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STATE OF ALASKA

Department of Natural Resources

Division of Geological & Geophysical Surveys

MINES & GEOLOGY BULLETIN

Vol. XXIV | November 1975 | No. 6

P.O. Box 80007 | Published Bimonthly | College, Alaska 99701

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Oil Exploration Pact Penned by Doyon, Ltd.

(from the Fairbanks Daily News-Miner, Sept. 3, 1975)

Doyon Ltd. has contracted for at least four exploratory wells and two years of seismic tests for oil and gas exploration in the Kandik Basin, Doyon President John Sackett announced Tuesday.

The exploration will be on land the Fairbanks-based regional corporation has selected under the Alaska Native Claims Settlement Act.

Doyon entered into an agreement with Louisiana Land and Exploration Company for the exploration and development of gas and oil potential in the Kandik Basin area, with drilling work to begin in February. The agreement also calls for the seismic work and an intensive geological and geophysical reconnaissance program which has begun.

In return for rights to acquire leases on 250,000 non-contiguous acres in the area, Louisiana Land and Exploration will also assist Doyon in its land selection process.

The Kandik Basin is a large sedimentary basin lying across the Alaska-Yukon border, approximately due east of Central. The area of more than three million acres is one of the few unexplored on-shore areas remaining in the United States, and Doyon says geologists feel the region's potential is more than a billion barrels of oil.

Sackett said the program took almost two years to develop and will be "a model example of orderly development in the sub-arctic.

"The program will have a significant and positive impact on interior Alaska," Sackett said. "All of our programs have, and will continue to have, environmental and ecological considerations far beyond those normally required."

The corporation is presently hiring the staff it will need for the new programs.

"In addition to geologists, landmen and drilling engineers, the company has a specific role spelled out for three persons to oversee environmental and ecological concerns," Sackett pointed out. He stresses that Doyon sees the venture as not only an opportunity for native people, but as a multi-million dollar project that create numerous opportunites for the Interior.

Advice in the negotiations with the exploration company was provided by Howard Lennon, a partner with the Dallas-based firm of Jackson, Walker, Winstead, Cantwell and Miller, and by Dr. Tom Cantwell, a petroleum consultant in Houston.

"We feel our agreement with Louisiana Land and Exploration is mutually beneficial," Sackett said, "I am comfortable that we have considered village concerns of a continued subsistence lifestyle as well as corporate objectives of business for profit."

The announcement of the new exploration program comes less than two weeks after Doyon announced it had entered into another agreement with five companies for exploration and development of hard rock mineral resources.

Like the petroleum resource program, the mining program involved only the regional corporation's land selections away from village areas.

Doyon is the largest landholder of the corporations formed by the land claims act, covering 37 per cent of Alaska. It holds subsurface rights to four million acres of land in individual village areas withdrawn by village corporations last year, and the regional corporation is selecting an additional eight million acres of land this year on which it will hold both surface and subsurface rights.

The latter selections will be half in the village withdrawal areas and half in more remote areas like the Kandik Basin, and the mineral and petroleum exploration projects will be in the remote area withdrawals.

Geochemistry as a Prospecting Tool
by Alfred F. Trites

(Ed. note—This is the fifth of a series from The Mining Record [Jan. 8, 1975]. The author is a consulting geologist in Denver.)

Analyses Available

In the four preceding articles we have considered the methods of soil sampling, the preparation of the samples and the selection of a laboratory. Now let us focus our attention on the choice of the element or elements to provide you with the most suitable geochemical data on the soils of your area.

Of course, the most comprehensive information possible would be obtained by a quantitative analysis of each element on the periodic table. Such a feat would not only exceed the capabilities of most laboratories in existence today but would also boggle the minds of the world's greatest geochemists in attempting to interpret all the results. A number of labs are now able to provide custom geochemical analysis on 25 or so elements, listed as follows:

Antimony, Arsenic, Barium, Beryllium, Bismuth, Cadmium, Chromium, Cobalt, Copper, Fluorine, Gold, Heavy Metals (combined), Lead, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Platinum and Palladium, Selenium, Silver, Tellurium, Tin, Tungsten, Uranium, Vanadium, Zinc.

Since you usually are dealing with only trace amounts of elements in your soils it is important to know the lowest content that your laboratory can determine within the accepted accuracy of plus or minus 10 percent. This is known as the lower threshold or the lower limit of detection. Your lab should be able to supply you with a catalog listing the elements they are equipped to analyze geochemically and the lower limit of detection for each element. In geochemical reporting it is customary to express the concentration of an element in parts per million (ppm). Occasionally certain elements, such as mercury, which have extremely low limits of detection, are reported in parts per billion (ppb). For a quick mental conversion simply remember that 10,000 ppm is equivalent to 1 percent. To convert parts per million to ounces per ton either divide by 34.28 or multiply by .0292.

