general one-man Chamber of Commerce, was again visited by Dame Destiny. She sidled up to his membranous organ and huskily whispered, "Let's split." And so, on a moonlight night in 1911, they did---taking with them the contents of the Washington-Alaska Bank, of which Barnette was the esteemed and beloved president. Where did they go, you ask? Nobody knows. Oh, there were more than just a few people just a mite more than mildly interested in the subsequent fate of Mr. E.T. Barnette, you can be sure. But he simply disappeared. Nobody ever learned of his where-

abouts, and his gravesite remains a mystery to this day.....But Yours Truly, however, knows what fate befell Barnette. You see, Ol' Cap shaved his beard and made his way south. He then changed his name and remarried, eventually becoming a respected grocer and doting father who religiously drummed his vast knowledge of life, finance, and political expediency to his new son, Dick, in his hideaway at Yorba Linda, California...in the news, Alaska climbed into second place in U.S. crude-oil production (behind Texas). The 49th State now produces 16.4 percent of the U.S. daily production. Louisiana dropped to third.....The Cook Inlet Region Native Association is reportedly working out an agreement with Arco for exploring 115,000 acres of the Kenai National Moose Range for oil and gas. The Native Ass'n holds the mineral rights.....On Halloween, Alaska Gold closed down its sole dredge in Nome for the season. This year's production, from Submarine Beach, will be lower than the 11,295 oz garnered last year. Next year's plans are unsettled because of ownership uncertainties, inflation, and the price of gold....In Canada, the Indian and Northern Affairs Dept. awarded a \$41,000 contract for a study on Yukon placer mining to review technology and water-use practices in hopes of clearing up the 'growing state of tension between the government and the placer industry,' said a spokesman....Perhaps we need a similar study on this side of the border.....On the plus side, there is good news from the Dept. of Interior for a change. In announcing \$2.7 million in assistance grants to western mineral institutes (including one of \$59,000 to UA), Undersecretary James A. Joseph said, 'We need your help to develop the technologies in your laboratories and in your field experiments that will help us meet the Nation's need for a secure mineral supply, and to do so in an environmentally sound way.'.....One thing is sure: Interior bigwig Whalen (p. 8), who apparently regards geochem sampling and even aerial surveys as deleteriously damaging to the environment, would never let DGGs geologist Tommy Bundtzen near any part of his domain. Bundtzen, you see, is an amateur lepidopterist, and trips through the Alaskan heather all summer with a rock hammer in one hand and a butterfly net in the other. Tommy just learned that one of his catches of last year, made near McGrath, could be a brand-new species. (But then again, maybe he finally located the mysterious Cap'n Barnette---in drag).....Cheers.

Metals Market

	<u>Nov. 30, 1979</u>	<u>3 Months Ago</u>	<u>1 Year Ago</u>
Antimony metal per lb., NY dealer	\$ 1.48*	\$ 1.38	\$ 1.25
Barite (drilling-mud grade per ton)	\$ 24-47	\$ 24-47	\$ 19-28
Beryllium ore, stu	\$ 60-65	\$ 60-65	\$ 45-50
Chrome ore per long ton (Transvaal)	\$ 54-58	\$ 58.00	\$ 54.00
Copper per lb. (MW-prod.)	\$ 1.00	\$ 0.91	\$ 0.70
Gold per oz.	\$419.10	\$314.75	\$198.25
Lead per lb.	\$ 0.57	\$ 0.58	\$ 0.38
Mercury per 76-lb flask	\$335.00	\$300.00	\$154.00
Molybdenum conc. per lb. (Climax)	\$ 8.84	\$ 8.84	\$ 4.95
Nickel per lb. (cathode)	\$ 3.00	\$ 2.75	\$ 2.00
Platinum per oz.	\$545.00	\$421.20	\$307.00
Silver, New York, per oz.	\$ 18.77	\$ 9.78	\$ 5.75
Tin per lb., NW composite	\$ 8.12	\$ 7.35	\$ 7.44
Titanium ore per ton (ilmenite)	\$ 50.00	\$ 50.00	\$ 50.00
Tungsten per unit (GSA domestic)	\$127.44	\$134.74	\$131.35
Uranium per lb., MW US spot oxide	Not quoted	\$ 42.70	\$ 42.50-44.00
Zinc per lb. (MW-US PW)	\$ 0.37	\$ 0.36	\$ 0.34

* - Metals Week has discontinued quoting antimony ore.

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