Developments in Minerals, Mining, and Energy Resources in Idaho for 1978

A Cooperative Yearly Report
by

Idaho Bureau of Mines and Geology
Idaho Bureau of Minerals
U.S. Bureau of Mines

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Moscow, Idaho 83844
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DEVELOPMENTS IN MINERALS, MINING, AND
ENERGY RESOURCES IN IDAHO FOR 1978

by
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INTRODUCTION

This report summarizes significant developments that occurred during 1978 in the minerals and energy industries in Idaho. The information has been gathered from many sources including field observations and written and oral communications by the staff of the Idaho Bureau of Mines and Geology, the Idaho Bureau of Minerals, and the U. S. Bureau of Mines. Information has also been gathered from the minerals industry, the general public, and the news media. To our knowledge, no privileged information has been solicited or used.

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1 This report is based in part on a paper presented at the Regional Developments Section, Northwest Mining Convention, Spokane, Washington, in December 1978.
2 Idaho Bureau of Mines and Geology, Moscow, Idaho.
4 U. S. Bureau of Mines, Boise, Idaho (USBM office in Boise has since closed).
For 1978, Idaho's mineral production was valued at more than $280 million according to figures released by the U. S. Bureau of Mines (Table 1). This total represents a marked increase over last year, mainly due to the increased price of silver, the greater demand for lead and zinc in the latter half of the year, and the return to full production at both the Sunshine and Bunker Hill Mines in the Coeur d'Alene district (Figure 1).

Silver was the leading metallic mineral commodity in revenue (Table 1). Silver accounted for approximately 35 percent of the total mineral revenue received in Idaho. It was followed in descending order of value by phosphate rock, lead, zinc, sand and gravel, vanadium, and cement. Metallic minerals accounted for 58 percent of the total mineral revenue as compared with 42 percent for nonmetallic minerals.

Higher metal prices (Figure 2) prevailed throughout 1978. Of special importance was the increased value of silver, gold, cobalt, and molybdenum. Copper, lead, and zinc prices also rose in 1978.

The precious-metal markets were strong in 1978. The devaluation of the U. S. dollar inflated the prices for gold and silver. The demand for precious metals is expected to continue and should favorably affect mining in the State, since Idaho alone accounts for approximately 47 percent of domestic silver production.

The military invasion and the subsequent disruption of mining in the Shaba Province of Zaire, one of the world's major cobalt producers, drastically affected cobalt prices in 1978. Prices climbed from $6.40 a pound in January to a record $20.00 a pound at years end. Although
### Table 1

Mineral Production in Idaho\(^1\), 1977-78

<table>
<thead>
<tr>
<th></th>
<th>1977</th>
<th></th>
<th>1978 (^P)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Value, thousand dollars</td>
<td>Quantity</td>
<td>Value, thousand dollars</td>
</tr>
<tr>
<td>Antimony ore and concentrate, antimony content</td>
<td>446</td>
<td>W</td>
<td>4,052</td>
<td>5,413</td>
</tr>
<tr>
<td>Copper (recoverable content of ores, etc.)...</td>
<td>12,894</td>
<td>1,912</td>
<td>19,500</td>
<td>3,757</td>
</tr>
<tr>
<td>Gem stones...</td>
<td>NA</td>
<td>100</td>
<td>NA</td>
<td>W</td>
</tr>
<tr>
<td>Gold (recoverable content of ores, etc.)...</td>
<td>47,258</td>
<td>29,016</td>
<td>47,285</td>
<td>32,154</td>
</tr>
<tr>
<td>Lead (recoverable content of ores, etc.)...</td>
<td>27,750</td>
<td>215,282</td>
<td>8,000</td>
<td>17,000</td>
</tr>
<tr>
<td>Sand and gravel...</td>
<td>15,292</td>
<td>70,649</td>
<td>18,051</td>
<td>97,478</td>
</tr>
<tr>
<td>Silver (recoverable content of ores, etc.)</td>
<td>3,077</td>
<td>8,005</td>
<td>2,920</td>
<td>7,260</td>
</tr>
<tr>
<td>Stone (crushed)...</td>
<td>30,998</td>
<td>21,327</td>
<td>34,990</td>
<td>21,694</td>
</tr>
<tr>
<td>Combined value of barite, cement (masonry and portland), clays, garnet (abrasive), gypsum, lime, perite, phosphate rock, pumice, sand and gravel (industrial, 1977), dimension stone, tungsten ore, vanadium, and items indicated by symbol W...</td>
<td>XX</td>
<td>100,966</td>
<td>XX</td>
<td>95,628</td>
</tr>
<tr>
<td>Total...</td>
<td>XX</td>
<td>252,670</td>
<td>XX</td>
<td>280,375</td>
</tr>
</tbody>
</table>

\(^1\)Preliminary. NA Not available. XX Not applicable.

