DEPARTMENT OF THE INTERIOR
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MAP SHOWING OUTCROPS OF PRE-QUATERNARY BASALTIC ROCKS, BASIN AND RANGE PROVINCE, UTAH

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INTRODUCTION

This map report is one of a series of geologic and hydrologic maps covering all or parts of States within the Basin and Range province of the western United States. The map reports contain detailed information on subjects that characterize the geohydrology of the province, including the ground-water hydrology, ground-water quality, surface distribution of selected rock types, tectonic conditions, areal geophysics, Pleistocene lakes and marshes, and energy and mineral resources. This work is a part of the U. S. Geological Survey's program for geologic and hydrologic evaluation of the Basin and Range province to identify potentially suitable regions for further study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984).

This map was prepared from published geologic maps and reports using the project guidelines defined in Sargent and Bedinger (1984). As used in this study, basaltic rocks include basaltic andesite, shoshonite, banakite, and basalt. The map shows the known occurrences of basaltic rocks more than 2 million years old. The Description of Map Units includes the geologic and, if available, the radiometric age, the lithology, thickness where available, and sources of data for the basaltic units in arbitrarily outlined and numbered areas within counties of the study area. The listed radiometric ages do not necessarily represent the entire age range of a unit.

DESCRIPTION OF MAP UNITS
[To convert feet (ft) to meters, multiply feet by 0.3048]

County-area number	Map Symbol	Geologic and radiometric age in millions of years (m.y.)	Lithology and comments	References for county area
			BEAVER COUNTY	
B-1	Tb	Pliocene and Miocene 6.4±0.3 m.y.	Intensively faulted basalt flows overlie 7 m.y.-old rhyolite dome. Maximum thickness 50 ft. Unit may include some some Pleistocene flows.	Best and others, 1980; Rowley, P. D., U.S. Geological Survey, oral commun., April, 1982
B-2	Tb	Miocene 21.8±0.4 to 22.3±0.4 m.y.	Basalt flows in southern Tushar Mountains, maximum thickness more than 500 ft; probable source is south of Circleville Mountain.	Anderson and Rowley, 1975; Fleck and others, 1975
B-3	Tb	Miocene 13.3±0.3 m.y.	Basalt of Brimstone Reservoir: Several basalt flows bounded by thick tuffs on west side of area. Unit may include some flows as young as early Pleistocene; maximum thickness 500 ft.	Best and others, 1980; Lemmon and Morris, 1979
			BOX ELDER COUNTY	
BE-1	Tb	Tertiary	Lenses of basalt 10 to 60 ft thick interbedded with limestone beds, in Rozel Hills in south one-half of area. Total thickness of limestone-basalt sequence is 1,700 ft. Possibly related to Snake River volcanic flows; resembles Pliocene to Miocene Salt Lake Formation to northwest. Basalts cap low-lying hills. Basalts at Black Mountain not described.	Slentz and Eardley, 1956
BE-2	Tb	Pliocene	Basalt, dark-gray, finely crystalline, slightly to highly vesicular; several flows exposed. Columnar jointing common. Forms low buttes and hills.	Anderson, 1931; Felix, 1956
BE-3	Tb	Tertiary	Basalts in Curlew valley. Similar to basalts of Snake River Group in Idaho.	Baker, 1974
BE-4	Tb	Late Tertiary	Basalt and basaltic andesite flows.	Stokes, 1963
			IRON COUNTY	
I-1	Tb	Miocene 10.8±0.6 m.y.	Basalt.	Best and others, 1980
I-2	Tb	Pliocene and Miocene 10.1±0.2 m.y.	Basalt flows; maximum thickness 50 ft. May include Pleistocene flows.	Best and others, 1980; Rowley, 1978

			JUAB COUNTY	
J-1	Tb	Miocene and Oligocene	Shoshonite and latite flows of Honeycomb Hills, and some tuff; 100 to 200 ft thick. Extensively eroded and faulted.	Hogg, 1972; Turley and Nash, 1980
J-2	Tb	Miocene and Oligocene	Table Knoll banakite: Flows 10 to 15 ft thick, extensively eroded and faulted. Banakite is basaltic rock with olivine and clinopyroxene phenocrysts in a labradorite groundmass.	Hogg, 1972
			MILLARD COUNTY	
M-1	Tb	Pliocene 2.5±0.4 m.y.	Basalt.	Best and others, 1980; Condie and Barsky, 1972
M-2	Tb	Pliocene and Miocene 3.40±0.1 and 6.1±0.3 m.y.	Smelter Knolls area: A 3.4-m.y.-old faulted rhyolite flow-dome complex containing small outcrops of tholeiitic basalt and basaltic andesite about 6 m.y. old.	Turley and Nash, 1980
			TOOELE COUNTY	
T-1	Tv	Oligocene, Eocene, or Paleocene	Volcanic rocks include nepheline basalt. As much as 300 ft thick on east side of Stansbury Mountains.	Hogg, 1972; Moore and Sorensen, 1979
T-2	Tb	Miocene and Oligocene	Banakite flows of Grayback Mountain, about 350 ft thick.	Doelling, 1964; Hogg, 1972
			UTAH COUNTY	
U-1	Tv	Eocene	Gravel, tuff, limestone, and basalt. Basalt is 75 ft or more in thickness.	Bissell, 1963; Proctor and others, 1956
			WASHINGTON COUNTY	
W-1	Tb	Pliocene 2.3±0.1 m.y.	Basalt.	Best and others, 1980
W-2	Tb	Miocene 7.7±0.2 m.y.	Basalt.	Best and others, 1980

REFERENCES CITED

Anderson, A. L., 1931, Geology and mineral resources of eastern Cassia County, Idaho: Idaho Bureau of Mines and Geology Bulletin 14, 169 p.

