DATA USERS GUIDES

1: Digital Line Graphs from 1:24,000-Scale Maps
2: Digital Line Graphs from 1:100,000-Scale Maps
3: Digital Line Graphs from 1:2,000,000-Scale Maps
4: Land Use and Land Cover Digital Data from 1:250,000- and 1:100,000-Scale Maps
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7: Alaska Interim Land Cover Mapping Program

Data Users Guides 1-7 generally replace the Geological Survey Circular 895.

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)860-6045

Technical questions and comments should be addressed to:

Branch of Technical Management
U.S. Geological Survey
510 National Center
Reston, Virginia 22092

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

DIGITAL LINE GRAPHS FROM 1:24,000-SCALE MAPS

Data Users Guide 1

Reston, Virginia
1990

First printing, 1986
Second printing (revised), 1990

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DIGITAL LINE GRAPHS FROM 1:24,000-SCALE MAPS

INTRODUCTION

The Earth Science Information Centers (ESIC) distribute digital cartographic/geographic data files produced by the U.S. Geological Survey (USGS) as part of the National Mapping Program. Digital cartographic data files are grouped into four basic types. The first of these, called a Digital Line Graph (DLG), is line map information in digital form. These data files include information on planimetric base categories, 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 map data such as political units and Federal land ownership. The fourth type, the Geographic Names Information System, provides primary information for all known places, features, and areas in the United States identified by a proper name.

The digital cartographic data files from selected quadrangles currently available from ESIC include the following:

- Digital Line Graphs (DLG)
  --1.24,000-scale
  --1:62,500-scale
  --1:63,360-scale
  --1:100,000-scale
  --1:2,000,000-scale

- Digital Elevation Models (DEM)
  --7.5-minute
  --15-minute
  --30-minute
  --1-degree

- 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

- Geographic Names

The digital data are useful for the production of cartographic products such as plotting base maps and for various kinds of spatial analysis. A major use of these digital cartographic/geographic data is to combine them with other geographically referenced data enabling scientists to conduct automated analysis in support of various decision making processes.

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This document describes the Digital Line Graphs (DLG's) prepared primarily from the 1:24,000 materials associated with the USGS Topographic Map Series. The series will eventually provide complete national coverage.

DATA CONTENT

The DLG data files derived from the 1:24,000-scale and other large-scale maps contain selected base categories of cartographic data in digital form; these data categories do not necessarily correspond to the traditional feature separates associated with the maps. The attribute coding scheme for these data has undergone several revisions since the start of the digital program. A major revision of these codes has been printed as Standards for Digital Line Graphs - Part 3, Attribute Coding, which is available for purchase from a USGS ESIC office (see the ordering information inside the front cover). Currently, DLG data entered in the National Digital Cartographic Data Base (NDCDB) are coded in accordance with the Standards for Digital Line Graphs. The implementation of the new coding standards will require the updating of existing files in the NDCDB in order to have a consistent product available for users. Software and procedures are being developed to convert existing data files to these codes during the next several years. Priority will be given to converting files retrieved in response to sales requests. In the meantime, a data base query will provide identification of the coding scheme used for any file in the NDCDB. This information will be supplied to customers when orders are submitted, and upon transmittal of data files. The following categories are included in current large-scale DLG files:

- Boundaries -- This category of data consists of (1) political boundaries that identify States, counties, cities, and other municipalities, and (2) administrative boundaries that identify areas such as National and State forests. Political and administrative boundaries are always collected as a single data set.

- Hydrography -- This category of data is currently being collected as combined hydrography consisting of all flowing water, standing water, and wetlands.

  Prior to l983, hydrographic data were differentiated into two components: streams and water bodies. Streams represent flowing water and were digitized as a network intended for hydrologic flow modeling. Streams included the banks of double-line rivers and centerline connectors placed through double-line rivers and lakes. Water bodies include standing water such as lakes and ponds. Wetlands and coastal hydrographic data were not collected. Appendix H contains a list of the attribute codes used in these files.

- Public Land Survey System (PLSS) -- This category of data describes the rectangular system of land surveys that is administered by the U.S. Bureau of Land Management. PLSS data are only collected for areas falling solely, or in part, within the States that were formed from the public domain. The PLSS subdivides the public domain and

represents property boundaries or references to property boundaries. These DLG data are not intended to be official or authoritative. They are presented as cartographic reference information. The only legal basis for determining land boundaries remains the original survey.

- Transportation -- This category of data includes major transportation systems collected in three separate overlays labeled: (1) Roads and Trails, (2) Railroads, and (3) Pipelines, Transmission Lines, and Miscellaneous Transportation Features.

  In the last quarter of 1985, new transportation attribute codes were implemented. The principal difference between the old and new coding schemes is that under the old transportation subcategory, certain miscellaneous transportation features were not collected and descriptive attribute codes were not used. Appendix I contains a list of the attribute codes formerly used.

- Other Significant Manmade Structures -- This category of data includes miscellaneous cultural features not included in the other major data categories.

  New attribute codes for Other Significant Manmade Structures were implemented in the last quarter of 1985. Very little data from this category currently reside in the NDCDB. Appendix J contains a list of the attribute codes used for these older files.

The attribute codes for the following base categories were newly defined in late 1985. Currently, there are very little data available in these categories.

- Hypsography -- This category of data consists of information on topographic relief (primarily contour data).

- Surface Cover -- This category of data consists of information about vegetative surface cover such as woods, scrub, orchards, and vineyards. Vegetative features associated with wetlands, such as marshes and swamps, are collected under Hydrography.

- Non-Vegetative Surface Features -- This category of data consists of information about the natural surface of the Earth as symbolized on the map such as lava, sand, and gravel features. This category is not all-inclusive, as other non-vegetative surface features are found in the category of Hydrography.

- Survey Control and Markers -- This category of data consists of information about the points of established position and third-order or better elevations that are used as fixed references in positioning and correlating map features.

DATA STRUCTURE

Levels of Structuring

The term Digital Line Graph (DLG) is used by the USGS to describe a digital map data set 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 and are fully topologically structured. These

two properties are required by users whose work includes both graphic and analytic applications. Therefore, all DLG data in the National Digital Cartographic Data Base are level 3.

Topology

Current data collection from 1:24,000-scale and other large-scale maps is exclusively directed toward producing fully topologically structured level 3 DLG data referred to as DLG-3. The DLG-3 concept is based on graph theory in which a two-dimensional diagram is expressed as a set of nodes (topologically significant points), lines, and areas in a manner that explicitly expresses logical relationships. Applied to a map, this concept is used to encode the digital data with the spatial relationships between map elements which are obvious when the map is examined visually. The spatial relationships include such concepts as adjacency and connectivity between features on the map. The abstraction of the map data according to the rules of graph theory preserves the spatial relationships inherent in the map graphic and creates a logical and consistent data file structure for computer processing. A digital file of cartographic or geographic data that maintains the spatial relationships inherent in the map 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 analyses involving areas and lines and their spatial relationships.

