Preliminary Digital Geologic Maps of the Mariposa, Kingman, Trona, and Death Valley Sheets, California

by Frank A. D'Agnese, Claudia C. Faunt, and A. Keith Turner

U.S. GEOLOGICAL SURVEY

Open-File Report 94-318

Prepared in cooperation with the
NEVADA OPERATIONS OFFICE
U.S. DEPARTMENT OF ENERGY under
Interagency Agreement DE-AI08-92NV10874

Denver, Colorado
1995

U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Gordon P. Eaton, Director

The use of trade, product, industry, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

For additional information write to:
Chief, Earth Science Investigations Program
Yucca Mountain Project Branch
U.S. Geological Survey
Box 25046, MS 421
Denver Federal Center
Denver, CO 80225

Copies of this report can be purchased from:
U.S. Geological Survey
Earth Science Information Center
Open-File Reports Section
Box 25286, MS 517
Denver Federal Center
Denver, CO 80225

CONTENTS

FIGURES

TABLES

Keywords:

digital map, Death Valley, Yucca Mountain

Preliminary Digital Geologic Maps of the Mariposa, Kingman, Trona, and Death Valley Sheets, California

By Frank A. D'Agnese, Claudia C. Faunt, and A. Keith Turner

Abstract

Parts of four 1:250,000-scale geologic maps by the California Department of Natural Resources, Division of Mines and Geology have been digitized for use in hydrogeologic characterization. These maps include the area of California between lat 35°N; long 115°W. and lat 38°N., long 118°W. of the Kingman Sheet (Jennings, 1961), Trona Sheet (Jennings and others, 1962), Mariposa Sheet (Strand, 1967), and Death Valley Sheet (Streitz and Stinson, 1974). These digital maps are being released by the U.S. Geological Survey in the ARC/INFO Version 6.1 Export format. The digitized data include geologic unit boundaries, fault traces, and identity of geologic units.

The procedure outlined in U.S. Geological Survey Circular 1054 (Soller and others, 1990) was used during the map construction. The procedure involves transferring hard-copy data into digital format by scanning manuscript maps, manipulating the digital map data, and outputting the data. Most of the work was done using Environmental Systems Research Institute's ARC/INFO software. The digital maps are available in ARC/INFO Rev 6.1 Export format, from the USGS, Yucca Mountain Project, in Denver, Colorado.

INTRODUCTION

Yucca Mountain on the Nevada Test Site in southwestern Nevada is being studied as a potential site for a high-level nuclear waste repository. The U.S. Geological Survey (USGS) is evaluating the hydrology of the site as part of the U.S. Department of Energy Yucca Mountain Site Characterization Project. Because of the potential for radionuclides to be transported by ground water from the repository to the accessible environment, the regional hydrologic regime at Yucca Mountain is being studied.