\(^P\)Withheld to avoid disclosing individual company confidential data; value indicated in "Combined value" figure.

\(^1\)Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

\(^2\)Excludes industrial sand; value included in "Combined value" figure.
Figure 1. Mineral Production in Idaho, 1967-1978.
Figure 2. Average Monthly Prices of Metals in Idaho for 1978
(Source: Engineering and Mining Journal, 1978
monthly issues).
Figure 2. Continued
the invasion of the Shaba Province did not result in a great loss of production, it did point out the vulnerability of the cobalt supply to such disruption. The present high price of cobalt has renewed the interest in mining and exploration near the Blackbird Mine in Lemhi County.

The higher price of molybdenum in 1978 generated more interest in exploration in Idaho. A continued strong price for molybdenum will greatly enhance Idaho's chances of becoming a major producer in this commodity.

Lead and zinc prices strengthened in the latter half of 1978; however, the future of lead and zinc appears uncertain. They are both mature commodities, and consumption has leveled off in recent years. The use of these metals in many traditional markets has been replaced by various substitutes. Furthermore, environmental restrictions and unchanging moderate prices are still arresting full production.

Copper showed moderate price gains in 1978. Although copper consumption has been increasing, large stockpiles have prevented higher prices. The price gain is expected to continue, resulting in a more favorable copper market.

Although governmental regulations are having a negative effect on the mining industry, increased metal prices and strengthening markets should be a positive one throughout 1979.
MINERAL OPERATIONS

METALLIC MINERALS

Coeur d'Alene Mining District

In 1978 the production of metallic minerals in the Coeur d'Alene district had a net value of $153,390,000. Production included 16,670,000 ounces of silver, 50,933 tons of lead, 37,751 tons of zinc, 3,059 ounces of gold, and 3,842 tons of copper. The Lucky Friday, Galena, Coeur, and Sunshine Mines all exceeded a million dollars in earnings during 1978, and the Bunker Hill Company had the most ore production. The district is the nation's major producer of silver and has a total metal production value of $3,251,827,000 since its beginning in 1884.

It appeared in midyear that a pending agreement between Hecla Mining Company and Superior Oil Company would solve Hecla's problems with its Lakeshore, Arizona, copper property. Unfortunately, the negotiations were not successful. Hecla later abandoned the mine for a $96,000,000 loss, when attempts to find a buyer failed. The Lucky Friday and Star-Morning Mines continued to be a bright spot for Hecla this year, although production at the Lucky Friday Mine (the third largest silver producer in the U. S.) was briefly interrupted by a strike in March. At the Star Mine ore production started on the 7,900-foot level, the deepest in the Coeur d'Alene district.

The financial status of the Sunshine Mine (the largest silver producer in the U. S.) improved significantly this year. The company's earnings tripled in the first three quarters of 1978, over the same
period in 1977, and it is expected that 1978 production will exceed both the 1976 and 1977 total. Production during 1976-77 was affected by a year long strike.

A somewhat confusing corporate battle started at year-end for control of the Sunshine Company between directors of the mine and Hunt International Resource Corporation (HIRCO). The contest is especially confusing because N. B. Hunt and W. H. Hunt of Dallas, Texas, are major stockholders in the Sunshine Mine. The suit filed by Sunshine's directors alleges that HIRCO has failed to live up to an agreement to purchase Sunshine stock at a set price. In other developments, Sunshine renewed its exploration agreement with Conjecture Mines and Lakeview Consolidated for a project south of Pend Oreille Lake and started drilling a 2,000-foot hole on the Inspiration Lead property northwest of Wallace.

The biggest civil trial in Idaho's history was conducted during the year. The trial decided a $660,000,000 lawsuit against five chemical firms by families of miners who perished in a disastrous fire at the Sunshine Mine in 1972. The suit involved the underground use of polyurethane foam, which supposedly contributed to the mine fire. The suit was dismissed in the federal courts. A $6,000,000 out-of-court settlement was reached early in the year.

