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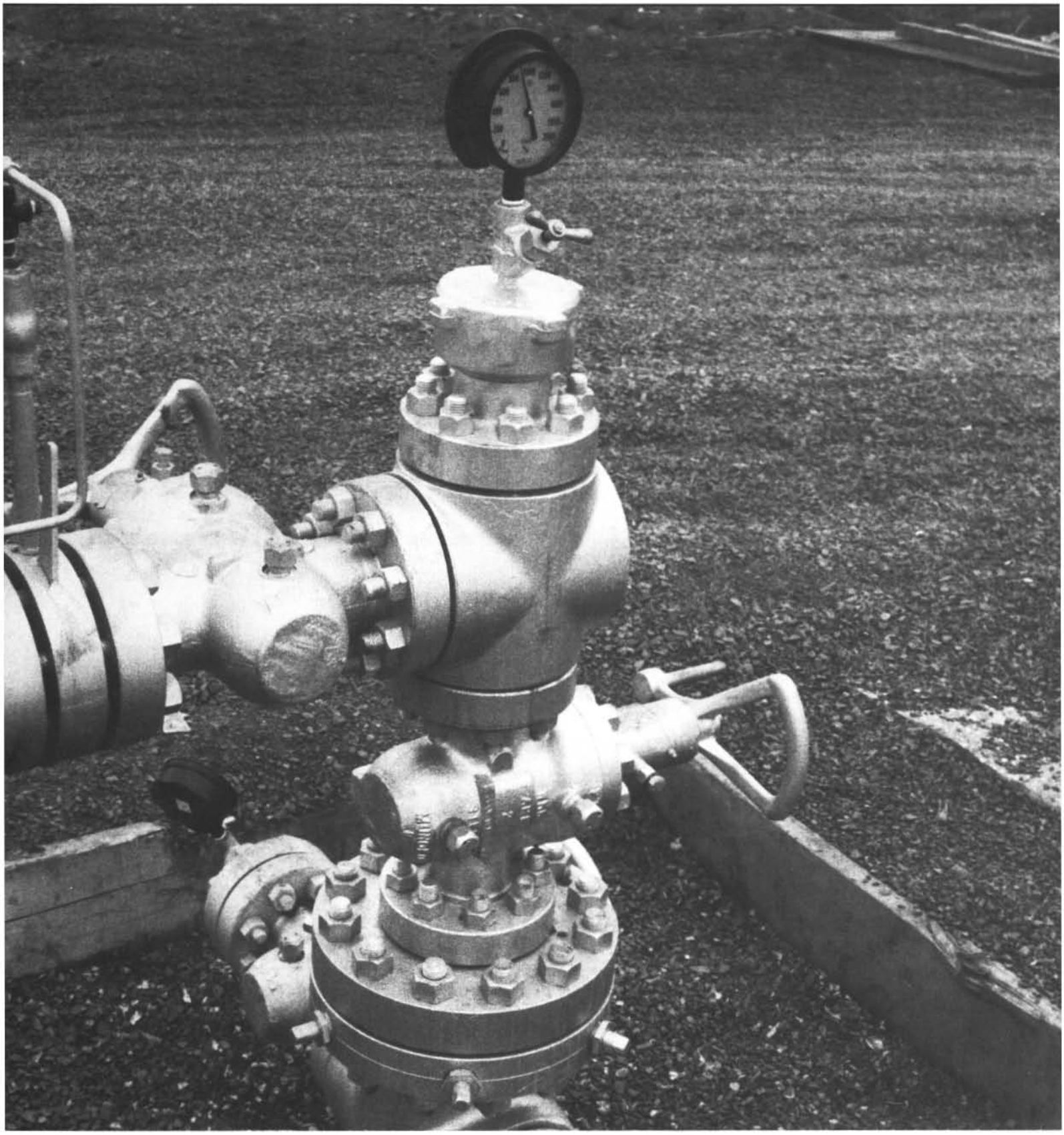

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COVER PHOTO

Reichhold Energy Corporation's Columbia County 1, discovery well of the Mist Gas Field. In 1979, Oregon joined the ranks of producing states with this discovery and four other producers in the field. In late December, this well produced 300,000 cu ft per day through a new pipeline to existing lines in Clatskanie, approximately 8 mi to the north.

GSA geologic field trip guide released

A guide for geologic field trips in western Oregon has just been released by the Oregon Department of Geology and Mineral Industries (DOGAMI). Bulletin 101, entitled *Geologic Field Trips in Western Oregon and Southwestern Washington*, was prepared by the Geology Department of Oregon State University in cooperation with DOGAMI for the annual meeting of the Cordilleran Section of the Geological Society of America to be held in Corvallis, Oregon, in March 1980.

Gathered from 23 contributors, the 232-page bulletin describes the geology of eight field trips in selected areas of the Oregon Coast Range, the Klamath Mountains, the Oregon Cascades, and parts of southwestern Washington. A ninth field trip deals with beach processes and erosion problems of the Oregon coast. Each trip guide consists of an introductory discussion, a bibliography, and a trip itinerary.

Copies of Bulletin 101 are available for purchase at DOGAMI's Portland, Baker, and Grants Pass offices; price is $9.00 per copy. Mailed orders should be addressed to the Oregon Department of Geology and Mineral Industries at one of the following addresses: 1069 State Office Building, Portland, OR 97201; 2033 First Street, Baker, OR 97814; or P.O. Box 417, Grants Pass, OR 97526. Orders under $20.00 must be prepaid. □

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Mineral industry in Oregon, 1979

by Jerry J. Gray, Economic Geologist, Albany Field Office; Howard C. Brooks, Resident Geologist, Baker Field Office; Norman V. Peterson, District Geologist, and Len Ramp, Resident Geologist, Grants Pass Field Office, Oregon Department of Geology and Mineral Industries

ABSTRACT

According to U.S. Bureau of Mines figures, the 1979 value of mineral output in Oregon rose 16 percent over that of 1978. Preliminary estimates indicate that production value rose $20.4 million, from $128.8 million in 1978 to $149.2 million in 1979. Rock materials (clay, pumice, sand and gravel, and stone) continued to account for the major portion of the 1979 total production value—64 percent, compared to 67 percent in 1978. The other two principal commodities were cement and nickel.

Mining exploration and development in Oregon focused on base metals, gold, silver, nickel, uranium, limestone, bentonite clay, block soapstone, and diatomite. The price rise of gold and silver brought increased exploration and mine development activity for these precious metals. In a number of cases, abandoned mines that had been productive in the past were rehabilitated. Old workings were extended, and new ones started. A major placer gold mine was brought into production in Malheur County.

Exploration for minerals in 1979 led to more uranium finds in southeastern Oregon. Major exploration efforts began and are continuing for gold, silver, volcanogenic sulfides, and nickel laterite.

Oregon's mineral production values for 1978 and 1979 are summarized in Table 1. This table does not include an additional estimated $600 million from the production of aluminum, carbide, nickel, steel, titanium, and zirconium from metallurgical plants employing approximately 10,500 people.

