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Evaluation of faults and their effect on ground-water flow southwest of Frenchman Flat, Nye and Clark Counties, Nevada: A Digital Database

By

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Open - File Report 98-580

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Introduction

This Open-File report is a digital geologic map database. This pamphlet serves to introduce and describe the digital data. There is no paper map included in the Open-File report. The report does include, however, PostScript plot files containing images of four geologic map sheets with explanation, as well as the accompanying text describing the geology of the area. For those only interested in a paper plot of information contained in the database or in obtaining the PostScript plot files, please see the section entitled "For Those Who Don't Use Digital Geologic Map Databases" below.

This digital map database, compiled from previously published and unpublished data, and new mapping by the authors, represents the general distribution of bedrock and surficial deposits in the region southwest of Frenchman Flat, in southern Nevada. Together with the accompanying text file (frnc.txt or frnc.ps), it provides current information on the geologic structure and stratigraphy of the area covered. The database delineates map units that are identified by general age and lithology following the stratigraphic nomenclature of the U.S. Geological Survey. The scale of the source maps limits the spatial resolution (scale) of the database to 1:24.000 or smaller. The content and character of the database, as well as three methods of obtaining the database, are described below.

For those who don't use digital geologic map databases

For those interested in the geology of the region southwest of Frenchman Flat, Nevada who do not use an ARC/INFO compatible Geographic Information System (GIS), we have provided four sets of plot files containing images of much of the information in the database. There is a set of images in PostScript format (see the sections "PostScript plot files" below).

Those interested who have computer capability can access the plot file packages in any of the three ways described below (see the section "Obtaining the digital database and plot file packages"). However, it should be noted the plot file packages do require gzip and tar utilities to access the plot files. Therefore additional software, available free on the Internet, may be required to use the plot files (see section "Tar files").

Those without computer capability can obtain plots of the map files through USGS plot-on-demand service for digital geologic maps (see section "Obtaining plots from USGS Open-File Services") or from an outside vendor (see section "Obtaining plots from an outside vendor").

Digital Open-File contents

This Open-File report consists of two digital packages. The first is the PostScript Plotfile Package, which consists of PostScript plot files of four geologic maps with explanations (Sheets 1-4), as well as a PostScript version of a geologic description pamphlet and figures 1-5. The second is the Digital Database Package, and contains the geologic map database itself, and the supporting data, including base maps, map explanation, geologic description, and references.

PostScript plot file package

This package contains the images described here in PostScript format (see below for more information on PostScript plot files):

mrc981023.ps	A PostScript plottable file containing an image of the geologic map and base maps of the Mercury 7.5 minute quadrangle at a scale of 1:24,000 (Sheet 1).
cdr981021.ps	A PostScript plottable file containing an image of the geologic map and base maps of the Camp Desert Rock 7.5 minute quadrangle at a scale of 1:24,000 (Sheet 2).
spnw981021.ps	A PostScript plottable file containing an image of the geologic map and base maps of the Specter NW 7.5 minute quadrangle at a scale of 1:24,000 (Sheet 3).
spsw981021.ps	A PostScript plottable file containing an image of the geologic map and base maps of the Specter SW 7.5 minute quadrangle at a scale of 1:24,000 (Sheet 4).
frnc.ps	A PostScript plot file of a report containing detailed unit descriptions and geological information, plus sources of data and references cited.

fig1.eps An Encapsulated PostScript file of Figure 1 which is referred to by frnc.ps. Shaded relief map of the western conterminous United States. The Basin and Range physiographic province, the Great Basin (the northern part of the Basin and Range physiographic province), and the Nevada Test Site (NTS) are outlined.

fig2.eps An Encapsulated PostScript file of Figure 2 which is referred to by frnc.ps. Map of southern Nevada and adjacent parts of California showing the region of the Death Valley ground-water flow system. The Tertiary volcanic rock flow path and the Paleozoic carbonate rock flow paths are shown.

fig3.eps An Encapsulated PostScript file of Figure 3 which is referred to by frnc.ps. Map of southern Nevada and adjacent California showing the location of major topographic features, highways, and populated areas.

fig4.eps An Encapsulated PostScript file of Figure 4 which is referred to by frnc.ps. Map of southern Nevada showing basins (unshaded) and ranges (shaded) near Frenchman Flat and the Las Vegas Valley shear zone.

fig5.eps An Encapsulated PostScript file of Figure 5 which is referred to by frnc.ps. Geologic map showing the ground-water flow path south and west of Frenchman Flat (broad arrows). The small thin arrows show the direction of the ground- water flow that encounters aquitard rocks. Paired heavy arrows show inferred sense of slip on strike-slip faults. Carbonate rocks are unshaded, siliceous rocks are shaded. Heavy lines are faults. The ground-water passes southwestward through carbonate rocks beneath the Spotted Range, Mercury Valley and the Specter Range. This route is controlled in the Specter Range, and probably in Rock Valley by siliceous clastic aquitard rocks in the upper plate of the Specter Range thrust.

