WYOMING STATE GEOLOGICAL SURVEY
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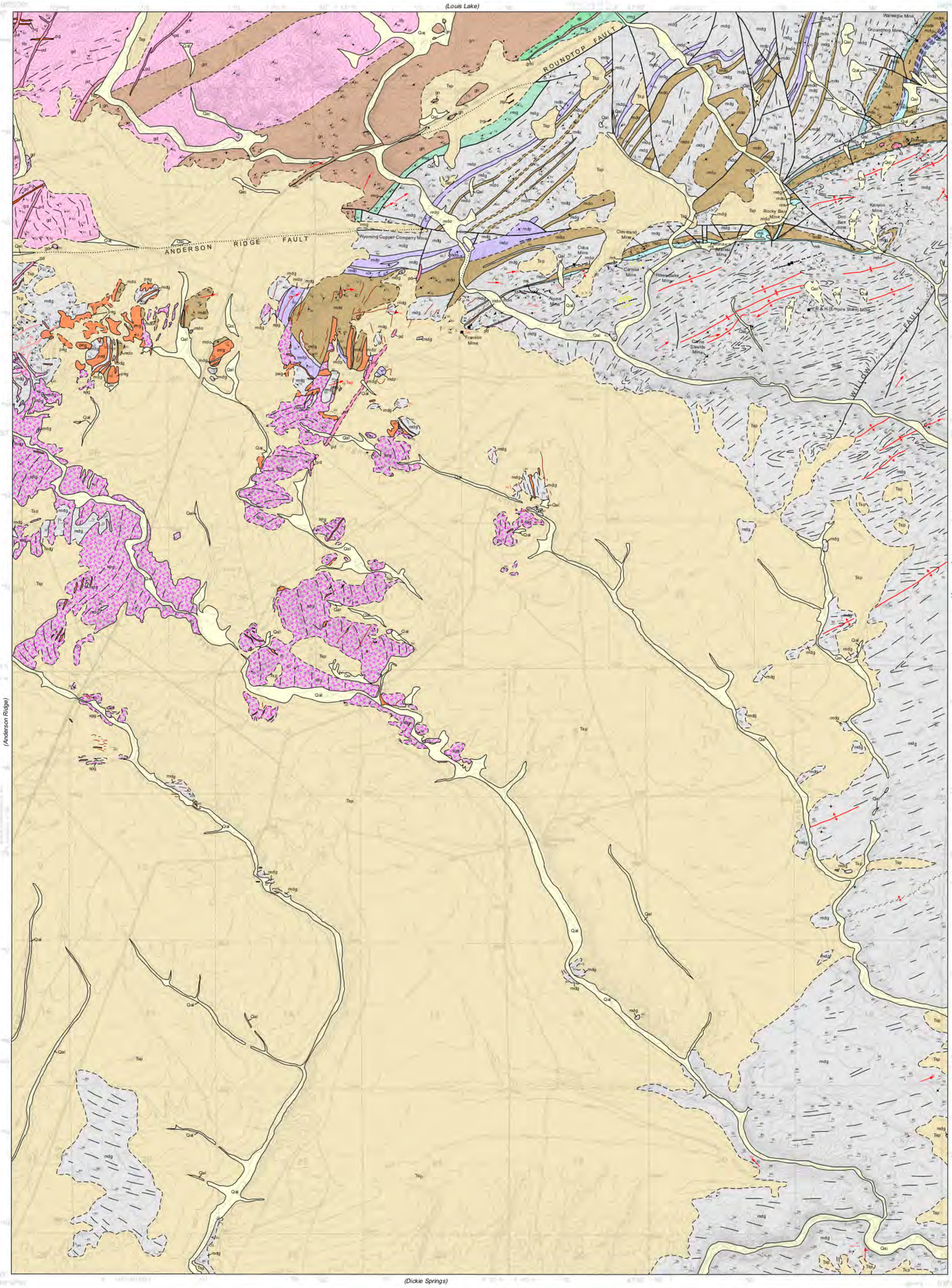
Laramie, Wyoming

Geology - Interpreting the past to provide for the future

Prepared in cooperation with the U.S. GEOLOGICAL SURVEY

MAP SERIES 74
South Pass City 1:24,000 - scale Geologic Map



EXPLANATION

CORRELATION OF MAP UNITS

Qal	Holocene and Pleistocene	Quaternary	CENOZOIC
Tsp	Pliocene, Miocene, and Eocene (?)	Tertiary	CENOZOIC
pd	Middle and Early Proterozoic	Proterozoic	PRECAMBRIAN
peg, spg, gd, pg, td, gn, mdg, mdp, mdo, mds, mdm, mk, rmg, gmi, ds	Archean		PRECAMBRIAN

