

**Discussion**

Sugar City is located at the eastern edge of the Snake River Plain in Madison County, Idaho. During the summer of 1977 the U.S. Geological Survey, in cooperation with the U.S. Department of Energy, conducted an extensive geophysical and geological investigation in the following areas: Sugar City, Rexburg, and Rexburg bench area southeast of Sugar City (Mabey, 1978; Zohdy and others, 1978; and Prostka and Embree, 1978). This study, complemented by previous regional geologic mapping of Prostka and Hackman (1974), suggests that a large, Pliocene caldera complex is centered in the Rexburg-Sugar City area.

From June 12 to August 11, 1978, the U.S. Department of Energy drilled a geological exploration well in the city park, at the southwest corner of Sugar City (SW 1/4 SW 1/4 sec. 4, T. 6 N., R. 40 E.). The drilling program was designed to answer questions regarding the structure and stratigraphy along the margin of this part of the eastern Snake River Plain, to verify the existence of the Rexburg caldera complex, and to collect local heat flow data.

More than 600 m of rhyolitic lava flows and tuffs in this well suggest a local rhyolitic source and therefore substantiates the existence of part of the Rexburg caldera complex beneath the Snake River Plain basalt and sediments in this area.

**REFERENCES**

Christiansen, R. L., and Blank, H. R., Jr., 1972, Volcanic stratigraphy of the Quaternary rhyolite plateau in Yellowstone National Park: U.S. Geological Survey Professional Paper 729-B, B1-B18.

Mabey, D. R., 1978, Gravity and Aeromagnetic Anomalies in the Rexburg Area of Eastern Idaho: U.S. Geological Survey Open-File Report 78-382, 19 p.

Prostka, H. J., and Embree, C. F., 1978, Geology and geothermal resources of the Rexburg area, eastern Idaho: U.S. Geological Survey Open-File Report 78-1009, 14 p.

Prostka, H. J., and Hackman, R. J., 1974, Preliminary geologic map of the NW 1/4 Driggs 10 by 20 quadrangle, southeastern Idaho: U.S. Geological Survey Open-File Report 74-105, scale 1:125,000.

Zohdy, A. A. R., Bisdorf, R. J., and Jackson, D. B., 1978, Simple Total Field and Schlumberger Soundings near Sugar City, Idaho: U.S. Geological Survey Open-File Report 78-709.

**EXPLANATION**

**Structures**

- Highly vesicular
- Amygdaloidal
- Spherulitic
- Lithophysal
- △ Highly fractured

**Mineral and Lithologic Variations**

- A Alteration—undetermined mineralogy, generally along fractures
- C Calcite
- Ca Calcite
- Ch Chalcedony
- Cl Clay (alteration product)
- Cc Calcite crystals in cavities
- D Devitrification (if not typical of rest of unit)
- F Iron oxide staining or alteration
- P Palagonite
- Pr Propylitic alteration
- o Secondary, euhedral quartz in cavities
- s Silt and/or sand in fractures and openings within basalt
- Fl Flow
- Si Sulfidation
- v Vapor phase crystallization (if atypical of unit in general)