Digital database package

The database package includes geologic map database files for the Mercury, Camp Desert Rock, Specter Range NW and Specter Range SW quadrangles. The digital maps, or coverages, along with their associated INFO directory have been converted to uncompressed ARC/INFO export files. ARC export files promote ease of data handling, and are usable by some Geographic Information Systems in addition to ARC/INFO (see below for a discussion of working with export files). The ARC export files and the associated ARC/INFO coverages and directories, as well as the additional digital material included in the database, are described below:

ARC/INFO export file	Resultant Coverage	Description of Coverage
Mercury quadrangle		
mrc_geo.e00	mrc_geo/	Faults, depositional contacts, and rock units in the quadrangle
mrc_sym.e00	mrc_sym/	Ball and bar and strike slip arrows, showing relative fault movement, in the quadrangle
mrc_tpo.e00	mrc_tpo/	Topographic base map of the quadrangle
Camp Desert Rock quadrangle		
cdr_geo.e00	cdr_geo/	Faults, depositional contacts, and rock units in the quadrangle
cdr_sym.e00	cdr_sym/	Ball and bar and strike slip arrows, showing relative fault movement, in the quadrangle
cdr_tpo.e00	cdr_tpo/	Topographic base map of the quadrangle
Specter Range NW quadrangle		
spnw_geo.e00	spnw_geo/	Depositional contacts and rock units in the quadrangle

spnw_sym.e00	spnw_sym/	Ball and bar and strike slip arrows, showing relative fault movement, in the quadrangle
spnw_flt.e00	spnw_flt/	Faults in the quadrangle
spnw_tpo.e00	spnw_tpo/	Topographic base map of the quadrangle

<u>Specter Range SW quadrangle</u>

spsw_geo.e00	spsw_geo/	Depositional contacts and rock units in the quadrangle
spsw_sym.e00	spsw_sym/	Ball and bar and strike slip arrows, showing relative fault movement, in the quadrangle
spsw_flt.e00	spsw_flt/	Faults in the quadrangle
spsw_tpo.e00	spsw_tpo/	Topographic base map of the quadrangle

The database package also includes the following files:

ASCII text files, including explanatory text, PostScript plot files, Encapsulated PostScript files from Adobe Illustrator 6.0 used as map collars and figures 1-5 (EPS and JPEG) for the geologic report, ARC Macro Language files for plotting maps, custom ARC lineset and a ARC Macro Language file for conversion of ARC export files into ARC coverages:

frnc.ps A PostScript plot file of a report containing detailed unit descriptions and geological information, plus sources of data and references cited

frnc.txt A text-only file containing an unformatted version of frnc.ps

fig1.eps An Encapsulated PostScript file of Figure 1 which is referred to by frnc.ps. Shaded relief map of the western conterminous United States. The Basin and Range physiographic province, the Great Basin (the northern part of the Basin and Range physiographic province), and the Nevada Test Site (NTS) are outlined.

fig2.eps An Encapsulated PostScript file of Figure 2 which is referred to by frnc.ps. Map of southern Nevada and adjacent parts of California showing the region of the Death Valley ground-water flow system. The Tertiary volcanic rock flow path and the Paleozoic carbonate rock flow paths are shown.

