DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PRELIMINARY MAP

54-92

Preliminary topography by Fairchild Surveys, Inc., for U. S. Bureau of Reclamation, 1947 and 1948

This map is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and nomenclature.

GEOLOGY OF PART OF THE JOHNNY GULCH QUADRANGLE MONTANA

2000 1000 0 2000 4000 6000 8000 10,000 FEET

MAGNETIC DECLINATION 1951

Geology mapped in 1949 and 1952 by V. L. Freeman, M. R. Klepper, E. T. Ruppel, and H. W. Smedes.

U.S. Geological Survey
Montana Bureau Mines

EXPLANATION

QUATERNARY — Recent

td — Tailings dump

Qal — Alluvium

Qt — Terrace
Gravel-veneered bench along Johnny Gulch.

QUATERNARY — ? Pleistocene ? / TERTIARY — ? Pliocene

Tfg — Fan and pediment gravels
Fan deposits and gravel veneer on pediment. Locally cemented by calcite.

TERTIARY — ? Miocene

Tr — Rhyolite flows
Gray to black flow-banded rhyolite in Crow Creek valley.

TERTIARY — ? Oligocene

Tfg — Volcanic sedimentary rocks
Poorly consolidated volcanic sands and gravel with abundant fine matrix. Includes limestone deposit (Tls).

Angular unconformity

CRETACEOUS — Upper Cretaceous

Kv — Elkhorn Mountains volcanics
Green andesitic massive crystal tuff and bedded tuff (t); breccia (b); and local red or black flows (f).

Local angular unconformity

Ks — Slim Sam formation
Pale yellow to greenish-gray tuff, thinly interbedded with black shale in lower part, thick bedded in upper part.

Kcu — Upper black shale unit
Dark gray to black fissile shale with numerous thin beds of sandstone and siltstone.

Kcm — Middle siliceous unit
Sandstone, siltstone, siliceous mudstone, and mudstone.

Kcl — Lower black shale unit
Dark gray fissile shale with light yellow quartzite unit at base and numerous dark gray argillaceous sandstone beds in upper part.

Colorado Group

Kk — Kootenai formation
Red and green mudstone and siltstone with a few "pepper-and-salt" sandstone beds at base and a gastropod-bearing limestone near top.

Lower Cretaceous

gm — Quartz monzonite
Medium-fine-grained hornblende quartz monzonite.

ba — Basalt
Fine-grained basalt present in small dikes.

Upper Cretaceous ?

ad — Diorite porphyry and related rocks
Fine-grained diorite porphyry with hornblende, hornblende and augite, or augite (pd) as varietal minerals. Local silicified area (q). Breccia consisting of bedded tuff fragments with diorite porphyry matrix (br).

Contact, showing dip

Fault: U = upthrown side, D = downthrown side.

Anticline, showing crestline and plunge of axis.

Syncline, showing position of trough and plunge of axis.

Above lines; long-dashed where approximately located, short-dashed where inferred or indefinite, dotted where concealed.

Strike and dip of beds.

Strike and dip of overturned beds.

Strike of vertical beds.

Strike and dip of joints.

Strike of horizontal flow lineation.

Vein, long-dashed where approximately located, short-dashed where indefinite.

Shaft

Caved shaft

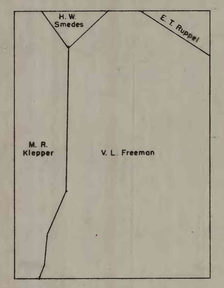
Adit

Caved adit

Mine

Prospect

Trench



V. L. Freeman - this report
M. R. Klepper - Klepper (1951)
E. T. Ruppel - Ruppel (1950)
H. W. Smedes - Unpublished