**GEOPHYSICAL LOGS**

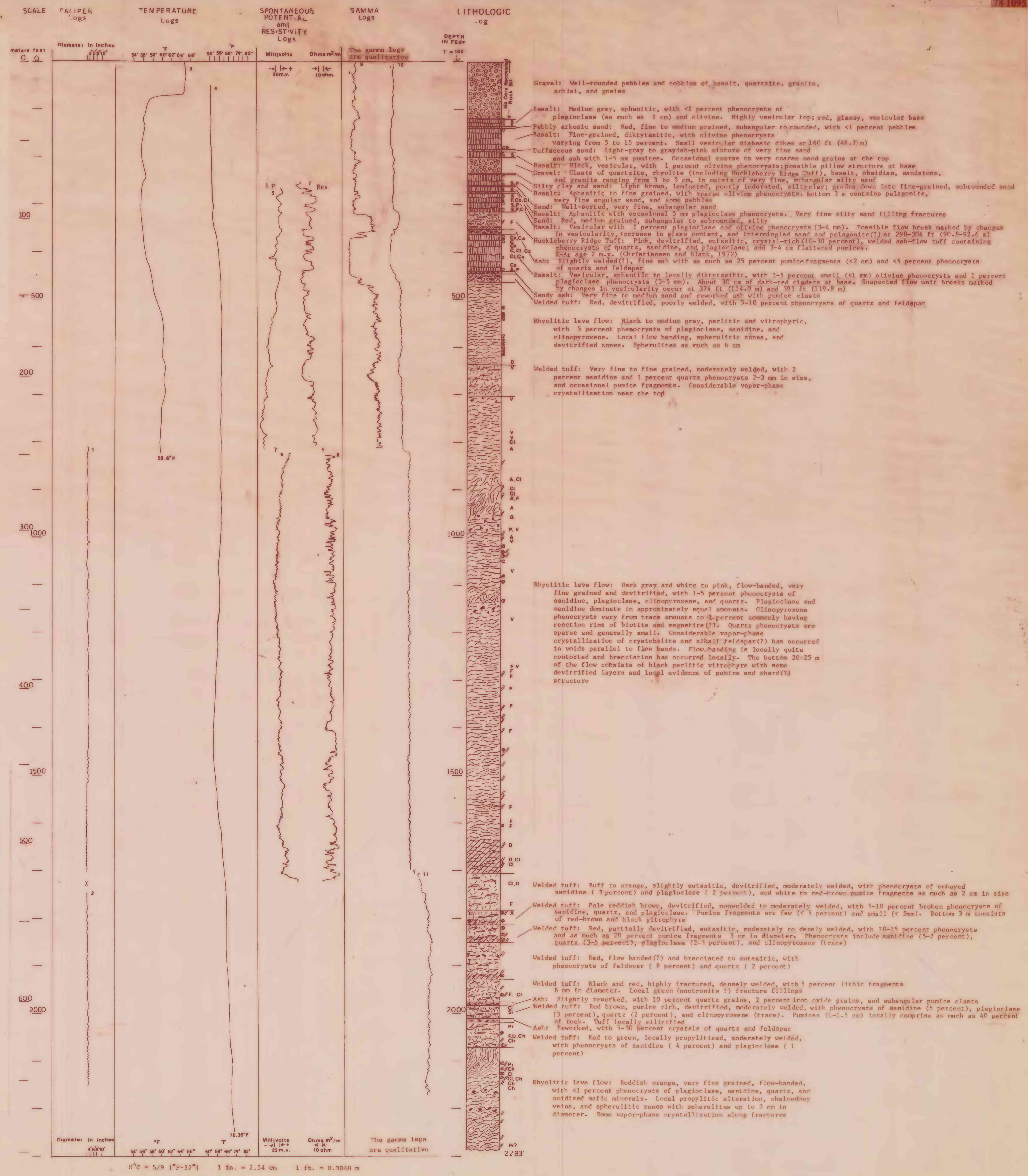
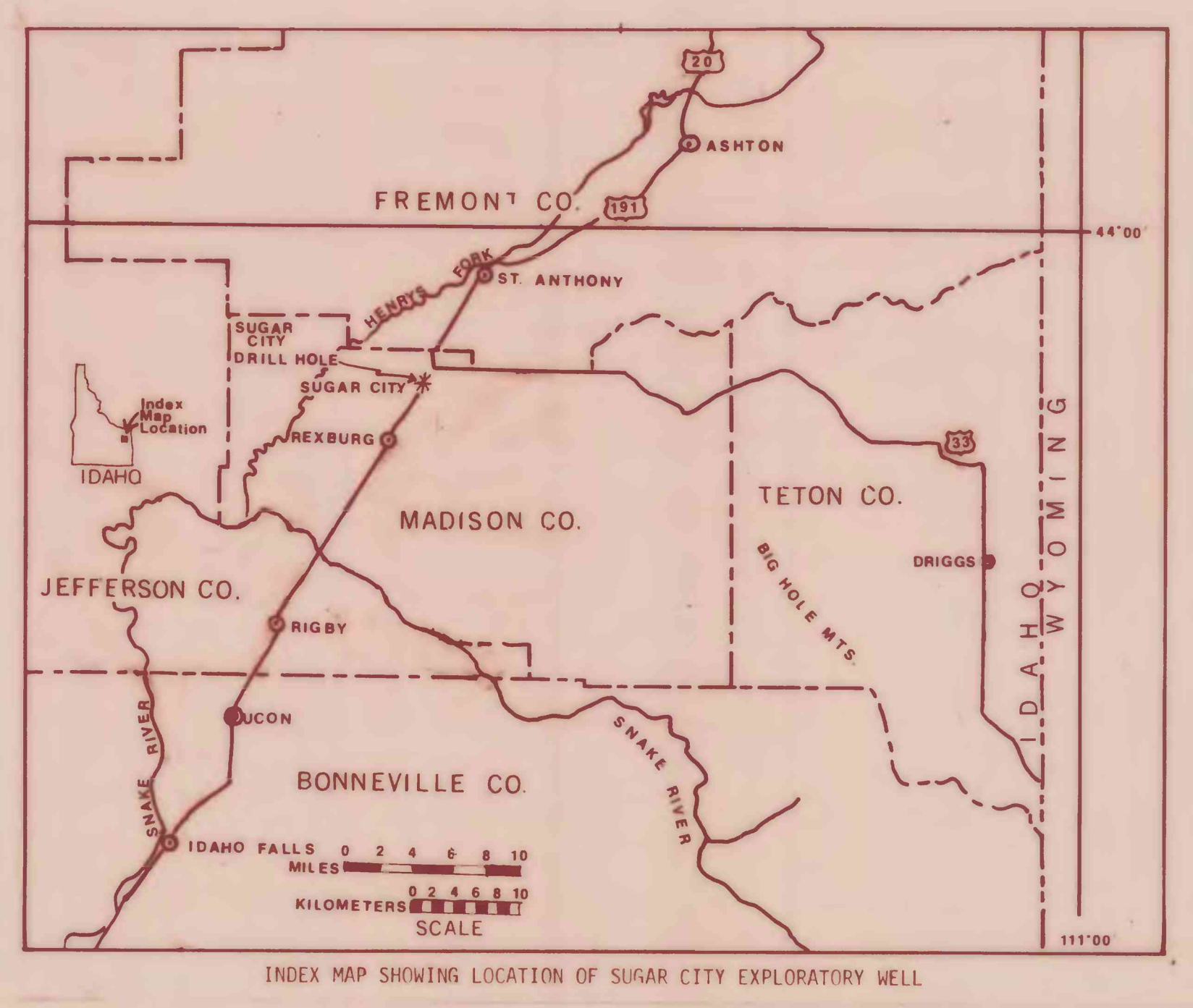
(X, Interval not logged; Y, change in scale between logs.)