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fig5.eps An Encapsulated PostScript file of Figure 5 which is referred to by frnc.ps. Geologic map showing the ground-water flow path south and west of Frenchman Flat (broad arrows). The small thin arrows show the direction of the ground- water flow that encounters aquitard rocks. Paired heavy arrows show inferred sense of slip on strike-slip faults. Carbonate rocks are unshaded, siliceous rocks are shaded. Heavy lines are faults. The ground-water passes southwestward through carbonate rocks beneath the Spotted Range, Mercury Valley and the Specter Range. This route is controlled in the Specter Range, and probably in Rock Valley by siliceous clastic aquitard rocks in the upper plate of the Specter Range thrust.

fig1.jpg A JPEG image of Figure 1 which is referred to by frnc.ps.

fig2.jpg A JPEG image of Figure 2 which is referred to by frnc.ps.

fig3.jpg	A JPEG image of Figure 3 which is referred to by frnc.ps.
fig4.jpg	A JPEG image of Figure 4 which is referred to by frnc.ps.
fig5.jpg	A JPEG image of Figure 5 which is referred to by frnc.ps.
readme.txt	This file
readme.ps	This file as PostScript plot file
import.aml	ASCII text file in ARC Macro Language to convert ARC export files to ARC coverages in ARC/INFO
merco.eps	Encapsulated PostScript Adobe Illustrator 6.0 file (map collar) Mercury quadrangle
cdro.eps	Encapsulated PostScript Adobe Illustrator 6.0 file (map collar) Camp Desert Rock quadrangle
spnwo.eps	Encapsulated PostScript Adobe Illustrator 6.0 file (map collar) Specter Range NW quadrangle
spswo.eps	Encapsulated PostScript Adobe Illustrator 6.0 file (map collar) Specter Range SW quadrangle
merc.aml	Plot AML generates PostScript of Mercury quadrangle (Sheet 1)
camp.aml	Plot AML generates PostScript of Camp Desert Rock quadrangle (Sheet 2)
spnw.aml	Plot AML generates PostScript of Specter Range NW quadrangle (Sheet 3)
spsw.aml	Plot AML generates PostScript of Specter Range SW quadrangle (Sheet 4)
tom1.lin	Custom ARC lineset
johanna.txt	Custom ARC textset
utm.prj	UTM projection file used by ARC plot amls
geo.prj	Geographic projection file used by ARC to project map to UTM
uncom	Parameter file used by ARC PostScript command in plot amls

The following supporting directory is not included in the database package, but is produced in the process of reconverting the export files into ARC coverages:

info/	INFO directory containing files supporting the databases.

Tar files

The two data packages described above are stored in tar (UNIX tape archive) files. A tar utility is required to extract the database from the tar file. This utility is included in most UNIX systems, and can be obtained free of charge over the Internet from Internet Literacy's Common Internet File Formats Webpage (http://www.matisse.net/files/formats.html). Both tar files have been compressed, and may be uncompressed with **gzip**, which is available free of charge over the Internet via links from the USGS Public Domain Software page (http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/public.html). When the tar file is uncompressed and the data is extracted from the tar file, a directory is produced that contains the data in the package as described above. The specifics of the tar files are listed below:

Name of compressed tar file	Size of compressed tar file (uncompressed)	Directory produced when extracted from tar file	Data package contained
frofrps.tar.gz	13.3 MB (51.4 MB)	frofrps/	PostScript Plotfile Package
frofr.tar.gz	31.3 MB (113.8 MB)	frofr/	Digital Database Package

PostScript plot files

For those interested in the geology of the region southwest of Frenchman Flat, Nevada who don't use an ARC/INFO compatible GIS system we have included a separate data package with five PostScript plot files. The first four each contain a color plot of the geologic map database at 1:24,000 scale (Sheet 1-4, mrc981023.ps, cdr981021.ps, spnw981021.ps, spsw981021.ps). Because this release is primarily a digital database, the plot files (and plots derived therefrom) have not been edited to conform to U.S. Geological Survey standards. Small units have not been labeled with leaders and in some instances map features or annotation overlap. Sample plots by the authors have proven to be quite legible and useful, however. In addition, another PostScript file containing the geologic description and discussion is provided (frnc.ps). It contains five figures which were converted to PostScript and JPEG images (fig1.eps, fig2.eps, fig3.eps, fig4.eps, fig5.eps, fig1.jpg, fig2.jpg, fig3.jpg, fig4.jpg, fig5.jpg).

The PostScript image of the geologic maps (Sheet 1-4) is 33 inches wide by 33 inches high, so it requires a large plotter to produce paper copies at the intended scale. The geologic description and figures are on 8.5 by 11 inch pages. The PostScript plot files for maps were produced by the PostScript command using the uncompressed option in ARC/INFO version 7.1.1. The PostScript plot files for pamphlets were produced in Microsoft Word 5.1a using the Destination PostScript File option from the Print command. The five figures for the pamphlet were produced in Adobe Illustrator 7 and saved as Encapsulated PostScript files, as well as the four map templates (merco.eps, cdro.eps, spnwo.eps, spswo.eps), which each contain a color plot of the map key, index map, and other graphics in map collar, (they were included as Placed EPS in the PostScript files from ARC/INFO).

