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Main Office: 1005 State Office Building, Portland 97201, phone (503) 229-5580.

Baker Field Office: 2033 First Street, Baker 97814, phone (503) 523-3133.
Howard C. Brooks, Resident Geologist

Grants Pass Field Office: 312 S.E. "H" Street, Grants Pass 97526, phone (503) 476-2496.
Len Ramp, Resident Geologist

Mined Land Reclamation Program: 1129 S.E. Santiam Road, Albany 97321, phone (503) 967-2039.
Paul F. Lawson, Supervisor

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COVER PHOTO

Charlie Stinson of Northwest Natural Gas installs pressure gauge on American Quasar's Hickey 9-12, Linn County. Article beginning on next page summarizes oil and gas activity in Oregon during 1981.

Notice to contributors

Oregon Geology readers are invited to submit articles about Oregon geology, such as field trip guides, descriptions of geology of state parks, results of student or faculty research, and information on interesting mineralogical or paleontological finds. Both technical and general interest articles will be published. Authors of technical articles are urged to obtain peer review prior to submittal, and such reviewers should be acknowledged in the article.

1. All material should be typewritten, double-spaced, with wide margins.
2. In general, articles, including tables, artwork, and photos, should not exceed 25 pages in length. Longer articles might be published in two installments.
3. Drafted material must be submitted in final form. If reduction will be necessary, lettering should be large enough to be legible after reduction.
4. Photos should be black-and-white glossy prints. If slides or color prints are the only photos available, consult with the editor.
5. All artwork and photos must be clearly marked. Figure references should be placed in appropriate places in the text. A separate typed list of figure captions should accompany the article. All artwork and photos become the property of the Department, unless other arrangements are made prior to publication.
6. Consult U.S. Geological Survey *Suggestions to Authors* (6th ed.) for questions of style. Authors are responsible for accuracy and completeness of citations. Cited references should be in USGS format.
7. Except for units of measurement, do not abbreviate.
8. Each author (or first author in the case of multiple authorship) will receive 20 complimentary copies of the issue of *Oregon Geology* in which his or her article appears. □

Number of mining claims to pass 50,000

The Oregon State Office of the Bureau of Land Management (BLM) will soon record its 50,000th mining claim. BLM is the agency with which miners must register their claims, if the claims are located on federal land. By the end of January, slightly more than 49,800 of the claims had been recorded.

"We've been averaging 10,000 claims a year," said Diane Buckley, miscellaneous documents examiner. "It ranges from a low of about 400 a month to 1,300 or 1,400. Summer and fall are the busiest times of the year."

The Oregon State Office is responsible for recording claims in both Oregon and Washington. Two to three times as many claims are from Oregon than from Washington, probably because Oregon has much more federal land, Buckley said. □

—BLM News, Oregon and Washington

CONTENTS

Oil and gas exploration and development in Oregon, 1981

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

ABSTRACT

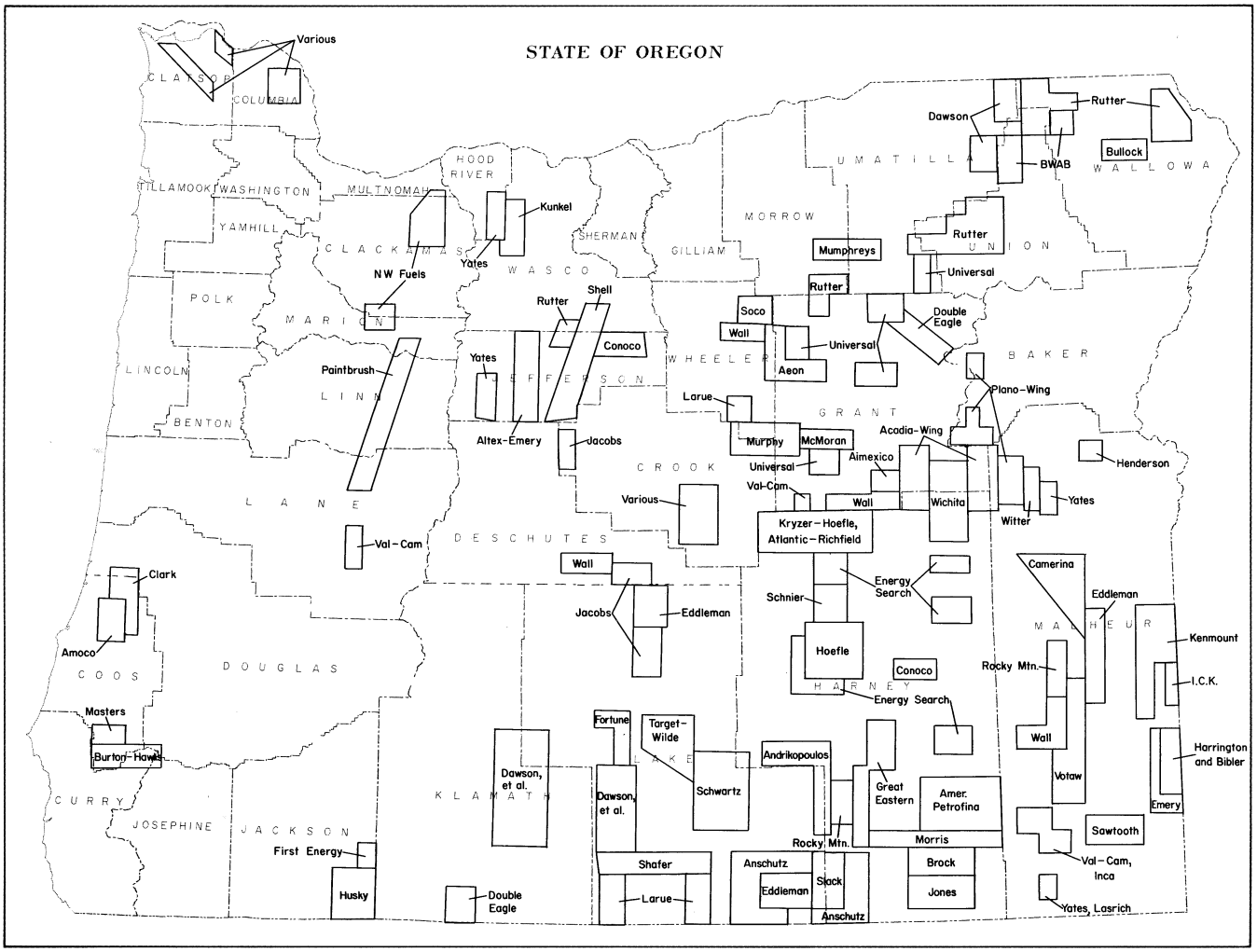
In 1981, acreage leased in Oregon for oil and gas drilling far exceeded that of previous years. By the end of the year, over 4 million acres were estimated to be under lease. In the central, eastern, and southeastern parts of the state, leasing took place in areas which saw little or no interest in past years. Such widespread interest was sparked in part by a deep-drilling program carried out by Shell Oil Company in central Washington. Central Oregon could also be the site of drilling programs in the next few years.

