UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

GSMARC: A program and procedure to convert GSMAP data bases into ARC/INFO coverages, GSDARC: a counterpart program for GSDRAW data bases and an ARC/INFO procedure to topologically structure resultant data.

By

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Open-File Report
88-430A
Program Disk
88-430B

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INTRODUCTION

This open-file report provides two microcomputer programs named GSMARC and GSDARC that translate GSMAP or GSDRAW data bases into ASCII files, and describes procedures to import and structure the data into the ARC/INFO system.

GSMAP Version 5.0 (Selner and Taylor, 1988) is a microcomputer based program used in the compilation and preparation of geologic maps. GSDRAW Version 5.0 (Selner and Taylor, 1988) is a microcomputer based program used in the compilation and preparation of geologic illustrations. ARC/INFO is a geographic information system from Environmental Systems Research Institute that provides important analytical capabilities.

SYSTEM REQUIREMENTS

GSMARC and GSDARC should execute correctly on IBM PC/XT/AT microcomputers, and require the following: at least 256K RAM, a floppy disk drive or hard disk, and an 8087 math co-processor.

GSMARC and GSDARC were written and tested using the Microsoft QuickBASIC Compiler. The source code cannot be executed under BASICA, but must be compiled.

The programs were tested on a Compaq Portable III with 640K of RAM memory and DOS 3.0.

The minimum software required to use the program is MS/DOS (or PC/DOS) 2.0 or higher and the Open-File release diskette.

RELEASE DISK

The release disk contains the following files:

GSMARC.BAS	Source code for GSMARC
GSMARC.EXE	Executable code for GSMARC
PROJLIB.BAS	Source code for Projection subroutines used by GSMARC
GSDARC.BAS	Source code for GSDARC
GSDARC.EXE	Executable code for GSDARC

GSMAP and GSDRAW CODES

Familiarity with GSMAP, GSDRAW and ARC/INFO is assumed.

GSMAP and GSDRAW use <u>codes</u> for specific functions. The brief review that follows is intended only as a reminder of the functions of the seven different code groups.

Codes 1-99 are used for lines, e. g. contacts, faults.

Codes 100-199 are used for single point locations such as sample collection locations or gravity station locations.

Codes 200-299 are used for single point locations of specific symbols, e. g. strike-and-dip, foliation.

Codes 300-399 are used for point locations, single or multiple, e. g. mines and prospects.

Codes 400-499 are used for closed polygonal areas, e. g. altered areas, mining districts.

Codes 500-599 are point locations for text, e. g. labels for rock units, names of mines, map titles.

Codes 600-699 are used for lines that are to be splined (smoothed) during plotting.

GSMARC PROGRAM OPERATION

GSMAP codes 1-99, 400-499, and 600-699 are used for line data.

GSMAP codes 100-199, 200-299, 300-399 and 500-599 are used for point data.

When using GSMARC, the user should not put line and point data into the same output file. Points and lines should be put into separate files during separate executions of the program.

The user should prepare a projection file by using a word processing program. This file describes the paramters used in converting latitude longitude coordinates to X,Y coordinates. See Appendix for details.

The program is started by entering GSMARC. On-screen prompts will call for responses from the keyboard of the computer.

```
ENTER GSMAP DATA BASE NAME:
ENTER FILENAME OF PROJECTION PARAMETERS:
ENTER OUTPUT FILENAME FOR LOCATION DATA FILE:
ENTER OUTPUT FILENAME FOR ATTRIBUTE DATA FILE:
```

The program will then open the output files and data base. The corners of the GSMAP data base will be projected to ground meters and typed to the screen for information purposes.

The program will then request the user to select a GSMAP code.

```
ENTER CODE TO BE SELECTED(-1 FOR ALL, 0=EXIT):
```

All GSMAP entries that contain this code will have the location points projected to ground meters. The projected points will be written to the location data file and attribute data will be written to the attribute data file. The program will assign a sequential number starting with 1 and incrementing by 1 for all entries written to the output files. This number will be used by ARC/INFO to correlate the GSMAP attribute data, code, parameter one (PARA1) and parameter two (PARA2) to the projected locations of lines and points in X,Y space.

