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GRANNY

A data bank of chemical analyses of Laramide and younger
high-silica rhyolites and granites from Colorado
and north-central New Mexico

by

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ABSTRACT

GRANNY is a data bank containing information on 507 chemically analyzed Laramide or younger high-silica rhyolites and granites from Colorado and north-central New Mexico. The data were compiled from both published and unpublished sources. The data bank is designed to aid in the recognition of igneous rocks with a high exploration potential for the discovery of molybdenum (and other lithophile element) deposits. Information on source reference, geographic location, age, mineralogic and petrologic characteristics, major constituent analyses, and trace element analyses for each sample are given. The data bank is available in two formats: (1) paper- or microfiche-hardcopy, and (2) fixed format computer readable magnetic tape.

INTRODUCTION

GRANNY is a computer-readable data bank consisting of descriptive and chemical data for 507 rock specimens for which major constituent chemical analyses are available. The analyses were largely compiled from published works and theses, available either on microfilm or through inter-library loan services. Several colleagues made unpublished chemical analyses available to us, and these, together with our own unpublished analyses, were also included in the data bank.

The three 1/ granite (or Climax-type) molybdenite deposits which are currently being mined in the United States occur within the area of our compilation. The source rocks for these deposits are high-silica low-calcium rhyolites and granites (Mutschler and others, 1981; White and others, 1981). Our compilation began as an attempt to assemble all the available petrochemical data for these deposits, and for the many granite molybdenite system prospects in Colorado. We then decided to broaden the data bank to include all Laramide and younger high-silica rhyolites and granites in Colorado for which chemical data were available. Our aim was to produce a data bank that would help in the development of "chemical fingerprints" for the recognition of high-silica rhyolites and granites with a high exploration potential for the discovery of Mo (and other lithophile elements such as Be, Sn, U, and W) deposits in Colorado.

For inclusion in the data bank we have defined high-silica rhyolites and granites as those igneous rocks containing at least 70.0 weight percent SiO₂. We have also included 33 analyses with less than 70.0 weight percent SiO₂ where those analyses represent rocks which are clearly related to granite molybdenite deposits or prospects.

We have tried to structure GRANNY so that it can be interfaced with other petrochemical data banks such as CLAIR (Le Maitre, 1973), IGBA (Chayes and Mutschler, 1978), PETROS (Mutschler and others, 1981), and RASS (U. S. Geological Survey, 1983). This, we hope, will allow the petrologist and explorationist to rapidly test models based on the Colorado data in other areas.

ACKNOWLEDGMENTS

We thank Siegfried Heintze for help with programming and tape production. Denise Rougon-Mutschler proofread GRANNY. Dolores Gable, W. E. Hall, D. A. Johnson, R.

1/ Climax and Henderson, Colorado, and Questa, New Mexico.

U. King, P. W. Lipman, M. E. McCallum, C. M. Rice, Priestley Toulmin, Ogden Tweto, and R. A. Zielenski graciously made unpublished analyses available to us.

DESCRIPTION OF GRANNY

GRANNY is available in two formats: (1) hardcopy, either as paper- or microfiche-copy of computer printout; and (2) computer-readable magnetic tape.

The same information is contained in both formats except that on the hardcopy version some information which is stored in code on the tape version is printed as the corresponding English literals. For example, the mineral name "quartz" is stored on the tape version as "UM", but is printed out as "QUARTZ" on the hardcopy.

The analyses in the hardcopy version of GRANNY are arranged by major groups and by secondary groups as explained below. Major groups are arranged in alphabetic order and secondary groups for each major group are arranged in the order listed on Table 1.

On the tape version of GRANNY analyses are arranged sequentially by record number (see below), in the order in which they were entered into the data bank. Tape characteristics are listed on page 35.

The following two sections are addressed to different audiences. The section, "Variable descriptions" tells the petrologist-user what information is stored in GRANNY. The section "Tape description, data formats, coding form, and program listings" is directed to computer programmers and data managers who will be responsible for loading the data bank into a computer and interfacing it with system- or user-supplied software.

Variable descriptions

Values for up to 106 variables may be stored for each analyzed specimen. Each analysis must have values for the variables AUTHOR, DATE, MAJOR GROUP, ROCK CODE, RECORD NUMBER, and at least eight of the MAJOR CONSTITUENTS: SiO₂, Al₂O₃, Fe₂O₃, FeO, MgO, CaO, Na₂O, K₂O, H₂O, H₂O-, TH₂O, TiO₂, P₂O₅, and MnO.

The variables are described below and are listed on Table 5.

AUTHOR:

Surname of author. Multiple authors are indicated by a plus sign (+) following the senior author's name. Complete citations for all references and unpublished data are given in Table 1.

DATE:

Year of publication, or year of inclusion in data bank for unpublished analyses.

MAJOR GROUP:

The analytical data are divided into 15 major groups which represent geographic areas. A three character alphabetic code is used for each major group. Table 1 contains a listing of the major group codes. The areas represented by the major group codes are shown on Figure 1.

SECONDARY GROUP:

Major groups may be subdivided into secondary groups (abbreviated SECOND GROUP on the printout). Secondary groups represent geographic location, or stratigraphic unit subdivisions. A two- to four-character alphabetic code is used to designate each secondary group. These codes are listed in Table 1. Even if a major group is divided into secondary groups not all analyses in that major group need have secondary group codes. On the printout analyses not assigned to a secondary group are listed last under each major group.

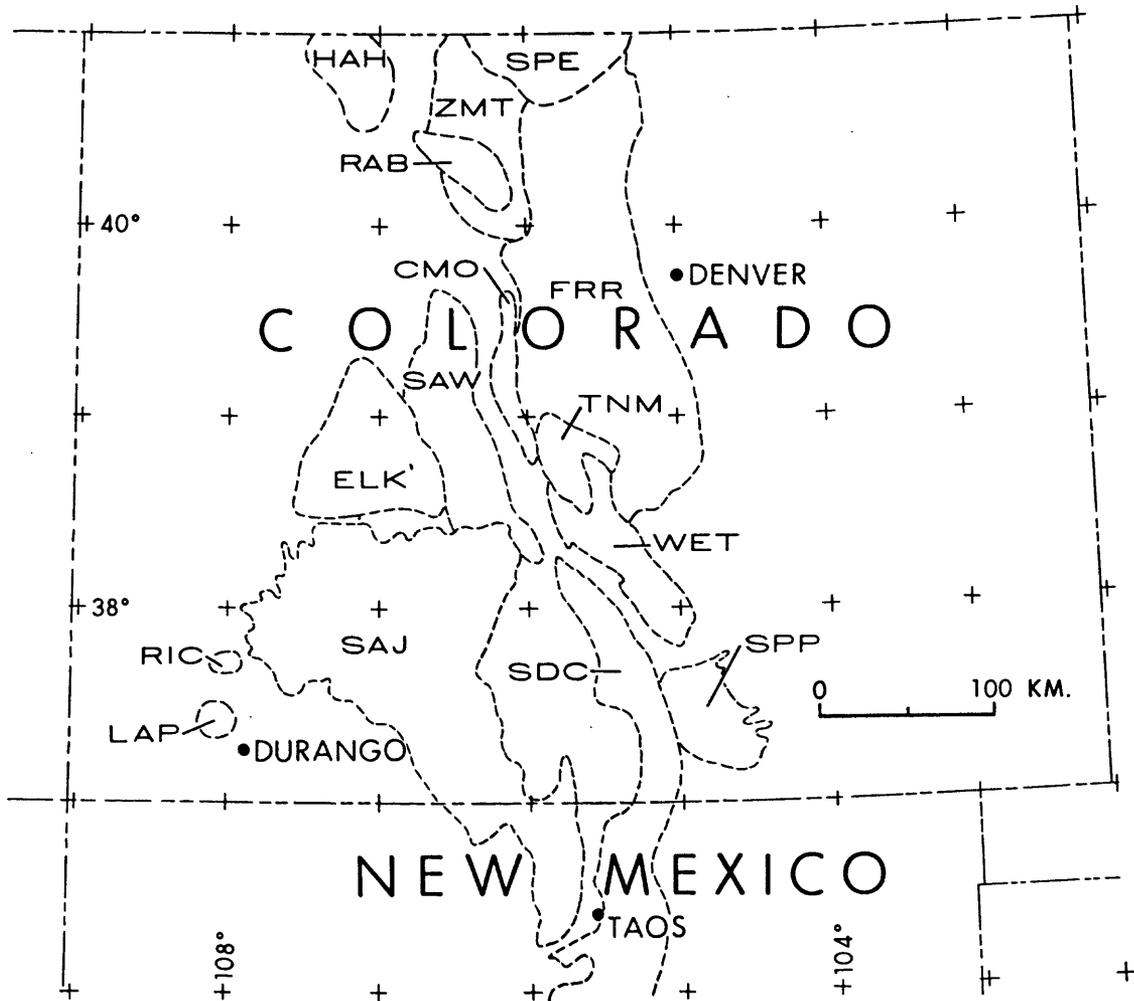


Figure 1 -- Index map showing areas represented by major group codes.

Figure 1. -- Explanation

Code ----	Major group -----
CMO	Mosquito Range
ELK	Elk Range, Ruby Range, and West Elk volcanic field
FRR	Front Range
HAH	Hahns Peak area
LAP	La Plata Mountains
RAB	Rabbit Ears volcanic field
RIC	Rico mining district
SAJ	San Juan volcanic field
SAW	Sawatch Range
SDC	Sangre de Cristo Mountains
SPE	Never Summer Range, Medicine Bow Range, and environs
SPP	Spanish Peaks
TNM	Thirtynine Mile volcanic field
WET	Wet Mountains
ZMT	Misc. Miocene tuffs, northwestern Colorado

Table 1. -- Listing of major group codes, secondary group codes, and sources of analyses for each major group.

Major group code	Location	Number of analyses
*****	*****	*****
CMO	MOSQUITO RANGE, COLORADO	64
*****	*****	*****

SECONDARY GROUP CODES

- Climax
 - CXL Late rhyolite dikes
 - CXS Climax stock, undivided
 - CXSC Climax stock, central mass
 - CXSG Climax stock, seriate granite
 - CXSS Climax stock, southwest mass
 - CXSL Climax stock, lower intrusive series
 - CM Chalk Mountain rhyolite
 - CLP Lincoln Porphyry (pre-ore)

- Leadville district
 - LER Rhyolites
 - LEP Pando Porphyry

- RU Ruby Mountain (Nathrop) volcanic complex

- UK Buckskin Gulch stock

SOURCES OF ANALYSES

Butler, B. S., and Vanderwilt, J. W., 1933, The Climax molybdenum deposit, Colorado, with a section on history, production, metallurgy and development by Charles W. Henderson: U. S. Geological Survey Bulletin 846-C, p. 195-237.

Carmichael, I. S. E., 1963, The crystallization of feldspar in volcanic acid liquids: Geological Society of London Journal, v. 119, p. 95-131.

Christiansen, E. H., Bikun, J. V., and Burt, D. M., 1980, Petrology and geochemistry of topaz rhyolites, western U. S. A., in, Burt, D. M., and Sheridan, M. F., editors, Uranium mineralization in fluorine-enriched volcanic rocks: U. S. Department of Energy, Report GFBX-225(80), p. 37-122.

Cross, C. W., 1886, On the occurrence of topaz and garnet in lithophyses of rhyolite: American Journal of Science, 3d Series, v. 31, p. 432-438.

Table 1. (continued)

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- Emmons, S. F., Irving, J. D., and Loughlin, G. F., 1927, Geology and ore deposits of the Leadville mining district, Colorado: U. S. Geological Survey Professional Paper 148, 368 p.
- Hall, W. E., 1973, Unpublished data.
- Johnson, D. A., 1983, Unpublished data.
- Kuntz, M. A., 1968, Petrogenesis of the Buckskin Gulch intrusive complex, northern Mosquito Range, Colorado: Stanford, Stanford University, Ph. D. Thesis, 200 p.
- Lux, D. R., 1977, A major element geochemical study of Laramide igneous rocks of the Colorado mineral belt: Houston, Rice University, M. S. thesis, 77 p.
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- Ranta, D. E., 1974, Geology, alteration, and mineralization of the Winfield (La Plata) district, Chaffee County, Colorado: Golden, Colorado School of Mines, Ph. D. Thesis, 261 p.
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- Steininger, Roger, 1973, Hydrothermal alteration in some quartz monzonite dikes at the Climax molybdenum deposit, Colorado: Brigham Young University Geology Studies, v. 20, Part 1, p. 115-128.
- Tweto, Ogden, 1983, Unpublished data.

Table 1. (continued)

Van Alstine, R. E., 1969, Geology and mineral deposits of the Poncha Springs NE quadrangle, Chaffee County, Colorado: U. S. Geological Survey Professional Paper 626, 52 p.

White, W. H., Bookstrom, A. A., Kamilli, R. J., Ganster, M. W., Smith, R. P., Ranta, D. E., and Steininger, R. C., 1981, Character and origin of Climax-type molybdenum deposits: Economic Geology, 75th Anniversary Volume, p. 270-316.

Table 1. (continued)

ELK ELK RANGE, RUBY RANGE, AND WEST ELK VOLCANIC 95
FIELD, COLORADO

SECONDARY GROUP CODES

BOS Boston Peak rhyolite

Granite of Treasure Mountain dome

TM Undivided

TMWQ White quartz porphyry facies

TMBM Bear Mountain porphyry facies

TMTB Twin Bridges porphyry facies

TMGR Granular facies

TMGM Mafic granite facies

RM Round Mountain rhyolite

RR Redwell Basin rhyolite

Mount Emmons

EM Undivided

EMK Keystone stock

EMLP Red Lady stock, porphyry phase

EMLA Red Lady stock, aplite phase

EMLB Red Lady stock, border phase

Miscellaneous felsites

MSA Middle Anthracite Creek, Ruby Range

MSB Buck Hollow, West Elk Mountains

MSE Emerald Lake, Elk Range

MSL Lost Trail Creek, Elk Range

MSP Spring Creek, Elk Range

MSS Smooth Canyon, West Elk Mountains

ITL Italian Mountain Intrusive Complex

PSS Paradise Pass stock

SNS Snowmass stock

Tomichi Dome

TD Undivided

TDU Upper unit

TDL Lower unit

TDX Breccia pipe

TDS Sill

TDT Remote tuff

Table 1. (continued)

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- Mutschler, F. E., 1968, Geology of the Treasure Mountain dome, Gunnison County, Colorado: Boulder, University of Colorado, Ph. D. Thesis, 240 p.
- Mutschler, F. E., 1982, Unpublished data.
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- White, W. H., Bookstrom, A. A., Kamilli, R. J., Ganster, M. W., Smith, R. P., Ranta, D. E., and Steininger, R. C., 1981, Character and origin of Climax-type molybdenum deposits: Economic Geology, 75th Anniversary Volume, p. 270-316.
- Young, E. J., 1972, Laramide-Tertiary intrusive rocks of Colorado: U. S. Geological Survey Open-File Report, 206 p.

Table 1. (continued)

FRR FRONT RANGE, COLORADO 39

SECONDARY GROUP CODES

	Henderson-Urad
HEU	Undivided
HEUH	Henderson granite
HEUP	Primos porphyry
HEUU	Urad porphyry
HEUR	Red Mountain porphyry
LVN	Leavenworth Gulch (Georgetown) volcanic complex
MON	Montezuma stock
EBO	Bostonite and rhyolite dikes--Eastern slope
ALC	Alice stock
JIM	Jamestown granite complex

SOURCES OF ANALYSES

Bookstrom, A. A., 1981, Tectonic setting and generation of Rocky Mountain porphyry molybdenum deposits: Arizona Geological Society Digest, v. 14, p. 215-226.

Braddock, W. A., 1969, Geology of the Empire quadrangle, Grand, Gilpin, and Clear Lake Counties, Colorado: U. S. Geological Survey Professional Paper 616, 56 p.

Gable, Dolores, 1983, Unpublished data.

Hoblitt, R., and Larson, E., 1975, Paleomagnetic and geochronologic data bearing on the structural evolution of the northeastern margin of the Front Range, Colorado: Geological Society of America Bulletin, v. 86, p. 237-242.

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King, R. U., 1971, Unpublished data.

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Phair, George, and Jenkins, L. B., 1975, Tabulation of uranium and thorium data on the Mesozoic-Cenozoic intrusive rocks of known chemical composition in Colorado: U. S. Geological Survey Open-File Report 75-501, 57 p.

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Rice, C. M., 1983, Unpublished data.

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Table 1. (continued)

HAH HAHNS PEAK AREA, COLORADO 1

SOURCES OF ANALYSES

Seegerstrom, K., and Young, E. J., 1972, General geology of the Hahns Peak and Farwell Mountain quadrangles, Routt County, Colorado: U. S. Geological Survey Bulletin 1349, 63 p.

LAP LA PLATA MOUNTAINS, COLORADO 2

SECONDARY GROUP CODES

AS Allard stock

SOURCES OF ANALYSES

Werle, J. L., Ikramuddin, Mohammed, and Mutschler, F. E., 1983, Allard stock, La Plata Mountains, Colorado--An enigmatic porphyry copper-precious metal deposit: Canadian Journal of Earth Sciences (in press).

Table 1. (continued)

RAB RABBIT EARS VOLCANIC FIELD, COLORADO 6

SECONDARY GROUP CODES

SPE Welded tuff--probably derived from Never Summer Range (SPE)

SOURCES OF ANALYSES

Hail, W. J., Jr., 1968, Geology of southwestern North Park and vicinity, Colorado: U. S. Geological Survey Bulletin 1257, 119 p.

Izett, G. A., 1968, Geology of the Hot Sulphur Springs quadrangle, Grand County, Colorado: U. S. Geological Survey Professional Paper 586, 79 p.

RIC RICO MINING DISTRICT, COLORADO 1

SOURCES OF ANALYSES

McKnight, E. T., 1974, Geology and ore deposits of the Rico district, Colorado: U. S. Geological Survey Professional Paper 723, 100 p.

Table 1. (continued)

SAJ SAN JUAN VOLCANIC FIELD, COLORADO 151

SECONDARY GROUP CODES

HIN Hinsdale Formation

Chicago Basin intrusive center

XD Late dike (mafic rock)

XY Younger intrusive

XOD Dikes related to older stock

XO Older stock

Lake City caldera

LRI Post-caldera intrusives

LRIN Nellie Creek intrusive

LAG Alpine Gulch granite

LSP Sunshine Peak Tuff

Post-caldera intrusives near Silverton

SSI South Silverton area

SHI Horseshoe Bend, Chattanooga

SPI Stony Mountain

SNI National Belle plug, Red Mountain

Creede caldera

CMM Mammoth Mountain Tuff--Farmers Creek Rhyolite

CWP Wasson Park Tuff

Cochetopa Park caldera

HD Dome

HCP Cochetopa Park Tuff

Bachelor caldera

BCR Carpenter Ridge Tuff

La Garita caldera

LFC Fish Canyon Tuff

Silverton caldera

SCL Crystal Lake Tuff

San Juan and Uncompahgre calderas

SBH Burns and Henson Formations
(post-collapse flows)

SSM Sapinero Mesa Tuff

SDM Dillon Mesa Tuff

Table 1. (continued)

	Lost Lake caldera
KBM	Blue Mesa Tuff
	Summitville and Platoro calderas
PF	Flows
PTM	Treasure Mountain Tuff
	Bonanza caldera
BZP	Porphyry Peak Rhyolite
BZM	Miscellaneous altered rocks
	Early intermediate stratovolcanoes
EIL	Miscellaneous lavas and tuffs
EIS	Summer Coon volcanic center
OL	Miscellaneous Oligocene
XX	Stratigraphic position unknown

SOURCES OF ANALYSES

- Burbank, W. S., 1932, Geology and ore deposits of the Bonanza mining district, Colorado: U. S. Geological Survey Professional Paper 169, 166 p.
- Ernst, R. P., 1981, Granite and rhyolite relationships of the Lake City caldera area, Hinsdale County, Colorado: Cheney, Eastern Washinton University, M. S. Thesis, 60 p.
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- Leedy, W. P., 1971, Hydrothermal alteration of volcanic rocks in the Red Mountains district of the San Juan Mountains, Colorado: Buffalo, State University of New York at Buffalo, Ph. D. Thesis, 108 p.
- Lipman, P. W., 1968, Geology of the Summer Coon volcanic center, eastern San Juan Mountains, Colorado: Colorado School of Mines Quarterly, v. 63, no. 3, p. 211-236.
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Table 1. (continued)

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Ransome, F. L., 1901, Economic geology of the Silverton quadrangle, Colorado: U. S. Geological Survey Bulletin 182, 265 p.

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Schmitt, L. J., and Raymond, W. H., 1977, Geology and mineral deposits of the Needle Mountains district, southwestern Colorado: U. S. Geological Survey Bulletin 1434, 40 p. (Trace element data from: Steven, T. A., Schmitt, L. J., Jr., Sheridan, M. J., and Williams, F. E., 1969, Mineral resources of the San Juan primitive area, Colorado: U. S. Geological Survey Bulletin 1261-F, 187 p.)

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Steven, T. A., Lipman, P. W., Fisher, F. S., Beiniewski, C. L., Meeves, H. C., Popenoe, Peter, and Luedke, R. G., 1977, Mineral resources of study areas contiguous to the Uncompahgre primitive area, San Juan Mountains, southwestern Colorado: U. S. Geological Survey Bulletin 1391-E, p. E1-E126.

Steven, T. A., and Ratte, J. C., 1960, Geology and ore deposits of the Summitville district, San Juan Mountains, Colorado: U. S. Geological Survey Professional Paper 343, 70 p.

Table 1. (continued)

Varnes, D. J., 1963, Geology and ore deposits of the south
Silverton mining area, San Juan County, Colorado:
U. S. Geological Survey Professional Paper 378-A,
p. A1-A56.

Zielinski, R. A., 1983, Unpublished data.

Table 1. (continued)

SAW SAWATCH RANGE, COLORADO 42

SECONDARY GROUP CODES

TU Turquoise Lake
OH Ohio City
Winfield
WIM Middle Mountain complex
WWP Winfield Peak complex
GZ Grizzly Peak caldera
ANT Mount Antero granite
TW Twin Lakes stock
ASP Aspen district

SOURCES OF ANALYSES

Bryant, Bruce, 1979, Geology of the Aspen 15-minute quadrangle, Pitkin and Gunnison Counties, Colorado: U. S. Geological Survey Professional Paper 1073, 146 p.

Dings, M. G., and Robinson, C. S., 1957, Geology and ore deposits of the Garfield quadrangle, Colorado: U. S. Geological Survey Professional Paper 289, 110 p.

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Toulmin, Priestley, 1983, Unpublished data.

Wilshire, H. G., 1969, Mineral layering in the Twin Lakes granodiorite, Colorado: Geological Society of America Memoir 115, p. 235-261.

Table 1. (continued)

SDC SANGRE DE CRISTO MOUNTAINS, COLORADO--NEW MEXICO 33

SECONDARY GROUP CODES

CPS Cottonwood Peak stock, Colorado

Questa, New Mexico

QUE Undivided

QUEL Late granite porphyry

QUEG Goat Hill porphyry

QUEA Questa Mine aplite

QUEC Log Cabin granite

QUEV Volcanics

SOURCES OF ANALYSES

Clark, K. R., and Read, C. B., 1972, Geology and ore deposits of the Eagle Nest area, New Mexico: New Mexico Bureau of Mines and Mineral Resources Bulletin 94, 149 p.

Ishihara, Shunso, 1967, Molybdenum mineralization at Questa mine, New Mexico, U. S. A.: Geological Survey of Japan Report no. 218, 64 p.

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Ranta, D. E., 1974, Geology, alteration, and mineralization of the Winfield (La Plata) district, Chaffee County, Colorado: Golden, Colorado School of Mines, Ph. D. Thesis, 261 p.

Table 1. (continued)

SPE NEVER SUMMER RANGE, MEDICINE BOW RANGE, 25
AND ENVIRONS, COLORADO

SOURCES OF ANALYSES

Corbett, M. K., 1968, Tertiary volcanism of the Specimen-
Lulu-Iron Mountain area, north central Colorado:
Colorado School of Mines Quarterly, v. 63, no. 3,
p. 1-37.

Mc Callum, M. E., 1983, Unpublished data.

Wahlstrom, E. E., 1944, Structures and petrology of
Specimen Mountain, Colorado: Geological Society of
America Bulletin, v. 55, p. 77-90.

SPP SPANISH PEAKS, COLORADO 5

SOURCES OF ANALYSES

Johnson, R. B., 1968, Geology of the igneous rocks of the
Spanish Peaks region, Colorado: U. S. Geological
Survey Professional Paper 594-G, 47 p.

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Young, E. J., 1972, Laramide-Tertiary intrusive rocks of
Colorado: U. S. Geological Survey Open-File Report,
206 p.

Table 1. (continued)

TNM THIRTYNINE MILE VOLCANIC FIELD, COLORADO 8

SECONDARY GROUP CODES

GP Gribbles Park Tuff
TR Thorn Ranch Tuff
EG East Gulch Tuff
SR Tuff of Stirrup Ranch
WM Wall Mountain Tuff

SOURCES OF ANALYSES

Epis, R. C., and Chapin, C. E., 1974, Stratigraphic nomenclature of the Thirtynine Mile volcanic field, central Colorado: U. S. Geological Survey Bulletin 1395-C, p. C1-C23.

Van Alstine, R. E., 1969, Geology and mineral deposits of the Poncha Springs NE quadrangle, Chaffee County, Colorado: U. S. Geological Survey Professional Paper 626, 52 p.

Table 1. (continued)

WET WET MOUNTAINS, COLORADO 30

SECONDARY GROUP CODES

AN Antrim Lode plug
RO Rosita volcanic center
SL Silver Cliff volcanic center

SOURCES OF ANALYSES

Anderson, F. G., Selvig, W. A., Baur, G. S., Colbassoni, P. J., and Bank, Walter, 1956, Composition of perlite: U. S. Bureau of Mines Report of Investigations 5199, 13 p.

Cross, Whitman, 1896, Geology of Silver Cliff and the Rosita Hills, Colorado: U. S. Geological Survey 17th Annual Report, Part 2, p. 263-403.

Mutschler, F. E., 1982, Unpublished data.

Mutschler, F. E., Ikramuddin, Mohammed, and Ludington, Steve, 1983, Silver Cliff, Colorado--Possible high-level expression of a granite molybdenite system in a bonanza silver camp: Economic Geology (in press).

Phair, George, and Jenkins, L. B., 1975, Tabulation of uranium and thorium data on the Mesozoic-Cenozoic intrusive rocks of known chemical composition in Colorado: U. S. Geological Survey Open-File Report 75-501, 57 p.

Table 1. (continued)

ZMT MISC. MIOCENE TUFFS, NORTHWESTERN COLORADO 5

* SOURCE AREAS MAY BE OUTSIDE OF COLORADO *

SECONDARY GROUP CODES

BPF Browns Park Formation
NPF North Park Formation
TRF Troublesome Formation

SOURCES OF ANALYSES

Izett, G. A., 1968, Geology of the Hot Sulphur Springs quadrangle, Grand County, Colorado: U. S. Geological Survey Professional Paper 586, 79 p.

Izett, G. A., Denson, N. M., and Obradovich, J. D., 1970, K-Ar age of the lower part of the Browns Park Formation, northwestern Colorado: U. S. Geological Survey Professional Paper 700-C, p. C150-C152.

LATITUDE:

Latitude (abbreviated LAT on the printout) of the sample location to the nearest one-hundredth part of a decimal degree, followed by an "N" for north.

LONGITUDE:

Longitude (abbreviated LONG on the printout) of the sample location to the nearest one-hundredth part of a decimal degree, followed by a "W" for west.

FLAGS:

Flags give information on the nature of the analytical data. Up to six flags may be stored for each analysis, but a maximum of two are used in this version of GRANNY. Each flag consists of two characters as shown below:

INFORMATION -----	FLAG ----
Total iron is reported as either Fe2O3 or FeO	2D
Analytical data represents an average of analyses of two or more specimens	3K

ROCK NAME -- CODE:

ROCK NAME is the name assigned to the analyzed specimen by the author. It is recorded by a literal name, and consists of up to 20 alphabetic characters. CODE consists of a four integer number which may be translated as shown on Table 2, and which represents the literal name stored in ROCK NAME.

Table 2. -- Rock names and codes.

ROCK NAME -----	CODE ----
NOT NAMED BY AUTHOR	0010
NAME NOT RECOGNIZED IN GRANNY	0020
ALASKITE	0080
ANDESITE	0190
APHANITE	0280
APLITE	0290
BOSTONITE	0750
FELSITE	1240
GLASS	1390
GRANITE	1420
GRANODIORITE	1490
MICROGRANITE	1440
MONZONITE	2310
NEVADITE	2400
OBSIDIAN	2500
PERLITE	2730
PITCHSTONE	2830
PORPHYRY	2870
PUMICE	2930
QUARTZ BOSTONITE	0760
QUARTZ LATITE	1980
QUARTZ MONZONITE	2330
QUARTZ PORPHYRY	2890
RHYODACITE	3000
RHYOLITE	3010
SODA GRANITE	1470
SYENITE	3350
TUFF	3880
VITROPHYRE	4000
WELDED TUFF	4060

AGE:

Both minimum and maximum values for stratigraphic and isotopic ages may be given for a sample. The method for determining ages may be specified. AGE: STRATIGRAPHIC: Minimum (MIN) and maximum (MAX) limits may be given with four character codes from the following list.