Drilling during the year did not show such a dramatic increase over previous years as did leasing. In fact, the number of holes drilled leveled off, and 1981 had a slight drop from 1980, with a total of 23 holes drilled. This level of activity is likely to continue for the foreseeable future, after the dramatic increase in drilling following the Mist Gas Field discovery. Additional field discoveries could cause another jump in the annual number of wells drilled. The seven active oil and gas operators in Oregon once again concentrated their efforts in the Coast Range and Willamette Valley provinces.

LEASING ACTIVITY

Of the 61,598,720 acres of land in Oregon, 52.6 percent is owned by the federal government, and this fact heavily influenced the oil and gas leasing statistics for 1981. Noncompetitive lease applications were received by the hundreds at the Portland office of the Bureau of Land Management (BLM) throughout the year. Interest shifted this year to central and eastern Oregon, where thousands of unleased acres were still available. Leasing was particularly heavy in the counties of Jefferson, Wheeler, Grant, Umatilla, Union, Lake, Harney, and Malheur. The heavy demand has resulted in far more acreage applied for than actually leased.

During the course of the year, lease applications were filed on more than 12 million acres of federal land in the state. Two million of these acres were leased by the BLM, more than tripling the total federal acreage under lease to about 2,672,000 acres. Noncompetitive leases are issued on properties not previously leased and where there are no known producing geological structures. Most new leaseholds in Oregon are on federal lands.



Oil and gas leases obtained in Oregon, 1981.

The Interior Department has proposed plans to reduce fraud in the lottery system of leasing by increasing the filing fee to $75. Annual rentals would remain $1 per acre for the first five years of the lease but would then jump to $3 per acre for the last five. Interior Secretary James Watt feels this change will slow down the speculation in oil and gas leases and increase participation by those involved with exploration.

The Division of State Lands in Salem leases land belonging to the State of Oregon for oil and gas exploration by holding public lease sales. Two such sales were held during 1981, and over 137,000 acres were leased, mostly in Clatsop, Coos, and Douglas Counties. The high bid was $310 per acre bonus for lands in Clatsop County. Winners of the largest acreages included A. Andrikopoulos, G. Tallmann, X-O Lease Fund, AMOCO, Phillips, J. Ryan, and Gulf Oil. The two sales brought in a total of $3.62 million which is to be distributed to the common school fund, counties where the leases exist, and various state departments.

A new rule governing assignment of state leases was adopted in June 1981. The rule establishes a fee of $50 for assigning a lease and requires that the assignment be approved by the Director of the Division of State Lands.

Columbia County, site of the Mist Gas Field, also held a lease sale during the year. $1.5 million in bonus bids was collected for 73 parcels totaling over 65,000 acres. Parcel sizes ranged from 100 acres up to as much as 1,200 acres. ARCO was the most active bidder at the sale, taking 24 parcels. The high bid, however, was a $93-per-acre offer by Nahama and Weagant for 600 acres in T. 7 N., R. 4 W. Exxon and Tenneco were also lease winners with high bids in T. 5 N., R. 5 W. Columbia County specifies a three-sixteenth royalty in their leases.

Rig moving in to drill Diamond Shamrock's Crown Zellerbach 31-17, Clatsop County.

One of the largest lease acquisitions of private land took place in January 1981, when AMOCO leased 2.75 million acres of Weyerhaeuser land in western Oregon and Washington. The lease includes virtually all of Weyerhaeuser's land and runs for three years, with option to extend up to seven years. Much leasing of smaller parcels of private land also took place during the year, mainly in central and eastern Oregon. Lease terms were usually a 10-year term for $1 per acre per year at a one-eighth royalty and a bonus of $5 to $15 per acre.

Longview Fibre held a sealed bid auction of about 2,000 acres of their property in Columbia County, bringing a high bid of $76.25 per acre from Diamond Shamrock. Other companies leasing land included Champlin Petroleum and Gulf Oil. Lease terms were $10 per acre annual rental, three-sixteenth royalty, and five-year primary term.

The total effect of the leasing during the year was a sudden shift of interest to the eastern half of the state, and the addition of around 4 million acres of land under lease.

1981 DRILLING IN OREGON

Oil and gas drilling in Oregon showed a slight drop from a total of 31 exploratory and development wells in 1980 to 22 in 1981. The same operators continued to work in the state: American Quasar (six wells), Diamond Shamrock (three wells), and Reichhold Energy (eight wells). The remaining six wells were divided among five operators: Ehrens Petroleum, John Miller, Oregon Natural Gas, Quintana Petroleum, and Texaco. Table 1 lists all drilling activities as well as new permitted locations that have not yet been drilled.

Total footage drilled during the year also dropped to 105,057 ft, a decrease of 18 percent. The difference can be attributed almost entirely to the lack of redrills in 1981: only one well was redrilled. The average depth of wells, however, jumped from 3,400 ft in 1980 to nearly 4,700 ft in 1981. This is a sign that the industry is more willing to drill thicker sections in Oregon's sediments.