The limit of detection will depend upon the element and the method of analysis used. Among the lowest are mercury, platinum and palladium (the latter two used infrequently in normal geochemical surveys) for which values as low as .01 ppm are being reported by some labs. Gold also is low with as little as .02 ppm detectable by today's methods. Antimony, beryllium, cadmium, cobalt, copper, lead, molybdenum, nickel, selenium, tungsten, uranium and zinc all have detection limits of 5 ppm or less. Arsenic, barium, bismuth and tin have detection limits of about 10 ppm. The elements with the highest limits of detection are chromium, manganese, phosphorus, vanadium (each with 50 ppm) and fluorine (100 ppm).

Analytical methods include the colorimetric (for phosphorus, selenium, tungsten and vanadium), fire assay (for platinum and palladium, possibly some on gold), atomic absorption (now used on many of the metallic elements) and spectrographic analysis. The method used may vary somewhat with the lab but is usually the one which will give you the most satisfactory results at the lowest sample cost. If you suspect the presence of any elements that would tend to interfere with the determination by the method used, it is advisable to confer with the analyst in advance to modify the lab procedure.

Selecting the Elements for Analysis

The selection of the elements to be determined will depend upon the nature of the buried deposits being prospected. For areas in which the geochemistry is completely unknown to me I like to submit a few soil samples, along with rock chip samples from any exposures, for semi-quantitative spectrographic analysis. This helps to give me a "feel" for the elemental content through such a scan. Spectrographic analysis can serve to detect elements such as arsenic, antimony, bismuth, cadmium, tin, vanadium, and the rare earths lanthanum, gallium, scandium, and vitrium that could easily be missed unless I specifically requested their determinations. Some of these elements could have important geochemical and possibly even economic significance within the area. "Spec" results are also very helpful in selecting the element or suite of elements to be determined in the soils.

Certain elements, such as fluorine, gold, mercury, phosphorus, platinum and palladium, selenium and tellurium are not detectable by the spectrographic method, at least in the concentrations usually found in nature. The lower detection limits are high for certain elements on the spectrograph, especially antimony (100 ppm), arsenic (500 ppm), manganese (200 ppm) and zinc (200 ppm). However, unusually high values some-

times are reported on these elements and are very often of geochemical value.

Whenever possible use the elements being sought. For instance, if you are tracing a buried vein with values in silver, lead and zinc, at least have enough samples run for each of these metals to determine which produces the best spread or pattern of concentrations in the soil. It could be that you would use all three. Some elements, such as fluorine and mercury (possibly also arsenic), are interpreted as "pathfinders" that indicate mineralizing solutions have passed through a fault or other conduit and may be helpful where metallic elements do not appear in sufficient concentrations to indicate a deposit. These and other examples of elemental distribution will be discussed more in detail in forthcoming articles.

GEOLOGY OF HEALY D-1 QUADRANGLE

(Ed. note—This completes the series on DGGS staff activities during the 1975 field season.)

A geologic mapping and geochemical sampling program in the Healy D-1 quadrangle is directed at understanding both the tectonic setting of the area and the controls of mineralization along the north flank of the Alaska Range. Preliminary results suggest 1) that the Buchanan Creek pluton, located in the southern part of the quadrangle, consists of two bodies that are separated by metamorphic rocks, and not as one composite pluton as had previously been thought; 2) that the Totatlanika Schist terrain in the northern part of the quadrangle is complexly thrust faulted and is probably allocthonous; and 3) that mineralization in the quadrangle is likely to be related to granitic intrusions, to thrust faulting, or to volcanogenic members of the Totatlanika Schist.

The program is about two-thirds complete.

W.G. Gilbert

Check Land Status First, Warns BLM

(from Alaska magazine, October 1975)

Gold seekers have been warned by the Bureau of Land Management that there is a lot more land in Alaska closed to prospecting than is open for pick-and-pan operators. All lands withdrawn for selection of 44 million acres by Alaska's Natives and more than 80 million acres of federally owned D-2 land are off-limits to location of new mining claims, according to the BLM. Also closed are most wildlife refuges, Mount McKinley National Park, Katmai National Monument, the Kenai Moose Range and most military withdrawals. The only federal lands open to mining, advises the BLM, are 46 million acres withdrawn as D-1 lands under terms of the Alaska Native Claims Settlement Act. Most of these open tracts are located in Interior and Western Alaska. The BLM recommends that prudent prospectors check land records in its Anchorage or Fairbanks offices before doing any claim staking.

Alaskan Mineral Find Reported By Mines Bureau

(from a Dept. of Interior news release, Sept. 2, 1975)

Field investigations sponsored by the Interior Department's Bureau of Mines have resulted in the discovery of an impressive series of lead, zinc, silver and barite occurrences about 2 miles inside the western boundary of the proposed Noatak National Arctic Range, the Department reported today.

The discovery, known as the Red Dog prospect, is in the western part of the Brooks Range in Northwest Alaska, about 35 miles north of the village of Noatak on the west side of Deadlock Mountain.