When all entries of the specified code have been processed and added to the output data file, the program prompts the user to enter a new code. This loop will continue until the user responds to the ENTER CODE prompt with a 0 (zero) to indicate a desire to exit from the program.

Because GSMARC uses the GSMAP projection routines, the ARC/INFO coverage will already be in the desired projection and have X,Y meter coordinates.

Remember, line and point data should never be written to the same output file.

GSDARC PROGRAM OPERATION

GSDRAW codes 1-99, 400-499, and 600-699 are used for line data.

GSDRAW codes 100-199, 200-299, 300-399 and 500-599 are used for point data.

When using GSDARC, the user should not put line and point data into the same output file. Points and lines should be put into separate files during separate executions of the program.

The program is started by entering GSDARC. On-screen prompts will call for responses from the keyboard of the computer.

```
ENTER GSDRAW DATA BASE NAME:
ENTER OUTPUT FILENAME FOR LOCATION DATA FILE:
ENTER OUTPUT FILENAME FOR ATTRIBUTE DATA FILE:
```

The program will then open the output files and data base. The corners of the GSDRAW data base will be typed to the screen for information purposes.

The program will then request the user to select a GSDRAW code.

```
ENTER CODE TO BE SELECTED(-1 FOR ALL, 0=EXIT):
```

All GSDRAW entries that contain this code will have the coordinates written to the location data file and attributes written to the attribute data file. The program will assign a sequential number starting with 1 and incrementing by 1 for all entries written to the output files. This number will be used by ARC/INFO to correlate the GSDRAW attribute data, code, parameter one (PARA1) and parameter two (PARA2) to the locations of lines and points in X,Y space.

When all entries of the specified code have been processed and added to the output data file, the program prompts the user to enter a new code. This loop will continue until the user responds to the ENTER CODE prompt with a 0 (zero) to indicate a desire to exit from the program.

Because GSDARC uses X,Y coordinates, the ARC/INFO coverage will already be in the desired coordinate space.

Remember, line and point data should never be written to the same output file.

OUTPUT FILES

Each execution of the programs will result in the creation of two files: a location data file and an attribute data file.

Location Data File

The location Data File will have one of two different formats depending on whether line data or point data was selected.

Format 1 - line data example

```
     1
       -56474.47    4219356.00
       -56450.97    4219326.50
       -56431.69    4219301.00
       -56407.18    4219254.00
           .            .
           .            .
           .            .
       -55906.13    4218192.50
       -55906.44    4218167.50
       -55907.47    4218134.00
END
     2
       -55909.86    4217649.00
       -55910.54    4217594.00
           .            .
           .            .
       -56193.39    4216516.00
       -56197.88    4216500.00
END
```

```
      3
        -56320.49     4215947.00
        -56324.47     4215922.50
            .             .
            .             .
        -56169.92     4217513.50
        -56166.62     4217483.50
END
END
```

Format 2 - point data example

```
    1     -58020.94    4216813.00
    2     -57907.13    4216611.50
    3     -57854.64    4216499.50
    4     -57792.69    4216362.00
    5     -57775.83    4216241.00
                .
                .
   22     -57015.29    4215322.00
   23     -55191.32    4218648.50
   24     -59375.48    4218052.50
END
```

<u>Attribute Data File</u>

The attribute data file will always have the same format regardless of the type of data output. Each line in the file represents an entry from the GSMAP or GSDRAW data base and contains a sequential number followed by the code, parameter 1 and parameter 2 for the entry from the data base. The format of this file is as follows:

Format 3 - Line or Point data

```
    1,     1,        0,        0
    2,     1,        0,        0
    3,     1,        0,        0
    .      .         .         .
    .      .         .         .
   57,     4,        0,        0
   58,     4,        0,        0
```

The following table will summarize these these data file formats.

GSMAP/GSDRAW Code	Location Data File line data	point data	Attribute Data File
1-99	Format 1		Format 3
100-199		Format 2	Format 3
200-299		Format 2	Format 3
300-399		Format 2	Format 3
400-499	Format 1		Format 3
500-599		Format 2	Format 3
600-699	Format 1		Format 3

OPERATIONAL PROCEDURES

GSMAP and GSDRAW Version 5.0

1. Digitize the boundary of the map area using a unique line code in the 1-99 series. Generally this will result in four entries representing the top, right, bottom and left boundaries. Make sure that you mark all intersections using the "4" key to indicate that these locations are nodes.

