INTRODUCTION

This compilation includes all known potassium-argon (K–Ar), fission-track, and \(^{40} \text{Ar}/^{39} \text{Ar}\) ages from the Reno 1° x 2° quadrangle. The compilation is part of a study of the geology and mineral resources of the Reno quadrangle, which has been done as part of the Conterminous United States Mineral Assessment Program (CUSMAP) of the U.S. Geological Survey. A review of the geology of the quadrangle is given by John, Stewart, and others (1993).

All ages are by the K–Ar methods unless otherwise indicated, and they have been calculated using the new decay constants and isotopic abundances given by the International Union of Geological Sciences Subcommission on Geochronology (Steiger and Jager, 1977). Ages are grouped by 15' quadrangle (labeled A, B, C, and so forth, on the map). With one exception, ages of unaltered rocks are listed in chronological order (youngest to oldest) within each quadrangle; the exception is the Virginia City quadrangle, in which some ages are grouped chronologically by formation and so the age range of one formation may overlap that of another. Ages from alteration minerals, hydrothermal minerals, and vein material are grouped under a separate heading at the end of each quadrangle's listing.

For new and (or) previously unpublished ages, the following analytical data are given: the K\(^2\)O content (in weight percent), the amount of radiogenic argon (\(^{40} \text{Ar}^*\)), and the ratio of radiogenic argon to total argon (\(^{40} \text{Ar}^*/\sum^{40} \text{Ar}\)). Analyses by E.H. McKee were carried out in the U.S. Geological Survey laboratories, Menlo Park, Calif. Potassium analyses were performed by a lithium metaborate flux fusion-flame photometry technique, the lithium serving as an internal standard. Argon analyses were performed by standard isotope dilution procedures using a 60° sector, 15.2–cm radius Neir-type mass spectrometer operated in the static mode for mass analysis or using a five-collector system for simultaneous measurement of argon-isotope ratios also with a Neir-type mass spectrometer. The precision of the ages, shown as the plus or minus value in millions of years, is the estimated analytical uncertainty at one standard deviation. It represents uncertainty in the measurement of radiogenic argon and K\(^2\)O contents in the sample and is based on experience with replicate analyses in the Menlo Park laboratories.

For previously published ages, the first publication cited is the primary source of information; other references list the same data, although some of these additional references contain information not covered in the original reference. In addition, the plus or minus value and the mineral analyzed are not listed when they were not cited in the original publication. At some localities, multiple chemical or isotopic analyses were made of the same mineral or different fractions of the same mineral.

The geology shown on this map has been highly generalized; therefore the rock descriptions or units may not correspond exactly to what is shown on the map.

SAMPLE LOCALITIES AND AGES

DOGSKIN MOUNTAIN 15' QUADRANGLE (A)

A1. Rock description: Tuff of Chimney Spring
   Location: NW\(^{1/4}\)SW\(^{1/4}\)NW\(^{1/4}\) sec. 34, T. 24 N., R. 18 E.
   Age (mineral): 23.0±5 Ma (sanidine)
   Reference: Deino (1985, p. 346)

A2. Rock description: Nine Hill Tuff
   Location: SE\(^{1/4}\)NE\(^{1/4}\)NW\(^{1/4}\) sec. 32, T. 23 N., R. 18 E.
   Age (mineral): 23.8±1.4 Ma (plagioclase), 25.6±1.2 Ma (sanidine), 27.0±0.7 Ma (sanidine)
   Reference: Deino (1985, p. 346)

A3. Rock description: Tuff of Porcupine Mountain
   Location: NE\(^{1/4}\)SE\(^{1/4}\)NW\(^{1/4}\) sec. 32, T. 23 N., R. 18 E.
   Age (mineral): 27.9±2.6 Ma (biotite)
   Reference: Deino (1985, p. 346)

A4. Rock description: Tuff of Harrys Spring
   Location: SW\(^{1/4}\)SW\(^{1/4}\)SE\(^{1/4}\) sec. 29, T. 24 1/2 N., R. 18 E.
   Age (mineral): 28.6±0.7 Ma (sanidine), 29.4±0.9 Ma (biotite)
   Reference: Deino (1985, p. 346)

A5. Rock description: Tuff of Long Valley
   Location: NW\(^{1/4}\)SW\(^{1/4}\)SE\(^{1/4}\) sec. 29, T. 24 N., R. 18 E.
   Age (mineral): 29.8±5.8 Ma (sanidine)
   Reference: Deino (1985, p. 346)

A6. Rock description: Tuff of Costantia
   Location: NW\(^{1/4}\)SW\(^{1/4}\)SE\(^{1/4}\) sec. 29, T. 24 N., R. 18 E.
   Age (mineral): 29.8±1.0 Ma (biotite), 30.2±0.6 Ma (sanidine)
   Reference: Deino (1985, p. 346)
A7. Rock description: Tuff of Zamboni
Location: NE\%SE\%SW\% sec. 29, T. 24 N., R. 18 E.
Age (mineral): 29.9±0.7 Ma (sanidine), 31.3±1.7 Ma (plagioclase)
Reference: Deino (1985, p. 346)

RENO 15' QUADRANGLE (B)

B1. Rock description: Andesite tuff in sandstone of Hunter Creek
Location: lat 39°31'30"N., long 119°57'48"; north-central part of sec. 16, T. 19 N., R. 18 E.
Age (mineral): 5.9 Ma (plagioclase)
Reference: Evernden and James (1964); Silberman and McKee (1972)
Comments: Andesitic tuff interbedded with leaf-bearing tuffaceous shale that contains Verdi flora (Axelrod, 1958)

B2. Rock description: Olivine basalt near base of sandstone of Hunter Creek
Location: lat 39°30'51.5"N., long 119°56'53.5"W.; SW\%NW\%NE\%SW\% sec. 15, T. 19 N., R. 18 E.
Age (mineral): 8.6±0.3 Ma (whole rock)
Reference: Garside and others (1993)

B3. Rock description: Olivine basalt
Location: lat 39°31'N., long 119°56'W.; sec. 14, T. 19 N., R. 18 E.
Age (mineral): 11.3 Ma (whole rock)
Reference: Evernden and James (1964); Silberman and McKee (1972)
Comments: Flow is 400 ft below fossil-mammal horizon of possible Clarendonian age

B4. Rock description: Kate Peak Formation; biotite-hornblende andesite flow
Location: lat 39°33'35"N., long 119°49'117"W.; NE\%NE\%SW\%NW\% sec. 35, T. 20 N., R. 19 E.
Age (mineral): 14.3±0.5 Ma (biotite)
Reference: Garside and others (1993)
Comments: Unaltered flow over rocks that have advanced argillic alteration in underlying Alta Formation

B5. Rock description: Hornblende andesite
Location: lat 39°35'29"N., long 119°59'51"W.; NE\%NE\%SW\%NW\% sec. 35, T. 20 N., R. 18 E.
Age (mineral): 16.0±0.5 Ma (hornblende)
Reference: Garside and others (1993)
Comments: Andesite lithologically resembles Kate Peak Formation but was correlated with Alta Formation by Bell and Garside (1987)

Alteration ages

B6. Rock description: Alunite
Location: lat 39°34'36.5"N., long 119°53'50"W.; NW\%NW\%NE\%NW\% sec. 30, T. 20 N., R. 19 E.
Age (mineral): 11.8±1.2 Ma (alunite)
Comments: Alunitic alteration of metavolcanic rocks of Jurassic (?) Peavine sequence
Collected by: D.M. Hudson

Isotopic data and age by: M.L. Silberman and C.L. Conner, U.S. Geological Survey
Analytical data: K20=1.37%, 1.39%; 4°Ar* = 0.235×10^-10 mole/g; 40Ar*/40Ar=0.16

B7. Rock description: Sericite
Location: lat 39°33'48.5"N., long 119°53'03"W.; SW\%SE\%SW\% sec. 30, T. 20 N., R. 19 E.
Age (mineral): 14.6±0.4 Ma (sericite)
Comments: Quartz-sericite alteration of intrusion of Miocene Kate Peak Formation
Collected by: D.M. Hudson

Isotopic data and age by: M.L. Silberman and C.L. Conner, U.S. Geological Survey
Analytical data: K20=6.39%, 6.48%; 4°Ar* = 1.360×10^-10 mole/g; 40Ar*/40Ar=0.34

MOUNT ROSE 15' QUADRANGLE (C)

C1. Rock description: Rhyolite dome
Location: Steamboat Hills; SW\% sec. 1, T. 17 N., R. 19 E.
Age (mineral): 1.17±0.05 Ma (sanidine)
Reference: Silberman and others (1979)

C2. Rock description: Hornblende-pyroxene andesite
Location: lat 39°28°23.9"N., long 119°52'48"W.; SW\%NW\%NW\% sec. 32, T. 19 N., R. 19 E.
Age (mineral): 18.9±1.1 Ma (hornblende); 20.2±1.1 Ma (augite)
Comments: From first flow rock overlying large hydrothermal system at north end of Carson Range (Hudson, 1983). Unit mapped as Kate Peak Formation by Thompson and White (1964), but according to D.M. Hudson (oral commun., 1993), unit is lithologically dissimilar to Kate Peak Formation or Alta Formation. Plagioclase also was analyzed but had very erratic argon-extraction values, possibly because plagioclase contained some glass inclusions; calculated ages from plagioclase range from 13 to 77 Ma
Collected by: D.M. Hudson

Isotopic data and age by: K.A. Poland, Ohio State University

Analytical data: Hornblende, K20=0.488%, 0.493%, 0.490%; 4°Ar* = 0.1651×10^-10 mole/g; 40Ar*/40Ar=0.175.
Augite, K20=0.076%, 0.077%; 4°Ar* = 0.0270×10^-10 mole/g; 40Ar*/40Ar=0.172

C3. Rock description: Porphyritic basaltic andesite
Location: lat 39°22.6'N., long 119°46.0'W.; SW\% sec. 32, T. 18 N., R. 20 E.
Age (mineral): 29.6±2.0 Ma (plagioclase); 0.21±0.07 Ma (whole rock)
Reference: Bell and others (1984); Fultz and others (1984)
Comments: Highly discordant ages

Alteration ages

C4. Rock description: Basaltic andesite altered to
adularia
Location: SW¹/₄ sec. 29, T. 18 N., R. 20 E.
Age (mineral): 1.13±0.11 Ma (whole rock)
Reference: Silberman and others (1979)

C5. Rock description: Alunite from altered andesite
Location: lat 39°26'58"N., long 119°53'43"W.; NE¹/₄SW¹/₄SW¹/₄ sec. 6, T. 18 N., R. 19 E.
Age (mineral): 6.55±0.15 Ma (alunite)
Comments: Age appears to be much too young. Oxidized sample, but very coarse alunite; may be supergene

