File: \DOCUMENT\DLG\2MDUG95.WP
Date: July 7, 1995

NOTICES:

This Data Users Guide was prepared before Digital Line Graph (DLG) data became available in the Spatial Data Transfer Standard (SDTS) format. SDTS is now a distribution format of DLG data at 1:2,000,000-scale though there is no discussion of SDTS as a distribution format in this document.

Also, data in SDTS format was transformed from Albers Equal-Area Conic projection to the geographic coordinate system.

Please refer to the document entitled "DLGSDTS" in
\DOCUMENT\SDTS
on this disc for information on DLG data in SDTS format.

DATA USERS GUIDES

1: Digital Line Graphs from 1:24,000-Scale Maps
2: Digital Line Graphs from 1:100,000-Scale Maps
3: 1:2,000,000-Scale Digital Line Graphs
4: Land Use and Land Cover Digital Data from 1:250,000- and 1:100,000-Scale Maps
5: Digital Elevation Models
6: Geographic Names Information System
7: Alaska Interim Land Cover Mapping Program

Questions regarding availability and ordering of US GeoData (all types of digital cartographic and geographic data produced and distributed by the U.S. Geological Survey) should be addressed to:

Earth Science Information Center
U.S. Geological Survey
507 National Center
Reston, Virginia 22092
(703) 648-6045

Technical questions and comments should be addressed to:

Branch of Technical Standards and Product Development
U.S. Geological Survey
510 National Center
Reston, Virginia 22092

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

1:2,000,000-SCALE DIGITAL LINE GRAPHS

Data Users Guide 3

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1:2,000,000-SCALE DIGITAL LINE GRAPHS

INTRODUCTION

The Earth Science Information Centers (ESIC) distribute digital cartographic and geographic data files produced by the U.S. Geological Survey (USGS) as part of the National Mapping Program. Digital cartographic data files can be grouped into five basic types. The first of these, called a digital line graph (DLG), includes planimetric base cartographic data, such as transportation, hydrography, and boundaries. The second type, called a digital elevation model (DEM), consists of a sampled array of elevations for a number of ground positions that are usually at regularly spaced intervals. The third type is land use and land cover digital data, which provides information on nine major classes of land use such as urban, agricultural, or forest, as well as associated data such as political units and Federal land ownership. The fourth type, the Geographic Names Information System, provides locational and other descriptive information for all known places, features, and areas in the United States identified by a proper name. The fifth type, digital orthophoto products, are digital images of aerial photographs, which are corrected for displacements caused by camera angle and the terrain.

The digital data files from selected sources currently available from ESIC include:

- Digital line graphs (DLG)
  --1:24,000 scale
  --1:62,500 scale
  --1:63,360 scale (Alaska)
  --1:100,000 scale
  --1:2,000,000 scale

- Digital elevation models (DEM)
  --7.5 minute
  --30 minute
  --1 degree
  --15 minute (Alaska)
  --7.5 minute (Alaska)

- Land use and land cover digital data
  --1:250,000- and 1:100,000-scale land use and land cover and associated maps
  --1:250,000-scale Alaska interim land cover data

 Manuscript approved for publication December 29, 1994.

- Geographic names

- Digital orthophoto quadrangles (DOQ)
  --3.75-minute digital orthophoto quarter-quadrangles
  --7.5-minute digital orthophoto quadrangles

This document describes DLG's originally collected from the 1:2,000,000-scale sectional maps of the National Atlas of the United States of America and revised and augmented from other more recent graphic and digital sources. The digital data are useful for the production of cartographic products, and the data are structured to support the analytical functions of geographic information systems.

DATA CONTENT

The 1:2,000,000-scale DLG data files contain selected base categories of cartographic data in digital form. The data files were originally derived from the sectional maps of the 1970 National Atlas of the United States of America. The files have been updated from a variety of sources and revised to meet the latest DLG standards. The following categories of data are included in current 1:2,000,000-scale DLG files:

- Boundaries -- Includes political and administrative boundaries. Boundaries of Federal lands are generalized to follow section lines. Most Federal lands with a minimum area of 640 acres are collected. Bureau of Land Management (BLM) lands with a minimum size of 320 acres are collected, but, as for other Federal lands, the boundaries are generalized to follow section lines.

- Hydrography -- Includes flowing water, water bodies, wetlands, and related features.

- Manmade Features -- Includes built-up areas and populated places, with information on population. State capitals and county seats are also identified.

- Transportation -- Includes major transportation systems collected in three separate subcategories: (1) Roads and Trails, which includes major highways; (2) Railroads; and (3) Pipelines, Transmission Lines, and Miscellaneous Transportation Features, which includes only airports and the Alaska pipeline.

- U.S. Public Land Survey System -- Includes land grants and subdivisions of the public lands to the township and range level.

Each 1:2,000,000-scale DLG file contains a data limit line, which is the State boundary in inland areas and the shoreline along the open ocean. The area between the data limit line and the cell edge (the neatline) is always collected as a void area.

Four text files which contain State and county Federal Information Processing Standard (FIPS) Codes, land grant names, airport names, and populated place names and populations, are distributed with the cartographic data. Attribute codes in the data files link the cartographic data to the text file entries. Metadata that comply with the Federal Geographic Data Committee Content Standards for Digital Geospatial Metadata are also available for each data set.

DATA STRUCTURE

Levels of Structuring

The term DLG is used by the USGS to describe a digital data set of base cartographic features in vector form. Originally, three levels of DLG data (DLG-1, DLG-2, and DLG-3) were envisioned; these levels were differentiated by their positional accuracy, level of attribute coding, and relational spatial information. It was found, however, that the widest user community would be served by producing DLG-3 data, which have the full range of attribute codes, are topologically structured, and have passed certain quality-control checks. These three properties are required for work that includes both graphic and analytic applications. Therefore, all DLG data in the National Digital Cartographic Data Base (NDCDB) are level 3.

Topology

Fully topologically structured level-3 DLG data is referred to as DLG-3. The DLG-3 concept is based on graph theory in which a two-dimensional diagram is expressed as a directed graph composed of a set of nodes (topologically significant points), lines, and areas in a manner that explicitly expresses logical relationships. This concept is used to encode the digital data with the spatial relationships among features. The spatial relationships include such concepts as adjacency and connectivity. The abstraction of the features according to the rules of graph theory preserves the realistic spatial relationships and creates a logical and consistent data file structure for computer processing. A digital file of cartographic or geographic data that maintains the realistic spatial relationships is called a topologically structured data file. A topologically structured data file can support simple graphic applications, such as plotting streams and roads for base maps, as well as more advanced applications, such as computations and analysis involving features and their spatial relationships.

Topological Elements

A DLG-3 file is composed of three separate, but related, topological elements: nodes, lines, and areas. Nodes define the location of the end points of every line, and a single node can mark the start or end of one or more lines. Thus nodes occur at intersections of linear features and at other places where a linear feature is subdivided into separate line segments.

A line is an ordered set of points that describes the position and shape of a linear feature. Each line starts at a node and ends at a node, has an area to the left of its direction of travel (the direction in which it was collected), and has an area to the right of its direction of travel. The direction of travel is arbitrarily determined at the time of data capture. Lines connect to each other at nodes, and a line does not cross itself or any other line. A line describes the boundary between two areal features, such as counties, or defines a feature by itself, such as a road. A special line, called a degenerate line, is used to represent isolated point features. A degenerate line starts and ends at the same node, has two identical coordinate pairs, has zero length, and is totally contained inside one area.

An area is a continuous, unbroken region of the file bounded by lines. All portions of the file must be assigned to some area. Files processed using the DLG Production System (PROSIX) have unique area points located inside the area they represent. Also, every DLG file will have at least two areas identified: one representing the area covered by the file and the other representing the area outside the coverage of the file. Additional areas will be defined as necessary to subdivide the area covered by the file.

GRAPH THEORY IN DLG DATA

The DLG concept is based on graph theory, in which a diagram is expressed as a set of elements (nodes, areas, and lines) showing logical spatial relationships with minimal redundancy. Historically, there were three ways to implement the line graph concept in DLG files: the area case, the network case, and the area-hybrid case. These cases were differentiated by the nature of the information contained in the categories. Presently, USGS DLG's are collected and processed as area case or area-hybrid case. The following information provides perspective on the various types of DLG files.

Area line graphs are used to represent areal features such as land use and land cover, political entities, or the U.S. Public Land Survey System. In the area case, all closed circuits of lines form unique areas and all line elements bound two different area elements. Line elements for area line graphs are not normally assigned primary attributes. The characteristics of lines in these categories can usually be derived by examining the attributes of the area elements on each side of the line.

Network line graphs were used to represent linear features such as roads or streams. The network case differed from the area case in that, irrespective of the number of closed areas forming the graph, only two area elements were encoded: (1) the area outside the domain, termed the outside area; and, (2) the area within the domain, termed the background area. All lines except the graph boundary, or neatline, were considered to be contained within the background area. The major topological relationship expressed by network data was that of connectivity. In the network case, the lines themselves had the identity and carried the appropriate attribute codes. Data encoded in network line graph form were suitable for various forms of network analysis, such as minimum path computations.

In the area-hybrid case, network and area type information are gathered in a single DLG file. In this approach, all closed circuits of lines define unique areas, some of which have a cartographic identity. Some lines can exist that do not form the boundaries between two areas. The unique areas that represent features for the overlay are given attribute codes. For example, in the hydrography category there are areal features, such as lakes, reservoirs, and swamps, that are represented by unique attributed area elements. There are also linear features, such as single-line streams and aqueducts, that are significant in themselves and are also assigned attribute codes. These features can occupy a position in an area of no other hydrographic significance, that is, an unattributed background area.

ATTRIBUTE CODES

In addition to locational and topological information, DLG data elements can have explicitly encoded attributes. Attribute codes, also called feature codes or classification attributes, describe the features represented by nodes, areas, or lines. For example, the attribute code for an area might identify a lake or glacier; the attribute code for a line might identify a road, railroad, stream, or shoreline (Figure 1). A listing of all the attribute codes currently available for use in the 1:2,000,000-scale DLG files is given in Appendix A.

Each attribute code identifies the general data category to which a feature belongs, as well as the specific nature of the feature. Codes also can provide additional descriptive information. Many features are uniquely described by a single attribute code. Others may require two or more codes for a complete description. If multiple attributes are needed to describe a feature, their ordering is not significant. A variable number of attribute codes is allowed, which creates an open-ended structure to which information can be added at any time. It is not necessary for each element to have associated attributes; in general, attribute codes are not assigned to an element if the classification can be derived based on relationships to adjacent elements.

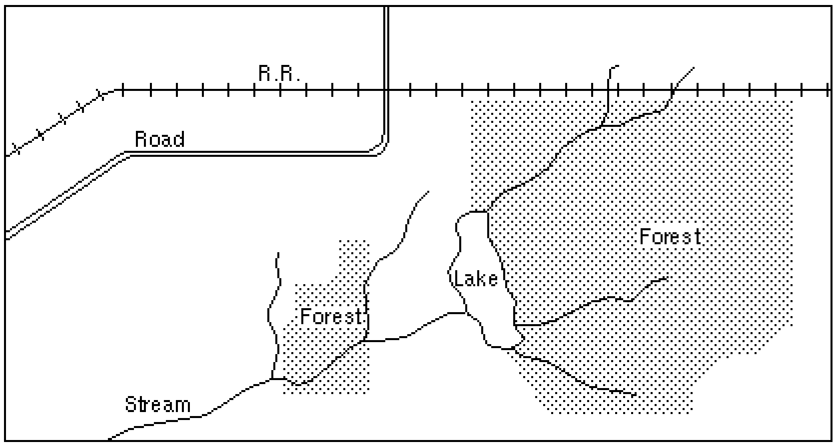

Figure 1. Map elements showing road, railroad,
streams, lake, and forest areas.

A DLG attribute code is composed of two distinct numeric fields: a three-digit major code and a four-digit minor code. In the digital file, the major and minor attributes are encoded in two integer fields of six digits, right justified with leading blanks (FORTRAN 2I6 format). In this document, major codes are presented as three digits, and minor codes are presented as four digits. Leading zeros are shown for clarity; for example: 090 0204.

Major Attribute Codes

The first two digits of the major code (including a leading zero) uniquely identify the category to which the described element belongs. The third digit of the major code is used to modify the minor code in two ways:

- If zero, the minor code represents a classification or description of the element.
- If not zero, the minor code is a parameter requiring special interpretation according to instructions given in the codes for each category.

A list of the major codes and the categories they represent is contained in Table 1.

Table 1. Major codes used for DLG categories

Major Code	Category
020*	Hypsography
050	Hydrography
070*	Vegetative Surface Cover
080*	Non-Vegetative Features
090	Boundaries
150*	Survey Control and Markers
	Transportation Systems:
170	Roads and Trails
180	Railroads
190	Pipelines, Transmission Lines, and Miscellaneous Transportation Features
200	Manmade Features
300	U.S. Public Land Survey System
340*	Land Use and Land Cover

* Not applicable at 1:2,000,000 scale

Minor Attribute Codes

The minor code provides specific information about a feature. In 1:2,000,000-scale data, the first digit of the minor code is zero except for some parameter codes. The remaining three digits are normally used to classify specific features. The type of topological element described by a particular code can be determined from the value of the last three digits:

001 - 099 = nodes
100 - 199 = areas
200 - 299 = lines
300 - 399 = degenerate lines
400 - 499 = codes that may be applied to any element type (nodes, lines, areas, or degenerate lines)
601 - 699 = descriptive codes

The descriptive codes (601 - 699) are used with another code to qualify the meaning of that code.

The last three digits (and occasionally all four digits) also may be used as a parameter code. Parameters are used when a minor code can legitimately assume a range of values such as a water elevation or a highway route number. The meaning of a parameter code is indicated by the (non-zero) third digit of the major code.

Sample Attribute Codes

Four examples of DLG attribute codes follow and should be interpreted with reference to Appendix A.

Example A:

050 0412 The major code 050 indicates the hydrography category. The minor code 0412 identifies the feature as a stream.

Example B:

170 0201 The major code 170 indicates the roads and trails subcategory in the transportation category. The minor code 0201 identifies the feature as a limited access highway.

170 0609 The major code 170 indicates the roads and trails subcategory in the transportation category. The minor code 0609 identifies the feature as a road in a tunnel. This code would be used in conjunction with the code describing the road type (170 0201).

Example C:

172 0095 The major code 172 indicates the roads and trails subcategory in the transportation category. Because the last digit of the major code is not zero, the minor code is a parameter. In this case, minor code 0095 is Interstate route number 95.

Example D:

306 0033 The major code 306 indicates the U.S. Public Land Survey System category, and the non-zero third digit indicates the minor code is a parameter code for the origin of survey. The minor code 0033 indicates the area element is referenced to the Willamette Meridian.

SAMPLE LINE GRAPH STRUCTURE

Examples of a line graph and its corresponding digital records are given in figure 2 and table 2.

These examples are simplified representations of the concepts used in the DLG-3 structure; they are not actual data files. The example shown is composed of 13 nodes, 5 areas, and 15 lines. Each element type is maintained as a separate list in the digital data. The nodes are labeled N1 through N13. Each node is the starting or ending point for at least one line. There are five distinct areas labeled A1 through A5. Area A1 represents the area outside the coverage of the file. There is one outside area for each DLG-3. It is always the first area encountered and has the attribute code 000 0000. In the example given in figure 2, the portion of the file inside the border is divided into four areas, each bounded (closed) by lines. Area A2 is bounded by lines L14, L1, L4, and L5. Area A3 is bounded by lines L3, L13, L4, L6, L7, L8, L15, and L9. Area A4 is bounded by lines L8, L15, and L9. Area A5 is bounded by lines L5, L6, L7, and L10 and L2.