Age ---	m.y. ----	Code ----
Cenozoic	0-65	CENO
Pliocene	2-5	PLIO
Miocene	5-23	MIOC
Oligocene	23-38	OLIG
Eocene	38-53	EOCE
Paleocene	53-65	PALC
Cretaceous	65-135	CRET

Each code is followed by two blank characters. These were left for insertion of modifiers if the user desires.

AGE: ISOTOPIC: Six-digit minimum (MIN) and maximum (MAX) ages may be given in m.y. Two decimal places are provided for.

AGE: METHOD: A code of up to four characters may be used to designate the age determination method. The current version of GRANNY uses the following codes.

Method -----	Code ----
Potassium-argon	KAR
Fission track	FSTR

NUMBER OF MINERALS:

This field contains the number of mineral names coded for the specimen (see below). It is not included on the printout.

MINERALS:

Up to ten codes for rock-forming minerals occurring in the analyzed sample may be included here. The first two characters of each code represent the mineral name as shown on Table 3. The third through fifth characters refer to the habit of the mineral. Only one of these habit codes is used in this version of GRANNY (see Table 3).

The print program translates the codes stored in the data bank back into mineral names on the printout.

Table 3. -- Mineral names and codes.

MINERAL PRINTOUT -----	CODE ----
Framework silicates	
SiO ₂ minerals	
CRISTOBALITE	UK
QUARTZ	UM
TRIDYMIT	UN
Feldspars	
FELDSPAR	NB
Alkali feldspars	
ALKALI FELDSPAR	NC
ANORTHOCLASE	ND
K-FELDSPAR	NE
MICROCLINE	NF
ORTHOCLASE	NH
PERTHITE	NI
SANIDINE	NJ
Plagioclase feldspars	
ALBITE	NP
ANDESINE	NT
NA-PLAGIOCLASE	NM
OLIGOCLASE	NR
OLIGOCLASE-ANDESINE	NS
PLAGIOCLASE	NL
Sheet silicates	
BIOTITE	PB
CHLORITE	PG
MUSCOVITE	PD
SERICITE	PF
Chain silicates	
AMPHIBOLE	QA
AUGITE	RG
DIOPSIDE	RH
HORNBLLENDE	QD
PYROXENE	RA
Orth- and Ring silicates	
EPIDOTE	TH
GARNET	TI
SPESSARTINE	TO
TOPAZ	TR
TOURMALINE	TS

Table 3. (continued)

Non-silicates

FLUORITE	VF
HABIT SUFFIX (PRINTOUT) -----	CODE -----
PHENOCRYST (PHENO.)	7

OCCURRENCE AND PETROGRAPHY:

Mode of occurrence and petrographic descriptors (abbreviated OCCUR-PETROG. on printout) are listed by up to six codes for each specimen. The occurrence is always listed first. The occurrence and petrographic descriptor codes are listed in Table 4. The print program translates the codes back into their literal names on the printout.

Table 4. -- Occurrence and petrographic descriptor codes.

OCCURRENCE -----	CODE ----
ASH FLOW	AE
BRECCIA	AJ
DIKE	AM
DOME	AN
FLOW	AP
FLOW BRECCIA	AQ
LACCOLITH	AW
PIPE	BI
PLUG	BJ
PLUTON	BK
PYROCLASTIC	BN
SILL	BS
STOCK	BU
TUFF	BZ
WELDED TUFF	CE
PETROGRAPHIC DESCRIPTOR -----	CODE ----
APLITIC	DU
DEVITRIFIED	DZ
EQUIGRANULAR	ED
GLASSY	EH
HOLOHYALINE	EQ
PORPHYRITIC	FP
PUMICEOUS	FQ
VITROPHYRIC	GC

ALTERATION:

Up to four codes may be used to describe alteration assemblages. Each code consists of a one or two character code, which may be suffixed with an additional character to indicate alteration intensity. The codes are listed below. The print program translates the codes into English on the printout.

ALTERATION ASSEMBLAGE -----	CODE ----
FRESH	F
ALTERED (Assemblage not specified)	IC
ALUNITIC	AL
ARGILLIC	AR
POTASSIC	K
QUARTZ-MAGNETITE	QM
QUARTZ-SERICITE	QS
SILICIFICATION	SI
INTENSITY SUFFIX (PRINTOUT) -----	CODE ----
WEAK (-W)	W
MODERATE (-M)	M
STRONG (-S)	S
EXTREME (-X)	X

AUTHOR NUMBER:

AUTHOR NUMBER is the author's sample number or the page (P.) or table (T.) on which the analysis is given in the source. Up to ten characters.

RECORD NUMBER:

Each analysis was assigned a sequential five-digit record number when it was entered into the data bank. This version of GRANNY contains 507 records.

MAJOR CONSTITUENTS:

Weight percentages of up to 26 constituents may be stored for each analysis. The constituents are given in the following order: SiO₂, Al₂O₃, Fe₂O₃, FeO, MgO, CaO, Na₂O, K₂O, H₂O+, H₂O-, TH₂O (Total H₂O), LOI (Loss on ignition), TiO₂, P₂O₅, MnO, ZrO₂, CO₂, SO₃, Cl, F, S, Cr₂O₃, NiO, BaO, Rb₂O, SrO. Major constituent values generally have two decimal places except for TiO₂, P₂O₅, MnO, Cl, F, S, Cr₂O₃, BaO, Rb₂O, and SrO which have three decimal places. A less than sign (<) preceding the CO₂ value indicates less than the value shown.

TOTAL:

This is a computer generated sum of the major constituents.

TRACE ELEMENTS:

Values for up to 37 trace elements may be stored for each sample. The trace elements are given in the order listed below: Ag, As, Au, B, Ba, Be, Bi, Ce, Co, Cr, Cu, F, Ga, Hg, La, Li, Mo, Nb, Nd, Ni, Pb, Rb, Sb, Sc, Sn, Sr, Ta, Te, Th, Tl, U, V, W, Y, Yb, Zn, and Zr.

All values are in parts per million (ppm) except for Au, Hg, and Te which are in parts per billion (ppb). A less than sign (<) before any trace element value indicates less than the amount shown.

Each trace element is stored as up to seven numeric characters with two decimal places. Trailing zeros to the right of the decimal point should be ignored.

Tape description, data formats, coding

form, and program listings

The tape is 9 track, 1600 BPI, ASCII character set. The tape is unlabeled, and contains two files, MOL.TEXT;1 and MOL.DAT;1. Data is blocked at 1214 characters per block. There are 2 records per 1214 character block.

File MOL.TEXT;1 is documentation for GRANNY. Records are fixed format and are 80 characters long.

File MOL.DAT;1 is the GRANNY data base. Records are fixed format and 607 characters long. The petrologist-user will recognize 106 variables per record. Table 5 lists the variable names and their formats.

The GRANNY data bank was built on a VAX 11/780 using DATATRIEVE-11-VERSION V02.04, the DEC query and report writing system. Table 6 gives listings of the DATATRIEVE domain and record definitions for inputting GRANNY records, DATATRIEVE procedures for printing records, and DATATRIEVE description tables.

Table 7 is a coding form which may be used for inputting additional data into GRANNY.

Table 5. -- Variable names and formats for GRANNY.

VARIABLE NAME (INPUT NAME)	DATATRIEVE QUERY NAME	COBOL FORMAT	DATATRIEVE PRINTOUT LABEL
-----	-----	-----	-----
AUTHOR		13X	AUTHOR
DATE		4X	DATE
MAJ-GRP-CODE	MAJ	3X	MAJOR GROUP
SEC-GRP-CODE	SEC	4X	SECOND GROUP
LAT		99V99	LAT
N-OR-S		X	
LONG		999V99	LONG
E-OR-W		X	
ROCK-NAME	RX-CO	20X	ROCK NAME
RX-CODE	RX-NO	9999	CODE
AGE			
AGE-STR-MIN	AG-S-MN	6X	STRAT-MIN
AGE-STR-MAX	AG-S-MX	6X	-MAX
AGE-ISO-MIN	AG-I-MIN	9999V99	ISOTOPIIC-MIN
AGE-ISO-MAX	AG-I-MAX	9999V99	-MAX
AGE-ISO-METHOD	AG-I-METH	4X	METHOD
FLAGS			FLAGS
FLAG-1	F-1	2X	
FLAG-2	F-2	2X	
FLAG-3	F-3	2X	
FLAG-4	F-4	2X	
FLAG-5	F-5	2X	
FLAG-6	F-6	2X	
NO-MIN-DESC (MIN)		99	
MIN-1	M-1	5X	MINERALS
MIN-2	M-2	5X	
MIN-3	M-3	5X	
MIN-4	M-4	5X	
MIN-5	M-5	5X	
MIN-6	M-6	5X	
MIN-8	M-8	5X	
MIN-9	M-9	5X	
MIN-10	M-10	5X	
(PET)			OCCUR-PETROG.
OCCUR	P-1	2X	
PET-2	P-2	2X	
PET-3	P-3	2X	
PET-4	P-4	2X	
PET-5	P-5	2X	
PET-6	P-6	2X	
			ALTERATION
ALT-1	A-1	3X	
ALT-2	A-2	3X	
ALT-3	A-3	3X	
ALT-4	A-4	3X	
AUT-ANAL-NO	AN-NO	10X	AUTHOR NUMBER
REC-NO		99999	RECORD NUMBER

Table 5. (continued)

(MAJ-OX)		MAJOR CONSTITUENTS
SI02	99V99	Si02
AL203	99V99	AL203
FE203	99V99	Fe203
FE0	99V99	Fe0
MGO	99V99	Mg0
CA0	99V99	Ca0
NA20	99V99	Na20
K20	99V99	K20
H20-PLUS	99V99	H20+
H20-MINUS	99V99	H20-
T-H20	99V99	TH20
LOI	99V99	LOI
TI02	99V999	Ti02
P205	99V999	P205
MNO	99V999	Mn0
ZR02	99V99	Zr02
CO2	99V99	CO2
SC02	X	
S03	99V99	S03
CL	99V999	Cl
F	99V999	F
S	99V999	S
CR203	99V999	Cr203
Ni0	99V99	Ni0
BA0	99V999	Ba0
RB20	99V999	Rb20
Sr0	99V999	Sr0
AUT-TOT	999V999	TOTAL
(TRACE-ELEM)		TRACE ELEMENTS
AG	99999V99	Ag
S-AG	X	
AS	99999V99	As
S-AS	X	
AU-	99999V99	Au*
S-AU-	X	
B	99999V99	B
S-B	X	
BA	99999V99	Ba
S-BA	X	
BE	99999V99	Be
S-BE	X	
BI	99999V99	Bi
S-BI	X	
CE	99999V99	Ce
S-CE	X	
CO	99999V99	Co
S-CO	X	
CR	99999V99	Cr
S-CR	X	
CU	99999V99	Cu
S-CU	X	

Table 5. (continued)

F2	99999V99	F
S-F2	X	
GA	99999V99	Ga
S-GA	X	
HG-	99999V99	Hg*
S-HG-	X	
LA	99999V99	La
S-LA	X	
LI	99999V99	Li
S-LI	X	
MO	99999V99	Mo
S-MO	X	
NB	99999V99	Nb
S-NB	X	
ND	99999V99	Nd
S-ND	X	
NI	99999V99	Ni
S-NI	X	
PB	99999V99	Pb
S-PB	X	
RB	99999V99	Rb
S-RB	X	
SB	99999V99	Sb
S-SB	X	
SC	99999V99	Sc
S-SC	X	
SN	99999V99	Sn
S-SN	X	
SR	99999V99	Sr
S-SR	X	
TA	99999V99	Ta
S-TA	X	
TE-	99999V99	Te*
S-TE-	X	
TH	99999V99	Th
S-TH	X	
TL	99999V99	Tl
S-TL	X	
U	99999V99	U
S-U	X	
V	99999V99	V
S-V	X	
W	99999V99	W
S-W	X	
Y	99999V99	Y
S-Y	X	
YB	99999V99	Yb
S-YB	X	
ZN	99999V99	Zn
S-ZN	X	
ZR	99999V99	Zr
S-ZR	X	

Table 5. (continued)

Names in parentheses are not stored variables.

Table 6. -- DATATRIEVE programs, procedures and tables.

DATATRIEVE domain and record definition for inputting

GRANNY records.

```
DEFINE DOMAIN MOL
  USING MOL-REC ON MOL.DAT;

DEFINE RECORD MOL-REC
01 GRAN-MO.
    05 AUTHOR PIC X(13).
    05 DATE PIC X(4).
    05 MAJ-GRP-CODE PIC X(3) QUERY-NAME MAJ.
    05 SEC-GRP-CODE PIC X(4) QUERY-NAME SEC.
    05 LAT PIC 99V99 EDIT-STRING ZZ.ZZ.
    05 N-OR-S PIC X.
    05 LONG PIC 999V99 EDIT-STRING ZZZ.ZZ.
    05 E-OR-W PIC X.
    05 ROCK-NAME PIC X(20) QUERY-NAME RX-CO.
    05 RX-CODE PIC 9(4) QUERY-NAME RX-NO.
    05 AGE-STR-MIN PIC X(6) QUERY-NAME AG-S-MN.
    05 AGE-STR-MAX PIC X(6) QUERY-NAME AG-S-MX.
    05 AGE-ISO-MIN PIC 9999V99 EDIT-STRING ZZZZ.ZZ
      QUERY-NAME AG-I-MIN.
    05 AGE-ISO-MAX PIC 9999V99 EDIT-STRING ZZZZ.ZZ
      QUERY-NAME AG-I-MAX.
    05 AGE-ISO-METHOD PIC X(4) QUERY-NAME AG-I-METH.

02 FLAGS.
    03 FLAG-1 PIC X(2) QUERY-NAME IS F-1.
    03 FLAG-2 PIC X(2) QUERY-NAME IS F-2.
    03 FLAG-3 PIC X(2) QUERY-NAME IS F-3.
    03 FLAG-4 PIC X(2) QUERY-NAME IS F-4.
    03 FLAG-5 PIC X(2) QUERY-NAME IS F-5.
    03 FLAG-6 PIC X(2) QUERY-NAME IS F-6.

02 NO-MIN-DESC PIC 99.

02 MIN.
    03 MIN-1 PIC X(5) QUERY-NAME IS M-1.
    03 MIN-2 PIC X(5) QUERY-NAME IS M-2.
    03 MIN-3 PIC X(5) QUERY-NAME IS M-3.
    03 MIN-4 PIC X(5) QUERY-NAME IS M-4.
    03 MIN-5 PIC X(5) QUERY-NAME IS M-5.
    03 MIN-6 PIC X(5) QUERY-NAME IS M-6.
    03 MIN-7 PIC X(5) QUERY-NAME IS M-7.
    03 MIN-8 PIC X(5) QUERY-NAME IS M-8.
    03 MIN-9 PIC X(5) QUERY-NAME IS M-9.
    03 MIN-10 PIC X(5) QUERY-NAME IS M-10.

02 PET.
    03 OCCUR PIC X(2) QUERY-NAME IS P-1.
    03 PET-2 PIC X(2) QUERY-NAME IS P-2.
    03 PET-3 PIC X(2) QUERY-NAME IS P-3.
    03 PET-4 PIC X(2) QUERY-NAME IS P-4.
    03 PET-5 PIC X(2) QUERY-NAME IS P-5.
```

Table 6. (continued)

```
      03 PET-6 PIC X(2) QUERY-NAME IS P-6.
02 ALT-1 PIC X(3) QUERY-NAME IS A-1.
02 ALT-2 PIC X(3) QUERY-NAME IS A-2.
02 ALT-3 PIC X(3) QUERY-NAME IS A-3.
02 ALT-4 PIC X(3) QUERY-NAME IS A-4.
02 AUT-ANAL-NO PIC X(10) QUERY-NAME AN-NO.
02 REC-NO PIC 9(5) EDIT-STRING ZZZZZ.

02 MAJ-OX.
      05 SI02 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 AL203 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 FE203 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 FE0 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 M60 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 CA0 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 NA20 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 K20 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 H20-PLUS PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 H20-MINUS PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 T-H20 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 LOI PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 TI02 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 P205 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 MNO PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 ZR02 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 C02 PIC S99V99 EDIT-STRING ZZ.ZZ.
      05 SC02 PIC X.
      05 S03 PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 CL PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 F PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 S PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 CR203 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 NIO PIC 99V99 EDIT-STRING ZZ.ZZ.
      05 BA0 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 RB20 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 SR0 PIC 99V999 EDIT-STRING ZZ.ZZZ.
      05 AUT-TOT PIC 999V999 EDIT-STRING ZZZ.ZZZ
      QUERY-NAME AUT-TOT.

02 TRACE-ELEM.
      05 AG PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
      05 S-AG PIC X.
      05 AS PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
      05 S-AS PIC X.
      05 AU- PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
      05 S-AU- PIC X.
      05 B PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
      05 S-B PIC X.
      05 BA PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
      05 S-BA PIC X.
```

Table 6. (continued)

```

05 BE PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-BE PIC X.
05 BI PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-BI PIC X.
05 CE PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-CE PIC X.
05 CO PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-CO PIC X.
05 CR PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-CR PIC X.
05 CU PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-CU PIC X.
05 F2 PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-F2 PIC X.
05 GA PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-GA PIC X.
05 HG- PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-HG- PIC X.
05 LA PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-LA PIC X.
05 LI PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-LI PIC X.
05 MO PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-MO PIC X.
05 NB PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-NB PIC X.
05 ND PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-ND PIC X.
05 NI PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-NI PIC X.
05 PB PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-PB PIC X.
05 RB PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-RB PIC X.
05 SB PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-SB PIC X.
05 SC PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-SC PIC X.
05 SN PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-SN PIC X.
05 SR PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-SR PIC X.
05 TA PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-TA PIC X.
05 TE- PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-TE- PIC X.
05 TH PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-TH PIC X.
05 TL PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-TL PIC X.

```

Table 6. (continued)

05 U PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-U PIC X.
05 V PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-V PIC X.
05 W PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-W PIC X.
05 Y PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-Y PIC X.
05 YB PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-YB PIC X.
05 ZN PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-ZN PIC X.
05 ZR PIC S99999V99 EDIT-STRING ZZZZZ.ZZ.
05 S-ZR PIC X.

Table 6. (continued)

DATATRIEVE procedures for printing GRANNY records.

```

-----
DEFINE PROCEDURE REC.
  DECLARE X PIC X(3).
  X=0
  :ADD
END-PROCEDURE

DEFINE PROCEDURE ADD.
  X=X+1
  FIND MOL WITH REC-NO=X
  SELECT 1
    DECLARE Z PIC 999V999 EDIT-STRING ZZZ.ZZZ.
    Z=(SI02)+(AL203)+(FE203)+(FEO)+(MGO)+(CAO)
      +(NA2O)+(K2O)+(H2O-PLUS)
    Z=Z+(H2O-MINUS)+(T-H2O)+(LOI)+(TI02)+(P2O5)
      +(MNO)+(ZRO2)+(SO3)+(CL)
    Z=Z+(F)+(S)+(CR2O3)+(NIO)+(BAO)+(RB2O)+(SRO)
    IF CO2<1 THEN Z=(Z)-(CO2) ELSE Z=Z+(CO2)
    MODIFY USING AUT-TOT=Z
  :DAT
END-PROCEDURE

DEFINE PROCEDURE DAT.

FOR CURRENT PRINT SKIP 6, COL 16, "AUTHOR:", SPACE,
AUTHOR (-), SPACE 2, "DATE:", SPACE, DATE (-), SKIP,
COL 54, "LAT:", SPACE 3, LAT (-), SPACE, N-OR-S (-),

COL 16, "MAJOR GROUP:", SPACE, MAJ (-), SPACE 2, "SECOND
GROUP:", SPACE, SEC (-), SPACE 2, "LONG:", SPACE, LONG (-),
SPACE, E-OR-W (-), SPACE 2, "FLAGS", SKIP, COL 72, F-1 (-),

COL 16, "ROCK NAME:", SPACE, RX-CO (-), SPACE, "CODE:",
SPACE, RX-NO (-), COL 72, F-2 (-), COL 72, F-3 (-),

COL 16, "AGE:", SPACE 2, "STRAT-MIN:", SPACE, AG-S-MN (-),
SPACE 2, "ISOTOPIIC-MIN:", SPACE, AG-I-MIN (-), COL 72, F-4
(-),

COL 27, "--MAX:", SPACE, AG-S-MX (-), SPACE 10, "--MAX:",
SPACE, AG-I-MAX (-), COL 72, F-5 (-),

COL 47, "METHOD:", SPACE 3, AG-I-METH (-), COL 72, F-6 (-),

COL 26, "MINERALS", COL 42, "OCCUR-PETROG.", COL 62,
"ALTERATION", SKIP,

COL 16, M-1 VIA D-TABLE (-) USING X(22),
  COL 40, P-1 VIA D-TABLE (-) USING X(17),
  COL 59, A-1 VIA D-TABLE (-) USING X(17),

```

Table 6. (continued)

COL 16, M-2 VIA D-TABLE (-) USING X(22),
COL 59, A-2 VIA D-TABLE (-) USING X(17),

COL 16, M-3 VIA D-TABLE (-) USING X(22),
COL 40, P-2 VIA D-TABLE (-) USING X(17),
COL 59, A-3 VIA D-TABLE (-) USING X(17),

COL 16, M-4 VIA D-TABLE (-) USING X(22),
COL 40, P-3 VIA D-TABLE (-) USING X(17),
COL 59, A-4 VIA D-TABLE (-) USING X(17),

COL 16, M-5 VIA D-TABLE (-) USING X(22),
COL 40, P-4 VIA D-TABLE (-) USING X(17),

COL 16, M-6 VIA D-TABLE (-) USING X(22),
COL 40, P-5 VIA D-TABLE (-) USING X(17),

COL 16, M-7 VIA D-TABLE (-) USING X(22),
COL 40, P-6 VIA D-TABLE (-) USING X(17),

COL 16, M-8 VIA D-TABLE (-) USING X(22),

COL 16, M-9 VIA D-TABLE (-) USING X(22),

COL 16, M-10 VIA D-TABLE (-) USING X(22)

RELEASE D-TABLE

FOR CURRENT PRINT COL 16, "MAJOR CONSTITUENTS", COL 52,
"TRACE ELEMENTS",

COL 16, "SiO2", SPACE 3, SiO2 (-), COL 42, "Ag", SPACE 1,
S-AG (-), AG (-), COL 62, "Ta", SPACE 1, S-TA (-), TA (-),

COL 16, "Al2O3", SPACE 2, Al2O3 (-), COL 42, "As", SPACE 1,
S-AS (-), AS (-), COL 62, "Te*", S-TE-, TE- (-),

COL 16, "Fe2O3", SPACE 2, Fe2O3 (-), COL 42, "Au*", S-AU-
(-), AU- (-), COL 62, "Th", SPACE 1, S-TH (-), TH (-),

COL 16, "FeO", SPACE 4, FeO (-), COL 42, "B", SPACE 2,
S-B (-), B(-), COL 62, "Tl", SPACE 1, S-TL (-), Tl (-),

COL 16, "MgO", SPACE 4, MgO (-), COL 42, "Ba", SPACE 1, S-BA
(-), BA (-), COL 62, "U", SPACE 2, S-U (-), U (-),

COL 16, "CaO", SPACE 4, CaO (-), COL 42, "Be", SPACE 1, S-BE
(-), BE (-), COL 62, "V", SPACE 2, S-V (-), V (-),

Table 6. (continued)

COL 16, "Na2O", SPACE 3, NA2O (-), COL 42, "Bi", SPACE 1, S-BI (-), BI (-), COL 62, "W", SPACE 2, S-W (-), W (-),

COL 16, "K2O", SPACE 4, K2O (-), COL 42, "Ce", SPACE 1, S-CE (-), CE (-), COL 62, "Y", SPACE 2, S-Y (-), Y (-),

COL 16, "H2O+", SPACE 3, H2O-PLUS (-), COL 42, "Co", SPACE 1, S-CO (-), CO (-), COL 62, "Yb", SPACE 1, S-YB (-), YB (-)

FOR CURRENT PRINT COL 16, "H2O-", SPACE 3, H2O-MINUS (-), COL 42, "Cr", SPACE 1, S-CR (-), CR (-), COL 62, "Zn", SPACE 1, S-ZN (-), ZN (-),

COL 16, "TH2O", SPACE 3, T-H2O (-), COL 42, "Cu", SPACE 1, S-CU (-), CU (-), COL 62, "Zr", SPACE 1, S-ZR (-), ZR (-),

COL 16, "LOI", SPACE 4, LOI (-), COL 42, "F", SPACE 2, S-F2 (-), F2 (-),

COL 16, "TiO2", SPACE 3, TIO2 (-), COL 42, "Ga", SPACE 1, S-GA (-), GA (-),

COL 16, "P2O5", SPACE 3, P2O5 (-), COL 42, "Hg*", S-HG- (-), HG- (-),

COL 16, "MnO", SPACE 4, MNO (-), COL 42, "La", SPACE 1, S-LA (-), LA (-),

COL 16, "ZrO2", SPACE 3, ZRO2 (-), COL 42, "Li", SPACE 1, S-LI (-), LI (-),

COL 16, "CO2", SPACE 3, CO2 (-), COL 42, "Mo", SPACE 1, S-MO (-), MO (-),

COL 16, "SO3", SPACE 4, SO3 (-), COL 42, "Nb", SPACE 1, S-NB (-), NB (-)

FOR CURRENT PRINT COL 16, "Cl", SPACE 5, CL (-), COL 42, "Nd", SPACE 1, S-ND (-), ND (-),

COL 16, "F", SPACE 6, F (-), COL 42, "Ni", SPACE 1, S-NI (-), NI (-),

COL 16, "S", SPACE 6, S (-), COL 42, "Pb", SPACE 1, S-PB (-), PB (-),

COL 16, "Cr2O3", SPACE 2, CR2O3 (-), COL 42, "Pb", SPACE 1, S-RB (-), RB (-), COL 56, "AUTHOR",

COL 16, "NiO", SPACE 4, NIO (-), COL 42, "Sb", SPACE 1, S-SB (-), SB (-), COL 56, "NUMBER:", SPACE 2, AN-NO (-),

Table 6. (continued)

COL 16, "Ba0", SPACE 4, BAO (-), COL 42, "Sc", SPACE 1,
S-SC (-), SC (-),

COL 16, "Rb20", SPACE 4, RB20 (-), COL 42, "Sn", SPACE 1,
S-SN (-), SN (-), COL 56, "RECORD NO:", SPACE 4, REC-NO (-),

COL 16, "Sr0", SPACE 4, SRO (-), COL 42, "Sr", SPACE 1,
S-SR (-), SR (-),

COL 16, "TOTAL", SPACE, AUT-TOT (-), SKIP 8

RELEASE Z

RELEASE CURRENT

:ADD

END-PROCEDURE

Table 6. (continued)

 DATATRIEVE description table for translating codes to

 literals for printing output.

