TEI
843

TEI-843

GEOLOGY OF JACKASS FLATS QUADRANGLE,
NEVADA TEST SITE, NEVADA

By Edward J. McKay and W. P. Williams

U.S. Geological Survey
Field Library
P. O. Box 4217
Albuquerque, New Mexico 87103

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

metadc502036

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GEOLOGY OF JACKASS FLATS QUADRANGLE,
NEVADA TEST SITE, NEVADA

By

Edward J. McKay and W. P. Williams

December 1963

Report TEI-843

*Prepared on behalf of the U.S. Atomic Energy Commission.

UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey

Washington 25, D.C.

December 12, 1963

Mr. James E. Reeves, Manager
Nevada Operations Office
U.S. Atomic Energy Commission
P. O. Box 1676
Las Vegas, Nevada

Dear Mr. Reeves:

Transmitted herewith are two copies of TEI-843, "Geology of Jackass Flats quadrangle, Nevada Test Site, Nevada," by Edward J. McKay and W. P. Williams, December 1963.

We plan to release this report to the public in the open files, and later to publish in the GQ series.

Sincerely yours,

V. R. Wilmarth
Assistant Chief Geologist
Office of Engineering Geology

Enclosure

USGS - TEI-843

<u>Distribution - AEC</u>	<u>No. of copies</u>
Nevada Operations Office (J. E. Reeves)-----	2
Nevada Operations Office (Technical Library)-----	4
Director, Nevada Bureau of Mines-----	1
Director of Military Application, Washington-----	1
Division of Military Application, Washington-----	2
Division of Peaceful Nuclear Explosion (R. Hamburger)-----	1
Division of Research, Washington (D. R. Miller)-----	1
Division of Technical Information Extension-----	1
Engineer Research and Development Lab., Ft. Belvoir, Va. (Chief, Special Projects Branch)-----	1
Fenix & Scisson, Inc., Las Vegas, Nev-----	1
Hazleton-Nuclear Science Corp-----	3
Headquarters, USAF/AFTAC, Washington (Wayne Helterbran)-----	1
Health Physics Div., Oak Ridge Natl. Lab. (F. L. Parker)-----	1
Lawrence Radiation Lab., Livermore (R. E. Batzel)-----	2
Lawrence Radiation Lab., Livermore (D. E. Rawson/N. M. Short)--	1
Lawrence Radiation Lab., Livermore (A. V. Shelton)-----	1
Lawrence Radiation Lab., Mercury (W. D. Richards)-----	5
Lawrence Radiation Lab., Mercury (D. T. Schueler/N. M. Fillip)-	1
Lawrence Radiation Lab., Mercury (J. L. Olsen)-----	1
Los Alamos Scientific Laboratory (J. H. Hall)-----	1
Los Alamos Scientific Laboratory (R. W. Newman)-----	1
San Francisco Operations Office (J. F. Philip)-----	1
Sandia Corp., Albuquerque, (D. B. Shuster)-----	2
Stanford Research Institute, Menlo Park (R. B. Hoy)-----	1
Roland F. Beers, Inc.-----	14
U.S. Coast and Geodetic Survey, Mercury-----	1

USGS - TEI-843

<u>USGS distribution</u>	<u>No. of copies</u>
Director-----	1
Conservation Division, Mineral Classification Branch-----	1
Water Resources Division:	
Branch Area Chief, GW:	
Denver, Colo-----	1
Menlo Park, Calif-----	1
W. A. Bettem, Denver, Colo-----	1
District Geologist, Albuquerque-----	1
District Hydrologist, Carson City-----	1
Ground Water Office, Mercury, Nev-----	14
Ground Water Branch, Washington-----	1
A. M. Piper, Menlo Park, Calif-----	1
Quality of Water Branch, Washington-----	1
Radiohydrology Section, Denver (W. E. Hale)-----	1
Radiohydrology Section, Washington-----	10
Surface Water Branch, Washington-----	1
Geologic Division:	
Office of Engineering Geology, Washington-----	1
Astrogeology Branch-----	1
Crustal Studies Branch-----	1
Field Geochemistry & Petrology Branch-----	1
Geologic Data Center, Mercury-----	5
Library, Denver-----	1
Menlo Park-----	1
Washington-----	1
Military Geology Branch-----	2
New England Branch-----	1
Regional Geophysics Branch-----	4
Southwestern Geology Branch-----	1
Special Projects Branch, Denver-----	20
Washington APU (Wenonah Bergquist)-----	2