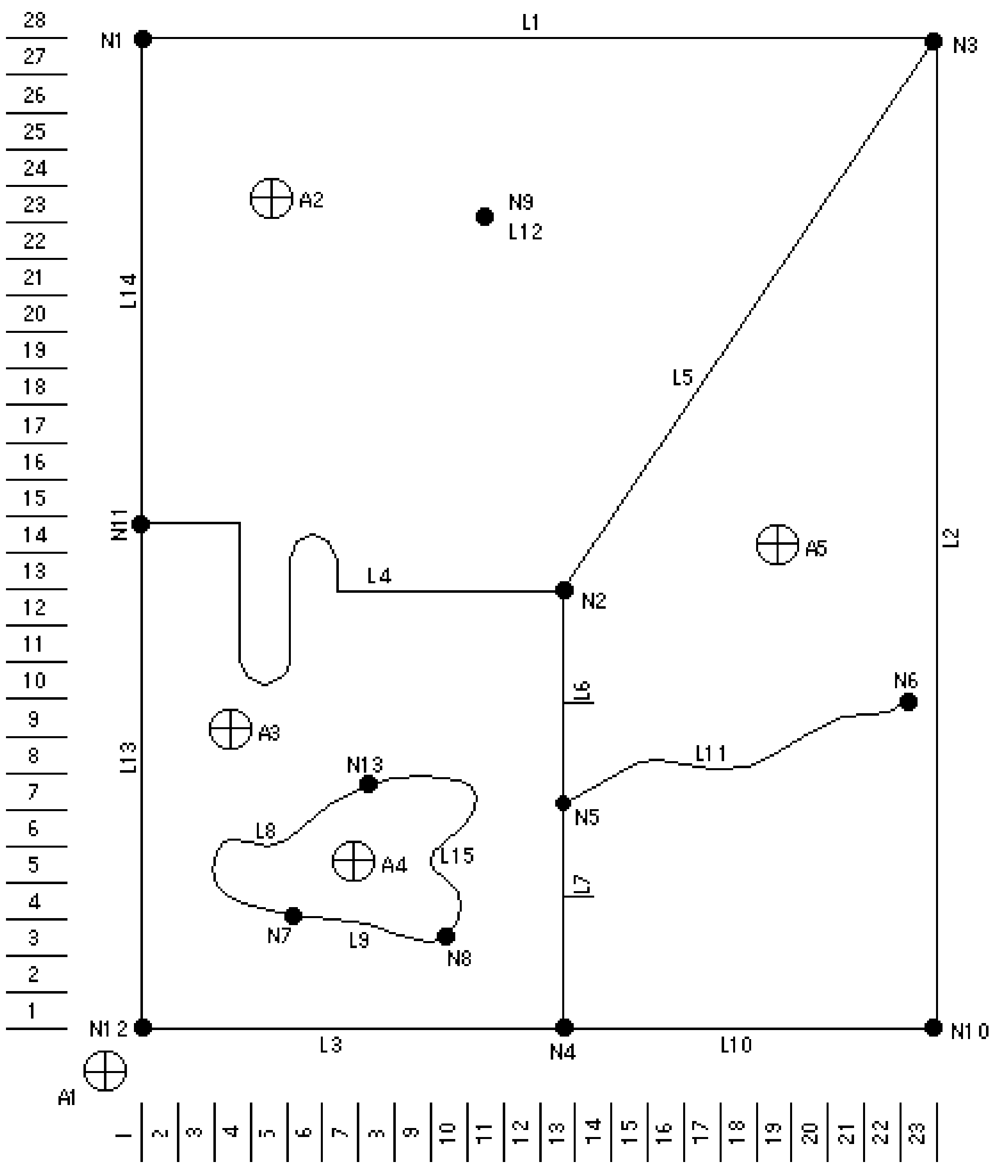

Figure 2. Sample line graph.

Table 2. Digital description of a sample DLG-3 (see fig. 2)

Nodes / **Areas**

Internal Id Number	X Coordinate	Y Coordinate	Internal Id Number	X Coordinate	Y Coordinate
N1	1	28	A1	0	0
N2	13	14	A2	6	24
N3	23	28	A3	3	10
N4	13	1	A4	8	7
N5	13	7	A5	18	14
N6	22	10			
N7	6	5			
N8	10	4			
N9	11	24			
N10	23	1			
N11	1	17			
N12	1	1			
N13	9	9			

Lines

Internal ID Number	Starting Node	Ending Node	Area Left	Area Right	Coordinates (first x y	last x y)
L1	1	3	1	2	1, 28	23, 28
L2	3	10	1	5	23, 28	23, 1
L3	4	12	1	3	13, 1	1, 1
L4	1	1	2	2	31, 17	13, 14
L5	2	3	2	5	13, 14	23, 28
L6	2	5	5	3	13, 14	13, 7
L7	5	4	5	3	13, 7	13, 1
L8	13	7	4	3	9, 9	6, 5
L9	7	8	4	3	6, 5	10, 4
L10	4	10	5	1	13, 1	23, 1
L11	5	6	5	5	13, 7	22, 10
L12	9	9	2	2	11, 24	11, 24
L13	12	11	1	3	1, 1	1, 17
L14	11	1	1	2	1, 17	1, 28
L15	8	13	4	3	10, 4	9, 9

In this example, as in the standard DLG-3 data structure, line elements contain the only explicit topological references. Each line contains pointers to its bounding nodes (starting and ending) and the areas that it bounds (left and right of the line). This format minimizes redundant linkages to achieve efficient data encoding and storage.

The lines in figure 2 are labeled L1 through L15. The lines can be identified by their starting node number, ending node number, number of the area to the left of the direction of travel, number of the area to the right of the direction of travel, and a string of coordinates describing the alignment of the line. In this example, only two pairs of coordinates are shown; however, in an actual DLG-3 file, an irregular line would have a variable number of coordinate pairs up to a limit of 3,000. The direction of travel of the line is arbitrarily determined during data collection. In this example, L1 is encoded as proceeding clockwise around area A2. Thus line L1 starts at node N1, ends at node N3, has area A1 to the left of the direction of travel, and has area A2 to the right of the direction of travel. The coordinate string describing the alignment of the line will start with the same coordinate values as those of node N1 and will end with the same coordinate values as those of node N3. The area to the left of its direction of travel, A1, is different from the area to the right of its direction of travel, A2, so the line is a boundary between the two areas.

Lines L11 and L12 are examples of lines that lie within one area. Line L11 starts at node N5, ends at node N6, has area A5 to the left of the direction of travel, and also has area A5 to the right of the direction of travel. The coordinate string for the line will start with the same coordinate values as those of node N5 and will end with the same coordinate values as those of node
N6. Line L12 is an example of a degenerate line. The line starts at node N9, ends at node N9, and has area A2 as both the area to its left and right. There are only two coordinate pairs in the string defining the line, and both points have the same coordinate values as node N9; thus, the two points are the same and the line has zero length.

Note that in this example the x and y coordinates are numbered from the lower left corner to simplify the drawing. In an actual DLG-3 file, however, the origin is the center of the cell and the internal file coordinates are expressed in thousandths of an inch. See the Coordinate Systems section for more detail.

DISTRIBUTION FORMATS

The 1:2,000,000-scale DLG data are available in two distribution formats: (1) standard and (2) optional.

The standard distribution format was designed to minimize storage requirements. Explicit topological links are contained only in the line elements. A sample DLG file in standard format is listed in Appendix B.

The optional distribution format was designed to facilitate usage. These files may be larger than those in the standard format but, for certain applications, can simplify processing requirements. Topological links are explicitly encoded between all line and node elements and between all line and area elements. A sample DLG file in optional format is listed in Appendix C.

The characteristics of the standard and optional DLG distribution formats are summarized in table 3.

Table 3. Standard and optional DLG format

	Standard	Optional

Character set	8-bit ASCII	8-bit ASCII
Logical record length	144 bytes	80 bytes
Physical record length (blocksize)	variable in multiples of 144 bytes	variable in multiples of 80 bytes
Coordinate system	internal file (thousandths of a map inch)	ground planimetric (Albers Equal-Area Conic)
Topological links	contained only in line elements	contained in node, area, and line elements

These formats are described in detail in Appendixes D and E.

Both formats include four text files. Format of the text files is described in detail in Appendix F.

COORDINATE SYSTEMS

The positional descriptions for DLG data elements are expressed in one of two coordinate systems, dependent upon the distribution format selected. These distribution formats, standard and optional, are described below.

Standard Distribution Format Coordinates

The DLG data in the standard distribution format are encoded using an internal file coordinate system to minimize storage requirements. The characteristics of this system are as follows:

1. The coordinate system is Cartesian.
2. The origin (x=0, y=0) is at the center of the cell.
3. The x-axis of the coordinate system is parallel to a theoretical straight line connecting the southwest and southeast registration points (corners) of the cell; the y-axis is perpendicular to that line.
4. One unit is equal to 0.001 inch at map scale.
5. The coordinate domain is limited to the range -32768 to +32767.

The file header contains transformation parameters that can be used to convert the internal file coordinates to the ground coordinate system (the Albers Equal-Area Conic projection for 1:2,000,000-scale DLG's). An example of this transformation is given in Appendix G.

Optional Distribution Format Coordinates

The DLG data in the optional distribution format are expressed in the units of the ground coordinate system, that is, meters in the Albers Equal-Area Conic coordinate system described in Appendix H.

SOURCE MATERIALS

The data described in this document were collected originally from USGS 1:2,000,000-scale sectional maps from The National Atlas of the United States of America. The digital files were revised and expanded in 1993 and 1994 from a variety of Federal graphic and digital sources. Data source and currency information is listed in Appendix I.

The nominal scale of the source materials used to produce a DLG is contained in the file header. The scale is also reflected in the resolution field, which states the ground length in meters of one unit (0.001 inch at map scale) in the file internal coordinate system used for data collection. For 1:2,000,000-scale data, 0.001 inch at map scale equals 50.8 meters.

CELL SIZE AND FILE EXTENT

The 1:2,000,000-scale DLG's are distributed by State. The cell size is variable. Cell corners are even degrees of latitude or longitude, and cell size is determined by the area necessary to encompass a given State. The cell always extends beyond the State boundary, so that the State "floats" within the cell. The cell completely encloses the State, except for Alaska, which is divided among three cells along arcs of longitude and latitude. The registration points for each cell are the cell corners.

The data for each cell are encoded in multiple categories (boundaries; hydrography; manmade features; pipelines, transmission lines, and miscellaneous transportation features; railroads; roads and trails; and U.S. Public Land Survey System). There is one file per category. The files for each cell are vertically registered using manual methods, and the State boundaries are manually edge matched to each other.

DATA VALIDATION

The DLG data do not carry quantified accuracy statements. The following procedures, however, are used to validate the 1:2,000,000-scale data files before they are released for distribution:

1. Positional accuracy and content completeness -- The data are collected and processed using equipment with a resolution of 0.001 inch. The positional accuracy of the data and completeness of the file are checked by visually comparing proof plots with the source materials.

2. Attribute accuracy -- Correct application of the attribute codes is checked using a combination of automated and manual techniques. Software is used to check code validity and application of codes. Manual checks, including comparison with proof plots, are used to confirm attribute application.

3. Topological fidelity -- The topological structure of each DLG file is fully validated by software. There are no extraneous intersections; that is, a line does not join or cross another line, or itself, except at a node. No line extends through a node. Polygon (area) adjacency is also validated; that is, area left and area right topology of lines is consistent throughout the file. The neatline and data limit line are free of gaps.

4.Edge matching -- The data for each State are manually edge matched to the adjacent States. The files are checked for both positional and attribute consistency and discrepancies are resolved. (Software exists to do digital edge matching along straight cell edges. However, because the 1:2,000,000-scale data does not touch the cell edges, and because it is the irregular State edges that need to be checked, the edge matching must be done manually for this data.)

5.Quality Control Flags -- The quality control flags in the DLG header record were designed for use with digital edge-matching software, and therefore do not provide information on manual edge matches. However, DLG data cannot be entered into the NDCDB unless the quality control flags are set. Therefore, for the 1:2,000,000-scale DLG the quality control flags are set to indicate that edge matching was not authorized even though a manual edge check has been performed.

The following text provides background information on quality control flags. Information in the header of the DLG file indicates the status of the file with respect to edge matching. A pair of "edge flags" are set for each of the four edges of the DLG (west, north, east, and south). The first flag indicates the status of the edge resulting from the edge-matching check, and the second flag indicates the reason for a particular status. These flags must be set before a file can be archived in the data base.

The available status values for a DLG entered into the NDCDB are:

(blank) = no status flag set
0 = passed edge match check
1 = alignment discontinuity
2 = attribute discontinuity
3 = attribute and alignment discontinuity

The available reason codes are:

(blank) = no reason flag set
4 = adjacent data do not exist
5 = adjacent data unavailable
6 = temporal/source discontinuity
7 = mismatch valid
8 = paneling unauthorized
9 = processing software limitation

The following combinations of status flags and reason flags are currently valid for files entered into the NDCDB:

blank,blank blank,4 blank,5 blank,8
0,blank
1,6 1,7 1,9
2,6 2,7
3,6 3,7

The following is a brief explanation of the reason flags:

(blank) = no reason flag set

This flag is used with a status flag of 0 (passed). No reason flag is required because no mismatches were found along the edge.

4 = adjacent data do not exist

This flag is used with a status flag of blank (unchecked). This combination exists primarily for file edges that are adjacent to areas unmapped within the series/scale of products being digitized, e.g., coastal and international boundary locations.

.... 5 = adjacent data unavailable

This flag is used with a status flag of blank (unchecked). It is used for edges adjacent to areas that have similar source materials and data categories, but that have not been digitized and archived. A reason code of 5 may be reset when the adjoining data cell becomes available for edge matching.

.... 6 = temporal/source discontinuity

This flag indicates a discontinuity in classification or alignment between features in adjacent files that were either digitized as represented on map sources with different information, or that were compiled or revised from source of different dates. Mismatches may also be due to changes in the standards and (or) in the processing software.

....7 = mismatch valid

This flag applies when a feature ends precisely at the neatline or has a reasonable attribute value change as it crosses the neatline.

....8 = paneling unauthorized

This flag is used with the edge status flag of blank and indicates that no authorization was in place for edge matching at the time the data were archived. This is the reason flag used for all 1:2,000,000-scale DLG data.

.... 9 = processing software limitation

This flag is used with a status flag of 1, indicating an alignment discontinuity. Mismatches occur when one file is segmented due to a processing software file size limitation. The alignment software is unable to distinguish between file segments that are missing data intentionally and file segments where data is missing due to an error. This flag is valid only in situations where the mismatches are due to software limitations.