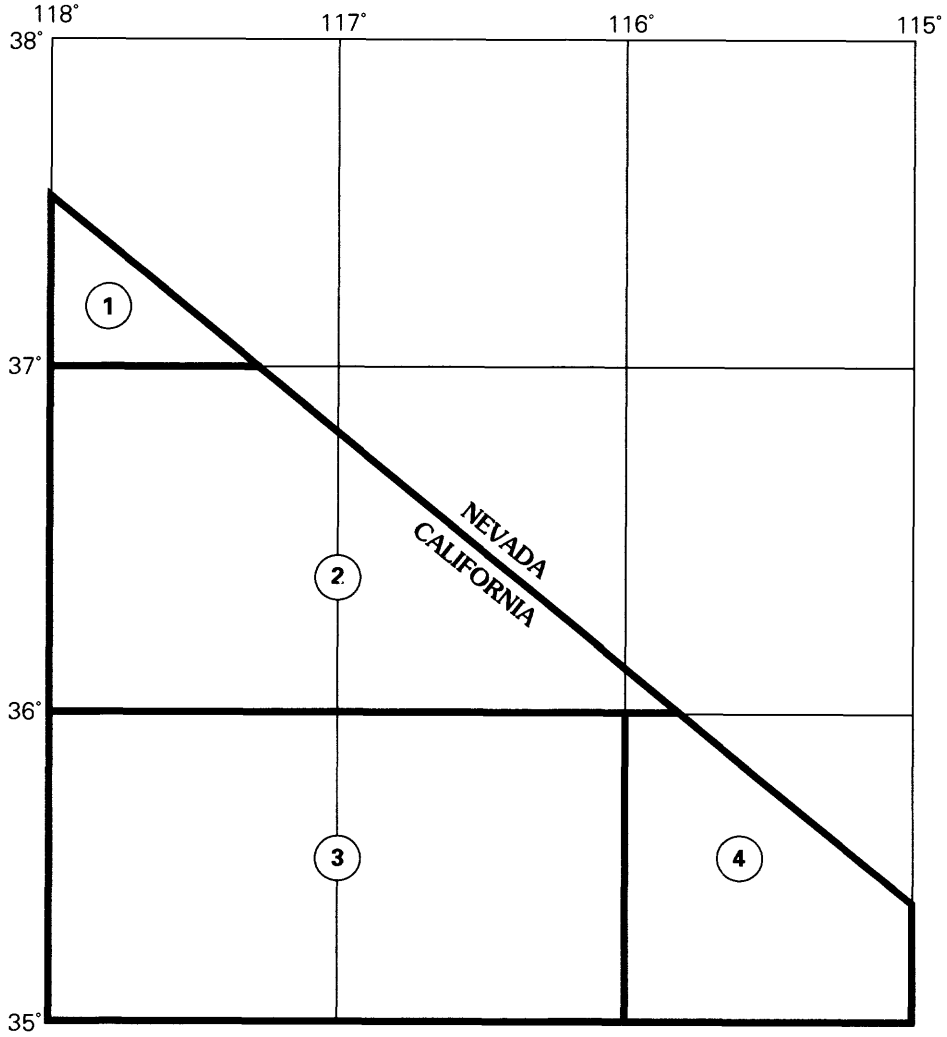
As part of this study, regional geologic maps of the Death Valley region have been digitized for use in a geographic information system (GIS). The area covered by this report is a triangular section of southeastern California bounded by the Nevada-California border on the northeast, by long 118°W. on the west, and by lat 35°N. on the south (fig. 1).

Parts of four 1:250,000-scale geologic maps, included in the Geologic Atlas of California, which was produced by the California Department of Natural Resources, Division of Mines and Geology (Bacon, 1971), cover this region. These map sheets are:

1. Death Valley Sheet (Streitz and Stinson, 1974),
2. Kingman Sheet (Jennings, 1961),
3. Mariposa Sheet (Strand, 1967), and
4. Trona Sheet (Jennings and others, 1962).

Although the various map sheets in the Geologic Atlas of California generally correspond to the standard 1:250,000-scale topographic map quadrangles and take their names from these quadrangles, the sheets were extended to encompass small parts of adjacent quadrangles, in some cases where they border adjacent States. In this way, only 27 geologic map sheets were required to produce the Geologic Atlas of California. One such extension occurs within this data release. The Mariposa Geologic Sheet was extended eastward from the Mariposa topographic map quadrangle to include a small triangular portion of California on the Goldfield, Nevada, topographic map quadrangle. In fact, the digital geologic data reported here for the Mariposa Sheet fall entirely within the geographic extent of the Goldfield topographic map quadrangle.