The discovery was made by a team working out of Anchorage for the Bureau of Mines. The field investigations are being made in response to a 1974 Congressional directive to appraise the mineral potential of areas proposed for withdrawal under terms of the Alaska Native Claims Settlement Act. The current investigation at the Red Dog prospect resulted from reported concentrations of lead, zinc, and barite found in rock and sediment samples collected in 1955 and 1968 by the U.S. Geological Survey during reconnaissance regional mapping of the Delong Mountains.

The mineralized area at the Red Dog prospect is slightly less than 2 miles long and 1/2 mile wide. The investigation included preliminary mapping, geochemical sampling, sampling of the few exposed outcrops and sampling of rubble derived from these outcrops. Because there were only a few outcrops on the rubble-covered hill slopes, information obtained so far on average grade, structure and distribution is limited. Nevertheless, Bureau of Mines Director Thomas V. Falkie said, "The strength of the mineralization and its extent on the surface makes the occurrence significant."

The mineralization noted thus far includes:

1. Lead and zinc sulfides in a rock that contains mostly barite;
2. Lead and zinc sulfides in siliceous rocks;
3. Barite zones with a little lead and zinc;
4. Abundant iron sulfides with minor lead-zinc sulfides in cherty brecciated rocks;
5. Massive to semimassive veins or zones of lead, zinc, and iron sulfides in brecciated black chert.

A detailed appraisal of the Red Dog prospect will be included in a report to Congress that will summarize exploration results to date in and near four proposed withdrawal areas in the western part of the Brooks Range.

"I got a free trip to Europe on my way in here. I travel to and from work every day in a helicopter. I live on a ship. I spend my night shift hanging by my toenails half a mile up the face of the biggest cliff I ever saw, where I have to wear dark glasses because the sun never goes down.... "My problem is that when I get home nobody will ever believe me."

—Canadian Miner in Greenland

ERDA Issues Report on Feasibility Study for Aerial Survey of Alaska

(from ERDA news release of Sept. 29, 1975)

The Energy Research and Development Administration today announced the publication of a report on the feasibility study for an airborne gamma-ray survey of Alaska.

The report, GJO-1646, entitled "Feasibility Study for an Airborne High-Sensitivity Gamma-Ray Survey of Alaska Phase II Report—1976-1979 Program," by Texas Instruments Incorporated.

The purpose of the feasibility study is to present a comprehensive plan for the airborne gamma-ray survey of Alaska during the period from 1976 to 1979. All feasible alternate methods for the attainment of the total survey are discussed. Development of new technology in airborne gamma-ray systems, for both fixed and rotary wing aircraft are considered. Time and costs analysis and the requirements for project management are reviewed.

The report will be placed on open-file for public inspection by the Grand Junction (Colorado) Office of ERDA at the following locations *(Ed. note—including all DGGS offices except Juneau)*:

Grand Junction, CO -- Tech. Library, Grand Junction Office, U.S. Energy Research & Development Administration.

Washington, D.C. -- Public Documents Room, Nuclear Regulatory Commission, 1717 H Street, N.W.

Fairbanks, AK -- U.S. Geological Survey, Alaskan Distribution Unit, 520 Illinois Street.

Little Squaw Gold Reports High-Grade Gold Values

(from The Mining Record, Aug. 6, 1975)

Work done in 1974 at the Little Squaw Gold Mining Co. property in Alaska's Chandalar District confirmed the presence of high-grade gold values, Eskil Anderson, president, informed stockholders last week.

The report of Noranda Exploration, Inc., on its work on the Mikado ore shoot stated that the deposit contains more than 2 ounces of gold per ton over a good mineable width of 10 to 15 feet, the Spokane mining geologist wrote.

Noranda spent about $300,000 on reopening of old workings, sampling, bulldozer stripping, road and airport maintenance and construction, underground mining and sampling, and placer sampling, he said.

In April, he reported, Noranda flew a mining crew and about $60,000 worth of mining equipment and supplies to the Tobin Creek airport at the Mikado mill site for this season's work.

Callahan Mining Corp. replaced Noranda as operator June 20 and Noranda's 1975 crew and others now are working under the direction of Callahan under an agreement providing for net profits to be divided on the basis of 60 per cent to Callahan and 40 per cent to Little Squaw Gold, he said.

"If Callahan's program is successful," he wrote, "it should result in production from the Mikado mill substantially before it would have been attained otherwise."

The mill is in good condition and can be revamped where necessary at a relatively low cost, Anderson said.

Callahan, owner of the Galena mine in Idaho's Coeur d'Alene Mining District, is one of the few mining companies familiar with the types of mining most likely to be used, he said.

$100/lb for Uranium?

(from the Northern Miner, Aug. 14, 1975)

That figure may not be as fantastic as you think, and at least one New York analyst has some reasonable argument to support this contention. He is David G. Snow, of Mitchell Hutchins, Inc., and according to the Wall Street Journal, one of the more influential bulls on energy investments.