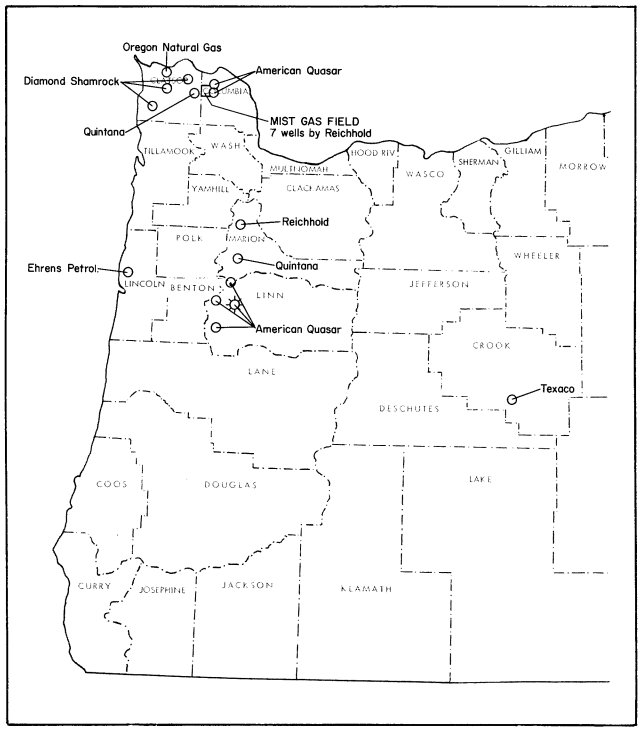
Since the Mist Gas Field discovery in 1979, most drilling has been in or near that field. This was true of 71 percent of all Oregon wells in 1980. But in 1981, only nine wells (41 percent) were field-development or step-out wells; the remaining 13 wells (59 percent) were wildcats in the true sense of the word, which meant they were looking for new fields. The drilling of these wildcat wells demonstrates a gradual change of philosophy among operators here. The combination of deeper drilling and more diversified drilling locations, if continued, increases the likelihood of further field discoveries in Oregon.

The Mist gas discovery of 1979 is having its effect on adjacent areas of the Coast Range. Diamond Shamrock is exploring Clatsop County, with three wells already drilled. The average depth of these wells was 6,550 ft, twice that of most Mist Gas Field wells (Table 1). All three were dry, but Diamond Shamrock will continue to drill in Clatsop County in 1982.

Oregon Natural Gas and Quintana Petroleum also drilled in Clatsop County during the year. These wells, drilled to 10,006 and 7,068 ft, were both dry holes, but Oregon Natural Gas may reenter its hole for redrilling.

WILLAMETTE VALLEY GAS DISCOVERY

The Willamette Valley continues to attract interest from the industry: three different operators drilled six new wells there in 1981. One, American Quasar's Hickey 9-12, in T. 12 S., R. 2 W., was completed as a gas discovery in May. The well



Well locations in Oregon, 1981.

had an initial production of about 200,000 cfd but decreased to 20,000 cfd by September, which led to its abandonment. Oregon's second gas field was short-lived but was encouraging to operators exploring in the Willamette Valley.