The Bunker Hill Company celebrated the 50th anniversary of opening its electrolytic zinc plant at Kellogg. The company has constructed a new electrolytic silver refinery, which is expected to be in full production soon. Studies have shown that the new emission stacks at the Bunker Hill smelter are improving the air quality in the Silver Valley, although there are still some problems meeting EPA standards. New EPA
lead standards announced in December may require extensive changes in lead smelting operations.

Bunker Hill's revegetation project in the "Silver Valley" continued during the year. The project is aided by the College of Forestry, Wildlife, and Range Science at the University of Idaho. Plans call for the annual planting of 400,000 trees and shrubs. The Bunker Hill "underground greenhouse" has a capacity of producing over 100,000 seedlings a year, and this may be expanded to an annual capacity of 350,000 seedlings.

Big Creek Apex, Silver Dollar, Sunshine Consolidated, and Silver Syndicate continued to do well during the year. All four companies control claims in the Sunshine unit area that is operated by the Sunshine Mining Company.

Bueno Coeur d'Alene, Inc., started diamond drilling on the Allied Silver-Lead property near Mullen. The target is a possible extension of the Lucky Friday vein system. Royal Apex Silver, Inc., continued diamond drilling and development work on its property on Two-Mile Creek, north of Osborn.

Silver Crystal Mines resumed production (curtailed in 1977) from the Bear Top Mine east of Murray. The ore is being hauled to the Nabob concentrator mill near Pinehurst. Mining was renewed at the Little Pittsburgh and Nabob Mines near the concentrator. Silver Baron continued efforts on the Silver Scott property near Murray, and some ore was stockpiled.

A study by the U. S. Geological Survey notes that a buried pluton may exist beneath the Atlas Mining Company property east of Mullen.
This possibility is based on geochemical and geophysical data. The Atlas pluton may be related to ore mineralization at depth.

Coeur d'Alene Mines', Coeur Mine (the fourth largest silver producer in the U.S.), operated by Asarco, should exceed 1977's production of 2,381,000 ounces of silver. The company, in a joint program with Merger Mining Company and Plainview Mining Company, intends to explore the 36 claims known as the CAMP area, west of the Coeur Mine.

It was reported that ore containing as much as 400 ounces of silver per ton was being mined from Day Mines' Hunter Ranch property, through the Lucky Friday Mine. Other properties in this area are owned by Independence Lead, Abbott, Vindicator, and Allied Silver. Day Mines closed the Tamarack Mine because of low zinc prices (some ore was stockpiled early in the year from the Phoenix and Nylus veins). Callahan's Galena Mine, the country's second largest silver mine, continued to be a good producer during the year.

Other Districts

The state's newest mining venture, Earth Resource's DeLamar Silver Mine, was in full production during 1978. Current mill production is 1,700 tons of ore per day (600,000 tons per year). The mine will produce 1.5 to 2 million ounces of silver and approximately 16,000 ounces of gold annually. Earth Resources terminated its operating agreement with Niagra Mining Company on Niagra's property in the Eagle Creek district in Shoshone County.

A substantial increase in the price of cobalt renewed interest in the Blackbird Mine area near Cobalt in Lemhi County. Noranda is studying
the feasibility of reopening the Blackbird Mine, which is owned by Hannah Mining Company. Several other companies are also looking for similar copper-cobalt deposits throughout the area.

Canadian Superior started a pilot plant to recover gold from a cyanide-heap-leach operation near Stibnite. Reportedly, a gold-silver bar weighing 60 ounces has been produced from this pilot plant. Canadian Superior has also acquired the Sunnyside Mine near the Stibnite property in Valley County.

Ronald Willden of Permian Exploration in Salt Lake City, Utah, announced that a large ore body, possibly of one billion tons, may be located near the old Bluejacket Mine within the boundaries of the Hells Canyon National Recreation Area. This announcement started a heated exchange among environmentalists, mining people, and the U. S. Forest Service.

N. L. Industries was reportedly working on a barite locality west of Clarendon Hot Springs, south of Hailey. The company reverted the Bayhorse fluorspar project near Challis back to Bayhorse Minerals, Inc.