C6. Rock description: Alunite from altered Tertiary volcanic rocks
Location: Carson Range; lat 39°28’07"N., long 119°51’00"W.
Age (mineral): 11.2±0.1 Ma (alunite)
Reference: Russell and others (1989)

C7. Rock description: Alunite from altered Tertiary volcanic rocks
Location: Carson Range; lat 39°28’00"N., long 119°51’00"W.
Age (mineral): 11.4±0.4 Ma (alunite)
Reference: Russell and others (1989)

CARSON CITY 15' QUADRANGLE (D)

D1. Rock description: Andesite
Location: Near Glendale; lat 39°5.33"N., long 119°54.67"W.; SW¹/₄ sec. 12, T. 14 N., R. 18 E.
Age (mineral): 8.7±0.3 Ma (biotite)
Reference: Morton and others (1977)

SUTCLIFFE 15' QUADRANGLE (E)

E1. Rock description: Dacite tuff
Location: lat 39°53’12"N., long 119°54’12"W.; south-central part of sec. 4, T. 23 N., R. 21 E.
Age (mineral): 12.7 Ma (plagioclase)
Reference: Evernden and James (1964); Silberman and McKee (1972)
Comments: Unconformably overlies olivine basalt listed below (see loc. E2)

E2. Rock description: Pyramid Formation; olivine basalt
Location: lat 39°53’30"N., long 119°36’30"W.; NE¹/₄NW¹/₄ sec. 3, T. 23 N., R. 21 E.
Comments: Overlies diatomite unit in which Pyramid flora is present (Axelrod, 1966, 1992) and is unconformably overlain by dacite tuff sample listed above (see loc. E1)
a. Method: K–Ar

Age (mineral): 15.6±2.4 Ma, (plagioclase)
Reference: Bonham (1969); Krueger and Schilling (1971); Silberman and McKee (1972)
b. Method: 40Ar/39Ar
Age (mineral): 13.836±0.148 Ma, (plagioclase)
Reference: Swisher (1992)

E3. Rock description: Dacite intrusion
Location: NE¹/₄SW¹/₄NE¹/₄ sec. 23, T. 23 N., R. 21 E.
Age (mineral): 19.8±0.8 Ma (plagioclase)
Reference: Wallace (1975)

E4. Rock description: Dacite lava flow
Location: SE¹/₄NE¹/₄SW¹/₄ sec. 15, T. 23 N., R. 21 E.
Age (mineral): 21.2±0.6 Ma (plagioclase)
Reference: Wallace (1975)

E5. Rock description: Nine Hill Tuff; rhyolite ash-flow tuff
Location: lat 39°45’50"W., long 119°34’50"W.; NE¹/₄ sec. 24, T. 22 N., R. 21 E.
Age (mineral): 21.8±0.7 Ma (alkali feldspar), 22.3±0.7 Ma (alkali feldspar)
Reference: Garside and others (1981)
Comments: Age too young in comparison with other ages on Nine Hill Tuff (see locs. A2, E7, and H6)

Location: SW¹/₄NW¹/₄NE¹/₄ sec. 1, T. 23 N., R. 21 E.
Age (mineral): 22.2±0.6 Ma (plagioclase), 23.2±0.7 Ma (biotite)
Reference: Wallace (1975)
Comments: According to Deino (1985, p. 185), unit is above Nine Hill Tuff

E7. Rock description: Nine Hill Tuff
Location: NW¹/₄SE¹/₄SW¹/₄ sec. 8, T. 22 N., R. 21 E.
Age (mineral): 24.71±0.82 Ma (sanidine)
Reference: Deino (1985, p. 182)

Location: NW¹/₄NE¹/₄SW¹/₄ sec. 36, T. 24 N., R. 20 E.
Age (mineral): 28.6±0.8 Ma (biotite)
Reference: Wallace (1975)
Comments: According to Deino (1985, p. 185), unit is tuff of Porcupine Mountain or tuff of Coyote Spring

E9. Rock description: Tuff of Whiskey Spring (from unit locally referred to as tuff cf Rattlesnake Canyon); unit erroneously called tuff of Piute Canyon by Garside and others (1981) (L.J. Garside, written commun., 1993); rhyolite ash-flow tuff
Location: lat 39°45’52"N., long 119°33’30"W.; NW¹/₄ sec. 19, T. 22 N., R. 22 E.
Age (mineral): 28.7±0.9 Ma (alkali feldspar), 29.3±0.9 Ma (alkali feldspar)
Reference: Garside and others (1981)
Comments: Age probably minimum; tuff of
Whiskey Spring unconformably overlies tuff of Coyote Spring

E10. **Rock description**: Tuff of Coyote Spring; rhyodacite ash-flow tuff  
**Location**: lat 39°45'45"N., long 119°34'04"W.; SW\(\times\)NE\(\times\) sec. 24, T. 22 N., R. 21 E.  
**Age (mineral)**: 27.8±0.8 Ma (biotite), 28.3±0.8 Ma (biotite), 29.2±0.9 Ma (plagioclase), 29.8±0.9 Ma (plagioclase)  
**Reference**: Garside and others (1981)

E11. **Rock description**: Tuff of Axe Handle Canyon  
**Location**: lat 39°45'31"N., long 119°38'25"W.; SE\(\times\) sec. 20, T. 22 N., R. 21 E.  
**Age (mineral)**: 31.8±1.0 Ma (biotite), 30.5±0.8 Ma (sanidine)  
**Reference**: Garside and others (1993)

**Comments**: Tuff is local erosional remnant below tuff of Whiskey Spring and rests on Mesozoic granodiorite

**Alteration age**

E12. **Rock description**: Sericite produced during hydrothermal alteration  
**Location**: Nevada Dominion adit; NE\(\times\)NW\(\times\)SW\(\times\) sec. 15, T. 23 N., R. 21 E.  
**Age (mineral)**: 21.8±0.7 Ma (sericite)  
**Reference**: Wallace (1975)

SPANISH SPRINGS VALLEY 15' QUADRANGLE (F)

F1. **Rock description**: Rhyolite dome  
**Location**: Near Mustang; NE\(\times\) sec. 8, T. 19 N., R. 21 E.  
**Age (mineral)**: 8.4±0.3 Ma (plagioclase)  
**Reference**: Silberman and others (1979)

F2. **Rock description**: Mustang Andesite; porphyritic hornblende andesite  
**Location**: lat 39°31.0'N., long 119°32.9'W.; NE\(\times\) sec. 18, T. 19 N., R. 22 E.  
**Age (mineral)**: 9.1±0.3 Ma (whole rock)  
**Reference**: Morton and others (1977, 1980); Fultz and others (1984)

F3. **Rock description**: Mustang Andesite; porphyritic hornblende andesite  
**Location**: lat 39°30.6'N., long 119°32.9'W.; SE\(\times\) sec. 18, T. 19 N., R. 22 E.  
**Age (mineral)**: 9.2±0.3 Ma (whole rock)  
**Reference**: Morton and others (1977, 1980); Fultz and others (1984)

**Alteration age**

F4. **Rock description**: Quartz-alunite alteration  
**Location**: NW\(\times\) sec. 21, T. 19 N., R. 21 E.  
**Age (mineral)**: 10.0±0.8 Ma (alunite-quartz)  
**Reference**: Vikre and McKee (1987)

F5. **Rock description**: Alunite  
**Location**: lat 39°33'52"N., long 119°44'21"W.; SE\(\times\)SE\(\times\) sec. 28, T. 20 N., R. 20 E.  
**Age (mineral)**: 16.3±0.5 Ma (alunite)  
**Reference**: Garside and others (1993)

**Comments**: Alunitic alteration of Alta Formation associated with mineralization in Wedekind mining district

VIRGINIA CITY 15' QUADRANGLE (G)

G1. **Rock description**: McClellan Peak basalt; olivine basalt  
**Location**: lat 39°15'36"N., long 119°38'47"W.; SE\(\times\) sec. 8, T. 16 N., R. 21 E.  
**Age (mineral)**: 1.17±0.04 Ma (whole rock)  
**Reference**: Doell and others (1966); Silberman and McKee (1972)

G2. **Rock description**: McClellan Peak basalt; olivine basalt  
**Location**: NE\(\times\) sec. 7, T. 18 N., R. 22 E.  
**Age (mineral)**: 1.51±0.18 Ma (whole rock)  
**Reference**: Morton and others (1980); Fultz and others (1984)

G3. **Rock description**: McClellan Peak basalt; olivine basalt  
**Location**: NE\(\times\) sec. 12, T. 18 N., R. 21 E.  
**Age (mineral)**: 1.54±0.13 Ma (whole rock)  
**Reference**: Morton and others (1980); Fultz and others (1984)

G4. **Rock description**: Rhyolite dome  
**Location**: Truckee Meadows; NW\(\times\) sec. 27, T. 18 N., R. 20 E.  
**Age (mineral)**: 1.24±0.06 Ma (sanidine)  
**Reference**: Silberman and others (1979)

G5. **Rock description**: Sutro rhyolite dome  
**Location**: Virginia Range; NW\(\times\) sec. 16, T. 17 N., R. 22 E.  
**Age (mineral)**: 1.51±0.22 Ma (alkali feldspar), 1.55±0.06 Ma (feldspar), 1.55±0.06 Ma (obsidian)  
**Reference**: Silberman and others (1979)

G6. **Rock description**: Basaltic andesite  
**Location**: Steamboat Hills; SW\(\times\) sec. 33, T. 18 N., R. 20 E.  
**Age (mineral)**: 2.59±0.19 Ma (plagioclase, An\(_{58-62}\)), 2.62±0.11 Ma (alkali feldspar and plagioclase), 2.60±0.10 Ma (alkali feldspar), 2.21±0.10 Ma (whole rock)  
**Reference**: Silberman and others (1979)

G7. **Rock description**: Rhyolite dome  
**Location**: Truckee Meadows; NW\(\times\) sec. 23, T. 18 N., R. 20 E.  
**Age (mineral)**: 3.05±0.09 Ma (whole rock), 3.11±0.12 Ma (whole rock), 1.19±0.05 Ma (sanidine)  
**Reference**: Silberman and others (1979)

G8. **Rock description**: Lousetown Formation; basalt  
**Location**: Lousetown Creek; NE\(\times\) sec. 15, T. 18 N., R. 21 E.  
**Age (mineral)**: 6.83±0.16 Ma (whole rock)  
**Reference**: Morton and others (1979); Fultz and
G9. Rock description: Lousetown Formation
Location: lat 39°22'00"N., long 119°37'57"W.; NW¼ sec. 21, T. 18 N., R. 21 E.
Age (mineral): 7.08±0.19 Ma (whole rock)
Reference: Dalrymple and others (1967); Silberman and McKee (1972)
Comments: Second flow above creek bed; lower part of Lousetown Formation