APPENDIXES

APPENDIX A. -- Valid Codes for 1:2,000,000-Scale Digital Line Graphs

HYDROGRAPHY

Line	Node	Area	Code	Description
		x	000.0000	Outside area
	x		050.0001	Upper origin of stream
	x		050.0002	Upper origin of stream at water body
	x		050.0003	Sink, channel no longer evident
	x		050.0004	Stream entering water body
	x		050.0005	Stream exiting water body
x		x	050.0101	Reservoir
x		x	050.0103	Glacier/permanent snow field
x		x	050.0111	Marsh/wetland/swamp/bog
		x	050.0116	Bays/estuaries/gulfs/oceans/seas
		x	050.0120	Area not within the land area of the State
x			050.0200	Shoreline
x			050.0202	Closure line
x			050.0203	Indefinite shoreline
x			050.0204	Apparent limit
x			050.0299	Processing line
x	x		050.0401	Falls
x	x	x	050.0406	Dam/weir
x		x	050.0412	Stream
x		x	050.0413	Braided stream
x		x	050.0414	Ditch/canal
x		x	050.0415	Aqueduct
x			050.0419	Major channel in water area (i.e. Intracoastal Waterway)
x	x	x	050.0421	Lake/pond
x			050.0605	Right bank
x			050.0606	Left bank
x	x	x	050.0610	Intermittent
x	x	x	050.0614	Dry

BOUNDARIES

Line	Node	Area	Code	Description
		x	000.0000	Outside area
		x	090.0190	Area not within the land area of the State
		x	090.0199	Open water
x			090.0204	Boundary closure line
x			090.0299	Processing line
x		x	090.0401	Federal lands
x		x	090.0601	Jurisdiction in dispute

APPENDIX A. -- Valid Codes for 1:2,000,000-Scale
Digital Line Graphs--continued

Line	Node	Area	Code	Description
X		X	091.00xx[1]	State FIPS Code (includes State equivalents)
X		X	092.0xxx[2]	County FIPS Code (includes County equivalents)
X		X	097.0110	Department of Agriculture/Agricultural Research Service
X		X	097.0121	Department of Agriculture/Forest Service/National Forest
X		X	097.0122	Department of Agriculture/Forest Service/National Grassland
X		X	097.0123	Department of Agriculture/Forest Service/National Monument
X		X	097.0124	Department of Agriculture/Forest Service/National Recreation Area
X		X	097.0125	Department of Agriculture/Forest Service/National Scenic Area
X		X	097.0126	Department of Agriculture/Forest Service/Wilderness
X		X	097.0127	Department of Agriculture/Forest Service/Wilderness Study Area
X		X	097.0128	Department of Agriculture/Forest Service/Purchase Unit Block
X		X	097.0200	Department of Defense
X		X	097.0210	Department of Defense/Air Force
X		X	097.0220	Department of Defense/Army
X		X	097.0225	Department of Defense/Army Corps of Engineers
X		X	097.0230	Department of Defense/Navy
X		X	097.0235	Department of Defense/Marine Corps
X		X	097.0250	Department of Energy
X		X	097.0310	DOI/BIA (Indian Reservations)
X		X	097.0321	DOI/BLM administered public domain land
X		X	097.0322	DOI/BLM/Conservation Area
X		X	097.0323	DOI/BLM/National Recreation Area
X		X	097.0324	DOI/BLM/Wilderness
X		X	097.0325	DOI/BLM/Wilderness Study Area
X		X	097.0340	DOI/Bureau of Reclamation
X		X	097.0351	DOI/NPS/International Historic Site
X		X	097.0352	DOI/NPS/National Battlefield
X		X	097.0353	DOI/NPS/National Battlefield Park
X		X	097.0354	DOI/NPS/National Battlefield Site
X		X	097.0355	DOI/NPS/National Capital Park
X		X	097.0356	DOI/NPS/National Historic Site
X		X	097.0357	DOI/NPS/National Historic Park
X		X	097.0358	DOI/NPS/National Lakeshore
X		X	097.0359	DOI/NPS/National Mall
X		X	097.0360	DOI/NPS/National Memorial
X		X	097.0361	DOI/NPS/National Military Park
X		X	097.0362	DOI/NPS/National Monument
X		X	097.0363	DOI/NPS/National Park
X		X	097.0364	DOI/NPS/National Parkway

[1]Valid minor code values are 1 through 56, except 3, 7, 14, 43 and 52. (Also references a text file, see Appendix C.)

[2]Valid minor code values are 1 through 999. (Also references a text file, see Appendix C.)

x	x	097.0365	DOI/NPS/National Preserve

Line	Node	Area	Code	Description
X		X	097.0366	DOI/NPS/National Reserve
X		X	097.0367	DOI/NPS/National Recreation Area
X		X	097.0368	DOI/NPS/National River
X		X	097.0369	DOI/NPS/National Scenic Trail
X		X	097.0370	DOI/NPS/National Seashore
X		X	097.0371	DOI/NPS/National Wild and Scenic River and Riverway
X		X	097.0372	DOI/NPS/White House
X		X	097.0373	DOI/NPS/Wilderness
X		X	097.0374	DOI/NPS/Wilderness Study Area
X		X	097.0391	DOI/Fish and Wildlife Service/Coordination Area
X		X	097.0392	DOI/Fish and Wildlife Service/Fishery Research Station
X		X	097.0393	DOI/Fish and Wildlife Service/National Fish Hatchery
X		X	097.0394	DOI/Fish and Wildlife Service/National Wildlife Refuge
X		X	097.0395	DOI/Fish and Wildlife Service/Waterfowl Production Area
X		X	097.0396	DOI/Fish and Wildlife Service/Wilderness
X		X	097.0397	DOI/Fish and Wildlife Service/Wilderness Study Area
X		X	097.0398	DOI/Fish and Wildlife Service/Wildlife Management Area
X		X	097.0460	Department of Justice/Bureau of Prisons
X		X	097.0510	Department of State/IBWC
X		X	097.0550	Department of Transportation
X		X	097.0580	Department of Transportation/US Coast Guard
X		X	097.0920	General Services Administration
X		X	097.0930	NASA
X		X	097.0940	TVA
X		X	097.0950	Veteran's Administration (VA Hospitals)
X		X	097.0960	Central Intelligence Agency
X		X	097.0970	Washington Metropolitan Area Transit Authority
X		X	098.xxxx[3]	Federal Land Name (will be implemented at a future date)

ROADS AND TRAILS

Line	Node	Area	Code	Description
		X	000.0000	Outside area
		X	170.0100	Area not within the land area of the State
X			170.0201	Limited access highway
X			170.0205	Principal highway
X			170.0209	Other through highway
X			170.0210	Other road
X			170.0214	Road ferry crossing
X			170.0299	Processing line

[3]Valid minor code values are 1 through 9999.

APPENDIX A. -- Valid Codes for 1:2,000,000-Scale
Digital Line Graphs--continued

Line	Node	Area	Code	Description
X			170.0601	In tunnel
X			170.0609	Toll road
X			170.0615	Bypass route
X			170.0616	Alternate route
X			170.0617	Business route
X			170.0622	Truck route
X			172.xxxx[4]	Interstate route #
X			173.xxxx[5]	U.S. route #
X			174.xxxx[6]	State route #
X			177.xxxx[7]	Alphabetic part of route #

RAILROADS

Line	Node	Area	Code	Description
		X	000.0000	Outside area
		X	180.0100	Area not within the land area of the State
X			180.0201	Railroad
X			180.0299	Processing line
X			180.0601	In tunnel

PIPELINES, TRANSMISSION LINES, AND MISC TRANSPORTATION FEATURES

Line	Node	Area	Code	Description
		X	000.0000	Outside area
		X	190.0100	Area not within the land area of the State
X			190.0201	Pipeline
X			190.0299	Processing line
X		X	190.0403	Airport
X		X	196.00xx[8]	State FIPS Code
X		X	197.xxxx[9]	Airport name identifier

[4]Valid minor code values are 1 through 9999.

[5]Valid minor code values are 1 through 9999.

[6]Valid minor code values are 1 through 9999.

[7]Valid minor code values are 1 through 2626.

[8]Valid minor code values are 1 through 56, except 3, 7, 14, 43 and 52.

APPENDIX A. -- Valid Codes for 1:2,000,000-Scale
Digital Line Graphs--continued

MANMADE FEATURES

Line	Node	Area	Code	Description
		x	000.0000	Outside area
		x	200.0150	Built-up/urban area
		x	200.0190	Area not within the land area of the State
x			200.0299	Processing line
x			200.0410	Populated place
x			200.0680	Population less than 10,000
x			200.0681	Population 10,000 to 49,999
x			200.0682	Population 50,000 to 99,999
x			200.0683	Population 100,000 to 249,999
x			200.0684	Population 250,000 to 499,999
x			200.0685	Population 500,000 to 999,999
x			200.0686	Population greater than 999,999
x			200.0687[10]	Population data not available
x			200.0690	National capital
x			200.0691	State capital
x			200.0692	County seat
x			206.00xx[11]	State FIPS Code
x			207.xxxx[12]	Populated place name identifier

U.S. PUBLIC LAND SURVEY SYSTEM

Line	Node	Area	Code	Description
		x	000.0000	Outside area
x		x	300.0100	Indian lands
		x	300.0102	Donation land claims
		x	300.0103	Land grants, civil colonies
		x	300.0106	Overlapping land grants
x	x	x	300.0107	Military reservation
		x	300.0108	Private survey
		x	300.0109	Other reservation
		x	300.0190	Area not within the land area of the State

---

[9]Valid minor code values are 1 through 9999. (References a text file, see Appendix C.)

[10]This code is not used at this time.

[11]Valid minor code values are 1 through 56, except 3, 7, 14, 43 and 52.

[12]Valid minor code values are 1 through 9999. (References a text file, see Appendix C.)

	x	300.0198	Water
	x	300.0199	Unsurveyed area
x		300.0203	Arbitrary closure line

APPENDIX A. -- Valid Codes for 1:2,000,000-Scale
Digital Line Graphs--continued

Line	Node	Area	Code	Description
x			300.0204	Base line
x			300.0299	Processing line
		x	302.xxxx[13]	Township number, north of baseline
		x	303.xxxx[14]	Township number, south of baseline
		x	304.xxxx[15]	Range number, east of principal meridian
		x	305.xxxx[16]	Range number, west of principal meridian
		x	306.00xx[17]	Origin of survey, two-digit code from table 3-3
		x	307.xxxx[18]	Land grant identifier
x		x	308.0000	Best estimate of position or classification

[13]Valid minor code values are 1 through 9999.

[14]Valid minor code values are 1 through 9999.

[15]Valid minor code values are 1 through 9999.

[16]Valid minor code values are 1 through 9999.

[17]Valid minor code values are 1 through 48, 70 through 73.

[18]Valid minor code values are 1 through 8099. (References a text file, see Appendix C.)

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)

(Note: Two lines in this listing represent one record in the file.)

```
ARIZONA                          1967, 1990D 2000000
                               0 ,  0   501,  0    _ 8 8 8 8
    3     3  9999   0.637820640000000D+07   0.676865799729109D-02   0.2
90300000000000D+08   0.450300000000000D+08  -0.960000000000000D+08
   0.230000000000000D+08   0.000000000000000D+00   0.000000000000000D+00
   0.000000000000000D+00   0.000000000000000D+00   0.000000000000000D+00
   0.000000000000000D+00   0.000000000000000D+00   0.000000000000000D+00
   0.000000000000000D+00     2   0.508000000000000D+02     0     4  0  0
  -0.115000000000000D+03   0.310000000000000D+02  -0.115000000000000D+03
   0.380000000000000D+02  -0.109000000000000D+03   0.380000000000000D+02
  -0.109000000000000D+03   0.310000000000000D+02

   0.500818133180000D+02   0.851247892230000D+01  -0.144999521010000D+07
   0.139826378900000D+07     4
SW -5622 -7696NW -5136  7696NE  5136  7696SE  5622 -7696

    1

HYDROGRAPHY         25960   669 25960    95 25938   721

N      1 -5622 -7696     0     0

N      2 -5136  7696     0     0

N      3  5136  7696     0     0

N      4  5622 -7696     0     0

N      5  5074 -1372     1     0

   50     1

N      6  5233   747     0     0

N      7  4886  4915     1     0

   50     1

N      8  3819  2874     1     0

   50     1

N      9  4281  3368     0     0

N     10  4258  3575     0     0

N     11  4247  3721     0     0
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
N     12  4179  3994     0     0
N     13  4197  4063     0     0
N     14  4182  4680     0     0
N     15  4140  4780     0     0
N     16  3953  5070     0     0
N     17  3928  5228     0     0
N     18  4011  5377     0     0
N     19  3791  3109     1     0
    50     1
       .
       .
       .
       .
N    662  5277   680     0     0
N    663  5383 -2792     0     0
N    664 -5168 -4434     0     0
N    665  5419 -3997     0     0
N    666  5240  1860     0     0
N    667  5249  1569     0     0
N    668  5343 -1513     0     0
N    669  5273   799     0     0
A      1 -5772 -7935     1     0
     0     0
A      2  4056 -5006     0     0
A      3  2943  3431     0     0
A      4  -250  4522     0     0
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
A      5   653  5314     0     0
A      6  -365  -252     0     0
A      7  5025   352     0     0
A      8  4415   823     0     0
A      9  2534   956     0     0
A     10  -154 -4735     0     0
A     11   429 -2681     0     0
A     12    11 -2681     0     0
A     13  -159 -6061     0     0
A     14  -397 -6162     0     0
A     15 -1231 -1751     0     0
A     16 -2339  4363     0     0
A     17 -3476  5228     0     0
A     18  3892  -491     1     0
    50   421
A     19  4528   214     1     0
    50   101
A     20 -1002 -5979     1     0
    50   421
A     21  3875  -391     2     0
    50   421    50   614
A     22   907  5369     1     0
    50   421
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
A     23 -2816  -575     1     0
    50   421
A     24  4245  4012     1     0
    50   421
A     25  -512 -1444     1     0
    50   421
A     26  -495 -1612     0     0
A     27 -2500  5421     0     0
A     28   979  5351     0     0
A     29 -4683 -3910     0     0
A     30 -4733  3042     1     0
    50   412
A     31 -4553 -1824     1     0
    50   412
A     32 -4544 -3382     1     0
    50   421
A     33 -4700  1294     1     0
    50   412
A     34 -4243  -135     1     0
    50   421
A     35 -4675  2029     1     0
    50   421
A     36 -3112  3245     1     0
    50   421
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
A    37 -3252  5355     0     0
A    38  -819  5309     0     0
A    39  1506  5402     1     0
    50   421
A    40  1228  5386     1     0
    50   421
A    41  1343  5383     1     0
    50   421
A    42 -4176  4420     1     0
    50   120
A    43  -481 -2461     0     0
A    44  -949 -2488     0     0
A    45 -1018 -2587     0     0
A    46  5203 -3301     0     0
A    47  5184  1685     0     0
A    48 -4510 -3689     1     0
    50   101
A    49 -4610 -3867     0     0
A    50 -4694 -3954     1     0
    50   412
A    51 -4523 -3472     1     0
    50   101
A    52   922 -6487     2     0
    50   421    50   610
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
A     53   -85 -1793     2     0
    50   421    50   610
A     54  4665 -1344     1     0
    50   421
A     55  2869   221     2     0
    50   421    50   614
A     56 -4498   595     1     0
    50   421
A     57   368 -3087     0     0
     .
     .
     .
     .
A     89  5260   741     0     0
A     90  3444  -409     1     0
    50   421
A     91  4189  -314     2     0
    50   421    50   610
A     92  4617 -1067     1     0
    50   421
A     93  4668 -1406     1     0
    50   421
A     94  2287  1313     2     0
    50   421    50   614
A     95  2159  1388     2     0
```

50 421 50 614

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
L     1   239   579     2    10    18     2     0

  3538 -6810  3533 -6826  3526 -6842  3522 -6869  3520 -6897  3516 -6915
  3513 -6927  3502 -6945  3492 -6955  3484 -6962  3478 -6963  3474 -6966
  3469 -6970  3462 -6979  3454 -6988  3450 -7000  3452 -7006  3453 -7022

    50   412    50   610

L     2     8     9     3     3    84     2     0

  3819  2874  3837  2866  3844  2862  3848  2865  3852  2864  3860  2865
  3867  2870  3872  2877  3874  2881  3880  2881  3884  2882  3887  2881
  3898  2886  3907  2887  3913  2898  3921  2909  3923  2916  3925  2926
  3932  2934  3939  2938  3950  2941  3958  2943  3965  2954  3974  2969
  3979  2984  3983  2990  3987  2992  3989  2999  3993  3000  3998  3001
  4003  3003  4013  3004  4024  3012  4039  3024  4046  3035  4049  3038
  4052  3044  4061  3043  4075  3050  4083  3058  4092  3071  4098  3074
  4101  3081  4105  3090  4111  3109  4114  3117  4121  3127  4126  3130
  4131  3133  4137  3138  4141  3142  4146  3150  4145  3161  4148  3173
  4148  3186  4150  3193  4148  3202  4144  3212  4143  3212  4140  3216
  4135  3223  4132  3232  4132  3243  4133  3250  4137  3257  4143  3259
  4154  3260  4162  3260  4176  3254  4184  3252  4195  3254  4206  3260
  4217  3264  4226  3272  4235  3275  4241  3280  4245  3293  4250  3306
  4255  3314  4259  3322  4266  3334  4273  3346  4278  3359  4281  3368
    50   412    50   610

L     3     9    10     3     3    17     2     0

  4281  3368  4280  3390  4277  3409  4273  3431  4270  3459  4269  3471
  4268  3487  4269  3492  4277  3508  4276  3516  4273  3533  4271  3543
  4268  3556  4266  3563  4260  3566  4260  3568  4258  3575

    50   412    50   610

L     4    10    11     3     3    17     2     0

  4258  3575  4259  3584  4261  3599  4262  3606  4264  3612  4258  3624
  4251  3629  4244  3636  4239  3650  4237  3655  4234  3667  4233  3677
  4234  3684  4234  3693  4237  3707  4241  3716  4247  3721

    50   412    50   610

L     5    12    13     3     3     8     2     0

  4179  3994  4188  4002  4188  4008  4187  4017  4186  4028  4191  4039
  4194  4052  4197  4063
```

```
    50   412    50   610
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
L     6    13    14     3     3    62     2     0

  4197  4063  4202  4075  4207  4096  4208  4112  4205  4134  4201  4153
  4200  4163  4201  4176  4201  4186  4204  4198  4208  4217  4210  4228
  4213  4253  4215  4267  4221  4279  4226  4295  4222  4299  4220  4310
  4216  4315  4207  4327  4202  4342  4199  4359  4201  4369  4198  4380
  4197  4384  4195  4389  4193  4393  4193  4400  4193  4408  4192  4419
  4194  4424  4196  4429  4194  4434  4194  4443  4193  4454  4194  4465
  4196  4475  4200  4485  4203  4492  4207  4501  4206  4513  4204  4531
  4204  4543  4200  4550  4195  4556  4188  4563  4181  4566  4178  4570
  4175  4578  4177  4584  4181  4593  4185  4603  4184  4611  4182  4619
  4177  4624  4175  4629  4177  4636  4177  4646  4179  4651  4182  4663
  4183  4671  4182  4680

    50   412    50   610

     .
     .
     .
     .

