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GEOTHERMAL STUDIES IN THE VALE AREA, MALHEUR COUNTY, OREGON

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Introduction

The Oregon Department of Geology and Mineral Industries has been engaged in studies of Oregon's geothermal energy potential for the past 10 years. The results of these activities have been described by Groh (1966), Peterson and Groh (1967), Bowen (1972), and Bowen and Blackwell (1973). Detailed studies of heat flow have been conducted since 1972 in the vicinity of Vale, Malheur County in southeastern Oregon (see Figure 1) under contract No. S0122129 with the U.S. Bureau of Mines. The studies, initiated by G. Bowen in cooperation with Dr. David D. Blackwell of Southern Methodist University, Dallas, Texas, are continuing, and a detailed report is being prepared summarizing the geothermal research conducted by the Department to date. The preliminary results tabulated herein are being released in the hope they will aid in the exploration for and development of geothermal resources.

The final phase of the current geothermal investigation of the Vale area, consisting of the drilling of five holes to obtain heat-flow data, was completed in May and June 1975. Temperature gradients measured in the drill holes are given in Table 1. Thermal conductivity measurements on drill core from these holes and heat-flow calculations are in progress. All gradients are uncorrected for topographic effects. Hole locations are shown in Figure 1.

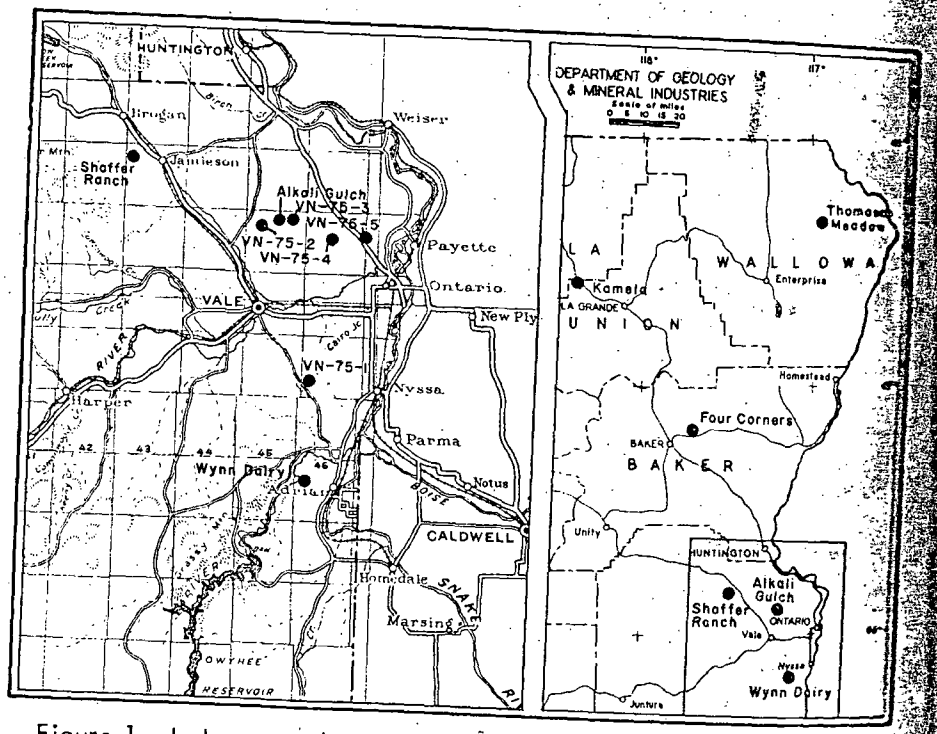

Figure 1. Index maps showing locations of temperature-gradient measurements taken by the Oregon Department of Geology and Mineral Industries between 1972 and 1975. Blow-up of Vale area map on left shows location of holes listed on Table 1; regional map on right shows location of holes listed on Table 2.

Temperature Gradients

Four of the five holes in the Vale area were drilled to a depth of 152 meters (500 feet) in siltstone of the Idaho Group of Pliocene age. Hole VN-75-2 was drilled in silty claystone from 0 to 95 feet and in altered basalt from 95 feet to a total depth of 203 feet. Drilling was done by a combination of air rotary, down-hole hammer, and coring techniques.

Hole VN-75-2 encountered warm artesian water at a depth of 105 feet which flowed at a rate of 10 to 14 gallons per minute with a temperature of 75°F (24°C) and a well-head pressure of 5 pounds per square inch. The average gradient, as shown in Table 1, was measured after the hole had been cemented to stop the artesian flow, but the gradient reflects the presence of warm thermal water at shallow depth.