G10. Rock description: Lousetown Formation
Location: Clark Mountain; NW¼ sec. 26, T. 19 N., R. 21 E.
Age (mineral): 7.35±0.70 Ma (whole rock)
Reference: Morton and others (1980); Fultz and others (1984)

G11. Rock description: Lousetown Formation
Location: Clark Mountain; central part of NW¼ sec. 26, T. 19 N., R. 21 E.
Age (mineral): 9.66±0.30 Ma (whole rock)
Reference: Morton and others (1980); Fultz and others (1984)

G12. Rock description: Black dike
Location: SW¼ sec. 29, T. 17 N., R. 21 E.; New Savage Mine
Age (mineral): 365-ft level, 8.6±0.3 Ma (whole rock); 465-ft level, 8.2±0.4 Ma (whole rock)
Reference: Vikre and McKee (1987); Vikre and others (1988)

G13. Rock description: Mustang Andesite
Location: NE¼ sec. 26, T. 19 N., R. 21 E.
Age (mineral): 8.65±0.26 Ma (hornblende)
Reference: Morton and others (1980); Fultz and others (1984)

G14. Rock description: Rhyolite dome
Location: Washington Hill; south half of sec. 34, T. 19 N., R. 21 E.
Age (mineral): 11.2±0.3 Ma (biotite), 10.0±0.3 Ma (plagioclase)
Reference: Silberman and others (1979); Vikre and others (1988)

G15. Rock description: Tuff in sedimentary rocks; called Coal Valley Formation by Axelrod (1962) and Truckee Formation by Thompson and White (1964)
Location: NE¼ sec. 36, T. 18 N., R. 21 E.
Age (mineral): 12.6±0.5 Ma (biotite)
Collected by: D.I. Axelrod, University of California, Davis
Isotopic data and age by: Geochron Laboratories, Inc., Cambridge, Mass.
Analytical Data: K2O=6.928%; 40Ar* = 0.00612×10^-6 mole/g; 40Ar*/39Ar = 0.171

G16. Rock description: Pumiceous rhyolite tuff breccia; called Coal Valley Formation by Axelrod (1962) and Truckee Formation by Thompson and White (1964)
Location: lat 39°23'34"N., long 119°33'12"W.; south-central part of sec. 30, T. 18 N., R. 22 E.
Age (mineral): 12.6±0.5 Ma (biotite)
Reference: Silberman and McKee (1972)
Comments: Mineral separate from large pumice block; in this area, Kate Peak Formation is interbedded with Truckee Formation (Thompson and White, 1964; Vikre and others, 1988)

G17. Rock description: Knickerbocker Andesite
Location: Virginia City reservoir; SE¼ sec. 1, T. 16 N., R. 20 E.
Age (mineral): 13.6±0.6 Ma (plagioclase), 10.6±0.4 Ma (whole rock)
Reference: Vikre and McKee (1987); Vikre and others (1988)

G18. Rock description: Knickerbocker Andesite
Location: Alta shaft; SW¼ sec. 5, T. 16 N., R. 21 E.
Age (mineral): 13.3±0.7 Ma (plagioclase)
Reference: Vikre and McKee (1987); Vikre and others (1988)

G19. Rock description: Knickerbocker Andesite
Location: North slope Mount Grosh; SW¼ sec. 34, T. 17 N., R. 21 E.
Age (mineral): 13.6±0.8 Ma (plagioclase)
Reference: Vikre and McKee (1987); Vikre and others (1988)

G20. Rock description: Knickerbocker Andesite
Location: Mount Davidson; NE¼ sec. 30, T. 17 N., R. 21 E.
Age (mineral): 12.4±1.1 Ma (chloritized hornblende)
Reference: Vikre and others (1988)

G21. Rock description: Knickerbocker Andesite
Location: Basaltic andesite flow; lat 39°16'50"N., long 119°40'48"W.; SE¼SW¼NE¼ sec. 6, T. 16 N., R. 21 E.
Age (mineral): 13.6±0.6 Ma (plagioclase)
Collected by: D.M. Hudson
Analytical data: K2O=0.2939%; 40Ar* = 0.0575353×10^-10 mole/g; 40Ar*/39Ar = 0.203

G22. Rock description: Davidson Granodiorite
Location: New Savage Mine, 365-f level; SW¼ sec. 29, T. 17 N., R. 21 E.
Age (mineral): 11.6±0.4 Ma (feldspar)
Reference: Vikre and McKee (1987); Vikre and others (1988)

G23. Rock description: Davidson Granodiorite
Location: Mount Davidson; SW¼ sec. 30, T. 17 N., R. 21 E.
Age (mineral): 12.4±1.1 Ma (chloritized hornblende)
Reference: Vikre and others (1988)

G24. Rock description: Davidson Granodiorite
Location: Hale and Norcross Tunnel dump; SW¼ sec. 29, T. 17 N., R. 21 E.
Age (mineral): 13.4±0.4 Ma (feldspar)
Reference: Vikre and McKee (1987); Vikre and others (1988)
G25. Rock description: Davidson Granodiorite
Location: Mount Davidson; sec. 30, T. 17 N., R. 21 E.
Age (mineral): 13.9±0.5 Ma (potassium feldspar), 13.0±0.8 Ma (chloritized hornblende), 10.8±0.8 Ma (plagioclase)
Reference: Vikre and others (1988)

G26. Rock description: Davidson Granodiorite
Location: Hale and Norcross Tunnel; SW¼ sec. 29, T. 17 N., R. 21 E.
Age (mineral): 14.4±0.4 Ma (biotite)
Reference: Vikre and others (1988)

G27. Rock description: Davidson Granodiorite
Location: Mount Davidson; NW¼ sec. 32, T. 17 N., R. 21 E.
Age (mineral): 14.7±0.4 Ma (plagioclase)
Reference: Vikre and others (1988)

G28. Rock description: Davidson Granodiorite
Location: Mount Davidson; sec. 30, T. 17 N., R. 21 E.
Age (mineral): 17.6±2.1 Ma (zircon), 16.9±2.1 Ma (zircon), 10.5±0.1 Ma (apatite)
Method: Fission track
Reference: Vikre and others (1988)

G29. Rock description: Kate Peak Formation
Location: Washington Hill; NE¼ sec. 5, T. 18 N., R. 21 E.
Age (mineral): 12.6±0.2 Ma (biotite)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G30. Rock description: Kate Peak Formation; intrusive rock
Location: Upper Lousetown Creek; SW¼ sec. 4, T. 17 N., R. 21 E.
Age (mineral): 12.7±0.3 Ma (biotite)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G31. Rock description: Vitrophyre; glassy rhyolite flow assigned to Kate Peak Formation by Silberman and McKee (1972) and to Coal Valley Formation by Vikre and others (1988)
Location: Chalk Hills area; lat 39°23'32"N., long 119°32'32"W.; west-central part of sec. 29, T. 18 N., R. 22 E.
Age (mineral): 12.7±0.2 Ma (biotite)
Reference: Silberman and McKee (1972); Vikre and others (1988)

G32. Rock description: Kate Peak Formation; porphyritic dacite flow
Location: Kate Peak; lat 39°16'29"N., long 119°38'21"W.; NE¼ sec. 9, T. 16 N., R. 21 E.
Age (mineral): 13.1±0.8 Ma (biotite)
Reference: Bonham (1969); Krueger and Schilling (1971); Silberman and McKee (1972); Vikre and others (1988)
Comments: About 60 m stratigraphically above base of formation

G33. Rock description: Kate Peak Formation; intrusive rock
Location: NE¼ sec. 33, T. 17 N., R. 21 E.
Age (mineral): 13.2±0.4 Ma (hornblende), 13.0±0.4 Ma (biotite)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G34. Rock description: Kate Peak Formation; intrusive rock
Location: Sierra Nevada mine; SE¼ sec. 20, T. 17 N., R. 21 E.
Age (mineral): 13.3±0.6 Ma (alkali feldspar)
Reference: Vikre and McKee (1977); Vikre and others (1988)

G35. Rock description: Extrusive rock
Location: Ophir Ravine; SW¼ sec. 20, T. 17 N., R. 21 E.
Age (mineral): 13.7±0.5 Ma (whole rock)
Reference: Vikre and McKee (1977); Vikre and others (1988)

G36. Rock description: Extrusive rock
Location: Scorpion shaft; SE¼ sec. 20, T. 17 N., R. 21 E.
Age (mineral): 13.7±0.5 Ma (whole rock)
Reference: Vikre and McKee (1977); Vikre and others (1988)

G37. Rock description: Kate Peak Formation
Location: NW¼ sec. 32, T. 17 N., R. 21 E.
Age (mineral): 14.3±1.6 Ma (hornblende)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G38. Rock description: Kate Peak Formation
Location: NW¼ SE¼ sec. 9, T. 17 N., R. 21 E.
Age (mineral): 14.2±0.3 Ma (biotite)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G39. Rock description: Kate Peak Formation
Location: Quarry, Utah shaft; SW¼ sec. 20, T. 17 N., R. 21 E.
Age (mineral): 15.3±0.4 Ma (biotite)
Reference: Whitebread (1976, table 1); Vikre and others (1988)

G40. Rock description: Kate Peak Formation; intrusive rock
Location: Utah mine; NE¼ sec. 20, T. 17 N., R. 21 E.
Age (mineral): 15.0±1.6 Ma (plagioclase)
Reference: Vikre and McKee (1977); Vikre and others (1988)
G42. **Rock description:** Intrusive part of Kate Peak Formation
**Location:** Quarry, Utah shaft; SW 1/4 sec. 16, T. 17 N., R. 21 E.
**Age (mineral):** 16.9±1.8 Ma (plagioclase)
**Reference:** Vikre and others (1988)

G43. **Rock description:** Alta Formation
**Location:** Central-western part of sec. 4, T. 16 N., R. 21 E.
**Age (mineral):** 16.9±1.8 Ma (plagioclase)
**Reference:** Vikre and others (1988)

G44. **Rock description:** Alta Formation
**Location:** Ophir Hill; SW 1/4 sec. 19, T. 17 N., R. 21 E.
**Age (mineral):** 16.6±0.6 Ma (hornblende)
**Reference:** Silberman and McKee (1972); Vikre and others (1988)

G45. **Rock description:** Alta Formation
**Location:** lat 39°16'27"N., long 119°37'41"W.; SW 1/4 sec. 4, T. 16 N., R. 21 E.
**Age (mineral):** 16.9±0.5 Ma (plagioclase)
**Reference:** Silberman and McKee (1972); Vikre and others (1988)

G46. **Rock description:** Alta Formation
**Location:** Woodville shaft; NE 1/4 sec. 8, T. 16 N., R. 21 E.
**Age (mineral):** 18.1±0.8 Ma (hornblende)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)