According to Mr. Snow's thesis, U.S. prices of all sources of energy are headed for the equivalent of $12 a barrel for oil in the next few years. If the comparison is made in terms of the number of British Thermal Units (the measure of energy) contained in a barrel of oil, it will be found that the equivalent is about 6,000 cu. ft. of natural gas, a quarter of a ton of coal, and 40 to 70 pounds of uranium.

A further dimension is introduced with consideration being given to the convenience of the various fuels. For instance, it is generally agreed that gas has been underpriced in relation to other fuels, and is now in the process of catching up. Taking such factors into account, Mr. Snow calculates that by the time U.S. oil is $12 a barrel, uranium should be valued as high as $100 a pound in equivalent BTUs. This compares with a uranium price said to be $24.70 a pound for immediate delivery and $35.55 a pound for 1980 delivery. Coal currently selling at $20 to $25 a ton will be priced at $40 to $50 a ton, the analyst calculates, and natural gas will be $2 per 1,000 cubic feet, well above current levels.

Regardless of how close the above predictions may be to the truth, it can be said with certainty that the price of uranium is headed much higher. Exploration companies are recognizing this fact and low-grade deposits that could not be considered economical under present conditions are getting attention because of their future worth.

On a pessimist's tombstone: "I expected this, and here I am."

Firm Starts Oil Imports

(from Anchorage Daily Times, Oct. 22, 1975)

For the first time last month, the state with the nation's largest petroleum reserves began importing crude oil.

The situation resulted from the internal structure of Alaska's most rapidly expanding petroleum supplier, Tesoro-Alaskan Petroleum Corp., which brought about 218,000 barrels of Indonesian crude oil here from its sister company, Tesoro Crude Oil Co.

To some it seemed suggestive of the British expression about "bringing coal to Newcastle," one of England's coal-rich areas.

On Sept. 18, a Greek tanker pulled up to the Kenai Pipeline Terminal dock at Nikiski. On board the vessel were a 28-man crew and oil which Tesoro Crude Oil had produced in Indonesia through a technical assistance and production sharing agreement.

Tesoro brought the oil more than 9,000 miles to Alaska because the demand for its products here is outstripping its ability to purchase crude oil from the Kenai Peninsula and Cook Inlet, Alaska's only producing fields. Tesoro produces no crude oil in the state.

Tesoro's main supply of crude oil for its refinery at North Kenai is the state's 12.5 per cent royalty share of production there. It has also been able to purchase or trade oil with Marathon Oil Co., Shell Oil Co., Atlantic Richfield and Standard Oil Co. of New Jersey. Tesoro traded oil in southern Louisiana or the Rocky Mountain states for oil the companies owned here.

The other reason Tesoro chose to bring the Indonesian crude to Alaska is that it has qualities similar to the Cook Inlet's low-surfur crude, which the refinery was designed to handle. It also has a high wax content, like Alaska oil.

There are three refineries in Alaska: the Tesoro refinery at North Kenai, a Standard Oil Co. of California refinery less than a mile north and a small ARCO distillation refinery at Prudhoe Bay which is being used to supply part of the oil companies' needs there.

As far as anyone at any of those refineries or the U.S. Customs Service can remember, Tesoro is the first company to have brought crude oil into the state. During the early part of the century the Chilkat Oil Co. refinery operated at Katalla, south of Cordova, and supplied in part the needs of the Copper River and Northwestern Railroad and the Kennecott Copper Mines. The operation had a fire in its boiler house in 1933 and was never rebuilt.

The crude oil "had to be loaded onto the ship by barges because we have not yet built an export facility there," said Tesoro Crude Oil President James Smith of San Antonio, Tex.

"Normally the production there is pipelined to one of Pertamina's refineries or exported as crude to Japan," Smith explained. Bringing the crude to Alaska is at least a $1 per barrel more expensive than producing it from Cook Inlet crude oil, he said. A barrel is 42 gallons of oil.

ERDA Issues Report on Aerial Survey of Copper River and Seward-Selawik Areas

(from ERDA news release of Oct. 17, 1975)

The Energy Research and Development Administration (ERDA) today announced plans to issue the seventh in a series of reports on the results of airborne radiation surveys.

The surveys, which are planned to cover the entire continental United States over the next several years, are a part of ERDA's National Uranium Resource Evaluation program. The program will provide better information for assessing the Nation's uranium resources and for identifying areas favorable for uranium occurrences.

The survey was conducted by Texas Instruments Incorporated during June and July 1975, using a high-sensitivity gamma-ray spectrometer and magnetometer system. A total of 54 flight lines were flown in the Seward-Selawik area, covering 7,630 miles, and a total of 17 flight lines were flown in the Copper River area covering 1,950 miles. Continuous single-reconnaissance profiles were flown between Anchorage and the Copper River area and between Nome and Fairbanks. The airborne data were collected along parallel, east-west flight lines spaced 6.25 miles (10 kilometers) apart and north-south tie lines spaced 25 miles (40 kilometers) apart.