Digital maps are commonly used for applications other than those for which they were originally intended. Misuse of digital data, a problem not unique to digital map files, arises when these data are used in ways that go beyond their intended purpose. This documentation is intended to allow others to judge the appropriateness of these digital geologic map files for their uses and to allow trained persons with similar hardware and software to reconstruct these maps from the digital files. To use the information in this report,



(1) Mariposa Sheet (Strand, 1967)
(2) Death Valley Sheet (Streitz and Stinson, 1974)
(3) Trona Sheet (Jennings and others, 1962)
(4) Kingman Sheet (Jennings, 1961)

Figure 1. Map showing parts of California geology sheets included in report.

one needs knowledge of general map and cartographic concepts, the PRIMOS and/or UNIX operating systems, ARC/INFO, file-management concepts, and data-archiving systems.

The digital maps are available in ARC/INFO Rev 6.1 Export format, from the USGS, Denver, online repository on Internet (via 'anonymous ftp') at ympbserv1.cr.usgs.gov.

DATA SOURCES

For the Death Valley, Trona, and Kingman Sheets, two black-and-white copies plotted on scale-stable acetate base materials, one showing the geologic unit boundaries and the other the faults (each containing geographic control points), were obtained from the California Division of Mines and Geology. These copies show the geologic boundaries and faults exactly as they are shown on the original published maps of the Geologic Atlas of California (Bacon, 1971). Such materials were not available for the Mariposa Sheet; thus, for the small part of this sheet that was required for this work, the geologic boundaries and the faults were traced from a library copy of the published paper map sheet onto two separate scale-stable masters, along with appropriate control points.

After appropriate digitization and verification procedures described in the following section, the digital data files include polygon boundaries, fault traces, and identification of geologic units. These data files are distributed in ARC/INFO Rev. 6.1 Export format.

PROCEDURES FOR PRODUCING THE DIGITAL MAP FILES

A procedure for transferring map documents to digital file format is described in Soller and others (1990). This procedure formed the basis for all data digitization described herein. The fault maps were scanned by using a raster-to-vector Tektronix scanner installed in the USGS GIS Laboratory in Denver. The geological boundary maps were scanned commercially and supplied as ARC/INFO vector files. The USGS performed all further processing on the entire suite of vector files. This processing was similar to that described by Bawiec and others (1992) during their development of the digital version of the geologic map of Nevada (Turner and Bawiec, 1991). The processing removed artifacts of the scanning process, transformed the files into a suitable geographic coordinate system, and edited the files to achieve accurate topology. The procedure can be summarized as follows:

1. Geologic unit contacts, faults, and control points were obtained from black-and-white copy. The map units used in the Geologic Atlas of California describe rocks of differing ages and lithology. Therefore, geologic unit contacts represent major changes in rock type and age. In some cases, volcanic units occurring on some map sheets are distinguished by mineralogy, texture, or mode of origin. These distinctions are not always included in the digital reproduction because such descriptions were not necessary for regional hydrogeologic characterization.

2. The black-and-white copies of geologic contacts were converted to digital format by a commercial subcontractor using raster scanners. The black-and-white copies of the faults were converted to digital format using a Tektronix raster scanner at the USGS GIS Laboratory in Denver, Colorado. The digital files were then converted into a sequence of individual ARC/INFO coverages.

3. The resulting digital map coverages were manually reviewed and corrected for scanning errors such as gaps in lines, stray lines, and incorrect line intersections. The control points were converted to geographic registration points (ARC/INFO tics). The map coverages were then geographically registered into Zone 11 of the Universal Transverse Mercator coordinate system.

4. For the geologic units coverages, the digital boundaries, represented by lines (or "arcs" in ARC/INFO terminology), were further analyzed to represent polygonal information defining the extent of each geologic map unit. ARC/INFO uses rules of planar enforcement to construct a topologically correct sequence of polygons from such boundary lines. This requires a point to be placed within each polygon representing a geologic unit area, and these points to be identified or labeled with an alphanumeric code representing that geologic unit. Using ARC/INFO commands, the coverages were analyzed (by the ARC/INFO "clean" and "build" commands) until no errors in topology were identified. For the fault coverages, construction of polygon topology was not required. The faults were edited as line string entities.

