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STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
DONALD A. HULL, STATE GEOLOGIST

GEOLOGY AND MINERAL RESOURCES MAP OF THE ADRIAN QUADRANGLE, MALHEUR COUNTY, OREGON, AND CANYON AND OWYHEE COUNTIES, IDAHO

1989

Base map by U.S. Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1966–67. Field checked 1967

Polyconic projection. 1927 North American datum 10,000-foot grids based on Oregon coordinate system, south zone and Idaho coordinate system, west zone 1000-meter Universal Transverse Mercator grid ticks, zone 11, shown

To place on the predicted North American Datum 1983 move the projection lines 16 meters north and 79 meters east as shown by dashed corner ticks

UTM GRID AND 1967 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

Geology by Mark L. Ferns, Oregon Department of Geology and Mineral Industries

Field work conducted in 1987-1988

Prepared in cooperation with the U.S. Geological Survey and the Idaho Geological Survey as part of the COGEOMAP program

Map reviewed by Michael L. Cummings, Department of Geology, Portland State University, and John D. Beaulieu, Oregon Department of Geology and Mineral Industries

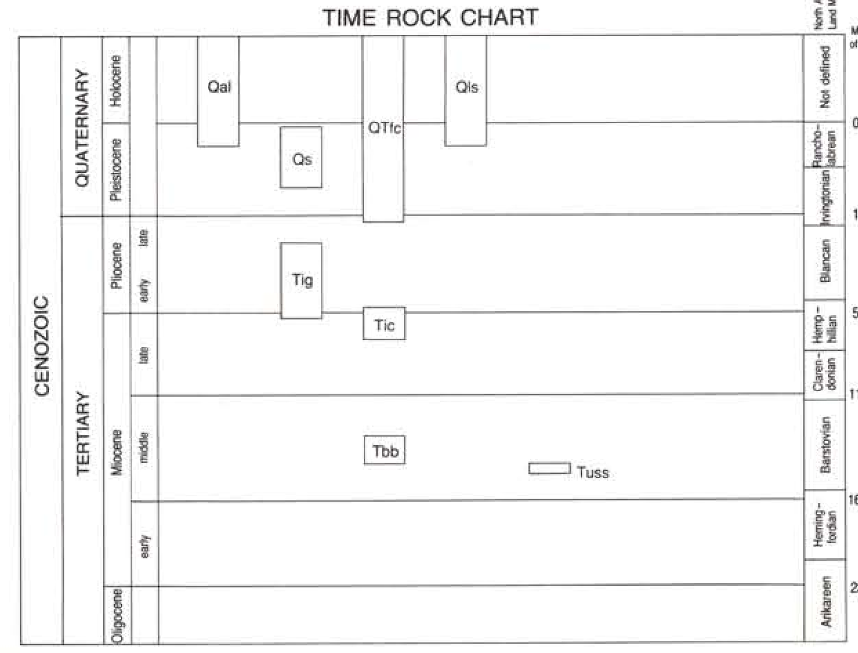
GMS-56

Geology and Mineral Resources Map of the Adrian Quadrangle, Malheur County, Oregon, and Canyon and Owyhee Counties, Idaho

By Mark L. Ferns

Funded in part by the U.S. Geological Survey (COGEOMAP)

TIME ROCK CHART



[1]Dates taken from Palmer (1983)

EXPLANATION

Qal — **Alluvium (Pleistocene and Holocene)**—Unconsolidated and generally poorly sorted deposits of gravels, sands, and silts accumulated in the flood plains of modern streams. Includes bench gravels and aeolian sand deposits along the Snake River

Qls — **Landslide deposits (Pleistocene and Holocene)**—Landslide and slump deposits of unconsolidated and unstratified soil and angular rock fragments formed as the result of bedrock failure

QTfc — **Colluvial and alluvial fan deposits (Pliocene?, Pleistocene, and Holocene)**—Mainly unconsolidated deposits of windblown silt (loess) and sand that mantle the slopes of ridges. Locally includes lag gravels derived from reworking of underlying unit **Tig** near Brown Butte. Includes alluvial fan and slope deposits consisting of unconsolidated coarse gravels and silts deposited by periodic flash floods along Coyote Gulch