DESCRIPTION OF MAP UNITS

Surficial deposits

Qal — **Alluvium (Holocene and Pleistocene)**—Stream sediments and gravels

Sedimentary rocks

Tsp — **South Pass Formation (Pliocene, Miocene, and Eocene?)**—Conglomerates and pediment deposits containing cobbles and boulders of metamorphic and granitic rocks; fission-track age of about 27 million years before present (Ma) (Love and Christiansen, 1985)

Intrusive igneous and metaigneous rocks

pd — **Basalt dikes**—Fine-grained thoelitic dikes. Similar dikes in the Wind River Range have yielded whole-rock K-Ar ages of 1,270 to 2,010 Ma (Condie and others, 1969). K-Ar ages from pyroxenes are limited to 1,600 to 1,800 Ma (Spall, 1971)

spg, peg — **South Pass Granite**—Coarse-grained gray to white garnet-bearing pegmatitic granite. Granite with 50% pegmatite or less is labelled spg; granite with greater than 50% pegmatite is labeled peg. Pegmatites contain diverse mineralogy including quartz, albite, microcline, almandine, mica, ±beryl, ±schorl, and rare arsenopyrite and columbite-tantalite (Proctor and El-Etr, 1968). One rare specimen of aquamarine was recovered from a pegmatite immediately west of Pine Creek just west of the quadrangle (Winters, Elmer C., 1983, personal communication)

gd, pg, td — **Louis Lake Batholith**—Gray biotite-hornblende quartz diorite and granodiorite. Contains small, widely spaced disc-shaped clots of amphibolite. Bull quartz and feldspar pegmatites (pg) are relatively uncommon. Age of batholith averages approximately 2,630 ±20 Ma (Stuckless and others, 1985)

td — **Tonalite**—Leucodacite porphyry tonalite plugs

Border zone gneiss complex

gn — **Gneiss**—Border zone of the Louis Lake Batholith consisting of interlayered migmatite, gray gneiss, amphibolite, granite, and Louis Lake granodiorite

Supracrustal metasedimentary and metaigneous rocks

Miners Delight Formation

mdg — **Metagreywacke**—Feldspathic and micaceous metagreywacke (turbidites) and mica schist. Porphyroblastic (peanut) schist common. A Rb-Sr whole rock isochron yielded a 2.8 Ga (Giga-annum or billions of years before present) date (Stuckless and others, 1985)

mdp — **Metadacite**—Dense, black to gray metadacite porphyry flows and dikes containing white plagioclase phenocrysts (porphyroblasts) aligned in trachitic texture

mdo — **Orthoamphibolite**—Black hornblendic amphibolite with fine-, medium-, and coarse-grained textures. This unit represents tholeiitic and calc-alkaline basalt flows and dikes

mds — **Graphitic schist**—Black, commonly iron-stained sheared schist

mdm, mk — **Mixed member**—Black mafic metabasalt metagreywacke with interbeds of metaconglomerate. The base of mixed member is often marked by sheared green chlorite and actinolite-talc-chlorite schists (mk) that have similar chemistries to komatiite (Bow, 1986)

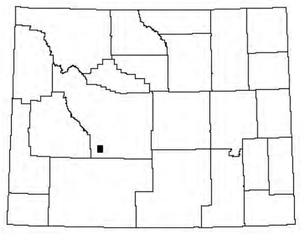
Roundtop Mountain greenstones

rmg — **Amphibolites**—Black metabasalt and amphibolite of tholeiitic affinity

Goldman Meadows Formation

gmi — **Iron formation member**—Banded iron formation composed chiefly of quartz and magnetite with minor amphibole

ds — **Diamond Springs Formation**—Black to gray amphibolite and metabasalt of tholeiitic affinity



QUADRANGLE LOCATION

MAP SYMBOLS

Contact—Dashed where approximately located

Fault—Dashed where approximately located, dotted where inferred; ball and bar on downdropped block; arrows parallel to fault indicate direction of relative transverse movement; arrows perpendicular to fault indicate direction and amount of dip of fault plane where it could be determined

Shear zone—Cataclastic zone of sheared rock; gold bearing; perpendicular arrow indicates direction and amount of dip of shear plane where it could be determined; inward pointing red arrows indicate shear zone is also the axis of a synform; outward pointing red arrows indicate shear zone is also axis of an antiform