Each final ARC/INFO PostScript file contains an Encapsulated PostScript file generated by Adobe Illustrator verion 6.0 and placed into the ARC/INFO graphic metafile by an ARC plotting AML. These EPS files include the marginal graphics and explanation of each of the maps. In the Mercury ARC/INFO PostScript file named mrc981023.ps, the EPS is called merco.eps. In the Camp Desert Rock PostScript file named cdr981021.ps, the EPS is called cdro.eps. In the Specter NW PostScript file called spnw981021.ps, the EPS is called spnwo.eps. In the Specter SW PostScript file called spsw981021.ps, the EPS is called spswo.eps.

The merc.aml, camp.aml, spnw.aml, and spsw.aml take the various coverages and produce printable PostScript files of the Mercury, Camp Desert Rock, Specter Range NW and Specter Range SW files. The import.aml imports all the export (.e00) files into ARC/INFO.

Digital database format

The databases in this report were compiled in ARC/INFO, a commercial Geographic Information System (Environmental Systems Research Institute, Redlands, California). The files are in COVERAGE (ARC/INFO vector data) format. Coverages are stored in uncompressed ARC export format (ARC/INFO version 7.1.1). ARC/INFO export files (files with the .e00 extension) can be converted into ARC/INFO coverages in ARC/INFO (see below) and can be read by some other Geographic Information Systems, such as MapInfo via ArcLink and ESRI's ArcView (version 1.0 for Windows 3.1 to 3.11 is available for free from ESRI's web site: http://www.esri.com). The digital compilation was done in version 7.1.1 of ARC/INFO.

Obtaining the Digital Database and Plotfile Packages

The digital data can be obtained in any of three ways:

a. From the Western Region Geologic Information Web Page.
b. Anonymous ftp over the Internet
c. Sending a tape with request

To obtain tar files of database or plot file packages from the USGS web pages:

The U.S. Geological Survey now supports a set of graphical pages on the World Wide Web. Digital publications (including this one) can be accessed via these pages. The location of the main Web page for the entire USGS is
http://www.usgs.gov

The Web server for digital publications from the Western Region is
http://wrgis.wr.usgs.gov

Go to
http://wrgis.wr.usgs.gov/open-file/of98-580

to access this publication. Besides providing easy access to the entire digital database, the Western Region Web page also affords easy access to the PostScript plot files for those who do not use digital databases (see below).

To obtain tar files of database or plot file packages by ftp:

The files in these reports are stored on the U.S. Geological Survey Western Region FTP server. The Internet ftp address of this server is:

ftp://wrgis.wr.usgs.gov

The user should log in with the user name anonymous and then input their e-mail address as the password. This will give the user access to all the publications available via ftp from this server.

The files in this report are stored in the subdirectory:

pub/open-file/of98-580

To obtain tar files of database or plot file packages on tape:

Database files, PostScript plot files, and related files can be obtained by sending a tape with request and return address to:

Frenchman Flat, Nevada Geologic Database
c/o Database Coordinator
U.S. Geological Survey
345 Middlefield Road, M/S 975
Menlo Park, CA 94025

Do not omit any part of this address!

NOTE: Be sure to include with your request the exact names, as listed above, of the tar files you require. An Open-File Report number is not sufficient, unless you are requesting both the database package and plot file package for the report.

The compressed tar file will be returned on the tape. The acceptable tape types are:

2.3 or 5.0 GB, 8 mm Exabyte tape.

Obtaining plots from a commercial vendor

Those interested in the geologic maps of the Frenchman Flat area, but who use neither a computer nor the Internet, can still obtain the information. We will provide the PostScript plot files on digital tape (details below) for use by commercial vendors who can make large-format plots. Send a blank tape with request and return address to:

Frenchman Flat, Nevada Geologic Map Plotfiles
c/o Database Coordinator

U.S. Geological Survey
345 Middlefield Road, M/S 975
Menlo Park, CA 94025

Do not omit any part of this address!

The compressed tar file will be returned on the tape. The acceptable tape types are:

2.3 or 5.0 GB, 8 mm Exabyte tape.