Topological Elements

A DLG-3 file is composed of three separate, but related, elements: nodes, lines, and area identifiers. Nodes define the location of the endpoints of every line, and a single node may mark the start or end of one or more lines. Thus, nodes occur at intersections of linear features and other places on linear features where the 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 on the map. Each line starts at a node and ends at a node, and has an area to the left of its direction of travel, 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 may describe the boundary between two areal map features, such as counties, or may define a map feature by itself, such as a road. A special line, called a degenerate line, is used to define features symbolized as independent points on a map. A degenerate line starts and ends at the same node, has two identical coordinate pairs, has zero length, and has the same area to the left and right of the direction of travel; that is, it is totally enclosed inside one map area.

An area is a portion of the map bounded by lines. All portions of the map must be assigned some area point. Each area is identified in a DLG-3 data file by a point chosen to represent the characteristics of the area. Newer versions of the processing software, the DLG Production System or PROSYS, locate a given area point inside the area it represents, although this is not a structural requirement. Every DLG data 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 identified as necessary to subdivide the area covered by the file. Polygons as unique features are not defined explicitly in a DLG file. However, polygons can be constructed using line-area linkages built into the DLG data structure.

ATTRIBUTE CODES

In addition to locational and topological information, DLG data elements may have explicitly encoded attributes. Attribute codes, also called feature codes or classification attributes, are used to

describe the map information represented by a node, area, or line. For example, the attribute code for an area might identify a lake or swamp; the attribute code for a line might identify a road, railroad, stream, or shoreline (fig. l).

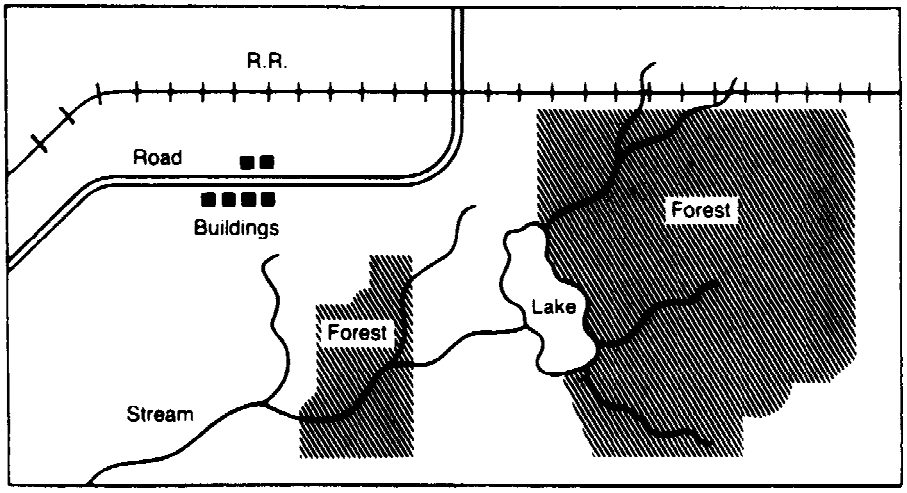

Figure 1.--Map elements showing roads, railroads, buildings, streams, and lake and forest areas.

The codes are based on the cartographic features symbolized on the USGS Topographic Map Series. These maps are the basic source material used to digitize and to encode the data elements, and therefore the map symbology has a strong influence on the overall classification strategy. A listing of all the attribute codes currently assigned and used in 1:24,000- and 1:100,000-scale DLG files is given in Appendix D. Detailed information on how to apply and interpret the attribute coding system is given in Standards for Digital Line Graphs, Part 3: Attribute Coding. (This publication may be purchased from the U.S. Geological Survey. See the ordering information inside the front cover.)

Each attribute code identifies the major category to which a data element belongs, as well as the specific nature of the element. Codes also may provide additional descriptive information. Most elements are uniquely described by a single attribute code. Others, however, may require two or more codes for a complete description. If multiple attributes are needed to describe an element, the order is not usually significant. Allowing for a variable number of attribute codes creates an open-ended structure to which information may 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 attributes can be derived based on relationships to adjacent elements. For example, a U.S. Public Land Survey section line is not assigned an attribute code because the line record carries a reference to the areas to the left and right, that will be assigned attribute codes identifying the two different section numbers. The fact that the line is a section line is derivable.

A DLG attribute code is composed of two distinct numeric fields: a three-digit major code, which identifies the major category to which the element belongs, and a four-digit minor code, which specifically describes the element. 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: 050 0412.

Major Attribute Codes

A list of the major codes and the categories that are currently being collected is contained in table 1. The first two digits of the major code 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 description or classification of the element.
- If non-zero, the minor code which follows is a parameter requiring special interpretation according to instructions given in the codes for each category (see next section).

Transportation systems have been assigned more than one major code so that their components may be readily separated for analytical applications.

Table 1.--Major codes used for DLG base categories

Major Code	Base Category
020	Hypsography
050[1]	Hydrography
070	Surface Cover
080	Non-Vegetative Surface Features
090	Boundaries
150	Survey Control and Markers
170[2]	Transportation--Roads and Trails
180[2]	Transportation--Railroads
190[2]	Transportation Systems--Pipelines, Transmission Lines, Miscellaneous Transportation Features
200[3]	Other Significant Manmade Structures
300	U.S. Public Land Survey System

[1] Prior to 1983, hydrographic features were digitized as two separate categories, (1) 030-Streams and (2) 040-Water bodies. Hydrographic features are currently digitized as a single category, 050-Hydrography. See Appendix H for a list of hydrographic attribute codes used prior to 1983.

[2] In the last quarter of 1985, the transition was made to these new transportation attribute codes, adding codes for certain miscellaneous transportation features. See Appendix I for a list of transportation attribute codes used prior to this transition.

[3] In the last quarter of 1985, codes for this category were created to replace an earlier version of codes. See Appendix J for a list of the previous attribute codes.

Minor Attribute Codes

The first digit of the minor code is normally zero. If non-zero, it is used as a modifier to provide additional information such as road access or railroad status.

The remaining three digits are normally used to indicate the cartographic interpretation to be applied to specific elements. The type of element described by a particular code usually can be determined from the range of value of the last three digits:

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

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 using the DLG attribute codes follow and should be interpreted with reference to Appendix D.