DESCRIPTION OF MAP UNITS

- Qac** ALLUVIUM AND COLLUVIUM (0-1,025 ft.)--brown to gray unconsolidated or caliche-cemented loess; lenses and sheets of sand; sandy gravel composed of pebbles to boulder-size fragments of subrounded to subangular silicified tuff, rhyolite, and basalt of Tertiary age and quartzites and carbonates of Paleozoic age.
- Tbk** BASALT FLOWS OF KIVI MESA (130 ft.)--black dense, vesicular, scoriaceous, stony basalt with quartz phenocrysts.
- Tsr** RHYOLITE FLOWS OF SHOSHONE MOUNTAIN (260 ft.)--pink to purplish-red flow-banded vesicular rhyolite. Limited to northeastern corner of quadrangle.
- Tbs** BASALT FLOWS OF SKULL MOUNTAIN (125-140 ft.)--dark-gray dense to scoriaceous amygdaloidal basalt.
- Tbd** BASALT DIKE--green fine-grained basalt dike containing argillite xenoliths from Eleena Formation; intrudes Eleena Formation and rhyolite intrusion of Calico Hills (Tci).
- Tpc** TIVA CANYON FORMATION (360 ft.)--multiple-flow, simple cooling unit. In descending order, 160 feet of altered pink, silicified, dense, welded tuff with devitrified flattened pumice near top; plagioclase and potash feldspar are common. Next is 50 feet of altered pink silicified dense crystal-poor welded tuff that is underlain by 140 feet of gray and white bedded zeolitic nonwelded tuff with gray-size rhyolite fragments. Welded tuff weathers out in plates on steep slopes.
- Tpt** TOPPAH SPRING MEMBER (300-400 ft.)--thickens to northeast. Multiple-flow simple cooling unit of lavender ash-flow dense devitrified welded tuff. A vapor phase zone is preserved locally at the top above a black vitrophyre that grades downward to welded lithophysal tuff. Next is a red or black glassy tuff that grades downward to a yellowish-brown nonwelded ash-fall and ash-flow tuff with pebbles to boulder-size fragments of rhyolite at base. Perseverant alteration ranges from red weakly silicified hematitic tuff to white silicified, alunitized, and kaolinized tuff. Weathers to chips, plates, and angular blocks.
- ANDESITE FLOWS AND TUFFS OF WAHMONIE FLAT**--extend from outcrop three miles southeast of quadrangle into the subsurface where they probably interfinger with the rhyolite flows of the Calico Hills (Tcf). Composed of interbedded andesite and rhyodacite flows and flow breccias, ash debris beds with cobbles to boulder-size fragments of andesite, and tuffaceous biotite-rich sandstone with pebbles of andesite. Shown on section only.
- RHYOLITE FLOWS AND TUFFACEOUS BEDS OF CALICO HILLS (1,000 ft.)**--correlative in part with Indian Trail Formation.
- Tcf** Rhyolite flows--red flow-banded, vesicular, lithophysal, or stony fluid rhyolite flows with bluish-gray glassy zones at top or base.
- Tcb** Tuffaceous beds--yellow nonwelded ash flows, white debris beds composed of cobbles and boulders of angular rhyolite and pumice in an ash matrix, and greenish gray tuffaceous lenticular, locally biotite-rich, sandstone. Basal tuffaceous beds are conglomeratic with subrounded cobbles of quartzite, carbonate, and rhyolite.
- Tci** Rhyolite intrusion--gray, silicified and kaolinized, porphyritic.
- Eleena Formation:**
- Unit J**--yellowish-brown and gray thin-bedded argillite, and thin- and thick-bedded quartzite and conglomerate. Only upper part exposed; forms sole of thrust fault.
- MDid** LIMESTONE AND DOLOMITE (100 ft.)--upper 30 feet dark-gray thin-bedded argillite; crinoidal limestone; lower 70 feet gray laminated to thin-bedded limestone and dolomite. Occurs in faulted blocks thrust over Eleena Formation. Probably equivalent to Mercury and Narrows Canyon Limestones.
- Ddn** DEVILS GATE (?) LIMESTONE AND DOLOMITE--gray to dark-gray fine- to coarse-grained thin- and thick-bedded brecciated dolomite and limestone. Occurs in faulted blocks thrust over Devonian limestone and dolomite (MDId) and the Eleena Formation. Mississippian and

EXPLANATION

- Qac**
Alluvium and colluvium
UNCONFORMITY
- Tbk**
Basalt flows of Kivi Mesa
UNCONFORMITY
- Tsr**
Rhyolite flows of Shoshone Mountain
UNCONFORMITY
- Tbs**
Basalt flows of Skull Mountain
Tbd, basalt dike
UNCONFORMITY
- Tpc**
Tiva Canyon Member
- Tpt**
Topopah Spring Member
Stippled where silicified, alunitized, and kaolinized
UNCONFORMITY
- Tcf**
Rhyolite flows and tuffaceous beds of Calico Hills
Tcf, rhyolite flows;
Tcb, tuffaceous beds;
Tci, rhyolite intrusion;
Stippled indicates silicification, alunitization, and kaolinization
UNCONFORMITY
- PHej**
Unit J of Eleena Formation
- MDId**
Limestone and dolomite
- Ddn**
Devils Gate (?) Limestone and Nevada Formation

Contact
Dashed where approximately located

Fault, showing dip, and bearing and plunge of slickensides (short dash where inferred); dashed where approximately located where concealed; U, upthrown side; D, downthrown side; Arrow indicates relative horizontal movement

Thrust fault
Dashed where approximately located; queried where in doubt; Sawtooth on upper plate

Strike and dip of beds and of layering in welded tuffs

Horizontal beds

Strike and dip of joints

Strike and dip of vertical joints

SE 3,445
Tbk 2,420
Tpt 2,205
TD 2,329
Drill hole

Showing surface elevation (SE), elevation of tops of basalt flows of Kivi Mesa (Tbk) and of Topopah Spring Member of Tiva Canyon Formation (Tpt), and total depth (TD), in feet

X
Prospect pit

Base by U.S. Geological Survey, 1961

SCALE 1:24,000

Geology mapped in 1961

GEOLOGY OF JACKASS FLATS QUADRANGLE, NEVADA TEST SITE, NEVADA

BY
Edward J. McKay and W.R. Williams