METALS

Mining and exploration for base metals, gold, silver, nickel, and uranium were conducted by major firms. Between January 1 and December 31, 1979, the price of gold rose from $223 to $512 per oz and that of silver from $6 to $28 per oz, overshadowing price rises in most other metals. Oregon's output of precious metals increased with the startup of two large placer operations, the influx of recreational miners using small portable dredges, and the installation of gold-saving equipment at private sand and gravel plants and at the aggregate source for the U.S. Army Corps of Engineers Applegate Dam project (point 2, Figures 1* and 2). By the end of the year, $285,000 worth of gold had been recovered from the Applegate gravel. Because much of the gold mined in Oregon comes from small placer

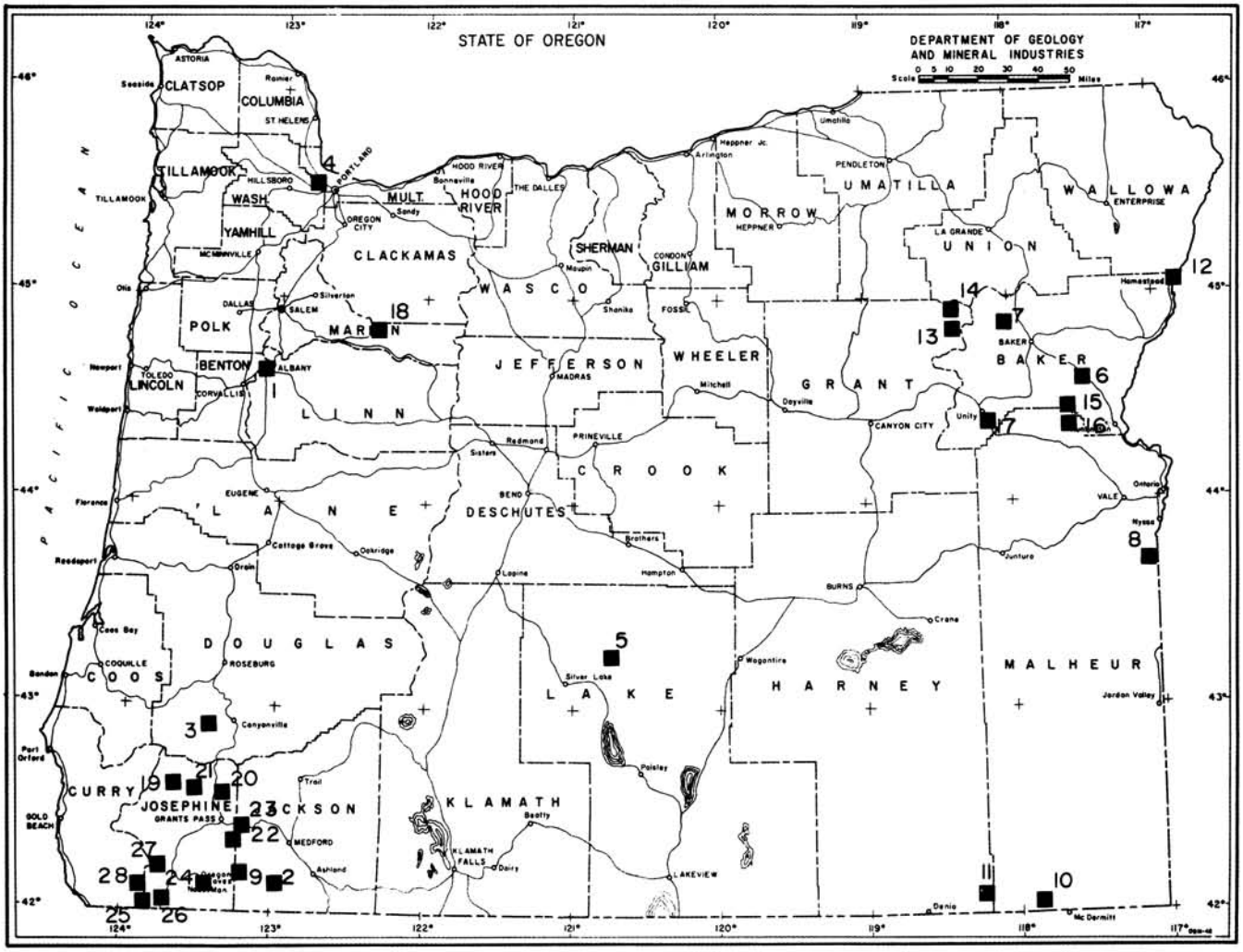
* All point numbers refer to locations shown on the map in Figure 1.

Table 1. *Oregon's mineral production values for 1978 and 1979*

Mineral commodity	1978 Value (thousands)	1978 Percent	1979* Value (thousands)	1979* Percent
Sand and gravel	$ 44,510	34	$ 51,000	34
Cement, copper, diatomite, lime, nickel, talc, and tungsten	41,872	32	52,275	35
Stone	39,510	31	41,763	28
Pumice	2,016	2	2,172	1
Gold	66	—	1,155	0.8
Gemstones	600	0.5	500	0.3
Clays	261	0.2	292	0.2
Silver	9	—	17	—
Total	$128,844	99.7**	$149,174	99.3**

* Preliminary data provided by U.S. Bureau of Mines.

** Percentages do not total 100 because of individual rounding.



LEGEND

1. Albany (Ti, Ni)
2. Applegate Dam (Au)
3. Nickel Mountain-Silver Peak (Ni-Cu, Zn, Ag)
4. Portland (stone)
5. Christmas Valley (diatomite)
6. Durkee (cement)
7. Blue Mountain Lime (limestone)
8. Adrian (bentonite)
9. Steatite of Oregon (soapstone)
10. McDermitt (U)
11. Trout Creek (U)
12. Iron Dyke (Cu, Au)
13. Cougar-New York (Au, Ag)
14. Buffalo Mine (Au, Ag)
15. Mormon Basin (Au)
16. Basin Creek (Au)
17. Unity (Cu)
18. Santiam mining district (Cu)
19. Almeda Mine (Ag, Cu)
20. Greenback Mine (Au, Ag)
21. Benton Mine (Au)
22. Dixie Queen Mine (Au)
23. Lyman Mine (Au, W)
24. Boswell Mine (Au)
25. Turner-Albright Mine (Cu)
26. Queen of Bronze Mine (Cu, Au)
27. Eight Dollar Mountain (Ni)
28. Rough and Ready Ridge (Ni)

Figure 1. Mineral industry activity, exploration, and development in Oregon in 1979. Point numbers in text refer to location numbers shown on this map.

mines that do not report their production, it is likely that the State's formal production statistics will never accurately reflect the total gold output.

Hanna Mining Company's mine (point 3) at Riddle in Douglas County continued to be the nation's only domestic mine source of nickel. Output rose from 13,509 tons in 1978 to 18,274 tons in 1979. During 1979, the surplus ferronickel inventories that had caused the smelter to be closed for 6 weeks in 1978 were eliminated.

Oregon Metallurgical Corporation announced plans to increase the titanium sponge capacity at its Albany plant (point 1) in Linn County by 50 percent, at a cost of $6 million. Increased aircraft industry demand for titanium and the relative price rise for foreign sponge caused by the falling value of the dollar on the world market provided the need for the expansion.

Figure 2. Panoramic view of one end of the U.S. Army Corps of Engineers Applegate Dam project, in which sand and gravel, Oregon's major mineral commodity, is being utilized as fill. When completed, the dam will be 242 ft high and 1,200 ft long and will contain 3 million cubic yards of fill. The tall concrete structure on the left is the intake tower for the dam. The downstream side of the dam is to the right.

The dark strip in the center of the photograph is the impervious clay core that is being compacted. The core extends into a notch cut in the bed rock, thereby keying the entire dam into bed rock. Lighter areas on both sides of the core are composed of crushed gravel. The outer layer of the dam will be made of coarser material.