Example A:

050 04l2 — The major code 050 indicates the Hydrography category. The minor code 04l2 identifies the feature as a stream.

Example B:

170 0201 — The major code 170 indicates the Roads and Trails overlay in the Transportation category. The minor code 0201 identifies the feature as a class 1 highway.

l70 0603 — The major code l70 indicates the Roads and Trails overlay in the Transportation category. The minor code identifies the feature as a road under construction. This code would be used in addition to the code describing the class of road, and would appear in the same record with the code 170 0201.

Example C:

055 0033 — The major code 055 indicates a river mile mark for the Hydrography category. Because the last digit of the major code is non-zero, the minor code is a parameter. The minor code 0033 indicates that the value of the river mile mark at that point is 33.

Example D:

306 0033 The major code 306 indicates an Origin of Survey code for the U.S. Public Land Survey System category. Because the last digit of the major code is non-zero, the minor code 0033 indicates that 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 examples shown are composed of 13 nodes, 5 areas, and 15 lines. The 13 nodes are labeled N1 through N13, the 5 areas are labeled A1 through A5, and the 15 lines are labeled L1 through L15. Each element type is maintained as a separate list in the digital data.

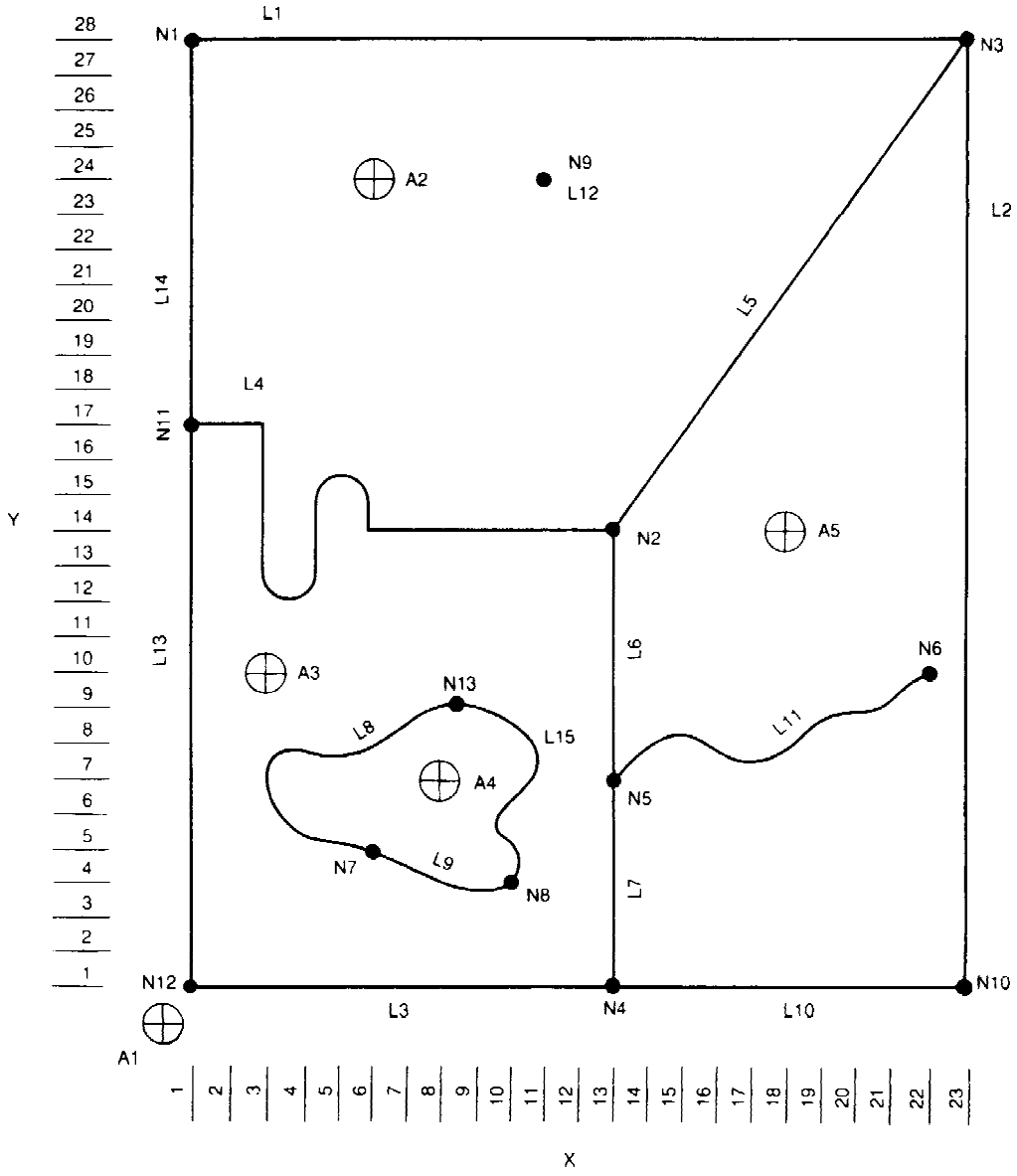

Figure 2.--Sample line graph.

The map represented by the example is divided into five distinct areas labeled Al through A5. Area A1 represents all the area outside of the map border. 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 map 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.

In this example, 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).

Table 2.--Digital description of the topological elements and relationships of a sample line graph (see fig. 2)

Nodes

Internal Id Number	X Coordinate	Y Coordinate
N1	1	28
N2	13	14
N3	23	28
N4	13	1
N5	13	7
N6	22	10
N7	6	5
N8	10	4
N9	11	24
N10	23	1
N11	1	17
N12	1	1
N13	9	9

Areas

Internal Id Number	X Coordinate	Y Coordinate
A1	0	0
A2	6	24
A3	3	10
A4	8	7
A5	18	14

Lines

	Nodes		Area		Coordinates	
Number	Starting	Ending	Left	Right	(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	11	2	2	3	1, 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

This format is simi1ar in concept to the standard DLG-3 data structure, which 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 string of coordinates describing the alignment of the line. In this example, only two pairs of coordinates are shown; however, in an actual file, an irregular line would have a variable number of coordinate pairs up to a limit of 3,000 coordinate pairs. The direction of travel of the line is arbitrarily determined during the digitizing operation. 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 that of node N1 and will end with the same coordinate values as that of node N3. Because 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, the line is known to be a boundary between the two areas.

Lines L11 and L12 are examples of lines that lie within one area. In this example, line L11 starts at node N5, ends at node N6, has area A5 to the left of the direction of travel, and again 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 that of node N5 and will end with the same coordinate value as that 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 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.