Numerous companies including Homestake, Asarco, Amex, Texas Gulf, and Houston Oil and Minerals are actively exploring an area north and west of Cambridge in western Idaho in the Seven Devils Volcanics and related rocks. Union Carbide continued work on the Chilco Mountain property near Pend Oreille Lake.

Clayton Silver has reportedly opened up new ore reserves on the 1100-foot level of its mine near Clayton. This should greatly expand the life of this long-time Idaho silver producer.
Exploration and development by Bear Creek Mining Company continued in the Triumph Mine in Blaine County. Operations continued at the New Hope Mine near Ketchum, owned by Sun Valley Lead-Silver Mine, Inc.

The Jack Waite Mine on the North Fork of the Coeur d'Alene River may be developed in 1979. Tailing ponds on federal land in the vicinity of this mine have concerned local citizens who fear pollution of Eagle and Prichard Creeks from old tailings.

Cyprus Mining has been conducting feasibility tests of its molybdenum property on Thompson Creek in Custer County. The current high price of molybdenum should be encouraging to this operation. Cominco is continuing work on the Napoleon Hill molybdenum property near Leesburg in Lemhi County. Abella Mining Company of Vancouver, British Columbia, Canada, is drilling and evaluating a molybdenum-bearing zone (Little Falls prospect) on the South Fork of the Payette River. Amax continued a drilling program on its molybdenum property (Cumo prospect) near Grimes Pass, north of Idaho City.

Dredge mining for gold continued to be popular throughout the state. Several small suction dredges were in operation in the streams around Elk City and other old gold camps in Idaho.

A gold-garnet dredging operation on Sherlock Creek, a tributary to the St. Joe River, was stopped by the Idaho Department of Lands and the State Board of Land Commissioners after sampling by U. S. Forest Service personnel showed that substantial erosion and stream pollution had occurred. The operation has been controversial for the past several years. Similar operations will not be allowed in the future on the Upper St. Joe and its tributaries, as the St. Joe is now part of the Wild and Scenic River System.
Three men from Lucile, Idaho, applied for federal permits to operate a suction dredge on the Salmon River near Slate Creek. They have already obtained state permits for this operation.

The high price of uranium oxide stimulated exploration several years ago. This year's price of $44 per pound, $U_2O_5$, supported this interest. Several companies including Minatome Corporation, St. Joe American, Conoco, Pathfinder Mines Corporation, Rocky Mountain Energy Company, and Urania Exploration Company were actively exploring in areas east and west of Priest Lake in northern Idaho. Excell Minerals started drilling in the Bear Valley blacksand placers in Valley County. Noranda is continuing to work in the Basin Creek uranium area near Stanley. Several companies are exploring for uranium in the black shales of the Phi Kappa Formation east of Sun Valley. Washington Public Power Supply System is exploring for uranium on claims northwest of Idaho Falls and near Cobalt and Ellis. Exploration was reported in the Blue Dome district, near the mouth of Long Canyon in Lemhi County.

Bendix Corporation, the primary contractor for the U. S. Department of Energy's National Uranium Resource Evaluation Program (NURE), and several subcontractors were very active in Idaho this year. Work included reconnaissance mapping and sampling and airborne geophysical studies. The NURE program is a multibillion dollar national project that will provide a great quantity of earth science data. Drilling commenced in the Lemhi Pass thorium deposits, under a joint contract between the U. S. Geological Survey and the U. S. Department of Energy for the Thorium Resource Assessment Project.
Phosphate

Phosphate production in southeastern Idaho continued at the same pace as in 1977. Secretary of the Interior, Cecil Andrus, has approved plans for two new phosphate mining operations, the South Mabey Canyon Mine (Beker Industries) and the North Trail Canyon Mine (J. R. Simplot & Company).

Beker Industries and Western Cooperative Fertilizer, Ltd., from Calgary, Alberta, Canada, are involved in a joint phosphate mining operation in southeastern Idaho. The new program is expected to have an annual production of 3,000,000 tons of phosphate rock. Earth Sciences, Inc., of Golden, Colorado, is constructing a plant to extract uranium oxide from Western Cooperative's phosphoric acid plant in Calgary, British Columbia, Canada. The extractive process may be applicable to southeastern Idaho operations as well.