Major mineral commodities being used in the dam are clay, cement, and sand and gravel. As the sand and gravel is processed for use as concrete aggregate and fill, the gold content is also recovered. By the end of 1979, $285,000 of gold had been recovered. (Composite photo courtesy U.S. Army Corps of Engineers)

INDUSTRIAL MINERALS

Sand and gravel and stone accounted for 62 percent of the total value of Oregon's 1979 mineral products (Figure 2), as compared with 65 percent in 1978. A major tightening of the rock-material resource supply for the Portland area occurred when the Portland Development Commission purchased the Rivergate Rock Products Company quarry (point 4) for $3.65 million. Because the quarry operation would have conflicted with that of a new silicon wafer plant nearby, drilling and blasting were stopped at the end of October. All equipment and stockpiles of crushed stone are to be removed by May 1980.

Deposits of sand and gravel and stone are nonrenewable and are rapidly being depleted or removed from mining by urbanization. As the demand increases and supply shrinks, the price will inevitably rise. Careful planning, however, will extend the useful life of the deposits. The Department continued its rock-material program to help such planning by publishing Special Paper 5, *Analysis and Forecasts of the Demand for Rock Materials in Oregon*, by Friedman and others (1979). The paper provides forecasts for the State and several substate areas and for the commodities of sand and gravel and stone. The study also gives forecasting methodologies that can be used by the planner at the local level.

Diatomite, composed of the siliceous skeletons of microscopic aquatic plants called diatoms, was mined, processed, and sold for pet litter, fertilizer filler, insecticide carrier, and floor sweep absorbent by American Fossil, Inc., at its diatomite operation (point 5) in Christmas Valley, Lake County. During 1979, the operation was sold to Oil-Dri West, who obtained industrial revenue bond financing totaling $1.5 million from the Oregon Economic Development Council for the purchase and expansion of the operation.

The Oregon Portland Cement Company completed construction of its new cement plant (point 6) near Durkee, Baker County. Test runs began in early November. The new plant, with a capacity of about 500,000 tons of cement per year, is twice as large as the one it replaced at Lime. Limestone for the plant comes from a nearby quarry.

Blue Mountain Lime Company purchased the limestone deposits and a treatment plant formerly owned by Chemical Lime Company. The plant is located about 5 mi north of Baker, in Baker County, and the limestone deposits (point 7) are in the Elkhorn Mountains about 10 mi to the west. The Chemical Lime Company operated fairly continuously between 1958 and 1970, producing chemical-grade lime and lime products for the metallurgical and construction industries. The Blue Mountain Lime Company now has developed small markets for ground limestone for agricultural purposes, such as soil additives and feed supplements. It is utilizing high-quality limestone which, because it was undersize (minus ⅜ in.), was stockpiled during the Chemical Lime Company operation. Equipment for

drying, grinding, and screening the limestone has been installed. Most of the product sold was pulverized to minus 40 mesh.

Teague Mineral Products, Malheur County, produced about 6,000 tons of bentonite clay used for binder in sandcasting molds, pond sealants, and fire retardants. The clay was mined from pits near the head of Succor Creek and was trucked to a drying-bagging plant (point 8) near Adrian, Malheur County.

Steatite of Oregon continues to mine and market block soapstone from its Jackson County deposit (point 9), for art carving and other specialty uses.

EXPLORATION AND DEVELOPMENT

The McDermitt Caldera, located in the southwest corner of Malheur County, continues to be a target for uranium exploration. In 1978, Placer Amex, Inc., announced the discovery of an orebody (point 10) located in tuffaceous lake sediments of late Miocene age and estimated to contain 13 million tons of 0.05 to 0.06 percent U_3O_8. In 1979, Anaconda also announced a uranium find (point 11), this time in the southeast corner of Harney County. Mining companies have staked 5,000 mining claims in Malheur County and 400 in Harney County.

During 1979, the Iron Dyke Mine (point 12) in Baker County was bought by Texas Gulf, Inc., from the Butler family. The purchase price for the Iron Dyke and the Red Ledge property in Idaho was $1.5 million. Texas Gulf formed a joint venture with Silver King Mining of Salt Lake City, Utah, to mine and mill ore from the Iron Dyke. Starting in September 1979, ore was trucked 22.5 mi to Silver King's 800-tons-per-day mill near Cuprum, Idaho, for concentration. Thirty-five people were employed at the mine by the end of the year. Past recorded production was about 7,000 tons of copper, 35,000 oz of gold, and 256,000 oz of silver. The main period of operation was between 1916 and 1928.

W. A. Bowes and Associates continued exploration and development work at the Cougar Mine (point 13) in the Granite district of Grant County. A 1,700-ft inclined shaft, driven on a 12-percent grade to get beneath the pre-1942 workings, was completed by the end of the year. The mine was originally opened before 1900; production during the last period of operation (1938-1942) was about 10,000 oz of gold and 10,000 oz of silver.

The Buffalo Mining Company, a group of Seattle investors, is reopening the gold and silver Buffalo Mine (point 14), last operated in the mid-1960's. The 600-adit level and the flotation mill are being rehabilitated.

Mormon Basin Mines Company began a 200-cubic-bank-yards-per-hour gold placer mining operation (point 15) in Mormon Basin, Malheur County. A few miles down Basin Creek, Delta Investors continued to produce placer gold from a 60-cubic-bank-yards-per-hour operation (point 16). Johns-Manville has filed about 330 mining claims since 1976 in the Camp Creek and Bullrun Creek drainages (point 17) south of Unity, Baker County. Preussag, Canada Ltd., working under an exploration agreement with Johns-Manville, did some geologic mapping, soil and rock chip sampling, and diamond drilling along an altered and mineralized zone, which is about 8 mi long and 1 mi wide. No commercial quantities of ore have yet been discovered. Johns-Manville's interest in the area followed an Oregon Department of Geology and Mineral Industries stream-sediment geochemical sampling program which indicated zinc and copper anomalies in the area. During 1979, the Department placed on open file two geologic maps by Howard Brooks (Open File Reports 0-79-6 and 0-79-7), which give brief discussions of the mineralization in this area.

Two firms have land positions within the Santiam mining district (point 18) in Marion County. Shiny Rock Mining Company, whose land until this year was leased by Freeport Minerals, controls the northeastern half of the district and AMOCO the southwestern half. The Santiam district contains zoned mineralization with copper in the center. During 1978, Freeport did some deep drilling on Shiny Rock's side of the center zone. On the other side of the center zone, AMOCO is continuing a program of test drilling, plus geological mapping and geochemical and geophysical studies.

In southwestern Oregon, volcanogenic sulfide exploration activity on the Big Yank mineralized zone, from the Silver Peak Mine (point 3) in Douglas County to the Almèda Mine (point 19) near Galice in Josephine County, has been continuing over the past five years, with as many as four major companies involved at various times. Work has involved geologic mapping, geochemical soil sampling, airborne and surface geophysical surveying, and diamond drilling at various places along the zone. Thus far, no firm plans for mining development have been announced.

Exploration and development activities at gold lode mines include the extension of a new crosscut at the Greenback Mine (point 20); preliminary development work at the Benton Mine (point 21); and small-scale mining activities at the Dixie Queen (point 22), Lyman (point 23), and Boswell (point 24) Mines.

Copper-cobalt exploration activity included drilling at the Turner-Albright Mine (point 25) and mapping and sampling at the Queen of Bronze Mine (point 26).