Qs — **Unconsolidated and poorly consolidated silt and sandstones (Pleistocene)**—Mainly unconsolidated flood-plain deposits of silt and sand deposited above the existing flood plains of the Owyhee and Snake Rivers. Includes poorly consolidated siltstones on Deer Flat that are capped by unconsolidated gravel deposits. Includes fine-grained flood deposits related to the Bonneville Flood (Malde, 1968). Poorly consolidated siltstones on Deer Flat may be correlative with Pleistocene and late Pleistocene lake deposits such as the Bruneau Formation of Malde and Powers (1962) and the sedimentary rocks of Captain Keeney Pass (Brown, 1982). Represents part of the older and now partially dissected Snake River flood plain that is now above the grade of the modern stream systems

Tig — **Tuffaceous conglomerates and sandstones (upper Miocene? and Pliocene)**—Mainly pebble conglomerates with a quarter of an inch in diameter black chert, basalt, granite, quartz, and rhyolite pebbles and angular fragments of petrified wood. Locally includes underlying medium-grained, cross-bedded arkosic sandstones and interbedded fossiliferous calcareous sandstones. Also includes interbedded white air-fall tuff. Correlated by Smith and others (1982) on the basis of fossils with the basal transgressive sandstones of the Pliocene Glenns Ferry Formation of Malde and Powers (1962). Equivalent to the upper part of unit **Tis** as mapped by Ferns in the Owyhee Dam quadrangle to the west (Ferns, 1989). Sandstones and conglomerates display a yellowish hue and form resistant outcrops near hydrothermal systems where silica and/or carbonate cement has been introduced. Limonitic conglomerates at Brown Butte and in sec. 33, T. 21 S., R. 46 E., are locally cemented by opaline quartz

Tic — **Tuffaceous siltstones and sandstones (upper Miocene and Pliocene?)**—Mainly lacustrine deposits of poorly consolidated light-gray to grayish-white, fine-grained tuffaceous sandstones, siltstones, and mudstones. Includes thin beds of diatomaceous siltstone, tuff, and pebbly sandstone. Smith and others (1982) use fish fossils to correlate the lacustrine rocks with the Chalk Hills Formation of Malde and Powers (1962). Also correlative with the Chalk Butte Formation of Corcoran and others (1962). Equivalent to the lower part of unit Tis as mapped by Ferns in the Owyhee Dam quadrangle to the west (Ferns, 1989)

Tbb — **Basalt and basaltic andesite? flows (middle Miocene)**—Mainly gray to black, vesicular, generally aphyric holocrystalline basalt flows. Usually gray in color on fresh surfaces due to abundant framework feldspars in groundmass. Textures range from pilotaxitic to ophitic. Characterized by plagioclase phenocrysts less than 3 mm in length and microphenocrysts of clinopyroxene, orthopyroxene, and iddingsitized olivine. Correlative with the Blackjack Basalt of Bryan (1929) and uppermost flows of the Owyhee Basalt as mapped by Corcoran and others (1962) and Kittleman and others (1967). Radiometric K/Ar dates from correlative flows in the Owyhee Dam and Owyhee Reservoir quadrangles to the west range from 13.8±0.3 to 16.1±0.9 m.y. (Fiebelkorn and others, 1982; Brown and Petros, 1982)

Tuss — **Tuffaceous siltstones (upper Miocene)**—Mainly pale yellowish-white and pale greenish-brown fine-grained tuffaceous siltstones. Includes poorly indurated arkosic sandstones and interbedded bentonite clay beds. Individual bentonite seams are gray to grayish-white and green in color and range from 2 to 8 in. in thickness where exposed in mine cuts in the Owyhee Ridge quadrangle to the southwest (Ferns, 1988)

MAP SYMBOLS

Contact—Approximately located

Fault—Dashed where inferred; dotted where concealed; queried where doubtful; ball and bar on downthrown side

Strike and dip of beds

Location of trace-element sample analyzed in Table 1

MINERAL RESOURCES

Potential mineral resources in the Adrian quadrangle include geothermal energy and natural gas. Geothermal energy is the only mineral resource known to exist in the quadrangle. A warm water well drilled in sec. 33, T. 21 S., R. 46 E., is reported to have a temperature of 46 °C (Brown and others, 1980).