5. Tables containing appropriate attributes were constructed within the ARC/INFO system. The digital files first were processed on a PRIME computer system using ARC/INFO Version 5.0.1. Later, the files were moved to a SunSparc Workstation and translated to ARC/INFO Version 6.0, then to Version 6.1.

6. Each of the coverages were plotted, using ARCPLOT, at the original map scale (1:250,000) on a Calcomp Electrostatic Plotter. The maps were then overlaid on the manuscript sheets and checked for discrepancies. Errors less than 1 kilometer on the ground were not corrected. To ensure that the geologic unit and fault coverages were geographically consistent, the geologic unit contact coverages were digitally overlaid onto the fault coverage. Where discrepancies existed that were larger than 250 m, arcs were adjusted to agree with the fault coverage. Then, each of the digital geologic map units were plotted in appropriate colors and agreement with the published maps was checked. Attribution errors were cor-

rected. The specifications for snap distances, tolerances, and other attributes can be found in Attachments A and B.

7. The individual map coverages were then converted to ASCII format using the "export cover" function of ARC/INFO. These ARC EXPORT files were then written to an archiving medium.

A number of limitations are inherent in the creation of these digital map files. They include:

1. The maps are only, at best, accurate to the scale of the original digitized map, in this case 1:250,000. However, since the final map product was compiled at a scale of 1:500,000, some errors translating to less than 1 km on the ground were not corrected.

2. The borders of the original California Geologic Atlas map sheets do not match exactly. This is especially true of the Death Valley Sheet, which was remapped and reissued later than the other sheets. These digital map files retain the differences inherent on the original map sources.

Certain criteria were used to decide which material to include and exclude. Only the geologic boundaries, unit identification, and fault data were included in the digitization procedure. Symbols such as anticlines, synclines, strikes, and dips were not included. Dashed contacts and faults were treated as solid lines and were not separated in the data base.

Inevitably, judgments were made by the authors in creating these digital map files. Units that were unlabeled on the source map were lumped with nearby units. Whenever possible, this was done after consulting a larger scale, more detailed, geologic map of the area.

Some of the source materials have some minor errors or discrepancies. As previously noted, the geologic units and faults have some abrupt changes on the map borders (especially between the Death Valley map and adjacent maps). No attempt was made to correct this problem.

DESCRIPTION OF THE DIGITAL MAP FILES

File Names:

The digital map files cover the triangular section of southeastern California between lat 35°and 38°N. and long 115°and 118°W. (fig. 1). The digital map files were developed as coverages within ARC/INFO Version 6.1 and are distributed in ARC/INFO's ASCII uncompressed Export format. There are four individual map sheets, and for each there are separate coverages for the faults and geologic units. The resulting eight files have the following names:

Geology	Faults	Sheet name
Deathvalgeo.e00	Deathvalf.e00	Death Valley (Streitz and Stinson, (1974)
Kingmangeo.e00	Kingmanf.e00	Kingman (Jennings, 1961)
Mariposageo.e00	Mariposaf.e00	Mariposa (Strand, (1967)
Tronageo.e00	Tronaf.e00	Trona (Jennings and others, 1962)

Data Elements:

The geologic unit polygons on these digital map files are attributed to correspond to the geologic units used by the Geologic Atlas of California. One hundred and twenty-four geologic units were used to represent the statewide geology of California (Bacon, 1971). Each map sheet has the same margin legend and is accompanied by its own explanatory data sheet, which includes bibliographic references and a table of stratigraphic nomenclature defining the correspondence between the map units and the individual formations. The fault traces on the fault coverages are not attributed.