The line graph concept allows all of the points on the map to be described as a member of a line graph element (node, area, or line) with minimal redundancy. The relationships between the various elements are indicated by the structure. 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, the origin is the center of the map and the internal file coordinates are numbered plus or minus 1 to 32,767 in thousandths of inches. See the section labeled "coordinate systems" for more detail.

GRAPH THEORY IN DLG DATA

The digital line graph concept is based on graph theory, in which a diagram can be expressed as a set of elements (nodes, areas, and lines) in a manner that shows logical spatial relationships with minimal redundancy. There are three ways to implement the line graph concept in DLG files: the area case, the network case, and the area-hybrid case. All NMD files are collected and processed as area-hybrid case DLG's.

Area Case

Area line graphs can be used to represent area features such as political entities or the U.S. Public Land Survey System. In the area case, all closed circuits of lines form unique areas. 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 Case

Network line graphs can be used to represent linear features such as roads, single-line streams, or railroads. The network case differs from the area case in that, irrespective of the number of closed areas forming the graph, only two area elements are encoded: (l) the area outside the graph, termed the outside area; and (2) the area within the graph, termed the background area. All lines except the graph boundary are considered to be contained within the background area. The major topological relationship expressed by network data is that of connectivity. Data encoded in network line graph form are suitable for various forms of network analysis, such as minimum path computations.

Area-Hybrid case

In the area-hybrid case, network and area type information is gathered in a single DLG file. In this approach, all closed circuits of lines define unique areas. However, some lines may exist which do not form boundaries between two areas. The unique areas which 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 may occupy a position in an area of no other hydrographic significance, that is, an unattributed background area. Therefore, in processing area-hybrid data, the background area itself is broken into numerous unattributed area records that distinguish the background areas from hydrographic areas. To further illustrate the area-hybrid case, a detailed description of a representative line graph follows.

Figure 3 shows a window taken from the Oneco, Connecticut-Rhode Island, 1:24,000-scale USGS quadrangle map.

Figure 4 shows the line graph encoded for the hydrography of the same area. Certain nodes, areas, and lines are labeled.

Table 3 contains some of the digital data records, extracted from the standard format DLG file, which describe this portion of the graph. The internal sequence identification numbers shown reflect the order of these features in the original file. (Note: Descriptions of DLG-3 formats are contained in Appendixes A and B, and a list of attribute codes is contained in Appendix D.)

In the Oneco example, each node and area element is described by one or two logical records: (1) a type D.l record that describes the element, and (2) an optional type F record that lists the attribute codes associated with the element. The first record (type D.1) for each node and area element contains the following fields:

1. Type of record indicator, N for node or A for area.
2. Internal sequence identification number.
3. X coordinate of node or representative area point.
4. Y coordinate of node or representative area point.
5. Number of attribute codes that describe the element.
6. Number of pairs of characters in the text string that describes the element.

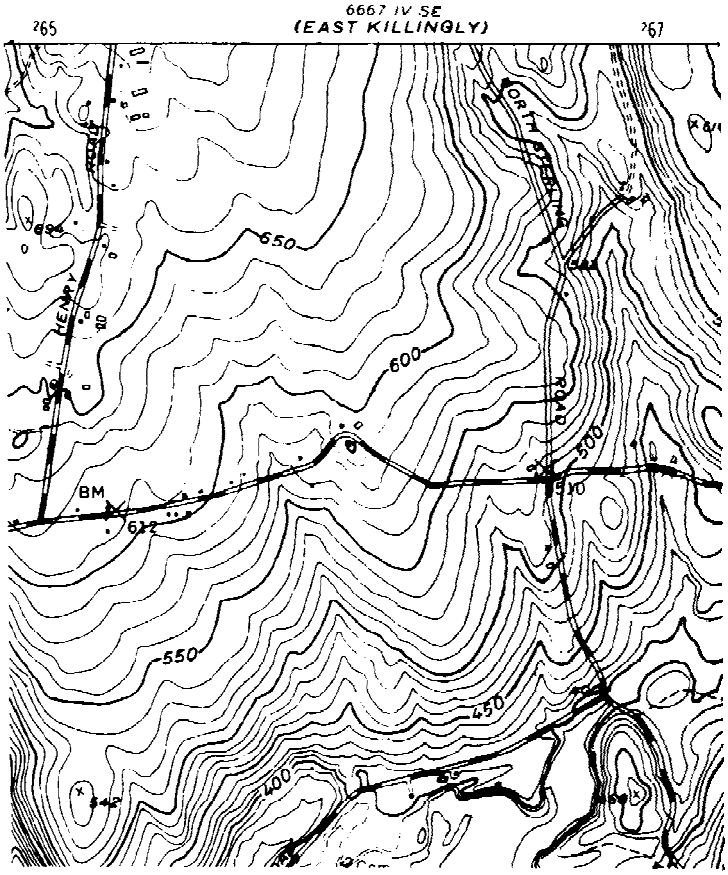

Figure 3.--Window from the Oneco, Connecticut-Rhode Island, 1:24,000-scale quadrangle map.

The second record (type F) for each node and area element contains n attribute codes (expressed as major and minor code pairs), where n is the number specified in field 5 of the first (type D.l) record.

Each line element in the Oneco example is described by two or three logical records: (1) a type D.2 line description record, and (2) a type E record that lists the x,y coordinate pairs that define the shape of the line, and, if appropriate, (3) a type F (attribute code) record. The first record (type D.2) for each line element contains the following fields:

1. Type of record indicator (L).
2. Internal sequence identification number.
3. Internal sequence number of starting node.
4. Internal sequence number of ending node.
5. Internal sequence number of the area to the left of the line.
6. Internal sequence number of the area to the right of the line.
7. Number of x,y coordinate pairs that locate the line on the map.

8. Number of attribute codes that describe the line.
9. Number of pairs of characters in the text string that describes the line.