The airborne measurements were compiled, using ground-based computer facilities, to provide profiles and maps of the gamma-radiation intensities equivalent to the relative concentrations of uranium, thorium, and potassium; also shown are the ratios of these intensities, total gamma-ray intensities, and magnetic field intensities. The gamma-ray measurements obtained over each geologic unit shown on the base maps were statistically evaluated. All maps, exclusive of those in the text, are at a scale of 1:250,000. The stacked profiles are at a horizontal scale of 1:500,000.

The text consists of eight chapters describing flight recovery methods, data reduction, data presentation, geology of the surveyed areas, references and the results of data analysis.

The report, GJO-1653, entitled "Airborne Geophysical Survey Copper River and Seward-Selawik Areas, Alaska" prepared for ERDA by Texas

Instruments Incorporated, will be placed on open-file for public inspection by the Grand Junction (Colorado) office of ERDA on November 3, 1975 at the following locations and times.

Grand Junction, CO	-- Technical Library, Grand Junction Office, ERDA - 11 a.m., MST
Washington, DC	-- Public Documents Room, Nuclear Regulatory Commission, 1717 H Street, N.W. - 1 p.m., EST
Anchorage, AK	-- State Geologist, DGGS, 3001 Porcupine Drive - 8 a.m., Alaska Standard time
College, AK	-- DGGS, UA Physical Plant Bldg., 8 a.m., Alaska Standard Time
Reston, VA	-- U.S. Geological Survey Library, Gifts and Exchange Unit, National Center - 1 p.m., EST
Denver, CO	-- USGS Library, Bldg. 25, Denver Federal Center, Lakewood, CO - 11 a.m., MST
Spokane, WA	-- USGS, Room 678, U.S. Court House - 10 a.m., PST
Menlo Park, CA	-- U.S. Geological Survey, 345 Middlefield Road - 10 a.m., PST

Simultaneously with the open-filing at 11 a.m. MST on November 3, 1975, the report and related materials will be made available for purchase from Airborne Geophysical Services, Texas Instruments Incorporated, P.O. Box 5621, Mail Stop 975, Dallas, Texas 75222. There are two purchase options available. Option one consists of the report and 100 paper sheets which include geologic maps, anomaly maps, record location maps and bound stacked profiles. The price for the complete package of option one is $145.00. Option two, consists of a report, 7 paper geologic maps, 78 film anomaly maps, 15 film record location maps and bound stacked profiles. The price for the complete package of option two is $487.00. The prices will prevail through January 1, 1976, after which price adjustments may be made by Texas Instruments Incorporated to reflect production costs. Purchase orders should be made by mail, allowing two days for the preparation of purchase option one and one week for preparation of purchase option two. An additional charge for shipping will be added when applicable.

DGGS Releases Two Open File Reports

Now available from Petroleum Publications, 409 W. Northern Lights Blvd., Anchorage, AK 99503, are two new open-file reports.

AOF-90, Present and historical demand for oil and gas in Alaska, by Georgia A. Bewley and others (14 p., including 10 figures). $4.60, postpaid; $4.20 in person.

AOF-91, Alaskan oil demand, 1975-2000, by Georgia A. Bewley and others (30 p., including 20 figures). $7.90, postpaid; $7.40 in person.

Aerial Photos of Alaska Available

The Denver-based exploration consulting firm of IntraSearch Inc. has announced the availability of nonexclusive color aerial photography of several thousand square miles in south-central and southeastern Alaska. This imagery provides stereoscopic coverage of several areas that are of interest to the mineral exploration and development community. Index maps showing the areas of coverage are available from:

IntraSearch Inc.
1600 Ogden Street
Denver, Colorado 80218
Attn: Don Reitz

Included in the coverage are parts of the Livengood area, Yukon-Tanana area, Nabesna area, Talkeetna Mountains, and Mount McKinley area.

Free Book

A book entitled "A History of the Kennecott Mines—Kennecott, Alaska" is available from the DGGS Anchorage mining information office. Written by William C. Douglass and reprinted by the Division of Lands, the 28-page paperback is a pictorial and written synopsis of events occurring in the Copper River Basin around the turn of the century, when bonanza copper strikes were made at Kennicott, Alaska. The mammoth Kennecott Copper Corporation had its modest beginnings here *(their founders obviously being better managers than spellers—Ed. note)*.

The book, available only at the DGGS Anchorage mining information office, 323 E. 4th Ave., zip 99501 (c/o Ona McBride), is free.

PRICE CONTROLS—A method of government intervention by which shortages are made universal rather than spotty; also an ineffective repealer of the law of supply and demand. (From the Devil's Dictionary.)