Within the region of interest, the geologic materials range in age from Precambrian to Holocene and are composed of metamorphic rocks, carbonate and clastic sedimentary rocks of both marine and continental origin, and plutonic and volcanic igneous rocks. This diverse geology is described by 74 geologic units (out of the 124 California statewide units), as listed in table 1. The formation codes shown in table 1 are those described in the Geologic Atlas of

Table 1. Geologic Unit ID codes for ARC/INFO geologic coverages

Formation	Kingman	Mariposa	Trona	Death Valley
		Sedimentary		
Qs	1026	2006	3013	4007
Qal	1004	2002	3005	4004
Qst	None	None	3038	4019
Ql	1012	2014	3002	4003
Qc	1008	2001	3001	4011
QP	None	2003	3032	4027
Pc	None	2018	3017	4018
Pmlc	None	None	3019	None
Mc	None	None	3046	None
Muc	None	None	3027	None
Mmc	None	None	3061	None
0c	None	2026	3050	4035
Epc	None	None	3020	None
Tc	1002	2017	3011	4013
Jml	1027	None	None	None
TR	None	None	3007	4037
m	None	None	3037	None
m (ls)	None	None	None	4022
ms	None	None	3057	None
IP	1011	2019	3021	4020
IR	1029	None	3042	4009
C	1010	2015	3063	None
CP	1019	2007	None	4028
CM	1020	2008	3049	4031
D	1021	2016	None	4006
S	None	2010	None	4030
O	None	2009	None	4002
-€	1001	2005	3009	4023
-€?	1023	2028	3066	4012
p€	None	None	None	4083
p€g	1013	None	3028	None
p€s	None	None	3068	4998
lp€	1030	2031	3008	4029
ep€	1000	None	3040	4040
		Igneous		
Qrv^b	1007	None	None	None
Qrv^p	1022	2024	None	4034
Qpv^a	None	None	3035	None
Qpv^b	1003	2030	3018	4014
Qpv^p	None	2025	None	4015
Qpv^r	None	None	3033	4103
Pv	None	None	3047	None
Pv^a	None	None	3023	4041

Table 1. Geologic Unit ID codes for ARC/INFO geologic coverages --Continued

Formation	Kingman	Mariposa	Trona	Death Valley
		Igneous--Continued		
Pv^b	None	2011	3045	4000
Pv^p	None	2029	3022	4008
Pv^r	None	None	3060	4024
Mv	None	None	3048	None
Mv^a	None	None	3051	None
Mv^b	None	None	3054	None
Mv^p	None	None	3026	None
Mv^r	1018	None	3030	None
0v	None	None	3014	None
QTv	None	None	3039	None
QTv^a	None	None	3003	None
QTv^b	None	None	3034	None
Tgr	None	None	None	4025
Ti	None	None	3029	4112
Ti^a	None	None	3041	None
Ti^b	None	None	3069	4032
Ti^r	None	2022	3055	4016
Tv	1005	None	3006	4010
Tv^a	1016	None	3004	4042
Tv^b	1015	None	3036	4038
Tv^p	1017	2013	3031	4026
Tv^r	1018	2012	3044	4005
gr	1006	2004	3010	4001
bi	None	None	3012	4039
JRv	1024	None	3025	4036
mv	None	2027	3052	4043
gr-m	1025	None	3024	None
PPv	None	None	3058	None
pCgr	1014	None	None	None
		Other		
Water	None	None	None	4021
Landslide	None	None	None	4033

California map sheets and their accompanying explanatory data sheets, which should be referred to for more information.

Not all geologic units occur on each map sheet; the word "None" in table 1 is used to show where a particular geologic unit is absent on a map sheet. Each geologic unit was given a unique numeric ID code on each map sheet. The codes were defined in the 1000-series for the Kingman Sheet, in the 2000-series for the Mariposa Sheet, in the 3000-series for the Trona Sheet, and in the 4000-series for the Death Valley Sheet. Table 1 summarizes the valid geologic unit ID codes for each sheet. These codes are stored as "user-id" in the appropriate ARC/INFO attribute tables (*.PAT files).

Map Projection:

The maps are in the Universal Transverse Mercator coordinate system, Zone 11, using the Clarke 1866 Spheroid. Coordinates are in meters, with no x- or y- offsets.