2. Digitize major features such as long fault lines using a unique code (1-99) for each type of feature. Again be sure to flag all line intersections with the "4" key.

3. Digitize all contact lines using a unique code (1-99). Flag all line intersections with the "4" key.

4. Digitize any other lines that are involved in the polygonal areas using unique codes (1-99). Flag all line intersections with the "4" key.

5. Construct a text label file containing the rock unit identifiers using a word processing or text editing program. This file should contain only true rock unit text and NOT other text for the GSMAP or GSDRAW graphics.

6. Assign a code from the 500-599 series for the polygon labels. Digitize a single point in each polygonal area using the assigned 500 code. The single point method should be used. These points will be used to assign the attribute of the area.

7. Plot each unique code on a separate piece of paper and edit.

8. Plot all line work on a single plot along with the node points. Plot the label points from the 500 series code. Make

sure that all areas are closed and that each area has one and only one label point. The lower left corner of the first character of each label should be within the area. Don't be alarmed if the label doesn't fit entirely within small areas. This 500 series code is used only for identifying the attribute of the area and not for graphical purposes.

9. Make a copy of this data base (i.e. .NDX,.LSF,.NOD and text label files). This data base contains the lines (with attributes) and label points (with rock unit attributes) which will be used by GSMARC or GSDARC.

10. Digitize the other geologic features such as symbols (strike dip, lineations) and additional rock unit labels (but with a different 500 series code). This data base should be used to draft the final geologic map with GSMAP or GSDRAW.

GSMARC or GSDARC

The following text describes a procedure involving GSMAP data files converted using GSMARC. The procedure for data files created using GSDRAW and GSDARC is identical.

Create a location data file for lines that define areas.

Create a separate location data file for any additional lines, such as fold axis, that will not be used to define areas.

Create a location data file for the label points used with rock unit label file.

This is the convention we use for file names.

GSM5.ARC .... the GSMAP lines that will be used to define areas (topology)
GSM5.AAT .... the line attribute table
GSM5.LAB .... the polygon label locations
GSM5.PAT .... the polygon attribute table
GSM5.RU .... the rock unit table.

Optional
GSM5ADD.ARC ... Additional lines not required for topology
GSM5ADD.AAT ... Additional lines attribute table

ARC/INFO

We assume that the user is familiar with ARC/INFO. This procedure was developed on a Digital Equipment VAX, but the method should be machine independent. Therefore, this "cook-book" provides actual ARC/INFO commands and output whenever possible. Conversion to ARC/INFO does not require a digitizer or a color terminal.

Copy the ASCII output files to the ARC/INFO host system.

Load the GSMAP line file into ARC.

```
$ ARC           ! This procedure works with ARC Version 4.0 also.

[ARC Version 3.2 (01/14/86)]
27-JAN-1987 18:32:38.18

ARC: GENERATE FILE_1
[ARC ver 3.2: GENERATE]
[GENERATE Version 3.2 (December 1985)]

Generate> INPUT GSM5.ARC
Generate> LINE
Creating Lines with coordinates loaded from GSM5.ARC
Generate> INPUT GSM5.LAB
Generate> POINTS
Creating points with coordinates loaded from GSM5.LAB
Generate> QUIT

Externalling BND and TIC...
```

Now BUILD topolgy.

```
ARC: BUILD FILE_1 LINE
```

Load GSMAP line attribute table into INFO.

```
$ARC
ARC: INFO
 ENTER USER NAME> ARC
 ENTER COMMAND >DEFINE A-CODE
 ITEM NAME,WIDTH [,OUTPUT WIDTH] ,TYPE [,DECIMAL PLACES] [,PROT.LEVEL]

 ITEM NAME>FILE_1-ID
 ITEM WIDTH>4
 ITEM OUTPUT WIDTH>5
 ITEM TYPE>B
 ITEM DECIMAL PLACES>0

 ITEM NAME>CODE
 ITEM WIDTH>3                               ! define GSMAP code
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I

 ITEM NAME>P1
 ITEM WIDTH>3                               ! define GSMAP P1
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I
```

```
 ITEM NAME>P2
 ITEM WIDTH>3                                ! define GSMAP P2
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I

 ENTER COMMAND >ADD FROM [enter complete pathname]GSM5.AAT
 ENTER COMMAND >Q STOP
```