Dust collection equipment installed at FMC Corporation's elemental phosphorus plant in Pocatello has completely eliminated the "visible stack plume." Two collectors are already in place. Two more will be added in 1979.

J. R. Simplot & Company is reclaiming the clay pits from its inactive operation near Bovill. Plans call for some grading and revegetation of these old workings.

Other Industrial Rocks and Minerals

Two placer operations for garnet on Emerald Creek (Emerald Creek Garnet Co.) and Carpenter Creek (Idaho Garnet Abrasive Co.) continued
throughout the year. Garnet is used primarily as an abrasive, although it is also a premium commodity as a filtering material in sewage treatment (approximately 1/3 of the market). These two operations mine four months of the year and mill all year long.

Some production and development work for barium was reported from the open pit mine west of Clarendon Hot Springs, north of Hailey.

Idaho Portland Cement Company of Inkom reports having an excellent year. Increased sales and a record demand characterized the cement industry in 1978. Critical cement shortages have developed west of the Mississippi River and are expected to continue.

**OIL AND GAS OPERATIONS**

**OIL AND GAS EXPLORATION**

Records were set for drilling activity and footage completed during the year. Interest continues to focus on the Overthrust Belt that extends through eastern Idaho. While drilling has been more extensive in the Utah and Wyoming parts of this region where significant discoveries have occurred, Idaho has received an important share of the exploration effort. A commercial discovery has yet to be found. Without question, the future will record continuing increases in exploration drilling--and a likely discovery--as priorities and venture capital are directed to Idaho.

In January 1978, a moratorium was imposed upon the continued acceptance and processing of oil and gas leases until the leasing program
was brought under contemporary formal rules and regulations. The program will be reopened in 1979, following rule adoption. Before this time oil and gas leasing was administered by "statute." Two major problems pending prior to the moratorium were addressed during the year--the leasing arrangements for oil and gas drilling on Bear Lake and the question of State mineral rights on contract land sales forfeited and reinstated after the date of State mineral reservation in May 1923.

In mid-1976 Hunt Oil Corporation purchased the lease application rights for Bear Lake, a body of navigable water lying half in Idaho and half in Utah. While Utah denied a similar lease issuance in 1976, no action was taken by Idaho. Aggressive pursuit of leases by Hunt resulted in a conditional approval by the Idaho State Board of Land Commissioners in January 1978. However, the failure of local governmental units to take a position for or against leasing, coupled with considerable new debate, led the Land Board to offer the lakebed for competitive lease by auction sale. Before the sale, Hunt filed suit contending that it held prior rights. The matter was resolved in June with an out-of-court settlement of the leasing arrangement of $6.00 per acre for the first year rental and $1.00 thereafter, as compared with the initial filing of $.50 per acre; 34,783 acres are involved. Utah's portion of Bear Lake remained unleased during the year. Common stipulations included in the leases were jointly developed by both states: any drilling which may ensue is limited to directional techniques, and the surface operation can be no closer than 500 feet to the shoreline.

Nine permits to drill were issued during 1978. Eight wildcat wells were completed to total depth under permits issued in 1977-78. Location and data on completed wells is stated in Table 2.
<table>
<thead>
<tr>
<th>Operator</th>
<th>Well Name</th>
<th>API No.</th>
<th>Location</th>
<th>County</th>
<th>Depth (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May Petroleum &amp; Snyder-Tucker</td>
<td>Federal No. 1-8</td>
<td>11,029-20,004</td>
<td>8-10S-46E</td>
<td>Caribou</td>
<td>16,750</td>
</tr>
<tr>
<td>American Quasar</td>
<td>Jensen 22-1</td>
<td>11,007-20,005</td>
<td>22-13S-44E</td>
<td>Bear Lake</td>
<td>11,780</td>
</tr>
<tr>
<td>American Quasar</td>
<td>Cook 26-1</td>
<td>11,081-20,002</td>
<td>26-5S-44E</td>
<td>Teton</td>
<td>6,565</td>
</tr>
<tr>
<td>American Quasar</td>
<td>King 2-1</td>
<td>11,011-20,001</td>
<td>2-2S-41E</td>
<td>Bingham</td>
<td>13,555</td>
</tr>
<tr>
<td>American Quasar</td>
<td>Grace Federal 10-1</td>
<td>11,007-20,006</td>
<td>10-16S-46E</td>
<td>Bear Lake</td>
<td>11,860</td>
</tr>
<tr>
<td>Sun Production</td>
<td>1-34 IGC</td>
<td>11,081-20,003</td>
<td>34-5S-44E</td>
<td>Teton</td>
<td>3,715</td>
</tr>
<tr>
<td>Nu-Day Exploration</td>
<td>Bannock 1A8</td>
<td>11,005-20,003</td>
<td>8-12S-38E</td>
<td>Bannock</td>
<td>1,859</td>
</tr>
<tr>
<td>Continental Oil</td>
<td>Gentile Valley No. 1</td>
<td>11,019-20,002</td>
<td>9-4S-42E</td>
<td>Bonneville</td>
<td>9,913</td>
</tr>
</tbody>
</table>