DEFINE TABLE D-TABLE

"NB7" : "FELDSPAR-PHENO",
 "NE" : "K-FELDSPAR",
 "NE7" : "K-FELDSPAR-PHENO",
 "NC" : "ALKALI FELDSPAR",
 "NC7" : "ALKALI FELDSPAR-PHENO",
 "ND7" : "ANORTHOCLASE-PHENO",
 "NJ" : "SANIDINE",
 "NJ7" : "SANIDINE-PHENO",
 "NI7" : "PERTHITE-PHENO",
 "NH" : "ORTHOCLASE",
 "NH7" : "ORTHOCLASE-PHENO",
 "NL" : "PLAGIOCLASE",
 "NL7" : "PLAGIOCLASE-PHENO",
 "NM" : "NA-PLAGIOCLASE",
 "NM7" : "NA-PLAGIOCLASE-PHENO",
 "NP" : "ALBITE",
 "NP7" : "ALBITE-PHENO",
 "NR" : "OLIGOCLASE",
 "NR7" : "OLIGOCLASE-PHENO",
 "NS7" : "OLIGOCL.-ANDESIN.-PHENO",
 "NT7" : "ANDESINE-PHENO",
 "NF" : "MICROCLINE",
 "NF7" : "MICROCLINE-PHENO",
 "PB" : "BIOTITE",
 "PB7" : "BIOTITE-PHENO",
 "PD" : "MUSCOVITE",
 "PF" : "SERICITE",
 "PG" : "CHLORITE",
 "QA" : "AMPHIBOLE",
 "QD" : "HORNBLLENDE",
 "QD7" : "HORNBLLENDE-PHENO",
 "RA" : "PYROXENE",
 "RG" : "AUGITE",
 "RG7" : "AUGITE-PHENO",
 "RH7" : "DIOPSIDE-PHENO",
 "TI" : "GARNET",
 "TO" : "SPESSARTINE",
 "TR" : "TOPAZ",
 "TS" : "TOURMALINE",
 "TH" : "EPIDOTE",
 "UK" : "CRISTOBALITE",
 "UM" : "QUARTZ",
 "UM7" : "QUARTZ-PHENO",
 "UN" : "TRIDYMITE",
 "VF" : "FLUORITE",

Table 6. (continued)

```

"AE" : "ASH FLOW",
"AJ" : "BRECCIA",
"AM" : "DIKE",
"AN" : "DOME",
"AP" : "FLOW",
"AQ" : "FLOW BRECCIA",
"AW" : "LACCOLITH",
"BI" : "PIPE",
"BJ" : "PLUG",
"BK" : "PLUTON",
"BN" : "PYROCLASTIC",
"BS" : "SILL",
"BU" : "STOCK",
"BZ" : "TUFF",
"CE" : "WELDED TUFF",
"DU" : "APLITIC",
"DZ" : "DEVITRIFIED",
"ED" : "EQUIGRANULAR",
"EH" : "GLASSY",
"EQ" : "HOLOHYALINE",
"FP" : "PORPHYRITIC",
"FG" : "PUMICEOUS",
"GC" : "VITROPHYRIC",

"AL" : "ALUNITIC",
"ALM" : "ALUNITIC-M",
"AR" : "ARGILLIC",
"ARW" : "ARGILLIC-W",
"ARM" : "ARGILLIC-M",
"ARS" : "ARGILLIC-S",
"ARX" : "ARGILLIC-X",
"F" : "FRESH",
"IC" : "ALTERED",
"K" : "POTASSIC",
"K W" : "POTASSIC-W",
"K M" : "POTASSIC-M",
"K S" : "POTASSIC-S",
"QM" : "QUARTZ-MAGNETITE",
"QMS" : "QUARTZ-MAGNET.-S",
"QS" : "QUARTZ-SERICITE",
"QSW" : "QUARTZ-SERICITE-W",
"QSM" : "QUARTZ-SERICITE-M",
"QSS" : "QUARTZ-SERICITE-S",
"QSX" : "QUARTZ-SERICITE-X",
"SI" : "SILICIFICATION",
"SIM" : "SILICIFICATION-M",
"SIS" : "SILICIFICATION-S",
"SIX" : "SILICIFICATION-X",
" " : " ",
ELSE "NO CODE"

```

END-TABLE

Table 7. -- GRANNY input coding form.

GRANNY INPUT CODING FORM -- FRONT

AUTHOR: ----- DATE: ----
MAJ-GRP-CODE: --- SEC-GRP-CODE: ----
LAT: --.--- N-OR-S: - LONG: ---.--- E-OR-W: -
ROCK-NAME: ----- RX-CODE: ----
AGE-STR-MIN: ----- AGE-STR-MAX: -----
AGE-ISO-MIN: ---.--- AGE-ISO-MAX: ---.---
AGE-ISO-METHOD: ----
FLAG-1:-- FLAG-2:-- FLAG-3:-- FLAG-4:-- FLAG-5:-- FLAG-6:--
NO-MIN-DESC: --
MIN-1:----- MIN-2:----- MIN-3:----- MIN-4:----- MIN-5:-----
MIN-6:----- MIN-7:----- MIN-8:----- MIN-9:----- MIN-10:-----
OCCUR: -- PET-2: -- PET-3: -- PET-4: -- PET-5: -- PET-6: --
ALT-1: --- ALT-2: --- ALT-3: --- ALT-4: ---
AUT-ANAL-NO: ----- REC-NO: -----
SI02: --.--- AL203: --.--- FE203: --.--- FE0: --.---
M60: --.--- CA0: --.--- NA20: --.--- K20: --.---
H20-PLUS: --.--- H20-MINUS: --.--- T-H20: --.--- LOI: --.---
TI02: --.--- P205: --.--- MNO: --.--- ZR02: --.---
CO2: --.--- SC02: - S03: --.--- CL: --.--- F: --.---
S: --.--- CR203: --.--- NIO: --.--- BA0: --.---
RB20: --.--- SR0: --.--- AUT-TOT: ---.---

Table 7. (continued)

GRANNY INPUT CODING FORM -- BACK

```

-----
AG:  -----.--      S-AG:  -      AS:  -----.--      S-AS:  -
AU-:  -----.--      S-AU-:  -      B:   -----.--      S-B:   -
BA:   -----.--      S-BA:  -      BE:  -----.--      S-BE:  -
BI:   -----.--      S-BI:  -      CE:  -----.--      S-CE:  -
CO:   -----.--      S-CO:  -      CR:  -----.--      S-CR:  -
CU:   -----.--      S-CU:  -      F2:  -----.--      S-F2:  -
GA:   -----.--      S-GA:  -      HG-:  -----.--      S-HG-:  -
LA:   -----.--      S-LA:  -      LI:  -----.--      S-LI:  -
MO:   -----.--      S-MO:  -      NB:  -----.--      S-NB:  -
ND:   -----.--      S-ND:  -      NI:  -----.--      S-NI:  -
PB:   -----.--      S-PB:  -      RB:  -----.--      S-RB:  -
SB:   -----.--      S-SB:  -      SC:  -----.--      S-SC:  -
SN:   -----.--      S-SN:  -      SR:  -----.--      S-SR:  -
TA:   -----.--      S-TA:  -      TE-:  -----.--      S-TE-:  -
TH:   -----.--      S-TH:  -      TL:  -----.--      S-TL:  -
U:    -----.--      S-U:   -      V:   -----.--      S-V:   -
W:    -----.--      S-W:   -      Y:   -----.--      S-Y:   -
YB:   -----.--      S-YB:  -      ZN:  -----.--      S-ZN:  -
ZR:   -----.--      S-ZR:  -

```

S-(constituent) is for insertion of a less than sign (<), which may be used for CO2 and all trace elements.

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APPENDIX

DATA BANK

GRANNY

HARDCOPY VERSION

Major constituents given in weight percent. Trace element values in parts per million (ppm) except for Au*, Hg*, and Te* which are in parts per billion (ppb).

CO2 and all trace elements may be preceded by a less than sign (<) indicating less than the amount shown.

AUTHOR: RANTA

DATE: 1974

LAT: 39.35 N

MAJOR GROUP: CMO SECOND GROUP: CXL LONG: 106.15 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 30.00
-MAX: OLIG -MAX:

METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO DIKE QUARTZ-SERICITE
ALKALI FELDSPAR-PHENO
ALBITE PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.80
Al2O3 13.80
Fe2O3 .30
FeO .22
MgO .46
CaO .06
Na2O .12
K2O 6.14

H2O+ 1.53
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 .20
SO3
Cl
F
S .005
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.635

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: T.3-18

RECORD NO: 372

AUTHOR: HALL

DATE: 1973

LAT: 39.37 N

MAJOR GROUP: CMO SECOND GROUP: CXS

LONG: 106.17 W FLAGS

ROCK NAME: GRANITE PORPHYRY

CODE: 1420

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 30.00
-MAX:

METHOD: KAR

MINERALS

OCCUR-PETROG.

ALTERATION

QUARTZ

STOCK

POTASSIC-M

ALKALI FELDSPAR

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.20

Al2O3 11.80

Fe2O3 .24

FeO .04

MgO .01

CaO .60

Na2O 1.10

K2O 7.80

H2O+ .63

H2O- .09

TH2O

LOI

TiO2 .080

P2O5 .010

MnO .010

ZrO2

CO2 < .05

SO3

Cl

F .350

S

Cr2O3

NiO

BaO

Rb2O

SrO

TOTAL 100.010

TRACE ELEMENTS

As

Ta

As

Te*

Au*

Th

B

Tl

Ba

U

Be

V

Bi

W

Ce

Y

Co

Yb

Cr

Zn

Cu

Zr

F

Ga

Hg*

La

Li

Mo

Nb

Nd

Ni

Pb

Rb

Sb

Sc

Sn

Sr

AUTHOR

NUMBER: CL-116

RECORD NO:

357

AUTHOR: HALL

DATE: 1973

LAT: 39.37 N

MAJOR GROUP: CMO SECOND GROUP: CXS LONG: 106.17 W FLAGS

ROCK NAME: APLITE

CODE: 0290

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 30.00
-MAX:

METHOD: KAR

MINERALS
QUARTZ
ALKALI FELDSPAR

OCCUR-PETROG.
STOCK

ALTERATION
SILICIFICATION-M

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 83.60
Al2O3 7.40
Fe2O3 .26
FeO .12
MgO .20
CaO 1.10
Na2O .20
K2O 4.70

H2O+ .55
H2O- .19
TH2O
LOI
TiO2 .140
P2O5 .020
MnO .010

ZrO2
CO2 .08
SO3
Cl
F .670
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.240

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce
Ta
Te*
Th
Tl
U
V
W
Y

Co
Cr
Cu
F
Ga
Hs*
La
Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: CL15-70C

RECORD NO: 358

AUTHOR: EMMONS

DATE: 1886

LAT: 39.37 N

MAJOR GROUP: CMO SECOND GROUP: CM

LONG: 106.19 W FLAGS

ROCK NAME: NEVADITE

CODE: 2400

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 30.00
-MAX:

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
TOPAZ

OCCUR-PETROG.
STOCK
PORPHYRITIC

ALTERATION
FRESH

MAJOR CONSTITUENTS

SiO2 74.45
Al2O3 14.72
Fe2O3
FeO .56
MgO .37
CaO .83
Na2O 3.97
K2O 4.53

H2O+
H2O-
TH2O .66
LOI
TiO2
P2O5 .010
MnO .280

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.380

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce
Co
Cr
Cu
F
Ga
Hf*
La

Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn
Zr

AUTHOR
NUMBER:

RECORD NO: 373

AUTHOR: STEININGER DATE: 1973
 MAJOR GROUP: CMO SECOND GROUP: CLP LAT: 39.37 N
 LONG: 106.17 W FLAGS
 ROCK NAME: ALT.CHAMOSITE-DOLOM. CODE: 0020

AGE: STRAT-MIN: PALC ISOTOPIE-MIN:
 -MAX: PALC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE ALTERED
 MICROCLINE-PHENO
 NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 67.94
 Al2O3 13.46
 Fe2O3 2.02
 FeO 1.04
 MgO .73
 CaO 2.42
 Na2O 3.75
 K2O 3.97

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 2.250
 P2O5 .220
 MnO .150

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 97.950

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zr
 Zr

AUTHOR
 NUMBER: 1

RECORD NO: 488

AUTHOR: STEININGER DATE: 1973
 MAJOR GROUP: CMO SECOND GROUP: CLP LAT: 39.37 N
 LONG: 106.17 W FLAGS
 ROCK NAME: ALT.CHLORITE-EPIDOT CODE: 0020

AGE: STRAT-MIN: PALC ISOTOPIC-MIN:
 -MAX: PALC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE ALTERED
 MICROCLINE-PHENO
 NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 67.67
 Al2O3 16.11
 Fe2O3 1.94
 FeO .94
 MgO .87
 CaO 2.52
 Na2O 3.41
 K2O 4.38

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .340
 P2O5 .230
 MnO .210

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.620

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 4

 RECORD NO: 489

AUTHOR: STEININGER DATE: 1973
 MAJOR GROUP: CMO SECOND GROUP: CLP LAT: 39.37 N
 LONG: 106.17 W FLAGS
 ROCK NAME: ALT.-CHLOR-EPID-RUTI CODE: 0020

AGE: STRAT-MIN: PALC ISOTOPIC-MIN:
 -MAX: PALC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ DIKE ALTERED
 MICROCLINE-PHENO
 NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 68.60
 Al2O3 15.85
 Fe2O3 2.25
 FeO 1.08
 MgO .88
 CaO .95
 Na2O 3.83
 K2O 4.70

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .330
 P2O5 .240
 MnO .080

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.790

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 5
 RECORD NO: 490

AUTHOR: STEININGER DATE: 1973 LAT: 39.37 N
 MAJOR GROUP: CMO SECOND GROUP: CLP LONG: 106.17 W FLAGS
 ROCK NAME: ALT. ARGILLIC-KADLIN CODE: 0020

AGE: STRAT-MIN: PALC ISOTOPIC-MIN:
 -MAX: PALC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE ARGILLIC
 MICROCLINE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 69.59
 Al2O3 15.32
 Fe2O3 1.42
 FeO .50
 MgO .67
 CaO .45
 Na2O .25
 K2O 7.35

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .220
 P2O5 .220
 MnO .020

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 96.010

TRACE ELEMENTS

As Ta
 As Te*
 Au* Th
 B Tl
 Ba U
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: 62
 RECORD NO: 491

AUTHOR: EMMONS

DATE: 1886

LAT: 39.28 N

MAJOR GROUP: CMO

SECOND GROUP: LEP

LONG: 106.27 W FLAGS

ROCK NAME: PORPHYRY

CODE: 2870

AGE: STRAT-MIN: CRET
-MAX: CRET

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUTON

ALTERATION

MAJOR CONSTITUENTS

SiO2 73.50
Al2O3 14.87
Fe2O3 .95
FeO .42
MgO .20
CaO 2.14
Na2O 3.46
K2O 3.56

H2O+
H2O-
TH2O .90
LOI
TiO2
P2O5
MnO .030

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.030

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hs*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: P.326-I

RECORD NO: 350

AUTHOR: EMMONS DATE: 1886 LAT: 39.00 N
 MAJOR GROUP: CMD SECOND GROUP: LEP LONG: 106.00 W FLAGS
 ROCK NAME: PORPHYRY CODE: 2870

AGE: STRAT-MIN: CRET ISOTOPIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLUTON QUARTZ-SERICITE-M

MAJOR CONSTITUENTS

SiO2 70.74
 Al2O3 14.68
 Fe2O3 .69
 FeO .58
 MgO .28
 CaO 4.12
 Na2O 2.29
 K2O 2.59

 H2O+
 H2O-
 TH2O 2.09
 LOI
 TiO2
 P2O5
 MnO .060

 ZrO2
 CO2 2.10
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO .030
 Rb2O
 SrO
 TOTAL 100.250

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: F.326-II

 RECORD NO: 351

AUTHOR: TWETO DATE: 1983 LAT: 39.30 N
 MAJOR GROUP: CMO SECOND GROUP: LEP LONG: 106.28 W FLAGS
 ROCK NAME: QUARTZ LATITE PORPH. CODE: 1980

AGE: STRAT-MIN: CRET ISOTOPIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 PLUTON QUARTZ-SERICITE
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.24
 Al2O3 15.19
 Fe2O3 .15
 FeO .32
 MgO .18
 CaO .03
 Na2O .11
 K2O 3.53

 H2O+ 3.44
 H2O- .12
 TH2O
 LOI
 TiO2 .060
 P2O5 .070
 MnO .010

 ZrO2
 CO2 .02
 SO3
 Cl
 F .060
 S .010
 Cr2O3
 NiO
 BaO .120
 Rb2O
 SrO
 TOTAL 99.660

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B	15.00	Tl	
Ba	1500.00	U	
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu	7.00	Zr	70.00
F			
Ga	7.00		
Hg*			
La			
Li			
Mo			
Nb	15.00		
Nd			
Ni			
Pb			
Rb			
Sb			
Sc			
Sn			
Sr	15.00		

AUTHOR
 NUMBER: 20T55B
 RECORD NO: 448

AUTHOR: VAN ALSTINE DATE: 1969

MAJOR GROUP: CMO SECOND GROUP: RU LAT: 38.75 N
LONG: 106.05 W FLAGS

ROCK NAME: PERLITE CODE: 2730

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 28.00
 -MAX: OLIG -MAX: 29.00
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLOW
SANIDINE-PHENO
OLIGOCLASE-PHENO GLASSY

MAJOR CONSTITUENTS

SiO2 74.32
Al2O3 12.55
Fe2O3 .44
FeO .13
MnO .05
CaO .40
Na2O 3.97
K2O 4.72

H2O+ 2.83
H2O- .13
TH2O
LOI
TiO2 .070
P2O5
MnO .010

ZrO2
CO2
SO3
Cl .050
F .230
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.900

TRACE ELEMENTS

Ag
As
Au*
B
Ba 1500.00
Be
Bi
Ce

Co 15.00
Cr 5.00
Cu 30.00
F
Ga 15.00
Hg*
La

Li
Mo
Nb 10.00
Nd
Ni 7.00
Pb 10.00
Rb
Sb
Sc 10.00
Sn
Sr 700.00

Ta
Te*
Th
Tl
U
V 150.00
W
Y 20.00

Yb 2.00
Zn
Zr 70.00

AUTHOR
NUMBER: T.6
RECORD NO: 118

AUTHOR: CROSS

DATE: 1986

LAT: 38.75 N

MAJOR GROUP: CMO SECOND GROUP: RU

LONG: 106.05 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
BIOTITE-PHENO
GARNET
TOPAZ

OCCUR-PETROG.
FLOW

ALTERATION

MAJOR CONSTITUENTS

SiO2 69.89
Al2O3 17.94
Fe2O3 .39
FeO .52
MnO .14
CaO
Na2O 4.21
K2O 4.38

H2O+ 2.07
H2O-
TH2O
LOI
TiO2
P2O5
MnO .230

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.770

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hf*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER:

RECORD NO: 121

AUTHOR: SCHOOLER

DATE: 1982

LAT: 38.75 N

MAJOR GROUP: CMO SECOND GROUP: RU

LONG: 106.05 W FLAGS

ROCK NAME: PERLITE

CODE: 2730

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00
METHOD: KAR

MINERALS
SANIDINE-PHENO
OLIGOCLASE-PHENO

OCCUR-PETROG. ALTERATION
WELDED TUFF
GLASSY

MAJOR CONSTITUENTS

SiO2	72.20
Al2O3	12.70
Fe2O3	.73
FeO	.07
MnO	1.35
CaO	.66
Na2O	3.16
K2O	4.75
H2O+	3.17
H2O-	1.19
TH2O	
LOI	
TiO2	.080
P2O5	.010
MnO	.100
ZrO2	
CO2	
SO3	
Cl	
F	.190
S	
Cr2O3	
NiO	
BaO	.010
Rb2O	
SrO	.003
TOTAL	100.373

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: RM-3

RECORD NO: 125

AUTHOR: SCHOOLER

DATE: 1982

MAJOR GROUP: CMO SECOND GROUP: RU

LAT: 38.75 N

LONG: 106.05 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00

METHOD: KAR

MINERALS

OCCUR-PETROG.

ALTERATION

QUARTZ-PHENO
SANIDINE-PHENO
OLIGOCLASE-PHENO
BIOTITE
GARNET
TOPAZ

FLOW

MAJOR CONSTITUENTS

SiO2 76.40
Al2O3 12.50
Fe2O3 .65
FeO .07
MgO .09
CaO .39
Na2O 4.30
K2O 4.63

H2O+ .21
H2O- .09
TH2O
LOI
TiO2 .080
P2O5 .030
MnO .090

ZrO2
CO2
SO3
Cl
F .050
S
Cr2O3
NiO
BaO .010
Rb2O
SrO .001
TOTAL 99.591

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: RM-4

RECORD NO: 126

AUTHOR: SCHOOLER

DATE: 1982

LAT: 38.76 N

MAJOR GROUP: CMO SECOND GROUP: RU

LONG: 106.06 W FLAGS

ROCK NAME: RHYOLITE PYROCLASTIC CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIE-MIN: 28.00
-MAX: 29.00
METHOD: KAR

MINERALS
SANIDINE-PHENO
OLIGOCLASE-PHENO
QUARTZ-PHENO

OCCUR-PETROG.
PYROCLASTIC

ALTERATION

MAJOR CONSTITUENTS

SiO2	75.90
Al2O3	12.60
Fe2O3	.72
FeO	.09
MgO	.21
CaO	.63
Na2O	4.35
K2O	4.17
H2O+	.38
H2O-	.16
TH2O	
LOI	
TiO2	.110
P2O5	.040
MnO	.090
ZrO2	
CO2	
SO3	
Cl	
F	.230
S	
Cr2O3	
NiO	
BaO	.010
Rb2O	
SrO	.003
TOTAL	99.693

TRACE ELEMENTS

Ag	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: SL-1

RECORD NO: 127

AUTHOR: SCHOOLER

DATE: 1982

LAT: 38.76 N

MAJOR GROUP: CMO SECOND GROUP: RU

LONG: 106.06 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00
METHOD: KAR

MINERALS
ANDESINE-PHENO
SANIDINE-PHENO
MICROCLINE-PHENO
QUARTZ-PHENO

OCCUR-PETROG, ALTERATION
DIKE

MAJOR CONSTITUENTS

SiO2	70.40
Al2O3	14.10
Fe2O3	.70
FeO	.08
MgO	1.02
CaO	1.33
Na2O	3.80
K2O	3.50
H2O+	2.37
H2O-	1.87
TH2O	
LOI	
TiO2	.090
P2O5	.110
MnO	.120
ZrO2	
CO2	
SO3	
Cl	
F	.220
S	
Cr2O3	
NiO	
BaO	.010
Rb2O	
SrO	.005
TOTAL	99.725

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: SL-12

RECORD NO: 129

AUTHOR: SCHOOLER

DATE: 1982

MAJOR GROUP: CMO SECOND GROUP: RU

LAT: 38.75 N

LONG: 106.06 W FLAGS

ROCK NAME: RHYOLITE PYROCLASTIC CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00

METHOD: KAR

MINERALS
SANIDINE-PHENO
OLIGOCLASE-PHENO
MICROCLINE-PHENO

OCCUR-PETROG.
PYROCLASTIC
PUMICEOUS

ALTERATION

MAJOR CONSTITUENTS

SiO2 74.00
Al2O3 12.70
Fe2O3 .58
FeO .13
MgO .51
CaO .63
Na2O 3.27
K2O 3.92

H2O+ 2.30
H2O- .86
TH2O
LOI
TiO2 .080
P2O5 .030
MnO .110

ZrO2
CO2
SO3
Cl
F .230
S
Cr2O3
NiO
BaO .010
Rb2O
SrO .002
TOTAL 99.362

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: PC-3A

RECORD NO: 130

AUTHOR: SCHOOLER

DATE: 1982

MAJOR GROUP: CMD

SECOND GROUP: RU

LAT: 38.75 N

LONG: 106.06 W FLAGS

ROCK NAME: RHYOLITE PYROCLASTIC CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 28.00
-MAX: 29.00

METHOD: KAR

MINERALS
SANIDINE-PHENO
OLIGOCLASE-PHENO
QUARTZ-PHENO

OCCUR-PETROG.
PYROCLASTIC
PUMICEOUS

ALTERATION

MAJOR CONSTITUENTS

SiO2 68.10
Al2O3 14.00
Fe2O3 .96
FeO
MgO 1.21
CaO 2.03
Na2O 1.85
K2O 4.55

H2O+ 3.73
H2O- 3.07
TH2O
LOI
TiO2 .120
P2O5 .030
MnO .120

ZrO2
CO2
SO3
Cl
F .240
S
Cr2O3
NiO
BaO .050
Rb2O
SrO .002
TOTAL 100.062

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: PC-8A

RECORD NO: 131

AUTHOR: CHRISTIANSEN+ DATE: 1980

MAJOR GROUP: CMO SECOND GROUP: RU LAT: 38.75 N
LONG: 106.05 W FLAGS
2D

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
DOME

ALTERATION

VITROPHYRIC

MAJOR CONSTITUENTS

SiO2 75.30
Al2O3 13.10
Fe2O3 .64
FeO
MgO .22
CaO .61
Na2O 4.26
K2O 4.97

H2O+
H2O-
TH2O
LOI
TiO2 .090
P2O5 .010
MnO .100

ZrO2
CO2
SO3
Cl
F .550
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.850

TRACE ELEMENTS

As Ta
As Te*
Au* Th
B Tl
Ba U 16.00
Be V
Bi W
Ce Y

Co Yb
Cr Zn
Cu Zr
F
Ga
Hs*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: NAT-1

RECORD NO: 298

AUTHOR: CHRISTIANSEN+ DATE: 1980 LAT: 38.75
 MAJOR GROUP: CMO SECOND GROUP: RU LONG: 106.05 FLAGS
 2D
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 DOME
 DEVITRIFIED

MAJOR CONSTITUENTS

SiO2 75.80
 Al2O3 12.70
 Fe2O3 .76
 FeO
 MgO .05
 CaO .41
 Na2O 4.35
 K2O 4.54

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .080
 P2O5 .010
 MnO .060

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.760

TRACE ELEMENTS

As Ta
 As Te*
 Au* Th
 B Tl
 Ba U 6.00
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: NAT-2
 RECORD NO: 299

AUTHOR: ERNST

DATE: 1980

LAT: 38.85 N

MAJOR GROUP: ELK

SECOND GROUP: BOS

LONG: 106.75 W

FLAGS
2D

ROCK NAME: RHYOLITE PORPHYRY

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 9.40
-MAX: 10.20

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
ALBITE-PHENO
BIOTITE
SPESSARTINE
TOPAZ
TOURMALINE
FLUORITE

OCCUR-PETROG.
FLUG
PORPHYRITIC

ALTERATION

MAJOR CONSTITUENTS

SiO2 75.84
Al2O3 13.29
Fe2O3 1.02
FeO
MgO .07
CaO .42
Na2O 3.96
K2O 4.60

H2O+
H2O-
TH2O .81
LOI
TiO2 .080
P2O5 .020
MnO .090

ZrO2
CO2
SO3
Cl
F .164
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.364

TRACE ELEMENTS

As
As
Au*
B
Ba 66.30
Be
Bi
Ce

Co
Cr
Cu
F 1642.00
Ga
Hg*
La

Li 99.60
Mo
Nb 59.00
Nd
Ni
Pb
Rb 434.00
Sb
Sc
Sn
Sr 9.20

Ta
Te*
Th
Tl
U 8.50
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 214A

RECORD NO: 53

AUTHOR: ERNST DATE: 1980
 MAJOR GROUP: ELK SECOND GROUP: BOS LAT: 38.85 N LONG: 106.75 W FLAGS 2D
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.40
 -MAX: MIOC -MAX: 10.20
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	PLUG	
SANIDINE-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		
SPESSARTINE		
TOURMALINE		
TOPAZ		
FLUORITE		

MAJOR CONSTITUENTS

SiO2	76.17
Al2O3	13.42
Fe2O3	.96
FeO	
MnO	.02
CaO	.23
Na2O	4.43
K2O	4.47
H2O+	
H2O-	
TH2O	.56
LOI	
TiO2	.070
P2O5	.020
MnO	.140
ZrO2	
CO2	
SO3	
Cl	
F	.316
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.806

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	53.30	U	18.40
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	
F	3163.00		
Ga			
Hg*			
La			
Li	266.00		
Mo			
Nb	156.00		
Nd			
Ni			
Pb			
Rb	822.00	AUTHOR	
Sb		NUMBER:	202B
Sc			
Sn		RECORD NO:	55
Sr	5.60		

AUTHOR: ERNST

DATE: 1980

LAT: 38.85 N

MAJOR GROUP: ELK SECOND GROUP: BOS LONG: 106.75 W FLAGS 2D

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.40
-MAX: MIOC -MAX: 10.20

METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	PLUG	
SANIDINE-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		
SPESSARTINE		
TOPAZ		
TOURMALINE		
FLUORITE		

MAJOR CONSTITUENTS

SiO2 76.13
 Al2O3 13.12
 Fe2O3 1.10
 FeO
 MgO .03
 CaO .50
 Na2O 4.33
 K2O 4.40

H2O+
 H2O-
 TH2O .71
 LOI
 TiO2 .060
 P2O5 .010
 MnO .140

ZrO2
 CO2
 SO3
 Cl
 F .493
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 101.023

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	61.70	U	12.00
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	
F	4926.00		
Ga			
Hg*			
La			
Li	240.00		
Mo			
Nb	135.00		
Nd			
Ni			
Pb			
Rb	677.00		
Sb			
Sc			
Sn			
Sr	7.10		

AUTHOR NUMBER: 204C

RECORD NO: 56

AUTHOR: ERNST

DATE: 1980

LAT: 38.85 N

MAJOR GROUP: ELK SECOND GROUP: BOS LONG: 106.75 W FLAGS 2D

ROCK NAME: VITROPHYRE

CODE: 4000

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 9.40
-MAX: 10.20
METHOD: KAR