JOINITEM this file to the structured coverage.

```
ARC: JOINITEM FILE_1.AAT A-CODE FILE_1.AAT FILE_1-ID FILE_1-ID
```

The GSMAP Version 5 lines are now attributed as ARC/INFO arcs.

```
ARC: CLEAN FILE_1 FILE_2 50 7             ! tolerances are in meters.
                                          ! for a 1:24,000 map
```

Examine coverage FILE_2 for errors.

```
ARC: LABELERRORS FILE_2
```

Use ARCEDIT to fix any errors

```
ARC: ARCEDIT
```

If ARCEDIT changed topology, then use BUILD.

```
ARC: BUILD FILE_2 POLY

ARC: QUIT

$ EDIT GSM5.PAT
```

Remove GSM5.PAT duplicate entries, or add entries for unlabled polygons.

Only after all the lines are fixed and there is one label point per polygon, load the GSMAP label file into INFO and JOINITEM this file to the structured coverage.

```
ARC: INFO
 ENTER USER NAME> ARC
 ENTER COMMAND >DEFINE P-CODE
 ITEM NAME,WIDTH [,OUTPUT WIDTH] ,TYPE [,DECIMAL PLACES] [,PROT.LEVEL]
    1
 ITEM NAME>FILE_2-ID
 ITEM WIDTH>4
 ITEM OUTPUT WIDTH>5
 ITEM TYPE>B
 ITEM DECIMAL PLACES>0


 ITEM NAME>CODE                                  ! define GSMAP code
 ITEM WIDTH>3
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I
```

```
 ITEM NAME>P1                                   ! define GSMAP p1
 ITEM WIDTH>3
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I

 ITEM NAME>P2                                   ! define GSMAP p2
 ITEM WIDTH>3
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I

 ENTER COMMAND >ADD FROM [enter complete pathname]GSM5.PAT

 ENTER COMMAND >Q STOP

ARC: JOINITEM FILE_2.PAT P-CODE FILE_2.PAT FILE_2-ID FILE_2-ID
ARC: QUIT
```

Select ARC/INFO patterns and colors for the polygons.
Insert the pattern and color symbols into the GSM5.RU table.
Load the GSMAP rock unit file into INFO and JOINITEM this file to the structured coverage. This file will contain the symbols (pattern and color) for ARCPLOT.

EXAMPLE: This is a Rock Unit file as transfered from the PC.

```
$ EDIT GSM5.RU
     1,"Qab"
     "EOT"
     2,"Ql"
     "EOT"
     3,"Qac"
     "EOT"
     4,"Qs"
     "EOT"
```

After text editing should read as follows.
5,17,53 and 65 are ARCPLOT patterns.

```
     1,Qab,5
     2,Ql ,17
     3,Qac,53
     4,Qs ,65

$ARC
ARC: INFO
 ENTER USER NAME> ARC
 ENTER COMMAND >DEFINE C-CODE
 ITEM NAME,WIDTH [,OUTPUT WIDTH] ,TYPE [,DECIMAL PLACES] [,PROT.LEVEL]
    1
 ITEM NAME>P1                                   ! define GSMAP p1
 ITEM WIDTH>3
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I
```

```
 ITEM NAME>CHAR                              ! define rock unit characters
 ITEM WIDTH>6
 ITEM OUTPUT WIDTH>6
 ITEM TYPE>C

 ITEM NAME>SYMBOL                            ! define the rock unit symbol
 ITEM WIDTH>3
 ITEM OUTPUT WIDTH>3
 ITEM TYPE>I


 ENTER COMMAND >ADD FROM [enter complete pathname]GSM5.RU

 ENTER COMMAND >Q STOP

ARC: JOINITEM FILE_2.PAT C-CODE FILE_2.PAT P1 P1
ARC: QUIT
```

REFERENCES

ESRI, 1986, ACR/INFO Users Manual Version 3.2, Environmental Systems Research Institute, Redlands California.