Nickel laterite exploration activity by private firms continued during 1979, and the U.S. Bureau of Mines supervised the mining of a 160-ton bulk ore sample from each of two deposits, the Eight Dollar Mountain (point 27) and Rough and Ready Ridge (point 28). A small portion of the sample was used for research at the Bureau of Mines Albany Research Center, and the rest

(See **Mineral industry**, *p. 54)*

Oil and gas exploration and development in Oregon, 1979

by Dennis L. Olmstead, Geologist, Oregon Department of Geology and Mineral Industries

ABSTRACT

During 1979, hydrocarbons were discovered in commercial quantities for the first time in Oregon. The gas discovery, named the Mist Gas Field, was in the northwestern corner of the State in Columbia County. A pipeline was constructed so production could be started by the end of 1979.

During the year, leasing for oil and gas exploration was active, extending from the Coast Range to parts of eastern Oregon. Continued interest in leasing during early 1980 and many additional applications to drill wells indicate that 1980 will be a very active year for exploration.

INDUSTRY ACTIVITY

In terms of oil and gas activity, the word "development" applies to Oregon at last. Until 1979, drilling in Oregon was confined to exploration and the search for a

Figure 1. Mist Gas Field, Columbia County, Oregon. Five wells were completed in 1979 in the sands of the upper Eocene Cowlitz Formation by Reichhold Energy Corporation and its partners. One of the wells, Columbia County 1, was producing at year's end, with a production of 300,000 cubic feet per day. Production is now about five million cubic feet per day from three wells.

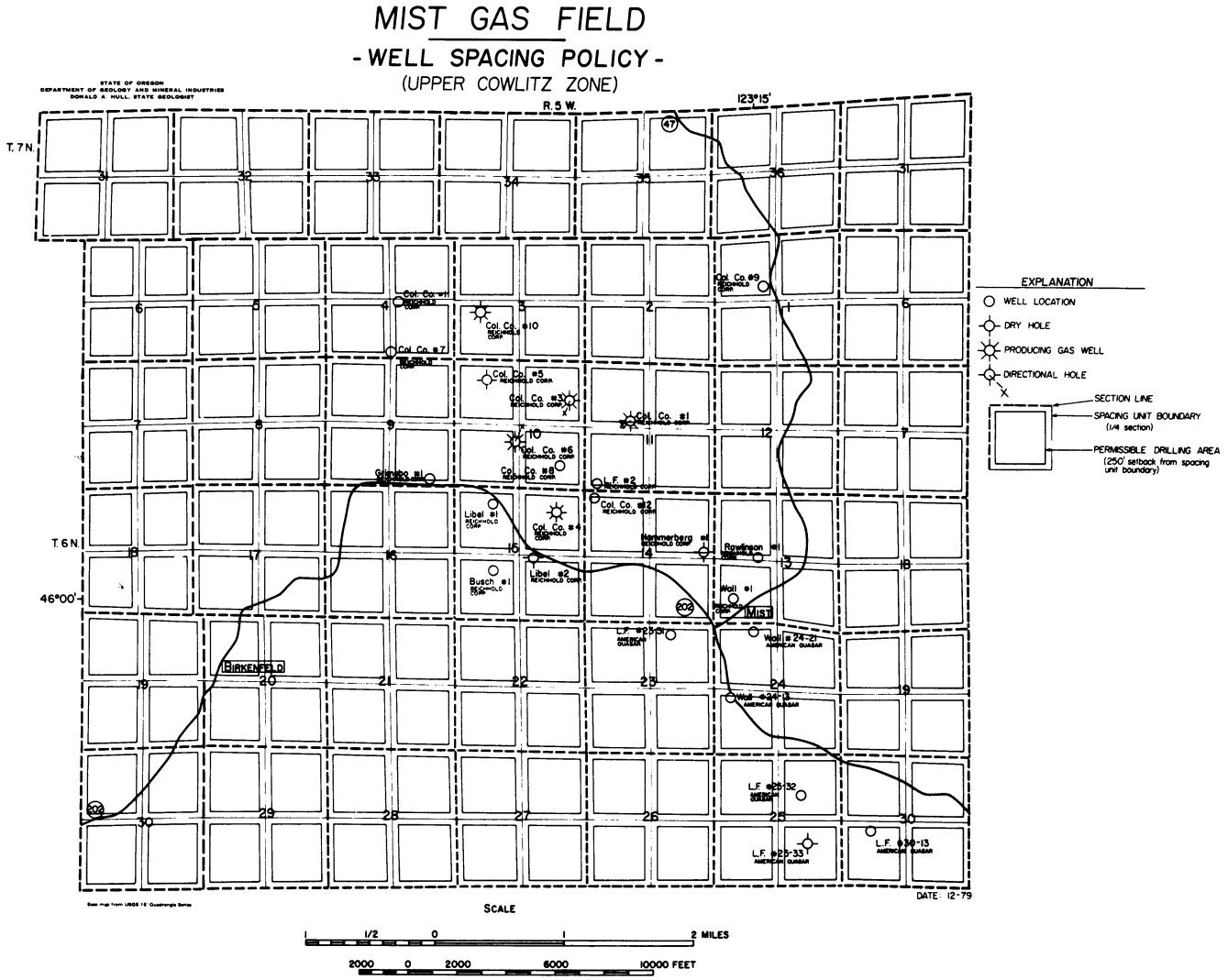


Table 1. *Oil and gas permits and drilling activity in Oregon, 1979*

Permit no.	Operator	Well name	Location	TD = Total depth (ft) RD = Redrill depth (ft)	Status
69 RD	Reichhold Energy Corporation	Columbia County 1	NW¼ sec. 11 T. 6 N., R. 5 W. Columbia County	TD: 3,111 RD: 2,965	Redrilled in 1979. Discovery: Mist Gas Field.
71	Reichhold Energy Corporation	Columbia County 2	NE¼ sec. 14 T. 6 N., R. 5 W. Columbia County	TD: 2,780	Abandoned, dry hole.
72	Reichhold Energy Corporation	Columbia County 3	NE¼ sec. 10 T. 6 N., R. 5 W. Columbia County	TD: 2,932 RD: 2,992	Completed, gas. Mist Gas Field.
75	Mobil Oil Company	Sutherlin Unit 1	SW¼ sec. 36 T. 24 S., R. 5 W. Douglas County	TD: 13,177	Abandoned, dry hole.
76	Agoil of Oregon	Hay Creek Ranch 2	NW¼ sec. 6 T. 11 S., R. 15 E. Jefferson County	TD: 2,065	Suspended, dry hole.
81	Mobil Oil Company	Ira Baker Unit 1	NE¼ sec. 28 T. 15 S., R. 3 W. Linn County	TD: 10,412	Abandoned, dry hole.
85	Farnham Chemical	Normark 4	NE¼ sec. 36 T. 11 S., R. 2 W. Linn County	–	Permit issued.
86	Reichhold Energy Corporation	Columbia County 4	NE¼ sec. 15 T. 6 N., R. 5 W. Columbia County	TD: 3,000	Completed, gas. Mist Gas Field.
87	Reichhold Energy Corporation	Columbia County 5	NW¼ sec. 10 T. 6 N., R. 5 W. Columbia County	TD: 3,100 RD: 3,116	Abandoned, dry hole.
88	Reichhold Energy Corporation	Grimsbo 1	SE¼ sec. 9 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
89	Reichhold Energy Corporation	Libel 1	NW¼ sec. 15 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
90	John T. Miller	Bursell 1	NW¼ sec. 14 T. 8 S., R. 5 W. Polk County	TD: 2,015	Abandoned, dry hole.
91	Reichhold Energy Corporation	Columbia County 6	SW¼ sec. 10 T. 6 N., R. 5 W. Columbia County	TD: 3,466 RD 1: 2,956 RD 2: 2,614	Completed, gas. Mist Gas Field.
92	Reichhold Energy Corporation	Columbia County 7	SE¼ sec. 4 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
93	American Quasar Petroleum Company	Longview Fibre 30-13	SW¼ sec. 30 T. 6 N., R. 4 W. Columbia County	–	Permit issued.
94	American Quasar Petroleum Company	Longview Fibre 25-33	SE¼ sec. 25 T. 6 N., R. 5 W. Columbia County	TD: 7,000	Abandoned, dry hole.
95	Reichhold Energy Corporation	Columbia County 8	SE¼ sec. 10 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
96	Reichhold Energy Corporation	Libel 2	SE¼ sec. 15 T. 6 N., R. 5 W. Columbia County	TD: 2,857	Abandoned, dry hole.
97	Floyd L. Cardinal	Watson 1	NE¼ sec. 14 T. 7 N., R. 9 W. Clatsop County	–	Permit issued.