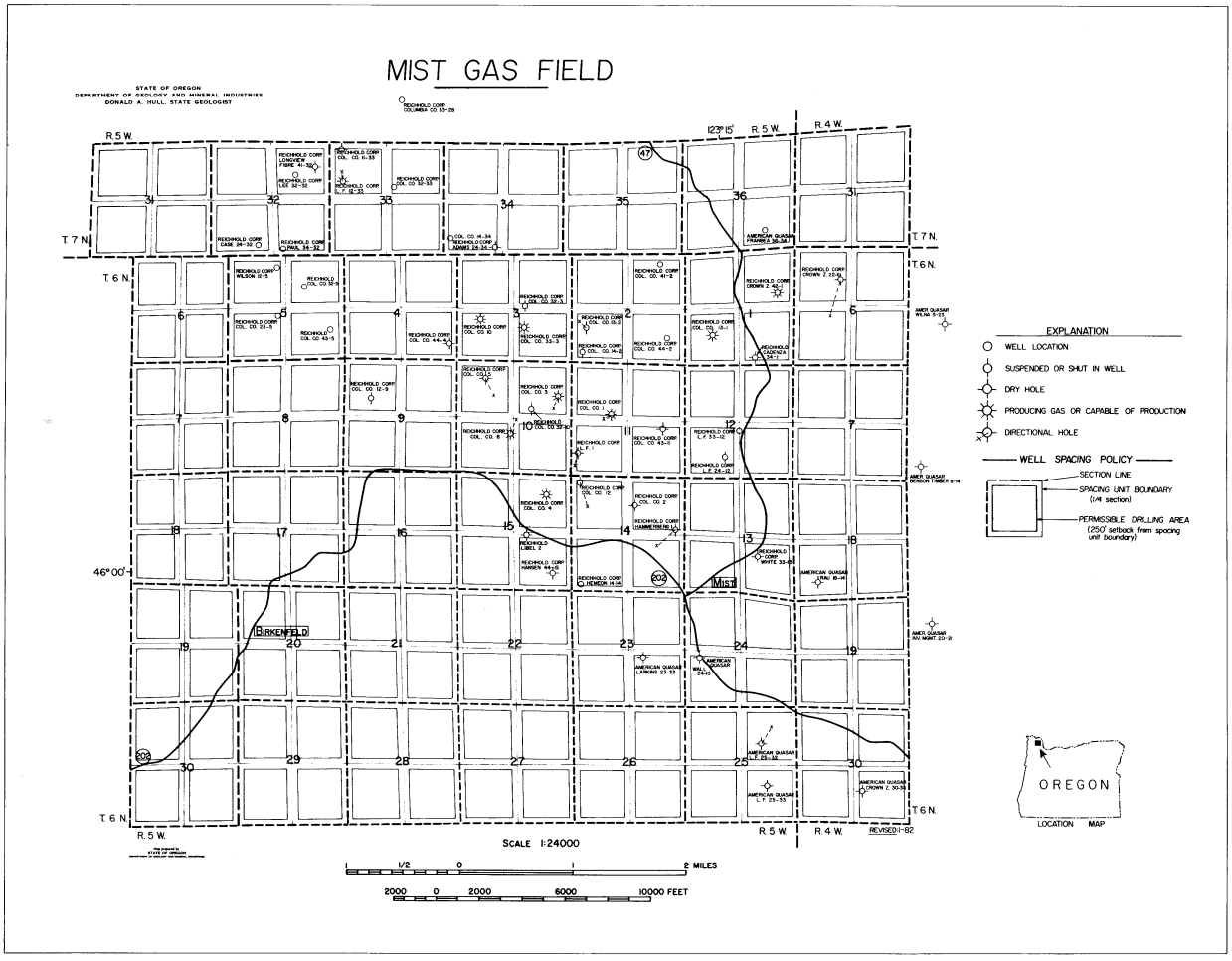
GAS PRODUCTION

Reichhold Energy and its partners, Northwest Natural Gas and Diamond Shamrock, continue to be the only producers in the state. American Quasar temporarily produced gas from Hickey 9-12 near Lebanon (see above), but this production only lasted four months.

Throughout 1981, the gas production came from five wells: Columbia County wells 1, 3, 6, 10, and 33-3, producing from two pools. Production dropped from over 20 million cfd at the beginning to less than 10 million by year's end. While production and zone pressures decrease in these pools, Reichhold Energy has successfully explored for more pools in the field. Columbia County 13-1 in sec. 1, T. 6 N., R. 5 W., was completed in August, but subsequent brief production resulted in water. This well will need remedial work or redrilling to be a commercial producer. At the present time it is shut in.

Later in the year, Reichhold Energy completed another step-out well, Longview Fibre 12-33, in sec. 33, T. 7 N., R. 5 W. With initial production of over 4 million cfd, this well promises to be a valuable addition to the field's productivity. Northwest Natural Gas is constructing a gathering line, and this well will soon be on line.

Two additional pools are known to exist at Mist. In previous years, Reichhold Energy completed Columbia County 4 in



Mist Gas Field, Columbia County.

Table 1. *Oil and gas permits and drilling activity in Oregon, 1981*

Permit no.	Operator and well name	Location	Status and depth TD = total depth (ft) RD = redrill (ft)
123	Reichhold Energy Corp.; Columbia County 11-10	NW¼ sec. 10 T. 6 N., R. 5 W. Columbia County	Permit canceled.
127	Reichhold Energy Corp.; Longview Fibre 34-12	SE¼ sec. 12 T. 6 N., R. 5 W. Columbia County	Permit canceled.
128	Reichhold Energy Corp.; Libel 44-15	SE¼ sec. 15 T. 6 N., R. 5 W. Columbia County	Permit canceled.
130	Reichhold Energy Corp.; Columbia County 21-10	NW¼ sec. 10 T. 6 N., R. 5 W. Columbia County	Permit canceled.
132	Reichhold Energy Corp.; Laubach 34-13	SE¼ sec. 13 T. 6 N., R. 5 W. Columbia County	Permit canceled.
133	Reichhold Energy Corp.; Libel 22-15	NW¼ sec. 15 T. 6 N., R. 5 W. Columbia County	Permit canceled.
134	Reichhold Energy Corp.; Longview Fibre 33-12	SE¼ sec. 12 T. 6 N., R. 5 W. Columbia County	Permit issued.
141	Northwest Exploration Co.; Fish Trap 1	NE¼ sec. 32 T. 28 S., R. 13 W. Coos County	Permit canceled.
142	Reichhold Energy Corp.; Adams 32-34	NE¼ sec. 34 T. 7 N., R. 5 W. Columbia County	Permit canceled.
144	Reichhold Energy Corp.; Adams 23-34	SW¼ sec. 34 T. 7 N., R. 5 W. Columbia County	Permit canceled.
145	Reichhold Energy Corp.; Columbia County 21-34	NW¼ sec. 34 T. 7 N., R. 5 W. Columbia County	Permit canceled.
149	Reichhold Energy Corp.; Columbia County 31-3	NE¼ sec. 3 T. 6 N., R. 5 W. Columbia County	Permit canceled.
150	Reichhold Energy Corp.; Columbia County 42-4	NE¼ sec. 4 T. 6 N., R. 5 W. Columbia County	Permit canceled.
151	Reichhold Energy Corp.; Columbia County 22-3	NW¼ sec. 3 T. 6 N., R. 5 W. Columbia County	Permit canceled.
152	Reichhold Energy Corp.; Longview Fibre 23-12	SW¼ sec. 12 T. 6 N., R. 5 W. Columbia County	Permit canceled.
159	Reichhold Energy Corp.; Sweet 14-1	SW¼ sec. 1 T. 6 N., R. 5 W. Columbia County	Permit canceled.
161	Reichhold Energy Corp.; Bagdanoff 23-28	SW¼ sec. 28 T. 5 S., R. 2 W. Marion County	Abandoned; dry hole; TD: 6,005.
163	Northwest Exploration Co.; Fat Elk 2	NE¼ sec. 11 T. 28 S., R. 13 W. Coos County	Permit canceled.
165	American Quasar Petroleum Co.; Wilna Inc. et al. 6-43	SE¼ sec. 6 T. 6 N., R. 4 W. Columbia County	Permit canceled.
166	Texaco, Inc.; USL-OR 17-1	NE¼ sec. 17 T. 19 S., R. 20 E. Crook County	Abandoned; dry hole; TD: 6,525.
167	Ehrens Petroleum & Development, Inc.; Longview Fibre 1	NE¼ sec. 20 T. 9 S., R. 11 W. Lincoln County	Suspended; TD: 800.
169	Reichhold Energy Corp.; Columbia County 14-34	SW¼ sec. 34 T. 7 N., R. 5 W. Columbia County	Permit issued.
172	American Quasar Petroleum Co.; Hickey 9-12	NW¼ sec. 9 T. 12 S., R. 2 W. Linn County	Abandoned; gas; TD: 4,692.
174	American Quasar Petroleum Co.; M & P Farms 33-24	SW¼ sec. 33 T. 11 S., R. 4 W. Linn County	Abandoned; dry hole; TD: 4,275.
176	American Quasar Petroleum Co.; Franbea et al. 36-34	SE¼ sec. 36 T. 7 N., R. 5 W. Columbia County	Permit issued.
177	Diamond Shamrock; Boise Cascade 11-14	NW¼ sec. 14 T. 7 N., R. 7 W. Clatsop County	Abandoned; dry hole; TD: 7,864.
178	Diamond Shamrock; Crown Zellerbach 11-28	NW¼ sec. 28 T. 5 N., R. 9 W. Clatsop County	Abandoned; dry hole; TD: 5,700.
179	Diamond Shamrock; Crown Zellerbach 31-17	NE¼ sec. 17 T. 6 N., R. 8 W. Clatsop County	Abandoned; dry hole; TD: 6,095.
180	Reichhold Energy Corp.; Columbia County 32-10	NE¼ sec. 10 T. 6 N., R. 5 W. Columbia County	Suspended; TD: 7,807
181	Reichhold Energy Corp.; Columbia County 23-5	SW¼ sec. 5 T. 6 N., R. 5 W. Columbia County	Permit issued.
182	Reichhold Energy Corp.; Columbia County 13-1	SW¼ sec. 1 T. 6 N., R. 5 W. Columbia County	Completed; gas; TD: 3,076.
183	Reichhold Energy Corp.; Hemeon 14-14	SW¼ sec. 14 T. 6 N., R. 5 W. Columbia County	Permit issued.
184	Reichhold Energy Corp.; Longview Fibre 41-32	NE¼ sec. 32 T. 7 N., R. 5 W. Columbia County	Abandoned; dry hole; TD: 2,487.
185	American Quasar Petroleum Co.; Kenneth Wetgen et al. 26-32	NE¼ sec. 26 T. 13 S., R. 4 W. Linn County	Abandoned; dry hole; TD: 2,620.
186	American Quasar Petroleum Co.; Wolverton 13-31	NE¼ sec. 13 T. 10 S., R. 3 W. Marion County	Abandoned; dry hole; TD: 4,555.
187	Reichhold Energy Corp.; Ellis 23-26	SW¼ sec. 26 T. 5 N., R. 4 W. Columbia County	Permit issued.
188	American Quasar Petroleum Co.; Chipman 4-14	SW¼ sec. 4 T. 12 S., R. 2 W. Linn County	Permit issued.
–	Miller Drilling Co.; Bork 2	SE¼ sec. 26 T. 8 S., R. 5 W. Polk County	Application.
190	Reichhold Energy Corp.; Lee 32-32	NE¼ sec. 32 T. 7 N., R. 5 W. Columbia County	Permit issued.
191	Reichhold Energy Corp.; Paul 34-32	SE¼ sec. 32 T. 7 N., R. 5 W. Columbia County	Permit issued.