Correction—Mining Claim Figures Too Low (Way Too Low)

The number of mining claims received in August was not the 319 reported in the last Bulletin. The total given represented only part of August, according to mining information specialist Carole Stevenson. The discrepancy came about when the Bulletin went to press earlier than usual, and the claims from all the recording districts had not been received. Mrs. Stevenson added, "Readers should be aware of the fact that all mining claims received here were actually filed the previous month—so in November we will receive claims that were filed in October at one of our recorders' offices." Mrs. Stevenson also said, "The large increase in claims filed is mainly due to the big mining companies, which are waiting their full 90 days after staking to record their claims." The correct totals are:

Received July (Recorded June)	Received August (Recorded July)
710	768
Received September (Recorded August)	Received October (Recorded September)
1783	2097

In related news, the College office recently gained a new mining information specialist. Pat Dieterich, a former DGGS employee, rejoined the Division after a lapse of 5 years. She recently returned to Alaska from Kenya, Africa, where her husband, Bob, a veterinarian with the UA Institute of Arctic Biology, was on a 1-year sabbatical leave.

"Alaskan Coals Could be Marketed"—Rao, Wolff at UA Coal Conference

In a conference on Alaskan coal held in mid-October at the UA Fairbanks campus, a number of professionals conversant with the problems and potential of Alaska's coals spoke out. Among them were Dr. P.D. Rao, Associate Professor of Coal Technology, and Dr. Ernest N. Wolff, Associate Director of the UA Mineral Industry Research Lab.

Wolff, who gave a paper on the current state of the art in the drying of low-rank coals, which he coauthored with Dr. Rao, said, "Alaska's coal resources, already substantial, promise to play a far greater role in the future. There are four reasons for this: 1) coals are generally low in sulfur (< 0.2 percent), making them environmentally desirable; 2) the coals are accessible for surface mining and have thick seams, sometimes exceeding 50 feet (in both the Nenana and Beluga coal fields). The Nenana coal field is already served by a railroad, and the Beluga coal field is potentially accessible to ocean shipping; 3) Alaska needs a sustained economic base; development of Alaska's coal reserves could provide a significant employment cushion when the oil boom ends; and 4) Alaskan coals, when processed, could meet the energy needs of the western United States; also, Japan has shown considerable interest in Alaskan coals.

"However, economics distates that coal production will have to be for markets outside Alaska. For example, in the more readily accessible Beluga and Nenana coal fields, the coal is of subbituminous rank, but with moisture as high as 28 percent and ash to 25 percent, beneficiation of at least a part of the coals will be required. However, in lowering both ash and moisture of these coals, a high-quality coal is produced. Thus, the changing energy picture makes the transportation of Alaska's coal to the lower states or to Japan a real possibility, comparable to the transportation of Wyoming and Montana coals to Texas and Chicago."

The paper went on to describe the primary problems in preparing Alaskan coal for market—washing the coal to reduce ash content, and reducing the moisture content—and methods of solving them. "Success in attaining these two objectives, reducing ash and moisture," the paper stated, "could make the development of Alaska's coals to meet the energy needs of the nation feasible."

"Feds Stalling Development"—Coal Industry View at UA

(from Fairbanks Daily News-Miner, Oct. 17, 1975)

Speakers at the "Focus on Alaska's Coal" conference here agreed the time is ripe for the long-awaited development of Alaska's coal industry, if only the government will let them.

The theme of paper problems overriding physical challenges was heavy throughout the two days of technical papers, panel discussions and speeches at the University of Alaska. Conferees toured the Usibelli Coal Mine in Healy.

They talked about how Alaskan coal could supply Anchorage with natural gas, liquefy North Slope natural gas or be burned for power right in the underground seams, but government regulations and restrictions impede both the mining and use of the material.

They believed, however, that Project Independence and a worldwide resources demand offer the best chance of Alaskan coal development. "Prudent development offers the brightest future for mankind," said Placer-AMEX vice president for exploration Hugh Matheson at a banquet speech Thursday night.

In 1973, Matheson said, America's energy consumption was the equivalent of 36 million barrels of oil per day. The latest projections call for a 1985 demand of 58 million barrels per day if energy use growth is unrestrained, and 51 million

barrels per day if active conservation programs are pursued.

"To meet with domestic energy supplies, we would have to increase nuclear energy, with all its problems, to one-third of all the energy production in the United States, then expand oil and gas production greatly and still double our coal production," Matheson said.

"That doubling of coal production would require the equivalent of 140 new two million ton per year eastern underground mines, 30 new two million ton per year eastern surface mines and 100 new five million ton per year western surface mines," he said.

"This would take $60 billion per year in capital investment."

Alaska's large coal deposits are not without problems, he said, with port access, weather, long lead times in development and other factors. "Nevertheless, I believe the physical problems can be met and markets do exist," he said. "Today engineering problems are the easier part of the task."

Matheson said the growth of nonproductive, man-caused problems from restrictions on the mining industry is fast approaching the point where "producing people" cannot continue.

"I do not mean to imply that environmental aspects are to be neglected," he said. "The mining industry should not repeat its examples of Appalachia and others."

At the same time, he said, the world can solve its massive problems of food and industrial supply "only if we technocrats continue to produce, expand and develop."