The younger Idaho Group sedimentary rocks may have some potential for hosting natural gas. Newton and Corcoran (1963) indicate that sand horizons in the Idaho Group may act as stratigraphic traps for natural gas. Some water wells in the region reportedly contain natural gas (Washburne, 1909).

Several areas of weak hydrothermal alteration, e.g., Brown Butte and an area in sec. 33, T. 21 S., R. 46 E., may have some potential for gold or uranium. Chalcedonic quartz veinlets that cut brecciated silicified sandstones along northwest-trending faults in sec. 33 probably mark one of the feeder zones.

GEOCHEMISTRY

Sample preparation

Samples for trace-element analysis (Table 1) were crushed to minus ¼-in. in a steel-jawed Braun chipmunk crusher and split in a Jones-type splitter in the Oregon Department of Geology and Mineral Industries (DOGAMI) laboratory. Each sample was ground to minus 200 mesh in chrome-steel grinding media in an Angstrom disc mill in the DOGAMI laboratory. Each minus-200-mesh split was split again to produce two subsamples: one for gold and one for the other trace elements to be determined.

Trace-element analysis:

1. Gold — Bondar-Clegg, Ltd., of North Vancouver, British Columbia, performed the analyses for gold. The method employed was fire assay preconcentration of the gold in a 20-g sample (gold was collected in added silver), acid dissolution of the resulting bead, and a directly coupled plasma (DCP) emission spectrometer finish. The detection limit was 1 ppb.

2. Other trace elements — Geochemical Services, Inc., (GSI) of Torrance, California, performed the analyses for 15 other trace elements. The method employed a proprietary acid dissolution/organic extraction of a 5-g sample. The finish was by induction coupled plasma (ICP) emission spectrometry. GSI considers the digestion to provide total metal contents except for gallium and thallium. The detection limit for a given element varies slightly as a result of GSI's monitoring process.

Table 1 Trace-element analyses, Adrian quadrangle, Oregon

Map no.	Laboratory no.	¼	¼	Sec.	T. (S.)	R. (E.)	UTM coordinates	Elev. (ft)	Lithology	Map unit	Ag (ppm)	As (ppm)	Au (ppb)	Cu (ppm)	Hg (ppm)	Mo (ppm)	Pb (ppm)	Sb (ppm)	Tl (ppm)	Zn (ppm)	Bi (ppm)	Cd (ppm)	Ga (ppm)	Pd (ppm)	Se (ppm)	Te (ppm)
1	AWB-3	NW	NW	4	22	46	483822N 49110E	2,700	Silicified sandstone	Tig	0.044	149	3	9.42	<0.10	2.26	4.43	1.39	<0.5	24.0	<0.25	0.139	1.68	<0.5	1.10	<0.5
2	AWB-4	SE	NW	33	21	46	483854N 49156E	2,680	Silicified conglomerate	Tig	0.053	123	2	4.92	<0.10	101	5.52	1.67	0.559	8.51	<0.25	<0.1	1.55	<0.5	<1.0	<0.5
3	AWB-5	SE	NW	33	21	46	483868N 49144E	2,694	Brecciated sandstone	Tig	0.072	69.5	2	7.27	<0.10	16.3	4.41	0.751	<0.5	12.9	<0.25	<0.1	1.70	<0.5	<1.0	<0.5
4	AWB-6	SE	NE	21	21	46	484190N 49201E	2,640	Conglomerate	Tig	0.046	104	3	6.40	<0.10	2.94	5.58	3.73	0.863	31.2	<0.25	0.202	2.41	<0.5	<1.0	<0.5

[1]Gold analyses by Bondar-Clegg; other trace-element analyses by GSI.

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GEOLOGIC CROSS SECTION