Table 1. *Oil and gas permits and drilling activity in Oregon, 1981—continued*

Permit no.	Operator and well name	Location	Status and depth TD = total depth (ft) RD = redrill (ft)
192	American Quasar Petroleum Co.; Benson Timber 8-14	SW¼ sec. 8 T. 6 N., R. 4 W. Columbia County	Abandoned; dry hole; TD: 2,196.
193	Oregon Natural Gas Development; Patton 13-33	SW¼ sec. 33 T. 8 N., R. 8 W. Clatsop County	Permit issued.
194	Quintana Petroleum Corp.; Gath 1	SE¼ sec. 16 T. 8 S., R. 2 W. Marion County	Abandoned; dry hole; TD: 6,002.
195	Oregon Natural Gas Development; Patton 21-10	NW¼ sec. 10 T. 7 N., R. 8 W. Clatsop County	Permit issued.
196	Oregon Natural Gas Development; Johnson 33-33	SE¼ sec. 33 T. 8 N., R. 8 W. Clatsop County	Testing; TD: 10,006.
197	Reichhold Energy Corp.; Longview Fibre 12-33	NW¼ sec. 33 T. 7 N., R. 5 W. Columbia County	Completed; gas; TD: 2,407; RD: 2,475.
198	Reichhold Energy Corp.; Columbia County 44-2	SE¼ sec. 2 T. 6 N., R. 5 W. Columbia County	Permit issued.
199	Oregon Natural Gas Development; Patton 32-9	NE¼ sec. 9 T. 7 N., R. 8 W. Clatsop County	Permit issued.
200	Reichhold Energy Corp.; Hansen 44-15	SE¼ sec. 15 T. 6 N., R. 5 W. Columbia County	Abandoned; dry hole; TD: 2,782.
201	Reichhold Energy Corp.; Cadenza 34-1	SE¼ sec. 1 T. 6 N., R. 5 W. Columbia County	Abandoned; dry hole; TD: 2,826.
202	Florida Exploration Co.; Florida Exploration 1-4	NE¼ sec. 4 T. 21 S., R. 6 W. Douglas County	Permit issued.
203	Reichhold Energy Corp.; Columbia County 41-2	NE¼ sec. 2 T. 6 N., R. 5 W. Columbia County	Permit issued.
204	Reichhold Energy Corp.; Case 24-32	SW¼ sec. 32 T. 7 N., R. 5 W. Columbia County	Permit issued.
205	Reichhold Energy Corp.; Columbia County 32-33	NE¼ sec. 33 T. 7 N., R. 5 W. Columbia County	Permit issued.
206	Reichhold Energy Corp.; Columbia County 33-28	SE¼ sec. 28 T. 7 N., R. 5 W. Columbia County	Permit issued.
207	American Quasar Petroleum Co.; Weber Farms 12-22	NW¼ sec. 12 T. 13 S., R. 3 W. Linn County	Permit issued.
208	Reichhold Energy Corp.; Wilson 12-5	NW¼ sec. 5 T. 6 N., R. 5 W. Columbia County	Permit issued.
209	Reichhold Energy Corp.; Columbia County 43-5	SE¼ sec. 5 T. 6 N., R. 5 W. Columbia County	Permit issued.

sec. 15, T. 6 N., R. 5 W., and Crown Zellerbach 42-1 in sec. 1, T. 6 N., R. 5 W. Well 4 awaits repair or redrilling, while production from 42-1 awaits completion of a pipeline connection.