MINERALS

OCCUR-PETROG.
PLUG

ALTERATION

HOLOHYALINE

MAJOR CONSTITUENTS

SiO2 74.01
Al2O3 12.89
Fe2O3 1.06
FeO
MgO .03
CaO .31
Na2O 4.26
K2O 4.50

H2O+
H2O-
TH2O 2.76
LOI
TiO2 .070
P2O5 .020
MnO .150

ZrO2
CO2
SO3
Cl
F .530
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.590

TRACE ELEMENTS

As
As
Au*
B
Ba 56.20
Be
Bi
Ce
Co
Cr
Cu
F 5129.00
Ga
Hs*
La
Li 206.00
Mo
Nb 142.00
Nd
Ni
Pb
Rb 743.00
Sb
Sc
Sn
Sr 2.70

Ta
Te*
Th
Tl
U 24.00
V
W
Y
Yb
Zn
Zr

AUTHOR
NUMBER: 208D

RECORD NO: 57

AUTHOR: MUTSCHLER DATE: 1968 LAT: 39.01 N
 MAJOR GROUP: ELK SECOND GROUP: TMWQ LONG: 107.11 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO STOCK FRESH
 K-FELDSPAR-PHENO
 ALBITE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.80
 Al2O3 12.50
 Fe2O3 .35
 FeO .24
 MgO .12
 CaO .24
 Na2O 3.30
 K2O 5.30

 H2O+ .31
 H2O- .08
 TH2O
 LOI
 TiO2 .170
 P2O5
 MnO .030

 ZrO2
 CO2 < .05
 SO3
 Cl
 F .014
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.504

TRACE ELEMENTS

As		Ta	
As	1.00	Te*	
Au*		Th	17.00
B		Tl	
Ba	168.00	U	5.00
Be	5.00	V	10.00
Bi		W	
Ce	77.00	Y	17.00
Co		Yb	2.00
Cr		Zn	17.00
Cu	10.00	Zr	149.00
F	140.00		
Ga	18.00		
Hg*			
La	34.00		
Li			
Mo	20.00		
Nb	30.00		
Nd			
Ni			
Pb	69.00		
Rb	216.00	AUTHOR	
Sb		NUMBER: 27	
Sc	3.00		
Sn	30.00	RECORD NO:	32
Sr	24.00		

AUTHOR: MUTSCHLER DATE: 1968
 MAJOR GROUP: ELK SECOND GROUP: TMWQ LAT: 39.04 N
 LONG: 107.08 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE
 K-FELDSPAR-PHENO
 ALBITE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.80
 Al2O3 13.10
 Fe2O3 .53
 FeO .20
 MgO .15
 CaO .69
 Na2O 4.20
 K2O 4.30

 H2O+ .46
 H2O- .18
 TH2O
 LOI
 TiO2 .060
 P2O5
 MnO .090

 ZrO2
 CO2 < .05
 SO3
 Cl
 F .011
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.821

TRACE ELEMENTS

As		Ta	
As	3.00	Te*	
Au*		Th	31.00
B		Tl	
Ba	963.00	U	17.00
Be	5.00	V	10.00
Bi		W	
Ce	87.00	Y	73.00
Co		Yb	7.00
Cr		Zn	145.00
Cu	7.00	Zr	120.00
F	110.00		
Ga	11.00		
Hs*			
La	48.00		
Li			
Mo			
Nb	100.00		
Nd			
Ni			
Pb	57.00		
Rb	157.00	AUTHOR	
Sb		NUMBER:	60
Sc	5.00		
Sn	20.00	RECORD NO:	33
Sr	245.00		

AUTHOR: MUTSCHLER DATE: 1968
 MAJOR GROUP: ELK SECOND GROUP: TMBM LAT: 39.06 N LONG: 107.13 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIE-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO STOCK FRESH
 K-FELDSPAR-PHENO
 ALBITE-PHENO PORPHYRITIC
 BIOTITE

MAJOR CONSTITUENTS

SiO2 79.10
 Al2O3 11.70
 Fe2O3
 FeO .10
 MnO .12
 CaO .38
 Na2O 6.20
 K2O .68
 H2O+ .38
 H2O- .17
 TH2O
 LOI
 TiO2 .110
 P2O5
 MnO .090
 ZrO2
 CO2 < .05
 SO3
 Cl
 F .019
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.099

TRACE ELEMENTS

As		Ta	
As	4.00	Te*	
Au*		Th	29.00
B		Tl	
Ba	15.00	U	10.00
Be	5.00	V	10.00
Bi		W	
Ce	44.00	Y	24.00
Co		Yb	5.00
Cr		Zn	20.00
Cu	1.00	Zr	83.00
F	190.00		
Ga	25.00		
Hg*			
La	24.00		
Li			
Mo			
Nb	50.00		
Nd			
Ni			
Pb	14.00		
Rb	6.00	AUTHOR	
Sb		NUMBER:	184
Sc			
Sn		RECORD NO:	18
Sr	35.00		

AUTHOR: MUTSCHLER DATE: 1968
 MAJOR GROUP: ELK SECOND GROUP: TMBM LAT: 39.05 N
 LONG: 107.09 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	STOCK	FRESH
K-FELDSPAR-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2	75.80
Al2O3	12.80
Fe2O3	
FeO	.56
MgO	.18
CaO	.81
Na2O	3.40
K2O	5.10
H2O+	.10
H2O-	.22
TH2O	
LOI	
TiO2	.160
P2O5	
MnO	
ZrO2	
CO2	.05
SO3	
Cl	
F	.250
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.430

TRACE ELEMENTS

As		Ta	
As	12.00	Te*	
Au*		Th	43.00
B		Tl	
Ba	44.00	U	19.00
Be	7.00	V	10.00
Bi		W	
Ce	84.00	Y	18.00
Co		Yb	3.00
Cr		Zn	11.00
Cu	7.00	Zr	122.00
F	2500.00		
Ga	31.00		
Hg*			
La	60.00		
Li			
Mo			
Nb	70.00		
Nd			
Ni			
Pb	86.00		
Rb	345.00	AUTHOR	
Sb		NUMBER:	249
Sc	3.00		
Sn	30.00	RECORD NO:	21
Sr	11.00		

AUTHOR: MUTSCHLER DATE: 1968 LAT: 39.05 N
 MAJOR GROUP: ELK SECOND GROUP: TMBM LONG: 107.10 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	STOCK	FRESH
K-FELDSPAR-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2	76.00
Al2O3	12.70
Fe2O3	.39
FeO	.20
MnO	.35
CaO	.56
Na2O	3.00
K2O	4.60
H2O+	.86
H2O-	.44
TH2O	
LOI	
TiO2	.060
P2O5	
MnO	.030
ZrO2	
CO2	.05
SO3	
Cl	
F	.330
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.570

TRACE ELEMENTS

Ag		Ta	
As	8.00	Te*	
Au*		Th	32.00
B		Tl	
Ba	143.00	U	21.00
Be	7.00	V	10.00
Bi		W	
Ce	95.00	Y	16.00
Co		Yb	3.00
Cr		Zn	17.00
Cu	1.00	Zr	125.00
F	3300.00		
Ga	9.00		
Hg*			
La	58.00		
Li			
Mo			
Nb	30.00		
Nd			
Ni			
Pb	27.00		
Rb	336.00	AUTHOR	
Sb		NUMBER:	251
Sc	3.00		
Sn		RECORD NO:	22
Sr	22.00		

AUTHOR: MUTSCHLER

DATE: 1968

LAT: 39.03 N

MAJOR GROUP: ELK SECOND GROUP: TMBM LONG: 107.11 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40

-MAX: MIOC -MAX: 12.40

METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	STOCK	FRESH
K-FELDSPAR-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2 76.00
 Al2O3 12.80
 Fe2O3 .31
 FeO .28
 MgO .12
 CaO .31
 Na2O 4.00
 K2O 4.60

 H2O+ .50
 H2O- .05
 TH2O
 LOI
 TiO2 .080
 P2O5
 MnO

 ZrO2
 CO2 .05
 SO3
 Cl
 F .030
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.130

TRACE ELEMENTS

As		Ta	
As	2.00	Te*	
Au*		Th	18.00
B		Tl	
Ba	18.00	U	11.00
Be	10.00	V	10.00
Bi		W	
Ce	87.00	Y	17.00
		Yb	2.00
Co		Zn	15.00
Cr		Zr	88.00
Cu	2.00		
F	300.00		
Ga	31.00		
Hg*			
La	40.00		
Li			
Mo	30.00		
Nb	50.00		
Nd			
Ni			
Pb	28.00		
Rb	241.00	AUTHOR	
Sb		NUMBER:	308
Sc	3.00		
Sn	3.00	RECORD NO:	26
Sr	13.00		

AUTHOR: MUTSCHLER

DATE: 1968

LAT: 39.01 N

MAJOR GROUP: ELK SECOND GROUP: TMBM LONG: 107.11 W FLAGS

ROCK NAME: GRANITE APLITE

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 12.40
-MAX: 12.40

METHOD: KAR

MINERALS
QUARTZ-PHENO
K-FELDSPAR-PHENO
ALBITE-PHENO
BIOTITE

OCCUR-PETROG.
DIKE
PORPHYRITIC

ALTERATION
FRESH

MAJOR CONSTITUENTS

SiO2	77.60
Al2O3	11.90
Fe2O3	.27
FeO	.20
MgO	.17
CaO	.31
Na2O	3.90
K2O	4.40
H2O+	.08
H2O-	.10
TH2O	
LOI	
TiO2	.110
P2O5	
MnO	.140
ZrO2	
CO2	.10
SO3	
Cl	
F	.024
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.304

TRACE ELEMENTS

Ag		Ta	
As	11.00	Te*	
Au*		Th	33.00
B		Tl	
Ba	111.00	U	8.00
Be	10.00	V	10.00
Bi		W	
Ce	49.00	Y	2.00
Co		Yb	
Cr		Zn	13.00
Cu	5.00	Zr	81.00
F	240.00		
Ga	24.00		
Hg*			
La	27.00		
Li			
Mo			
Nb	20.00		
Nd			
Ni			
Pb	38.00		
Rb	314.00	AUTHOR	
Sb		NUMBER:	30
Sc	3.00		
Sn	10.00	RECORD NO:	28
Sr	26.00		

AUTHOR: MUTSCHLER

DATE: 1982

LAT: 39.01 N

MAJOR GROUP: ELK SECOND GROUP: TMBM LONG: 107.11 W FLAGS

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 12.40
-MAX: 12.40
METHOD: KAR

MINERALS
QUARTZ-PHENO
K-FELDSPAR-PHENO
ALBITE-PHENO
BIOTITE

OCCUR-PETROG.
STOCK
PORPHYRITIC

ALTERATION
FRESH

MAJOR CONSTITUENTS

SiO2 75.20
Al2O3 13.00
Fe2O3 .38
FeO .56
MgO .15
CaO .73
Na2O 3.40
K2O 5.60

H2O+ .44
H2O- .16
TH2O
LOI
TiO2 .190
P2O5 .020
MnO .020

ZrO2
CO2 < .05
SO3
Cl
F .015
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.915

TRACE ELEMENTS

As
As 4.00
Au*
B
Ba 111.00
Be 5.00
Bi
Ce 49.00

Co
Cr
Cu 50.00
F 150.00
Ga 24.00
Hg*
La 27.00

Li
Mo 20.00
Nb 50.00
Nd
Ni
Pb 38.00
Rb 314.00
Sb
Sc
Sn
Sr 26.00

Ta
Te*
Th 33.00
Tl
U 9.00
V
W
Y 2.00

Yb
Zn 13.00
Zr 81.00

AUTHOR
NUMBER: 465

RECORD NO: 29

AUTHOR: MUTSCHLER DATE: 1968 LAT: 39.01 N
 MAJOR GROUP: ELK SECOND GROUP: TMTB LONG: 107.12 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	STOCK	FRESH
K-FELDSPAR-PHENO		
ALBITE-PHENO	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2	71.90
Al2O3	14.70
Fe2O3	.30
FeO	.28
MgO	.23
CaO	.18
Na2O	1.70
K2O	9.20
H2O+	.39
H2O-	.13
TH2O	
LOI	
TiO2	.090
P2O5	.080
MnO	.040
ZrO2	
CO2	.05
SO3	
Cl	
F	.095
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.365

TRACE ELEMENTS

As		Ta	
As	4.00	Te*	
Au*		Th	11.00
B		Tl	
Ba	1331.00	U	3.00
Be <	1.00	V	10.00
Bi		W	
Ce	156.00	Y	16.00
Co		Yb	2.00
Cr		Zn	35.00
Cu	5.00	Zr	56.00
F	950.00		
Ga	6.00		
Hg*			
La	77.00		
Li			
Mo	5.00		
Nb			
Nd			
Ni			
Pb	33.00		
Rb	200.00	AUTHOR	
Sb		NUMBER:	6
Sc	3.00		
Sn	10.00	RECORD NO:	11
Sr	108.00		

AUTHOR: MUTSCHLER

DATE: 1968

LAT: 39.05 N

MAJOR GROUP: ELK SECOND GROUP: TMTB LONG: 107.11 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
-MAX: MIOC -MAX: 12.40

METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO STOCK FRESH
K-FELDSPAR-PHENO
ALBITE-PHENO PORPHYRITIC
BIOTITE

MAJOR CONSTITUENTS

SiO2 71.00
Al2O3 14.00
Fe2O3 2.10
FeO .32
MgO .50
CaO 1.40
Na2O 4.00
K2O 4.80

H2O+ .52
H2O- .17
TH2O
LOI
TiO2 .500
P2O5 .270
MnO .020

ZrO2
CO2 .10
SO3
Cl
F .200
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.900

TRACE ELEMENTS

Ag
As 11.00
Au*
B
Ba 672.00
Be 3.00
Bi
Ce 166.00

Co
Cr
Cu 2.00
F 2000.00
Ga 30.00
Hg*
La 93.00

Li
Mo
Nb 20.00
Nd
Ni
Pb 9.00
Rb 175.00
Sb
Sc
Sn
Sr 173.00

Ta
Te*
Th 5.00
Tl
U 5.00
V
W
Y 45.00

Yb 5.00
Zn 41.00
Zr 332.00

AUTHOR
NUMBER: 348

RECORD NO: 14

AUTHOR: MUTSCHLER DATE: 1968 LAT: 39.02 N
 MAJOR GROUP: ELK SECOND GROUP: TMGR LONG: 107.10 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

MINERALS	OCCUR-PETROG. STOCK	ALTERATION
QUARTZ		FRESH
K-FELDSPAR		
ALBITE	EQUIGRANULAR	
BIOTITE		

MAJOR CONSTITUENTS

SiO2 75.30
 Al2O3 13.40
 Fe2O3 .25
 FeO .16
 MgO .08
 CaO .83
 Na2O 4.10
 K2O 4.80

H2O+ .43
 H2O- .08

TH2O
 LOI
 TiO2 .140
 P2O5 .020
 MnO

ZrO2
 CO2 < .05
 SO3
 Cl
 F .350

S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.990

TRACE ELEMENTS

Ag		Ta	
As	12.00	Te*	
Au*		Th	19.00
B		Tl	
Ba	288.00	U	13.00
Be	5.00	V	150.00
Bi		W	
Ce	81.00	Y	31.00

Co		Yb	5.00
Cr		Zn	23.00
Cu		Zr	116.00

F 3500.00
 Ga 26.00
 Hg*
 La 53.00

Li
 Mo
 Nb 70.00
 Nd
 Ni
 Pb 23.00
 Rb 358.00
 Sb
 Sc
 Sn
 Sr 44.00

AUTHOR
 NUMBER: 5

RECORD NO: 1

AUTHOR: MUTSCHLER

DATE: 1982

LAT: 39.00 N

MAJOR GROUP: ELK SECOND GROUP: TMGR LONG: 107.11 W FLAGS

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 12.40
-MAX: 12.40

METHOD: KAR

MINERALS
QUARTZ
K-FELDSPAR
ALBITE
BIOTITE

OCCUR-PETROG.
STOCK
EQUIGRANULAR

ALTERATION
FRESH

MAJOR CONSTITUENTS

SiO2	71.30
Al2O3	14.70
Fe2O3	1.00
FeO	1.10
MgO	.55
CaO	1.00
Na2O	3.80
K2O	5.30
H2O+	.43
H2O-	.09
TH2O	
LOI	
TiO2	.410
P2O5	.130
MnO	.030
ZrO2	
CO2 <	.05
SO3	
Cl	
F	.009
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.899

TRACE ELEMENTS

As		Ta	
As	6.00	Te*	
Au*		Th	13.00
B		Tl	
Ba	629.00	U	6.00
Be	1.00	V	
Bi		W	
Ce	114.00	Y	16.00
Co		Yb	
Cr		Zn	47.00
Cu	10.00	Zr	167.00
F	90.00		
Ga	22.00		
Hg*			
La	72.00		
Li			
Mo			
Nb	10.00		
Nd			
Ni			
Pb	9.00		
Rb	236.00	AUTHOR	
Sb		NUMBER:	466
Sc			
Sn		RECORD NO:	5
Sr	206.00		

AUTHOR: VANDERWILT DATE: 1937
 MAJOR GROUP: ELK SECOND GROUP: TMGR LAT: 39.02 N
 LONG: 107.10 W FLAGS

ROCK NAME: SODA GRANITE CODE: 1470

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ	STOCK	FRESH
K-FELDSPAR		
ALBITE	EQUIGRANULAR	
BIOTITE		

MAJOR CONSTITUENTS

SiO2 76.46
 Al2O3 12.58
 Fe2O3 .52
 FeO .59
 MgO .13
 CaO .52
 Na2O 3.78
 K2O 5.45

 H2O+ .48
 H2O-
 TH2O
 LOI
 TiO2 .050
 P2O5 .060
 MnO .040

ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.660

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: P.47

RECORD NO: 7

AUTHOR: MUTSCHLER DATE: 1968
 MAJOR GROUP: ELK SECOND GROUP: TMGM LAT: 39.00 N LONG: 107.11 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 12.40
 -MAX: MIOC -MAX: 12.40
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ STOCK FRESH
 K-FELDSPAR
 ALBITE EQUIGRANULAR
 BIOTITE
 AMPHIBOLE
 CHLORITE
 EPIDOTE

MAJOR CONSTITUENTS

SiO2 72.40
 Al2O3 14.10
 Fe2O3 .85
 FeO .68
 MgO .53
 CaO .95
 Na2O 3.70
 K2O 4.60

H2O+ .59
 H2O- .18
 TH2O
 LOI
 TiO2 .270
 P2O5 .160
 MnO .040

ZrO2
 CO2 .08
 SO3
 Cl
 F .081
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.211

TRACE ELEMENTS

As		Ta	
As	5.00	Te*	
Au*		Th	23.00
B		Tl	
Ba	523.00	U	9.00
Be	5.00	V	20.00
Bi		W	
Ce	222.00	Y	9.00
Co		Yb	3.00
Cr		Zn	42.00
Cu	5.00	Zr	210.00
F	810.00		
Ga	6.00		
Hg*			
La	112.00		
Li			
Mo			
Nb	30.00		
Nd			
Ni			
Pb	17.00		
Rb	227.00	AUTHOR	
Sb		NUMBER:	34
Sc	5.00		
Sn		RECORD NO:	8
Sr	175.00		

AUTHOR: MUTSCHLER

DATE: 1968

LAT: 38.89 N

MAJOR GROUP: ELK SECOND GROUP: RR

LONG: 107.05 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 17.00
-MAX: 17.00

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO

OCCUR-PETROG.
PLUG

ALTERATION
QUARTZ-SERICITE-S

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2	77.00
Al2O3	13.20
Fe2O3	1.50
FeO	.24
MnO	1.10
CaO	.12
Na2O	.38
K2O	3.70
H2O+	1.80
H2O-	.23
TH2O	
LOI	
TiO2	.210
P2O5	.090
MnO	.290
ZrO2	
CO2 <	.05
SO3	
Cl	
F	.190
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.100

TRACE ELEMENTS

As	5.50	Ta	
As		Te*	
Au*		Th	15.00
B		Tl	
Ba	773.00	U	12.00
Be	9.80	V	
Bi		W	
Ce	25.00	Y	41.00
Co		Yb	
Cr		Zn	33.00
Cu	35.00	Zr	134.00
F	1900.00		
Ga	32.00		
Hg*			
La	17.00		
Li			
Mo	7.00		
Nb	130.00		
Nd			
Ni			
Pb	451.00		
Rb	570.00		
Sb			
Sc			
Sn	24.00		
Sr	8.00		

AUTHOR
NUMBER: I-754

RECORD NO: 73

AUTHOR: MUTSCHLER DATE: 1982 LAT: 38.89 N
 MAJOR GROUP: ELK SECOND GROUP: RR LONG: 107.05 W FLAGS
 ROCK NAME: RHYOLITE BRECCIA CODE: 3010
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 17.00
 -MAX: MIOC -MAX: 17.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
 SANIDINE-PHENO

MAJOR CONSTITUENTS

SiO2 65.80
 Al2O3 15.30
 Fe2O3 2.35
 FeO .45
 MgO .95
 CaO 3.85
 Na2O 1.80
 K2O 4.00

 H2O+ .20
 H2O- 2.60
 TH2O
 LOI
 TiO2 .350
 P2O5 .370
 MnO .580

 ZrO2
 CO2 .10
 SO3
 Cl
 F .140
 S 1.200
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.040

TRACE ELEMENTS

As	.40	Ta	
As	62.00	Te*	
Au*	1.53	Th	
B		Tl	1.86
Ba	1352.00	U	11.00
Be	6.00	V	
Bi		W	5.00
Ce	101.00	Y	27.00
Co		Yb	
Cr		Zn	135.00
Cu	9.00	Zr	187.00
F	1400.00		
Ga			
Hg*			
La	57.00		
Li	35.00		
Mo	2.00		
Nb	17.00		
Nd			
Ni			
Pb	19.00		
Rb	372.00	AUTHOR	
Sb		NUMBER:	PYR-14
Sc			
Sn	6.00	RECORD NO:	76
Sr	386.00		

AUTHOR: MUTSCHLER DATE: 1982 LAT: 38.88 N
 MAJOR GROUP: ELK SECOND GROUP: EMK LONG: 107.04 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 17.30
 -MAX: MIOC -MAX: 17.70
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK FRESH
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.40
 Al2O3 13.00
 Fe2O3 .80
 FeO .70
 MgO .30
 CaO .50
 Na2O 3.30
 K2O 5.20

 H2O+ .10
 H2O- .05
 TH2O
 LOI
 TiO2 .170
 P2O5 .120
 MnO .040

 ZrO2
 CO2 .30
 SO3
 Cl
 F .068
 S .350
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.398

TRACE ELEMENTS

As	.20	Ta	
As		Te*	
Au*	.30	Th	37.00
B		Tl	1.07
Ba	166.00	U	13.00
Be	7.00	V	
Bi		W	10.00
Ce	86.00	Y	18.00
Co		Yb	
Cr		Zn	34.00
Cu	17.00	Zr	168.00
F	680.00		
Ga	7.00		
Hg*			
La	39.00		
Li	10.00		
Mo	11.00		
Nb	38.00		
Nd			
Ni			
Pb	18.00		
Rb	298.00	AUTHOR	
Sb		NUMBER: PYR-6	
Sc			
Sn	2.00	RECORD NO:	82
Sr	51.00		

AUTHOR: MUTSCHLER DATE: 1982 LAT: 38.88 N
 MAJOR GROUP: ELK SECOND GROUP: EMK LONG: 107.04 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 17.30
 -MAX: MIOC -MAX: 17.70
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK FRESH

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.20
 Al2O3 12.70
 Fe2O3 1.10
 FeO .85
 MgO .30
 CaO .50
 Na2O 2.80
 K2O 5.10

 H2O+ .40
 H2O- .15
 TH2O
 LOI
 TiO2 .110
 P2O5 .110
 MnO .080

 ZrO2
 CO2 .50
 SO3
 Cl
 F .092
 S .080
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.072

TRACE ELEMENTS

As	.20	Ta	
As		Te*	
Au*	.72	Th	
B		Tl	1.41
Ba		U	18.00
Be	8.00	V	
Bi		W	4.00
Ce		Y	
Co		Yb	
Cr		Zn	
Cu	6.00	Zr	
F	920.00		
Ga			
Hg*			
La			
Li	5.00		
Mo	450.00		
Nb	55.00		
Nd			
Ni			
Pb			
Rb			
Sb			
Sc			
Sn	3.00		
Sr			

AUTHOR
 NUMBER: PYR-11

3.00 RECORD NO: 86

AUTHOR: MUTSCHLER DATE: 1982 LAT: 38.88 N
 MAJOR GROUP: ELK SECOND GROUP: EMLP LONG: 107.04 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 17.30
 -MAX: MIOC -MAX: 17.70
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 STOCK ARGILLIC
 PORPHYRITIC QUARTZ-MAGNETITE

MAJOR CONSTITUENTS

SiO2 73.30
 Al2O3 11.80
 Fe2O3 2.30
 FeO 1.80
 MgO .40
 CaO .35
 Na2O 2.05
 K2O 5.90

 H2O+ .85
 H2O- .20
 TH2O
 LOI
 TiO2 .260
 P2O5 .130
 MnO .120

 ZrO2
 CO2 1.00
 SO3
 Cl
 F .110
 S .060
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.630

TRACE ELEMENTS

As	.20	Ta	
As		Te*	
Au*	.43	Th	20.00
B		Tl	
Ba	189.00	U	8.00
Be	4.00	V	
Bi		W	5.00
Ce	117.00	Y	26.00
		Yb	
Co		Zn	231.00
Cr		Zr	190.00
Cu	14.00		
F	1100.00		
Ga	7.00		
Hg*			
La	64.00		
Li	10.00		
Mo	64.00		
Nb	62.00		
Nd			
Ni			
Pb	13.00		
Rb	255.00	AUTHOR	
Sb		NUMBER:	PYR-10
Sc			
Sn	2.00	RECORD NO:	79
Sr	49.00		

AUTHOR: MUTSCHLER

DATE: 1982

LAT: 38.88 N

MAJOR GROUP: ELK

SECOND GROUP: EMLA

LONG: 107.04 W

FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 17.30
-MAX: 17.70

METHOD: KAR

MINERALS

OCCUR-PETROG.
STOCK

ALTERATION
QUARTZ-MAGNET.-S

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2	75.90
Al2O3	7.80
Fe2O3	6.10
FeO	3.00
MgO	.15
CaO	.15
Na2O	1.55
K2O	4.30
H2O+	.40
H2O-	.15
TH2O	
LOI	
TiO2	.070
P2O5	.030
MnO	.050
ZrO2	
CO2	.70
SO3	
Cl	
F	.019
S	.050
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.419

TRACE ELEMENTS

Ag	.20	Ta	
As	2.00	Te*	
Au*	1.43	Th	24.00
B		Tl	6.50
Ba	77.00	U	4.00
Be	2.00	V	
Bi		W	3.00
Ce	3.00	Y	
Co		Yb	
Cr		Zn	54.00
Cu	27.00	Zr	99.00
F	190.00		
Ga	19.00		
Hg*			
La	3.00		
Li <	5.00		
Mo	83.00		
Nb <	1.00		
Nd			
Ni			
Pb	14.00		
Rb	194.00		
Sb			
Sc			
Sn	3.00		
Sr	19.00		

AUTHOR
NUMBER: PYR-1

RECORD NO: 78

AUTHOR: MUTSCHLER DATE: 1968 LAT: 38.97 N
 MAJOR GROUP: ELK SECOND GROUP: MSA LONG: 107.12 W FLAGS
 ROCK NAME: FELSITE CODE: 1240

AGE: STRAT-MIN: MIDC ISOTOPIE-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE
 ALKALI FELDSPAR-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.10
 Al2O3 12.80
 Fe2O3 .36
 FeO .12
 MgO .10
 CaO .49
 Na2O 3.80
 K2O 4.00

 H2O+ .59
 H2O- .11
 TH2O
 LOI
 TiO2 .200
 P2O5
 MnO .030

 ZrO2
 CO2 .08
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.780

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	20.00	U	
Be	5.00	V	
Bi		W	
Ce		Y	20.00
Co		Yb	2.00
Cr	3.00	Zn	
Cu	2.00	Zr	70.00
F			
Ga	20.00		
Hg*			
La			
Li			
Mo			
Nb	20.00		
Nd			
Ni			
Pb	200.00		
Rb		AUTHOR	
Sb		NUMBER: L48	
Sc			
Sn		RECORD NO:	44
Sr	50.00		

AUTHOR: ERNST

DATE: 1980

LAT: 38.75 N

MAJOR GROUP: ELK SECOND GROUP: MSP LONG: 106.73 W FLAGS 2D

ROCK NAME: MICROGRANITE CODE: 1440

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.20
-MAX: -MAX:

METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ PLUG
K-FELDSPAR
ALBITE
BIOTITE