G47. **Rock description:** Alta Formation
**Location:** Twin Peaks, Gold Hill; SW 1/4 sec. 32, T. 17 N., R. 21 E.
**Age (mineral):** 20±1.4 Ma (hornblende)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)

G48. **Rock description:** Santiago Canyon Tuff
**Location:** American Flat; SE 1/4 sec. 7, T. 16 N., R. 21 E.
**Age (mineral):** 23.1±0.7 Ma (biotite)
**Reference:** Whitebread (1976, table 1); Vikre and others (1988)

G49. **Rock description:** Hartford Hill Rhyolite of Evernden and James (1964); rhyolitic welded tuff
**Location:** NW 1/4 sec. 31, T. 17 N., R. 21 E.
**Age (mineral):** 23.3 Ma (sanidine)
**Reference:** Evernden and James (1964); Silberman and McKee (1972)

**Comments:** Evernden and James (1964) describe locality as "3 miles northwest of Sutro Flora at Silver City, Nevada;" however, according to Silberman and McKee (1972), the location given by Evernden and James (1964) does not match their description of the geology at the supposedly same place. For this reason, Silberman and McKee (1972) believe the location given by Evernden and James (1964) is incorrect

G50. **Rock description:** Lenihan Canyon Tuff
**Location:** South of McClelland Peak; NE 1/4NW 1/4NW 1/4 sec. 14, T. 16 N., R. 20 E.
**Age (mineral):** 26.7±0.8 Ma (biotite), 25.1±0.8 Ma (sanidine)
**Reference:** Bingler and others (1978)

**Vein material or alteration age**

G51. **Rock description:** Quartz-alunite alteration
**Location:** Base of Geiger Grade; NW 1/4 sec. 35, T. 18 N., R. 20 E.
**Age (mineral):** 9±0.8 Ma (alunite-quartz)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)

G52. **Rock description:** Vein
**Location:** Root Mine; NE 1/4 sec. 5, T. 18 N., R. 21 E.
**Age (mineral):** 11.7±0.4 Ma (alunite)
**Reference:** Vikre and others (1988)

G53. **Rock description:** Vein quartz that has calcite and euhedral crystals of adularia
**Location:** Occidental Lode, near Sutro Tunnel air shaft; lat 39°18'59"N., long 119°37'51"W.; NE 1/4 sec. 33, T. 17 N., R. 21 E.
**Age (mineral):** 12±0.6 Ma (adularia)
**Reference:** Bonham (1969, p. 131); Krueger and Schilling (1971); Vikre and others (1988)

G54. **Rock description:** Vein material
**Location:** Flowery lode, Sixmile Canyon; SW 1/4 sec. 24, T. 17 N., R. 21 E.
**Age (mineral):** 12.9±0.4 Ma (adularia)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)

G55. **Rock description:** Vein material
**Location:** Flowery lode, Sixmile Canyon; SE 1/4 sec. 23, T. 17 N., R. 21 E.
**Age (mineral):** 13.1±0.4 Ma (adularia)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)

G56. **Rock description:** Occidental vein
**Location:** Sixmile Canyon; SE 1/4NW 1/4NE 1/4 sec. 33, T. 17 N., R. 21 E.
**Age (mineral):** 13.1±0.4 Ma (adularia)
**Reference:** Whitebread (1976); Vikre and others (1988)

G57. **Rock description:** Vein material
**Location:** Cedar Hill Canyon; NW 1/4 sec. 20, T. 17 N., R. 21 E.
**Age (mineral):** 13.5±0.4 Ma (muscovite)
**Reference:** Whitebread (1976); Vikre and others (1988)

G58. **Rock description:** Vein material
**Location:** Comstock lode; 2,340-ft level, Ward Mine; NW 1/4 sec. 32, T. 17 N., R. 21 E.
**Age (mineral):** 13.6±0.4 Ma (muscovite)
**Reference:** Vikre and McKee (1987); Vikre and others (1988)
G59. Rock description: Vein material
   Location: Silver City Fault, Keystone Mine; SW¼ sec. 5, T. 16 N., R. 21 E.
   Age (mineral): 13.7±0.4 Ma (muscovite)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G60. Rock description: Quartz-alunite alteration
   Location: Upper Lousetown Creek; SW¼ sec. 4, T. 17 N., R. 21 E.
   Age (mineral): 13.8±0.4 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G61. Rock description: Cedar Hill vein
   Location: Cedar Hill Canyon; SW¼ sec. 20, T. 17 N., R. 21 E.
   Age (mineral): 14.0±0.4 Ma (muscovite)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G62. Rock description: Comstock vein
   Location: Gold Hill; central-western part of sec. 32, T. 17 N., R. 21 E.
   Age (mineral): 14.1±0.4 Ma (adularia)
   Reference: Whitebread (1976); Vikre and others (1988)

G63. Rock description: Sericite in Kate Peak Formation, upper member
   Location: lat 39°19’17”N., long 119°38’34”W.; SW¼NE¼SE¼ sec. 20, T. 17 N., R. 21 E.
   Age (mineral): 14.1±0.4 Ma (sericite)
   Comments: Overlies altered rocks of Alta Formation in hanging wall of Comstock Lode directly northeast of Cedar Hill pit
   Collected by: D.M. Hudson and E.H. McKee
   Isotopic data and age by: E.H. McKee
   Analytical data: K2O=7.88%; 40Ar*=1.6096×10^-10 mole/g; 40Ar*/36Ar=0.79

G64. Rock description: Vein material, Flowery lode
   Location: Sixmile Canyon; SE¼ sec. 23, T. 17 N., R. 21 E.
   Age (mineral): 14.1±0.4 Ma (muscovite)
   Reference: Vikre and others (1988)

G65. Rock description: Quartz-alunite alteration
   Location: Upper Lousetown Creek; SW¼ sec. 4, T. 17 N., R. 21 E.
   Age (mineral): 14.1±0.7 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G66. Rock description: Quartz-sericite alteration
   Location: Mount Davidson; SW¼ sec. 30, T. 17 N., R. 21 E.
   Age (mineral): 14.9±0.6 Ma (sericite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G67. Rock description: Quartz-alunite alteration
   Location: Mount Grosh; NE¼ sec. 4, T. 16 N., R. 21 E.
   Age (mineral): 15.0±0.6 Ma (alunite-quartz)

G68. Rock description: Quartz-alunite alteration
   Location: Ward shaft; SW¼ sec. 33, T. 17 N., R. 21 E.
   Age (mineral): 15.4±1.0 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G69. Rock description: Quartz-alunite alteration
   Location: Orleans Hill; SW¼ sec. 17, T. 17 N., R. 21 E.
   Age (mineral): 15.9±1.0 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G70. Rock description: Quartz-alunite alteration
   Location: Base of Geiger Grade; NW¼ sec. 35, T. 18 N., R. 20 E.
   Age: 16.0±1.6 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

G71. Rock description: Quartz-alunite alteration
   Location: 1.6 km west of Mount Davidson; SE¼ sec. 25, T. 17 N., R. 20 E.
   Age: 16.3±0.5 Ma (alunite-quartz)
   Reference: Vikre and McKee (1987); Vikre and others (1988)

DAYTON 15’ QUADRANGLE (H)

H1. Rock description: Basalt flow
   Location: North of Carson City; central-eastern part of sec. 22, T. 16 N., R. 20 E.
   Age (mineral): 1.39±0.29 Ma (whole rock)
   Reference: Bingler (1977)

H2. Rock description: Dacite
   Location: lat 39°09’47”N., long 119°30’53”W.
   Age (mineral): 4.6±0.2 Ma (whole rock)
   Reference: Vikre and McKee (1994)

H3. Rock description: Andesite
   Location: lat 39°10’13”N., long 119°30’02”W.
   Age (mineral): 6.6±0.5 Ma (whole rock)
   Reference: Vikre and McKee (1994)

H4. Rock description: Eureka Canyon Tuff
   Location: SE¼NW¼SW¼NW¼ sec. 33, T. 16 N., R. 21 E.
   Age (mineral): 17.75±0.40 Ma (sani/lime)
   Reference: Deino (1985, p. 182)
   Comments: Much younger than other age from rocks called Eureka Canyon Tuff listed below (see loc. H7)

H5. Rock description: Santiago Canyon Tuff
   Location: lat 39°10’33”N., long 119°38’11”W.; NE¼SW¼SW¼NW¼ sec. 9, T. 15 N., R. 21 E.
   Age (mineral): 21.6±0.9 Ma (sani/lime), 22.8±0.7 Ma (biotite)
   Reference: Bingler and others (1977)

H6. Rock description: Nine Hill Tuff
   Location: Central part of NW¼SW¼NW¼ sec. 12, T. 15 N., R. 20 E.
Age (mineral): 24.29±0.80 Ma (devitrified matrix)
Reference: Deino (1985, p. 182)

H7. Rock description: Eureka Canyon Tuff
Location: lat 39°12′49"W., long 119°43′34"W.; central part of NE¼NW¼ sec. 34, T. 16 N., R. 20 E.
Age (mineral): 26.1±0.2 Ma (sanidine)
Reference: Bingler and others (1978)
Comments: Much older than other age from rocks listed above as Eureka Canyon Tuff (see loc. H4)

H8. Rock description: Mickey Pass Tuff
Location: lat 39°11′42″W., long 119°43′34″W.; central part of NE¼NW¼ sec. 34, T. 16 N., R. 20 E.
Age (mineral): 28.0±0.8 Ma (biotite), 28.6±0.9 Ma (plagioclase)
Reference: Bingler and others (1978)

H9. Rock description: Potassium feldspar in vein
Location: lat 39°10′09″W., long 119°30′06″W.
Age (mineral): 7.0±0.3 Ma (potassium feldspar)
Reference: Vikre and McKee (1994)

NIXON 15′ QUADRANGLE (I)

I1. Rock description: Sericite and quartz produced during hydrothermal alteration of Guanomi pluton
Location: Guanomi Mine dump; SE¼NW¼SE¼ sec. 24, T. 23 N., R. 22 E.
Age (mineral): 24.0±0.7 Ma (quartz, sericite)
Reference: Wallace (1975)

WADSWORTH 15′ QUADRANGLE (J)

J1. Rock description: Ash associated with diatomite
Location: Eagle-Picher diatomite mine; north-central part of sec. 34, T. 20 N., R. 23 E.
Age: 11.2±0.3 Ma
Reference: Krebs and Bradbury (1984; in press)

J2. Rock description: Rhyolite ash-flow tuff within Pyramid sequence
Location: Pierson Canyon; lat 39°36′05″N., long 119°25′59″W.; NE¼NW¼sec. 6, T. 20 N., R. 23 E.
Age (mineral): 12.0±0.18 Ma (groundmass feldspar concentrate)
Collected by: D.I. Axelrod, University of California, Davis