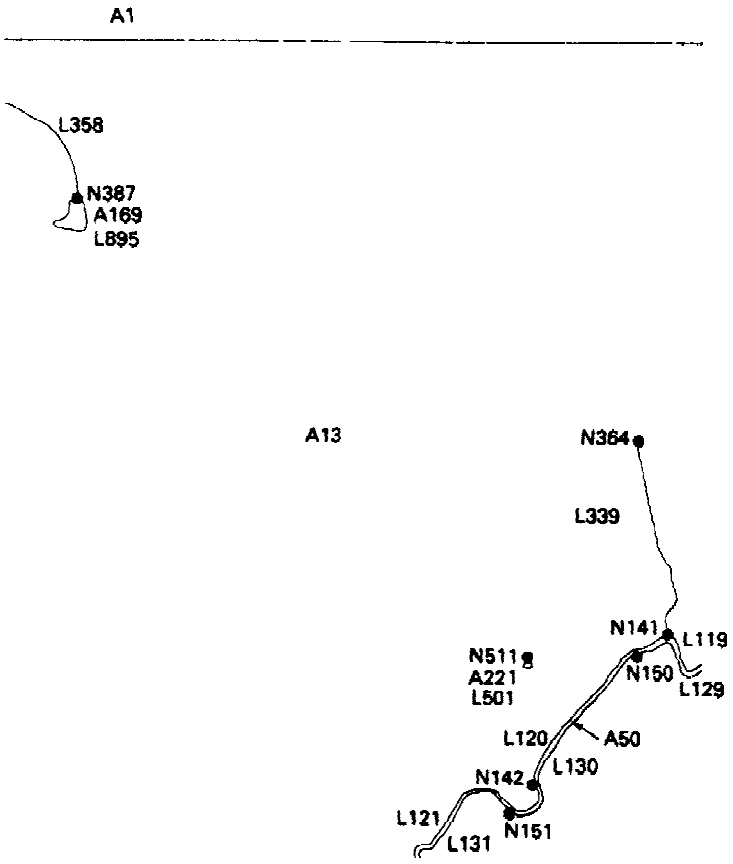

Figure 4.--Window from line graph of hydrography, Oneco, Connecticut Rhode Island, quadrangle.

The second logical record (type E) for each line element contains n coordinate pairs, where n is the number specified in field 7 of the first (type D.2) record. The type F record is as described above.

The records listed in table 3 describe several hydrographic features in the center of the north edge of figure 3, including a portion of Quanduck Brook, a small pond, a swamp, and two small streams. The records referred to in the following description have been extracted from a complete DLG. Therefore, the internal sequence identification numbers shown reflect the order of these features in the original file. The records are referred to in this description by these internal sequence numbers; for example, node 141, area 13, line 119.

Background area 13 has an x,y coordinate of 0,0. This is a result of the processing software automatically determining the numerous background areas within a DLG and assigning these areas an

x,y coordinate of 0,0 (which is the origin of a DLG, usually located at the center of a quad). The area outside of the map is represented by area record 1 and is identified by the attribute code 000 0000.

Table 3.--Selected sample of standard format DLG-3 records
for Oneco, Connecticut-Rhode Island, Hydrography

```
HYDROGRAPHY          2360   808  1180   368  1572  1021
N    141  1654  8143        0     0
N    142   949  7238        0     0
N    150  1501  8058        0     0
N    151   794  7190        0     0
N    364  1484  9210        1     0
   50     1
N    387 -1571 10532        1     0
   50     1
N    511   893  7972        0     0
A      1 -9137   146        1     0
    0     0
A     13     0     0        0     0

A     50 -3179  6522        1     0
   50   412
A    169 -1557 10407        2     0
   50   111    50   613
A    221   893  7991        2     0
   50   421    50     0
L    119   141   140    13    50    26     1     0
  1654  8143  1681  8142  1695  8134  1709  8106  1721  8071  1727  8023
  1758  7963  1765  7956  1785  7958  1856  8012  1954  8106  2008  8162
  2057  8191  2082  8198  2113  8220  2309  8328  2342  8332  2362  8327
  2411  8287  2424  8279  2448  8283  2507  8310  2565  8348  2590  8362
  2638  8391  2655  8406
   50   605
L    120   142   141    13    50    22     1     0
   949  7238   952    7275        926  7357   929        7394   941  7427   972  7490
```

1004 7542 1095 7665 1121 7691 1176 7754 1277 7852 1306 7883
1324 7921 1372 7980 1382 7988 1407 8027 1462 8072 1526 8083
1558 8100 1620 8137 1641 8144 1654 8143
50 605

Table 3.--Selected sample of standard format DLG-3 records
for Oneco, Connecticut-Rhode Island, Hydrography--continued

```
L    121   143   142    13    50    33     1     0

   219  6694   211  6712   211  6745   200  6785   206  6809   223  6821
   264  6825   288  6844   292  6871   285  6907   276  6928   274  6959
   284  6978   300  6990   319  6992   349  6991   363  7001   431  7099
   442  7112   536  7275   563  7290   609  7303   665  7307   717  7296
   731  7281   739  7262   784  7230   816  7195   844  7182   877  7183
   909  7200   937  7225   949  7238
    50   605

L    129   150   139    50    13    33     1     0

  1501  8058  1572  8070  1601  8086  1626  8105  1651  8114  1671  8109
  1685  8081  1707  8020  1718  8001  1731  7950  1743  7938  1765  7927
  1788  7928  1820  7948  1844  7966  1954  8074  2011  8123  2034  9151
  2085  8179  2104  8192  2114  8195  2180  8239  2253  8280  2298  8304
  2321  8313  2345  8312  2359  8305  2400  8269  2424  8263  2452  8266
  2476  8277  2500  8286  2512  8294
    50   606

L    130   151   150    50    13    25     1     0

   794  7190   834  7159   854  7157   903  7169   927  7181   953  7205
   973  7239   975  7259   955  7337   947  7351   952  7390   981  7461
  1008  7492  1065  7577  1107  7645  1143  7679  1162  7697  1193  7741
  1288  7831  1338  7890  1348  7909  1413  7996  1453  8038  1491  8057
  1501  8058
     50              606

L    131   152   151    50    13    36     1     0

    59  6583   109  6597   205  6612   225  6621   239  6637   245  6657
   237  6715   237  6748   222  6775   226  6791   237  6802   278  6809
   315  6835   325  6859   319  6885   313  6900   311  6914   297  6939
   302  6959   313  6967   360  6970   375  6975   394  7004   413  7037
   423  7042   453  7082   510  7183   542  7252   568  7275   638  7291
   670  7295   709  7283   734  7245   767  7213   786  7201   794  7190
    50   606

L    339   364   141    13    13    21     1     0

  1484  9210  1490  9148  1531  8966  1550  8852  1560  8820  1566  8780
  1594  8677  1599  8629  1626  8580  1636  8559  1648  8540  1661  8529
  1673  8510  1675  8450  1698  8376  1701  8350  1690  8318  1643  8261
  1641  8219  1653  8159  1654  8143
    50              412

L    358   387    21    13    13    23     1     0

 -1571 10532 -1578 10608 -1597 10705 -1641 10804 -1657 10832 -1683 11865
 -1689 10877 -1730 10922 -1769 10946 -1841 10979 -1945 11041 -1979 11049
 -2019 11074 -2061 11110 -2080 11131 -2093 11172 -2101 11212 -2109 11230
```