Price on Mist gas, controlled by the Federal Energy Regulatory Commission (FERC), varied during the year from $2.67 to $2.97 per million Btu. The total value for the 5 billion cubic feet of gas withdrawn for the year is $12.8 million. The Mist production comprised about 3 percent of the supply for Northwest Natural Gas, the gas utility serving the area. The remaining gas came from Canada and from New Mexico.

OTHER DEVELOPMENTS

Seismic surveys are a major exploration tool used by the industry prior to drilling. The increase in the number of surveys has paralleled the growth in leasing activity in the state. Several companies have conducted surveys in many parts of the state, notably AMOCO on the Weyerhaeuser property in the coastal counties. In addition, companies such as May Petroleum have made use of magnetotellurics to examine structures beneath the volcanic rocks of central and eastern Oregon. Exxon conducted its seismic studies during November off the coast of Oregon and Washington, rather than onshore. Such geophysical surveys in Oregon suggest that further drilling programs can be expected in future years.

Northwest Natural Gas applied to the Oregon Energy Facility Siting Council for permission to use the Mist Gas Field as a gas storage site. As the two producing pools deplete, the utility is putting plans in place to store 10 billion cubic feet of gas during periods of low demand, to be withdrawn during periods of high demand. After a public hearing, the Siting Council approved the application with the provisions that the project not adversely affect the wildlife habitat or socio-economic base of the area. The $7.5-million project will include the installation of compressors and one or more large-diameter injection wells. One such well, Columbia County 32-10, has already been drilled.

Base and pipe racks of new ROVOR drilling rig.

Oregon now has its own deep drilling rig. ROVOR, a partnership of Riedel International, Voorhees, and Northwest Natural Gas, has bought and is operating a new 14,000-foot rig. The $5-million rig was used to drill the Oregon Natural Gas well Johnson 33-33 (Table 1) and is now contracted to Shell Oil in Yakima, Washington. The rig was purchased from National Supply in Edmonton, Alberta, and will be used primarily in Oregon and Washington. □

Surface mined land reclamation in Oregon, 1981

by Paul F. Lawson, Supervisor, Mined Land Reclamation Program, Albany Field Office, Oregon Department of Geology and Mineral Industries

ABSTRACT

The Mined Land Reclamation (MLR) Program completed a busy and successful year that saw a 17-percent increase in the total acreage bonded; a 34-percent increase in the number of field inspections; major changes in the law, including much stricter requirements for coal and metal mines; and the initiation of an awards program to recognize outstanding reclamation.

LEGISLATION

There were three significant legislative changes to the program. On July 2, 1981, House Bill 2220 of the Oregon Legislative Assembly became law, raising the permit fees for surface mining (provided in ORS 517.800). The Mined Land Reclamation Program is 90 percent funded by the industry which it regulates. The fee increase is designed to maintain the self-sufficiency of the program through the 1981-1983 biennium.

House Bill 2160, which became law on August 17, 1981, contains the other two changes. In one provision which applies to all mined commodities, the threshold figure of disturbed surface requiring a permit is changed from 2,500 cubic yards to 5,000 cubic yards minimum. The major changes included in H.B. 2160, however, apply only to coal and metal mines which receive permits after the effective date of the new law and are designed to place greater emphasis on the protection and rehabilitation of surface and subsurface aquifers, on the recognition and assessment of any toxic or radioactive materials present in any area or stage of the mining operation, and on the handling of such hazardous materials during mining and reclamation according to previously developed plans.

Before issuing a permit to a coal or metal mining operation, the Oregon Department of Geology and Mineral Industries must find now that reclamation is possible and that the approved plan will achieve the reclamation of the affected lands. An operator who willfully abandons a site under these provisions shall not obtain another permit until he has reclaimed the abandoned site. The maximum bond or security authorized under these sections is $10,000 per acre of land to be surface mined, and the bond can be used by the Department to reclaim ground abandoned by an operator. The maximum fine for violation of rules and orders pursuant to the added sections of the law or for the operation of a coal or metal mine without a valid operating permit is $10,000.

RECLAMATION AWARD

At its April 9, 1981, meeting, the Department's Governing Board approved a proposal to recognize and honor an outstanding example of mined land reclamation each year. The award is intended to reward outstanding achievements by operators and to further the goal of reclamation by recognition and appropriate publicity. The first of these awards is to be announced in June 1982, and the Department and the Mined Land Reclamation Program welcome nominations from any source. This year's nomination deadline is April 15.

STATUS OF THE MLR PROGRAM

Total surface reclaimed (in acres):
1980: 106
1981: 326
1972 through 1981: 769

Total acreage under security to guarantee reclamation:
December 31, 1980: 2,173
December 31, 1981: 2,606

Uses to which acreage was reclaimed:

	Agriculture	Forestry	Housing	Other*
1972 through 1980:	251	6.5	37	148
During 1981:	168	7.0	21	129.5
Total	419	13.5	58	277.5

* "Other" includes water impoundments, sites for wildlife management, industrial-commercial sites, and permanent stockpiles.