MAJOR CONSTITUENTS

SiO2 74.61
Al2O3 13.62
Fe2O3 1.37
FeO
MgO .15
CaO .87
Na2O 4.47
K2O 4.01

H2O+
H2O-
TH2O .77
LOI
TiO2 .090
P2O5 .120
MnO .010

ZrO2
CO2
SO3
Cl
F .019
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.109

TRACE ELEMENTS

Ag
As
Au*
B
Ba 1215.00
Be
Bi
Ce

Co
Cr
Cu
F 194.00
Ga
Hg*
La

Li 11.40
Mo
Nb
Nd
Ni
Pb
Rb 82.50
Sb
Sc
Sn
Sr 481.00

Ta
Te*
Th
Tl
U 1.90
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 229F

RECORD NO: 49

AUTHOR: CUNNINGHAM DATE: 1976 LAT: 38.95 N
 MAJOR GROUP: ELK SECOND GROUP: ITL LONG: 106.75 W FLAGS
 ROCK NAME: QUARTZ MONZONITE CODE: 2330

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 31.20
 -MAX: OLIG -MAX: 34.80
 METHOD: FSTR
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO STOCK
 SANIDINE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 71.50
 Al2O3 15.00
 Fe2O3 1.10
 FeO .80
 MgO .44
 CaO 1.80
 Na2O 3.30
 K2O 4.40

 H2O+ 1.20
 H2O- .29
 TH2O
 LOI
 TiO2 .270
 P2O5 .160
 MnO .010

 ZrO2
 CO2 .06
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.330

TRACE ELEMENTS

Ag Ta
 As Te*
 Au* Th
 B Tl
 Ba U
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: I-294

 RECORD NO: 295

AUTHOR: CUNNINGHAM DATE: 1976 LAT: 38.95 N
 MAJOR GROUP: ELK SECOND GROUP: ITL LONG: 106.75 W FLAGS

ROCK NAME: QUARTZ MONZONITE CODE: 2330

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 31.20
 -MAX: OLIG -MAX: 34.80
 METHOD: FSTR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO STOCK
 SANIDINE-PHENO
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 72.40
 Al2O3 14.50
 Fe2O3 1.20
 FeO .68
 MgO .32
 CaO 1.80
 Na2O 3.20
 K2O 4.20

 H2O+ .86
 H2O- .24
 TH2O
 LOI
 TiO2 .290
 P2O5 .130
 MnO .090

 ZrO2
 CO2 .04
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.950

TRACE ELEMENTS

As Ta
 As Te*
 Au* Th
 B Tl
 Ba U
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: I-325

RECORD NO: 297

AUTHOR: MUTSCHLER DATE: 1968
 MAJOR GROUP: ELK SECOND GROUP: SNS LAT: 39.12 N
 LONG: 107.04 W FLAGS
 ROCK NAME: APLITE CODE: 0290

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ DIKE FRESH
 K-FELDSPAR
 ALBITE APLITIC

MAJOR CONSTITUENTS

SiO2 79.60
 Al2O3 11.40
 Fe2O3 .18
 FeO .28
 MgO .17
 CaO .65
 Na2O 3.30
 K2O 4.10

 H2O+ .24
 H2O- .05
 TH2O
 LOI
 TiO2 .060
 P2O5 .020
 MnO

 ZrO2
 CO2 < .05
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.100

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	70.00	U	
Be	1.50	V	
Bi		W	
Ce		Y	20.00
Co		Yb	2.00
Cr		Zn	
Cu		Zr	150.00
F	.70		
Ga	15.00		
Hg*			
La			
Li			
Mo			
Nb	15.00		
Nd			
Ni			
Pb	50.00		
Rb			
Sb			
Sc			
Sr	70.00		

AUTHOR
 NUMBER: 387

RECORD NO: 464

AUTHOR: YOUNG

DATE: 1972

LAT: 38.48 N

MAJOR GROUP: ELK SECOND GROUP: TD

LONG: 106.53 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: EOCENE

ISOTOPIC-MIN: 37.10
-MAX: 40.30

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
PERTHITE-PHENO

OCCUR-PETROG.
PLUG

ALTERATION

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2	75.70
Al2O3	13.30
Fe2O3	.26
FeO	.28
MgO	.12
CaO	.46
Na2O	4.10
K2O	4.40
H2O+	.63
H2O-	.13
TH2O	
LOI	
TiO2	.110
P2O5	.020
MnO	.100
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.660

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	100.00	U	
Be		V	
Bi		W	
Ce		Y	3.00
Co		Yb	3.00
Cr	15.00	Zn	
Cu	3.00	Zr	30.00
F			
Ga	20.00		
Hg*			
La			
Li			
Mo			
Nb	30.00		
Nd			
Ni			
Pb	30.00		
Rb			
Sb			
Sc	10.00		
Sn			
Sr	10.00		

AUTHOR
NUMBER: 17-71

RECORD NO: 72

AUTHOR: ERNST

DATE: 1980

LAT: 38.48 N

MAJOR GROUP: ELK

SECOND GROUP: TDU

LONG: 106.53 W
FLAGS
2D

ROCK NAME: MICROGRANITE

CODE: 1440

AGE: STRAT-MIN: OLIG
-MAX: EOCE

ISOTOPIC-MIN: 37.10
-MAX: 40.30

METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	PLUG	
SANIDINE-PHENO		
PERTHITE-PHENO	PORPHYRITIC	
BIOTITE-PHENO		
FLUORITE		
GARNET		
TOPAZ		

MAJOR CONSTITUENTS

SiO2 74.77
 Al2O3 13.77
 Fe2O3 1.32
 FeO
 MnO .08
 CaO .31
 Na2O 4.16
 K2O 4.30

H2O+
 H2O-
 TH2O .77
 LOI
 TiO2 .080
 P2O5 .030
 MnO .160

ZrO2
 CO2
 SO3
 Cl
 F .164
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.914

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	88.60	U	7.10
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	
F	1642.00		
Ga			
Hg*			
La			
Li	103.00		
Mo			
Nb	38.00		
Nd			
Ni			
Pb			
Rb	290.00	AUTHOR	
Sb		NUMBER:	257A
Sc			
Sn		RECORD NO:	65
Sr	16.30		

AUTHOR: ERNST

DATE: 1980

MAJOR GROUP: ELK

SECOND GROUP: TDX

LAT: 38.48 N

LONG: 106.53 W FLAGS
2D

ROCK NAME: MICROGRANITE BRECCIA CODE: 1440

AGE: STRAT-MIN: OLIG
-MAX: EOCE

ISOTOPIC-MIN: 37.10
-MAX: 40.30
METHOD: KAR

MINERALS

OCCUR-PETROG.
PIPE

ALTERATION

BRECCIA

MAJOR CONSTITUENTS

SiO2	75.90
Al2O3	12.28
Fe2O3	1.44
FeO	
MgO	.30
CaO	.19
Na2O	2.75
K2O	4.82
H2O+	
H2O-	
TH2O	1.47
LOI	
TiO2	.140
P2O5	.010
MnO	.140
ZrO2	
CO2	
SO3	
Cl	
F	.135
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.575

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	231.00	U	3.90
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	
F	1347.00		
Ga			
Hg*			
La			
Li	31.30		
Mo			
Nb	34.00		
Nd			
Ni			
Pb			
Rb	274.00	AUTHOR	
Sb	51.90	NUMBER:	261C
Sc			
Sn		RECORD NO:	68
Sr			

AUTHOR: ERNST

DATE: 1980

LAT: 38.48 N

MAJOR GROUP: ELK SECOND GROUP: TDX LONG: 106.53 W FLAGS
2D

ROCK NAME: MICROGRANITE BRECCIA CODE: 1440

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 37.10
-MAX: EOCE -MAX: 40.30
METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
PIPE
BRECCIA

MAJOR CONSTITUENTS

SiO2 71.41
Al2O3 13.71
Fe2O3 3.10
FeO
MgO .66
CaO 1.14
Na2O 2.73
K2O 4.06

H2O+
H2O-
TH2O 2.68
LOI
TiO2 .330
P2O5 .110
MnO .110

ZrO2
CO2
SO3
Cl
F .116
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.156

TRACE ELEMENTS

As
As
Au*
B
Ba 582.00
Be
Bi
Ce

Co
Cr
Cu
F 1162.00
Ga
Hs*
La

Li 52.70
Mo
Nb
Nd
Ni
Pb
Rb 180.00
Sb
Sc
Sn
Sr 128.00

Ta
Te*
Th
Tl
U 4.80
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 249C
RECORD NO: 69

AUTHOR: ERNST

DATE: 1980

LAT: 38.48 N

MAJOR GROUP: ELK SECOND GROUP: TDS LONG: 106.53 W FLAGS 2D

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 37.10

-MAX: EOCE -MAX: 40.30

METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	SILL	
SANIDINE-PHENO		
PERTHITE-PHENO	PORPHYRITIC	
BIOTITE-PHENO		

MAJOR CONSTITUENTS

SiO2 74.71
 Al2O3 13.27
 Fe2O3 1.63
 FeO
 MgO .23
 CaO .39
 Na2O 3.57
 K2O 4.37

H2O+
 H2O-
 TH2O 2.05
 LOI
 TiO2 .070
 P2O5 .130
 MnO .090

ZrO2
 CO2
 SO3
 Cl
 F .085
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.595

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	111.00	U	5.30
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	
F	851.00		
Ga			
Hg*			
La			
Li	141.00		
Mo			
Nb	16.00		
Nd			
Ni			
Pb			
Rb	286.00	AUTHOR	
Sb		NUMBER:	252D
Sc			
Sn		RECORD NO:	70
Sr	39.80		

AUTHOR: WHITE + DATE: 1981
 MAJOR GROUP: FRR SECOND GROUP: HEU LAT: 39.76 N
 LONG: 105.83 W FLAGS
 ROCK NAME: LOWER ARGILLIC CODE: 0010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.00
 -MAX: OLIG -MAX: 27.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 STOCK ARGILLIC
 PORPHYRITIC QUARTZ-SERICITE

MAJOR CONSTITUENTS

SiO2 74.60
 Al2O3 12.30
 Fe2O3 .53
 FeO .92
 MgO .07
 CaO .65
 Na2O .34
 K2O 6.13

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .140
 P2O5
 MnO .300

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 95.980

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zr
 Zr

AUTHOR
 NUMBER: T.9

RECORD NO: 398

AUTHOR: MUTSCHLER + DATE: 1981
 LAT: 39.76 N
 MAJOR GROUP: FRR SECOND GROUP: HEUH LONG: 105.83 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.00
 -MAX: OLIG -MAX: 27.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 QUARTZ-PHEND STOCK FRESH
 ALKALI FELDSPAR
 ALBITE

MAJOR CONSTITUENTS

SiO2 76.00
 Al2O3 12.30
 Fe2O3 .20
 FeO .60
 MgO .75
 CaO .90
 Na2O 3.10
 K2O 6.40

 H2O+ .41
 H2O- .10
 TH2O
 LOI
 TiO2 .010
 P2O5 .060
 MnO .060

 ZrO2
 CO2 .20
 SO3
 Cl
 F .170
 S .070
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 101.330

TRACE ELEMENTS

As	.20	Ta	
As	7.00	Te*	
Au*		Th	25.00
B		Tl	
Ba	46.00	U	25.00
Be	4.00	V	
Bi		W	40.00
Ce	59.00	Y	18.00
		Yb	
Co		Zn	45.00
Cr		Zr	74.00
Cu	8.00		
F	1700.00		
Ga	25.00		
Hg*			
La	34.00		
Li	21.00		
Mo	44.00		
Nb	160.00		
Nd			
Ni			
Pb	34.00		
Rb	621.00	AUTHOR	
Sb		NUMBER:	HN-4
Sc			
Sn	12.00	RECORD NO:	387
Sr	5.00		

AUTHOR: WHITE + DATE: 1981 LAT: 39.76 N
 MAJOR GROUP: FRR SECOND GROUP: HEUH LONG: 105.83 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.00
 -MAX: OLIG -MAX: 27.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 STOCK

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.50
 Al2O3 12.10
 Fe2O3 .37
 FeO .39
 MgO .13
 CaO .61
 Na2O 3.61
 K2O 5.00

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .080
 P2O5
 MnO .030

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 97.820

TRACE ELEMENTS

As Ta
 As Te*
 Au* Th
 B Tl
 Ba U
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: T.5-9

 RECORD NO: 388

AUTHOR: BOOKSTROM DATE: 1981
 MAJOR GROUP: FRR SECOND GROUP: HEUU LAT: 39.76 N LONG: 105.83 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.00
 -MAX: OLIG -MAX: 27.00
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.00
 Al2O3 12.30
 Fe2O3 .73
 FeO .76
 MgO .12
 CaO .76
 Na2O 3.17
 K2O 5.14

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .150
 P2O5
 MnO .040

 ZrO2
 CO2
 SO3
 Cl
 F .530
 S
 Cr2O3
 NiO
 BaO
 Rb2O .050
 SrO
 TOTAL 98.750

TRACE ELEMENTS

As		Ta
As		Te*
Au*		Th
B		Tl
Ba	10.00	U
Be		V
Bi		W
Ce		Y
Co		Yb
Cr		Zn
Cu		Zr
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr	260.00	

AUTHOR
 NUMBER: T.5-7
 RECORD NO: 384

AUTHOR: KING

DATE: 1971

LAT: 39.66 N

MAJOR GROUP: FRR SECOND GROUP: LVN

LONG: 105.74 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: CENO
-MAX:

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS
QUARTZ-PHENO
ALKALI FELDSPAR-PHENO

OCCUR-PETROG.
PLUG
PORPHYRITIC

ALTERATION
ARGILLIC-S
QUARTZ-SERICITE

MAJOR CONSTITUENTS

SiO2	70.60
Al2O3	16.50
Fe2O3	2.50
FeO	.40
MgO	.47
CaO	.27
Na2O	1.30
K2O	4.80
H2O+	1.60
H2O-	.46
TH2O	
LOI	
TiO2	.290
P2O5	.150
MnO	.060
ZrO2	
CO2 <	.05
SO3	
Cl	
F	.100
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.550

TRACE ELEMENTS

Ag	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: 22-120

RECORD NO: 378

AUTHOR: PHAIR + J. DATE: 1975 LAT: 39.67 N
 MAJOR GROUP: FRR SECOND GROUP: MON LONG: 105.83 W FLAGS
 ROCK NAME: CODE: 0010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 STOCK

MAJOR CONSTITUENTS

SiO2 75.40
 Al2O3 13.10
 Fe2O3 .76
 FeO .76
 MgO .30
 CaO 1.70
 Na2O 2.90
 K2O 4.00

 H2O+ .47
 H2O- .02
 TH2O
 LOI
 TiO2 .210
 P2O5 .070
 MnO .100

 ZrO2
 CO2 < .05
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.840

TRACE ELEMENTS

As
 As
 Au* 24.80
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hs*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

 Ta
 Te*
 Th 24.80
 Tl
 U 12.20
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 412+34

 RECORD NO: 408

AUTHOR: PHAIR + J. DATE: 1975
 MAJOR GROUP: FRR SECOND GROUP: BMS LAT: 39.62 N
 LONG: 105.95 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: EOCE ISOTOPIIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 STOCK

MAJOR CONSTITUENTS

SiO2 76.80
 Al2O3 12.20
 Fe2O3 1.70
 FeO .08
 MgO .09
 CaO .12
 Na2O 3.40
 K2O 5.00

 H2O+ .38
 H2O- .10
 TH2O
 LOI
 TiO2 .110
 P2O5 .100
 MnO .040

 ZrO2
 CO2 < .05
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.170

TRACE ELEMENTS

Ag	Ta	
As	Te*	
Au*	Th	58.00
B	Tl	
Ba	U	5.80
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: P1106
 RECORD NO: 407

AUTHOR: PHAIR + J. DATE: 1975
 MAJOR GROUP: FRR SECOND GROUP: EBO LAT: 39.77 N
 LONG: 105.53 W FLAGS
 ROCK NAME: QUARTZ BOSTONITE CODE: 0760

AGE: STRAT-MIN: EOCE ISOTOPIIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 DIKE

MAJOR CONSTITUENTS

SiO2 70.80
 Al2O3 14.60
 Fe2O3 1.90
 FeO 2.80
 MgO .06
 CaO .06
 Na2O 2.10
 K2O 7.30

 H2O+
 H2O-
 TH2O
 LOI .08
 TiO2 .080
 P2O5 .080
 MnO .200

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.060

TRACE ELEMENTS

As	Ta	
As	Te*	
Au*	Th	28.10
B	Tl	
Ba	U	13.80
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: F36
 RECORD NO: 402

AUTHOR: PHAIR + J. DATE: 1975
 MAJOR GROUP: FRR SECOND GROUP: EBO LAT: 39.75 N
 LONG: 105.63 W FLAGS
 ROCK NAME: QUARTZ BOSTONITE CODE: 0760

AGE: STRAT-MIN: EOCE ISOTOPIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 DIKE ALTERED

MAJOR CONSTITUENTS

SiO2 70.60
 Al2O3 16.40
 Fe2O3 2.70
 FeO 1.20
 MgO .06
 CaO .02
 Na2O .28
 K2O 5.40

 H2O+
 H2O-
 TH2O
 LOI 3.20
 TiO2 .180
 P2O5 .060
 MnO .030

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.130

TRACE ELEMENTS

As	Ta	
As	Te*	
Au*	Th	76.00
B	Tl	
Ba	U	13.90
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: P586
 RECORD NO: 404

AUTHOR: BRADDOCK DATE: 1969 LAT: 39.82 N
 MAJOR GROUP: FRR SECOND GROUP: ALC LONG: 105.63 W FLAGS
 ROCK NAME: APLITE CODE: 0290

AGE: STRAT-MIN: EOCE ISOTOPIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ DIKE FRESH
 ORTHOCLASE
 OLIGOCLASE APLITIC

MAJOR CONSTITUENTS

SiO2 76.40
 Al2O3 12.40
 Fe2O3 1.40
 FeO .72
 MgO .18
 CaO .64
 Na2O 2.30
 K2O 5.90

 H2O+
 H2O-
 TH2O .50
 LOI
 TiO2 .080
 P2O5 .020
 MnO

 ZrO2
 CO2
 SO3
 Cl .020
 F .010
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.570

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	2000.00	U	
Be	7.00	V	20.00
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu	50.00	Zr	70.00
F			
Ga	20.00		
Hg*			
La			
Li			
Mo			
Nb			
Nd			
Ni			
Pb	15.00		
Rb			
Sb			
Sc			
Sn			
Sr	1500.00		

AUTHOR
 NUMBER: 4-165A
 RECORD NO: 462

AUTHOR: PHAIR + J. DATE: 1975
 LAT: 40.10 N
 MAJOR GROUP: FRR SECOND GROUP: JIM LONG: 105.38 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010
 AGE: STRAT-MIN: EOCE ISOTOPIIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 DIKE

MAJOR CONSTITUENTS

SiO2 72.20
 Al2O3 15.60
 Fe2O3 .80
 FeO 1.60
 MgO .14
 CaO 1.60
 Na2O 3.60
 K2O 4.00

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .020
 P2O5 .060
 MnO .050

 ZrO2
 CO2 .30
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.970

TRACE ELEMENTS

As	Ta	
As	Te*	
Au*	Th	4.50
B	Tl	
Ba	U	1.80
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: P523

RECORD NO: 406

AUTHOR: SEGERSTROM+Y. DATE: 1972
 MAJOR GROUP: HAH SECOND GROUP: LAT: 40.82 N LONG: 106.90 W FLAGS
 ROCK NAME: QUARTZ LATITE CODE: 1980

AGE: STRAT-MIN: PLIO ISOTOPIC-MIN:
 -MAX: PLIO -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLUTON

MAJOR CONSTITUENTS

SiO2 72.40
 Al2O3 14.80
 Fe2O3 .91
 FeO .72
 MgO .38
 CaO 1.10
 Na2O 3.70
 K2O 4.00
 H2O+ .91
 H2O- .39
 TH2O
 LOI
 TiO2 .190
 P2O5 .100
 MnO .030
 ZrO2
 CO2 < .05
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.680

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1500.00	U	
Be	3.00	V	15.00
Bi		W	
Ce		Y <	3.00
Co		Yb	
Cr	3.00	Zn	
Cu	5.00	Zr	100.00
F			
Ga	15.00		
Hg*			
La			
Li			
Mo	3.00		
Nb	10.00		
Nd			
Ni			
Pb	50.00		
Rb			
Sb			
Sc	1.00		
Sn			
Sr	500.00		

AUTHOR
 NUMBER: T.5-2
 RECORD NO: 409

AUTHOR: HAIL

DATE: 1968

LAT: 40.32 N

MAJOR GROUP: RAB SECOND GROUP:

LONG: 106.47 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUTON

ALTERATION

MAJOR CONSTITUENTS

SiO2	74.60
Al2O3	14.00
Fe2O3	.27
FeO	.28
MnO	.10
CaO	.53
Na2O	4.40
K2O	4.20
H2O+	
H2O-	
TH2O	1.20
LOI	
TiO2	.020
P2O5	.010
MnO	.090
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.750

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hs*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: T.3-2

RECORD NO: 412

AUTHOR: HAIL

DATE: 1968

LAT: 40.37 N

MAJOR GROUP: RAB SECOND GROUP:

LONG: 106.42 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUTON

ALTERATION

MAJOR CONSTITUENTS

SiO2	72.30
Al2O3	14.20
Fe2O3	1.80
FeO	.06
MgO	.13
CaO	.73
Na2O	4.00
K2O	4.60
H2O+	
H2O-	
TH2O	1.80
LOI	
TiO2	.340
P2O5	.020
MnO	.040
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.070

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: T.3-3

RECORD NO: 413

AUTHOR: HAIL

DATE: 1968

LAT: 40.38 N

MAJOR GROUP: RAB SECOND GROUP:

LONG: 106.38 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUTON

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.30
Al2O3	15.00
Fe2O3	1.80
FeO	.06
MgO	.31
CaO	1.10
Na2O	4.10
K2O	5.10
H2O+	
H2O-	
TH2O	.53
LOI	
TiO2	.290
P2O5	.110
MnO	.090
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.840

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: T.3-4

RECORD NO: 414

AUTHOR: HAIL

DATE: 1968

LAT: 40.35 N

MAJOR GROUP: RAB SECOND GROUP:

LONG: 106.40 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
FLOW BRECCIA

ALTERATION

MAJOR CONSTITUENTS

SiO2	73.90
Al2O3	12.70
Fe2O3	1.70
FeO	.07
MgO	.20
CaO	.93
Na2O	3.70
K2O	4.20
H2O+	
H2O-	
TH2O	1.90
LOI	
TiO2	.310
P2O5	.050
MnO	.080
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.790

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hs*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: T.3-6

RECORD NO: 415

AUTHOR: LIPMAN

DATE: 1975

LAT: 37.49 N

MAJOR GROUP: SAJ SECOND GROUP: HIN LONG: 106.65 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: PLIO
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
PLAGIOCLASE-PHENO
BIOTITE-PHENO
AUGITE-PHENO

OCCUR-PETROG.
FLOW

ALTERATION

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2	70.00
Al2O3	15.20
Fe2O3	2.20
FeO	.20
MgO	.34
CaO	1.20
Na2O	4.00
K2O	5.50
H2O+	.55
H2O-	.15
TH2O	
LOI	
TiO2	.420
P2O5	.060
MnO	.120
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.990

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1000.00	U	
Be	5.00	V	20.00
Bi		W	
Ce	500.00	Y	20.00
Co		Yb	2.00
Cr	5.00	Zn	
Cu	7.00	Zr	200.00
F			
Ga	10.00		
Hg*			
La	150.00		
Li			
Mo	5.00		
Nb	20.00		
Nd			
Ni			
Pb	15.00		
Rb			
Sb			
Sc	5.00		
Sn			
Sr	200.00		

AUTHOR
NUMBER: T.11-19

RECORD NO: 158

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XD LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: MAFIC ROCK CODE: 0010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10

METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO DIKE
SANIDINE-PHENO
PLAGIOCLASE-PHENO
DIOPHIDE-PHENO

MAJOR CONSTITUENTS

SiO2 54.40
Al2O3 12.30
Fe2O3 3.50
FeO 3.50
MgO 5.10
CaO 7.00
Na2O 2.20
K2O 3.20

H2O+ 2.70
H2O- .98
TH2O
LOI
TiO2 1.400
P2O5 .550
MnO .260

ZrO2
CO2 2.80
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.890

TRACE ELEMENTS

As Ta
As Te*
Au* Th
B Tl
Ba U
Be V
Bi W
Ce Y

Co 30.00 Yb
Cr 300.00 Zn
Cu Zr
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni 100.00
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 136

RECORD NO: 182

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XY

LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIIC-MIN: 9.00
-MAX: 10.10

METHOD: FSTR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO
BIOTITE-PHENO

OCCUR-PETROG.
PLUG

ALTERATION
QUARTZ-SERICITE-M

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 73.50
Al2O3 14.20
Fe2O3 1.10
FeO .32
MgO .18
CaO .30
Na2O 2.40
K2O 5.20

H2O+ 1.30
H2O- .29
TH2O
LOI
TiO2 .270
P2O5 .030
MnO .050

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.190

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hf*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 27

RECORD NO: 179

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XY LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10

METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-M
SANIDINE-PHENO
NA-FLAGIOCLASE-PHENO PORPHYRITIC
BIOTITE-PHENO

MAJOR CONSTITUENTS

SiO2 74.30
Al2O3 13.60
Fe2O3 1.00
FeO .40
MgO .31
CaO .40
Na2O 2.30
K2O 5.10

H2O+ 1.50
H2O- .51
TH2O
LOI
TiO2 .240
P2O5 .060
MnO .020

ZrO2
CO2 .08
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.820

TRACE ELEMENTS

As
As
Au*
B
Ba 300.00
Be
Bi
Ce

Co
Cr
Cu 10.00
F
Ga
Hs*
La

Li
Mo 7.00
Nb
Nd
Ni
Pb 46.00
Rb
Sb 3.00
Sc
Sn < 10.00
Sr 100.00

Ta
Te*
Th
Tl
U
V 20.00
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 185A
RECORD NO: 180

AUTHOR: SCHMITT + R. DATE: 1977

LAT: 37.60 N

MAJOR GROUP: SAJ SECOND GROUP: XOD

LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 9.00
-MAX: 10.10

METHOD: FSTR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO

OCCUR-PETROG.
DIKE
PORPHYRITIC

ALTERATION
QUARTZ-SERICITE-W

MAJOR CONSTITUENTS

SiO2 78.30
Al2O3 11.40
Fe2O3 .54
FeO .12
MnO .07
CaO .13
Na2O 1.40
K2O 6.20

H2O+ .70
H2O- .02
TH2O
LOI
TiO2 .070
P2O5
MnO .030

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.030

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 163

RECORD NO: 175

AUTHOR: SCHMITT + R. DATE: 1977 LAT: 37.59 N
 MAJOR GROUP: SAJ SECOND GROUP: XOD LONG: 107.59 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
 -MAX: MIOC -MAX: 10.10
 METHOD: FSTR
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE QUARTZ-SERICITE-W
 SANIDINE-PHENO
 NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 66.60
 Al2O3 15.50
 Fe2O3 2.70
 FeO .32
 MgO .84
 CaO 1.10
 Na2O 1.70
 K2O 8.00

 H2O+ 1.60
 H2O- .43
 TH2O
 LOI
 TiO2 .640
 P2O5 .240
 MnO .150

 ZrO2
 CO2 .09
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.910

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 231

RECORD NO: 176

AUTHOR: SCHMITT + R. DATE: 1977
 LAT: 37.59 N
 MAJOR GROUP: SAJ SECOND GROUP: XOD LONG: 107.58 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
 -MAX: MIOC -MAX: 10.10
 METHOD: FSTR
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE QUARTZ-SERICITE-S
 SANIDINE-PHENO
 NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 78.90
 Al2O3 13.20
 Fe2O3 .06
 FeO .16
 MgO .58
 CaO .11
 Na2O
 K2O 3.60
 H2O+ 2.10
 H2O- .71
 TH2O
 LOI
 TiO2 .370
 P2O5 .020
 MnO .040
 ZrO2
 CO2 .09
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.940

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce
 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La
 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y
 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 266

RECORD NO: 177

AUTHOR: SCHMITT + R. DATE: 1977

LAT: 37.59 N

MAJOR GROUP: SAJ SECOND GROUP: XOD LONG: 107.58 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO DIKE QUARTZ-SERICITE-W
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.70
Al2O3 11.40
Fe2O3
FeO .76
MgO .28
CaO .18
Na2O .18
K2O 8.20

H2O+ 1.00
H2O- .11
TH2O
LOI
TiO2 .130
P2O5 .020
MnO .040

ZrO2
CO2 .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.050

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 267B

RECORD NO: 178

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-W
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.60
Al2O3 12.20
Fe2O3 .39
FeO .24
MnO .15
CaO .09
Na2O 1.00
K2O 6.70

H2O+ 1.80
H2O- .17
TH2O
LOI
TiO2 .150
P2O5
MnO

ZrO2
CO2 .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.540

TRACE ELEMENTS

Ag Ta
As Te*
Au* Th
B Tl
Ba U
Be V
Bi W
Ce Y

Co Yb
Cr Zn
Cu Zr
F
Ga
Hs*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 1A