-2131 11263 -2135 11273 -2143 11280 -2185 11369 -2201 11395
50 412

Table 3.--Selected sample of standard format DLG-3 records
for Oneco, Connecticut-Rhode Island, Hydrography--continued

```
L    501   511   511   221    13     7     2     0

   893  7972   915  7976   912  7997   890  8020   871  7996   864  7974
   893  7972
    50     0    50   200

L    895   387   387   169    13    20     1     0

 -1571 10532 -1586 10532 -1619 10513 -1622 10504 -1622 10454 -1638 10426
 -1655 10415 -1671 10409 -1698 10404 -1707 10392 -1697 10373 -1667 10365
 -1562 10348 -1542 10354 -1526 10373 -1523 10412 -1530 10462 -1543 10503
 -1563 10527 -1571 10532
    50   204
```

The double-line stream, Quanduck Brook, is represented by area record 50 and identified by the attribute code 050 0412 (stream). Area record 13 is the background area on either side of the stream, and as such has no attribute code assigned. Line records 129, 130, and 131 form the left bank of the river, coded as though one were facing downstream. These lines are identified by the attribute code 050 0606 (left bank) and can be chained by referring to the common nodes. Line record 131 begins outside figure 4 and ends at node 151. Line record 130 starts at node 151 and ends at node 150. Line record 129 starts at node 150 and ends outside figure 4.

The right bank of the river is formed in a similar fashion by line records 119, 120, and 121, which are identified by the attribute code 050 0605 (right bank). They are similarly linked through the nodes 141 and 142. Note that the identity of the shoreline as either left or right bank (coded as such to indicate downstream flow) is established by the attribute code, so the given line segments making up the shoreline may be digitized in either direction without altering its identity.

Area record 221 describes the small pond just north of Quanduck Brook. It is identified by two attribute codes: 050 0421 (lake or pond) and 050 0000 (photorevised feature). Its shoreline is formed by line record 501 and identified by the attribute codes 050 0200 (shoreline) and 050 0000 (photorevised feature). This line can be identified as bounding area 221 by the reference within the line record to area 221 being located to the left of the line (indicating that line 501 was digitized counterclockwise).

Area record 169 describes the marsh in the upper-left corner of figure 4. It is identified by two attribute codes: 050 0111 (marsh, wetland, swamp, bog) and 050 0613 (wooded). The perimeter of the swamp is formed by line record 895 and identified by the attribute code 050 0204 (apparent limit). This line can be identified as bounding area 169 by the reference within the line record to area 169 being located to the left of the line (indicating that line 895 was digitized counter-clockwise).

The single-line stream flowing into Quanduck Brook is represented by line record 339 and identified by attribute code 050 0412 (stream). Note that this stream has the same attribute code as the Quanduck Brook (050 0412). This is because both are streams, one of which is digitized as a line and one of which is digitized as an area and its delimiting banks. Line 339 extends from node

364 to node 141. The direction of flow of this stream can be derived from the fact that node 364 is identified with attribute code 050 0001 (upper origin of stream). Background area 13 is located on both sides of the stream.

DISTRIBUTION FORMATS

The 1:24,000-scale and other large-scale DLG data are available in two distribution formats: (1) standard and (2) optional.

The standard distribution format is intended to minimize storage requirements. Explicit topological linkages are contained only in the line elements (starting node, ending node, area to the left of direction of travel, area to the right of direction of travel). A sample DLG in standard format is found in Appendix F.

The optional distribution format was designed to facilitate data usage. The topological relationships explicitly encoded include starting node, ending node, area to the left of direction of travel and area to the right of direction of travel for line elements, bounding lines for area elements, and bounding lines for node elements. These files are typically larger than those in the standard format but, for certain applications, can simplify processing requirements. For example, topological linkages are explicitly encoded for all line, node, and area elements, allowing a polygon data structure to be easily created. These linkages facilitate GIS applications of DLG data as well as generation of graphic products. A sample DLG in optional format is found in Appendix G.

The characteristics of the standard and optional DLG formats are summarized in table 4.

Table 4.--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 (UTM).
Topological linkages	Contained only in line elements.	Contained in node, area, and line elements.

These formats are described in detail in Appendixes A and B.

SOURCE MATERIALS

The DLG data files described in this document are derived from USGS topographic maps published as 7.5-minute quadrangles at 1:24,000- or 1:25,000-scale. Where 7.5-minute coverage is not available, the following sources are used, in order of preference:

1. Advance manuscripts for 7.5-minute maps,
2. Published 1:62,500 scale 15-minute quadrangle maps (1:63,360 scale in Alaska), or
3. Archival compilation materials for 15-minute quadrangle maps, if available at a larger scale than the published map, such as 1:48,000 scale.

The scale of the source materials used to generate 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 the smallest data collection unit (0.001 inch) for each scale.

Source scale	Resolution
1:24,000	0.61 meter
1:25,000	0.635 meter
1:48,000	1.22 meters
1:62,500	1.587 meters
1:63,360	1.61 meters

CELL SIZE AND FILE EXTENT

In general, the DLG's are stored and distributed in standard cells of 7.5 minutes of latitude by 7.5 minutes of longitude. The majority of 1:24,000-scale data collected from l5-minute quadrangles are digitized as four 7.5-minute units. A few older data files collected from 15-minute quadrangles were not digitized in 7.5-minute units, but in 15-minute units.

Nonstandard cells are collected in coastal areas where map format is sometimes extended to conform to the shoreline. It is anticipated that these nonstandard files will eventually be partitioned into standard 7.5-minute by 7.5-minute files.

COORDINATE SYSTEMS

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

Standard Distribution Format

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 normally at the center of the cell. Some older files will have their origin below and to the left of the lower left corner of the cell (see fig. 5).

3. The x-axis of the coordinate system is parallel to a theoretical straight line connecting the southwest and southeast corners of the cell; y-axis is perpendicular to that line.
4. One unit is equal to 0.00l-inch at map scale.
5. The coordinate domain is limited to the range -32768 to +32767.