1. Location coded as Section-Township-Range.
May Petroleum's Federal 1-8 test at 16,750 feet was the deepest ever drilled in Idaho. Actual drilling operations exceeded ten months. An investment record per single well drilled was also set, with expenses incurred believed to be near $7,000,000. Gas was found near 11,000 feet with an initial flow of 240,000 cubic feet per day. However, the flow ceased and the zone was abandoned as an isolated trap. Following an evaluation of other geologic formations of interest, the well was plugged and abandoned.

With few exceptions, all other wells drilled were also eventually plugged and abandoned. The Cook 26-1 venture in Teton County bottomed in granite, compared with a well drilled two miles to the southwest which remained in a sedimentary structure at the 12,720-foot mark. Temperatures above that anticipated were found in several wells.

The Union Texas Petroleum Big Canyon Federal 1-13 test in Sec. 13, T. 10 S., R. 43 E., was past the 6,000-foot mark with a target depth of 13,000 feet, and it was the only venture still engaged in primary drilling at the end of the year.

Without question, interest in the untapped potential of the Rocky Mountain region has been encouraged by potent discoveries, rising prices, and the real prospect of energy demand exceeding supply. Idaho's participation and contribution in this program will increase with each passing year.

The regulatory agency for oil and gas exploration and production is the Idaho Oil and Gas Conservation Commission. A historical summary of known oil and gas drilling in the state is shown in Table 3. Average annual footage during the past three years has increased more than 330 percent over that recorded in the first thirteen years of the commission's
Table 3

Historical Summary of Oil and Gas Drilling in Idaho

<table>
<thead>
<tr>
<th>Area</th>
<th>Pre-1963</th>
<th>1963-1975 (13 Year Period)</th>
<th>1976-1978 (3 Year Period)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well</td>
<td>Footage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Idaho</td>
<td>21</td>
<td>5</td>
<td>12(3)</td>
<td>38(3)</td>
</tr>
<tr>
<td></td>
<td>81,849*</td>
<td>32,466</td>
<td>95,860(7,000)</td>
<td>210,175(7,000)</td>
</tr>
<tr>
<td>Southwest Idaho</td>
<td>36</td>
<td>5</td>
<td>1(1)</td>
<td>42(1)</td>
</tr>
<tr>
<td></td>
<td>69,921</td>
<td>41,231</td>
<td>14,006</td>
<td>125,158</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>14,308</td>
<td>25,761</td>
<td>40,069</td>
<td></td>
</tr>
<tr>
<td>Wells Drilled</td>
<td>65</td>
<td></td>
<td>13(4)</td>
<td>93(4)</td>
</tr>
<tr>
<td>Footage Drilled</td>
<td>166,078</td>
<td>99,458</td>
<td>109,866(7,000)</td>
<td>375,402(7,000)</td>
</tr>
<tr>
<td>Average Depth</td>
<td>2,555</td>
<td>6,631</td>
<td>8,451</td>
<td>4,036</td>
</tr>
</tbody>
</table>

() Data on wells in various stages of development.
* Represents total footage figure for the number immediately above in each case.
existence. Lithologic, electric, and hydrocarbon logs, geologists' reports, drill stem tests, and other records filed with the commission are maintained for public access and review. A one-year confidentiality period following the well completion is observed on most records.

GEOTHERMAL RESOURCES

Several Idaho cities have expressed interest this year in using geothermal resources. With federal funds Boise will attempt to extend the Warm Springs geothermal resource to heat state office buildings. The city of St. Anthony is investigating the possibility of heating the city with hot water.