L   147   223   216    10     6    48     2     0

   887 -3346   874 -3345   865 -3346   854 -3344   843 -3342   837 -3337
   833 -3333   827 -3322   827 -3318   823 -3310   818 -3305   808 -3296
   801 -3294   794 -3291   789 -3287   780 -3285   777 -3281   773 -3275
   769 -3269   765 -3264   758 -3263   746 -3260   730 -3256   717 -3254
   711 -3249   704 -3243   701 -3243   695 -3245   689 -3248   683 -3250
   678 -3249   675 -3248   668 -3239   658 -3234   652 -3235   648 -3235
   640 -3230   635 -3222   625 -3213   611 -3208   601 -3206   582 -3197
   561 -3196   553 -3199   549 -3200   544 -3201   537 -3198   525 -3190
    50   412    50   610

L   148   219   224    10    12   108     2     0

   201 -3037   200 -3031   184 -3022   175 -3021   171 -3020   168 -3018
   166 -3010   159 -3003   156 -3000   147 -2999   139 -3002   135 -3005
   127 -3009   124 -3009   115 -3006   109 -3008   104 -3012    96 -3012
    91 -3012    87 -3016    85 -3018    81 -3020    76 -3025    70 -3029
    62 -3031    58 -3031    53 -3034    47 -3039    43 -3039    39 -3040
    34 -3037    27 -3039    18 -3038    11 -3037     2 -3033   -11 -3018
   -27 -3004   -37 -3000   -54 -2990   -86 -2965  -106 -2959  -113 -2951
  -119 -2950  -128 -2950  -140 -2947  -144 -2943  -148 -2939  -155 -2936
  -159 -2928  -159 -2919  -160 -2911  -161 -2906  -165 -2900  -172 -2900
  -177 -2897  -187 -2887  -191 -2882  -198 -2884  -209 -2882  -213 -2885
  -220 -2877  -225 -2874  -232 -2875  -236 -2876  -243 -2873  -249 -2866
```

```
-251 -2860  -251 -2850  -251 -2843  -253 -2841  -255 -2838  -260 -2838
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
 -274 -2836  -278 -2839  -281 -2840  -293 -2831  -300 -2831  -307 -2834
 -320 -2828  -324 -2818  -323 -2809  -331 -2799  -337 -2793  -342 -2789
 -347 -2782  -351 -2768  -353 -2761  -354 -2754  -356 -2744  -357 -2738
 -360 -2726  -367 -2722  -376 -2709  -384 -2702  -392 -2688  -393 -2684
 -398 -2682  -404 -2681  -409 -2679  -414 -2676  -418 -2672  -425 -2663
 -429 -2662  -434 -2655  -442 -2657  -460 -2653  -469 -2658  -476 -2660
   50   412    50   610

L    149   225   209     6    59     4     1     0

  526 -2266   516 -2273   507 -2285   503 -2289

   50   412

L    150   232   233     6     6    25     1     0

 -810 -1962  -809 -1974  -814 -1981  -823 -1986  -831 -1988  -830 -1992
 -831 -2001  -829 -2015  -826 -2032  -829 -2052  -833 -2066  -838 -2075
 -843 -2084  -844 -2089  -850 -2103  -851 -2125  -852 -2140  -855 -2156
 -856 -2172  -854 -2198  -855 -2216  -854 -2235  -858 -2256  -859 -2277
 -854 -2340

   50   414

     .
     .
     .
     .

L    574    70   110     3     6   131     1     0

 1907  1628  1910  1625  1922  1621  1932  1616  1944  1615  1949  1615
 1953  1616  1955  1616  1958  1619  1959  1621  1964  1634  1965  1639
 1970  1640  1975  1640  1980  1635  1985  1629  1988  1629  1992  1626
 1996  1626  2003  1627  2013  1627  2019  1626  2021  1625  2024  1622
 2024  1615  2024  1599  2023  1595  2025  1593  2029  1595  2038  1599
 2043  1602  2044  1602  2048  1603  2055  1604  2062  1608  2066  1609
 2069  1612  2076  1613  2077  1609  2080  1595  2082  1588  2086  1590
 2090  1589  2095  1589  2098  1589  2099  1590  2103  1596  2108  1604
 2112  1605  2115  1607  2117  1601  2126  1592  2136  1582  2144  1574
 2157  1571  2163  1571  2167  1566  2172  1564  2173  1559  2172  1554
 2176  1540  2181  1532  2186  1522  2191  1518  2195  1513  2196  1509
 2194  1502  2196  1494  2195  1492  2201  1489  2207  1483  2208  1474
 2213  1457  2216  1440  2218  1435  2224  1432  2230  1431  2235  1431
 2243  1433  2250  1434  2260  1434  2275  1434  2291  1433  2303  1435
 2310  1436  2316  1438  2322  1435  2325  1431  2329  1423  2330  1418
```

```
  2336  1414  2341  1416  2348  1418  2352  1420  2358  1422  2365  1424
  2365  1420  2366  1414  2364  1409  2363  1394  2361  1382  2360  1364
```

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

```
  2361  1355  2365  1349  2373  1342  2377  1340  2376  1334  2378  1327
  2382  1320  2386  1314  2392  1303  2400  1296  2404  1293  2402  1283
  2399  1279  2396  1271  2390  1269  2379  1261  2376  1253  2378  1249
  2380  1242  2370  1213  2366  1185  2382  1119  2381  1114  2384  1108
  2373  1087  2396  1061  2401  1047  2411  1036  2412  1021
    50   412

L    575   137   110     6     3     2     1     0

  2430   973  2412  1021

    50   412

L    576    93   111     3     9    24     1     0

  2472   997  2483   992  2485   990  2489   984  2500   984  2506   980
  2524   979  2553   976  2559   972  2564   970  2568   966  2570   960
  2574   950  2578   946  2584   939  2587   938  2592   932  2595   927
  2601   923  2610   920  2620   914  2639   912  2644   911  2648   911
    50   412

L    577   137    93     3     9     2     1     0

  2430   973  2472   997

    50   412

     .
     .
     .
     .

L    719   658   657    56    33     3     1     0

 -4468   481 -4451   474 -4448   468

    50   202

L    720   657   535     6    33     2     1     0

 -4448   468 -4441   455

    50   606

L    721   587   586    30    42   124     0     0
```

-4818 3303 -4819 3301 -4821 3293 -4819 3281 -4817 3272 -4819 3264
-4822 3257 -4826 3250 -4826 3241 -4824 3230 -4820 3217 -4811 3202

APPENDIX B. -- Sample DLG data file (Standard Distribution Format)--continued

-4805 3194 -4802 3184 -4804 3174 -4805 3160 -4806 3151 -4802 3144
-4794 3139 -4784 3132 -4772 3121 -4766 3110 -4766 3101 -4767 3089
-4767 3079 -4765 3070 -4760 3063 -4752 3052 -4737 3035 -4727 3025
-4717 3014 -4711 3005 -4703 2997 -4695 2994 -4689 2991 -4688 2989
-4689 2984 -4694 2982 -4701 2979 -4707 2977 -4719 2972 -4728 2969
-4735 2966 -4738 2963 -4740 2960 -4743 2956 -4748 2953 -4754 2952
-4761 2951 -4766 2949 -4768 2945 -4768 2940 -4766 2933 -4764 2927
-4759 2920 -4754 2911 -4752 2907 -4751 2901 -4752 2899 -4756 2894
-4760 2889 -4762 2885 -4763 2879 -4763 2875 -4767 2867 -4773 2862
-4777 2857 -4780 2851 -4781 2845 -4777 2839 -4771 2832 -4767 2824
-4763 2810 -4762 2800 -4763 2790 -4763 2781 -4762 2770 -4762 2761
-4759 2755 -4756 2748 -4754 2743 -4754 2740 -4757 2732 -4759 2727
-4759 2721 -4758 2716 -4757 2709 -4756 2699 -4758 2690 -4762 2673
-4767 2661 -4772 2650 -4774 2641 -4774 2631 -4773 2622 -4769 2612
-4762 2603 -4754 2595 -4746 2589 -4740 2584 -4736 2579 -4735 2572
-4735 2566 -4737 2561 -4740 2552 -4746 2533 -4750 2516 -4748 2498
-4742 2484 -4735 2478 -4728 2470 -4725 2464 -4720 2456 -4719 2444
-4714 2437 -4708 2433 -4702 2429 -4697 2424 -4694 2414 -4692 2406
-4693 2394 -4696 2383 -4697 2374 -4701 2369

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)

```
 *** DLG-OPTIONAL FORMAT   PRODUCED BY USGS   PROSYS RELEASE
ARIZONA                          1967, 1990D 2000000
                             0 ,  0   501,  0    _ 8 8 8 8
    3     3  9999      2 0.50800000000D+02     4     0     4     1  0  0
   0.637820640000000D+07   0.676865799729109D-02   0.290300000000000D+08
   0.450300000000000D+08  -0.960000000000000D+08   0.230000000000000D+08
   0.000000000000000D+00   0.000000000000000D+00   0.000000000000000D+00
   0.000000000000000D+00   0.000000000000000D+00   0.000000000000000D+00
   0.000000000000000D+00   0.000000000000000D+00   0.000000000000000D+00
 0.10000000000D+01 0.00000000000D+00 0.00000000000D+00 0.00000000000D+00
SW       31.000000 -115.000000       -1797067.20  1060691.31
NW       38.000000 -115.000000       -1641703.37  1827413.52
NE       38.000000 -109.000000       -1127262.98  1739973.33
SE       31.000000 -109.000000       -1233947.29   964977.00
HYDROGRAPHY            0   669    669 01      95     95 010    721    721   1
N    1 -1797067.20  1060691.31      0     2           0     0
   460  -463
N    2 -1641703.37  1827413.52      0     2           0     0
  -460   461
N    3 -1127262.98  1739973.33      0     2           0     0
  -461   462
N    4 -1233947.29   964977.00      0     2           0     0
  -462   463
N    5 -1207559.21  1286359.22      0     1           1     0
   581
    50     1
N    6 -1181558.26  1391129.10      0     3           0     0
   622  -415    64
N    7 -1163456.64  1602823.93      0     1           1     0
   446
    50     1
N    8 -1234267.90  1509689.76      0     1           1     0
     2
    50     1
N    9 -1206924.94  1530497.41      0     3           0     0
   -18    -2     3
N   10 -1206314.74  1541060.14      0     3           0     0
     4    -3   -20
N   11 -1205622.81  1548465.72      0     3           0     0
   561   -29    -4
N   12 -1206704.47  1562716.90      0     3           0     0
     5  -561   -13
N   13 -1205215.64  1566019.32      0     3           0     0
     6    14    -5
N   14 -1200714.67  1597047.49      0     3           0     0
     7   -26    -6
N   15 -1201966.85  1602413.19      0     3           0     0
    -7   -23     8
```

```
N   16 -1208863.53  1618528.75     0     3           0     0
    -8   -22     9
N   17 -1208770.61  1626654.49     0     3           0     0
    -9  -467    10
N   18 -1203345.46  1633410.15     0     3           0     0
   -21   -10    11
N   19 -1233669.76  1521697.34     0     1           1     0
    12
    50     1
     .
     .
     .
     .

N  662 -1179925.00  1387399.07     0     3           0     0
   623   415  -621
N  663 -1204171.65  1212612.69     0     3           0     0
  -626   627  -416
N  664 -1746562.35  1220193.52     0     3           0     0
  -654   453   454
N  665 -1212626.24  1151957.66     0     3           0     0
  -627   628  -531
N  666 -1171733.30  1446810.57     0     3           0     0
   620   564  -618
N  667 -1173759.69  1432160.15     0     3           0     0
  -620   619   565
N  668 -1195287.46  1277007.83     0     3           0     0
   626  -581   625
N  669 -1179112.34  1393392.86     0     3           0     0
   621  -622  -619
A    1 -1806613.96  1049998.63     0     4     0     1     0     0
  -463  -462  -461  -460
     0     0
A    2 -1289476.84  1113027.62     0    20     0     0     0     1
  -540  -151  -614   133   134   132  -295   334   128   527   528  -529
  -530   531   628  -447  -448    -1     0  -316
A    3 -1273398.12  1545042.27     0    48     0     0     0     1
   445   618   564   563   567   566   569   -74  -571   -73  -576  -577
   575  -574   -49   -48   -47  -385   -46   -41  -562   -38   -37   -36
    30   373  -329  -332   322  -369  -428  -368  -430  -367  -431   437
  -438  -439  -441  -440  -442  -443  -444     0   327  -328   325   326
A    4 -1424022.23  1626861.87     0    17     0     0     0     0
    36    37    38   562  -226  -472   404   403   402   400   399   398
  -234  -235  -426    31   -30
A    5 -1372056.47  1658839.90     0     5     0     0     0     0
  -436  -331  -330  -373   -31
A    6 -1470420.22  1388750.23     0   202     0     0     0    38
   385    47    48    49   574  -575    91   -94    73   571    74    75
```