Make sure your vendor is capable of reading these tape types and PostScript plot files. Important information regarding tape file format is included in the sections "Database Release Format", "Tar Files", and "PostScript Plot Files" above, so be certain to provide a copy of this document to your vendor.

Obtaining plots from USGS Open-File Services

NOTE: As of this writing, plot-on-demand is **not available** from USGS. It is anticipated later in 1998 or 1999.

U.S. Geological Survey is planning to provide a plot-on-demand service for map files, such as those described in this report, through Open-File Services. In order to obtain plots, contact Open-File Services at:

USGS Information Services
Box 25286
Denver Federal Center
Denver, CO 80225-0046

(303) 202-4200
1-800-USA-MAPS

FAX: (303) 202-4695

e-mail: infoservices@usgs.gov

Be sure to include with your request the Open-File Report number and the exact names, as listed in the Database Contents section above, of the plot files you require. An Open-File Report number and its letter alone may not be sufficient, unless you are requesting plots of all the plot files for that report.

Converting ARC export files

ARC export files are converted to ARC coverages using the ARC command IMPORT with the option COVER. To ease conversion and maintain naming conventions, we have included an ASCII text file in ARC Macro Language that will convert all of the export files in the database into coverages and create the associated INFO directory. From the ARC command line type:

```
Arc:  &run import.aml
```

ARC export files can also be read by some other Geographic Information Systems. Please consult your GIS documentation to see if you can use ARC export files and the procedure to import them.

Digital compilation

Several different coverages were generated during the construction of each of the four geologic maps. All maps were digitized by hand from rolled paper copies of each map, using a CALCOMP 9100 SMART digitizing table and ESRI ARC/INFO software.

Geology and faults for the Mercury quadrangle were compiled from Barnes and others (1982); the Camp Desert Rock quadrangle were compiled from Hendrichs (1968). Digitized faults and geology are stored in the ARC/INFO coverages mrc_geo, and cdr_geo. Separate geology and fault coverages for each of the Specter Range NW and Specter Range SW quadrangle maps were digitized as spnw_geo, spnw_flt, spsw_geo, and spsw_flt. The geology and faults for the Specter Range NW were compiled from Sargent and Stewart (1971); the Specter Range SW from Burchfiel (1965).

The faults are categorized into their possible importance in affecting ground water flow. Many of the faults probably have little or no effect in ground water flow, while some faults may affect the flow of ground water by increasing fracture permeability or by acting as a flow barrier. There are also many calcite veins in the Camp Desert Rock, Specter Range NW and Specter Range SW quadrangles, which are categorized as faults for the purpose of these coverages. These calcite veins were probably deposited by the flow of calcium-rich ground water.

Annotation

Within each geology polygon coverage is an annotation subclass, anno.mapu. This annotation layer is called by the plot ARC Macro Language files (merc.aml, camp.aml, spnw.aml, and spsw.aml) used by ARC/INFO, calling a custom ARC textset, johanna.txt. The plot amls convert all coverages into a four PostScript files according to quadrangle. The annotation is to label the larger polygons with their map unit abbreviations. Smaller polygons, in which the annotation would not fit, can be identified on plots by the color of the polygon.

Base maps

The source of the base maps used is the U.S. Geological Survey, 1:24,000 scale topographic maps, which have a 20-meter contour intervals (1961, revised 1983). One base map layer for each of the four 7.5 minute quadrangles was prepared from scale-stable, photographically reproduced, clear film, black line, positive mylars made from negatives. Topographic bases for the Mercury, Camp Desert Rock, Specter SW, and Specter NW were scanned on an Ideal rasterizing scanner at 400 dpi as 1-bit TIFF images. Scanned TIFF images of the bases were vectorized using a centerline trace with Corel Trace software and saved into an AutoCad DXF format. The AutoCad file was converted into an ARC/INFO coverage using the ARC dxfarc command. Scanned and vectorized images were transformed from scanner coordinates to projection coordinates with digital tics placed by hand at map corners. The images were then trimmed interactively by hand using ARC/INFO and ArcEdit to conform to the area of the geologic coverages. These base map layers are digital images but no information other than location is attached to the lines. The base maps are provided for reference only.