New and closed sites, 1980 and 1981:
(Permits issued for new sites, records closed, sites reclaimed, or activity legally terminated)

	Surface mining permit[1]		Limited exemption[2]		Total exemption[3]	
	New	Closed	New	Closed	New	Closed
1980:	46	19	34	4	46	3
1981:[4]	84	32	50	7	51	26

[1] Sites requiring a fee, reclamation, and security.
[2] Sites requiring a fee, but legally exempt from reclamation and security.
[3] Sites legally exempt from fee, reclamation, and bonding.
[4] There were 71 other changes in status from one category to another during 1981.

Total number of sites under permit:

	Surface mining permit and limited exemption	Total exemption
As of December 31, 1980:	615	571
As of December 31, 1981:	703	587

Field inspections:
1980: 681
1981: 912 □

GSOC luncheon meetings announced

The Geological Society of the Oregon Country (GSOC) holds noon meetings in the Standard Plaza Building, 1100 SW Sixth Avenue, Portland, in Room A adjacent to the third floor cafeteria. Topics of upcoming meetings and speakers include:

March 19—*Native Clays and Glazes for North American Potters*: by Ralph Mason, geologist, retired.

April 2—*The Channeled Scablands of Eastern Washington: Geologic Story of the Spokane Flood:* by Donald D. Barr, naturalist and lecturer.

April 16—*Bella Colla and Beyond by Freighter:* by Phyllis and John Bonebrake, members and president of GSOC, 1975.

For additional information, contact Viola L. Oberson, Luncheon Chairwoman, phone (503) 282-3685. □

Western U.S. has at least 75 potentially active volcanic fields

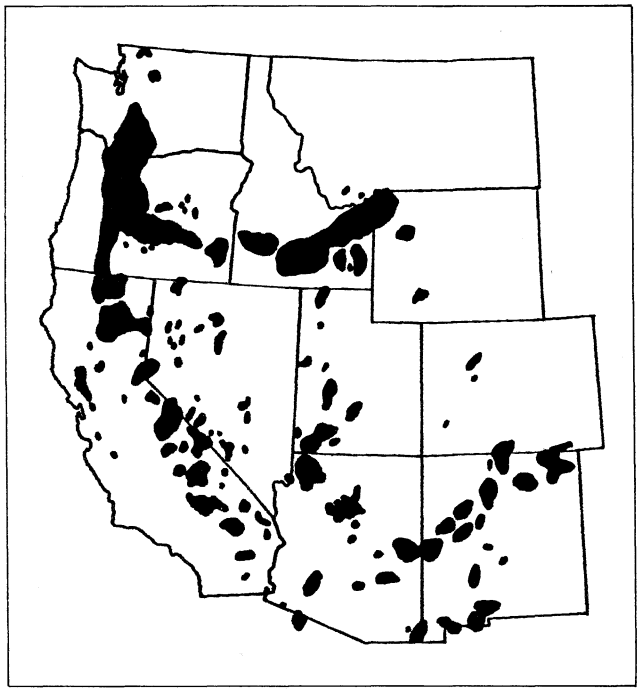
In addition to about 15 volcanic centers in the Cascade Range and vicinity, there are at least 60 other identifiable volcanic centers in 11 western states which have the potential for future eruptions, U.S. Geological Survey (USGS) geologists Robert L. Smith and Robert G. Luedke announced at the December 1981 American Geophysical Union annual meeting in San Francisco.

Smith and Luedke described the results of a map compilation project designed to investigate potentially active volcanic zones and centers in the western United States, including Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The scientists say that they are not suggesting that an eruption from any of these volcanic fields is imminent, but that the probability for eruptions exists and therefore further studies are essential for adequate long-term land-use planning.

The distribution of volcanoes, volcanic fields, and volcanic rocks younger than 16 m.y. old in the western states suggests that (1) most of the volcanic activity has occurred along major linear zones, (2) any volcanic field that appeared during the last 5 m.y. may still be potentially active, and (3) new volcanic centers could form within the linear zones at any time.

The USGS spokesmen said that these conclusions are reinforced by the observation that many volcanic centers have demonstrated long life spans that have ranged from 1 to more than 10 m.y. The history of any volcanic field contains both major cycles of high activity and long cycles of no activity. The scientists noted that the timing of the intervals of volcanic activity can be characterized only in a very general way: for some volcanic centers the interval of dormancy may last 100 or 1,000 years; for others, 10,000 years; and for very large volcanic systems, 100,000 or even a million years may elapse between eruptions.

The USGS scientists concluded that further detailed studies of the volcanic centers are needed before scientists can truly understand volcanic processes and evaluate the probability of future eruptions of volcanic centers that have not erupted during the last 200 years. □



Dark areas show volcanic fields that have produced eruptions during the past 5 million years (m.y.) and that should be considered still potentially active, according to U.S. Geological Survey scientists. Map courtesy U.S. Geological Survey.

Annual Meeting of Geothermal Resources Council set for October in San Diego

The Geothermal Resources Council's (GRC) 1982 Annual Meeting will be held October 11-14, 1982, at the Sheraton Harbor Island Hotel in San Diego, California. There will be three days of technical sessions, along with poster sessions, special sessions, commercial and educational exhibits, a photo contest display, optional luncheons, special entertainment, and a guest program. In addition, both pre- and post-meeting field trips have been scheduled.

The meeting, which will officially begin with a reception on the evening of October 11, will feature a number of events for participants to choose from. A total of ten technical sessions is planned, at which formal oral presentations will be given. Special emphasis will be given to a separate poster session, and special sessions may be devoted to particular topics.

The Council's Annual Meeting is intended to provide a forum of exchange of new and significant information on the development and use of geothermal resources. Papers are solicited for both the technical and poster sessions on various aspects of geothermal energy and its development, including exploration, field development, applications, and politics-economics.

Authors may request that submitted papers be considered for oral presentation in the technical sessions, poster session presentation, or for publication only—or for a combination of the above. Deadline for submission of papers is Friday, June 4, 1982. Authors should consult with GRC for instructions.