Copyright and Distribution Restrictions:

These data are in the public domain and contain no copyright or distribution restrictions.

CONCLUSIONS

These digital map files appear to meet their intended application of being used as part of a smaller scale regional hydrogeologic map. Additional work may be necessary before the maps can be used for other purposes. Joining of the maps is an obvious next step to the process. Digitization errors and actual errors or changes of interpretations between maps will cause problems during this procedure. The authors have attempted this procedure after the existing geologic units were combined, or "lumped," into fewer more general units.

REFERENCES

Bacon, Forrest, 1971, California's geologic atlas complete: California Geology, v. 24, no. 6, California Division of Mines and Geology, p. 99–103. (MOL.19941018.0002)

Bawiec, W.J., Traudt, D.K., Ambroziak, R.A., Arndt, R.E., 1992, The evolution of a digital geologic coverage—from paper to CD-ROM: U.S. Geologic Survey Bulletin 2016, chap. E, p. E1–E8. (MOL.19941102.0002)

Jennings, C.W., 1961, Geologic Map of California-Kingman Sheet: California Division of Mines and Geology, Sacramento, California, scale 1:250,000. (MOL.19941122.0002)

Jennings, C.W., Burnett, J.L., and Troxel, B.W., 1962, Geologic map of California-Trona Sheet: California Division of Mines and Geology, Sacramento, California, scale 1:250,000. (MOL.19941122.0003)

Soller, D.R., Stettner, W.R., Lanfear, K.J., and Aitken, D.S., 1990, A user's manual for a method of map scanning and digital editing for thematic map production and data-base construction: U.S. Geological Survey Circular 1054, 38 p. (MOL.19941102.0006)

Strand, R.G., 1967, Geologic map of California-Mariposa Sheet: California Division of Mines and Geology, Sacramento, California, scale 1:250,000. (MOL.19941122.0004)

Streitz, Robert, and Stinson, M.C., 1974, Geologic map of California-Death Valley Sheet: California Division of Mines and Geology, Sacramento, California, scale 1:250,000. (NNA.901204.0005)

Turner, R.M., and Bawiec, W.J., 1991, Digital geologic coverage of Nevada—a digital representation of the 1978 geologic map of Nevada: U.S. Geologic Survey Digital Data Series 2. (MOL.19941129.0075)

NOTE: Parenthesized numbers following each cited reference are for U.S. Department of Energy OCRWM Records Management purposes only and should not be used when ordering the publication.