RECORD NO: 161

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: X0 LAT: 37.60 N LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-W
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 78.20
Al2O3 11.50
Fe2O3 .26
FeO .28
MnO .07
CaO .18
Na2O 1.10
K2O 7.10

H2O+ 1.00
H2O- .13
TH2O
LOI
TiO2 .130
P2O5
MnO .020

ZrO2
CO2 .06
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.030

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 1B

RECORD NO: 162

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIE-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-W
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.50
Al2O3 12.20
Fe2O3 .06
FeO .16
MgO .06
CaO .08
Na2O 1.80
K2O 7.30

H2O+ 1.30
H2O-
TH2O
LOI
TiO2 .120
P2O5
MnO .020

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.650

TRACE ELEMENTS

As Ta
As Te*
Au* Th
B Tl
Ba U
Be V
Bi W
Ce Y

Co Yb
Cr Zn
Cu Zr
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 125A

RECORD NO: 163

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 79.80
Al2O3 12.60
Fe2O3 .40
FeO .16
MgO .12
CaO .38
Na2O .13
K2O 3.20

H2O+ 2.60
H2O- .08
TH2O
LOI
TiO2 .220
P2O5
MnO

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.740

TRACE ELEMENTS

As 1.00 Ta
As 300.00 Te*
Au* .10 Th
B Tl
Ba 30.00 U
Be V 10.00
Bi W
Ce Y

Co Yb
Cr 10.00 Zn 40.00
Cu 70.00 Zr
F
Ga
Hg*
La

Li
Mo 300.00
Nb
Nd
Ni
Pb 1800.00
Rb
Sb
Sc
Sn 10.00
Sr

AUTHOR
NUMBER: 7

RECORD NO: 165

AUTHOR: SCHMITT + R. DATE: 1977

LAT: 37.60 N

MAJOR GROUP: SAJ SECOND GROUP: XO

LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIIC-MIN: 9.00
-MAX: 10.10

METHOD: FSTR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO

OCCUR-PETROG.
PLUG
PORPHYRITIC

ALTERATION
QUARTZ-SERICITE-S

MAJOR CONSTITUENTS

SiO2 78.40
Al2O3 13.60
Fe2O3 .56
FeO .40
MgO .23
CaO .14
Na2O .09
K2O 3.90

H2O+ 1.80
H2O- .09
TH2O
LOI
TiO2 .220
P2O5 .030
MnO

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.510

TRACE ELEMENTS

As .50
As
Au*
B
Ba 70.00
Be
Bi 10.00
Ce

Co
Cr 5.00
Cu 15.00
F
Ga
Hs*
La

Li
Mo 10.00
Nb
Nd
Ni
Pb 100.00
Rb
Sb
Sc
Sn 20.00
Sr

Ta
Te*
Th
Tl
U
V 10.00
W
Y

Yb
Zn 50.00
Zr

AUTHOR
NUMBER: 17
RECORD NO: 166

AUTHOR: SCHMITT + R. DATE: 1977

LAT: 37.60 N

MAJOR GROUP: SAJ SECOND GROUP: XO

LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 9.00
-MAX: 10.10

METHOD: FSTR

MINERALS
QUARTZ-PHEND
SANIDINE-PHEND
NA-PLAGIOCLASE-PHEND

OCCUR-PETROG.
PLUG
PORPHYRITIC

ALTERATION
QUARTZ-SERICITE-S

MAJOR CONSTITUENTS

SiO2 79.90
Al2O3 11.90
Fe2O3 .94
FeO .24
MgO .18
CaO .17
Na2O .16
K2O 3.80

H2O+ 1.70
H2O- .07
TH2O
LOI
TiO2 .130
P2O5
MnO

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.240

TRACE ELEMENTS

As
As
Au*
B
Ba 50.00
Be
Bi
Ce

Co
Cr 5.00
Cu 30.00
F
Ga
Hs*
La

Li
Mo 70.00
Nb
Nd
Ni
Pb 30.00
Rb
Sb
Sc
Sn 10.00
Sr

Ta
Te*
Th
Tl
U
V 10.00
W
Y

Yb
Zn 85.00
Zr

AUTHOR
NUMBER: 32
RECORD NO: 167

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLUG QUARTZ-SERICITE-S
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 78.40
Al2O3 13.40
Fe2O3 .66
FeO .24
MgO .55
CaO .61
Na2O .37
K2O 3.60

H2O+ 1.70
H2O- .10
TH2O
LOI
TiO2 .150
P2O5 .040
MnO .020

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.890

TRACE ELEMENTS

Ag
As
Au* .20
B
Ba 300.00
Be
Bi
Ce

Co
Cr
Cu 15.00
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb 50.00
Rb
Sb 300.00
Sc
Sn 10.00
Sr 200.00

Ta
Te*
Th
Tl
U
V 10.00
W
Y

Yb
Zn 40.00
Zr

AUTHOR
NUMBER: 63

RECORD NO: 169

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10

METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 79.20
Al2O3 13.20
Fe2O3 .14
FeO .24
MgO .31
CaO .07
Na2O .03
K2O 3.80

H2O+ 1.70
H2O- .12
TH2O
LOI
TiO2 .160
P2O5 .050
MnO .040

ZrO2
CO2 .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.110

TRACE ELEMENTS

As 10.00 Ta
As Te*
Au* Th
B Tl
Ba 2000.00 U
Be V 10.00
Bi W
Ce Y

Co Yb
Cr Zn 50.00
Cu 20.00 Zr
F
Ga
Hg*
La

Li
Mo < 5.00
Nb
Nd
Ni
Pb 48.00
Rb
Sb
Sc
Sn < 10.00
Sr 100.00

AUTHOR NUMBER: 123

RECORD NO: 170

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLUG QUARTZ-SERICITE-S
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 78.40
Al2O3 13.40
Fe2O3 .57
FeO .32
MgO .41
CaO .14
Na2O .12
K2O 3.80

H2O+ 2.10
H2O- .12
TH2O
LOI
TiO2 .280
P2O5 .150
MnO .020

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.880

TRACE ELEMENTS

Ag
As
Au*
B
Ba 150.00
Be
Bi
Ce

Co
Cr 5.00
Cu 10.00
F
Ga
Hg*
La

Li
Mo 10.00
Nb
Nd
Ni
Pb 30.00
Rb
Sb
Sc
Sn < 10.00
Sr

Ta
Te*
Th
Tl
U
V 70.00
W
Y

Yb
Zn 40.00
Zr

AUTHOR
NUMBER: 21
RECORD NO: 171

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10
METHOD: FSTR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
SANIDINE-PHENO
NA-PLAGIOCLASE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.90
Al2O3 13.00
Fe2O3 2.30
FeO .16
MgO .55
CaO .12
Na2O .16
K2O 3.80

H2O+ 1.60
H2O- .05
TH2O
LOI
TiO2 .360
P2O5 .070
MnO

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.120

TRACE ELEMENTS

As
As
Au* .04
B
Ba 200.00
Be
Bi
Ce

Co
Cr 10.00
Cu 15.00
F
Ga
Hs*
La

Li
Mo < 5.00
Nb
Nd
Ni
Pb 50.00
Rb
Sb
Sc
Sn < 10.00
Sr

Ta
Te*
Th
Tl
U
V 70.00
W
Y

Yb
Zn 60.00
Zr

AUTHOR
NUMBER: 37

RECORD NO: 172

AUTHOR: SCHMITT + R. DATE: 1977

MAJOR GROUP: SAJ SECOND GROUP: XO LAT: 37.60 N
LONG: 107.61 W FLAGS

ROCK NAME: PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 9.00
-MAX: MIOC -MAX: 10.10

METHOD: FSTR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	PLUG	QUARTZ-SERICITE-S
SANIDINE-PHENO		ARGILLIC-S
NA-PLAGIOCLASE-PHENO	PORPHYRITIC	

MAJOR CONSTITUENTS

SiO2 76.30
Al2O3 14.40
Fe2O3 .47
FeO .16
MgO .33
CaO .43
Na2O .11
K2O 4.00

H2O+ 2.30
H2O- .22
TH2O
LOI
TiO2 .410
P2O5 .060
MnO .030

ZrO2
CO2 < .05
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.270

TRACE ELEMENTS

As	2.00	Ta	
As		Te*	
Au*	.10	Th	
B		Tl	
Ba	2000.00	U	
Be		V	7.00
Bi		W	
Ce		Y	
Co		Yb	
Cr	10.00	Zn	300.00
Cu	70.00	Zr	
F			
Ga			
Hg*			
La			
Li			
Mo	70.00		
Nb			
Nd			
Ni			
Pb	150.00		
Rb			
Sb	100.00		
Sc			
Sn	15.00		
Sr	100.00		

AUTHOR
NUMBER: 46

RECORD NO: 173

AUTHOR: ERNST DATE: 1981
 MAJOR GROUP: SAJ SECOND GROUP: LRI LAT: 38.03 N LONG: 107.51 W FLAGS 2D
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLUG
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.51
 Al2O3 13.62
 Fe2O3 .95
 FeO
 MgO .34
 CaO .44
 Na2O 3.35
 K2O 4.61

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .090
 P2O5 .010
 MnO .110

 ZrO2
 CO2
 SO3
 Cl
 F .059
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.089

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	574.00	U	
Be		V	
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	23.00
Cu		Zr	133.00
F	590.00		
Ga			
Hg*			
La			
Li	93.00		
Mo			
Nb			
Nd			
Ni			
Pb			
Rb	483.00	AUTHOR	
Sb		NUMBER:	37
Sc			
Sn		RECORD NO:	191
Sr	51.00		

AUTHOR: ERNST

DATE: 1981

LAT: 38.07 N

MAJOR GROUP: SAJ SECOND GROUP: LRI LONG: 107.37 W FLAGS 2D

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUG

ALTERATION

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.02
Al2O3 13.15
Fe2O3 1.24
FeO
MgO .36
CaO .13
Na2O 2.77
K2O 4.56

H2O+
H2O-
TH2O
LOI
TiO2 .150
P2O5 .050
MnO .080

ZrO2
CO2
SO3
Cl
F .056
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 98.566

TRACE ELEMENTS

As
As
Au*
B
Ba 510.00
Be
Bi
Ce
Co
Cr
Cu
F 560.00
Ga
Hg*
La
Li 92.00
Mo
Nb
Nd
Ni
Pb
Rb 355.00
Sb
Sc
Sn
Sr 52.00
Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn 29.00
Zr 163.00

AUTHOR
NUMBER: 49

RECORD NO: 197

AUTHOR: LIPMAN DATE: 1976
 MAJOR GROUP: SAJ SECOND GROUP: LRIN LAT: 38.07 N
 LONG: 107.41 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 18.50
 -MAX: MIOC -MAX: 18.50
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 PLUG
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 75.30
 Al2O3 13.00
 Fe2O3 .75
 FeO .08
 MgO .06
 CaO .70
 Na2O 3.40
 K2O 4.70

 H2O+ 1.40
 H2O- .79
 TH2O
 LOI
 TiO2 .080
 P2O5 .030
 MnO .030

 ZrO2
 CO2 .02
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.340

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hs*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 72L-34

 RECORD NO: 200

AUTHOR: ERNST

DATE: 1981

LAT: 38.05 N

MAJOR GROUP: SAJ SECOND GROUP: LRIN LONG: 107.43 W FLAGS
2D

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 18.50
-MAX: 18.50

METHOD: KAR

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO

OCCUR-PETROG. ALTERATION
PLUG

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 74.94
Al2O3 14.12
Fe2O3 1.04
FeO
MgO .37
CaO .89
Na2O 2.26
K2O 4.64

H2O+
H2O-
TH2O
LOI
TiO2 .160
P2O5 .040
MnO .090

ZrO2
CO2
SO3
Cl
F .056
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 98.606

TRACE ELEMENTS

As
As
Au*
B
Ba 638.00
Be
Bi
Ce

Co
Cr
Cu
F 558.00
Ga
Hs*
La

Li 96.00
Mo
Nb
Nd
Ni
Pb
Rb 434.00
Sb
Sc
Sn
Sr 103.00

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn 24.00
Zr 164.00

AUTHOR
NUMBER: 2

RECORD NO: 203

AUTHOR: ERNST

DATE: 1981

LAT: 38.07 N

MAJOR GROUP: SAJ SECOND GROUP: LRIN LONG: 107.42 W FLAGS
2D

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 18.50
-MAX: MIOC -MAX: 18.50

METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG
SANIDINE-PHENO
BIOTITE-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 73.40
Al2O3 14.42
Fe2O3 1.77
FeO
MgO .51
CaO .59
Na2O 3.21
K2O 4.86

H2O+
H2O-
TH2O
LOI
TiO2 .290
P2O5 .070
MnO .080

ZrO2
CO2
SO3
Cl
F .090
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.290

TRACE ELEMENTS

As
As
Au*
B
Ba 657.00
Be
Bi
Ce

Co
Cr
Cu 900.00
F
Ga
Hf*
La

Li 37.00
Mo
Nb
Nd
Ni
Pb
Rb 282.00
Sb
Sc
Sn
Sr 151.00

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn 22.00
Zr 212.00

AUTHOR
NUMBER: 29

RECORD NO: 207

AUTHOR: ERNST

DATE: 1981

LAT: 38.07 N

MAJOR GROUP: SAJ SECOND GROUP: LRIN LONG: 107.42 W FLAGS
2D

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 18.50
-MAX: MIOC -MAX: 18.50

METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO PLUG
SANIDINE-PHENO
PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 73.37
Al2O3 13.70
Fe2O3 1.31
FeO
MgO .56
CaO .88
Na2O 1.96
K2O 4.82

H2O+
H2O-
TH2O
LOI
TiO2 .250
P2O5 .060
MnO .060

ZrO2
CO2
SO3
Cl
F .066
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 97.036

TRACE ELEMENTS

As
As
Au*
B
Ba 685.00
Be
Bi
Ce
Co
Cr
Cu
F 660.00
Ga
Hs*
La
Li 39.00
Mo
Nb
Nd
Ni
Pb
Rb 301.00
Sb
Sc
Sn
Sr 90.00

Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn 21.00
Zr 180.00

AUTHOR
NUMBER: 30
RECORD NO: 208

AUTHOR: ZIELINSKI DATE: 1983 LAT: 38.07 N
 MAJOR GROUP: SAJ SECOND GROUP: LRIN LONG: 107.41 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLUG
 DEVITRIFIED

MAJOR CONSTITUENTS

SiO2 77.20
 Al2O3 12.80
 Fe2O3 .66
 FeO .16
 MgO .11
 CaO .25
 Na2O 3.90
 K2O 4.60

 H2O+ .34
 H2O- .14
 TH2O
 LOI
 TiO2 .120
 P2O5 .040
 MnO .040

 ZrO2
 CO2 .01
 SO3
 Cl
 F .070
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.440

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: S110B

RECORD NO: 470

AUTHOR: ZIELINSKI DATE: 1983 LAT: 38.07 N
 MAJOR GROUP: SAJ SECOND GROUP: LRIN LONG: 107.41 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 PLUG

DEVITRIFIED

MAJOR CONSTITUENTS

SiO2 75.70
 Al2O3 12.30
 Fe2O3 .74
 FeO .16
 MgO .33
 CaO .73
 Na2O 2.80
 K2O 4.60

 H2O+ 1.50
 H2O- .87
 TH2O
 LOI
 TiO2 .120
 P2O5 .050
 MnO .050

 ZrO2
 CO2 .01
 SO3
 Cl
 F .080
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.040

TRACE ELEMENTS

As Ta
 As Te*
 Au* Th
 B Tl
 Ba U
 Be V
 Bi W
 Ce Y

 Co Yb
 Cr Zn
 Cu Zr
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: S106A

RECORD NO: 473

AUTHOR: LARSEN + C. DATE: 1956 LAT: 37.99 N
 MAJOR GROUP: SAJ SECOND GROUP: LAG LONG: 107.39 W FLAGS
 ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ
 ORTHOCLASE-PHENO DIKE
 PLAGIOCLASE PORPHYRITIC
 BIOTITE
 PYROXENE

MAJOR CONSTITUENTS

SiO2 75.19
 Al2O3 12.91
 Fe2O3 .88
 FeO .68
 MgO
 CaO .68
 Na2O 3.72
 K2O 5.30

 H2O+ .47
 H2O- .21
 TH2O
 LOI
 TiO2 .180
 P2O5
 MnO .030

 ZrO2
 CO2 .10
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.350

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.21-59

 RECORD NO: 214

AUTHOR: ERNST

DATE: 1981

LAT: 37.95 N

MAJOR GROUP: SAJ SECOND GROUP: LAG LONG: 107.44 W FLAGS 2D

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
STOCK

ALTERATION

MAJOR CONSTITUENTS

SiO2 63.85
Al2O3 16.91
Fe2O3 4.38
FeO
MgO 1.24
CaO 2.12
Na2O 2.83
K2O 5.54

H2O+
H2O-
TH2O
LOI
TiO2 .890
P2O5 .230
MnO .140

ZrO2
CO2
SO3
Cl
F .100
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 98.230

TRACE ELEMENTS

Ag
As
Au*
B
Ba 778.00
Be
Bi
Ce
Co
Cr
Cu
F 1000.00
Ga
Hs*
La
Li 37.00
Mo
Nb
Nd
Ni
Pb
Rb 172.00
Sb
Sc
Sn
Sr 335.00
Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn 62.00
Zr 367.00

AUTHOR
NUMBER: 58

RECORD NO: 223

AUTHOR: ERNST

DATE: 1981

LAT: 37.95 N

MAJOR GROUP: SAJ SECOND GROUP: LAG LONG: 107.44 W FLAGS 2D

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
STOCK

ALTERATION

MAJOR CONSTITUENTS

SiO2 66.34
Al2O3 15.76
Fe2O3 4.60
FeO
MgO 1.35
CaO 2.08
Na2O 3.35
K2O 5.73

H2O+
H2O-
TH2O
LOI
TiO2 .930
P2O5 .260
MnO .170

ZrO2
CO2
SO3
Cl
F .129
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.699

TRACE ELEMENTS

As
As
Au*
B
Ba 805.00
Be
Bi
Ce
Co
Cr
Cu
F 1290.00
Ga
Hg*
La
Li 36.00
Mo
Nb
Nd
Ni
Pb
Rb 177.00
Sb
Sc
Sn
Sr 367.00
Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn 69.00
Zr 359.00

AUTHOR
NUMBER: 59

RECORD NO: 224

AUTHOR: LIPMAN

DATE: 1976

LAT: 37.91 N

MAJOR GROUP: SAJ SECOND GROUP: LSP

LONG: 107.44 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 22.50
-MAX: 22.50

METHOD: KAR

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.60
Al2O3	13.80
Fe2O3	1.50
FeO	.64
MgO	.55
CaO	1.30
Na2O	3.00
K2O	5.00
H2O+	.90
H2O-	.20
TH2O	
LOI	
TiO2	.280
P2O5	.050
MnO	.060
ZrO2	
CO2	.50
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.380

TRACE ELEMENTS

As	Ta
As*	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: 73L-34

RECORD NO: 183

AUTHOR: MUTSCHLER DATE: 1982 LAT: 37.86 N
 MAJOR GROUP: SAJ SECOND GROUP: SHI LONG: 107.73 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010
 AGE: STRAT-MIN: PLIO ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO PLUG QUARTZ-SERICITE-M
 ALKALI FELDSPAR-PHENO PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.60
 Al2O3 12.80
 Fe2O3 .70
 FeO .25
 MgO .30
 CaO .10
 Na2O .20
 K2O 6.00

 H2O+ 1.50
 H2O- .10
 TH2O
 LOI
 TiO2 .100
 P2O5 .070
 MnO .090

 ZrO2
 CO2 .10
 SO3
 Cl
 F .095
 S .260
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.265

TRACE ELEMENTS

As	.30	Ta	
As <	2.00	Te*	
Au*		Th	22.00
B		Tl	
Ba	63.00	U	26.00
Be	2.00	V	
Bi		W	6.00
Ce	52.00	Y	6.00
		Yb	
Co		Zn	44.00
Cr		Zr	109.00
Cu	36.00		
F	950.00		
Ga	15.00		
Hg*			
La	44.00		
Li	5.00		
Mo	8.00		
Nb	51.00		
Nd			
Ni			
Pb	22.00		
Rb	589.00		
Sb			
Sc			
Sn	5.00		
Sr	36.00		

AUTHOR
 NUMBER: 79FM943
 RECORD NO: 255

AUTHOR: LIPMAN

DATE: 1976

LAT: 37.98 N

MAJOR GROUP: SAJ SECOND GROUP: SPI

LONG: 107.77 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN: 12.70
-MAX: 16.70

METHOD: FSTR

MINERALS
QUARTZ-PHENO
FELDSPAR-PHENO

OCCUR-PETROG.
DIKE
PORPHYRITIC

ALTERATION
QUARTZ-SERICITE-W

MAJOR CONSTITUENTS

SiO2	74.10
Al2O3	12.80
Fe2O3	.67
FeO	.20
MgO	.04
CaO	.81
Na2O	3.40
K2O	5.10
H2O+	.91
H2O-	.29
TH2O	
LOI	
TiO2	.090
P2O5	.020
MnO	.070
ZrO2	
CO2	.20
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	98.700

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: 74L-3

RECORD NO: 252

AUTHOR: RATTE + S. DATE: 1967 LAT: 37.87 N
 MAJOR GROUP: SAJ SECOND GROUP: CWF LONG: 106.98 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIE-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 WELDED TUFF

MAJOR CONSTITUENTS

SiO2 70.90
 Al2O3 14.10
 Fe2O3 2.40
 FeO .30
 MgO .58
 CaO 1.60
 Na2O 3.60
 K2O 4.60

 H2O+ 1.20
 H2O- .42
 TH2O
 LOI
 TiO2 .450
 P2O5 .120
 MnO .040

 ZrO2
 CO2 .10
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.410

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1300.00	U	
Be	1.00	V	28.00
Bi		W	
Ce		Y	30.00
Co	2.00	Yb	2.80
Cr	3.00	Zn	
Cu	7.60	Zr	340.00
F			
Ga	15.00		
Hg*			
La	55.00		
Li			
Mo			
Nb			
Nd			
Ni			
Pb	38.00		
Rb			
Sb			
Sc	6.00		
Sn			
Sr	480.00		

AUTHOR
 NUMBER: T.14-2
 RECORD NO: 241

AUTHOR: OLSON +

DATE: 1968

LAT: 38.24 N

MAJOR GROUP: SAJ

SECOND GROUP: BCR

LONG: 107.17 W FLAGS

ROCK NAME: QUARTZ LATITE

CODE: 1980

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 26.70
-MAX: 27.80

METHOD: KAR

MINERALS
SANIDINE-PHENO
OLIGOCL.-ANDESIN.-PHENO
BIOTITE-PHENO

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2 71.40
Al2O3 15.00
Fe2O3 1.40
FeO .23
MgO .26
CaO 1.20
Na2O 4.00
K2O 5.40

H2O+ .45
H2O-
TH2O
LOI
TiO2 .230
P2O5 .080
MnO .080

ZrO2
CO2 .10
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.830

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hf*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: T.1-12

RECORD NO: 229

AUTHOR: LIPMAN

DATE: 1975

LAT: 37.48 N

MAJOR GROUP: SAJ SECOND GROUP: BCR LONG: 106.67 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 26.70
-MAX: 27.80

METHOD: KAR

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	72.40
Al2O3	14.00
Fe2O3	1.00
FeO	.44
MgO	.43
CaO	1.50
Na2O	2.70
K2O	5.30
H2O+	.74
H2O-	.96
TH2O	
LOI	
TiO2	.250
P2O5	
MnO	.070
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.840

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	680.00	U	
Be		V	
Bi		W	
Ce		Y	30.00
Co		Yb	
Cr	2.00	Zn	
Cu	8.00	Zr	220.00
F			
Ga	20.00		
Hg*			
La			
Li			
Mo			
Nb			
Nd			
Ni			
Pb	60.00		
Rb			
Sb			
Sc	5.00		
Sn			
Sr	56.00		

AUTHOR
NUMBER: T.6-19
RECORD NO: 231

AUTHOR: LIPMAN

DATE: 1975

LAT: 37.67 N

MAJOR GROUP: SAJ SECOND GROUP: BCR LONG: 106.70 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 26.70
-MAX: 27.80

METHOD: KAR

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	70.20
Al2O3	14.90
Fe2O3	2.20
FeO	.16
MgO	.43
CaO	1.90
Na2O	3.10
K2O	4.80
H2O+	.69
H2O-	.91
TH2O	
LOI	
TiO2	.290
P2O5	.060
MnO	.050
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.740

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	2400.00	U	
Be		V	
Bi		W	
Ce		Y	30.00
Co		Yb	
Cr	2.00	Zn	
Cu	8.00	Zr	330.00
F			
Ga	20.00		
Hg*			
La			
Li			
Mo			
Nb			
Nd			
Ni			
Pb	90.00		
Rb			
Sb			
Sc	6.00		
Sn			
Sr	140.00		

AUTHOR
NUMBER: T.6-17

RECORD NO: 232

AUTHOR: RATTE + S. DATE: 1967 LAT: 37.88 N
 MAJOR GROUP: SAJ SECOND GROUP: BCR LONG: 106.92 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.70
 -MAX: OLIG -MAX: 27.80
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 WELDED TUFF

MAJOR CONSTITUENTS

SiO2 75.40
 Al2O3 12.66
 Fe2O3 .88
 FeO .12
 MgO .20
 CaO .12
 Na2O .40
 K2O 9.05

 H2O+ .23
 H2O- .55
 TH2O
 LOI
 TiO2 .190
 P2O5 .010
 MnO .020

 ZrO2
 CO2 .02
 SO3
 Cl .020
 F .020
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.890

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1000.00	U	
Be		V	7.00
Bi		W	
Ce		Y	30.00
Co		Yb	3.00
Cr	2.00	Zn	
Cu	2.00	Zr	200.00
F			
Ga	9.00		
Hg*			
La	100.00		
Li			
Mo			
Nb	20.00		
Nd			
Ni			
Pb	30.00		
Rb			
Sb			
Sc			
Sn			
Sr	100.00		

AUTHOR
 NUMBER: T.2-3

RECORD NO: 234

AUTHOR: RATTE + S. DATE: 1967

MAJOR GROUP: SAJ SECOND GROUP: BCR LAT: 37.87 N
LONG: 106.93 W FLAGS

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIIC-MIN: 26.70
 -MAX: OLIG -MAX: 27.80
 METHOD: KAR

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION
SILICIFICATION

MAJOR CONSTITUENTS

SiO2 73.61
Al2O3 13.99
Fe2O3 .93
FeO .18
MgO .20
CaO .35
Na2O 2.18
K2O 7.18

H2O+ .45
H2O- .50
TH2O
LOI
TiO2 .210
P2O5 .020
MnO .020

ZrO2
CO2
SO3
Cl .010
F .040
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.870

TRACE ELEMENTS

As
As
Au*
B
Ba 500.00
Be
Bi
Ce

Co
Cr 4.00
Cu 10.00
F
Ga 9.00
Hs*
La 100.00

Li
Mo
Nb 20.00
Nd
Ni
Pb 80.00
Rb
Sb
Sc
Sn
Sr 60.00

Ta
Te*
Th
Tl
U
V 6.00
W
Y 30.00

Yb 3.00
Zn
Zr 200.00

AUTHOR
NUMBER: T.2-4

RECORD NO: 235

AUTHOR: RATTE + S. DATE: 1967 LAT: 37.88 N
 MAJOR GROUP: SAJ SECOND GROUP: BCR LONG: 106.93 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.70
 -MAX: OLIG -MAX: 27.80
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 WELDED TUFF SILICIFICATION

MAJOR CONSTITUENTS

SiO2 76.03
 Al2O3 12.03
 Fe2O3 1.00
 FeO .18
 MgO .04
 CaO .19
 Na2O 1.01
 K2O 8.88

 H2O+ .15
 H2O- .07
 TH2O
 LOI
 TiO2 .200
 P2O5 .030
 MnO .020

 ZrO2
 CO2
 SO3
 Cl .020
 F .010
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.860

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	500.00	U	
Be		V	6.00
Bi		W	
Ce		Y	30.00
Co		Yb	3.00
Cr	4.00	Zn	
Cu	10.00	Zr	200.00
F			
Ga	9.00		
Hg*			
La	100.00		
Li			
Mo			
Nb	20.00		
Nd			
Ni			
Pb	80.00		
Rb			
Sb			
Sc			
Sn			
Sr	60.00		

AUTHOR
 NUMBER: T.2-5

RECORD NO: 236

AUTHOR: RATTE + S. DATE: 1967
 MAJOR GROUP: SAJ SECOND GROUP: BCR LAT: 37.87 N
 LONG: 106.97 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 26.70
 -MAX: OLIG -MAX: 27.80
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 WELDED TUFF

MAJOR CONSTITUENTS

SiO2 72.80
 Al2O3 14.20
 Fe2O3 1.00
 FeO .28
 MgO .18
 CaO .20
 Na2O .89
 K2O 9.50