J3. Rock description: Basaltic andesite
Location: Center part of NE¼NW¼ sec. 26, T. 20 N., R. 23 E.
Age (mineral): 12.02±0.18 Ma (groundmass feldspar concentrate)
Collected by: D.I. Axelrod, University of California, Davis

J4. Rock description: Chloropagus Formation (Axelrod, 1956), upper part; andesite or basalt
Location: Pierson Canyon; NE¼NW¼sec. 6, T. 20 N., R. 23 E.
Age (mineral): 13.3±0.7 Ma (biotite)
Collected by: D.I. Axelrod, University of California, Davis

J5. Rock description: Chloropagus Formation (Axelrod, 1956); olivine basalt flow
Location: lat 39°36′12″N., long 119°21′54″W.; SW¼NE¼sec. 14, T. 20 N., R. 23 E.
Age (mineral): 23.4 Ma (sanidine), 23.3 Ma (plagioclase)
Reference: Evernden and James (1984); Silberman and McKee (1972)

J6. Rock description: Rhyolite welded tuff
Location: Pierson Canyon; lat 39°36′12″N., long 119°21′54″W.; SW¼NE¼sec. 14, T. 20 N., R. 23 E.
Age (mineral): 23.4 Ma (sanidine), 23.3 Ma (plagioclase)
Reference: Evernden and James (1984); Silberman and McKee (1972)

CHURCHILL BUTTE 15′ QUADRANGLE (K)

K1. Rock description: Basalt
Location: Churchill Butte; sec. 25, T. 17 N., R. 23 E.
Age (mineral): 3.3±0.2 Ma (whole rock)
Reference: Nichols-Tingley (1981); Fultz and others (1984)

K2. Rock description: Basalt
Location: Churchill Butte; sec. 25, T. 17 N., R. 23 E.
Age (mineral): 3.5±0.2 Ma (whole rock)
Reference: Nichols-Tingley (1981); Fultz and others (1984)

K3. Rock description: Porphyritic olivine-bearing basaltic andesite
Location: Churchill Butte; lat 30°18′9″N., long 119°20′7″W.; NE¼NW¼sec. 25, T. 17 N., R. 23 E.
Age (mineral): 4.3±0.6 Ma (whole rock)
Reference: Fultz and others (1984); Bell and others (1984)

K4. Rock description: Basaltic andesite
Location: Table Mountain; lat 39°17′2″N., long 119°23′5″W.; NW¼sec. 3, T. 16 N., R. 23 E.
Age (mineral): 6.7±0.7 Ma (whole rock)
Reference: Fultz and others (1984); Bell and others (1984)

Vein material and alteration ages

K5. Rock description: Quartz-alunite alteration
Location: San Juan Hill, Ramsey district; SE¼ sec. 33, T. 19 N., R. 23 E.
Age (mineral): 9.3±0.5 Ma (quartz-alunite)
Reference: Vikre and McKee (1987); Vikre and others (1988)

K6. Rock description: Quartz-adularia-calcrete vein
Location: 1,000-ft level, Gooseberry Mine; lat 39°29.2'N., long 119°27.8'W.; NW¼ sec. 25, T. 19 N., R. 22 E.
Age (mineral): 10.3±0.3 Ma (adularia)
Reference: Morton and others (1977); Vikre and others (1988)

K7. Rock description: Adularia
Location: Talapoosa mining district; SE¼SE¼NW¼ sec. 3, T. 18 N., R. 24 E.
Age (mineral): 10.8±0.3 Ma (adularia)
Reference: Garside and Silberman (1973)

K8. Rock description: Quartz and adularia
Location: 1.5 km southeast of Ramsey townsite; lat 39°26'37.1'N., long 119°22'12'W.; SW¼NW¼ sec. 11, T. 18 N., R. 23 E.
Age (mineral): 10.8±0.3 Ma (adularia)
Reference: Garside and others (1993)
Comments: Quartz-adularia alteration associated with precious metal mineralization in Ramsey district

COMO 15' QUADRANGLE (L)

L1. Rock description: Dacite
Location: lat 39°11'50"N., long 119°29'22"W.
Age (mineral): 2.8±0.1 Ma (whole rock)
Reference: Vikre and McKee (1994)

L2. Rock description: Dacite
Location: lat 39°11'42"N., long 119°27'56"W.
Age (mineral): 4.6±0.2 Ma (whole rock)
Reference: Vikre and McKee (1994)

L3. Rock description: Basalt flow; underlain by porphyritic andesite and overlain by thin sedimentary unit, which is in turn overlain by another porphyritic andesite
Location: About 2 km northeast of Hercules Mine; lat 39°14'27"N., long 119°27'56"W.
Age (mineral): 5.2±0.2 Ma (whole rock, acid treated)
Collected by: J.H. Stewart
Isotopic data and age by: E.H. McKee
Analytical data: K2O=1.603%; 40Ar*/39Ar=1.20549×10^-11 mole/g; 40Ar*/36Ar=0.27

L4. Rock description: Porphyritic andesite clast from monolithologic volcanic breccia
Location: Along powerline road west of Churchill Canyon; NW¼NE¼NW¼ sec. 3, T. 14 N., R. 23 E.
Age (mineral): 6.0±0.2 Ma (whole rock, acid treated)
Collected by: J.H. Stewart
Isotopic data and age by: E.H. McKee
Analytical data: K2O=2.181%; 40Ar*/39Ar=1.89875×10^-11 mole/g; 40Ar*/36Ar=0.38

L5. Rock description: Dacite intrusion
Location: lat 39°10'05"N., long 119°27'46"W.
Age (mineral): 6.0±0.3 Ma (whole rock)
Reference: Vikre and McKee (in press)

L6. Rock description: Andesite
Location: lat 39°10'09"N., long 119°29°13"W.
Age (mineral): 6.0±0.2 Ma (whole rock)
Reference: Vikre and McKee (1994)

L7. Rock description: Andesite
Location: lat 39°10'00"N., long 119°28'50"W.
Age (mineral): 6.0±0.7 Ma (whole rock)
Reference: Vikre and McKee (1994)

L8. Rock description: Dacite intrusion
Location: lat 39°09'50"N., long 119°27'28"W.
Age (mineral): 6.3±0.7 Ma (whole rock)
Reference: Vikre and McKee (1994)

L9. Rock description: Andesite
Location: lat 39°10'12"W., long 119°29'20"W.
Age (mineral): 6.6±0.3 Ma (whole rock)
Reference: Vikre and McKee (1994)

L10. Rock description: Andesite
Location: lat 39°10'04"N., long 119°28'41"W.
Age (mineral): 6.6±0.3 Ma (whole rock)
Reference: Vikre and McKee (1994)

L11. Rock description: Andesite
Location: lat 39°10'43"N., long 119°29'08"W.
Age (mineral): 7.5±0.3 Ma (whole rock)
Reference: Vikre and McKee (1994)

L12. Rock description: Porphyritic andesite lava flow
Location: Central Pine Nut Mountains, about 1 km west of Sunrise Pass; NE¼SW¼NE¼ sec. 10, T. 14 N., R. 22 E.
Age (mineral): 15.2±0.7 Ma.
Collected by: J.H. Stewart
Isotopic data and age by: E.H. McKee
Analytical data: K2O=2.810%; 40Ar*/36Ar=6.15591×10^-11 mole/g; 40Ar*/36Ar=0.73

L13. Rock description: Biotite-hornblende porphyry
Location: Southern part of Buckskin Range; eastern part of sec. 11 or western part of sec. 12, T. 13 N., R. 23 E.
Age (mineral): 15.7±1.5 Ma (hornblende)
Reference: Hudson and Oriel (1979)

L14. Rock description: Andesite
Location: lat 39°09'57"N., long 119°28'54"W.
Age (mineral): 17.6±0.5 Ma (whole rock)
Reference: Vikre and McKee (1994)

L15. Rock description: Porphyritic hornblende-biotite dacite intrusion; related to hornblende-andesite sequence of Lincoln Flat
Location: lat 39°00'10"N., long 119°19'41"W.

a. Method: K-Ar
   Age (mineral): 19.2±2.5 Ma (hornblende), 14.6±0.6 Ma (biotite)
   Reference: Proffett and Proffett (1976)
   Comments: Redating (Dilles and Gans, 1993; see also, in press) using more reliable 40Ar/39Ar methods gives 12.64±0.07 Ma (see below)

b. Method: 40Ar/39Ar
   Age (mineral): 12.64±0.07 Ma (biotite), 12.12±0.36 Ma (hornblende)
   Reference: Dilles and Gans (1993; see also, in press)

L16. Rock description: Porphyritic hornblende andesite dike; cuts and intrudes one of oldest Basin and Range normal faults in Yerington district
   Location: lat 39°02'28"N., long 119°16'14"W.
   Age (mineral): 19.4±2.8 Ma (plagioclase), 19.0±2.5 Ma (hornblende)
   Reference: Proffett and Proffett (1976)

L17. Rock description: Tuff and breccia of Gallagher Pass; pumice block
   Location: lat 39°05'40"N., long 119°17'01"W.
   Age (mineral): 24.7±0.9 Ma (biotite), 24.2±0.9 Ma (plagioclase)
   Reference: Proffett and Proffett (1976)

L18. Rock description: Mickey Pass Tuff, Weed Heights Member
   Location: lat 39°08'19"N., long 119°19'42"W.
   Age (mineral): 32.5±1.8 Ma (hornblende), 27.9±1.1 Ma (biotite)
   Reference: Proffett and Proffett (1976)
   Alteration and vein ages

L20. Rock description: Alunite and kaolinite alteration
   Location: lat 39°11'38"N., long 119°28'48"W.
   Age (mineral): 6.0±1.0 Ma (alunite)
   Reference: Vikre and McKee (1994)

L21. Rock description: Potassium feldspar in vein
   Location: lat 39°11'11"N., long 119°26'53"W.
   Age (mineral): 6.6±0.2 Ma (potassium feldspar)
   Reference: Vikre and McKee (1994)

FIREBALL RIDGE 15' QUADRANGLE (M)

M1. Rock description: Basalt
   Location: sec. 22, T. 22 N., R. 26 E.
   Age: 11.2 Ma

TWO TIPS 15' QUADRANGLE (N)

N1. Rock description: Basalt
   Location: lat 39°30.67"N., long 119°3.06"W.
   Age (mineral): 9.6±0.3 Ma (whole rock)
   Collected by: J.H. Stewart
   Isotopic data and age by: E.H. McKee
   Analytical data: K2O=2.581%; 40Ar*=3.587x10^-11 mole/g; 40Ar*/39Ar=0.44