ATTACHMENT A

Standard Coverage Information

Dataset name:	Deathvalgeo.E00
Dataset format:	ARC Export Coverage
Dataset description:	Geologic Units of Death Valley Sheet
Dataset geographic extent:	California portio of lat 36°-37° N and long 116°-118° W
Source name:	Death Valley Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Death Valley Sheet
Source author:	California Division of Mines and Geology, Streitz and Stinson
Source geographic extent:	California portion of lat 36°-37° N and long 116°-118° W
Year source was compiled/published:	1974
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Raster scanner, line-following scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Deathvalf.E00
Dataset format:	ARC Export Coverage
Dataset description:	Fault Traces of Death Valley Sheet
Dataset geographic extent:	California portion of lat 36°-37° N and long 116°-118° W
Source name:	Death Valley Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Death Valley Sheet
Source author:	California Division of Mines and Geology, Streitz and Stinson
Source geographic extent:	California portion of lat 36°-37° N and long 116°-118° W
Year source was compiled/published:	1974
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Tektronix raster scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Kingmangeo.E00
Dataset format:	ARC Export Coverage
Dataset description:	Geologic Units of Kingman Sheet
Dataset geographic extent:	California portion of lat 35°-36° N and long 115°-116° W
Source name:	Kingman Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Kingman Sheet
Source author:	California Division of Mines and Geology, Jennings
Source geographic extent:	California portion of lat 35°-36° N and long 115°-116° W
Year source was compiled/published:	1961
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Raster scanner, line-following scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Kingmanf.E00
Dataset format:	ARC Export Coverage
Dataset description:	Fault Traces of Kingman Sheet
Dataset geographic extent:	California portion of lat 35°-36° N and long 115°-116° W
Source name:	Kingman Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Kingman Sheet
Source author:	California Division of Mines and Geology, Jennings
Source geographic extent:	California portion of lat 35°-36° N and long 115°-116° W
Year source was compiled/published:	1961
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Tektronix raster scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Mariposageo.E00
Dataset format:	ARC Export Coverage
Dataset description:	Geologic Units of Mariposa Sheet
Dataset geographic extent:	California portion of lat 37°-38° N and long 117°-118° W
Source name:	Mariposa Sheet
Source format:	Mylar trace of map sheet
Source description:	Geologic Map of Mariposa Sheet
Source author:	California Division of Mines and Geology, Strand
Source geographic extent:	California portion of lat 37°-38° N and long 117°-118° W
Year source was compiled/published:	1967
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Tektronix raster scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Mariposaf.E00
Dataset format:	ARC Export Coverage
Dataset description:	Fault Traces of Mariposa Sheet
Dataset geographic extent:	California portion of lat 37°-38° N and long 117°-118° W
Source name:	Mariposa Sheet
Source format:	Mylar trace of map sheet
Source description:	Geologic Map of Mariposa Sheet
Source author:	California Division of Mines and Geology, Strand
Source geographic extent:	California portion of lat 37°-38° N and long 117°-118° W
Year source was compiled/published:	1967
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Tektronix raster scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Tronageo.E00
Dataset format:	ARC Export Coverage
Dataset description:	Geologic Units of Trona Sheet
Dataset geographic extent:	California portion of lat 35°-36° N and long 116°-118° W
Source name:	Trona Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Trona Sheet
Source author:	California Division of Mines and Geology, Jennings and others
Source geographic extent:	California portion of lat 35°-36° N and long 116°-118° W
Year source was compiled/published:	1962
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Raster scanner, line-following scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

Standard Coverage Information

Dataset name:	Tronaf.E00
Dataset format:	ARC Export Coverage
Dataset description:	Fault Traces of Trona Sheet
Dataset geographic extent:	California portion of lat 35°-36° N and long 116°-118° W
Source name:	Trona Sheet
Source format:	Acetate stable map sheet
Source description:	Geologic Map of Trona Sheet
Source author:	California Division of Mines and Geology, Jennings and others
Source geographic extent:	California portion of lat 35°-36° N and long 116°-118° W
Year source was compiled/published:	1962
Scale of source:	1:250,000
Source purchased from:	California Division of Mines and Geology
Digitized by:	U.S. Geological Survey and contractors
Digitized using:	Tektronix raster scanner
Projection characteristics of source:	Universal Transverse Mercator
Projection characteristics of final dataset:	Universal Transverse Mercator

ATTACHMENT B

Results of Describe Command on Each Coverage

Description of SINGLE precision coverage deathvalgeo

ARCS

Arcs = 8907
Segments = 129054
0 bytes of Arc Attribute Data

POLYGONS

Polygons = 3091
Polygon Topology is present.
20 bytes of Polygon Attribute Data

NODES

Nodes = 6454
0 bytes of Node Attribute Data

POINTS

Label Points = 3090

ANNOTATIONS

Subclass	Annotations	Text Attribute Data
(blank):	0	0 bytes

TOLERANCES

Fuzzy = 79.202 V
Dangle = 121.849 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 409851.594
Xmax = 599775.000
Ymin = 3983738.000
Ymax = 4095113.500

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage deathvalf

ARCS

Arcs = 6201
Segments = 27383
28 bytes of Arc Attribute Data

POLYGONS

Polygons = 0
There is NO Polygon Topology.
0 bytes of Polygon Attribute Data

NODES

Nodes = 7723
0 bytes of Node Attribute Data

POINTS

Label Points = 0

TOLERANCES

Fuzzy = 0.839 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 631
Links = 0