Matheson noted that there are only 8.68 land acres per person in the world right now, and if the world's population were evenly distributed the population of Alaska would be 43 million.

"I find it incredible how many tens of millions of acres are to be locked up, and I find it incredible how many people spend so much time talking about whether a float plane can land in a lake or whether it is a 'canoe area'," Matheson said. "Are there not larger problems?"

Golden Valley Electric Association (GVEA) spokesman A.W. Baker, sitting on a panel discussing the future of Alaska's coal development, pointed out that one reason GVEA is turning to oil-burning power plants is the five-year long lead time for building coal-fired plants, and about half this time is taken up in government regulatory paperwork.

The conference's representatives from the government regulators could offer little more than sympathetic shrugs to the complaints.

"I have no answer for it," said Arthur Hughes, special assistant for economic affairs in the Federal Energy Administration's Office of Coal. "It is a major problem. All we can do is admit it and wish something could be done about it."

In looking into the slowdown of coal plant construction, Hughes said, federal paperwork is found to be the third leading cause behind a fall in demand and problems with financing.

The conference featured talks on ways to convert coal to natural gas, including a discussion of in-situ gasification of coals.

Anchorage engineering consultant Harold Galliett suggested another way Alaskan natural gas can be "produced" by coal. He said a liquefaction plant for a trans-Alaska natural gas pipeline could be powered by coal instead of the gas from the pipeline, thereby saving the 10 per cent of the gas used to power the liquefaction process.

Other ideas discussed were the igniting of coal in deep seams for "in-place combustion" in producing power, and use of offshore floating coal-fired power generators in areas where land is scarce or greater flexibility is needed in power supplies.

Using coal as a raw material for a petrochemical industry was suggested but Galliett said producing from coal is more expensive than production from natural gas.

Gulf Test Drilling Suspended

(from Alaska Business News Letter, Oct. 10, 1975)

Four major storms in the Gulf of Alaska in the last two and one-half months along with logistical problems prevented the drilling ship Glomar Conception from completing a stratographic test well. The operation, run by Atlantic Richfield and participated in by 25 other oil firms, was plagued by winds to 104 mph and waves reaching over 35 feet in height. Reliable sources reported the test did not reach even the halfway mark of projected depth of nearly 16,000 feet. The Glomar was reported pulling its 12 anchors preparatory to returning to a port—possibly Seward—for the winter.

The Bureau of Mines, Department of Interior says Alaska became the number one producer of sand and gravel in the United States in 1974, surpassing California. Total production for 1974 was 118 million tons. *(BUT, a funny thing happened on the way to the dump. It turns out that in 1975, Anchorage, which was a heavy factor in amassing this tonnage, has taken to importing the stuff from the Matanuska Valley. Seems there is too much of Anchorage's source areas being paved over. Beware, Anchorage, we hear that southern California, before it became a housing development, once had oranges—Ed. note.)*

Antimony in Alaska

by Thomas K. Bundtzen, DGGS geologist

Economic antimony deposits in Alaska usually occur as small, high-grade fissure veins that assay out at 50 percent or better antimony. Stibnite (Sb_2S_3) is the most important antimony-ore mineral. Mining for this strategic metal is almost invariably cyclic as prices rise and fall with demand, particularly in times of war. Price fluctuations also depend on how much of the metal is released annually by the world's major supplier, Red China. Antimony mineralization, usually associated with lode-gold mineralization, is found in Alaska from the southeastern panhandle to the Brooks Range. Most of the production has come from the Interior, a nationally significant antimony province.

Most of the Fairbanks-district production occurred during World War I in several mines, most notably the Scrafford (Treasure Creek), the Fredericks (Vault Creek), the Stibnite lode (Eva Creek), and the Markovich property. Minor producers include the McKarty, Hi Yu, and others near Cleary Hill that produced antimony as a by-product of gold mining. The Scrafford property and others near Murphy Dome are currently under development, and could be significant producers (see p. 10).

The Kantishna district has had four major producers: Stampede, Slate Creek, Slippery Creek, and Last Chance Creek. Stampede, Alaska's largest producer, accounts for 3,800,000 pounds of antimony, won from 3860 tons of high-grade ores and concentrates. Slippery Creek, in Mt. McKinley National Park, was still producing this year. Past production from the Nome district includes the Sliscovich, Hed & Strand, Gray Eagle, and Christopheson properties. Most of the production there occurred during World War I.

Considerable antimony reserves are found in the Kuskokwim region, often associated with mercury deposits. Red Devil, Alaska's largest mercury producer, has abundant stibnite associated with the ore; however, the antimony content was a costly hindrance during the major productive years of the mine, and little (if any) was produced. During 1970-71, both mercury and antimony concentrates from Red Devil were sold to Japan. In the Tolovana district, a large lode on Sawtooth Mountain accounts for almost all the antimony production.

Antimony ore has been shipped out of Wiseman in the Brooks Range and from a large lode on Stibnite Creek, a tributary of the Tok River, in the eastern Alaska Range.