N2. Rock description: Basalt
   Location: sec. 3, T. 20 N., R. 26 E.
   Age: 9.6 Ma

N3. Rock description: Ash bed associated with diatomite
   Location: lat 39°31'03"N., long 119°0^28"W.
   Age (mineral): 9.79±0.12 Ma (biotite)
   Reference: F.H. Brown (written commun., 1993); see also, Krebs and Bradbury (in press)

N4. Rock description: Ash bed associated with diatomite
   Location: lat 39°31'10"N., long 119°0^14"W.
   Age (mineral): 9.75±0.31 Ma (plagioclase)
   Reference: F.H. Brown (written commun., 1993); see also, Krebs and Bradbury (in press)

SILVER SPRINGS 15' QUADRANGLE (O)

O1. Rock description: Hornblende andesite
   Location: lat 39°25.15"N., long 119°8.15"W.; about 2 km north of The Narrows of Lahontan Reservoir
   Age (mineral): 6.7±0.18 Ma (whole rock)
   Collected by: J.H. Stewart
   Isotopic data and age by: E.H. McKee
   Analytical data: K2O=2.648%; 40Ar*=2.556x10^-11 mole/g; 40Ar*/39Ar=0.47

O2. Rock description: Flow-banded rhyolite dome
   Location: About 5.5 km due south of Lahontan Well on north flank of Desert Mountains; lat 39°15.25"N.; long 119°5.25"W.
   Age (mineral): 8.3±0.25 Ma (biotite)
   Collected by: J.H. Stewart
   Isotopic data and age by: E.H. McKee
   Analytical data: K2O=8.48%; 40Ar*=2.556x10^-11 mole/g; 40Ar*/39Ar=0.47

O3. Rock description: Porphyritic basaltic andesite
   Location: Silver Springs; lat 39°28.5"N., long 119°13.4"W.; NE^N^W^V sec. 31, T. 19 N., R. 25 E.
   Age (mineral): 11.8±0.7 Ma (whole rock)
   Reference: Fultz and others (1984); Pale and others (1984)

O4. Rock description: Flow-banded rhyolite dome
   Location: About 5 km southeast of The Narrows of Lahontan Reservoir; lat 39°22.04"N., long 119°3.97"W.
   Age (mineral): 13.4±0.4 Ma (biotite)
   Collected by: J.H. Stewart
   Isotopic data and age by: E.H. McKee
   Analytical data: K2O=8.81%; 40Ar*=1.707x10^-10
mole/g; $^{40}\text{Ar}*/\Sigma^{40}\text{Ar}=0.61$

**O5. Rock description:** Glassy rhyolite dome

**Location:** lat 39°26.91'N., long 119°13.41'W.

**Age (mineral):** 14.4±0.4 Ma (biotite)

**Collected by:** J.H. Stewart

**Isotopic data and age by:** E.H. McKee

**Analytical data:** $K_2O=8.62\%$; $^{40}\text{Ar}*=1.791\times10^{-10}$ mole/g; $^{40}\text{Ar}*/\Sigma^{40}\text{Ar}=0.55$

**WABUSKA 15' QUADRANGLE (P)**

**P1. Rock description:** Basaltic andesite

**Location:** Cleaver Peak; lat 39°12.8'N.; long 119°11.6'W.; NW 1/4 sec. 33, T. 16 N., R. 25 E.

**Age (mineral):** 9.2±0.6 Ma (whole rock)

**Reference:** Fultz and others (1984); Bell and others (1984)

**DESERT PEAK 15' QUADRANGLE (Q)**

**Q1. Rock description:** Volcanic rock above diatomite

**Location:** NW\%NE\% sec. 33, T. 23 N., R. 27 E.

**Age:** 9.8±0.7 Ma

**Reference:** Krebs and Bradbury (1984; in press); Krebs and others (1987, loc. 55)

**Q2. Rock description:** Basaltic andesite

**Location:** Desert Peak; lat 39°47.2'N., long 118°56.8'W.; NW\%SW\% sec. 10, T. 22 N., R. 27 E.

**Age (mineral):** 10.2±0.7 Ma

**Reference:** Fultz and others (1984); Bell and others (1984)

**Q3. Rock description:** Dacite flow

**Location:** lat 39°56'24"N., long 118°50'24"W.; SW\%NE\% sec. 21, T. 24 N., R. 28 E.

**Age (mineral):** 12.3 Ma (hornblende)

**Reference:** Silberman and McKee (1972); Willden and Speed (1974)

**Comments:** Columnar-jointed flow along road from Interstate 80 to Jessup in southern Trinity Range

**Q4. Rock description:** Chloropagus Formation (Axelrod, 1956); andesite tuff

**Location:** About 2.1 km north of Desert Peak; lat 39°48'N., long 118°56'W.; sec. 3, T. 22 N., R. 27 E.

**Age (mineral):** 14.3 Ma (plagioclase)

**Reference:** Silberman and McKee (1972); Evernden and James (1964)

**Comments:** Andesite tuff interbedded with leaf-bearing tuffaceous shales containing Chloropagus flora (Axelrod, 1956)

**SODA LAKE 15' QUADRANGLE (R)**

**R1. Rock description:** Basalt from core of U.S.G.S. drill hole CD–64A

**Location:** About 340 m west of southeast corner of sec. 30, T. 21 N., R. 29 E.

**Collected by:** F.H. Olmsted

**Isotopic data and age by:** E.H. McKee

**a. Sample number:** CD–DH 403, depth=403 ft

**Age (mineral):** 4.7±1.0 Ma (whole rock)

**Analytical data:** $K_2O=0.877\%$; $^{40}\text{Ar}*=5.878\times10^{-12}$ mole/g; $^{40}\text{Ar}*/\Sigma^{40}\text{Ar}=0.084$

**b. Sample number:** CD–DH 86C, depth=860 ft

**Age (mineral):** 4.7±1.6 Ma (whole rock)

**Analytical data:** $K_2O=1.971\%$; $^{40}\text{Ar}*=1.324\times10^{-11}$ mole/g; $^{40}\text{Ar}*/\Sigma^{40}\text{Ar}=0.053$

**c. Sample number:** CD–DH 863.1, depth=863.1 ft

**Age (mineral):** 4.4±2.0 Ma (whole rock)

**Analytical data:** $K_2O=1.871\%$; $^{40}\text{Ar}*=1.196\times10^{-11}$ mole/g; $^{40}\text{Ar}*/\Sigma^{40}\text{Ar}=0.043$

**R2. Rock description:** Black glassy rhyolite inclusion in basalt flow

**Location:** Upsal Hogback; lat 39°37.4'N., long 118°48.2'W.; SE 1/4 sec. 2, T. 20 N., R. 28 E.

**Age (mineral):** 6.3±0.3 Ma (whole rock)

**Reference:** Fultz and others (1984); Bell and others (1984)

**R3. Rock description:** Vitrophric part of ash-flow tuff

**Location:** lat 39°44.7'N., long 118°53.0'W.; SW 1/4 sec. 30, T. 22 N., R. 28 E.

**Comments:** Ages are highly discordant, and so age of unit is uncertain

**a. Age (mineral):** 14.3±1.1 Ma (plagioclase)

**Reference:** Fultz and others (1984); Bell and others (1984)

**b. Age (mineral):** 12.0±1.1 Ma (plagioclase)

**Reference:** Bell and others, 1984; see also, W.R. Benoit, Phillip Petroleum Co., quoted in Voegtly, 1981

**c. Age (mineral):** 4.6 Ma (hornblende)


**d. Age (mineral):** 2.3 Ma (plagioclase)

**Reference:** Hiner, 1979; Benoit and others, 1982

**R4. Rock description:** Gabbro

**Location:** lat 39°44.3'N., long 118°58.0'W.; SE 1/4 SE 1/4 sec. 29, T. 22 N., R. 27 E.

**Age (mineral):** 9.5±0.6 Ma (plagioclase), 26.2±1.2 Ma (hornblende)

**Reference:** Morton and others (1977)

**Comments:** Morton and others (1977) noted that high atmospheric-argon content of both minerals is typical of some rocks that have undergone hydrothermal alteration; discordance may indicate resetting of plagioclase, and perhaps both minerals, by postrystallization thermal activity. The 26–Ma hornblende age is typical of andesites in region

**FALLON 15' QUADRANGLE (S)**

**S1. Rock description:** Basalt

**Location:** Rattlesnake Hill; NW 1/4 sec. 29, T. 19 N., R. 29 E.
Age (mineral): 1.03±0.05 Ma (whole rock)

S2. Rock description: Basalt
Location: Red Mountain; SW¼ sec. 20, T. 18 N., R. 27 E.
Age (mineral): 6.96±0.42 Ma (whole rock)

WEBER RESERVOIR 15' QUADRANGLE (T)

T1. Rock description: Ash bed in Wassuk Group
Location: lat 39°00'15"N., long 118°59'43.5"W.
Age (mineral): 9.5±1.2 Ma (hornblende)
Reference: Silberman and McKee (1972); Willden and Speed (1974)
Comments: Lapilli tuff interbedded in top of diatomaceous shale sequence, northeastern Desert Mountains

T2. Rock description: Intrusion related to andesite of Lincoln Flat
Location: lat 39°00'09.5"N., long 118°53'52"W.
Age (mineral): 12.85±0.33 Ma (hornblende)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)

T3. Rock description: Andesite of Lincoln Flat; lava flow
Location: lat 39°00'35"N., long 118°56'08"W.
Age (mineral): 14.08±0.23 Ma (hornblende)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)

T4. Rock description: Pyroxene-andesite dike
Location: lat 39°00'46"N., long 118°56'38"W.
Age (mineral): 22.16±0.27 Ma (whole rock)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)

T5. Rock description: Ash block in breccia
Location: lat 39°02'24"N., long 118°56'40"W.
Age (mineral): 23.73±0.039 Ma (sanidine)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)
Comments: Age considered too old because of incorporation of fragments and minerals of older rocks

T6. Rock description: Tuff of Bluestone Mine; ash-flow tuff
Location: lat 39°02'11"N., long 118°57'43"W.
Age (mineral): 24.65±0.020 Ma (sanidine)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)

T7. Rock description: Rhyolite ash-flow tuff
Location: lat 39°01'57"N., long 118°57'37"W.
Age (mineral): 28.579±0.038 Ma (sanidine)
Method: 40 Ar/39 Ar
Reference: Dilles and Gans (1993; see also, in press)

ALLEN SPRINGS 15' QUADRANGLE (X)

X1. Rock description: Hornblende dacite
Location: lat 39°06'00"N., long 118°42'36"W.; NW¼SW¼ sec. 2, T. 14 N., R. 29 E.
Age (mineral): 21.8 Ma (hornblende)
Reference: Silberman and McKee (1972); Willden and Speed (1974)
Comments: Plug intruding rhyolite tuffs along northeastern front of Terrill Mountains