For additional information about papers or the meeting, contact Geothermal Resources Council, P.O. Box 98, Davis, CA 95617, phone (916) 758-2360. □

Gryc appointed USGS Assistant Director, Western Region

George Gryc of Sunnyvale, Calif., a geologist widely recognized for his contributions to Alaskan geology, has been appointed Assistant Director for the Western Region, U.S. Geological Survey (USGS), Department of the Interior, at Regional Headquarters in Menlo Park, California.

Gryc has been acting in this capacity for the past several months while continuing his duties as chief of the Office of National Petroleum Reserve in Alaska (ONPRA). He has headed that office since 1977.

As Assistant Director, Gryc is the personal representative of the Director of the Geological Survey. He provides policy guidance, coordination of Survey activities, and liaison with federal, state, and local agencies in the states of Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington, as well as in the Pacific Trust Territories. □

OIL AND GAS NEWS

Mist Gas Field:

Drilling activity has resumed at the Mist Gas Field, where Reichhold Energy Corporation has drilled Columbia County 41-2 in sec. 2, T. 6 N., R. 5 W. The straight hole, drilled to 2,875 ft, was dry, and at last report, the 3,040-ft redrill was being logged.

Reichhold now plans to redrill Columbia County 12-9, which they drilled and suspended in 1980.

Clatsop County:

Diamond Shamrock holds much land under lease in Clatsop County and drilled three wells there last year (see article beginning on page 27, this issue). In 1982 the company plans to return to drill several more wells in the county. Locations have not yet been announced, but a June spud date is planned.

Douglas County:

An application from Florida Exploration Company to drill in sec. 4, T. 21 S., R. 6 W., has been the subject of two public hearings. At the second hearing, held February 18, 1982, in Roseburg, the Governing Board of the Oregon Department of Geology and Mineral Industries approved Florida's application. □

DOGAMI assessing mineral potential of wilderness study areas for BLM

The Oregon State Office of the Bureau of Land Management (BLM) has contracted with the Oregon Department of Geology and Mineral Industries (DOGAMI) to assess the mineral potential of approximately 800,000 acres of wilderness study areas in southeastern Oregon.

The $300,000 contract, which is to be completed by the spring of 1983, will include the assessment of the mineral potential of Steens Mountain, the Pueblo and Trout Creek Mountains, and Owyhee River areas, including the Honeycombs on the east side of the Owyhee River. The contract is the first phase of a three-phase proposal to inventory mineral potential of BLM's wilderness study areas in eastern Oregon.

BLM's Oregon State Director William G. Leavell commented, "This will add to our knowledge of energy and mineral potential in areas where this information is lacking. The results will contribute to intelligent wilderness study recommendations for BLM lands in Oregon."

Mineral potential is one of the many criteria BLM will use to determine whether or not areas will be recommended for wilderness designation. Suitability and non-suitability recommendations will be made to BLM's Director in Washington, D.C., and forwarded through the Secretary of the Interior to the President. The President will then make his recommendations to Congress. Only Congress can designate wilderness areas.

The contract calls for geological and geochemical surveys to identify areas with economic mineral potential. Samples will be analyzed for arsenic, barium, beryllium, cobalt, copper, gold, lead, manganese, mercury, molybdenum, nickel, silver, tin, tungsten, uranium, and zinc. Available information such as magnetic, geothermal, and gravity surveys will also be reviewed and integrated in the evaluation. □

Mineral deposits map of North America published by USGS

A map that shows more than 4,000 ore deposits of North America on a geologic background has been published by the U.S. Geological Survey (USGS). The 14-color map, titled *Preliminary Metallogenic Map of North America* (scale 1:5,000,000), depicts the geology and ore deposits from Greenland to Panama, including the islands of the Caribbean. It is 5×6 ft and printed in four sheets.

Colors and patterns on the map depict the rocks of North America and provide information on the amount of structural deformation, degree of metamorphism, chemical nature, and age of various units. The location, metal and mineral content, relative size, host-rock environment, igneous-rock association, type, and geologic age of 4,215 ore deposits and districts are shown on the map by colored symbols superimposed on the geology. Deposits of 26 metals that occur plus those of 15 of the more important nonmetallic minerals are distinguished on the map.

The map is the product of a cooperative effort by the geological surveys of the continent; the project was initiated in 1964 under the aegis of the Commission for the Geological Map of the World, an affiliate of the International Union of Geological Sciences.

Copies of the *Preliminary Metallogenic Map of North America* (four sheets) may be purchased for $10.00 a set from Branch of Distribution, U.S. Geological Survey, 1200 South Eads St., Arlington, VA 22202, or Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225. Orders must specify the map by name and include a check or money order payable to the U.S. Geological Survey. Copies of the companion reports, USGS Circular 858-A, *Preliminary Metallogenic Map of North America: A Numerical Listing of Deposits*, and USGS Circular 858-B, *An Alphabetical Listing of Deposits*, are free upon application to Text Products Section, Branch of Distribution, U.S. Geological Survey, 604 South Pickett St., Alexandria, VA 22304. □

Theme of PNMM conference to be "Discovery '82"

The Pacific Northwest Metals and Minerals Conference will hold its annual convention at the Sheraton Hotel in Spokane, Washington, on April 29 and 30 and May 1, 1982. The theme of the conference is "Discovery '82." The event is sponsored by the Pacific Northwest Sections of the American Institute of Mining, Metallurgical and Petroleum Engineers and by the American Society for Metals.

"Discovery '82" will explore new horizons, opportunities, and concepts for the mineral industry in 1982. Over 40 papers addressing the economics and geological setting of strategic minerals, the problems of shaft and small mining developments, the occurrence of precious metal deposits and the glamour of new discoveries, the changing governmental regulations facing the mining industry, and the advances in the aluminum casting technology will be presented.

For more information relating to the conference, please contact George Krempasky, Registration Chairman, U.S. Bureau of Mines, E. 360 Third Avenue, Spokane, WA 99202, phone (509) 456-5350. □

Available publications

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