Table 1. Temperature gradients in the Vale area, Malheur County

Hole	Section	Township	Range	Depth	Average gradient (°C/km)
VN-75-1	30	19 S.	46 E.	152m (500 ft)	91.9
VN-75-2	8	17 S.	45 E.	62m (203 ft)	153.8
VN-75-3	2	17 S.	45 E.	152m (500 ft)	71.5
VN-75-4	16	17 S.	46 E.	152m (500 ft)	115.3
VN-75-5	13	17 S.	46 E.	152m (500 ft)	73.4

The Department also has a continuing program of measuring temperature gradients in pre-drilled holes such as water wells and mineral exploration holes. The results from holes measured from 1971 through 1973 were placed on open file status in March 1975. Holes probed in 1974 and 1975 are summarized below in Table 2. Detailed temperature logs from all of the holes listed in Tables 1 and 2 are available for inspection, or copying at cost, in the Portland, Grants Pass, and Baker offices of the Department.

Table 2. Temperature gradients in pre-drilled holes

Locality	Section	Township	Range	County	Depth	Average gradient (°C/km)
Thomason Meadow	26	3 N.	47 E.	Wallowa	65m (213 ft)	23.0
Kamela	36	1 S.	35 E.	Union	70m (230 ft)	24.5
Four Corners	34	8 S.	41 E.	Baker	130m(427 ft)	42.7
Schaffer Ranch	7	16 S.	43 E.	Malheur	115m(377 ft)	33.4
Alkali Gulch	3	17 S.	45 E.	Malheur	180m(591 ft)	61.4
Wynn Dairy	7	21 S.	46 E.	Malheur	70m(230 ft)	108.1

References

Bowen, R. G., 1972, Geothermal gradient studies in Oregon: Ore Bin, v. 34, no. 4, p. 68-71.

Bowen, R. G., and Blackwell, D. D., 1973, Progress report on geothermal measurements in Oregon: Ore Bin, v. 35, no. 1, p. 6-7.

Groh, E. A., 1966, Geothermal energy potential in Oregon: Ore Bin, v. 28, no. 7, p. 125-135.

Peterson, N. V., and Groh, E. A., 1967, Geothermal potential of the Klamath Falls area, Oregon, a preliminary study: Ore Bin, v. 29, no. 11, p. 209-231.

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!!! CORRECTION !!!

GEOTHERMAL INFORMATION TELEPHONE NUMBER

In the May issue of The ORE BIN (page 85), the telephone number given for Don Hull, geothermal specialist at the Baker Field Office, should be changed to 503 - 523-3133. Our apologies for inconvenience this may have caused you.

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GEOTHERMAL LEASE BIDS ANNOUNCED ON ALVORD KGRA

...table bonus bids totaling $179,604.82 have been received on 14 of the ...its designated for geothermal leasing in the Alvord Known Geothermal ...ce Area (KGRA) in Harney County, Oregon. The bids cover 31,182 ... of the 92,000 acres offered for lease; one unit was withdrawn from ...g by BLM. Bids on six of the units were determined to be unacceptable by the U.S. Geological Survey and Bureau of Land Management. ...e were no bidders on 23 of the parcels. Successful bidders for the ...5, 1975 sale were as follows:

Al-Aquitaine Explorations	Unit 7	2,560 acres	$7.17 per acre
Al-Aquitaine Explorations	Unit 8	2,400 acres	3.83
Al-Aquitaine Explorations	Unit 12	2,560 acres	6.51
Republic Geothermal	Unit 15	1,920 acres	2.07
Republic Geothermal	Unit 16	649 acres	5.38
Republic Geothermal	Unit 17	2,560 acres	2.07
Republic Geothermal	Unit 18	2,560 acres	10.56
Republic Geothermal	Unit 21	2,402 acres	2.13
Chevron Oil Co.	Unit 24	2,561 acres	17.90
Mapco, Inc.	Unit 30	2,397 acres	4.47
Mapco, Inc.	Unit 31	1,920 acres	2.17
Mapco, Inc.	Unit 32	2,016 acres	6.03
Getty Oil Co.	Unit 34	2,126 acres	5.25
Southern Union Production Co.	Unit 42	2,560 acres	2.53

Following a hearing in the U.S. District Court June 10, 1975, on a ...on filed by environmental groups to halt geothermal leasing in the ...d KGRA, the Court allowed the 14 leases to be awarded.

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CITIZENS' FORUM ON ENERGY PUBLISHED

...ceedings of the Citizens' Forum on Potential Future Energy Sources" has ...published by the Oregon Department of Geology and Mineral Industries ...ellaneous Paper 18. Six papers presented at the Forum, held at Port... State University January 17, 1974, are contained in the volume. Wind ..., solar energy, geothermal power, oil-shale conversion, and coal-to-... process are discussed by authorities in those fields. The 62-page publi..., illustrated with many photographs and line drawings, is for sale by ...Department at its Portland, Baker, and Grants Pass offices for $2.00.

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