Anderson, J. J., and Rowley, P. D., 1975, Cenozoic stratigraphy of southwestern High Plateaus of Utah, in Anderson, J. J., Rowley, P. D., Fleck, R. J., and Nairn, A. E. M., Cenozoic geology of southwestern High Plateaus of Utah: Geological Society of America Special Paper 160, p. 1-51.

Baker, C. H., Jr., 1974, Water resources of the Curlew Valley drainage basin, Utah and Idaho: Utah Department of Natural Resources Technical Publication 45, 91 p.

Bedinger, M. S., Sargent, K. A., and Reed, J. E., 1984, Geologic and hydrologic characterization and evaluation of the Basin and Range province relative to the disposal of high-level radioactive waste--Part I, Introduction and guidelines: U.S. Geological Survey Circular 904-A, [in press].

Best, M. G., McKee, E. H., and Damon, P. E., 1980, Space-time-composition patterns of late Cenozoic mafic volcanism, southwestern Utah and adjoining areas: American Journal of Science, v. 280, p. 1035-1050.

Bissell, H. J., 1963, Lake Bonneville: Geology of the southern Utah Valley, Utah: U.S. Geological Survey Professional Paper 257-B, p. 101-130.

Condie, K. C., and Barsky, C. K., 1972, Origin of Quaternary basalts from the Black Rock Desert region, Utah: Geological Society of America Bulletin, v. 83, no. 2, p. 333-352.

Doelling, H. H., 1964, Geology of the northern Lakeside Mountains and the Grassy Mountains and vicinity, Tooele and Box Elder Counties, Utah: Salt Lake City, University of Utah, unpublished, Ph.D. dissertation, 354 p.

Felix, C. E., 1956, Geology of the eastern part of the Raft River Range, Box Elder County, Utah, in Eardley, A. J., and Hardy, C. T., eds., Geology of parts of northwestern Utah: Utah Geological Society, Guidebook to the geology of Utah, no. 11, p. 76-97.

Fleck, R. J., Anderson, J. J., and Rowley, P. D., 1975, Chronology of mid-Tertiary volcanism in High Plateaus region of Utah, in Anderson, J. J., Rowley, P. D., Fleck, R. J., and Nairn, A. E. M., Cenozoic geology of southwestern High Plateaus of Utah: Geological Society of America Special Paper 160, p. 53-61.

Hintze, L. F., compiler, 1980, Geologic map of Utah: Utah Geological and Mineral Survey, scale 1:500,000.

Hogg, N. C., 1972, Shoshonitic lavas in west-central Utah: Provo, Utah, Brigham Young University Geology Studies, v. 19, pt. 2, p. 133-184.

Lemmon, D. M., and Morris, H. T., 1979, Preliminary geologic map of the Frisco Quadrangle, Beaver County, Utah: U.S. Geological Survey Open-File Report 79-724, scale 1:48,000.

Moore, W. J., and Sorensen, M. L., 1979, Geologic map of the Tooele 1°×2° Quadrangle, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1132, scale 1:250,000.

Proctor, P. D., Lemish, John, Wrucker, C. T., Camp, L. W., and Littlefield, R. F., 1956, Preliminary geologic map of the Allens Ranch Quadrangle Utah: U.S. Geological Survey Mineral Investigations Field Studies Map MF-45, scale 1:12,000.

Rowley, P. D., 1978, Geologic map of the Thermo 15-minute Quadrangle, Beaver and Iron Counties, Utah: U.S. Geological Survey Geologic Quadrangle Map GQ-1493, scale 1:62,500.

Sargent, K. A., and Bedinger, M. S., 1984, Geologic and hydrologic characterization and evaluation of the Basin and Range province relative to the disposal of high-level radioactive waste--Part II, Geologic and hydrologic characterization: U.S. Geological Survey Circular 904-B, [in press].

Slentz, L. W., and Eardley, A. J., 1956, Geology of Rozel Hills, in Eardley, A. J., and Hardy, C. T., eds., Geology of parts of northwestern Utah: Utah Geological Society, Guidebook to the geology of Utah, no. 11, p. 32-40.

Stokes, W. L., compiler, 1963, Geologic map of northwestern Utah: Utah Geological and Mineralogical Survey, scale 1:250,000.

Turley, C. H., and Nash, W. P., 1980, Petrology of late Tertiary and Quaternary volcanism in western Juab and Millard Counties, Utah, in Studies in late Cenozoic volcanism in west-central Utah: Utah Geological and Mineral Survey Special Studies 52, p. 1-33.

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