Spatial resolution

Uses of this digital geologic map should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The fact that this database was edited at a scale of 1:24,000 means that higher resolution information is not present in the dataset. Plotting at scales larger than 1:24,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, where this database is used in combination with other data of higher resolution, the resolution of the combined output will be limited by the lower resolution of these data.

Database specifics

The map databases consist of ARC coverages and supporting INFO files, which are stored in a UTM (Universal Transverse Mercator) projection (Table 1). Digital tics define a 7.5 minute grid of latitude and longitude in the coverages corresponding with quadrangle corners.

Table 1 - Map Projection

The maps are stored in UTM projection

PROJECTION UTM	
UNITS METERS	-on the ground
ZONE 11	-UTM zone
PARAMETERS	
END	

The content of the geologic database can be described in terms of the lines, points, and the areas that compose the map. Descriptions of the database fields use the terms explained in Table 2.

Table 2 - Field Definition Terms

ITEM NAME	name of the database field (item)
WIDTH	maximum number of digits or characters stored
OUTPUT	output width
TYPE	B-binary integer, F-binary floating point number, I-ASCII integer, C-ASCII character string
N. DEC.	number of decimal places maintained for floating point numbers

Lines

The lines (arcs) are recorded as strings of vectors and are described in the arc attribute table (Table 3). They define the boundaries of the map units, faults, calcite veins, and the map boundaries. These distinctions, including the geologic identities of the unit boundaries, are recorded in the TYPE field according to the line types listed in Table 4. The Specter Range NW and SW geology maps do not contain arc attribute tables, however, the fault maps for those map do (spnw_flt and spsw_flt). The Mercury, Camp Desert Rock, Specter NW and Specter SW topographic coverages (mrc_tpo, cdr_tpo, spnw_tpo, spsw_tpo) do not contain arc attribute tables.

Table 3 - Content of the Arc Attribute Tables (mrc_geo, cdr_geo, spnw_flt and spsw_flt)

ITEM NAME	WIDTH	OUTPUT	TYPE	N. DEC	
FNODE#	4	5	B		starting node of arc (from node)
TNODE#	4	5	B		ending node of arc (to node)
LPOLY#	4	5	B		polygon to the left of the arc
RPOLY#	4	5	B		polygon to the right of the arc
LENGTH	4	12	F	3	length of arc in meters
<coverage>#	4	5	B		unique internal control number
<coverage>-ID	4	5	B		unique identification number
SYMBOL	8	8	I		user-defined, calcite veins (cdr_geo)
TYPE	8	8	I		user-defined, line type (see Table 4)

Table 4 - Line Types Recorded in the TYPE Field

Both the Camp Desert Rock and Mercury coverages have the fault coverage (arcs) within the rock unit (polygon) coverage. For the two Specter Range maps, the faults are digitized into coverages separate from the rock unit polygon coverages, spnw_flt and spsw_flt, respectively. The faults are labeled as type, a number which corresponds both to the particular type of fault and to the line used to draw the fault from the tom1.lin lineset.

1 = solid black thrust (solid black line with thrust teeth; tom1.lin = 1)
2 = dotted black thrust (dotted black line with thrust teeth; tom1.lin = 97)
3 = dotted green thrust (dotted green line with thrust teeth; tom1.lin = 97)
4 = solid orange (solid orange line; tom1.lin = 6)
5 = solid black (solid black line; tom1.lin = 5)
6 = solid orange (solid orange line; tom1.lin = 6)
7 = solid green (solid green line; tom1.lin = 7)
8 = solid purple (solid purple line; tom1.lin = 8)
9 = dotted orange (dotted orange line; tom1.lin = 9)
10 = dotted black (dotted black line; tom1.lin = 10)
11 = dotted green (dotted green line; tom1.lin = 11)
12 = dotted purple (dotted purple line; tom1.lin = 12)
14 = solid red (solid red line; tom1.lin = 14)
22 = dotted black (dotted black line; tom1.lin = 22)

The orange lines are actually yellow and the purple lines are blue in the tom1.lin lineset. A command in the ARC plotting AML is necessary to change the color to the desired one. The arc attributes for spnw_flt and spsw_flt are the same for the Camp Desert Rock and Mercury coverages. The fault arcs are divided into arc segments plotted as solid lines, which are exposed faults. Arc segments are plotted as dotted lines representing buried fault traces.