COVERAGE BOUNDARY

Xmin = 410034.875
Xmax = 588902.000
Ymin = 3983716.000
Ymax = 4095021.000

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage kingmangeo

ARCS

Arcs = 1418
Segments = 39384
0 bytes of Arc Attribute Data

POLYGONS

Polygons = 576
Polygon Topology is present.
24 bytes of Polygon Attribute Data

NODES

Nodes = 1021
0 bytes of Node Attribute Data

POINTS

Label Points = 575

ANNOTATIONS

Subclass	Annotations	Text Attribute Data
(blank):	0	0 bytes

TOLERANCES

Fuzzy = 0.795 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 590070.062
Xmax = 715785.312
Ymin = 3873319.000
Ymax = 3984217.500

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage kingmanf

ARCS

Arcs = 613
Segments = 3715
28 bytes of Arc Attribute Data

POLYGONS

Polygons = 0
There is NO Polygon Topology.
0 bytes of Polygon Attribute Data

NODES

Nodes = 704
0 bytes of Node Attribute Data

POINTS

Label Points = 0

TOLERANCES

Fuzzy = 10.648 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 589180.375
Xmax = 707274.125
Ymin = 3872681.500
Ymax = 3979163.000

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage mariposageo

ARCS

Arcs = 2518
Segments = 58135
0 bytes of Arc Attribute Data

POLYGONS

Polygons = 584
Polygon Topology is present.
24 bytes of Polygon Attribute Data

NODES

Nodes = 2065
0 bytes of Node Attribute Data

POINTS

Label Points = 583

ANNOTATIONS

Subclass	Annotations	Text Attribute Data
(blank):	0	0 bytes

TOLERANCES

Fuzzy = 1.000 V
Dangle = 0.030 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 410607.531
Xmax = 481918.906
Ymin = 4094568.000
Ymax = 4160245.500

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage mariposaf

ARCS

Arcs = 673
Segments = 3021
28 bytes of Arc Attribute Data

POLYGONS

Polygons = 0
There is NO Polygon Topology.
0 bytes of Polygon Attribute Data

NODES

Nodes = 911
0 bytes of Node Attribute Data

POINTS

Label Points = 0

TOLERANCES

Fuzzy = 0.837 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 631
Links = 0

COVERAGE BOUNDARY

Xmin = 393650.250
Xmax = 482550.625
Ymin = 4094250.000
Ymax = 4196279.000

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage tronageo

ARCS

Arcs = 5499
Segments = 152700
0 bytes of Arc Attribute Data

POLYGONS

Polygons = 2342
Polygon Topology is present.
20 bytes of Polygon Attribute Data

NODES

Nodes = 3847
0 bytes of Node Attribute Data

POINTS

Label Points = 2341

ANNOTATIONS

Subclass	Annotations	Text Attribute Data
(blank):	0	0 bytes

TOLERANCES

Fuzzy = 0.900 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 408732.094
Xmax = 591207.250
Ymin = 3872779.500
Ymax = 3984176.750

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

Description of SINGLE precision coverage tronaf

ARCS

Arcs = 2125
Segments = 11964
28 bytes of Arc Attribute Data

POLYGONS

Polygons = 0
There is NO Polygon Topology.
0 bytes of Polygon Attribute Data

NODES

Nodes = 2903
0 bytes of Node Attribute Data

POINTS

Label Points = 0

TOLERANCES

Fuzzy = 50.867 V
Dangle = 0.000 V

SECONDARY FEATURES

Tics = 632
Links = 0

COVERAGE BOUNDARY

Xmin = 408880.062
Xmax = 591840.125
Ymin = 3872026.000
Ymax = 3985403.500

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

NO COORDINATE SYSTEM DEFINED

☆ U.S. GOVERNMENT PRINTING OFFICE: 1995 - 673-211 / 00020 REGION NO. 8