Pegmetite dikes—same as peg but represented as lines instead of polygons

Major folds

Antiform

Synform

Minor folds

Plunge direction and dip of fold axis

Plunge direction and dip of fold axis with dip of axial plane

Plunge direction and dip of fold axis with vertical axial plane

Plunge direction and dip of fold axis with dip of foliation; no value indicates only the direction of foliation or direction of plunge could be determined

Strike and dip of beds

Inclined, only the direction of dip could be determined

Inclined, showing dip

Inclined, showing dip, with direction and plunge of lineations on bedding

Vertical

Horizontal

Bedding symbols

Strike and plunge of crenulated beds; no value indicates only the direction of plunge could be determined

Graded beds, tick mark on stratigraphic top; no value indicates general dip direction; queried where poorly exposed or stratigraphic top uncertain

Foliation trends

Inclined, showing dip

Inclined, only the direction of dip could be determined

Vertical

Inclined, showing dip with direction and plunge of lineations

Foliation/bedding form lines, showing approximate strike

Strike and dip of joints

Inclined, showing dip

Vertical

Mine, prospect, and vein-related symbols

Shaft

Adit

Prospect pit

Mill site

Dredge tailings

Inclined quartz vein with dip direction and value

Vertical quartz vein

Area of abundant (predominantly conformable) quartz veins and veinlets

Miscellaneous symbols

Conglomerate beds

Breccia

Cabin (historical)

REFERENCES CITED

Bayley, R.W., 1965, Geologic map of the South Pass City Quadrangle, Fremont County, Wyoming: U.S. Geological Survey Geologic Quadrangle Map GQ-458, scale 1:24,000.

Bow, C.S., 1986, Structural and lithologic controls on Archean greywacke-hosted gold mineralization within the Sweetwater district, Wyoming, USA, *in* Keppie, J.D., Boyle, R.W., and Hanes, S.J., editors, Turbidite-hosted gold deposits: Geological Association of Canada Special Paper 32, p. 107-118.

Condie, K.C., Leach, A.P., and Baadsgaard, H., 1969, Potassium-argon ages of Precambrian mafic dikes in Wyoming: Geological Society of America Bulletin, v. 80, p. 899-906.

Denson, N.M., Zeller, H.D., and Stephens, E.V., 1965, South Pass Formation on the southwest flank of Wind River Range, Wyoming, *in* Cohee, G.V., and West, W.S., Changes in stratigraphic nomenclature by the U.S. Geological Survey, 1964: U.S. Geological Survey Bulletin 1224-A, p. A27-A29.

Hausel, W.D., 1988, Revised geologic map of the South Pass City Quadrangle, Fremont County, Wyoming: Wyoming State Geological Survey Open File Report 88-2, scale 1:24,000.

Love, J.D., and Christiansen, A.C., 1985, Geologic map of Wyoming: U.S. Geological Survey map, scale 1:500,000 (color), 3 sheets.

Proctor, P.D., and El-Etr, H.A., 1968, Layered pegmatites, southern Wind River Range, Fremont County, Wyoming: Economic Geology, v. 63, p. 595-611.

Spall, H., 1971, Paleomagnetism and K-Ar age of mafic dikes from the Wind River Range, Wyoming: Geological Society of America Bulletin, v. 82, p. 2457-2472.

Stuckless, J.S., Hedge, C.E., Worl, R.G., Simmons, K.R., Nkomo, I.T., and Wenner, D.B., 1985, Isotopic studies of the late Archean plutonic rocks of the Wind River Range, Wyoming: Geological Society of America Bulletin, v. 96, p. 850-860.

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The author thanks Hank Hudspeth, Jr., for reviewing an earlier version of the map (Hausel, 1988) and also dedicates this map to the memory of Elmer C. Winters, a good friend and prospector.

Base map from U.S. Geological Survey 1:24,000-scale topographic map of the South Pass City, Wyoming Quadrangle, 1991

Projection: Universal Transverse Mercator (UTM), zone 12
North American Datum of 1927 (NAD 27)
10,000-foot grid ticks:Wyoming State Plane Coordinate System, East Central zone

UTM GRID CONVERGENCE (GN)
1991 MAGNETIC DECLINATION (MN) AT CENTER OF SHEET
DIAGRAM IS APPROXIMATE

SCALE 1:24,000

1 0.5 0 1 Mile

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometer

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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Digital cartography by Robin W. Lyons

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REVISED* GEOLOGIC MAP OF SOUTH PASS CITY QUADRANGLE, FREMONT COUNTY, WYOMING

by
W. Dan Hausel
2007

* Revised from original mapping of Bayley (1965) by Hausel (1988)
The current map supercedes Wyoming State Geological Survey Open File Report 88-2