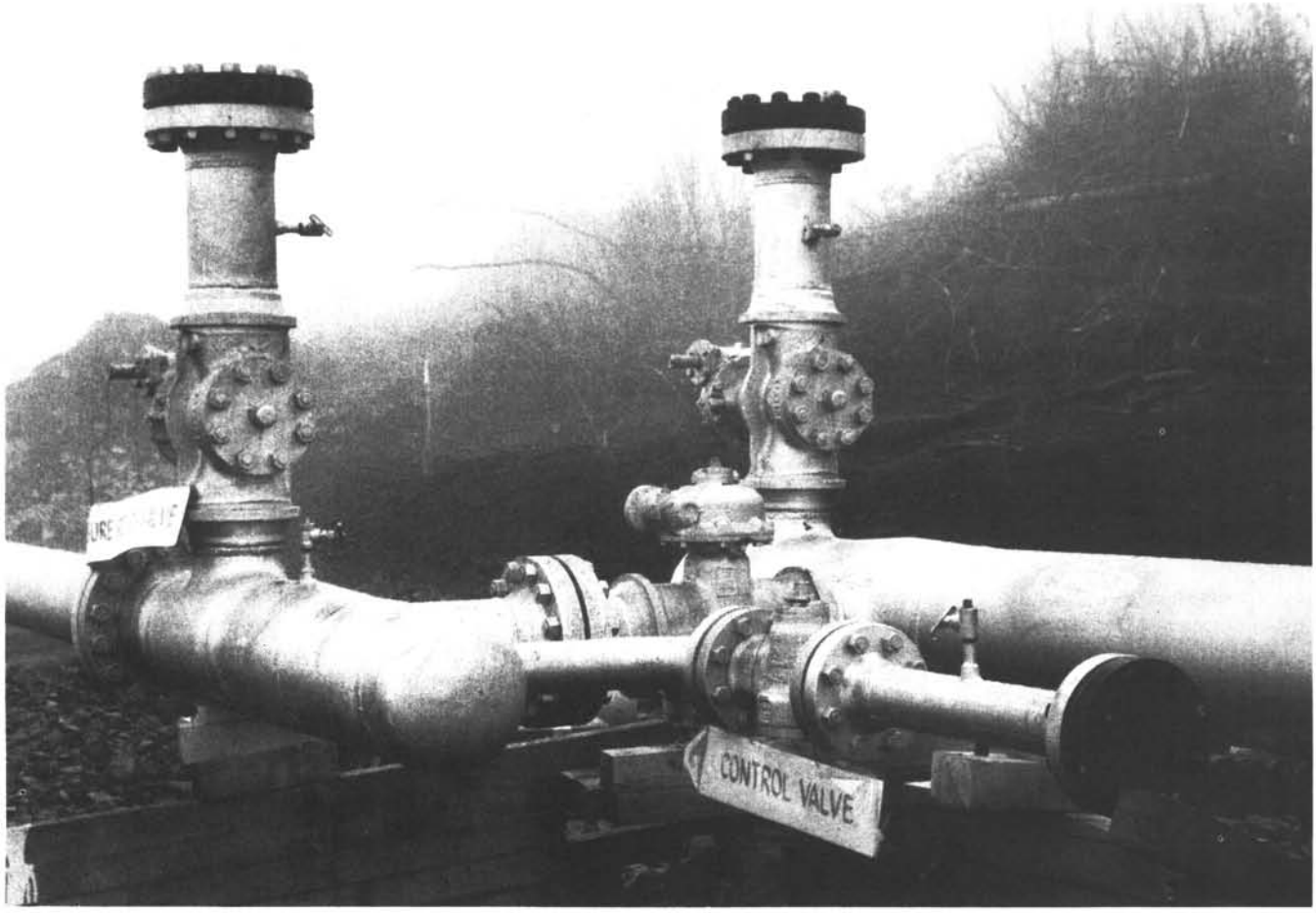
Table 1. *Oil and gas permits and drilling activity in Oregon, 1979 (continued)*

Permit no.	Operator	Well name	Location	TD = Total depth (ft) RD = Redrill depth (ft)	Status
98	Reichhold Energy Corporation	Columbia County 9	NW¼ sec. 1 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
99	Reichhold Energy Corporation	Columbia County 10	SW¼ sec. 3 T. 6 N., R. 5 W. Columbia County	TD: 2,983	Completed, gas. Mist Gas Field.
100	Reichhold Energy Corporation	Columbia County 11	SE¼ sec. 11 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
101	Reichhold Energy Corporation	Hammerberg 1	NE¼ sec. 14 T. 6 N., R. 5 W. Columbia County	TD: 2,851 RD: 3,318	Abandoned, dry hole.
102	Reichhold Energy Corporation	Wall 1	SW¼ sec. 13 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
103	Reichhold Energy Corporation	Busch 1	SW¼ sec. 15 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
104	Reichhold Energy Corporation	Rawlinson 1	NW¼ sec. 13 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
105	Reichhold Energy Corporation	Longview Fibre 2	SW¼ sec. 11 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
106	American Quasar Petroleum Company	Longview Fibre 6-21	NW¼ sec. 6 T. 5 N., R. 4 W. Columbia County	–	Permit issued.
107	American Quasar Petroleum Company	Longview Fibre 31-33	SE¼ sec. 31 T. 6 N., R. 4 W. Columbia County	–	Permit issued.
108	American Quasar Petroleum Company	Crown Zellerbach 15-14	SW¼ sec. 15 T. 6 N., R. 4 W. Columbia County	TD: 3,219	Abandoned, dry hole.
109	American Quasar Petroleum Company	Crown Zellerbach 21-41	NE¼ sec. 21 T. 6 N., R. 4 W. Columbia County	–	Permit issued.
110	American Quasar Petroleum Company	Wall 24-21	NW¼ sec. 24 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
111	Reichhold Energy Corporation	Crown Zellerbach 3	SE¼ sec. 6 T. 4 N., R. 3 W. Columbia County	–	Permit issued.
112	Reichhold Energy Corporation	Crown Zellerbach 4	NW¼ sec. 36 T. 5 N., R. 4 W. Columbia County	TD: 6,063	Abandoned, dry hole.
113	American Quasar Petroleum Company	Longview Fibre 36-41	NE¼ sec. 36 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
114	American Quasar Petroleum Company	Longview Fibre 31-21	NW¼ sec. 31 T. 6 N., R. 4 W. Columbia County	–	Permit issued.
115	Reichhold Energy Corporation	Columbia County 12	NW¼ sec. 14 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
116	Oregon Natural Gas Development Company	Crown Zellerbach 1	NW¼ sec. 13 T. 2 S., R. 10 W. Tillamook County	TD: 6,158	Abandoned, dry hole (1980).