ESRI, 1987, ACR/INFO Users Guide, Version 4.0, Environmental Systems Research Institute, Redlands California.

HENCO, 1984, INFO VAX Reference Manual, Revsion 9, Henco Software, Inc. Waltham Maryland.

Snyder, J. P., 1982, Map Projections used by the U.S. Geological Survey; U. S. Geological Survey Bulletin 1532, 313p.

Selner, Gary I. and Taylor, Richard B., 1988 GSDRAW and GSMAP Version 5.0: Prototype Programs for the IBM PC or Compatible Microcomputers to assist Compilation and Publication of Geologic Maps and Illustrations: U.S. Geological Survey Open-File Report 88-295A, 53 p., Program Disks 88-295B, 2 disks.

APPENDIX

GSMAP PROJECTION FILES

Map projections and USGS practice are described by Snyder, 1982, in USGS Bulletin 1532. Information on the map projection is given in marginal notes on USGS maps, but the data on the parallels and meridian used to prepare the map is not provided. The summary below should help, but please read the original by Snyder, 1982. This bulletin answers questions you should have. Unless otherwise stated on the margin or Snyder, use the Clarke 1866 Ellipsoid.

Small Scale Maps

Maps labeled Albers Equal-Area projection

When used for maps of the 48 conterminous states, the standard parallels are 29,30,0,N degrees and and 45,30,0,N. The central meridian is 96,0,0,W.

For maps of Alaska, the standard parallels are 55,0,0,N degrees and 65,0,0,N degrees. The central meridian is 154,0,0,W.

For maps of Hawaii, the standard parallels are 8,0,0,N and 18,0,0,N. The central meridian is 157,0,0,W.

Maps labeled Lambert Conformal Conic

The Lambert conformal conic is used by the USGS for a map of the US showing all 50 states in true relative position. This map has been issued at scales of 1:6,000,000 and at 1:10,000,000. For this map the standard parallels are 37,0,0,N and 65,0,0 N. The central meridian is the line of longitude central to the map.

Maps labeled Transverse Mercator

In 1979 a spherical form of the Transverse Mercator was chosen for a base map of North America at a scale of 1:5,000,000 for tectonic and other geologic maps. The central meridian is 100,0,0,W longitude.

State Scale Maps (1:500,000)

For the 1:500,000 scale base maps of the 48 conterminous states, the Lambert projection was used with standard parallels of 33,0,0,N and 45,0,0,N. The central meridian is the line of longitude central to the map.

1 x 2 Degree Maps (1:250,000)

Maps labeled Transverse Mercator

Army Map Service (AMS) 1 degree by 2 degree sheets use the Transverse Mercator projection. The central meridian is the line of longitude central to the map.

Maps labeled Universal Transverse Mercator (UTM)

The UTM projection will be used by the USGS for 1 x 2 degree sheets as it updates the AMS series. The proper central meridian can be determined either by using tables listing the central meridian for the UTM Zone or by locating the nearest line of longitude of whole number of degrees that is divisible by 3 but not by 2.

30′ x 60′ Maps (1:100,000)

For all new 30 minute by 60 minute quadrangles, the UTM projection is used. The proper central meridian can be determined either by using tables listing the central meridian for the UTM Zone or by locating the nearest line of longitude of whole number of degrees that is divisible by 3 but not by 2.

15′ Quadrangles (1:62,500)

Maps labeled Polyconic

Many 15 minute quadrangle maps have been drawn using the Polyconic projection. The central meridian is the line of longitude central to the map.

Maps labeled Universal Transverse Mercator (UTM)

The UTM projection has been used by the USGS for 15" sheets. The proper central meridian can be determined either by using tables listing the central meridian for the UTM Zone or by locating the nearest line of longitude of whole number of degrees that is divisible by 3 but not by 2.

7 1/2′ Quadrangles (1:24,000)

Maps labeled Polyconic

Many 7 1/2 minute quadrangle maps have been drawn using the Polyconic projection. The central meridian is the line of longitude central to the map.