```
  76  639   77   78   79 -287   80  624 -625  626 -416  545
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
  530  529 -528 -527 -128 -334 -294 -337 -336 -132  643  521
  147 -142 -141 -140 -136 -149 -488 -486 -499 -491  495 -505
 -642  641  516  181  182  389  188  189  190 -180 -179 -387
 -536 -178 -645  651  391 -377 -634 -378  376 -660  661 -662
 -633 -720  717 -718 -396 -394  473  412  413 -411 -410 -414
 -409 -408 -407 -406 -405  472  226   41   46    0 -284    0
 -285    0 -290    0 -291    0 -292    0 -293    0 -301    0
 -302    0 -303    0 -304    0 -305    0 -306    0 -309    0
  320    0  286    0 -692    0 -693    0  697    0 -698    0
 -714    0 -715    0  716    0 -317    0 -308 -307    0 -310
 -364    0 -312 -323 -311 -360  324    0  201  197    0 -631
  358 -374 -314 -356 -313 -357 -485    0  689  690  691  688
    0 -354 -353 -299    0 -351 -350 -349    0 -298 -348 -347
    0 -297 -346    0 -296 -345 -344    0 -342 -341 -365 -343
 -339 -338    0 -695 -694 -696    0 -289    0 -300
A    7 -1195337.71  1373117.38    0    9    0    0    0    0
 -415  623 -624  -80  288  -79  -78   81  -64
A    8 -1221878.23  1401898.53    0   13    0    0    0    0
  -76  -75 -569 -566 -567 -563 -565  619 -622   64  -81  -77
 -639
A    9 -1314949.97  1424571.38    0    4    0    0    0    0
  577  576   94  -91
A   10 -1498014.40  1162437.32    0   50    0    0    0    4
  614  151  540    1  450  160 -170  559  162  163  164 -452
 -453 -654 -382 -379  178  536  387  179  180 -190 -189 -188
 -389 -182 -181 -516 -641 -492 -493  666  664 -148 -519 -147
 -521 -643 -134 -133    0  674 -673    0 -315    0 -177    0
  318 -319
A   11 -1451332.07  1260342.59    0    5    0    0    0    0
  140 -139 -145 -138 -137
A   12 -1472266.27  1263900.81    0   11    0    0    0    0
  148 -664 -665 -498  136  137  138 -497  139  141 -144
A   13 -1509552.35  1096071.40    0    8    0    0    0    0
 -449  168  169 -163 -162 -559 -161 -160
A   14 -1522331.59  1093039.11    0    4    0    0    0    0
 -169 -168 -451 -164
A   15 -1526551.27  1321049.40    0    2    0    0    0    0
 -201 -197
A   16 -1529996.63  1636681.43    0   27    0    0    0    0
 -362 -459  282  468 -423 -422  366 -420 -419 -424 -397 -398
 -399 -400 -402 -403 -404  405  406  407  408  409  414  410
  411 -251 -250
A   17 -1579576.35  1689680.89    0    3    0    0    0    0
 -282 -418 -281
A   18 -1259256.42  1340543.05    0    1    0    1    0    0
 -286
   50  421
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
A   19 -1221403.09  1370436.79    0    2    0    1    0    0
   287  -288
    50   101
A   20 -1551073.30  1107354.13    0    2    0    1    0    0
   319  -318
    50   421
A   21 -1259256.56  1345695.94    0    1    0    2    0    0
  -320
    50   421    50   614
A   22 -1358867.51  1659432.23    0    9    0    1    0    0
   332   329   330   331  -435   370  -433   369  -322
    50   421
A   23 -1595920.27  1393437.89    0    5    0    1    0    0
   360   311   323   312  -324
    50   421
A   24 -1203245.85  1563056.55    0    4    0    1    0    0
   328  -327  -326  -325
    50   421
A   25 -1487929.12  1330304.04    0    7    0    1    0    0
   359   357   313   356   314   374  -358
    50   421
A   26 -1488507.82  1321745.58    0    3    0    0    0    0
   631   485  -359
A   27 -1529053.60  1691038.50    0    2    0    0    0    0
  -421  -366
A   28 -1355414.84  1657917.86    0    2    0    0    0    0
  -434  -370
A   29 -1717812.13  1242307.84    0    2    0    0    0    0
  -455  -371
A   30 -1661137.47  1590902.23    0    4    0    1    0    0
   394   395  -721  -375
    50   412
A   31 -1693544.47  1345671.88    0    8    0    1    0    0
   378   634   377   637  -636  -659   660  -376
    50   412
A   32 -1706356.17  1267567.80    0    4    0    1    0    0
   635  -637  -391  -390
    50   421
A   33 -1674364.58  1503078.31    0    7    0    1    0    0
   718   719   720   633   393  -456  -392
    50   412
A   34 -1663641.53  1427621.19    0    5    0    1    0    0
   662  -661   659   658  -393
    50   421
A   35 -1666855.87  1539675.63    0    4    0    1    0    0
   396   392  -457  -395
```

```
   50   421
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
A   36 -1578226.82  1587270.11     0     8     0     1     0     0
  -473   375  -458   362   250   251  -413  -412
    50   421
A   37 -1567276.94  1694134.48     0     3     0     0     0     0
  -468   281  -417
A   38 -1445819.46  1671119.86     0     4     0     0     0     0
   235   234   397  -425
A   39 -1328587.59  1655985.95     0     2     0     1     0     0
  -437  -427
    50   421
A   40 -1342646.53  1657551.11     0     2     0     1     0     0
   368  -429
    50   421
A   41 -1336912.66  1656421.93     0     2     0     1     0     0
   367  -432
    50   421
A   42 -1621511.71  1655173.52     0    62     0     1     0     1
   461   462   463   460     0   444   443   442   440   441   439   438
   427   431   432   430   429   428   433   434   435   436   426   425
   424   419   420   421   422   423   417   418   459   458   721   457
   456  -658   636  -635   652   646   653   455  -454   453   452   451
   449  -450   448   447  -628  -627  -626   625  -623  -621  -619  -620
  -618  -445
    50   120
A   43 -1495033.77  1279106.95     0     5     0     0     0     0
   665  -666  -494   491  -490
A   44 -1518701.90  1281738.58     0     4     0     0     0     0
   494   496   505  -495
A   45 -1523000.28  1277367.84     0     4     0     0     0     0
   493   492   642  -496
A   46 -1217519.23  1188653.30     0     4     0     0     0     0
  -545   416   627  -531
A   47 -1176027.56  1438522.95     0     3     0     0     0     0
   620   565  -564
A   48 -1707266.72  1251903.26     0     4     0     1     0     0
  -647   648   649  -646
    50   101
A   49 -1713790.13  1243839.94     0     4     0     0     0     0
   645   379   650  -648
A   50 -1718737.58  1240197.88     0     7     0     1     0     0
  -650   382   654   454   371  -653  -649
    50   412
A   51 -1706070.58  1262881.68     0     4     0     1     0     0
   647  -652   390  -651
    50   101
```

```
A   52 -1459040.23  1065534.56     0     2     0     2     0     0
   673  -674
    50   421    50   610
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
A   53 -1469515.04  1309190.66     0     4     0     2     0     0
  -691  -690  -689  -688
    50   421    50   610
A   54 -1227804.32  1291243.12     0     1     0     1     0     0
  -697
    50  421
A   55 -1304429.23  1384909.57     0     1     0     2     0     0
  -716
    50   421    50   614
A   56 -1670198.28  1466351.60     0     2     0     1     0     0
  -719  -717
    50   421
A   57 -1457843.13  1240528.64     0     3     0     0     0     0
   519   144   142
     .
     .

     .
     .
A   89 -1180257.13  1390598.77     0     3     0     0     0     0
   622   621   415
A   90 -1280995.05  1348463.35     0     1     0     1     0     0
   692
    50   421
A   91 -1242875.41  1346879.33     0     1     0     2     0     0
   693
    50   421    50   610
A   92 -1227850.29  1305524.38     0     3     0     1     0     0
   695   696   694
    50   421
A   93 -1228181.85  1288112.51     0     1     0     1     0     0
   698
    50   421
A   94 -1324281.22  1444553.17     0     1     0     2     0     0
   714
    50   421    50   614
A   95 -1330053.25  1449398.90     0     1     0     2     0     0
   715
    50   421    50   614
L    1   239   579     2    10               18     2     0
 -1330775.74  1027089.49 -1331162.34  1026330.74 -1331649.12  1025589.02
 -1332079.28  1024270.86 -1332417.79  1022885.60 -1332771.35  1022018.17
 -1333023.74  1021442.73 -1333727.87  1020634.89 -1334313.81  1020219.20
 -1334774.05  1019936.73 -1335083.05  1019937.72 -1335308.92  1019821.53
```

```
 -1335593.38  1019663.76 -1336020.56  1019272.61 -1336497.83  1018889.98
 -1336800.31  1018323.04 -1336751.22  1018005.53 -1336837.34  1017195.71
    50   412    50   610
L    2     8     9     3     3                84     2     0
 -1234267.90  1509689.76 -1233434.53  1509135.88 -1233118.01  1508875.97
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
 -1232892.14  1508992.17 -1232700.33  1508908.03 -1232291.16  1508890.02
 -1231898.02  1509080.84 -1231588.03  1509388.85 -1231453.81  1509572.15
 -1231153.32  1509521.07 -1230944.48  1509537.11 -1230802.75  1509461.49
 -1230209.29  1509618.26 -1229750.04  1509591.73 -1229355.91  1510091.55
 -1228861.62  1510574.35 -1228701.87  1510907.90 -1228516.58  1511391.69
 -1228097.91  1511732.76 -1227713.28  1511873.50 -1227136.85  1511930.11
 -1226719.17  1511962.17 -1226274.96  1512453.49 -1225696.53  1513128.10
 -1225318.44  1513836.77 -1225067.04  1514103.21 -1224849.68  1514169.32
 -1224689.93  1514502.87 -1224481.09  1514518.90 -1224222.17  1514526.42
 -1223954.74  1514584.02 -1223445.41  1514548.98 -1222826.41  1514856.00
 -1221973.03  1515329.29 -1221528.82  1515820.60 -1221353.04  1515945.31
 -1221151.72  1516220.26 -1220709.49  1516093.57 -1219948.76  1516324.97
 -1219480.01  1516657.52 -1218918.61  1517231.97 -1218592.58  1517331.14
 -1218382.75  1517656.18 -1218105.81  1518072.87 -1217643.58  1518973.35
 -1217425.23  1519348.46 -1216989.54  1519789.69 -1216713.59  1519897.38
 -1216437.64  1520005.06 -1216094.59  1520204.39 -1215860.21  1520370.67
 -1215541.70  1520728.76 -1215498.15  1521288.18 -1215245.75  1521863.62
 -1215135.09  1522514.68 -1214975.34  1522848.23 -1214998.89  1523315.99
 -1215114.09  1523850.86 -1215164.18  1523859.37 -1215280.37  1524085.24
 -1215471.19  1524478.37 -1215544.83  1524954.65 -1215451.19  1525505.55
 -1215341.52  1525847.61 -1215081.60  1526164.13 -1214764.09  1526213.22
 -1214204.68  1526169.66 -1213804.02  1526101.56 -1213153.95  1525681.90
 -1212770.32  1525513.63 -1212202.40  1525520.16 -1211600.42  1525727.01
 -1211015.47  1525833.70 -1210496.64  1526157.75 -1210020.36  1526231.38
 -1209677.31  1526430.71 -1209366.32  1527047.73 -1209005.25  1527656.23
 -1208686.74  1528014.32 -1208418.31  1528380.93 -1207965.59  1528922.32
 -1207512.87  1529463.71 -1207151.80  1530072.22 -1206924.94  1530497.41
    50   412    50   610
L    3     9    10     3     3                17     2     0
 -1206924.94  1530497.41 -1206787.75  1531607.73 -1206776.25  1532584.82
 -1206789.31  1533720.67 -1206701.20  1535148.50 -1206649.13  1535757.99
 -1206563.02  1536567.81 -1206470.37  1536809.71 -1205933.52  1537542.92
 -1205915.50  1537952.08 -1205921.03  1538829.01 -1205936.07  1539346.86
 -1205975.66  1540023.46 -1206016.23  1540391.05 -1206291.19  1540592.38
 -1206274.16  1540692.54 -1206314.74  1541060.14
    50   412    50   610
L    4    10    11     3     3                17     2     0
 -1206314.74  1541060.14 -1206188.04  1541502.36 -1205960.19  1542236.56
 -1205850.52  1542578.62 -1205699.28  1542862.09 -1205897.63  1543514.15
 -1206205.64  1543824.14 -1206496.62  1544234.30 -1206627.86  1544978.01
 -1206685.46  1545245.44 -1206733.55  1545871.96 -1206698.51  1546381.29
 -1206588.84  1546723.35 -1206512.23  1547174.09 -1206242.81  1547849.70
 -1205965.87  1548266.38 -1205622.81  1548465.72
```

```
    50   412    50   610
L    5    12    13     3     3                  8     2     0
 -1206704.47  1562716.90 -1206185.64  1563040.94 -1206134.56  1563341.44
 -1206108.03  1563800.68 -1206064.47  1564360.10 -1205720.43  1564868.43
 -1205459.52  1565493.96 -1205215.64  1566019.32
    50   412    50   610
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
L    6    13    14     3     3                 62     2     0
 -1205215.64  1566019.32 -1204863.08  1566577.74 -1204433.91  1567586.90
 -1204247.63  1568379.69 -1204210.60  1569507.03 -1204249.19  1570492.64
 -1204214.14  1571001.97 -1204053.40  1571644.52 -1203968.28  1572145.34
 -1203715.88  1572720.78 -1203353.82  1573638.28 -1203160.02  1574172.16
 -1202796.96  1575398.67 -1202577.62  1576082.79 -1202174.98  1576632.69
 -1201788.37  1577391.44 -1201954.65  1577625.82 -1201961.17  1578193.74
 -1202118.94  1578478.20 -1202467.53  1579155.80 -1202590.25  1579949.59
 -1202595.78  1580826.51 -1202410.49  1581310.31 -1202467.10  1581886.74
 -1202483.13  1582095.58 -1202540.73  1582363.02 -1202606.85  1582580.37
 -1202547.26  1582930.94 -1202479.16  1583331.60 -1202435.60  1583891.01
 -1202292.88  1584124.39 -1202150.15  1584357.78 -1202207.75  1584625.21
 -1202131.14  1585075.95 -1202087.59  1585635.36 -1201943.87  1586177.75
 -1201758.58  1586661.54 -1201473.13  1587128.31 -1201263.29  1587453.35
 -1200986.35  1587870.03 -1200934.29  1588479.53 -1200881.22  1589398.02
 -1200779.08  1589999.01 -1200919.82  1590383.63 -1201119.15  1590726.68
 -1201410.13  1591136.84 -1201735.17  1591346.67 -1201851.37  1591572.54
 -1201933.51  1591998.73 -1201782.27  1592282.20 -1201505.33  1592698.88
 -1201219.88  1593165.65 -1201201.86  1593574.82 -1201233.93  1593992.50
 -1201441.77  1594285.47 -1201499.37  1594552.90 -1201339.62  1594886.45
 -1201254.50  1595387.27 -1201111.77  1595620.65 -1200859.38  1596196.10
 -1200741.20  1596588.24 -1200714.67  1597047.49
    50   412    50   610

      .
      .
      .
      .