 H2O+ .90
 H2O- .21
 TH2O
 LOI
 TiO2 .260
 P2O5 .060
 MnO .010

 ZrO2
 CO2 .08
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.570

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1100.00	U	
Be		V	14.00
Bi		W	
Ce	1.00	Y	34.00
Co	1.00	Yb	4.00
Cr	1.00	Zn	
Cu	3.00	Zr	170.00
F			
Ga	15.00		
Hg*			
La	69.00		
Li			
Mo			
Nb	10.00		
Nd			
Ni			
Pb	28.00		
Rb			
Sb			
Sc	5.00		
Sn			
Sr	110.00		

AUTHOR
 NUMBER: T.2-10
 RECORD NO: 237

AUTHOR: LEEDY

DATE: 1971

LAT: 37.90 N

MAJOR GROUP: SAJ SECOND GROUP: SBH LONG: 107.66 W FLAGS

ROCK NAME: RHYODACITE

CODE: 3000

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
FLOW

ALTERATION
QUARTZ-SERICITE

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2	74.60
Al2O3	16.60
Fe2O3	.48
FeO	.56
MnO	.11
CaO	.13
Na2O	.07
K2O	.77
H2O+	4.50
H2O-	.20
TH2O	
LOI	
TiO2	.660
P2O5	.320
MnO	.040
ZrO2	
CO2	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.090

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	500.00	U	
Be		V	100.00
Bi		W	
Ce		Y	
Co		Yb	
Cr		Zn	
Cu		Zr	150.00
F			
Ga			
Hg*			
La	70.00		
Li			
Mo			
Nb	10.00		
Nd			
Ni			
Pb	10.00		
Rb			
Sb			
Sc	7.00		
Sn			
Sr	3000.00		

AUTHOR
NUMBER: RM1-7E
RECORD NO: 500

AUTHOR: LIPMAN

DATE: 1975

LAT: 37.45 N

MAJOR GROUP: SAJ SECOND GROUP: PF

LONG: 106.62 W FLAGS

ROCK NAME: VITROPHYRE

CODE: 4000

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
PLUG

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.10
Al2O3	14.00
Fe2O3	1.80
FeO	.48
MgO	.48
CaO	1.50
Na2O	3.80
K2O	4.50
H2O+	.82
H2O-	.78
TH2O	
LOI	
TiO2	.420
P2O5	.110
MnO	.060
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.900

TRACE ELEMENTS

As		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1000.00	U	
Be	5.00	V	20.00
Bi		W	
Ce	100.00	Y	20.00
Co		Yb	2.00
Cr	15.00	Zn	
Cu	1.00	Zr	150.00
F			
Ga	15.00		
Hg*			
La	70.00		
Li			
Mo	3.00		
Nb	15.00		
Nd			
Ni			
Pb	15.00		
Rb			
Sb			
Sc	3.00		
Sn			
Sr	500.00		

AUTHOR
NUMBER: T.9-29

RECORD NO: 266

AUTHOR: STEVEN + R. DATE: 1960
 MAJOR GROUP: SAJ SECOND GROUP: PF LAT: 37.45 N
 LONG: 106.62 W FLAGS
 ROCK NAME: VITROPHYRE CODE: 4000

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLUG

MAJOR CONSTITUENTS

SiO2 70.90
 Al2O3 14.30
 Fe2O3 1.30
 FeO .51
 MgO .61
 CaO 1.60
 Na2O 3.70
 K2O 4.60

 H2O+
 H2O-
 TH2O 2.50
 LOI
 TiO2 .280
 P2O5 .260
 MnO .040

 ZrO2
 CO2 .05
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.650

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hs*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.3-6

RECORD NO: 267

AUTHOR: STEVEN + R. DATE: 1960
 LAT: 37.44 N
 MAJOR GROUP: SAJ SECOND GROUP: PF LONG: 106.60 W FLAGS
 ROCK NAME: ILLITIC ROCK CODE: 0020
 AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 DOME ARGILLIC-X

MAJOR CONSTITUENTS

SiO2 72.14
 Al2O3 14.87
 Fe2O3 .81
 FeO .04
 MnO .79
 CaO .04
 Na2O .20
 K2O 5.49

 H2O+ 2.48
 H2O- 1.37
 TH2O
 LOI
 TiO2 .600
 P2O5 .280
 MnO .020

 ZrO2
 CO2 .01
 SO3 .48
 Cl
 F .100
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.720

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.7-5

RECORD NO: 268

AUTHOR: STEVEN + R. DATE: 1960

MAJOR GROUP: SAJ SECOND GROUP: PF LAT: 37.44 N
LONG: 106.60 W FLAGS

ROCK NAME: KAOLINITIC ROCK CODE: 0020

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:

MINERALS

METHOD:
OCCUR-PETROG.
DOME

ALTERATION
ARGILLIC-X

MAJOR CONSTITUENTS

SiO2 73.73
Al2O3 17.30
Fe2O3 .06
FeO .09
MgO .01
CaO .11
Na2O .01
K2O .09

H2O+ 6.07
H2O- .15
TH2O
LOI
TiO2 .600
P2O5 .490
MnO

ZrO2
CO2 .01
SO3 .63
Cl
F
S
Cr2O3
NiO
BaO .130
Rb2O
SrO
TOTAL 99.480

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: T.7-6

RECORD NO: 269

AUTHOR: LARSEN + C. DATE: 1956
 MAJOR GROUP: SAJ SECOND GROUP: PTM LAT: 38.47 N
 LONG: 106.83 W FLAGS

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLAGIOCLASE-PHENO WELDED TUFF
 BIOTITE-PHENO

MAJOR CONSTITUENTS

SiO2 70.80
 Al2O3 14.48
 Fe2O3 2.14
 FeO .16
 MgO .14
 CaO 1.24
 Na2O 3.24
 K2O 6.58

H2O+ .57
 H2O- .13
 TH2O
 LOI
 TiO2 .450
 P2O5 .110
 MnO

ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO

TOTAL 100.040

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce
 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y
 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.21-56

RECORD NO: 265

AUTHOR: LARSEN + C. DATE: 1956
 MAJOR GROUP: SAJ SECOND GROUP: EIL LAT: 38.42 N
 LONG: 107.38 W FLAGS
 ROCK NAME: QUARTZ LATITE CODE: 1980
 AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 PLAGIOCLASE-PHENO WELDED TUFF
 BIOTITE-PHENO
 HORNBLLENDE-PHENO

MAJOR CONSTITUENTS

SiO2 70.86
 Al2O3 14.92
 Fe2O3 2.73
 FeO .14
 MgO .49
 CaO 2.14
 Na2O 3.82
 K2O 3.47

 H2O+ .72
 H2O-
 TH2O
 LOI
 TiO2 .290
 P2O5 .190
 MnO .050

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO .140
 Rb2O
 SrO .030
 TOTAL 99.990

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.13-1

RECORD NO: 277

AUTHOR: LIPMAN

DATE: 1968

LAT: 37.75 N

MAJOR GROUP: SAJ SECOND GROUP: EIS LONG: 106.60 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
FLOW

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.10
Al2O3	14.30
Fe2O3	.35
FeO	.06
MnO	.19
CaO	2.70
Na2O	4.60
K2O	4.40
H2O+	.51
H2O-	.17
TH2O	
LOI	
TiO2	.190
P2O5	.020
MnO	.040
ZrO2	
CO2	.70
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.330

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1500.00	U	
Be	1.50	V	
Bi		W	
Ce	200.00	Y	15.00
Co		Yb	1.50
Cr	3.00	Zn	
Cu	3.00	Zr	150.00
F			
Ga	15.00		
Hg*			
La	100.00		
Li			
Mo			
Nb	10.00		
Nd			
Ni			
Pb	20.00		
Rb			
Sb			
Sc			
Sn			
Sr	300.00		

AUTHOR
NUMBER: T.1-4

RECORD NO: 280

AUTHOR: MERTZMAN DATE: 1971
 MAJOR GROUP: SAJ SECOND GROUP: EIS LAT: 37.75 N
 LONG: 106.40 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 FLOW

MAJOR CONSTITUENTS

SiO2 73.78
 Al2O3 14.30
 Fe2O3 .44
 FeO .19
 MgO .13
 CaO 1.18
 Na2O 4.53
 K2O 4.41

 H2O+
 H2O-
 TH2O .87
 LOI
 TiO2 .210
 P2O5
 MnO .030

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.070

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 30

RECORD NO: 285

AUTHOR: LARSEN + C. DATE: 1956
 MAJOR GROUP: SAJ SECOND GROUP: EIS LAT: 37.76 N
 LONG: 106.40 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 MINERALS
 PLAGIOCLASE-PHENO DIKE
 BIOTITE
 AUGITE

MAJOR CONSTITUENTS

SiO2 71.21
 Al2O3 15.24
 Fe2O3 1.46
 FeO .33
 MgO .20
 CaO 1.56
 Na2O 4.41
 K2O 4.75

 H2O+ .64
 H2O- .44
 TH2O
 LOI
 TiO2 .240
 P2O5 .100
 MnO

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO .030
 TOTAL 100.610

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

 AUTHOR
 NUMBER: T.21-26
 RECORD NO: 286

AUTHOR: LIPMAN

DATE: 1968

LAT: 37.78 N

MAJOR GROUP: SAJ SECOND GROUP: EIS LONG: 106.30 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
DIKE

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.40
Al2O3	15.20
Fe2O3	1.30
FeO	.06
MgO	.18
CaO	1.40
Na2O	4.60
K2O	4.50
H2O+	.28
H2O-	.26
TH2O	
LOI	
TiO2	.190
P2O5	.040
MnO	.110
ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.570

TRACE ELEMENTS

Ag		Ta	
As		Te*	
Au*		Th	
B		Tl	
Ba	1000.00	U	
Be	3.00	V	
Bi		W	
Ce	100.00	Y	15.00
Co		Yb	1.50
Cr		Zn	
Cu	1.00	Zr	200.00
F			
Ga	15.00		
Hg*			
La	100.00		
Li			
Mo			
Nb	10.00		
Nd			
Ni			
Pb	30.00		
Rb			
Sb			
Sc			
Sn			
Sr	300.00		

AUTHOR
NUMBER: T.1-5

RECORD NO: 287

AUTHOR: MERTZMAN DATE: 1971 LAT: 37.78 N
 MAJOR GROUP: SAJ SECOND GROUP: EIS LONG: 106.30 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 DIKE

MAJOR CONSTITUENTS

SiO2 72.21
 Al2O3 15.51
 Fe2O3 1.04
 FeO .16
 MgO .23
 CaO 1.16
 Na2O 4.53
 K2O 4.88

 H2O+
 H2O-
 TH2O 1.05
 LOI
 TiO2 .200
 P2O5
 MnO .020

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.990

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: 64

 RECORD NO: 288

AUTHOR: LARSEN + C. DATE: 1956
 MAJOR GROUP: SAJ SECOND GROUP: OL LAT: 37.86 N
 LONG: 107.20 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 FLOW

MAJOR CONSTITUENTS

SiO2 72.02
 Al2O3 15.28
 Fe2O3 .97
 FeO .74
 MgO .26
 CaO 2.00
 Na2O 3.79
 K2O 4.35

 H2O+ .40
 H2O- .45
 TH2O
 LOI
 TiO2 .220
 P2O5 .020
 MnO .110

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.610

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: T.24.1

 RECORD NO: 290

AUTHOR: LARSEN + C. DATE: 1956
 MAJOR GROUP: SAJ SECOND GROUP: OL LAT: 37.00 N
 LONG: 106.25 W FLAGS
 ROCK NAME: RHYDLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIE-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION

MAJOR CONSTITUENTS

SiO2 75.79
 Al2O3 11.63
 Fe2O3 1.99
 FeO .25
 MgO .49
 CaO 1.70
 Na2O 2.76
 K2O 3.47

 H2O+ .73
 H2O- .46
 TH2O
 LOI
 TiO2 .350
 P2O5 .040
 MnO

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.660

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: T.21-57

 RECORD NO: 291

AUTHOR: ZIELINSKI DATE: 1983 LAT: 38.03 N
 MAJOR GROUP: SAJ SECOND GROUP: OL LONG: 107.00 W FLAGS

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 SILL
 DEVITRIFIED

MAJOR CONSTITUENTS

SiO2 77.20
 Al2O3 12.70
 Fe2O3 .69
 FeO .12
 MgO .07
 CaO .39
 Na2O 4.10
 K2O 4.70

 H2O+ .64
 H2O- .15
 TH2O
 LOI
 TiO2 .090
 P2O5 .040
 MnO .070

 ZrO2
 CO2 .01
 SO3
 Cl
 F .190
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 101.160

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: G324I

RECORD NO: 475

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WIM LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 36.60

-MAX: EOCE -MAX: 39.20

METHOD: KAR

	MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO		STOCK	ARGILLIC-W
SANIDINE-PHENO			QUARTZ-SERICITE-W
ALBITE-PHENO		PORPHYRITIC	
BIOTITE-PHENO			

MAJOR CONSTITUENTS

SiO2 75.20
 Al2O3 13.90
 Fe2O3 .52
 FeO .30
 MgO .23
 CaO 1.25
 Na2O 3.09
 K2O 5.40

H2O+ .70
 H2O-
 TH2O
 LOI
 TiO2
 P2O5
 MnO

ZrO2
 CO2 .60
 SO3
 Cl
 F .089
 S .046
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 101.325

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: MM-1-996.7

RECORD NO: 312

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WIM LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 36.60
-MAX: EOCE -MAX: 39.20
METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO STOCK
SANIDINE-PHENO
ALBITE-PHENO PORPHYRITIC
BIOTITE-PHENO APLITIC

MAJOR CONSTITUENTS

SiO2 75.60
Al2O3 13.60
Fe2O3 .42
FeO .47
MgO .22
CaO .65
Na2O 3.78
K2O 5.74

H2O+ .39
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 .20
SO3
Cl
F
S .046
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 101.116

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce
Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: W-272

RECORD NO: 313

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW

SECOND GROUP: WIM

LONG: 106.48 W FLAGS

ROCK NAME: GRANITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 35.60
-MAX: 38.00

METHOD: KAR

MINERALS
QUARTZ-PHENO
ORTHOCLASE
PLAGIOCLASE
BIOTITE

OCCUR-PETROG.
STOCK
PORPHYRITIC

ALTERATION

MAJOR CONSTITUENTS

SiO2 73.10
Al2O3 14.40
Fe2O3 .51
FeO .31
MgO .19
CaO .92
Na2O 3.79
K2O 4.91

H2O+ .53
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 .30
SO3
Cl
F .280
S .113
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.353

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hs*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: MM-1-2203

RECORD NO: 314

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WIM LONG: 106.48 W FLAGS

ROCK NAME: GRANITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 35.60
-MAX: 38.00

METHOD: KAR

MINERALS
QUARTZ-PHENO
ORTHOCLASE
PLAGIOCLASE
BIOTITE

OCCUR-PETROG.
STOCK

ALTERATION

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 74.70
Al2O3 15.30
Fe2O3 .20
FeO .20
MgO .18
CaO .57
Na2O 4.57
K2O 4.75

H2O+ .48
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 < .20
SO3
Cl
F
S .011
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 101.161

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce
Co
Cr
Cu
F
Ga
Hg*
La
Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: MM-1-1922

RECORD NO: 315

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WWP LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
-MAX: OLIG -MAX:

METHOD:

MINERALS

OCCUR-PETROG.
STOCK

ALTERATION
QUARTZ-SERICITE-S

QUARTZ-PHENO

SANIDINE

PLAGIOCLASE-PHENO

BIOTITE-PHENO

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.80

Al2O3 13.20

Fe2O3 .73

FeO .11

MgO .21

CaO .20

Na2O .20

K2O 6.19

H2O+ 1.73

H2O-

TH2O

LOI

TiO2

P2O5

MnO

ZrO2

CO2 < .30

SO3

Cl

F

S .240

Cr2O3

NiO

BaO

Rb2O

SrO

TOTAL 99.910

TRACE ELEMENTS

Ag

As

Au*

B

Ba

Be

Bi

Ce

Co

Cr

Cu

F

Ga

Hg*

La

Li

Mo

Nb

Nd

Ni

Pb

Rb

Sb

Sc

Sn

Sr

Ta

Te*

Th

Tl

U

V

W

Y

Yb

Zn

Zr

AUTHOR
NUMBER: W-112

RECORD NO: 317

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW

SECOND GROUP: WWP

LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO
PLAGIOCLASE-PHENO
BIOTITE-PHENO

OCCUR-PETROG.
STOCK

ALTERATION
ARGILLIC-W
QUARTZ-SERICITE-W

MAJOR CONSTITUENTS

SiO2 77.20
Al2O3 15.50
Fe2O3 .61
FeO .10
MgO .31
CaO .31
Na2O 3.98
K2O 4.88

H2O+ .75
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 < .20
SO3
Cl
F
S .184
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 104.024

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: W-157

RECORD NO: 318

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WWP LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
-MAX: OLIG -MAX:

METHOD:

	MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO		STOCK	ARGILLIC-W
SANIDINE-PHENO			QUARTZ-SERICITE-W
PLAGIOCLASE-PHENO		PORPHYRITIC	
BIOTITE-PHENO			

MAJOR CONSTITUENTS

SiO2 75.10
 Al2O3 14.10
 Fe2O3 .26
 FeO .20
 MgO .11
 CaO .44
 Na2O 3.92
 K2O 5.11

 H2O+ .62
 H2O-
 TH2O
 LOI
 TiO2
 P2O5
 MnO

 ZrO2
 CO2 .20
 SO3
 Cl
 F
 S .048
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.108

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
NUMBER: W-85

RECORD NO: 320

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: WWP LONG: 106.48 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN:
-MAX: OLIG -MAX:

METHOD:

MINERALS

OCCUR-PETROG.
STOCK

ALTERATION
QUARTZ-SERICITE-S

QUARTZ-PHENO

SANIDINE-PHENO

PLAGIOCLASE-PHENO

BIOTITE-PHENO

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 73.30

Al2O3 14.70

Fe2O3 .51

FeO .07

MnO .16

CaO 1.31

Na2O .20

K2O 7.71

H2O+ 1.40

H2O-

TH2O

LOI

TiO2

P2O5

MnO

ZrO2

CO2 .70

SO3

Cl

F

S .330

Cr2O3

NiO

BaO

Rb2O

SrO

TOTAL 100.390

TRACE ELEMENTS

As

As

Au*

B

Ba

Be

Bi

Ce

Co

Cr

Cu

F

Ga

Hg*

La

Li

Mo

Nb

Nd

Ni

Pb

Rb

Sb

Sc

Sn

Sr

Ta

Te*

Th

Tl

U

V

W

Y

Yb

Zn

Zr

AUTHOR
NUMBER: W-90

RECORD NO: 316

AUTHOR: MUTSCHLER

DATE: 1982

LAT: 38.68 N

MAJOR GROUP: SAW

SECOND GROUP: ANT

LONG: 106.25 W FLAGS

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 29.70
-MAX: 31.90
METHOD: KAR

MINERALS
QUARTZ
ORTHOCLASE
ALBITE
BIOTITE

OCCUR-PETROG.
STOCK

ALTERATION

MAJOR CONSTITUENTS

SiO2	78.70
Al2O3	12.00
Fe2O3	.30
FeO	.25
MgO	.05
CaO	.20
Na2O	3.75
K2O	3.45
H2O+	.12
H2O-	.25
TH2O	
LOI	
TiO2	.050
P2O5	.040
MnO	.030
ZrO2	
CO2	
SO3	
Cl	
F	.102
S	.020
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.312

TRACE ELEMENTS

Ag	.20	Ta	
As	2.00	Te*	
Au*		Th	14.00
B		Tl	
Ba	105.00	U	15.00
Be	4.00	V	
Bi		W	18.00
Ce	57.00	Y	13.00
Co		Yb	
Cr		Zn	28.00
Cu	1.00	Zr	60.00
F	1025.00		
Ga	39.00		
Hg*			
La	18.00		
Li	37.00		
Mo <	1.00		
Nb	150.00		
Nd			
Ni			
Pb	12.00		
Rb	594.00		
Sb			
Sc			
Sn	22.00		
Sr	17.00		

AUTHOR
NUMBER: 507

RECORD NO: 134

AUTHOR: MUTSCHLER

DATE: 1982

MAJOR GROUP: SAW SECOND GROUP: ANT LAT: 38.68 N LONG: 106.25 W FLAGS

ROCK NAME: GRANITE

CODE: 1420

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN: 29.70
-MAX: 31.90

METHOD: KAR

MINERALS

OCCUR-PETROG.

ALTERATION

QUARTZ
ORTHOCLASE
ALBITE
BIOTITE

STOCK

MAJOR CONSTITUENTS

SiO2	75.90
Al2O3	13.40
Fe2O3	1.60
FeO	.25
MgO	.15
CaO	.50
Na2O	3.35
K2O	4.40
H2O+	.03
H2O-	.35
TH2O	
LOI	
TiO2	.050
P2O5	.010
MnO	.060
ZrO2	
CO2 <	.05
SO3	
Cl	
F	.069
S	.010
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.179

TRACE ELEMENTS

Ag	.20	Ta	
As	3.00	Te*	
Au*		Th	12.00
B		Tl	
Ba	76.00	U	14.00
Be	8.00	V	
Bi		W	10.00
Ce	64.00	Y	2.00
Co		Yb	
Cr		Zn	26.00
Cu	1.00	Zr	59.00
F	690.00		
Ga	33.00		
Hg*			
La	28.00		
Li	125.00		
Mo <	1.00		
Nb	100.00		
Nd			
Ni			
Pb	24.00		
Rb	702.00		
Sb			
Sc			
Sn	16.00		
Sr	22.00		

AUTHOR
NUMBER: 509B

RECORD NO: 136

AUTHOR: DINGS + R. DATE: 1957

MAJOR GROUP: SAW SECOND GROUP: ANT LAT: 38.65 N
LONG: 106.27 W FLAGS

ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 29.70
 -MAX: OLIG -MAX: 31.90
 METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ
ALBITE
MICROCLINE
ORTHOCLASE
BIOTITE

MAJOR CONSTITUENTS

SiO2 74.27
Al2O3 13.67
Fe2O3 .48
FeO .45
MgO .12
CaO .65
Na2O 3.48
K2O 5.90

H2O+ .04
H2O- .10
TH2O
LOI
TiO2 .490
P2O5 .040
MnO

ZrO2 .01
CO2
SO3
Cl .020
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.720

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: P.29

RECORD NO: 137

AUTHOR: THOMPSON + P. DATE: 1973

MAJOR GROUP: SAW SECOND GROUP: ANT LAT: 38.65 N
LONG: 107.25 W FLAGS
2D

ROCK NAME: GRANITE CODE: 1420

AGE: STRAT-MIN: OLIG ISOTOPIC-MIN: 29.70
-MAX: OLIG -MAX: 31.90
METHOD: KAR

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ STOCK
ORTHOCLASE
PLAGIOCLASE
BIOTITE
MUSCOVITE

MAJOR CONSTITUENTS

SiO2 80.00
Al2O3 14.20
Fe2O3 .86
FeO
MgO .18
CaO .27
Na2O 3.70
K2O 4.50

H2O+
H2O-
TH2O
LOI
TiO2
P2O5 .120
MnO .040

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 103.870

TRACE ELEMENTS

As Ta
As Te*
Au* Th
B Tl
Ba U
Be V
Bi W
Ce Y

Co Yb
Cr Zn
Cu Zr
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 11
RECORD NO: 139

AUTHOR: PHAIR + J. DATE: 1975
 MAJOR GROUP: SAW SECOND GROUP: TW LAT: 39.10 N
 LONG: 106.40 W FLAGS
 ROCK NAME: QUARTZ MONZONITE CODE: 2330

AGE: STRAT-MIN: EOCE ISOTOPIC-MIN:
 -MAX: CRET -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK

MAJOR CONSTITUENTS

SiO2 70.60
 Al2O3 15.20
 Fe2O3 1.30
 FeO 1.40
 MgO .80
 CaO 2.90
 Na2O 3.70
 K2O 2.80

 H2O+ .68
 H2O- .06
 TH2O
 LOI
 TiO2 .360
 P2O5 .120
 MnO .080

 ZrO2
 CO2 .10
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.100

TRACE ELEMENTS

As	Ta	
As	Te*	
Au*	Th	5.90
B	Tl	
Ba	U	3.00
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: ME-3
 RECORD NO: 150

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: TW

LONG: 106.48 W FLAGS

ROCK NAME: QUARTZ MONZONITE CODE: 2330

AGE: STRAT-MIN: EOCE ISOTOPIC-MIN:
-MAX: EOCE -MAX:

METHOD:

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	STOCK	
ORTHOCLASE-PHENO		
PLAGIOCLASE-PHENO	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2 70.50
 Al2O3 15.90
 Fe2O3 1.24
 FeO .95
 MgO .53
 CaO 2.17
 Na2O 4.21
 K2O 4.13

H2O+
 H2O-
 TH2O
 LOI
 TiO2
 P2O5
 MnO

ZrO2
 CO2 < .30
 SO3
 Cl
 F
 S .003
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.933

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce
 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La
 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y
 Yb
 Zn
 Zr

AUTHOR
NUMBER: W-115R

RECORD NO: 307

AUTHOR: RANTA

DATE: 1974

LAT: 38.98 N

MAJOR GROUP: SAW SECOND GROUP: TW

LONG: 106.48 W FLAGS

ROCK NAME: QUARTZ MONZONITE

CODE: 2330

AGE: STRAT-MIN: EOCE
-MAX: EOCE

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS
QUARTZ-PHENO
ORTHOCLASE-PHENO
PLAGIOCLASE-PHENO
BIOTITE

OCCUR-PETROG.
STOCK

ALTERATION
QUARTZ-SERICITE-W

MAJOR CONSTITUENTS

SiO2 71.00
Al2O3 14.80
Fe2O3 .67
FeO .60
MnO .33
CaO 1.61
Na2O 4.37
K2O 4.02

H2O+ .42
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2 < .30
SO3
Cl
F
S .021
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 98.141

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

TRACE ELEMENTS

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: W-117

RECORD NO: 308

AUTHOR: PHAIR + J. DATE: 1975 LAT: N
 MAJOR GROUP: SDC SECOND GROUP: CPS LONG: W FLAGS

ROCK NAME: CODE: 0010

AGE: STRAT-MIN: ISOTOPIC-MIN:
 -MAX: -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK

MAJOR CONSTITUENTS

SiO2 73.90
 Al2O3 13.80
 Fe2O3 .85
 FeO .32
 MgO .18
 CaO .82
 Na2O 4.00
 K2O 4.40

 H2O+ .65
 H2O- .25
 TH2O
 LOI
 TiO2 .210
 P2O5 .030
 MnO .050

 ZrO2
 CO2 .20
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.660

TRACE ELEMENTS

Ag	Ta	
As	Te*	
Au*	Th	14.10
B	Tl	
Ba	U	1.70
Be	V	
Bi	W	
Ce	Y	
Co	Yb	
Cr	Zn	
Cu	Zr	
F		
Ga		
Hg*		
La		
Li		
Mo		
Nb		
Nd		
Ni		
Pb		
Rb		
Sb		
Sc		
Sn		
Sr		

AUTHOR
 NUMBER: WM647

RECORD NO: 416

AUTHOR: MUTSCHLER DATE: 1982
 MAJOR GROUP: SDC SECOND GROUP: QUEL LAT: 36.70 N
 LONG: 105.50 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ-PHENO	DIKE	
K-FELDSPAR-PHENO		
ALBITE	PORPHYRITIC	
BIOTITE		

MAJOR CONSTITUENTS

SiO2	73.68
Al2O3	13.81
Fe2O3	.94
FeO	.56
MnO	.63
CaO	.79
Na2O	4.62
K2O	4.10
H2O+	.44
H2O-	
TH2O	
LOI	
TiO2	.300
P2O5	.150
MnO	.050
ZrO2	
CO2	
SO3	
Cl	
F	.123
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.193

TRACE ELEMENTS

As	1.00	Ta	
As	1.00	Te*	
Au*	1.60	Th	
B		Tl	1.93
Ba	754.00	U	4.00
Be	3.00	V	
Bi		W	24.00
Ce		Y	9.00
Co		Yb	
Cr		Zn	25.00
Cu	88.00	Zr	170.00
F	1230.00		
Ga			
Hg*			
La			
Li	7.00		
Mo	12.00		
Nb	32.00		
Nd			
Ni			
Pb	4.00		
Rb	136.00	AUTHOR	
Sb		NUMBER:	Q-6
Sc			
Sn	.20	RECORD NO:	439
Sr	166.00		

AUTHOR: MUTSCHLER DATE: 1982 LAT: 36.70 N
 MAJOR GROUP: SDC SECOND GROUP: QUEL LONG: 105.50 W FLAGS
 ROCK NAME: GRANITE PORPHYRY CODE: 1420