LONE ROCK NW, LONE ROCK, LONE ROCK SW, AND LONE ROCK SE 7½' QUADRANGLES (Y)

Y1. Rock description: Very coarse grained olivine basalt; sample from Amoco S.P. Land Co. drill hole #1
Location: Central part of NW¼ sec. 3; T. 24 N., R. 33 E.
Age (mineral): 4.2±0.1 Ma (whole rock, acid treated)
Comments: Sample made up of chis from core from 5,156 to 5,168 ft (specific depth and weight of chip fractions: 5,156 ft, 1.9 g; 5,160 ft, 5.75 g; 5,164 ft, 17.02 g; 5,168 ft, 24.2 g). Basalt is considered to be a sill by Hastings (1979) but could be a lava flow. From surface down to 6,900 ft, drill hole consists of largely lacustrine clays and silts that contain a few tuff beds; from 6,900 to 7,500 ft, it consists of "capping basalt" (Hastings, 1979), from which sample loc. Y2 was collected
Sample material from: Drill-core and chip library, Nevada Bureau of Mines and Geology, Reno, Nev.
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=1.188%; 40 Ar = 7.23799x10^-12 mole/g; 40 Ar/39 Ar=0.37
Y2. Rock description: Basalt; sample from Amoco S.P. Land Co. drill hole #1
Location: Central part of NW¼ sec. 33, T. 24 N., R. 33 E.
Age (mineral): 7.7±0.2 Ma (whole rock, acid treated)
Comments: Sample made up of drill chips from 7,480 to 7,430 ft (specific depth and weight of chip fractions: 7,430 to 7,440 ft, 13.99 g; 7,440 to 7,450 ft, 14.98 g; 7,450 to 7,460 ft, 15.99 g; 7,460 to 7,470 ft, 14.99 g; 7,470 to 7,480 ft, 9.70 g; 7,480 to 7,490 ft, 5.65 g). Basalt is referred to as "capping basalt" by Hastings (1979) and is main widespread reflector on seismic reflection line
Sample material from: Drill-core and chip library, Nevada Bureau of Mines and Geology, Reno, Nev.

Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=2.838%; 40 Ar* = 3.15479×10⁻¹¹ mole/g; 40 Ar*/Σ 40 Ar=0.45

Z1. Rock description: Fine-grained, microcrystalline olivine-clinopyroxene-plagioclase basalt lava flow unconformably overlying ash-flow tuff
Location: Southern end of Table Mountain in southern Stillwater Range; lat 39°30'37"N., long 118°19'05"W.
Age (mineral): 13.3±0.4 Ma (whole rock)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=1.907%; 40 Ar* = 3.667×10⁻¹¹ mole/g; 40 Ar*/Σ 40 Ar=0.61

Z2. Rock description: Microcrystalline olivine-clinopyroxene-plagioclase basalt lava flow unconformably overlying Miocene sedimentary rocks
Location: Near mouth of West Lee Canyon in southern Stillwater Range; lat 39°35'32"N., long 118°19'00"W.
Age (mineral): 14.4±0.6 Ma (whole rock)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=1.907%; 40 Ar* = 3.667×10⁻¹¹ mole/g; 40 Ar*/Σ 40 Ar=0.61

Z3. Rock description: Sparsely porphyritic rhyolite intrusion
Location: lat 39°37'N., long 118°19'W.
Age (mineral): 20.9±0.6 Ma (sanidine)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=7.53%; 40 Ar* = 2.27447×10⁻¹⁰ mole/g; 40 Ar*/Σ 40 Ar=0.721

Z4. Rock description: Sparsely porphyritic rhyolite lava flow unconformably overlying tuff of Poco Canyon
Location: lat 39°37'00"N., long 118°16'53"W.
Age (mineral): 22.4±0.7 Ma (sanidine)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=4.21%; 40 Ar* = 1.3665×10⁻¹⁰ mole/g; 40 Ar*/Σ 40 Ar=0.65

Z5. Rock description: Biotite-hornblende-plagioclase dacite porphyry intruding the tuff of Poco Canyon
Location: Poco Canyon; lat 39°36'47"N., long 118°16'08"W.
Age (mineral): 22.6±0.7 Ma (hornblende)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=0.697%; 40 Ar* = 2.276×10⁻¹¹ mole/g; 40 Ar*/Σ 40 Ar=0.31

Z6. Rock description: Tuff of Poco Canyon (intracaldera)
Location: Poco Canyon; lat 39°36'40"N., long 118°15'35"W.
Age (mineral): 23.3±0.7 Ma (sanidine)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K 2 O=8.44%; 40 Ar* = 2.699×10⁻¹⁰ mole/g; 40 Ar*/Σ 40 Ar=0.92
mole/g; $^{40}$Ar*/$^{40}$Ar=0.78

Z11. Rock description: Vitrophyric, fine-grained biotite-rhyolite dome intruding tuff of Lee Canyon
Location: Long Canyon, southern Stillwater Range; lat 39°35’02”N., long 118°18’28”W.
Age (mineral): 24.8±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=8.22\%$; $^{40}$Ar* = 2.97053x10$^{-10}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.74

Z12. Rock description: Coarsely porphyritic dacite flow breccia; caldera fill from younger dacite and andesite sequence
Location: Job Canyon caldera; lat 39°38’10”N., long 118°17’46”W.
Age (mineral): 27.3±0.9 Ma (plagioclase)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=0.481\%$; $^{40}$Ar* = 1.90329x10$^{-11}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.402

DIAMOND CANYON, LA PLATA CANYON, FOURMILE FLAT, AND FRESHMAN 7 ½’ QUADRANGLES (AA)

AA1. Rock description: Reworked, hornblende-rich andesite tuff interbedded near top of sequence of lacustrine and fluvial sedimentary rocks
Location: lat 39°26’58”N., long 118°23’15”W.
Age (mineral): 12.6±0.5 Ma (hornblende)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=0.752\%$; $^{40}$Ar* = 1.36459x10$^{-11}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.211

AA2. Rock description: Fine-grained basaltic andesite depositionally overlying reworked tuff listed above (loc. AA1)
Location: lat 39°26’57”N., long 118°23’33”W.
Age (mineral): 13.0±0.4 Ma (whole rock)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=2.053\%$; $^{40}$Ar* = 3.85813x10$^{-11}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.712

AA3. Rock description: Biotite-hornblende dacite tuff interbedded near top of sequence of lacustrine and fluvial sedimentary rocks
Location: lat 39°28’23”N., long 118°24’33”W.
Age (mineral): 13.5±0.4 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=8.04\%$; $^{40}$Ar* = 1.568848x10$^{-10}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.668

AA4. Rock description: Reworked dacitic tuff interbedded near top of sequence of lacustrine and fluvial sedimentary rocks
Location: lat 39°26’42”N., long 118°23’28”W.
Age (mineral): 13.9±0.4 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=7.93\%$; $^{40}$Ar* = 1.59614x10$^{-10}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.605

AA5. Rock description: Porphyritic basalt dike intruding Miocene sedimentary rocks
Location: Southern Stillwater Range, about 1 km north of Mountain Well; lat 39°27’28”N., long 118°22’17”W.
Age (mineral): 13.9±0.5 Ma (whole rock)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=0.541\%$; $^{40}$Ar* = 1.197x10$^{-11}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.25

Location: lat 39°26’36”N., long 118°16’12”W.
Age (mineral): 18.3±0.5 Ma (biotite+chlorite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: $K_2O=1.526\%$; $^{40}$Ar* = 6.67666x10$^{-11}$ mole/g; $^{40}$Ar*/$^{40}$Ar=0.344

Alteration age

AA8. Rock description: Hydrothermal alkali feldspar in sugary vein quartz; some vein material appears to be replacement of lamellar calcite
Location: lat 39°16’06”N., long 118°21’06”W.; N5°E W4°E sec. 11, T. 16 N., R. 32 E.
Age (mineral): 19.5±0.5 Ma (alkali feldspar), 20.0±0.5 Ma (alkali feldspar)
Reference: Garside and others (1981)
Comments: Sample is from main, east-trending quartz vein in Sand Springs mining district; age is believed to be that of mineralization in district

FOURMILE CANYON, CHUKAR CANYON, RAWHIDE, AND BIG KASOCK MOUNTAIN 7 ½’ QUADRANGLES (BB)

BB1. Rock description: Porphyritic rhyolite
Location: lat 39°01’0”N., long 118°25’9”W.; north-central part of T. 13 N., R. 31°E
Age (mineral): 15.0±0.4 Ma (biotite), 15.1±0.4 Ma (sanidine)
Reference: Silberman and others (1975)

BB2. Rock description: Hornblende andesite
Location: lat 39°08'48"N., long 118°27'42"W.; SE 1/4 sec. 24, T. 15 N., R. 31 E.
Age (mineral): 18.1 Ma (hornblende)
Reference: Silberman and McKee (1972); Willden and Speed (1974)
Comments: Flow in southwestern Cocoon Mountains

BB3. Rock description: Aplite-pegmatite dike
Location: lat 39°12'00"N., long 118°23'00"W.
Age (mineral): 33.4±3.0 Ma (biotite)
Reference: Nevada Bureau of Mines and Geology (1964)
Comments: Biotite shows considerable alteration to chlorite, and unaltered biotite from another dike in area gives Cretaceous K-Ar age; thus, age is not considered reliable

BB4. Rock description: Adularia associated with mineralization
Location: NE 1/4 sec. 8, T. 13 N., R. 32 E.
Age (mineral): 15.7±0.6 Ma (adularia)
Reference: Black and others (1991)
Comments: Rawhide mining district; vein adularia from large mine dump adjacent to prominent open stope of Truett Mine, south side of Hooligan Hill

BB5. Rock description: Altered rhyolite
Location: lat 39°01.0'N., long 118°23.6'W.; NE 1/4 sec. 8, T. 13 N., R. 32 E.
Age (mineral): 15.9±0.5 Ma (muscovite)
Reference: Silberman and others (1975)
Comments: Portal of adit of Yellowstone tunnel, east end of Hooligan Hill within Rawhide townsite. Rock consists of altered porphyritic rhyolite recrystallized to assemblage of sericite, quartz, potassium-feldspar, and limonite (after pyrite). Potassium-feldspar is present mostly in groundmass that contains quartz and fine-grained mica. Feldspar phenocrysts are now mostly sericite and quartz. Mica flakes, which probably were originally biotite, now consist of muscovite lamellae that contain iron-oxide minerals. Mica flakes are coarser grained than potassium-mica grains in groundmass