Available production figures are admittedly poor, especially during the last 20 years. Additions or corrections to the above data are welcomed and can be sent to this writer at the DGGS College address.

Our Gangue

By Frank Larson, DGGS Editor

Greetings, sports fans....It's that time of year again.... By now, most of you know who the top football teams are, who's going to which bowl games and so forth, but one burning question remains: Will this be the year the DGGS-UA Geology Dept. basketball team wins another game? Four years ago, the gentlemen with the touch of blacksmiths won two games (one by forfeit and one out of sheer pity). Since then, they have gone winless, and in the process have suffered scorn, obloquy, and just plain rotten, mealy-mouthed incredibly profane abuse (mostly from their wives)...."But all that is in the past," vows Steve 'Stretch' Hackett, DGGS geophysicist, coach, and team center. (He is 5'8".) "We've gone out and done some heavy recruiting for this year. We've got Milt 'Crusher' Wiltse, a weight lifter who formerly stroked crew for Penn." "Ummm. I've seen Milt," I said. "Are you sure he can shoot with his fingers permanently curled in the rower's grip?" "Maybe, maybe not," said Stretch, "but if nothing else, we'll give him a pompon and he can cheerlead. Then, from last year's team of stalwarts we have Wyatt 'Stonehands' Gilbert, famous for his outside shots (0 for 406 from the floor), and Prof. Don 'Flash' Triplehorn, our playmaker, speed merchant, and last year's high scorer. He recently turned 43. Plus," added Hackett, "coming back after playing out his option for the Christchurch (N.Z.) Seminoles last year is our team inspiration, little Tommy Bundtzen." "Bundtzen? Inspiring? He can barely walk and chew gum at the same time." "That's true," said Hackett, "but he always brings the beer." "A good point. With inspiration like that, your chances are certainly improved." Coach Hackett replied, "Yes, this is a 'must' year for us. We've been told to either win a game or join the Pioneer Home league."....Good luck, Stretch..... Reports from the Kotzebue area indicate that diamond drilling has been underway this summer north of Buckland in the Selawik Hills. Claims were staked in this area in 1972 by Pete Sainsbury and H.D. Pilkington on behalf of a major mining company after geologic mapping and radiometric surveys were completed by AirSamplex Corporation for the mining company.....A geological survey of the Nabesna quadrangle has disclosed indicated and inferred reserves of 3.1 million tons of gold ore, 174 million tons of molybdenum ore, 5.4 million oz of gold, and 10.8 million oz of silver.... Sunshine Mining released the first assays on a prospect in the Ambler district of Alaska. Sunshine and Anaconda are jointly financing exploration on the site. Preliminary results showed 1.7% copper from 79 to 89 ft; 1.2 to 13% copper over an intersection of 216 to 231 ft; and 3.1% from 327 to 335 ft....And finally, Stanford Mines is to start work to reopen the Livengood gold mine northwest of Fairbanks. Low-grade reserves are expected to support a 15-year operation.....Well, it's finally inspiration time.....Cheers.

Estimated antimony production from four major districts

District	Ore mined (short tons)	Antimony content (lb)	Productive years
Fairbanks	4249[1]	3,781,000	1915-18, 1927-28, 1970-71[3]
Kantishna	4760[2]	4,804,000	1923, 1970,[3] 1972-75
Nome	315	170,000	1907-18
Tolovana	650	784,000	1943-51,[3] 1970
All others	414[1]	347,000	- - -

[1]Conservative (probably many unpublished data). [2]Does not include Slippery Creek production. [3]Sporadic production.

Metals Market

	October 17, 1975	Two Months Ago	Year Ago
Antimony ore, stu equivalent European ore	$ 18.74-20.39	$ 17.00-18.50	$ 31.3-32.2
Barite (drilling mud grade per ton)	$ 17-21	$ 17-21	$ 17.00-21.00
Beryllium ore stu.	$ 30.00	$ 30.00	$ 30.00
Chrome ore per long ton (Transvaal)	$ 37-52	$ 37-52	$ 47.00
Copper per lb. (MW-prod.)	$ 0.63	$ 0.63	$ 79.98
Gold per oz.	$145.05	$162.82	$159.30
Lead per lb.	$ 0.20	$ 0.20	$ 0.245
Mercury per 76-lb. flask	$128.00	$143.00	$270-277
Molybdenum conc. per lb.	$ 2.62	$ 2.43	$ 2.30
Nickel per lb. (cathode)	$ 2.20	$ 2.01	$ 1.85
Platinum per oz.	$147.20	$169.50	$190.00
Silver, New York, per oz.	$ 4.35	$ 4.87	$ 4.87
Tin per lb.	$ 3.24	$ 3.34	$ 3.877
Titanium ore per ton (Ilmenite)	$ 55.00	$ 55.00	$ 55.00
Tungsten per unit (GSA domestic)	$ 78.26	$ 75.90	$ 99.41
Zinc per lb.	$ 0.39	$ 0.39	$ 39.37

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