Table 1. *Oil and gas permits and drilling activity in Oregon, 1979 (continued)*

Permit no.	Operator	Well name	Location	TD = Total depth (ft) RD = Redrill depth (ft)	Status
–	John T. Miller	John Stump 1	NW¼ sec. 26 T. 8 S., R. 5 W. Polk County	–	Application received.
118	American Quasar Petroleum Company	Crown Zellerbach 29-14	SW¼ sec. 29 T. 6 N., R. 4 W. Columbia County	TD: 2,880	Abandoned, dry hole.
119	American Quasar Petroleum Company	Wall 24-13	SW¼ sec. 24 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
120	American Quasar Petroleum Company	Longview Fibre 23-31	NE¼ sec. 23 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
121	American Quasar Petroleum Company	Longview Fibre 25-32	NE¼ sec. 25 T. 6 N., R. 5 W. Columbia County	–	Permit issued.
122	American Quasar Petroleum Company	Crown Zellerbach 14-21	NW¼ sec. 14 T. 5 N., R. 5 W. Columbia County	–	Permit issued.

Figure 2. Northwest Natural Gas pipeline and control valves, Mist, Oregon. Designed and constructed in 1979, the new 12-in. pipeline connects the Mist Gas Field to the existing system at Clatskanie, 7 mi to the north. These valves are located at the Northwest Natural Gas gathering facility near Mist.



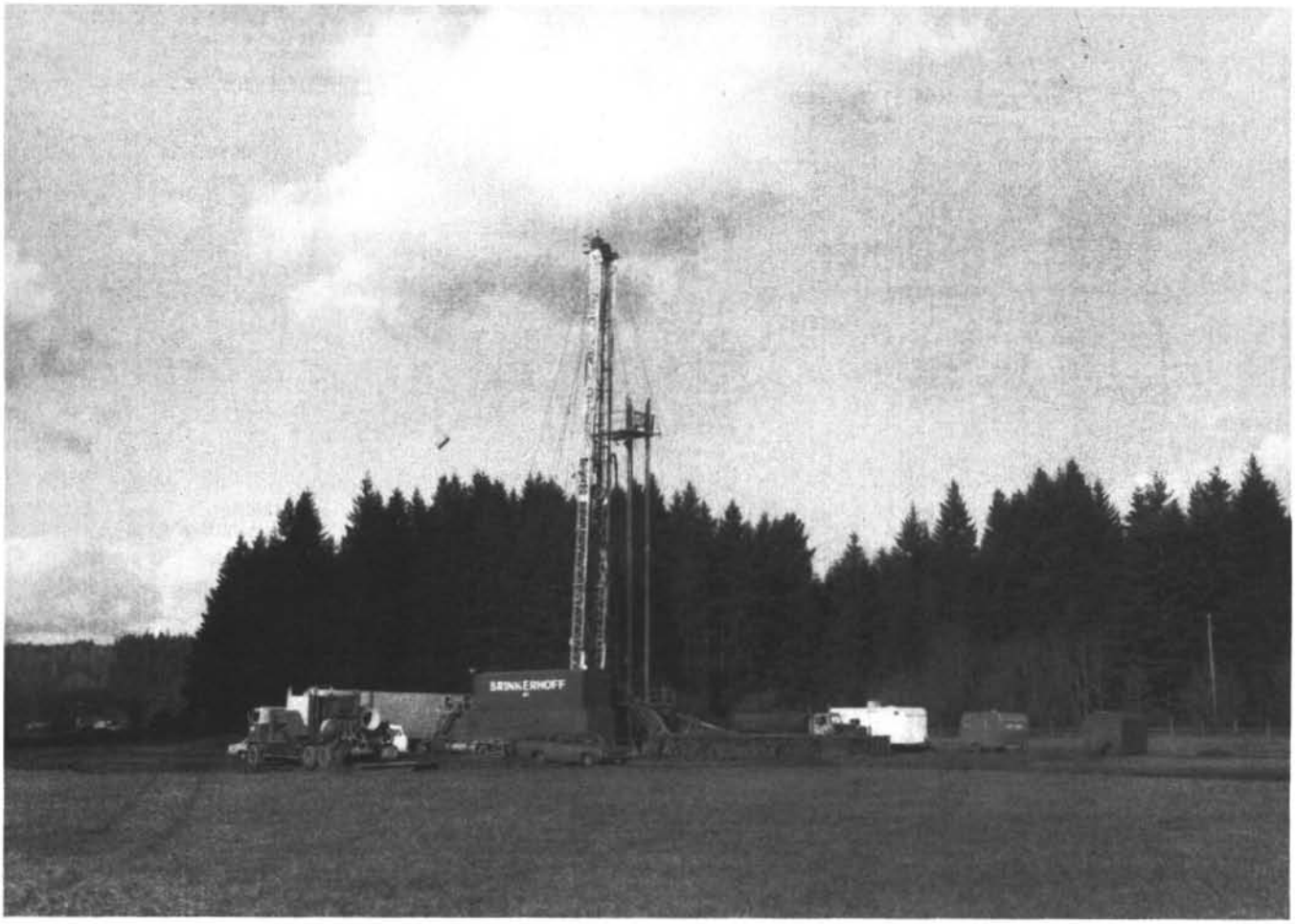


Figure 3. Brinkerhoff-Signal rig, drilling American Quasar Petroleum's Wall 24-13, 1 mi south of Mist, Oregon. This rig, the only one to work through the winter in Columbia County, also drilled an exploratory well in Tillamook County for Oregon Natural Gas Development Corporation.

gas storage site, but drilling during the year (Table 1) resulted in the discovery of the Mist Gas Field in Columbia County (Figure 1).

The discovery well, Columbia County 1, was first drilled during 1977 by a partnership composed of Reichhold Energy Corporation, Northwest Natural Gas Company, and Diamond Shamrock Corporation. The well was drilled for the dual purpose of discovering hydrocarbons or a gas storage reservoir. Gas shows existed in the Columbia County well, but they were considered to be noncommercial. Redrilled in 1979, the well produced a sizeable quantity of gas from the upper Cowlitz sand of the upper Eocene Cowlitz Formation. The initial test showed a flow rate of over 1.6 million cubic feet per day (MMcfd) and a shut-in pressure of 970 psi. The gas contained 92 percent methane and provided a heating value of 950 Btu per cubic foot.

The Mist gas discovery well was followed shortly by four more producers, all drilled by Reichhold and its partners within 1½ mi of the discovery well. These wells were all completed in the same sand at depths of 2,000 to 2,800 ft with a combined capacity of about 17 MMcfd. Further drilling in the vicinity has been carried out by Reichhold and by American Quasar Petroleum Company.

The discovery finally occurred after more than 200 dry holes were drilled throughout the State, including five in the Mist area alone. The northwest-trending structure in the Mist Gas Field consists of a highly faulted anticline, and the five producers appear to be completed in three separate pools.

Gas flowed from one of the wells in late December through a new 12-in. pipeline to the existing Northwest Natural Gas pipeline system (Figure 2) in Clatskanie.

Its 0.3 MMcfd will be augmented in 1980 as gathering lines are installed for the remaining producers. Further drilling is also expected in the area (Figure 3).