Research is continuing at the Raft River experimental geothermal site in southern Idaho. EG&G and the Idaho National Engineering Laboratory will soon start construction of a 5-megawatt-generating plant. Presently, a pilot 60-kilowatt generator is providing some electricity for the town of Malta. Four wells (deepest 6,000 feet) will provide hot water for the plant. This project is of great interest, as it will use relatively low temperature (150°C) hot water, not steam, for electrical generation.

The Raft River project has successfully utilized geothermal water in cultivating catfish, Tilapia (a tropical fish), and tropical shrimp. All three are a potential food source. A prototype of a fluidized bed dryer was tested to dry potato wastes, which can be used for fish and animal feed.
Some environmental problems occurred at the Raft River geothermal site when 167 tons of salt that was being used to control a flowing well, so that drill tools could be recovered, disappeared into the aquifer and was only partially recovered. Different techniques will be used in the future, as salt could contaminate domestic and agricultural water systems throughout the area.

Ore-Ida Foods, Inc., signed an agreement with the U. S. Department of Energy to investigate the use of geothermal energy in its plant in Ontario, Oregon (just west of the Idaho-Oregon state line). A similar program is scheduled by Roger's Foods in Rexburg for 1979.

Geologic field work was completed this year for the Snake River Plain geothermal program jointly conducted by the U. S. Geological Survey and the Idaho Department of Water Resources.

Modifications to the rules governing geothermal resource activity on state-owned lands were adopted, enabling the reopening of state lands to leasing in November. Applications for previously unleased land, plus the award of leases offered in the first simultaneous filing held on state mineral lands, added over 305,000 acres of issued or in-process leases to the 58,804 acres previously leased.

Over 670 new leases will be added to the 160 existing leases prior to reopening. Leasing is concentrated in these counties: Washington, Elmore-Owyhee, Lincoln-Gooding, Cassia, Fremont, Fremont-Madison, Bonneville-Bingham-Caribou, and Franklin. State acreage under lease or pending exceeds the reported federal acreage leased at year end. The modified rules provide for a simplified application and lease acquisition procedure, and the concurrent establishment of standards concerning lease privileges and responsibilities.
NEW MINING LEGISLATION AND REGULATIONS

Legislative actions at both the state and federal level continued to be of grave concern to the minerals industry during 1978. Major revisions were proposed for the Mining Law of 1872. Another issue affected millions of acres of federal land, as RARE II areas, that would be subject to possible mineral entry exclusion if declared wilderness.

Owners of mining claims that were located on most federal lands in Idaho before October 21, 1976, must refile these claims with the U. S. Bureau of Land Management by October 22, 1979 (as required by the Federal Land Policy and Management Act of 1976--BLM "Organic Act"). Failure to do so will constitute abandonment of the claims. During the past two years 8,400 claims have been filed in the BLM office in Boise; however, more than 80,000 claims are expected to be refiled before the deadline.

RARE II, the Roadless Area Review and Evaluation program conducted by the U. S. Forest Service, was the major issue during the year. Approximately eight million acres in Idaho are affected by this program. Many of these areas have a high mineral potential. Public comments on RARE II were collected during the summer and have been evaluated. Some 54,500 Idaho citizens responded. Whether these areas are to become wilderness, are to be held for more study, or are to be returned to multiple use will be decided by the end of January 1979.

In a related issue, President Carter asked Congress to designate 1.9 million acres in central Idaho as The River of No Return Wilderness. This area will include the areas formally known as the Idaho Primitive
Area and the Salmon River Breaks Primitive Area, and an additional 400,000 acres. President Carter and family observed part of this vast area on a float trip down the Middle Fork of the Salmon River in August.

Several bills were introduced in Congress that would replace and fundamentally change the Mining Law of 1872. Three bills in the House included the Administration's bill (HR-9292) that would put most mining under a lease system, the Ruppe Bill (HR-5831) that was designed in accord with recommendations made by the American Mining Congress, and the AMC Mining Law Bill (HR-5931). No final action was taken on these bills. It is expected that similar proposals from the Administration and other bills will be proposed early in 1979. The mining industry's concern about these law changes resulted in the formation of an organization in north Idaho known as Citizens for Sound Mining Law. This group has stimulated the formation of similar organizations in other western states.