L  147   223   216    10     6                 48     2     0
 -1434055.40  1223139.47 -1434697.95  1223300.22 -1435157.20  1223326.75
 -1435691.07  1223520.55 -1436224.95  1223714.35 -1436482.87  1224015.83
 -1436649.15  1224250.21 -1436856.01  1224852.19 -1436821.96  1225052.51
 -1436954.18  1225487.22 -1437162.03  1225780.19 -1437586.24  1226316.05
 -1437919.78  1226475.80 -1438244.82  1226685.63 -1438461.18  1226928.52
 -1438894.89  1227105.30 -1439011.08  1227331.16 -1439160.34  1227665.70
 -1439309.59  1228000.24 -1439467.35  1228284.70 -1439809.41  1228394.37
 -1440384.86  1228646.77 -1441152.12  1228983.30 -1441786.16  1229194.12
 -1442044.08  1229495.61 -1442343.58  1229855.68 -1442493.83  1229881.22
 -1442811.34  1229832.13 -1443137.37  1229732.96 -1443454.89  1229683.87
 -1443696.78  1229776.52 -1443838.52  1229852.14 -1444112.48  1230362.46
 -1444570.73  1230697.99 -1444879.74  1230698.99 -1445080.06  1230733.04
```

```
 -1445438.16  1231051.55 -1445620.47  1231494.76 -1446044.67  1232030.62
 -1446703.25  1232400.21 -1447187.05  1232585.50 -1448061.99  1233197.97
 -1449105.20  1233426.81 -1449531.39  1233344.67 -1449740.23  1233328.64
 -1449999.15  1233321.12 -1450324.18  1233530.95 -1450857.07  1234033.75
    50   412    50   610
L  148   219   224    10    12              108     2     0
 -1465781.16  1244454.31 -1465780.17  1244763.32 -1466504.87  1245350.25
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
 -1466947.09  1245476.95 -1467138.91  1245561.08 -1467272.13  1245686.78
 -1467304.19  1246104.46 -1467595.18  1246514.62 -1467719.88  1246690.40
 -1468162.11  1246817.10 -1468588.30  1246734.95 -1468814.16  1246618.76
 -1469248.87  1246486.53 -1469399.11  1246512.07 -1469824.31  1246738.92
 -1470141.83  1246689.83 -1470426.29  1246532.07 -1470826.94  1246600.17
 -1471077.35  1246642.73 -1471311.73  1246476.45 -1471428.92  1246393.32
 -1471646.27  1246327.20 -1471939.24  1246119.36 -1472273.78  1245970.10
 -1472691.46  1245938.04 -1472891.79  1245972.09 -1473167.74  1245864.41
 -1473510.79  1245665.07 -1473711.12  1245699.12 -1473919.96  1245683.09
 -1474144.83  1245875.90 -1474512.42  1245835.32 -1474954.65  1245962.02
 -1475296.71  1246071.68 -1475713.40  1246348.62 -147623.77  1247210.51
 -1476918.91  1248047.86 -1477385.67  1248333.31 -1478151.94  1248978.84
 -1479541.75  1250503.29 -1480492.31  1250974.03 -1480774.78  1251434.27
 -1481066.76  1251535.42 -1481517.50  1251612.04 -1482092.94  1251864.43
 -1482259.22  1252098.81 -1482425.49  1252333.19 -1482750.53  1252543.02
 -1482882.76  1252977.72 -1482806.14  1253428.46 -1482788.13  1253837.63
 -1482795.65  1254096.55 -1482944.90  1254431.09 -1483295.47  1254490.68
 -1483520.34  1254683.48 -1483936.04  1255269.43 -1484093.80  1255553.89
 -1484461.40  1255513.31 -1484995.27  1255707.11 -1485221.14  1255590.92
 -1485503.61  1256051.16 -1485728.48  1256243.97 -1486087.57  1256253.47
 -1486296.41  1256237.44 -1486621.44  1256447.27 -1486862.35  1256848.92
 -1486911.43  1257166.44 -1486826.31  1257667.25 -1486766.72  1258017.83
 -1486849.86  1258135.01 -1486924.49  1258302.28 -1487174.90  1258344.85
 -1487859.02  1258564.19 -1488084.88  1258447.99 -1488243.64  1258423.45
 -1488768.01  1258976.33 -1489118.58  1259035.92 -1489494.69  1258945.26
 -1490094.68  1259356.41 -1490209.88  1259891.28 -1490083.19  1260333.51
 -1490398.72  1260902.42 -1490648.13  1261253.99 -1490864.49  1261496.88
 -1491055.32  1261890.01 -1491136.47  1262625.21 -1491177.04  1262992.81
 -1491167.54  1263351.89 -1491182.58  1263869.74 -1491181.58  1264178.74
 -1491229.68  1264805.26 -1491546.20  1265065.17 -1491886.28  1265792.85
 -1492227.34  1266211.52 -1492508.82  1266980.77 -1492524.86  1267189.61
 -1492758.24  1267332.33 -1493050.22  1267433.49 -1493283.60  1267576.22
 -1493508.47  1267769.02 -1493674.75  1268003.40 -1493948.71  1268513.72
 -1494140.53  1268597.86 -1494331.35  1268990.99 -1494749.03  1268958.93
 -1495616.45  1269312.48 -1496109.75  1269138.68 -1496477.35  1269098.11
    50   412    50   610
L  149   225   209     6    59                4     1     0
 -1442941.45  1280300.84 -1443501.86  1280035.39 -1444054.75  1279511.02
 -1444289.12  1279344.74
    50   412
L  150   232   233     6     6               25     1     0
```

```
 -1507262.96  1306898.38 -1507315.03  1306288.88 -1507625.03  1305980.87
 -1508118.33  1305807.08 -1508536.01  1305775.01 -1508519.97  1305566.17
 -1508646.67  1305123.95 -1508665.68  1304405.78 -1508660.15  1303528.85
 -1508980.64  1302552.75 -1509300.14  1301885.66 -1509627.16  1301477.48
 -1509954.18  1301069.31 -1510046.83  1300827.41 -1510466.49  1300177.34
 -1510703.85  1299084.06 -1510881.62  1298341.34 -1511168.07  1297565.57
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
 -1511354.35  1296772.77 -1511475.51  1295453.62 -1511678.81  1294560.66
 -1511790.47  1293600.59 -1512169.56  1292582.93 -1512398.40  1291539.72
 -1512684.28  1288342.00
    50   414
      .
      .
      .
      .
L  574    70   110     3     6              131     1     0
 -1340630.88  1463563.68 -1340506.17  1463387.90 -1339939.24  1463085.42
 -1339480.98  1462749.89 -1338888.51  1462597.66 -1338638.10  1462555.10
 -1338429.26  1462571.13 -1338329.10  1462554.10 -1338153.32  1462678.81
 -1338086.21  1462770.46 -1337725.14  1463378.96 -1337632.49  1463620.86
 -1337373.57  1463628.38 -1337123.16  1463585.82 -1336915.32  1463292.85
 -1336715.98  1462949.79 -1336565.74  1462924.25 -1336390.95  1462739.96
 -1336190.62  1462705.91 -1335831.53  1462696.40 -1335330.72  1462611.28
 -1335038.74  1462510.12 -1334947.09  1462443.02 -1334822.38  1462267.23
 -1334881.97  1461916.66 -1335018.17  1461115.35 -1335102.30  1460923.54
 -1335019.16  1460806.35 -1334801.81  1460872.46 -1334317.02  1460996.18
 -1334041.07  1461103.86 -1333990.99  1461095.35 -1333782.15  1461111.38
 -1333423.07  1461101.87 -1333038.44  1461242.61 -1332829.61  1461258.65
 -1332653.82  1461383.35 -1332294.74  1461373.85 -1332278.71  1461165.01
 -1332247.63  1460438.33 -1332207.06  1460070.73 -1331989.71  1460136.84
 -1331797.89  1460052.71 -1331547.48  1460010.15 -1331397.24  1459984.61
 -1331338.64  1460026.18 -1331087.24  1460292.62 -1330768.73  1460650.71
 -1330559.89  1460666.74 -1330392.62  1460741.37 -1330343.53  1460423.85
 -1329969.41  1459896.51 -1329553.72  1459310.56 -1329221.16  1458841.81
 -1328595.63  1458580.90 -1328295.14  1458529.83 -1328137.38  1458245.37
 -1327903.99  1458102.64 -1327896.48  1457843.72 -1327989.12  1457601.82
 -1327907.97  1456866.63 -1327725.66  1456423.41 -1327560.37  1455880.03
 -1327344.01  1455637.14 -1327186.25  1455352.68 -1327170.22  1455143.84
 -1327329.97  1454810.29 -1327297.90  1454392.61 -1327365.01  1454300.96
 -1327090.06  1454099.64 -1326840.64  1453748.08 -1326867.17  1453288.83
 -1326761.48  1452394.88 -1326755.94  1451517.95 -1326698.34  1451250.51
 -1326423.39  1451049.19 -1326131.41  1450948.04 -1325881.00  1450905.47
 -1325463.32  1450937.54 -1325104.24  1450928.03 -1324603.42  1450842.91
 -1323852.19  1450715.22 -1323059.39  1450528.94 -1322441.39  1450526.95
 -1322082.30  1450517.45 -1321764.79  1450566.54 -1321489.83  1450365.22
 -1321373.64  1450139.35 -1321241.41  1449704.65 -1321233.89  1449445.72
 -1320967.45  1449194.32 -1320700.01  1449251.92 -1320332.42  1449292.50
```

```
 -1320115.07  1449358.61 -1319797.55  1449407.70 -1319429.95  1449448.28
 -1319464.00  1449247.95 -1319464.99  1448938.95 -1319607.72  1448705.56
 -1319785.49  1447962.85 -1319987.80  1447378.89 -1320191.11  1446485.93
 -1320217.64  1446026.68 -1320068.39  1445692.14 -1319727.32  1445273.47
 -1319544.02  1445139.26 -1319645.17  1444847.28 -1319604.60  1444479.68
 -1319463.86  1444095.06 -1319314.61  1443760.52 -1319107.75  1443158.54
 -1318766.69  1442739.87 -1318591.90  1442555.57 -1318777.18  1442071.78
 -1318961.48  1441896.99 -1319179.82  1441521.87 -1319497.34  1441472.79
 -1320116.34  1441165.77 -1320334.69  1440790.65 -1320268.57  1440573.30
```

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

```
 -1320228.00  1440205.70 -1320975.68  1438838.45 -1321414.35  1437470.21
 -1321174.87  1434028.61 -1321267.51  1433786.72 -1321168.34  1433460.69
 -1321898.00  1432502.61 -1320967.45  1431004.69 -1320836.21  1430260.99
 -1320429.03  1429624.96 -1320506.64  1428865.22
   50   412
L  575   137   110     6     3                2     1     0
 -1320013.76  1426308.07 -1320506.64  1428865.22
   50   412
L  576    93   111     3     9               24     1     0
 -1317706.03  1427152.51 -1317197.69  1426808.46 -1317114.55  1426691.27
 -1316965.30  1426356.73 -1316414.40  1426263.10 -1316147.96  1426011.69
 -1315255.00  1425808.39 -1313828.16  1425411.28 -1313561.72  1425159.88
 -1313328.34  1425017.15 -1313162.06  1424782.77 -1313112.97  1424465.26
 -1312997.77  1423930.39 -1312831.49  1423696.01 -1312590.59  1423294.37
 -1312448.85  1423218.75 -1312249.52  1422875.69 -1312141.84  1422599.75
 -1311875.40  1422348.35 -1311450.20  1422121.49 -1311000.45  1421735.87
 -1310065.92  1421473.97 -1309824.03  1421381.33 -1309623.70  1421347.28
   50   412
L  577   137    93     3     9                2     1     0
 -1320013.76  1426308.07 -1317706.03  1427152.51
   50   412
    .
    .
    .
    .