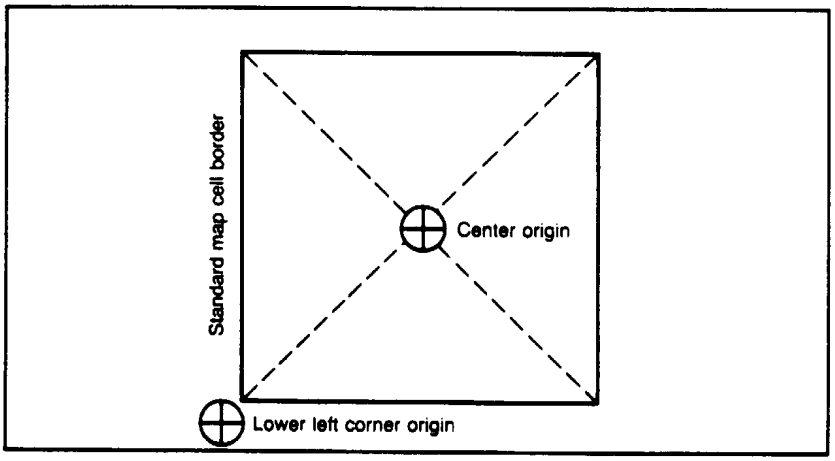

Figure 5.--Location of origin of file reference coordinates.

The file header contains the parameters of a transformation which can be used to convert the internal file coordinates to the ground coordinate system, which is the Universal Transverse Mercator (UTM) for 1:24,000-scale DLG's. An example of this transformation is given in Appendix E.

Optional Distribution Format

The DLG data in the optional distribution format are expressed in the units of the ground coordinate system; that is, meters in the UTM coordinate system.

DATA VALIDATION

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

1. File fidelity and completeness -- The data are either manually digitized using equipment with a resolution of 0.00l inch and an absolute accuracy of from 0.003 to 0.005 inch, or are scanned on an automatic device with a resolution of 30 points per millimeter, or 0.0013 inch. The positional accuracy of the data and completeness of the file are checked by

visually comparing proof plots with the original stable-base source material. These proof plots are generated using automated drafting machines with a resolution of 0.00l inch and an absolute accuracy of from 0.003 to 0.005 inch.

2. Attribute accuracy -- DLG attribute codes are checked by software against a table of valid codes to ensure that each attribute in a file is valid for the category and element type to which it is assigned. Validating the codes for correct application is currently a manual process involving the correlation of formatted listings with proof plots.

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 right topological attributes of lines are consistent throughout the file. The neatline is free of gaps. Validation of DLG data is performed for each category within a file.

Additional data validation is being implemented as follows:

1. Edge matching -- Validation software provides for checking the edges of each quadrangle against the edges of the four adjacent quadrangles. Each edge of a DLG-3 is checked for positional and attribute matching along the neatlines of the adjoining DLG-3 cells, provided that the surrounding data cells are available at the time the DLG-3 is entered into the NDCDB. There is currently no attempt, other than the coding of coincident features, to provide fully integrated data categories.

2. Quality Control Flags -- Information in the header of the DLG-3 file indicates the status of the file with respect to the edge matching described above. Twelve bytes at the end of record A.1 in the standard distribution format and at the end of record 3 in the optional distribution format of the ASCII file is set aside for quality control flags (see Appendixes A and B). The first three of these flag positions are for future use. The fourth flag position contains a value encoded in the bit pattern that is used only by the database manager to check the edge status. The remaining either flags indicate to the user the edge status code and the status reason code. The four status flags contain the status of the West, North, East, and South edges of a DLG-3 as compared to the edges of the four adjoining DLG-3 files. Each of the four flags is followed by a status reason code that explains the status of the four edges respectively. The possible status values for a DLG-3 entered into the NDCDB are:

    - "b" - unchecked ("b" = blank)
    - "0" - passed edge match test
    - "1" - alignment discontinuity
    - "2" - attribute discontinuity
    - "3" - attribute and alignment discontinuity

    The possible reason codes are:

    - "b" - no reason code set ("b" = blank)
    - "4" - data do not exist
    - "5" - adjacent data cell not currently available for test
    - "6" - discontinuity due to temporal differences in source materials
    - "7" - attribute mismatch valid
    - "8" - paneling unauthorized

A value of "4" indicates that the data cannot be matched because there are no adjacent data. This situation occurs where the quadrangle is on the coast and no adjoining map exists. A reason code with the value of "5" may be reset as the adjoining data cell becomes available for edge match verification. A reason code with the value of "6" means that the adjoining quadrangles were mapped at different times and there are features that do not match in alignment or classification due to the time elapsed between the compilation of the two sets of source materials. A value of "7" indicates that the discrepancy in attribute codes between the two files has been checked and is valid. A reason code with the value of "8" indicates that there was no authorization in place for edge matching at the time the data were archived.

When an edge status code is other than "0", the DLG-3 file will be entered into the NDCDB only when the reason code has also been set as a result of examination of the file.

The following combinations of status flags and reason flags are currently valid for the processing software.

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

APPENDIXES

APPENDIX A.--Standard DLG Distribution Format (Record Contents)

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 l44 characters. Nine distinct record types are defined.

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.l	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).

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

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

2. Data records

Node records	Repeated	
Node description (D.l)	for each	
Attribute codes (F)	node within a	
Text string (G)	data category	
Area records		
Area description (D.l)	Repeated	Repeated
Attribute codes (F)	for each	for each
Text string (G)	area within a	data category
	data category	
Line records		
Line description (D.2)	Repeated	
x,y coordinates (E)	for each	
Attribute codes (F)	line within a	
Text string (G)	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 l44-byte logical records.

APPENDIX A.--Standard DLG Distribution Format (Record Contents)--continued

[Integer fields with a value of zero have leading zeros suppressed. Any field with the format of D24.15 which has a value of zero will be represented as "bbb0.0bbbbbbbbbbbbbbbbb", 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	When practical, the name of the source map followed by the State two-character designator(s).
---	---	Filler	---	---	41	41	1 space
A.1	2	Date of original source materials	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=photo-inspected, L=limited revision)
A.1	4	Scale of original source material	INTEGER*4	I8	53	60	Scale denominator of source material; for example, 24000.
---	---	Filler	---		61	63	3 spaces
A.1	5	Arbitrary quad number	ALPHA	A3	64	66	Quad number assigned for USGS internal use.
		Filler	---	---	67	113	47 spaces

Logical Record Type A

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
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 contour intervals exist. (Selected overlays.)
A.1	7	Comma	ALPHA	A1	118	118	Comma separator
A.1	8	Largest primary bathymetric contour interval	ALPHA	A4	119	122	Largest primary bathy-metric interval, followed by the interval unit (1=feet 2=meters). Present only if two or more primary contour intervals exist.
---	---	Filler					1 space
A.1	9	Smallest primary contour interval	ALPHA	A4	124	127	Smallest or only primary contour interval, followed by the interval unit (1=feet, 2=meters). (Selected overlays.)
A.1	10	Comma	ALPHA	A1	128	128	Comma separator
A.1	11	Smallest primary bathymetric contour interval	ALPHA	A4	129	132	Smallest or only primary bathymetric interval, followed by the interval unit (1=feet, 2=meters).
A.1	12-14	Coded Flags	ALPHA	A1	133	135	3 flags for future use