Areas

Map units (polygons) are described in the polygon attribute table (Table 5). The identities of the map units from compilation sources are recorded in the MAP_UNIT field by map label (Table 6). Map units are described more fully in the accompanying text file frnc.txt or frnc.ps. Note that ARC/INFO coverages cannot contain both point and polygon information, so only coverages with polygon information will have a polygon attribute table, and these coverages will not have a point attribute table.

The distribution of rock units was digitized into the geology coverages as arcs, which were cleaned and built into polygon coverages. Each polygon coverage has two attributes, MAP_UNIT and SYMBOL. MAP_UNIT is the abbreviation used for the different rock units, and SYMBOL is the number of the color used in the ARC/INFO shadeset alc1.shd. The MAP_UNIT and SYMBOL attributes are listed below:

Q = Quaternary alluvium (no symbol; no color)

S = laminated carbonate rocks ; 73 (yellow)

C = Cenozoic rocks (symbol 949; green)

Ps = Paleozoic carbonate (symbol 550; pink)

Pc = Paleozoic quartzite; 302 (blue green) and 359 (light blue green)

More complete descriptions of the various rock units can be found in the geologic report that accompanies this dataset, frnc.txt or frnc.ps.

Table 5 - Content of the Polygon Attribute Tables

ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
AREA	4	12	F	3	area of polygon in square meters
PERIMETER	4	12	F	3	length of perimeter in meters

<coverage>#	4	5	B	unique internal control number
<coverage>-ID	4	5	B	unique identification number
MAP_UNIT	25	5	C	user-defined, rock unit abbreviation
SYMBOL	8	8	I	user-defined, color number in shadeset

Table 6 - Map Units
(See frnc.txt or frnc.ps for descriptions of units)

Q
S
C
Ps
Pc

Points and Arrows

The point attribute table consists of the following fields:

Table 7 - Content of Point Attribute Tables

ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
AREA	4	12	F	3	no definition for a point
PERIMETER	4	12	F	3	no definition for a point
<coverage>#	4	5	B	-	unique ARC/INFO internal control number
<coverage>-ID	4	5	B	-	unique ARC/INFO internal identification number
STRIKE	8	8	I	-	user-defined, symbol angle for plotting
SYMBOL	8	8	I	-	user-defined, markerset symbol number

The point coverages, mrc_sym, cdr_sym, spnw_sym, and spsw_sym, contain points that are the locations of the bar and ball symbols. These symbols are used to indicate normal movement on faults. The point attributes used in the coverages are STRIKE and SYMBOL. STRIKE is the angle, relative to the fault, at which the marker is drawn. The angle at which ARC/INFO draws symbols is slightly different than the standard geographic/geologic method. Geography/geology has 0, pointing north, toward the top of the page; 9 0, pointing east, toward the right of the page; 180, south, toward the bottom of the page; 270, west, toward the left of the page; and 360 equal to 0. ARC/INFO, however, uses a cartesian coordinate system, where 0, points east, to the right of the page; 90, north, to the top of the page; 180, west, to the left of the page; 270, south, to the bottom of the page; and 360 equal to 0. The number in the STRIKE attribute for the point coverage is the angle in the ARC/INFO system, not the real world geographic system. Although the strike is not given in the real world system, the bar and ball are drawn in such a way that they appear to be in real world coordinates. SYMBOL is the number (145) of the symbol in the symbolset mineral.mrk which is used to draw the bar and ball. The same coverages contain arcs that display the arrows of strike-slip movement on those faults that contain a component of strike-slip movement. The arc attribute tables for these arcs contains only the default system defined items. The location of the points and arrows has been selected for cartographic purposes and has no other significance.

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References Cited

Barnes, Harley, Ekren, E.B., Rogers, C.L., and Hedlund, D.C., 1982, Geologic and tectonic maps of the Mercury Quadrangle, Nye and Clark Counties, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1197, scale 1:24,000.

Burchfiel, B.C., 1965, Structural geology of the Specter Range quadrangle, Nevada, and its regional significance: Geological Society of American Bulletin, v. 76, p. 175-192.

Henrichs, E.N., 1968, Geologic map of the Camp Desert Rock Quadrangle, Nye County, Nevada: U.S. Geological Survey Geologic Quadrangle Map GQ-726, scale 1:24,000.

Sargent, K.A., and Stewart, J.H., 1971, Geologic map of the Specter Range NW Quadrangle, Nye Country, Nevada: U.S.Geological Survey Geologic Quadrangle Map GQ-884, scale 1:24,000.