L  719   658   657    56    33                3     1     0
 -1669666.25  1460386.90 -1668874.45  1459891.61 -1668775.28  1459565.58
   50   202
L  720   657   535     6    33                2     1     0
 -1668775.28  1459565.58 -1668535.37  1458854.93
   50   606
L  721   587   586    30    42              124     0     0
 -1663172.67  1604697.14 -1663239.78  1604605.49 -1663408.04  1604221.86
 -1663410.03  1603603.85 -1663386.47  1603136.09 -1663554.74  1602752.46
 -1663764.57  1602427.43 -1664024.48  1602110.91 -1664101.10  1601660.17
 -1664094.57  1601092.24 -1664004.91  1600407.13 -1663681.86  1599579.29
 -1663449.47  1599127.56 -1663384.34  1598601.21 -1663569.63  1598117.41
 -1663738.89  1597424.78 -1663865.58  1596982.56 -1663724.84  1596597.93
```

-1663366.75	1596279.42	-1662925.52	1595843.73	-1662418.18	1595190.68
-1662211.32	1594588.70	-1662287.94	1594137.97	-1662440.17	1593545.50
-1662525.29	1593044.68	-1662501.74	1592576.92	-1662310.92	1592183.78
-1662003.90	1591564.78	-1661397.39	1590585.71	-1660981.69	1589999.76
-1660574.51	1589363.74	-1660350.63	1588861.93	-1660018.08	1588393.17
-1659642.96	1588174.83	-1659368.01	1587973.51	-1659334.95	1587864.83
-1659427.60	1587622.93	-1659695.03	1587565.33	-1660071.14	1587474.67
-1660388.66	1587425.59	-1661032.20	1587277.33	-1661508.47	1587203.69
-1661884.58	1587113.03	-1662060.37	1586988.33	-1662186.07	1586855.11
-1662370.36	1586680.32	-1662646.31	1586572.63	-1662955.31	1586573.63

APPENDIX C. -- Sample DLG data file (Optional Distribution Format)--continued

-1663314.40	1586583.13	-1663581.83	1586525.53	-1663716.05	1586342.23
-1663758.61	1586091.82	-1663718.03	1585724.22	-1663668.94	1585406.71
-1663478.12	1585013.57	-1663304.32	1584520.27	-1663238.21	1584302.92
-1663239.20	1583993.92	-1663306.31	1583902.27	-1663549.20	1583685.91
-1663792.09	1583469.55	-1663926.30	1583286.25	-1664027.46	1582994.27
-1664061.51	1582793.94	-1664329.94	1582427.33	-1664672.99	1582228.00
-1664915.88	1582011.64	-1665117.20	1581736.69	-1665218.36	1581444.71
-1665069.10	1581110.17	-1664828.20	1580708.52	-1664695.97	1580273.82
-1664614.82	1579538.62	-1664649.86	1579029.29	-1664785.07	1578536.99
-1664861.68	1578086.25	-1664905.24	1577526.84	-1664981.85	1577076.10
-1664882.68	1576750.07	-1664792.02	1576373.96	-1664734.42	1576106.53
-1664759.96	1575956.28	-1664978.30	1575581.17	-1665121.03	1575347.78
-1665172.10	1575047.29	-1665164.59	1574788.37	-1665174.09	1574429.28
-1665209.13	1573919.95	-1665385.91	1573486.24	-1665730.95	1572668.90
-1666083.51	1572110.48	-1666427.55	1571602.14	-1666604.33	1571168.43
-1666689.45	1570667.61	-1666715.99	1570208.37	-1666600.78	1569673.50
-1666326.82	1569163.17	-1665994.27	1568694.42	-1665644.69	1568325.83
-1665386.76	1568024.34	-1665228.99	1567739.89	-1665238.50	1567380.80
-1665289.58	1567080.31	-1665432.30	1566846.93	-1665659.16	1566421.73
-1666121.39	1565521.25	-1666466.43	1564703.91	-1666519.49	1563785.41
-1666338.17	1563033.19	-1666038.67	1562673.11	-1665756.20	1562212.87
-1665657.03	1561886.84	-1665474.72	1561443.62	-1665526.79	1560834.13
-1665335.97	1560440.99	-1665069.53	1560189.59	-1664803.09	1559938.19
-1664595.24	1559645.22	-1664530.12	1559118.86	-1664498.05	1558701.18
-1664650.29	1558108.71	-1664894.17	1557583.35	-1665020.86	1557141.13
-1665263.75	1556924.77				

APPENDIX D. -- Standard DLG Distribution Format

In the standard DLG distribution format, the topological linkages are contained only in the line elements. The files are physically comprised of standard 8-bit ASCII characters organized into fixed-length logical records of 144 characters. Nine distinct record types are defined (three header records and six data records).

Logical record type	Content
A	Header record containing DLG identification information.
B	Header record containing projection information and registration points.
C	Header record identifying data categories contained in this DLG and indicating the number of nodes, areas, and lines in each category.
D.1	A node or an area record.
D.2	A line record.
E	Record containing x,y coordinate string.
F	Record containing attribute codes.
G	Record containing text string (not currently used).
H	Accuracy estimate (not currently used).

Appendix D. -- Standard DLG Distribution Format--continued

The actual sequence of records in a standard distribution format DLG file is:

1. Header records
   - Type A (one record)
   - Type B (one record)
   - Type C (one record)

2. Data records

Node records Node description (D.1) Attribute codes (F) Text string (G)*	Repeated for each node within a data category	
Area records Area description (D.1) Attribute codes (F) Text string (G)*	Repeated for each area within a data category	Repeated for each data category
Line records Line description (D.2) x,y coordinates (E) Attribute codes (F) Text string (G)*	Repeated for each line within a data category	

3. Accuracy estimate
   - Type H (one record)*

* Not currently used

Descriptions of the contents of records A-F are contained in the following tables. The tables also reflect the relationship between these record types and 144-byte logical records.

[Integer fields with a value of zero will have leading zeros suppressed.]
[Any field with the format of D24.15 which has a value of zero will be
represented as "bbb0.0bbbbbbbbbbbbbbbbbb", the last four positions
of the fractional portion being reserved for a decimal exponent. (b=blank)]

Logical Record Type A

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

A.1
1
Name of digital cartographic unit
ALPHA
A40
1
40
The Topographic Map Names Data Base name of the digital data cell, a comma and a space, followed by the State two-character designators separated by hyphens; or, for 1:2,000,000-scale files, the name of the State.
A.1

Filler

41
41
1 space
A.1
2
Date of original source material
ALPHA
A10
42
51
Year of original source material, followed by latest revision date if applicable. For example, 1956, 1965.
A.1
3
Date qualifier
ALPHA
A1
52
52
Qualifier to discriminate revision date, if present. (P = photorevision, I = photoinspected, L = limited revision, D = digital revision, C = digital correction.)
A.1
4
Scale of original source material
INTEGER*4
I8
53
60
Scale denominator of source material. For example, 24000, 100000, or 2000000.
(Data elements 5 through 8 of record A.1 apply to 1:24,000- and 1:100,000-scale files only. For 1:2,000,000-scale data files, bytes 61-123 of record A.1 are filler.)

A.1

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

(Data elements 6 through 11 of record A.1 apply to topographic categories only. For Land Use and Land Cover data files, bytes 67 - 132 of record A.1 are filler.)

A.1

Filler

67
113
47 spaces
A.1
6
Largest primary contour interval
ALPHA
A4
114
117
Largest primary contour interval, followed by the interval unit (1 = feet, 2 = meters). Present only if two or more primary intervals exist (selected categories).
A.1
7
Comma
ALPHA
A1
118
118
Comma separator
A.1
8
Largest primary bathymetric contour interval
ALPHA
A4
119
122
Largest primary bathymetric contour interval, followed by the interval unit (1 = feet, 2 = meters, 3 = fathoms). Present only if two or more primary intervals exist (selected categories).
A.1

Filler

123
123
1 space

A.1
9
Smallest primary contour interval
ALPHA
A4

Logical Record Type A--continued

Record	Data Element Number	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
A.1	12-14	Coded flags	ALPHA	A1	133	135	3 flags for future use.
A.1	15	Coded flag	ALPHA	A1	136	136	Database coded edge flag for internal NMD use.
A.1	16	EDGEWS	ALPHA	A1	137	137	Status flag for west edge. ('b' = unchecked, 0 = passed, 1 = alignment discontinuity, 2 = attribute discontinuity, 3 = attribute and alignment discontinuity.)
A.1	17	EDGEWR	ALPHA	A1	138	138	Reason for EDGEWS. ('b' = no problem, 4 = adjacent data do not exist, 5 = adjacent data unavailable, 6 = graphic discontinuity, 7 = mismatch valid, 8 = paneling unauthorized, 9 = processing software limitation.)
A.1	18	EDGENS	ALPHA	A1	139	139	Status flag for north edge. ('b', 0, 1, 2, or 3 as above.)
A.1	19	EDGENR	ALPHA	A1	140	140	Reason for EDGENS. ('b', 4, 5, 6, 7, 8, or 9 as above.)

Logical Record Type A--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
A.2	1	DLG level code	INTEGER*2	I6	1	6	3 = DLG-3.
A.2	2	Code defining ground planimetric coordinate system	INTEGER*2	I6	7	12	1 = UTM (24K and 100K). 3 = Albers Equal-Area Conic (2M).
A.2	3	Code defining zone in ground planimetric coordinate system	INTEGER*2	I6	13	18	Code for appropriate UTM zone (24K and 100K). Code = 9999 (2M).
A.2	4	Map projection parameters	REAL*8	5D24.15	19	138	This field contains map projection parameters 1 through 5 (of 15) (see Appendix C).
A.2	---	Filler	---	---	139	144	6 spaces
A.3	1	Map projection parameters	REAL*8	6D24.15	1	144	This field contains map projection parameters 6 through 11 (see Appendix C).
A.4	1						

Logical Record Type A--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
A.4	3	Resolution	REAL*8	D24.15	103	126	The true ground distance corresponding to one unit (0.001 inch at map scale) in the file internal coordinate system. Scale / Resolution 1:24,000 0.61 m 1:25,000 0.635 m 1:48,000 1.22 m 1:62,500 1.587 m 1:63,360 1.61 m 1:100,000 2.54 m 1:250,000 6.35 m 1:2,000,000 50.8 m
A.4	4	Accuracy code of planimetric data	INTEGER*2	I6	127	132	0 = unknown accuracy.
A.4	5	Number (n) of sides in the polygon which defines the coverage of the cell	INTEGER*2	I6	133	138	n = 4
A.4	6	Horizontal Datum code	INTEGER*2	I3	139	141	Horizontal datum of DLG 'b' or 0 = NAD 27 1 = NAD 83 2 = Puerto Rico 3 = Old Hawaiian 4 = Local (Astro)
A.4	7	Vertical Datum code	INTEGER*2				

Logical Record Type A--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
A.5	A.6	1	A (4,2) array containing geographic coordinates of the registration points	REAL*8	3(2D24.15) 2D24.15	1 1	144 48	The four registration points usually coincide with an area defined by one of the standard map formats of the National Mapping Program. Coordinates are in geographic longitude and latitude degrees and decimal degrees, and are in the order: SW, NW, NE, SE.
A.6	---	Filler	---	---	49	144	96 spaces

Logical Record Type B

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

B.1
1
Parameters (A1, A2, A3, A4) of file-to-ground coordinate projection transformation
REAL*8
4D24.15
1
96
The explicit form of the transformation is:
$X = A1x + A2y + A3$
$Y = A1y - A2x + A4$
where:
x,y are coordinates in the file internal coordinate system; X,Y are coordinates in the ground coordinate projection system.
X,Y coordinates resulting from this transformation will be in ground units in the appropriate projection defined by the data elements in records A.2 through A.4.
B.1
2
Number (m) of registration points
INTEGER*2
I6
97
102
m = 4.
B.1

Filler

103
144
42 spaces

Logical Record Type B--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
B.2	1	A (4,3) array containing identification and coordinates of registration points.	ALPHA/INTEGER*2	4(A2, 2I6)	1	56	The four registration points usually coincide with an area defined by one of the standard map formats of the National Mapping Program. The array is stored by row. Coordinates are in the file internal coordinate system. The coordinates are expressed in units of thousandths of an inch and fall in the range -32768 to +32767. The identification sequence is: SW, NW, NE, SE. These coordinates correspond to the geographic coordinates contained in records A.5 and A.6.
B.2	---	Filler	---	---	57	144	88 spaces

Logical Record Type C

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
C.1	1	Number (q) of categories in the DLG file	INTEGER*4	I6	1	6	q = 1.
C.1	---	Filler	---	---	7	144	138 spaces
C.2[1] to C.N	1	A (q,7) array containing category name, and the maximum and actual number of node, area, and line elements in each category	ALPHA/INTEGER*2	q(A20,6I6)	1 (57	56 112)	The array is stored by row. The first element is the category name consisting of 20 alphanumeric characters, the first four of which are unique. Elements 2 and 3 contain the maximum and actual number of nodes in the category, elements 4 and 5 the maximum and actual number of areas, and elements 6 and 7 the maximum and actual number of line segments.[2] (The absolute maximum number of nodes or areas in a category is 25,960 and the absolute maximum number of lines is 25,938.)
	---	Filler	---	---	---	144	32 or 88 spaces

[1]The number of categories "q" is given in record C.1. There are 56 bytes of data per category, and thus a maximum of two categories can be described on a 144-character record. The space filler will vary in size depending on the value of "q". Current NMD standard is q = 1.

[2]The actual number of each element type will equal the highest identification number used because the files are packed and the

Logical Record Type D

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

D.1
1
Type-of-element code
ALPHA
A2
1
2
N'b' = Node element,
A'b' = Area element.
D.1
2
Element internal identification number
INTEGER*2
I6
3
8
Number is positive and sequential from 1-n within each element type, where "n" is the highest element identification number.
D.1
3
x,y file coordinates of node point or of representative point for the area element.
INTEGER*2
2I6
9
20
The representative area point is usually, but not always, contained within the polygon it represents.
D.1
4
Number (t) of attribute codes attached to the node or area element
INTEGER*2
I6
21
26
$t \geq 0$. Absence of attribute codes is indicated by $t = 0$.
D.1
5
Number (k) of text characters attached to the node or area element
INTEGER*2
I6
27
32
$k \geq 0$. Not currently used, so $k = 0$.

D.1

Filler

33
144
112 spaces

Logical Record Type D--continued

Record	Number Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
D.2	3	Internal identification number of starting node	INTEGER*2	I6	9	14	Number refers to data element 2 in record D.1.
D.2	4	Internal identification number of ending node	INTEGER*2	I6	15	20	Number refers to data element 2 in record D.1.
D.2	5	Internal identification number of left area	INTEGER*2	I6	21	26	Number refers to data element 2 in record D.1.
D.2	6	Internal identification number of right area	INTEGER*2	I6	27	32	Number refers to data element 2 in record D.1.
D.2	7	Number (v) of coordinate pairs which define the line segment	INTEGER*2	I6	33	38	The value of v is from 2 to 3000.
D.2	8	Number (t) of attribute codes attached to the line segment	INTEGER*2	I6	39	44	Absence of attribute codes is indicated by t = 0.
D.2	9	Number (k) of text characters attached to the line segment					

Logical Record Type E

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

E.1 to E.n[3]
1
A (v,2) array containing an ordered sequence of coordinate pairs which define the line element
INTEGER*2
v(2I6)
1

Coordinates are expressed in the internal file coordinate system, in units of thousandths of an inch. The array is stored by row.

Filler

144
0 to 132 spaces

[3]The number of coordinate pairs, "v" is given in record D.2. There will be v(2I6) coordinate pairs of which a maximum of 12 pairs will fit on a 144-character ASCII record. The space filler will vary in size depending on the value of "v". If "v" is an integer multiple of 12, there will be no spaces as filler at the end of the record.

Logical Record Type F

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
F.1 to F.n[4]	1	A (t,2) array containing major and minor attribute codes for a graph element	INTEGER*2	t(2I6)	1	---	The array is stored by row with the first column containing the major attribute code, and the second column containing the minor attribute code.
	---	Filler	---	---	---	144	0 to 132 spaces

[4]The number of attribute codes, "t" is given in records D.1 and D.2. There will be t(2I6) attribute code pairs of which a maximum of 12 pairs will fit on a 144-character ASCII record. The space filler will vary in size depending on the value of "t". If "t" is an integer multiple of 12, there will be no spaces as filler at the end of the record.

APPENDIX E. -- Optional DLG Distribution Format

In the optional DLG distribution format, topological linkages are explicitly encoded for node and area elements as well as for line elements. The files are physically comprised of 8-bit ASCII characters organized into fixed-length logical records of 80 bytes. Bytes 1-72 of each record contain DLG data, and bytes 73-80 may contain a record sequence number.

The 11 distinct record types used in the optional DLG distribution format may be categorized as header and data records.

There are four types of header records:

- File identification and description records
- Accuracy records (not currently used)
- Control-point identification records
- Data-category identification records

There are seven types of data records:

- Node and area identification records
- Node-to-line linkage records
- Area-to-line linkage records
- Line identification records (also contain line-to-node and line-to-area linkages)
- Coordinate string records
- Attribute code records
- Text records (not currently used)

Appendix E. -- Optional DLG Distribution Format--continued

The actual sequence of records in an optional distribution format DLG file is as follows:

1. Header records
    - Ten file identification and description records
    - Accuracy records (not currently used)
    - Control point identification records (one per control point, usually 4)
    - Data category identification records (one per data category in the file, ... usually 1)

2. Data records

Node identification record
    Node-to-line linkage record(s)
    Attribute code record(s)
    Text record(s)*
	Repeated for each node within a data category	

Area identification record
    Area-to-line linkage record(s)
    Attribute code record(s)
    Text record(s)*
	Repeated for each area within a data category	Repeated for each data category

Line identification records
    Coordinate string record(s)
    Attribute code record(s)
    Text record(s)*
	Repeated for each line within a data category	

Descriptions of the contents of the various types of records in an optional distribution format DLG are contained in the following tables.

* Not currently used.

File Identification and Description Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte*

Comment

1
1
Banner
ALPHA
A72
1
72
"*** DLG-OPTIONAL FORMAT PRODUCED BY USGS   PROSYS RELEASE".
2
1
Name of digital cartographic unit
ALPHA
A40
1
40
The Topographic Map Names Data Base name of the digital data cell, a comma, a space, followed by the State two-character designators, separated by hyphens; or, for 1:2,000,000-scale files, the name of the State.
2

Filler

41
41
1 space
2
2
Date of original source material
ALPHA
A10
42
51
Year of original source material, followed by latest revision date if applicable. For example, 1956, 1965.
2
3
Date qualifier
ALPHA
A1
52
52
Qualifier to discriminate revision date, if present. (P = photorevision, I = photoinspected, L = limited revision, D = digital revision, C = digital correction.)
2
4
Scale of original source material
INTEGER*4
I8
53
60
Scale denominator of source material. For example, 24000, 100000, or 2000000.
2

File Identification and Description Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

(Record 2, data element 5, and Record 3, data elements 1 through 3 apply to 1:24,000- and 1:100,000-scale files only. For 1:2,000,000-scale data files, these fields contain filler.)

2
5
Sectional indicator
ALPHA
A3
64
66
Codes S, F, or T for size of section, plus sequence number. (100K files)