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO DIKE
 K-FELDSPAR-PHENO
 ALBITE PORPHYRITIC
 BIOTITE

MAJOR CONSTITUENTS

SiO2 72.10
 Al2O3 13.42
 Fe2O3 1.49
 FeO 1.09
 MgO .74
 CaO 1.03
 Na2O 3.88
 K2O 5.02

 H2O+ .67
 H2O-
 TH2O
 LOI
 TiO2 .330
 P2O5 .160
 MnO .040

ZrO2
 CO2
 SO3
 Cl
 F .111
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.081

TRACE ELEMENTS

As	.20	Ta	
As	1.00	Te*	
Au*	.62	Th	
B		Tl	1.48
Ba	714.00	U	5.30
Be	3.00	V	
Bi		W	12.00
Ce		Y <	5.00
Co		Yb	
Cr		Zn	32.00
Cu	138.00	Zr	155.00
F	1115.00		
Ga			
Hg*			
La			
Li	8.00		
Mo	3.00		
Nb	31.00		
Nd			
Ni			
Pb	13.00		
Rb	131.00	AUTHOR	
Sb		NUMBER:	Q-7
Sc			
Sn	1.40	RECORD NO:	440
Sr	195.00		

AUTHOR: MUTSCHLER DATE: 1982
 MAJOR GROUP: SDC SECOND GROUP: QUEG LAT: 36.70 N LONG: 105.50 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 77.62
 Al2O3 13.74
 Fe2O3 .65
 FeO .26
 MgO .51
 CaO .08
 Na2O .24
 K2O 4.06
 H2O+ 1.75
 H2O-
 TH2O
 LOI
 TiO2 .350
 P2O5 .090
 MnO .010

ZrO2
 CO2
 SO3
 Cl
 F .169
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.529

TRACE ELEMENTS

Ag	.30	Ta	
As	2.00	Te*	
Au*	2.50	Th	
B		Tl	1.76
Ba	187.00	U	3.00
Be	3.00	V	
Bi		W	28.00
Ce		Y <	5.00
Co		Yb	
Cr		Zn	15.00
Cu	6.00	Zr	190.00
F	1695.00		
Ga			
Hg*			
La			
Li	16.00		
Mo <	1.00		
Nb	34.00		
Nd			
Ni			
Pb <	1.00		
Rb	168.00	AUTHOR	
Sb		NUMBER:	Q-8
Sc			
Sn	38.00	RECORD NO:	425
Sr	6.00		

AUTHOR: MUTSCHLER DATE: 1982
 MAJOR GROUP: SDC SECOND GROUP: QUEG LAT: 36.70 N LONG: 105.50 W FLAGS
 ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR

 MINERALS OCCUR-PETROG. ALTERATION
 QUARTZ-PHENO PLUG QUARTZ-SERICITE-S
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 79.42
 Al2O3 12.54
 Fe2O3 .54
 FeO .12
 MgO .29
 CaO .09
 Na2O .15
 K2O 3.58

 H2O+ 1.62
 H2O-
 TH2O
 LOI
 TiO2 .150
 P2O5 .070
 MnO .020

 ZrO2
 CO2
 SO3
 Cl
 F .163
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.753

TRACE ELEMENTS

As .50 Ta
 As 1.00 Te*
 Au* 2.60 Th
 B Tl 3.05
 Ba 32.00 U 4.00
 Be 3.00 V
 Bi W 8.00
 Ce Y < 5.00

 Co Yb
 Cr Zn 9.00
 Cu 19.00 Zr 110.00
 F 1630.00
 Ga
 Hs*
 La

 Li 9.00
 Mo 2.00
 Nb 47.00
 Nd
 Ni
 Pb 3.00
 Rb 152.00 AUTHOR
 Sb NUMBER: Q-9
 Sc
 Sn 17.00 RECORD NO: 426
 Sr 5.00

AUTHOR: RANTA

DATE: 1974

LAT: 36.70 N

MAJOR GROUP: SDC SECOND GROUP: QUEG LONG: 105.50 W FLAGS

ROCK NAME: RHYOLITE PORPHYRY CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00

-MAX: OLIG -MAX: 25.00

METHOD: KAR

MINERALS

OCCUR-PETROG.
FLUG

ALTERATION
QUARTZ-SERICITE-M
ARGILLIC

PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 74.60

Al2O3 13.80

Fe2O3 .13

FeO .15

MgO .24

CaO .36

Na2O 1.23

K2O 9.37

H2O+ .53

H2O-

TH2O

LOI

TiO2

P2O5

MnO

ZrO2

CO2 .20

SO3

Cl

F

S .750

Cr2O3

NiO

BaO

Rb2O

SrO

TOTAL 101.360

TRACE ELEMENTS

As Ta

As Te*

Au* Th

B Tl

Ba U

Be V

Bi W

Ce Y

Co Yb

Cr Zn

Cu Zr

F

Ga

Hg*

La

Li

Mo

Nb

Nd

Ni

Pb

Rb

Sb

Sc

Sn

Sr

AUTHOR
NUMBER: T.3-20

RECORD NO: 427

AUTHOR: CLARK + R. DATE: 1972 LAT: 36.70 N
 MAJOR GROUP: SDC SECOND GROUP: QUEA LONG: 105.50 W FLAGS
 ROCK NAME: APLITE CODE: 0290
 AGE: STRAT-MIN: MIOC ISOTOPIE-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 STOCK

MAJOR CONSTITUENTS

SiO2 73.22
 Al2O3 11.98
 Fe2O3 1.36
 FeO .45
 MgO .52
 CaO 1.16
 Na2O 3.29
 K2O 5.51

 H2O+ .67
 H2O- .18
 TH2O
 LOI
 TiO2 .280
 P2O5 .040
 MnO .010

 ZrO2
 CO2 .10
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.770

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: P.72

RECORD NO: 436

AUTHOR: CLARK + R. DATE: 1972
 MAJOR GROUP: SDC SECOND GROUP: QUEA LAT: 36.70 N
 LONG: 105.50 W FLAGS
 ROCK NAME: APLITE CODE: 0290
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR
 OCCUR-PETROG. ALTERATION
 PLUG

MAJOR CONSTITUENTS

SiO2 75.04
 Al2O3 11.66
 Fe2O3 .27
 FeO .44
 MgO .11
 CaO 1.08
 Na2O 2.68
 K2O 6.89

 H2O+ .46
 H2O- .64
 TH2O
 LOI
 TiO2 .150
 P2O5 .040
 MnO

 ZrO2
 CO2 .30
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.760

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: P.72

RECORD NO: 437

AUTHOR: CLARK + R. DATE: 1972 LAT: 36.70 N
 MAJOR GROUP: SDC SECOND GROUP: QUEA LONG: 105.50 W FLAGS
 ROCK NAME: APLITE-CHILL CODE: 0290
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN: 22.00
 -MAX: OLIG -MAX: 25.00
 METHOD: KAR
 MINERALS OCCUR-PETROG. ALTERATION
 PLUG

MAJOR CONSTITUENTS

SiO2 75.18
 Al2O3 12.53
 Fe2O3 .09
 FeO .58
 MgO .18
 CaO .12
 Na2O 2.18
 K2O 8.31

 H2O+ .63
 H2O- .06
 TH2O
 LOI
 TiO2 .250
 P2O5
 MnO .010

 ZrO2
 CO2 .09
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.210

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: P.72

RECORD NO: 438

AUTHOR: KURTZ DATE: 1983
 MAJOR GROUP: SDC SECOND GROUP: QUEA LAT: 36.70 N LONG: 105.50 W FLAGS 2D
 ROCK NAME: APLITE CODE: 0290

AGE: STRAT-MIN: MIOC ISOTOPIIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK ARGILLIC-W
 PORPHYRITIC POTASSIC-W

MAJOR CONSTITUENTS

SiO2 74.79
 Al2O3 12.97
 Fe2O3 .81
 FeO
 MgO .35
 CaO .82
 Na2O 3.53
 K2O 5.74

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .240
 P2O5
 MnO .038

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.288

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: QA-3A

RECORD NO: 455

AUTHOR: KURTZ DATE: 1983
 MAJOR GROUP: SDC SECOND GROUP: QUEA LAT: 36.70 N LONG: 105.50 W FLAGS 2D
 ROCK NAME: QUARTZ PORPHYRY CODE: 2890

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK ARGILLIC-W
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.72
 Al2O3 12.19
 Fe2O3 .65
 FeO
 MgO .10
 CaO .38
 Na2O 4.03
 K2O 4.75

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .110
 P2O5
 MnO .030

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 98.960

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

AUTHOR
 NUMBER: QB-2
 RECORD NO: 458

AUTHOR: KURTZ DATE: 1983
 MAJOR GROUP: SDC SECOND GROUP: QUEA LAT: 36.70 N LONG: 105.50 W FLAGS 2D
 ROCK NAME: APLITE CODE: 0290

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: OLIG -MAX:
 METHOD:
 MINERALS OCCUR-PETROG. ALTERATION
 STOCK ARGILLIC-W
 PORPHYRITIC

MAJOR CONSTITUENTS

SiO2 76.04
 Al2O3 12.23
 Fe2O3 1.01
 FeO
 MgO .20
 CaO .57
 Na2O 3.78
 K2O 5.42

 H2O+
 H2O-
 TH2O
 LOI
 TiO2 .200
 P2O5
 MnO .056

 ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 99.506

TRACE ELEMENTS

As
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce

 Co
 Cr
 Cu
 F
 Ga
 Hs*
 La

 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y

 Yb
 Zn
 Zr

AUTHOR
 NUMBER: QB-3

RECORD NO: 459

AUTHOR: ISHIHARA

DATE: 1967

LAT: 36.70 N

MAJOR GROUP: SDC SECOND GROUP: QUEC LONG: 105.50 W FLAGS

ROCK NAME: APLITE

CODE: 0290

AGE: STRAT-MIN: MIOC
-MAX: OLIG

ISOTOPIC-MIN: 22.00
-MAX: 25.00

METHOD: KAR

MINERALS	OCCUR-PETROG.	ALTERATION
QUARTZ	STOCK	
K-FELDSPAR		
PLAGIOCLASE		
BIOTITE		

MAJOR CONSTITUENTS

SiO2	78.10
Al2O3	11.74
Fe2O3	1.08
FeO	.05
MgO	.06
CaO	.07
Na2O	3.62
K2O	4.40
H2O+	.46
H2O-	.14
TH2O	
LOI	
TiO2	.150
P2O5	.030
MnO	.020
ZrO2	
CO2	
SO3	
Cl	
F	
S	.070
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.990

TRACE ELEMENTS

Ag	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: SI-180

RECORD NO: 421

AUTHOR: WAHLSTROM

DATE: 1944

LAT: 40.43 N

MAJOR GROUP: SPE SECOND GROUP:

LONG: 105.83 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.

ALTERATION

QUARTZ
SANIDINE
TOPAZ

FLOW

MAJOR CONSTITUENTS

SiO2 75.35
Al2O3 13.31
Fe2O3 1.24
FeO .19
MgO .04
CaO .36
Na2O 3.95
K2O 5.00

H2O+ .39
H2O-
TH2O
LOI
TiO2
P2O5
MnO

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.830

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hs*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: T.1-8

RECORD NO: 325

AUTHOR: CORBETT

DATE: 1968

LAT: 40.50 N

MAJOR GROUP: SPE SECOND GROUP:

LONG: 105.85 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2 72.70
Al2O3 13.80
Fe2O3 .90
FeO .40
MgO .30
CaO .70
Na2O 4.30
K2O 6.00

H2O+ .80
H2O-
TH2O
LOI
TiO2 .200
P2O5 .100
MnO

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.200

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

TRACE ELEMENTS

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: 4

RECORD NO: 330

AUTHOR: CORBETT

DATE: 1968

LAT: 40.50 N

MAJOR GROUP: SPE SECOND GROUP:

LONG: 105.85 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2 72.60
Al2O3 14.10
Fe2O3 1.70
FeO .10
MnO
CaO .40
Na2O 4.20
K2O 5.60

H2O+ .70
H2O-
TH2O
LOI
TiO2 .200
P2O5
MnO

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.600

TRACE ELEMENTS

As Ta
As Te*
Au* Th
B Tl
Ba U
Be V
Bi W
Ce Y

Co Yb
Cr Zn
Cu Zr
F
Ga
Hs*
La

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 47

RECORD NO: 334

AUTHOR: CORBETT

DATE: 1968

LAT: 40.50 N

MAJOR GROUP: SPE SECOND GROUP:

LONG: 105.85 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2 71.20
Al2O3 14.00
Fe2O3 2.70
FeO .10
MgO .20
CaO .40
Na2O 4.60
K2O 5.30

H2O+ .90
H2O-
TH2O
LOI
TiO2 .200
P2O5
MnO

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO

TOTAL 99.600

TRACE ELEMENTS

As
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hf*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

Li
Mo
Nb
Nd
Ni
Pb
Rb
Sb
Sc
Sn
Sr

AUTHOR
NUMBER: 62

RECORD NO: 335

AUTHOR: CORBETT

DATE: 1968

LAT: 40.45 N

MAJOR GROUP: SFE SECOND GROUP:

LONG: 105.80 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	71.50
Al2O3	14.10
Fe2O3	.60
FeO	.30
MgO	
CaO	.40
Na2O	5.20
K2O	4.10
H2O+	3.30
H2O-	
TH2O	
LOI	
TiO2	
F2O5	.100
MnO	
ZrO2	
CO2	
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.600

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hg*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: 174

RECORD NO: 339

AUTHOR: EPIS + C.

DATE: 1974

MAJOR GROUP: TNM

SECOND GROUP: EG

LAT:

N

LONG:

W FLAGS

ROCK NAME: TUFF

CODE: 3880

AGE: STRAT-MIN: OLIG
-MAX: OLIG

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
WELDED TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	72.00
Al2O3	13.10
Fe2O3	1.10
FeO	.20
MgO	.62
CaO	1.10
Na2O	2.70
K2O	4.80
H2O+	3.00
H2O-	1.00
TH2O	
LOI	
TiO2	.180
P2O5	.030
MnO	.060

ZrO2	
CO2 <	.05
SO3	
Cl	
F	
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.940

TRACE ELEMENTS

As	Ta
As	Te*
Au*	Th
B	Tl
Ba	U
Be	V
Bi	W
Ce	Y
Co	Yb
Cr	Zn
Cu	Zr
F	
Ga	
Hs*	
La	
Li	
Mo	
Nb	
Nd	
Ni	
Pb	
Rb	
Sb	
Sc	
Sn	
Sr	

AUTHOR
NUMBER: W170624

RECORD NO: 344

AUTHOR: CROSS

DATE: 1896

LAT: 38.08 N

MAJOR GROUP: WET SECOND GROUP: RO

LONG: 105.34 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC

ISOTOPIC-MIN:

-MAX: MIOC

-MAX:

METHOD:

MINERALS

OCCUR-PETROG.

ALTERATION

MAJOR CONSTITUENTS

SiO2 70.87
 Al2O3 15.18
 Fe2O3 2.18
 FeO .12
 MgO .60
 CaO 1.58
 Na2O 3.47
 K2O 5.04

H2O+
 H2O-
 TH2O 1.08
 LOI
 TiO2
 P2O5
 MnO

ZrO2
 CO2
 SO3
 Cl
 F
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.120

TRACE ELEMENTS

Ag
 As
 Au*
 B
 Ba
 Be
 Bi
 Ce
 Co
 Cr
 Cu
 F
 Ga
 Hg*
 La
 Li
 Mo
 Nb
 Nd
 Ni
 Pb
 Rb
 Sb
 Sc
 Sn
 Sr

Ta
 Te*
 Th
 Tl
 U
 V
 W
 Y
 Yb
 Zn
 Zr

AUTHOR
 NUMBER: F.324

RECORD NO: 113

AUTHOR: MUTSCHLER + DATE: 1983

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: RHYOLITE GLASS

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.
FLOW

ALTERATION

GLASSY

MAJOR CONSTITUENTS

SiO2	71.83
Al2O3	13.28
Fe2O3	.53
FeO	.17
MgO	.05
CaO	.50
Na2O	3.14
K2O	5.31
H2O+	4.30
H2O-	
TH2O	
LOI	
TiO2	.120
P2O5	.030
MnO	.210
ZrO2	
CO2	
SO3	
Cl	
F	.086
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	99.556

TRACE ELEMENTS

As	.02	Ta	
As	1.00	Te*	
Au*	.50	Th	
B		Tl	.90
Ba	20.00	U	5.70
Be	5.00	V	
Bi	.80	W <	2.00
Ce		Y	34.00
Co		Yb	
Cr		Zn	66.00
Cu	5.00	Zr	105.00
F	865.00		
Ga			
Hg*	20.00		
La			
Li	12.00		
Mo	1.00		
Nb	57.00		
Nd			
Ni			
Pb	37.00		
Rb	240.00	AUTHOR	
Sb <	1.00	NUMBER:	1
Sc			
Sn	5.60	RECORD NO:	88
Sr	10.00		

AUTHOR: MUTSCHLER + DATE: 1983

MAJOR GROUP: WET SECOND GROUP: SL LAT: 38.14 N
LONG: 105.45 W FLAGS

ROCK NAME: HIGH-K RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
-MAX: MIOC -MAX:

METHOD:

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLOW
SANIDINE-PHENO

MAJOR CONSTITUENTS

SiO2 76.01
Al2O3 13.02
Fe2O3 .42
FeO .16
MnO .05
CaO .22
Na2O 1.51
K2O 7.52

H2O+ 1.07
H2O-
TH2O
LOI
TiO2 .070
P2O5 .040
MnO .210

ZrO2
CO2
SO3
Cl
F .062
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.362

TRACE ELEMENTS

As 12.00 Ta
As 2.00 Te*
Au* .30 Th
B 3.80 Tl
Ba 48.00 U 4.60
Be 4.00 V
Bi .50 W 2.00
Ce Y 36.00

Co Yb
Cr Zn 130.00
Cu 4.00 Zr 98.00
F 620.00
Ga
Hf* 40.00
La

Li 19.00
Mo < 1.00
Nb 52.00
Nd
Ni
Pb 70.00
Rb 315.00 AUTHOR
Sb 4.00 NUMBER: 6
Sc
Sn 4.80 RECORD NO: 91
Sr 18.00

AUTHOR: MUTSCHLER + DATE: 1983 LAT: 38.14 N
 MAJOR GROUP: WET SECOND GROUP: SL LONG: 105.43 W FLAGS
 ROCK NAME: HIGH-K RHYOLITE CODE: 3010
 AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 OCCUR-PETROG. ALTERATION
 MINERALS
 QUARTZ-PHENO
 SANIDINE-PHENO

MAJOR CONSTITUENTS

SiO2 77.22
 Al2O3 11.91
 Fe2O3 .12
 FeO .39
 MgO .04
 CaO .31
 Na2O .53
 K2O 8.98

 H2O+ .52
 H2O-
 TH2O
 LOI
 TiO2 .040
 P2O5 .040
 MnO .053

 ZrO2
 CO2 .10
 SO3
 Cl
 F .051
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.304

TRACE ELEMENTS

Ag	22.00	Ta	
As	4.00	Te*	
Au*	1.20	Th	
B		Tl	5.70
Ba	174.00	U	5.30
Be	3.00	V	
Bi	7.00	W	2.00
Ce		Y	39.00
Co		Yb	
Cr		Zn	81.00
Cu	7.00	Zr	93.00
F	515.00		
Ga			
Hg*	25.00		
La			
Li	40.00		
Mo	2.00		
Nb	45.00		
Nd			
Ni			
Pb	61.00		
Rb	352.00	AUTHOR	
Sb	10.00	NUMBER: 10	
Sc			
Sn	4.00	RECORD NO:	95
Sr	12.00		

AUTHOR: MUTSCHLER + DATE: 1983

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: HIGH-K RHYOLITE TUFF CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG,
TUFF

ALTERATION

MAJOR CONSTITUENTS

SiO2	75.02
Al2O3	12.63
Fe2O3	.16
FeO	.48
MgO	.43
CaO	.94
Na2O	.69
K2O	9.02
H2O+	.50
H2O-	
TH2O	
LOI	
TiO2	.050
P2O5	.060
MnO	.088
ZrO2	
CO2	
SO3	
Cl	
F	.025
S	
Cr2O3	
NiO	
BaO	
Rb2O	
SrO	
TOTAL	100.093

TRACE ELEMENTS

As	.80	Ta	
As	2.00	Te*	
Au*	.60	Th	
B		Tl	1.50
Ba	697.00	U	2.00
Be	1.00	V	
Bi	.60	W <	2.00
Ce		Y <	5.00
Co		Yb	
Cr		Zn	81.00
Cu	8.00	Zr	68.00
F	250.00		
Ga			
Hg*	50.00		
La			
Li	10.00		
Mo	2.00		
Nb	9.00		
Nd			
Ni			
Pb	61.00		
Rb	201.00	AUTHOR	
Sb	1.00	NUMBER:	11
Sc			
Sn	2.00	RECORD NO:	96
Sr	73.00		

AUTHOR: MUTSCHLER + DATE: 1983
 LAT: 38.14 N
 MAJOR GROUP: WET SECOND GROUP: SL LONG: 105.45 W FLAGS
 ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
 -MAX: MIOC -MAX:
 METHOD:
 ALTERATION
 ARGILLIC-W
 OCCUR-PETROG.
 FLOW
 MINERALS
 QUARTZ-PHENO
 SANIDINE-PHENO
 GARNET
 TOPAZ

MAJOR CONSTITUENTS

SiO2 75.32
 Al2O3 13.60
 Fe2O3 .23
 FeO .28
 MgO .04
 CaO .29
 Na2O 2.50
 K2O 6.21

 H2O+ 1.02
 H2O-
 TH2O
 LOI
 TiO2 .060
 P2O5 .040
 MnO .160

 ZrO2
 CO2
 SO3
 Cl
 F .277
 S
 Cr2O3
 NiO
 BaO
 Rb2O
 SrO
 TOTAL 100.027

TRACE ELEMENTS

Ag	.10	Ta	
As	1.00	Te*	
Au*	.40	Th	
B		Tl	2.50
Ba	48.00	U	4.90
Be	4.00	V	
Bi	.60	W	3.00
Ce		Y	31.00
Co		Yb	
Cr		Zn	58.00
Cu	3.00	Zr	105.00
F	2770.00		
Ga			
Hg*	30.00		
La			
Li	25.00		
Mo	2.00		
Nb	53.00		
Nd			
Ni			
Pb	85.00		
Rb	244.00	AUTHOR	
Sb	2.00	NUMBER:	12
Sc			
Sn	6.00	RECORD NO:	97
Sr	9.00		

AUTHOR: MUTSCHLER + DATE: 1983

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIIC-MIN:
-MAX:

METHOD:

MINERALS
QUARTZ-PHENO
SANIDINE-PHENO

OCCUR-PETROG.
FLOW

ALTERATION
ARGILLIC-W

MAJOR CONSTITUENTS

SiO2 76.81
Al2O3 13.08
Fe2O3 .26
FeO .30
MgO .05
CaO .27
Na2O 2.40
K2O 5.41

H2O+ .94
H2O-
TH2O
LOI
TiO2 .080
P2O5 .050
MnO .180

ZrO2
CO2
SO3
Cl
F .210
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.040

TRACE ELEMENTS

As .90 Ta
As 2.00 Te*
Au* .50 Th
B Tl 2.30
Ba 36.00 U 5.90
Be 5.00 V
Bi .70 W 4.00
Ce Y 33.00

Co Yb
Cr Zn 145.00
Cu 4.00 Zr 98.00
F 2100.00
Ga
Hs* 40.00
La

Li 21.00
Mo 1.00
Nb 54.00
Nd
Ni
Pb 105.00
Rb 162.00 AUTHOR
Sb 3.00 NUMBER: 13
Sc
Sn 5.10 RECORD NO: 98
Sr 8.00

AUTHOR: MUTSCHLER + DATE: 1983

MAJOR GROUP: WET SECOND GROUP: SL LAT: 38.14 N
LONG: 105.42 W FLAGS

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
-MAX: MIOC -MAX:

METHOD:

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLOW SILICIFICATION-M

MAJOR CONSTITUENTS

SiO2 80.16
Al2O3 10.22
Fe2O3 .13
FeO .40
MgO .02
CaO .18
Na2O .60
K2O 4.62

H2O+ 3.67
H2O-
TH2O
LOI
TiO2 .030
P2O5 .030
MnO .060

ZrO2
CO2 .03
SO3
Cl
F .117
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.267

TRACE ELEMENTS

Ag 1.30 Ta
As 3.00 Te*
Au* 1.00 Th
B Tl 2.10
Ba 46.00 U 2.90
Be 4.00 V
Bi 4.00 W 2.00
Ce Y 18.00

Co Yb
Cr Zn 77.00
Cu 3.00 Zr 86.00
F 1175.00
Ga
Hg* 10.00
La

Li 14.00
Mo 1.00
Nb 44.00
Nd
Ni
Pb 38.00
Rb 151.00 AUTHOR
Sb < 1.00 NUMBER: 17
Sc
Sn 6.10 RECORD NO: 102
Sr 11.00

AUTHOR: MUTSCHLER + DATE: 1983

MAJOR GROUP: WET SECOND GROUP: SL LAT: 38.13 N
LONG: 105.42 W FLAGS

ROCK NAME: RHYOLITE CODE: 3010

AGE: STRAT-MIN: MIOC ISOTOPIC-MIN:
-MAX: MIOC -MAX:
METHOD:

MINERALS OCCUR-PETROG. ALTERATION
QUARTZ-PHENO FLOW SILICIFICATION-M

MAJOR CONSTITUENTS

SiO2 81.62
Al2O3 10.58
Fe2O3 .10
FeO .59
MgO .03
CaO .44
Na2O .61
K2O 4.60

H2O+ .75
H2O-
TH2O
LOI
TiO2 .030
P2O5 .040
MnO .061

ZrO2
CO2 .03
SO3
Cl
F .009
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.490

TRACE ELEMENTS

Ag 7.80 Ta
As 2.00 Te*
Au* .40 Th
B Tl 1.60
Ba 55.00 U 4.70
Be 4.00 V
Bi 1.00 W < 2.00
Ce Y 23.00

Co Yb
Cr Zn 63.00
Cu 3.00 Zr 91.00
F 88.00
Ga
Hs* 10.00
La

Li 10.00
Mo 1.00
Nb 49.00
Nd
Ni
Pb 115.00
Rb 115.00 AUTHOR
Sb < 1.00 NUMBER: 18
Sc
Sn 6.00 RECORD NO: 103
Sr 11.00

AUTHOR: CROSS

DATE: 1896

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: PITCHSTONE

CODE: 2830

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:

METHOD:

MINERALS

OCCUR-PETROG.

ALTERATION

FLOW
GLASSY

MAJOR CONSTITUENTS

SiO2 71.56
Al2O3 13.10
Fe2O3 .66
FeO .28
MgO .14
CaO .74
Na2O 3.77
K2O 4.06

H2O+
H2O-
TH2O 5.52
LOI
TiO2
P2O5
MnO .160

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.990

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hf*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: F.324

RECORD NO: 107

AUTHOR: CROSS

DATE: 1896

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: PITCHSTONE

CODE: 2830

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIIC-MIN:
-MAX:
METHOD:

MINERALS

OCCUR-PETROG.
FLOW

ALTERATION

GLASSY

MAJOR CONSTITUENTS

SiO2 73.11
Al2O3 13.16
Fe2O3 .62
FeO .23
MnO .19
CaO .54
Na2O 2.85
K2O 5.10

H2O+
H2O-
TH2O 4.05
LOI
TiO2
P2O5
MnO .140

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 99.990

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce
Co
Cr
Cu
F
Ga
Hf*
La

Ta
Te*
Th
Tl
U
V
W
Y
Yb
Zn
Zr

AUTHOR
NUMBER: P.324

RECORD NO: 108

AUTHOR: CROSS

DATE: 1896

LAT: 38.14 N

MAJOR GROUP: WET SECOND GROUP: SL

LONG: 105.45 W FLAGS

ROCK NAME: RHYOLITE

CODE: 3010

AGE: STRAT-MIN: MIOC
-MAX: MIOC

ISOTOPIC-MIN:
-MAX:
METHOD:

MINERALS

OCCUR-PETROG.

ALTERATION

MAJOR CONSTITUENTS

SiO2 75.39
Al2O3 13.65
Fe2O3 .38
FeO .18
MgO .15
CaO .51
Na2O 1.84
K2O 6.81

H2O+
H2O-
TH2O 1.13
LOI
TiO2
P2O5
MnO .140

ZrO2
CO2
SO3
Cl
F
S
Cr2O3
NiO
BaO
Rb2O
SrO
TOTAL 100.180

TRACE ELEMENTS

Ag
As
Au*
B
Ba
Be
Bi
Ce

Co
Cr
Cu
F
Ga
Hg*
La

Ta
Te*
Th
Tl
U
V
W
Y

Yb
Zn
Zr

AUTHOR
NUMBER: F.324

RECORD NO: 110