The planning team for the Hells Canyon National Recreation Area developed five different alternatives for managing the 100 square miles of recreation area designated by Congress in 1975. Public input will be gathered early next year on these five alternatives.

A new federal Mine, Safety and Health Act was implemented early in the year. This act is administered by the Mine Safety and Health Administration (MSHA) of the U. S. Department of Labor. The Department of Labor announced that workers and former workers at the Tamarack Mine (Day Mines) are eligible to apply for worker adjustment assistance (under the Trade Act of 1974 regarding imports of metals affecting the economics of producing mines).
A bill declaring the upper 66-1/2 miles of the St. Joe River and its tributaries, east of Avery, as a "Wild and Scenic River" or "Recreation Area" was passed by Congress in October. Just how this will affect hard rock mining near the tributaries of the upper St. Joe River is not clear at the present time. Placer and dredge mining will not be allowed within the classified river area.

Hearings were held on a complaint filed by the U. S. Forest Service that challenged the validity of claims on the Fisher and Swanson mining properties, located west of the East Fork of the Salmon River. Hearings were originally scheduled to be held in Challis but were changed to Boise at the request of the U. S. Forest Service, which cited as its reason, "strong antigovernment feelings" and "threats of physical violence by deadly means." The hearings were delayed indefinitely because of inadequate funds to hold an administrative court.

A major concern within state government was lieu land selection. The state at the beginning of the year selected 14,000 acres of federal land in west-central Idaho and 10,000 acres in the Hoodoo Mountain and Grandmother Mountain areas in northern Idaho. This land is "in lieu" of school sections acquired by the federal government when the National Forest System was created. However, because of recent federal decisions in a court case on lieu lands in Utah, the Idaho Land Board has decided to obtain more valuable land and at a later date will probably file for the Hoodoo unit, an area near McCall, and other lands.

Early in the year, the Idaho legislature dropped the funding for the State Mine Inspectors Program, in spite of the efforts of miners to get the funding reinstated. The staff was cut from six inspectors to two. The overlapping of state and federal programs was cited for the cutbacks.
Other actions by the 1978 Idaho legislature that affect mining included HB-628, a bill that gives jurisdiction over placer mine tailings and impoundments to the Idaho Department of Water Resources, and SJM-111, a senate memorial which asks congress to forego the creation of any new wilderness areas in Idaho without the approval of the governor and the state legislature.

In November 1978 most of the state senators and representatives went underground on mine tours as guests of several companies in the Coeur d'Alene district. The trips were conducted during the north Idaho Chamber of Commerce legislative tour that is held after each election. The purpose of the tour was to introduce many of the legislators from "down south" to north Idaho. The underground trips were most informative and were the highlight of the tour for many of the lawmakers.

OTHER DEVELOPMENTS

The College of Mines and Earth Resources at the University of Idaho was recently designated as a Mining and Mineral Resources Research Institute by the U. S. Department of Interior's Office of Surface Mining. The Institute, under the direction of Roy Williams will receive $270,000 per year to fund research and education in mining and minerals.

The Stockbridge photographic collection, housed at the University of Idaho Library, has been converted from highly flammable nitrocellulose negatives to modern safety film. The collection records seventy years of history in the Coeur d'Alene mining district and contains many fascinating prints of the old mining days.
A new fossil site was discovered between the east and west forks of Emerald Creek in Shoshone County. The occurrence is similar to the locality near Clarkia that is known for the remarkable preservation of plants, fish, and insect fossils of Miocene age.

Geologists from the U. S. Geological Survey were active on numerous projects throughout the state. Of note, is the start of the Selway-Bitterroot Wilderness Evaluation Program under the direction of William Greenwood. This will be one of the most extensive and thorough wilderness studies that have been conducted by the USGS.

The state adopted a new water plan to be administered by the Idaho Department of Water Resources. The Department received a $1,000,000 grant to develop the water resources within the state.

Controversy between environmentalists and private developers and the U. S. Bureau of Land Management continued throughout the year on the proposed route of the Northern Tier Pipeline that will carry oil from Port Angeles, Washington, 1,600 miles through north Idaho, Montana, and North Dakota to Minnesota. Several proposed routes are under consideration for the line in northern Idaho, if and when it is ever built.

In November, Boise Cascade Corporation conducted tours through its experimental solar homes. These are the first factory-manufactured homes with solar systems. The house uses a "passive" solar system installed in the walls.