2

Filler

67
72
6 spaces
(Record 3, data elements 1 through 6 apply to topographic categories only. For Land Use and Land Cover data files, these fields contain filler.)

3

Filler

1
41
41 spaces
3
1
Largest primary contour interval
ALPHA
A4
42
45
Largest primary contour interval, followed by the interval unit (1 = feet, 2 = meters). Present only if two or more primary intervals exist (selected categories).
3
2
Comma
ALPHA
A1
46
46
Comma separator
3
3
Largest primary bathymetric contour interval

File Identification and Description Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

3
4
Smallest primary contour interval
ALPHA
A4
52
55
Smallest or only primary interval, followed by the interval unit as shown above (selected categories). (A primary contour interval is entered for 1:2,000,000-scale Hydrography files due to a software requirement. The value will always be 501 (50 feet). 1:2,000,000-scale data does not include contour information.)
(Record 3, data elements 5 through 9 apply to 1:24,000- and 1:100,000-scale files only. For 1:2,000,000-scale data files, these fields contain filler.)

3
5
Comma
ALPHA
A1
56
56
Comma separator.
3
6
Smallest primary bathymetric contour interval
ALPHA
A4
57
60
Smallest or only primary bathymetric interval, followed by the interval unit as shown above (selected categories).
3
7-9
Coded flags
ALPHA
A1
61
63
3 flags for future use.
3
10
Coded flag
ALPHA
A1
64
64
Database coded edge flag for internal NMD use.

3
11
EDGEWS
ALPHA

File Identification and Description Records

Record Number	Data Element	Contents Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
3	13	EDGENS	ALPHA	A1	67	67 Status flag for north edge. ('b', 0, 1, 2, or 3 as above.)
3	14	EDGENR	ALPHA	A1	68	68 Reason for EDGENS. ('b', 4, 5, 6, 7, 8, or 9 as above.)
3	15	EDGEES	ALPHA	A1	69	69 Status flag for east edge. ('b', 0, 1, 2, or 3 as above.)
3	16	EDGEER	ALPHA	A1	70	70 Reason for EDGEES. ('b', 4, 5, 6, 7, 8, or 9 as above.)
3	17	EDGESS	ALPHA	A1	71	71 Status flag for south edge. ('b', 0, 1, 2, or 3 as above.)
3	18	EDGESR	ALPHA	A1	72	72 Reason for EDGESS. ('b', 4, 5, 6, 7, 8, or 9 as above.)
4	1	DLG level code				

File Identification and Description Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

4
4
Code defining units of measure for ground planimetric coordinates throughout the file
INTEGER*2
I6
19
24
2 = meters.
4
5
Resolution
REAL*4
D18.11
25
42
The true ground distance corresponding to 0.001 inch at map scale.

Scale	Resolution
1:24,000	0.61 m
1:25,000	0.635 m
1:48,000	1.22 m
1:62,500	1.587 m
1:63,360	1.61 m
1:100,000	2.54 m
1:250,000	6.35 m
1:2,000,000	50.8 m

4
6
Number (p) of file-to-ground coordinate projection transformation parameters
INTEGER*2
I6
43
48
p = 4.
4
7
Number of accuracy/miscella-neous records
INTEGER*2
I6
49
54
Currently 0, none included.
4
8
Number (n) of registration points
INTEGER*2
I6
55
60
n = 4. These points are usually, but not always, a definition of the file coverage

File Identification and Description Records

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
4	9	Number (q) of categories in the DLG file	INTEGER*2	I6	61	66	q = 1.
4	10	Horizontal Datum code	INTEGER*2	I3	67	69	Horizontal datum of DLG 'b' or 0 = NAD 27 1 = NAD 83 2 = Puerto Rico 3 = Old Hawaiian 4 = Local (Astro)
4	11	Vertical Datum code	INTEGER*2	I3	70	72	Vertical datum of DLG 'b' or 0 = NGVD 29 1 = NAVD 88 2 = Local Mean Sea Level
5-9	1	Map projection parameters	REAL*8	3D24.15	1	72	3 parameters on each of 5 records (see Appendix 2-D).
10	1	Parameters (A1, A2, A3, A4) of file-to-ground coordinate projection transformation	REAL*4	4D18.11	1	72	The explicit form of the transformation is: X = A1x + A2y + A3 Y = A1y - A2x + A4 where

Registration Point Identification Records

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
1-n[1]	1	Registration-point label	ALPHA	A6	1	6	"SW", "NW", "NE", or "SE" for four cell corners. Field is padded with trailing blanks.
	2	Latitude	REAL*4	F12.6	7	18	In degrees and decimal degrees.
	3	Longitude	REAL*4	F12.6	19	30	In degrees and decimal degrees.
	---	Filler	---	---	31	36	6 spaces
	4	X coordinate	REAL*4	F12.2	37	48	In units in the ground planimetric coordinate system.
	5	Y coordinate	REAL*4	F12.2	49	60	In units in the ground planimetric coordinate system.
	---	Filler	---	---	61	72	12 spaces

Data Category Identification Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

1-q[2]
1
Category name
ALPHA
A20
1
20
The first four characters are unique.
2
Attribute format code
INTEGER*2
I4
21
24
Blank or 0 indicates default (2I6) attribute formatting in major-minor pairs.
3
Highest node identification number
INTEGER*2
I6
25
30
Number of nodes referenced in the file.
4
Actual number of nodes in the file
INTEGER*2
I6
31
36
This number will be different from data element 3 only if the file is not packed during processing and the element identification numbers not compressed.

Filler

37
37
1 space
5
Presence of node-to-area linkage records
INTEGER*2
I1
38
38
***0 = node-area list not included, 1 = node-area list included.**
6
Presence of node-to-line linkage records
INTEGER*2
I1
39
39
0 = node-line list not included, *1 = node-line list included

Data Category Identification Records--continued

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

1-q
7
Highest area identification number
INTEGER*2
I6
41
46
Number of areas referenced in the file.
8
Actual number of areas in the file
INTEGER*2
I6
47
52
This number will be different from data element 7 only if the file is not packed during processing and the element identification numbers not compressed.

Filler

53
53
1 space
9
Presence of area-to-node linkage records
INTEGER*2
I1
54
54
*0 = area-node list not included, 1 = area-node list included.
10
Presence of area-to-line linkage records
INTEGER*2
I1
55
55
0 = area-line list not included, *1 = area-line list included.
11
Presence of area-coordinate lists
INTEGER*2
I1
56
56
*0 = area coordinates not included, 1 = area coordinates included.
12
Highest line identification number
INTEGER*2
I6
57
62
Number of lines referenced in the file

____

Node and Area Identification Records

____

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment____

1-x[3]
1
Element type
ALPHA
A1
1
1
"N" or "A".
2
Element internal identification number
INTEGER*2
I5
2
6
Number is positive and sequential from 1-n within each element type, where "n" is the highest element identification number.
3
Coordinates of node point or of representative point for the area element
REAL*4
2F12.2
7
30
The representative area point is contained within the polygon it represents. (Some older 1:24,000- and 1:62,500-scale data files include areas where the representative area point is outside the polygon it represents.)
4
Number of elements in the area list (for nodes), or the node list (for areas)
INTEGER*2
I6
31
36

5
Number of elements in the line list
INTEGER*2
I6
37
42
Number of line segments that intersect at the node, or for areas, number of line segments that define the area, plus number of islands.
6
Number of points in the area-coordinate list
INTEGER*2
I6
43
48
For area records only, blank for node records.
7
Number of attribute codes listed
INTEGER*2
I6
49
54

Node-To-Area Linkage Records
FORTRAN FORMAT (12I6), for each node: The list consists of area internal ID numbers (which appear in bytes 2-6 of the area identification records) of all the areas that are adjacent to the node. There is no logical order to the list.

Node-To-Line Linkage Records*
FORTRAN FORMAT (12I6), for each node: The list consists of line internal ID numbers (which appear in bytes 2-6 of the line identification records) of all the lines that connect to the node. The lines that begin at this node are included in the list as positive ID numbers. The lines which terminate at this node are included as negative ID numbers. There is no logical order to the list.

Area-To-Node Linkage Records
FORTRAN FORMAT (12I6) for each area: The list consists of node internal ID numbers (which appear in bytes 2-6 of the node identification records) of all nodes that are adjacent to the area. For those areas with islands, the number zero, used as a delimiter, marks the beginning of each island sublist. The format of this list is the same as the Area-Line list below.

Area-To-Line Linkage Records*
FORTRAN format (12I6), for each area: The list consists of line internal ID numbers (which appear in bytes 2-6 of the line identification records) of all lines that bound the area and lines which are internal to the area but which do not contribute to the effective boundary of the area (those having both their area left and area right assigned to the same area). For those areas with islands (indicated by bytes 61-66 of the area's first record), the number zero, used as a delimiter, marks the beginning of each island sublist. Lines with this area to the right are included as positive ID numbers. Lines with this area to the left are included as negative ID numbers. The list is ordered clockwise around the perimeter of the area and counterclockwise around each island, if any (counterclockwise around an island in an area is still a clockwise direction in reference to the area itself). For data distributed from the NDCDB, lines that do not contribute to the effective boundary of the area and are not considered bounding lines will not be referenced in the area-to-line linkage records, although they will still be present in the file.

Area Coordinate String Records
FORTRAN FORMAT (3(2F12.2)): The last data element in the area identification record contains the number of islands within the area. If this number is greater than zero, the following convention applies to the Area Coordinate list:

The coordinates of the outside boundary of the area are listed first. The first coordinate of the outside boundary is repeated to signal the closure of this ring. Next, the coordinates of one of the islands are listed. The first coordinate of this boundary is repeated, again signaling the end of this ring. Next, the first coordinate of the outside boundary is listed as a ring delimiter. This process is repeated until the coordinates of the boundaries of all the islands are listed. The coordinates in this list are ordered so that the area being referenced is always to the right of the boundary described by the sequence of coordinates. Therefore, the list is ordered clockwise around the perimeter of the area and counterclockwise around each island, if any. The common coordinates between adjacent ring lines are only listed once, except for the beginning and ending of a ring.

Attribute Code Records*
As major-minor attribute code pairs, FORTRAN format (6(2I6)): Within each pair, the first integer is the major code and the second integer is the minor code. Each major and minor code is a one-to-four-digit integer, right justified within the six-byte field.

*These records are present for data distributed from the NDCDB.

Line Identification Records

Record
Number
Data
Element

Contents
Type
(Fortran Notation)

Format
Starting
Byte
Ending
Byte

Comment

1-y[4]
1
Element type
ALPHA
A1
1
1
"L".
2
Element internal identification number
INTEGER*2
I5
2
6
Number is positive and sequential from 1-n within each element type, where "n" is the highest element identification number.
3
Internal identification number of starting node
INTEGER*2
I6
7
12
Number refers to data element 2 of the node identification record.
4
Internal identification number of ending node
INTEGER*2
I6
13
18
Number refers to data element 2 of the node identification record.
5
Internal identification number of left area
INTEGER*2
I6
19
24
Number refers to data element 2 of the area identification record.
6
Internal identification number of right area
INTEGER*2
I6
25
30
Number refers to data element 2 of the area identification record.

Filler

31
42
12 spaces

Line Coordinate String Records
FORTRAN format (3(2F12.2)): The coordinates are in appropriate units in the designated ground planimetric coordinate system (usually meters), or in internal file units. Data distributed from the NDCDB will always use units in the ground planimetric coordinate system.

Attribute Code Records
As major-minor attribute code pairs, FORTRAN format (6(2I6)): Within each pair, the first integer is the major code and the second integer is the minor code. Each major and minor code is a one-to-four-digit integer, right justified within the six-byte field.

APPENDIX F. -- Text File Formats

Four text files are distributed with each 1:2,000,000-scale state file. The file containing land grant names and the file containing Federal Information Processing Standard (FIPS) codes for States and counties are both master files that include information for the entire United States. The remaining two files contain state-specific information on airport names and on populated place names and populations. Descriptions of the record contents for these text files are contained in the following tables.

Proper Name Data-Definition Records for Airports

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
1-n	1	Index Number	INTEGER*2	I5	1	5	This value correlates to the minor code attached to the 197 major code.
	---	Filler	---	---	6	8	3 spaces
	2	Place Name	ALPHA	A72	9	80	Name of the Airport referenced by the index number.

Proper Name Data-Definition Records for Populated Places

Record Number
Data Element

Contents
Type
(Fortran Notation)

Format
Starting Byte
Ending Byte
Comment

1-n
1
Index Number
INTEGER*2
I5
1
5
This value correlates to the minor code attached to the 207 major code.

Filler

6
8
3 spaces
2
Place Name
ALPHA
A42
9
52
Name of the Populated Place referenced by the index number.
3
County FIPS Code
INTEGER*2
I3
53
55
County FIPS Code.[1]

Filler

56
59
4 spaces
4
1990 Census Population
INTEGER*2
I10
60
69
1990 Census Population (if available).

Filler

70
80
11 spaces

State and County FIPS Codes

Record Number
Data Element

Contents
Type
(Fortran Notation)

Format
Starting Byte
Ending Byte
Comment

L.1
1
State FIPS Code
INTEGER*2
I2
1
2
The two-digit State FIPS Code. A leading zero is included where appropriate. This value correlates to the minor code attached to the 091 major code.

Filler

3
11
9 spaces
2
State Name
ALPHA
A69
12
80
The State Name.
L.2-n
1
State FIPS Code
INTEGER*2
I2
1
2
The two-digit State FIPS Code. A leading zero is included where appropriate. This value correlates to the minor code attached to the 091 major code.

Filler

3
5
3 spaces
2
County FIPS Code
INTEGER*2
I3
6
8
The three-digit County FIPS Code. Leading zeros are included where appropriate. This value correlates to the minor code attached to the 092 major code.

Filler

9
11
3 spaces
3

Proper Name Data-Definition Records for Land Grants

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
L.1	1	State Name	ALPHA	A80	1	80	The first record for each State contains the State name, left justified.
L.2-n	1	Land Grant Identifier	INTEGER*2	I4	1	4	This value correlates to the minor code attached to the 307 major code.
	---	Filler	---	---	5	5	1 space
	2	Land Grant Name	ALPHA	A75	6	80	Name of the Land Grant referenced by the land grant identifier.

Note: Records L.1 and L.2-n are repeated for each State in which named land grants are collected. The States are listed in alphabetical order.

APPENDIX G. -- Coordinate Conversion

This appendix illustrates the procedure for converting internal file coordinates to ground planimetric reference coordinates. The formulas for this conversion are as follows:

$$X = A1x + A2y + A3$$

$$Y = A1y - A2x + A4$$

where X and Y are the ground planimetric coordinate values and x and y are the internal file coordinates.

The parameters for these formulas (A1, A2, A3, and A4) are contained in Header Record B, as double-precision floating-point numbers.

This example converts four coordinate pairs from internal file coordinates to ground planimetric coordinate values (Albers Equal-Area Conic projection). The parameters are:

A1 = 50.325538142
A2 = 6.9275199981
A3 = -1185878.9723
A4 = 1314164.3401

The internal file coordinates to be converted are:

	x	y
1st pair	-11238	-6583
2nd pair	-10405	6583
3rd pair	10405	6583
4th pair	11238	-6583

The calculations to determine the ground planimetric coordinates for the first pair are:

$$X = (50.325538142)(-11238) + (6.9275199981)(-6583) + (-11858789723)$$
$$= -1797041.23$$

$$Y = (50.325538142)(-6583) - (6.9275199981)(-11238) + (1314164.3401)$$
$$= 1060722.79$$

The resulting X,Y coordinate values for the four pairs given above are as follows:

1st pair	-1,797,041.23	1,060,722.79
2nd pair	-1,663,912.33	1,717,538.20
3rd pair	-616,637.88	1,573,376.51
4th pair	-665,924.44	905,019.86

APPENDIX H. -- Map Projection Parameters
Albers Equal-Area Conic Projection

The standard and optional DLG distribution formats include 15 fields reserved for map projection parameters. These parameters are typically used as input for a coordinate transformation package such as the USGS General Coordinate Transformation Package (GCTP).

When the ground coordinate system of a DLG is the Albers Equal-Area Conic projection, as is the case for all 1:2,000,000-scale DLG's, the first eight parameter fields are used:

1. Semimajor axis of ellipsoid
2. Eccentricity squared of ellipsoid
3. Latitude of first standard parallel
4. Latitude of second standard parallel
5. Longitude of central meridian
6. Latitude of projection origin
7. False easting
8. False northing

9-15. Not used

For the 1:2,000,000-scale files, the parameters are:

For all maps:
Spheroid parameters: Clarke 1866
False easting: 0.0
False northing: 0.0

For conterminous United States:
First standard parallel: 29.5° North
Second standard parallel: 45.5° North
Longitude of central meridian: 96° West
Latitude of projection origin: 23° North

For Hawaii:
First standard parallel: 8° North
Second standard parallel: 18° North
Longitude of central meridian: 157° West
Latitude of projection origin: 3° North

For Alaska:
First standard parallel: 55° North
Second standard parallel: 65° North
Longitude of central meridian: 154° West
Latitude of projection origin: 50° North

A transformation to or from Albers Equal-Area Conic projection coordinates using GCTP can be controlled by specifying the parameters stated above. In the projection parameters of a DLG file, the longitude-latitude parameter values are encoded as packed, degrees-minutes-seconds (DMS) as follows:

degrees * 1000000 + minutes * 1000 + seconds

For example, if degrees = +50, minutes = 30, and seconds = 36.25, then the parameter value is 50030036.25 stored as a REAL*8 variable, and "bbb0.500300362500000D 08" encoded in FORTRAN D24.15 format.

APPENDIX I. -- Data Sources and Currency

The published 1:2,000,000-scale National Atlas sectional maps were completely revised in 1972-73. Selected information was revised again in 1993-94 prior to data collection. The source and date of the updated information are presented below:

Category	**Source(s)**	**Currency of Data**
Boundaries	Bureau of the Census	1990
	Administering Federal agency	1990
Hydrography	Various	1990
Manmade Features	GNIS	1990
	Bureau of the Census	1990
Pipelines, Transmission Lines, and Miscellaneous Transportation Features	Department of Transportation	1993
	USGS maps (Alaska pipeline)	various
Railroads	Department of Transportation	1993
Roads and Trails	Department of Transportation	1994
	USGS 1:100,000-scale quadrangles	various
U.S. Public Land Survey System	Bureau of Land Management	1990
	Alaska Department of Natural Resources	1993