

By
David J. Doherty
1979

EXPLANATION

DISCUSSION

During the summer and fall of 1978, the U.S. Department of Energy, in cooperation with the U.S. Geological Survey, drilled three exploration wells on the eastern Snake River Plain, Idaho. The wells range in depth from 2,000 ft (610 m) to 3,000 ft (914 m). The wells were drilled to obtain relatively deep, subsurface, geologic information in three areas that have distinctly different types of geology.

Two of the wells are located on the Idaho National Engineering Laboratory, between Arco and Idaho Falls, Idaho (Doherty, 1979). The third well, located in Sugar City, Idaho, has been described by Embree and others (1978).

This preliminary report describes the lithology and shows the temperature distribution and geophysical logs of Well #1, located between East Butte and Middle Butte, in the NE 1/4, sec. 22, T. 2 N., R. 32 E., Bingham County, Idaho. This well was sited by the U.S. Geological Survey to obtain information on (1) the character and distribution of rhyolite rocks, (2) the structural relations of the rhyolite rocks with basalt lava flows, (3) the age of the rocks encountered in the well, (4) the nature and extent of alteration of the rocks, and (5) the heat flow in this area.

The geology of this area has been described briefly in earlier reports by Robertson and others (1974), Nace and others (1975), and Walker (1964). The geology of this area of the eastern Snake River Plain has recently been mapped by Kuntz and others (1979). K-Ar dates of the rhyolitic rocks of nearby East Butte are 0.6 ± 1 m.y. (G. B. Dalrymple, written commun., 1978), and the basalts capping Middle Butte are 1.9 ± 1.2 m.y. (Armstrong and others, 1975).

Continuing studies of rocks from this well will investigate their age, chemistry, and alteration. Drilling of Well #1 began June 15, 1978, and ended August 5, 1978; rhyolite was the predominant rock type encountered. The rhyolite is 1,327 ft (404 m) thick, covered by 388 ft (118 m) of basaltic lava flows and underlain by 285 ft (87 m) of dense, altered basaltic lava flows. The rhyolite is flow banded to flow brecciated, vitric to devitrified, vapor-phase crystallized, slightly altered, and mostly aphanitic. Vapor-phase crystallization includes growths of sanidine and cristobalite in fractures and vesicles. A spherulitic texture is developed where vesicles are filled by vapor-crystallization products. Alteration is common in the lower one third of the well and consists of yellow, green, and dark-blue clays along fractures and in vesicles. Olivine phenocrysts in the basalts are altered to serpentine near the bottom of the well.

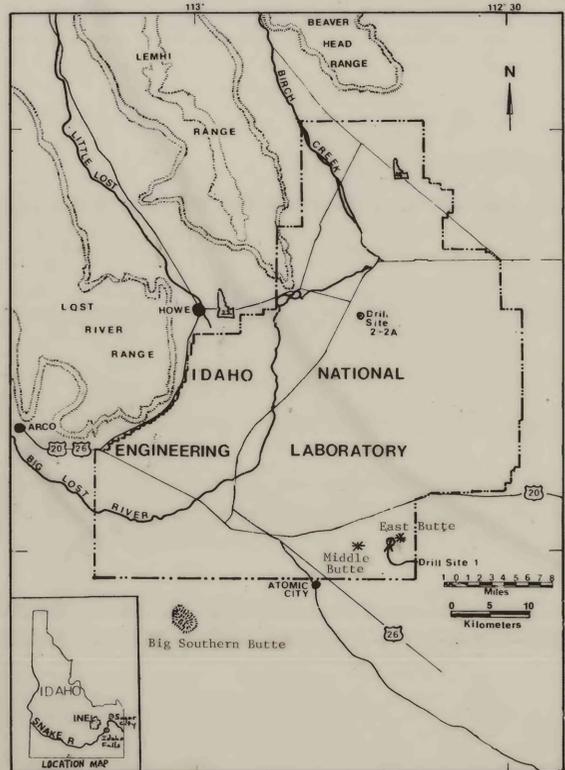
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GEOPHYSICAL LOGS

Log No.	Type	Date Logged	Logged Interval Feet	Logged Interval Meters
1	Caliper ^{2/}	8-5-78	820-1975	250-602
2	Temperature ^{1/}	8-5-78	0-1925	0-587
3	Temperature ^{3/}	9-10-78	0-1987.6	0-545
4	Spontaneous Potential ^{1/}	8-5-78	925-1925	282-587
5	Resistivity ^{1/}	8-5-78	925-1925	282-587
6	Neutron ^{2/}	8-5-78	0-1982	0-604
7	Gamma-Gamma ^{1/}	8-5-78	0-1925	0-587
8	Gamma ^{1/}	8-5-78	0-1925	0-587

- ^{1/} Logged by EG&C, Idaho Inc., Idaho National Engineering Laboratory, Idaho Falls, Idaho 83401.
^{2/} Logged by the U.S. Geological Survey, Idaho National Engineering Laboratory, Idaho Falls, Idaho 83401.
^{3/} Logged by Charles A. Brott and David D. Blackwell, Institute for the Study of Earth and Man, Geothermal Laboratory, 253 Heroy Building, Southern Methodist University, Dallas, Texas 75275.



INDEX MAP