CC3. Rock description: Biotite-rich tuff
Location: White Rock Canyon, Stillwater Range; lat 39°54'32"N., long 118°02'24"W.
Age (mineral): 27.2±0.7 Ma (biotite)
Comments: Tentatively correlated by Hudson and Geissman (1991) with tuff of McCoy mine (McKee and Stewart, 1971)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K2O=8.21%; 40Ar*=3.244×10^-10 mole/g; 40Ar*/36Ar=0.78

IXL CANYON, DIXIE VALLEY, JOB PEAK, AND DIXIE VALLEY SE 7/8 QUADRANGLES (DD)

DD1. Rock description: Freeman Creek pluton; coarse-grained biotite granite
Location: Mouth of Freeman Creek, along east side of southern Stillwater Range; lat 39°35'11"N., long 118°12'18"W.
Age (mineral): 19.5±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=5.54%; 40Ar*=1.566×10^-10 mole/g; 40Ar*/36Ar=0.679

DD2. Rock description: Freeman Creek pluton; medium-grained biotite-hornblende granodiorite
Location: lat 39°35'19"N., long 118°11'47"W.
Age (mineral): 22.8±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=8.13%; 40Ar*=3.016×10^-10 mole/g; 40Ar*/36Ar=0.156

DD3. Rock description: Biotite-hornblende dike intruding tuff of Elevenmile Canyon
Location: lat 39°30'36"N., long 118°13'09"W.
Age (mineral): 25.6±1.1 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=8.13%; 40Ar*=3.016×10^-10 mole/g; 40Ar*/36Ar=0.156

DD4. Rock description: IXL Canyon pluton; biotite-hornblende granodiorite
Location: Along crest of Stillwater Range, at head of East Job Canyon; lat 39°39'14"N., long 118°14'12"W.
Age (mineral): 27.8±0.8 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=7.69%; 40Ar*=3.099×10^-10 mole/g; 40Ar*/36Ar=0.75

DD5. Rock description: IXL Canyon pluton; quartz monzonite
Location: Floor of IXL Canyon, about 180 m upstream from canyon mouth; lat 39°39'42"N., long 118°11'27"W.
Age (mineral): 28.7±2 Ma (biotite)

DIXIE HOT SPRINGS 15' QUADRANGLE (CC)

CC1. Rock description: Altered gabbro
Location: Dixie Comstock Mine; lat 39°52'12"N., long 118°01'00"W.
Age (mineral): 13.6±0.4 Ma (whole rock)
Reference: Russell and others (1989)

CC2. Rock description: Diabase-pegmatite dike
Location: Copper Kettle Canyon; sec. 26, T. 24 N., R. 34 E.
Age: 18.9±1.9 Ma
Reference: Krebs and Bradbury (1984; see also, in press)

IXL Canyon, DIXIE VALLEY, JOB PEAK, AND DIXIE VALLEY SE 7/8 QUADRANGLES (DD)

DD1. Rock description: Freeman Creek pluton; coarse-grained biotite granite
Location: Mouth of Freeman Creek, along east side of southern Stillwater Range; lat 39°35'11"N., long 118°12'18"W.
Age (mineral): 19.5±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=5.54%; 40Ar*=1.566×10^-10 mole/g; 40Ar*/36Ar=0.679

DD2. Rock description: Freeman Creek pluton; medium-grained biotite-hornblende granodiorite
Location: lat 39°35'19"N., long 118°11'47"W.
Age (mineral): 22.8±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=8.13%; 40Ar*=3.016×10^-10 mole/g; 40Ar*/36Ar=0.156

DD3. Rock description: Biotite-hornblende dike intruding tuff of Elevenmile Canyon
Location: lat 39°30'36"N., long 118°13'09"W.
Age (mineral): 25.6±1.1 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=8.13%; 40Ar*=3.016×10^-10 mole/g; 40Ar*/36Ar=0.156

DD4. Rock description: IXL Canyon pluton; biotite-hornblende granodiorite
Location: Along crest of Stillwater Range, at head of East Job Canyon; lat 39°39'14"N., long 118°14'12"W.
Age (mineral): 27.8±0.8 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McFee
Analytical data: K2O=7.69%; 40Ar*=3.099×10^-10 mole/g; 40Ar*/36Ar=0.75

DD5. Rock description: IXL Canyon pluton; quartz monzonite
Location: Floor of IXL Canyon, about 180 m upstream from canyon mouth; lat 39°39'42"N., long 118°11'27"W.
Age (mineral): 28.7±2 Ma (biotite)
PIROUETTE MOUNTAIN, WONDER MOUNTAIN, DRUMM SUMMIT, AND WEST GATE 7½' QUADRANGLES (EE)

EE1. Rock description: Fine-grained, porphyritic biotite-rhyolite dike
Location: lat 39°28'42"N., long 118°07'53"W.
Age (mineral): 19.5±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K₂O=8.23%; 4⁰Ar*/3⁰Ar=2.31883x10^-10 mole/g; 4⁰Ar*/3⁰Ar=0.465

EE2. Rock description: Biotite-hornblende dacite ash-flow tuff
Location: lat 39°26'37"N., long 118°03'55"W.
Age (mineral): 21.5±0.6 Ma (sanidine)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K₂O=8.18%; 4⁰Ar*/3⁰Ar=2.53304x10^-10 mole/g; 4⁰Ar*/3⁰Ar=0.830

EE3. Rock description: Medium-grained biotite-hornblende-plagioclase dacite porphyry intruding propylitized intracaldera rocks of tuff of Elevenmile Canyon
Location: About 3 km east of Elevenmile Canyon, in southern Stillwater Range; lat 39°28'59"N., long 118°14'46"W.
Age (mineral): 24.3±0.6 Ma (biotite)
Collected by: D.A. John
Isotopic data and age by: E.H. McKee
Analytical data: K₂O=8.22%; 4⁰Ar*/3⁰Ar=2.9705x10^-10 mole/g; 4⁰Ar*/3⁰Ar=0.735

REFERENCES CITED
Black, J.E., Mancuso, T.K., and Gant, J.L., 1991, Geology and mineralization at the Rawhide Au-Ag deposit, Mineral County, Nevada, in Raines, G.L, Lisle, R.E.,


Bureau of Mines K/Ar age determinations—List 1:
Isochron/West, no. 71–1, p. 9–14.
McKee, E.H., and Stewart, J.H., 1971, Stratigraphy and
potassium-argon ages of some Tertiary tuffs from
Lander and Churchill Counties, central Nevada: U.S.
Morton, J.L., Silberman, M.L., Bonham, H.F., Jr., Garside,
L.J., and Noble, D.C., 1977, K-Ar ages of volcanic
rocks, plutonic rocks, and ore deposits in Nevada and
eastern California—determinations run under the
USGS-NBMG cooperative program: Isochron/West, no.
Morton, J.L., Silberman, M.L., Thompson, G.A., and
Brookins, D.G., 1980, New K–Ar ages and sturontium
isotopic data from late Miocene and younger volcanic
rocks of the northern Virginia Range, Nevada [abs.]:
Geological Society of America Abstracts with
Programs, v. 12, no. 3, p. 143.
Nevada Bureau of Mines and Geology, 1964, Final report:
geological, geophysical, chemical, and hydrological
investigations of the Sand Springs Range, Fairview
Valley, and Fourmile Flat, Churchill County, Nevada,
for SHOAL event, Project SHADE, Vela Uniform
available from Clearinghouse for Federal Scientific
and Technical Information, National Bureau of
Nicholls-Tingley, S.L., 1981, Age determinations from other
Parry, W.T., Hedderly-Smith, D., and Bruhn, R.L., 1991,
Fluid inclusions and hydrothermal alteration on the
Dixie Valley Fault, Nevada: Journal of Geophysical
Proffett, J.M., Jr., and Proffett, B.H., 1976, Stratigraphy of
the Tertiary ash-flow tuffs in the Yerington district,
Nevada: Nevada Bureau of Mines and Geology Report
27, 28 p.
ages from Nevada and eastern California: Isochron/West,
no. 52, p. 12–14.
Silberman, M.L., Bonham, H.F., Jr., and Osborne, D.H.,
1975, New potassium-argon ages of volcanic rocks and
ore deposits in western Nevada: Isochron/West, no. 13,
p. 13–21.
Silberman, M.L., Johnson, M.G., Koski, R.A., and Roberts,
R.J., 1973, K–Ar ages of mineral deposits at Wonder,
Seven Troughs, Imlay, Ten Mile, and Adelaide mining
districts in central Nevada: Isochron/West, no. 8, p. 31–
35.
Silberman, M.L., and McKee, E.H., 1972, A summary of
radiometric age determinations on Tertiary volcanic
rocks from Nevada and eastern California: Part II,
western Nevada: Isochron/West, no. 4, p. 7–28.
Silberman, M.L., White, D.E., Keith, T.E.C., and Dockter,
R.D., 1979, Duration of hydrothermal activity at
Steamboat Springs, Nevada, from ages of spatially
associated volcanic rocks: U.S. Geological Survey
Speed, R.C., and Armstrong, R.L., 1971, Potassium-argon
ages of some minerals from igneous rocks of western
Steiger, R.H., and Jager, E., 1977, Subcommission on
geochronology—convention on the use of decay
constants in ge- and cosmochronology: Earth and
Swisher, C.C., III, 40Ar/39Ar dating and its application to
the calibration of the North American land mammal
ages: Berkeley, University of California, Ph.D.
Thompson, G.A., and White, D.E., 1964, Regional geology of
the Steamboat Springs area, Washoe County,
458-A, 52 p.
Vikre, P.G., and McKee, E.H., 1987, New K–Ar ages of
hydrothermal minerals and igneous rocks from the
western Virginia Range, Washoe and Storey Counties,
Nevada: Isochron/West, no. 48, p. 11–15.
Vikre, P.G., McKee, E.H., and Silberman, M.L., 1988,
Chronology of Miocene hydrothermal and igneous
events in the western Virginia Range, Washoe, Storey,
and Lyon Counties, Nevada: Economic Geology, v. 83,
p. 864–874.
Voegty, N.E., 1981, Reconnaissance map of the Hot
Springs Mountains and adjacent areas, Churchill
County, Nevada: U.S. Geological Survey Open-File
Wallace, A.B., 1975, Geology and mineral deposits of the
Pyramid District, southern Washoe Co., Nevada: Reno,
University of Nevada, Ph.D. dissertation, 162 p.
events in the western Virginia Range, Washoe, Storey,
and Lyon Counties, Nevada: Economic Geology, v. 83,
p. 864–874.
Whitebread, D.H., 1976, Alteration and geochemistry of
Tertiary volcanic rocks in parts of the Virginia City
quadrangle, Nevada: U.S. Geological Survey
Professional Paper 936, 43 p.
Willden, Ronald, and Speed, R.C., 1974, Geology and
mineral deposits of Churchill County, Nevada: Nevada