Maps labeled Lambert and Transverse Mercator

Beginning in the late 1950's the USGS began using projections that were based on the parameters that serve as the basis of the State Plane Coordinates System. Depending on the state the projection will be either a Lambert Conformal Conic, Transverse Mercator or Oblique Mercator (panhandle of Alaska only). USGS Bulletin 1532 (Snyder, 1982) presents an excellent description of the basis of the SPCS and the projection that is used for each State. This Bulletin also describes in Table 8 the projection parameters that are used for each zone of each State. Table 8 lists a scale reduction for Transverse Mercator such as 1:2500. The projection file require a scale factor. The formula to compute scale factor from scale reduction is scale factor = 1.0 - (1/scale reduction) i.e. a 1:2500 scale reduction results in a scale factor of 0.9996 or scale factor=1.0 -(1.0/2500)=0.9996.

A useful approximation for digitizing and plotting is to use the Polyconic Projection. The maximum difference in the 700-800 mm diagonals of 7 1/2 or 15 minute between Transverse Mercator, Lambert, and Polyconic projections is about 0.05 mm. This figure is much smaller than paper size changes due to humidity variations.

Before digitizing, we suggest starting a data base with the proper data base corners, then plotting the corners using stable film, and comparing the result with a scale-stable base map. If it fits, you are ready to digitize. If there are problems, try the listed projection, using the parameters given in by Snyder, 1982. This procedure not only checks to see if the projection file is the correct one, but also finds possible errors of entry for data base corners. Checking by plotting corners before digitizing can save lots of time.

PROJECTION FILES FOR LEVEL 5 SOFTWARE

Examples of Projection Files

Latitude,Longitude values are entered in Degrees, Minutes, Seconds and followed by the Appropriate letter: for example, W longitude, N latitude in the conterminous U.S. Equatorial and polar radii are specified in kilometers.

Universal Transverse Mercator

File	Description of Contents
1	"1" designates Universal Transverse Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, Central Meridian of UTM Zone
0.9996	Scale factor

Albers Equal Area

File	Description of contents
2	"2" designates Albers Equal Area
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
45,30,0,N	Latitude, first standard parallel
29,30,0,N	Latitude, second standard parallel
100,0,0,W	Longitude, meridian central to map

Lambert Conformal Conic

File	Description of contents
3	"3" designates Lambert Conformal Conic
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
33,0,0,N	Latitude, first standard parallel
45,0,0,N	Latitude, second standard parallel
105,0,0,W	Longitude, meridian central to map

Mercator

File	Description of contents
4	"4" designates Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, meridian central to map

Polyconic

File	Description of contents
5	"5" designates Polyconic
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, meridian central to map

Transverse Mercator

File	Description of contents
6	"6" designates Transverse Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, meridian central to map
0.9996	Scale factor

"Parameters of special DNAG map for spherical Earth"

File	Description of contents
6	"6" designates Transverse Mercator
6371.204	Radius of Earth in km
6371.204	Radius of Earth in Km
100,0,0,W	Longitude, meridian central to map
0.926	Scale factor unique to this map

Oblique Mercator Projection

File	Contents
7	"7" designates Oblique Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
1.0	Scale factor along central axis
42,0,0,N	Latitude, center point of projection
73,0,0,W	Longitude, center point of projection
51,30,0,N	Latitude, S end of line defining axis
56,0,0,W	Longitude, S end of line defining axis
33,30,0,N	Latitude, N end of line defining axis
84,30,0,W	Longitude, N end of line defining axis

The sample oblique mercator projection file provides parameters used in generating the Appalachian Map

Equidistant Conic

File	Description of contents
8	"8" designates Equidistant Conic
6378.38584	Radius of Earth in km
6356.910	Radius of Earth in Km
9,0,0,N	Latitude, first standard parallel
4,0,0,N	Latitude, second standard parallel
66,0,0,W	Longitude, merdian central to map

Values in this example are for Venezuela maps labeled "Proyeccion Conico Secante Compensada". This projection is also used for certain maps in Alaska labeled "Modified Mercator", see Snyder, 1982.