Elsewhere in the State, deep exploratory drilling was carried out by Mobil Oil Company in Douglas and Linn Counties. Sutherlin Unit 1 was drilled north of Roseburg to a depth of 13,177 ft and abandoned as a dry hole in April 1979. Mobil also drilled another deep

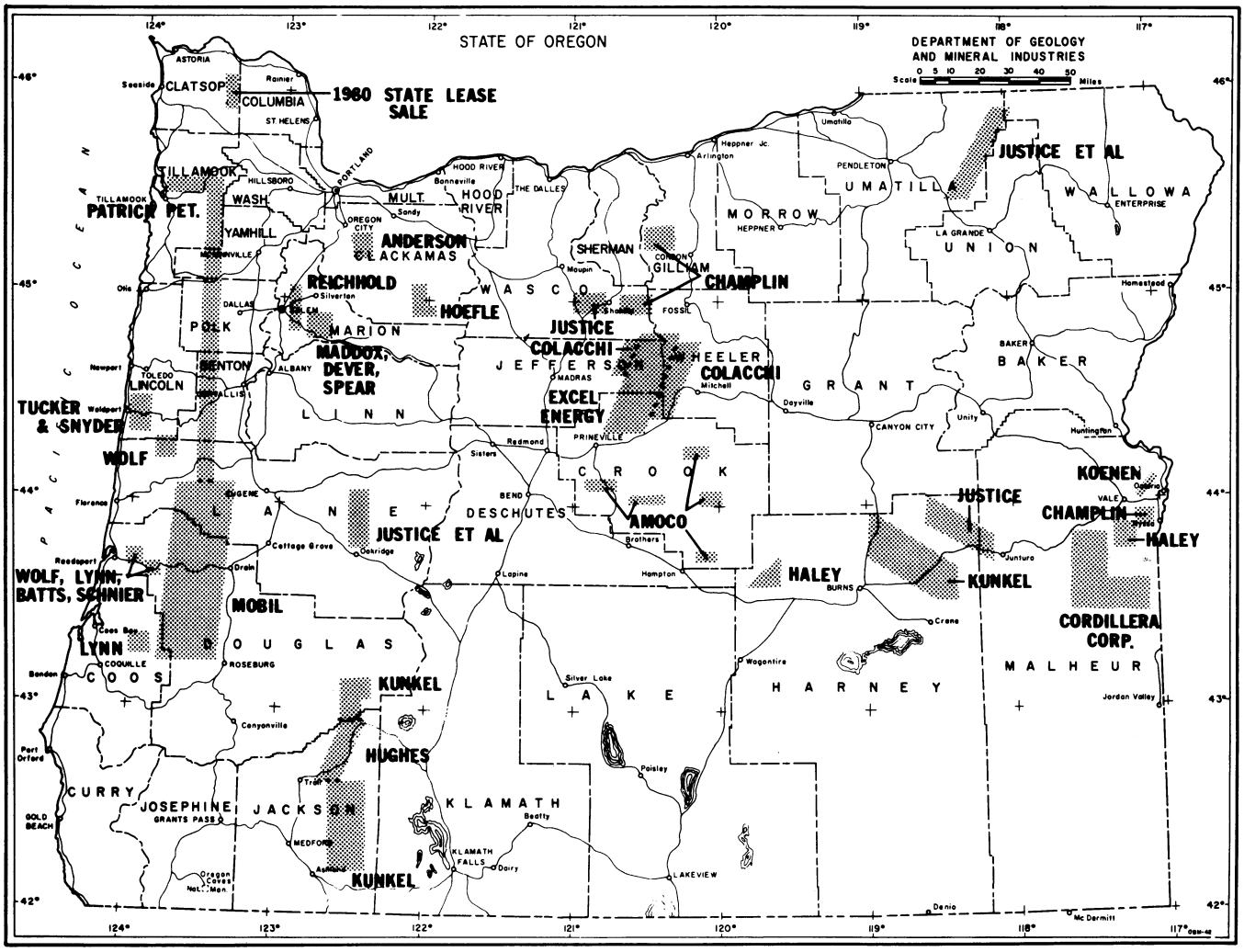


Figure 4. Oil and gas leases in Oregon, 1979.

exploratory well to 10,412 ft in southern Linn County, north of Eugene. This well, Ira Baker 1, was also a dry hole. Although both were dry, the drilling of these wells was encouraging, because it demonstrated the industry's willingness to drill deep holes in Oregon.

Drilling in the rest of the State consisted of a well in Jefferson County and one in Polk County. These dry holes were drilled to total depths of about 2,000 ft. At the year's end, Oregon Natural Gas Development Corporation was drilling an exploratory well in Tillamook County. This well, Crown Zellerbach 1, was abandoned as a dry hole in January 1980.

Leasing was very active in 1979 and continued into early 1980. Counties in northwestern Oregon enjoyed popularity stemming from the Mist gas discovery. Reichhold Energy Corporation and its partners, as well as American Quasar Petroleum Company, continued to be major leaseholders in Columbia County. Of the major oil companies, Mobil was active in leasing as well as drilling. Coos, Douglas, Lane, and Linn Counties were the sites of nearly 50,000 acres of new Mobil leaseholds.

Statewide, leases of Federal land in 1979 alone accounted for about a quarter million acres of new oil and gas leaseholds. More than 125 individuals and corporations acquired leases last year in the State, demonstrating the increased interest in the State's potential. Douglas County experienced one of the largest increases in oil and gas leasing for the year, with additions of over 125,000 acres on Federal land (Figure 4).

The industry showed further interest in Oregon when, in early 1980, a State Lands Division lease sale brought bonus bids of up to $150 per acre in Clatsop County, adjacent to Columbia County. Eight bidders leased 25,343 acres in Clatsop County. A statewide total of 41,096 acres was leased at this sale, bringing in $1,765,695 in bonus bids. This unusual showing of enthusiasm for Oregon oil and gas prospects points to a promising decade ahead. The relatively high level of drilling in 1979 (Figure 5) will likely continue through 1980 and beyond.