Log No.	Log Type	Date	Foot	Meters
1	Caliper <sup>1/</sup>	8-7-78	810-1700	247-518
2	Caliper <sup>1/</sup>	8-7-78	1745-2146	532-654
3	Temperature <sup>2/</sup>	7-12-78	0-812	0-247
4	Temperature <sup>2/</sup>	9-8-78	90-2247	27-685
5	Spontaneous Potential <sup>2/</sup>	7-12-78	266-812	0-247
6	Spontaneous Potential <sup>2/</sup>	8-7-78	820-1725	0-526
7	Resistivity <sup>2/</sup>	7-12-78	266-812	81-247
8	Resistivity <sup>2/</sup>	8-7-78	820-1725	0-526
9	Gamma <sup>2/</sup>	7-12-78	0-812	0-247
10	Gamma <sup>1/</sup>	8-7-78	0-1706	0-520
11	Gamma <sup>1/</sup>	8-8-78	1700-2165	518-660

<sup>1/</sup> Logged by the U.S. Geological Survey, Idaho National Engineering Laboratory, Idaho Falls, Idaho.

<sup>2/</sup> Logged by EG&G, Idaho Inc., Idaho National Engineering Laboratory, Idaho Falls, Idaho 83401.

<sup>3/</sup> 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.



**DRILLING DATA FROM SUGAR CITY EXPLORATION WELL, MADISON COUNTY, IDAHO**  
By  
G. F. Embree, M. D. Lovell, and D. J. Doherty  
1978