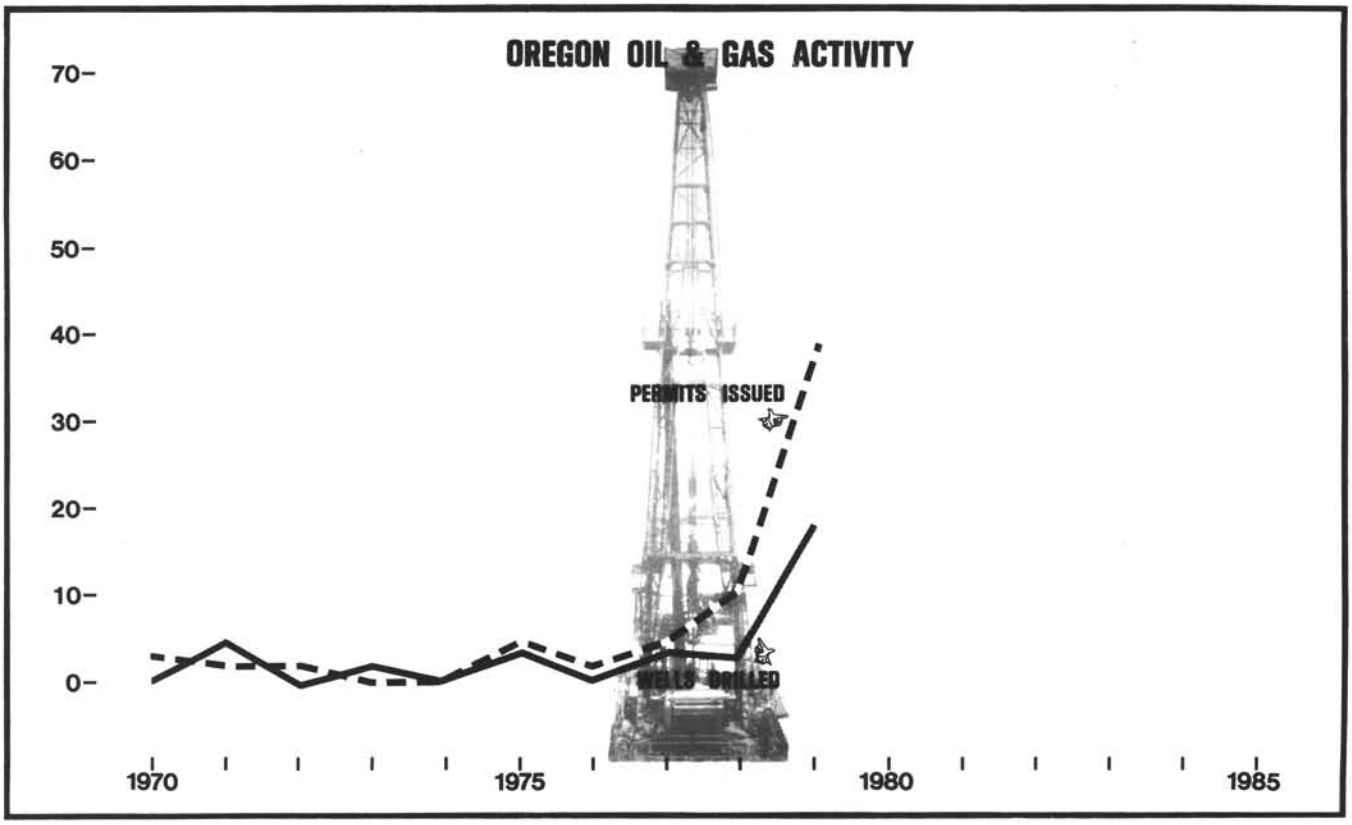


Figure 5. Oil and gas drilling activity in Oregon, 1979. The gas discovery at Mist resulted in a surge of drilling permits and drilling of wells during 1979. Even more activity is expected in Columbia County in 1980. □

State lands yield oil and gas revenue

Seven organizations and six individuals bid a total of $1,765,695 for oil and gas rights on 41,000 acres of State lands in western Oregon that were offered at one auction by the State Lands Division on January 8, 1980. Main interest was in land located in eastern Clatsop County, where bonus bids averaged approximately $60 per acre. The second area of interest was along the coast in Lane and Douglas counties. Bonus bids averaged $5 per acre in that area.

Participants in the bidding included the following:

Kyle R. Miller, Denver, Colorado, 11,000 acres;

Northwest Exploration Co., Denver, Colorado, 9,000 acres;

Nehama and Weagant, Bakersfield, California, 5,600 acres;

Diamond Shamrock Corp., Denver, Colorado, 3,900 acres;

Marvin and Melvin Wolf, Denver, Colorado, 2,500 acres.

High bid of $150 per acre was made by C.J. Ellsworth, Denver, Colorado, on a tract a few miles northeast of the town of Jewell in Clatsop County. □

Correction

The following corrections should be made to your February 1980 issue of *Oregon Geology*.

1. Page 22, second line of **COVER PHOTO** should read: "looking east toward Jackson Gap."
2. Page 33, starting seven lines from the bottom of the first column and continuing to the second column, the following numbers for **Km** and **Mi** should be changed:

13.1	8.2	should read	11.2	7.0
13.6	8.5	should read	11.7	7.3
16.6	10.4	should read	14.7	9.2
18.1	11.3	should read	20.6	12.9
23.2	14.5	should read	21.3	13.3

3. Page 33, nine lines from the bottom of the second column. The description for mile 5.8 should read: "Outcrop of interlayered Paleozoic and Triassic cherts, argillites, and marble, cut by Jurassic quartz monzonite." □

Send us your new address

When you move, don't forget to send your new address to the Oregon Department of Geology and Mineral Industries.

Mined land reclamation in Oregon, 1979

by Standley L. Ausmus, Supervisor, Mined Land Reclamation Program, Albany Field Office, Oregon Department of Geology and Mineral Industries

Surface mining activity in Oregon increased markedly during 1979, as shown by the numbers of inquiries about and applications for surface mining permits. This increased interest in surface mining is particularly true with regard to gold placer mining operations in Baker, Grant, Jackson, Josephine, and northern Malheur Counties. A substantial number of gold placer operations began or significantly expanded during the past year and are now operating under State surface mining permits with approved reclamation plans fully implemented and in place. Several other mines are very close to the start of operations.

The number of aggregate resource mining sites continues to increase at a rate comparable to those of previous years, with some seasonal fluctuation, of course. There have been an average of five new surface mining permits per month and an average of three new limited exemptions or grandfather certificates issued by the Program. This growth rate has been steady since about 1976 and is expected to continue, barring unforeseen economic circumstances. The expanded interest in gold and silver may influence that projection somewhat in the coming months.

As of January 1, 1980, 414 reclamation plans had been approved since the inception of the field program in January 1974. Over that same time span, 34 reclamation projects had been completed, representing approximately 350 acres of reclaimed ground.

A major Department concern of the past year was the rewriting of the administrative rules for the Mined Land Reclamation Program. Revisions were necessitated by the legislative changes which were enacted during the 1975, 1977, and 1979 sessions of the State Legislature. In addition, the Department recognized the need to rewrite, in simple and clear language, the instructions needed and steps to be followed in making application for a surface mining permit and in preparing the reclamation plan.

The initial draft of these proposed administrative rule changes was distributed for review to various mining industry representatives, to the Association of Oregon Counties, to State natural resource agencies, and to other interested parties and associations. Responses to this draft were presented to the Governing Board of the Department on November 20, 1979. A second draft was prepared and reviewed at three public hearings in January.

The third and final hearing on the draft and final Board action took place in February 1980. The revised rules were then sent to the office of the Secretary of State for publication.

Copies of the new rules will be distributed to those on the mailing list and others who have requested copies. Additional copies will be available in the Department's Portland, Albany, Baker, and Grants Pass offices.

Questions concerning the new administrative rules should be directed to the Albany office (phone: [503] 967-2039 or the toll-free number 1-800-452-7813).

The Department would like to take this opportunity to thank those people in government and industry who have labored with us in such a cooperative manner over the past 6 years to make the State surface mining reclamation program a reality and an effective tool in the proper development, conservation, and preservation of our natural resources. Without the support of these State and local agencies and the diligent and cooperative efforts of the miners and the construction industry, this program would not be a reality today. As a result, there has developed in Oregon a reclamation ethic which was, after all, the purpose and the intent of the legislation which brought this program into being in 1972.

It is the Department's determination to continue and to extend that cooperative effort throughout the coming decade as we strive together to meet the continuing and expanding demands of the economy for mineral resources while simultaneously protecting and preserving our environment and the value of the lands which must necessarily be mined for those mineral resources. □

(Mineral Industry, *from p. 46)*

was shipped to a pilot plant belonging to the UOP, Inc., a division of Signal Oil, in Tucson, Arizona, to test the Bureau of Mines' newly developed leach process to extract nickel, chromium, and cobalt from the laterites.

A Josephine County mineral report which summarizes information on 470 mines and prospects and contains a countywide geologic map was published by the Department as Bulletin 100, *Geology and Mineral Resources of Josephine County, Oregon* (Ramp and Peterson, 1979). □

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