Logical Record Type A--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
A.1	15	Coded Flag	ALPHA	A1	136	136	Database coded edge flag
A.1	16	EDGEWS	ALPHA	A1	137	137	Status flag for west edge, values are: 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, values are: b = unchecked, 4 = adjacent data do not exist 5 = adjacent data unavail-able, 6 = temporal discontinuity, 7 = attribute mismatch valid, 8 = paneling unauthorized.
A.1	18	EDGENS	ALPHA	A1	139	139	Status flag for north edge, values = b,0,1,2, or 3 as above.
A.1	19	EDGENR	ALPHA	A1	140	140	Reason for EDGENS, values are b,4,5,6,7, or 8 as above.
A.1	20	EDGEES	ALPHA	A1	141	141	Status flag for east edge. Values are b,0,1,2, or 3 as above.
A.1	21	EDGEER	ALPHA	A1	142	142	Reason for EDGEES. Values are b,4,5,6,7, or 8 as above.
A.1	22	EDGESS	ALPHA	A1	143	143	Status flag for south edge. Values are b,0,1,2, or 3 as above.
A.1	23	EDGESR	ALPHA	A1	144	144	Reason for EDGESS. Values are b,4,5,6,7, or 8 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	Code=3, DLG-3
A.2	2	Code defining ground planimetric reference system	INTEGER*2	I6	7	12	Code=1, Universal Transverse Mercator (UTM)
A.2	3	Code defining zone in ground plan-imetric reference system	INTEGER*2	I6	13	18	Codes for UTM coordinate zones are given in Appendix C.
A.2	4	Map projection parameters	REAL*8	5D24.15	19	138	This field contains the first 5 of 15 map projection parameters. Parameters for the UTM projection are given in Appendix C.
---	---	Filler	---	---	139	144	6 spaces
A.3	1	Map projection parameters	REAL*8	6D24.15	1	144	This record contains projection parameters 6 thru 11. Parameters for the UTM projection are given in Appendix C.
A.4	1	Map projection parameters	REAL*8	4D24.15	1	96	This field contains the last 4 projection parameters. Parameters for the UTM projection are given in Appendix C.
A.4	2	Code defining units of measure for ground planimetric coordinates throughout the file	INTEGER*2	I6	97	102	Code=2, meters

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 reference 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
A.4	4	Accuracy code of planimetric data	INTEGER*2	I6	127	132	Code=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
---	---	Filler	---	---	139	144	6 spaces
A.5 A.6	1	A (4,2) array containing geographic coordinates which constitute the registration points for the DLG. In quadrangle-based mapping, these points form a geographic rectangle/square which contains the domain of the DLG.	REAL*8	3(2D24.15) 2D24.15	1 1	144 48	The four registration points will 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 in units of degrees and decimal degrees and are expressed in the order=SW, NW, NE, SE.
---	---	Filler	---	---	49	144	96 spaces

Logical Record Type B

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
B.l	1	Parameters (Al, A2, A3, A4) of file-to-ground projection transformation; the explicit form of the transformation is: X=Alx+A2y+A3 Y=Aly-A2x+A4 where: x,y are coordinates in file internal reference system X,Y are coordinates in map projection reference system	REAL*8	4D24.l5	1	96	X,Y coordinates resulting from this transformation will be in ground meters in UTM zone defined by data element 3 of record A.2.
B.l	2	Number (m) of registration points	INTEGER*2	I6	97	l02	m=4
---	---	Filler	---	---	l03	l44	42 spaces
B.2	1	A (4,3) array containing identifications and coordinates of registration points. Coordinates are expressed in the file internal reference system.	ALPHA/ INTEGER*2	4(A2, 2I6)	l	56	The corners of a four-sided polygon are used as registration points. The identification sequence is SW, NW, NE, SE. The array is stored by row. Coordinates in the file internal reference system are expressed in units of thousandths of an inch and fall in the range -32768 to +32767. These coordinates correspond to the geographic coordinates contained in records A.5 and A.6.
---	---	Filler	---	---	57	l44	88 spaces

Logical Record Type C

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
C.l	1	Number (q) of categories in the DLG file	INTEGER*4	I6	1	6	The value of q may be from 1 to 32. Up to 32 categories can be represented in a given file. The value will be 1.
---	---	Filler	---	---	7	l44	l38 spaces
C.2[1] to C.N	1	A (q,7) array containing category names as well as maximum and actual number of node, area, and line elements in each category	ALPHA/ INTEGER*2	q (A20,6I6)	1 (57	56 112)	This array is stored by row. The first element is the category name consisting of 20 alphanumeric characters the first four of which are unique. Columns 2 and 3 of the array contain maximum and actual number of nodes in the category. Columns 4 and 5 contain maximum and actual number of areas in the category. Columns 6 and 7 are the maximum and actual number of line segments. (Note: the maximum number of nodes or areas within a category is 25, 960. The maximum number of lines is 25,938. This field is used only during initial processing of data).
---	---	Filler	---	---	---	144	32 or 88 spaces

[1]The number of categories "q" is given in record C.1. There will be 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."

Logical Record Type D

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
D.l	1	Type of element code	ALPHA	A2	1	2	Code ='Nb' for Node element, 'Ab' for Area element.
D.l	2	Element's internal identification number	INTEGER*2	I6	3	8	Number is positive and se quential from 1-n within each category and element type.
D.l	3	x,y file coordinate of node point or repre-sentative point for the area element	INTEGER*2	2I6	9	20	The representative area point is usually, but not always, contained within the area it represents.
D.l	4	Number (t) of attri-bute codes which are attached to the node or area element (t≥0)	INTEGER*2	I6	2l	26	Absence of attribute codes is indicated by t=0.
D.l	5	Number (k) of pairs of text characters which are attached to the node or area element (k≥0)	INTEGER*2	I6	27	32	k=0. Not currently used.
---	---	Filler	---	---	33	l44	ll2 spaces
D.2	1	Code indicating a line segment graph element	ALPHA	A2	l	2	Code='Lb' for line segment.
D.2	2	Line segment's internal identification number	INTEGER*2	I6	3	8	Number is positive and sequential from 1-n within each category and element type.
D.2	3	Internal identification number of starting node	INTEGER*2	I6	9	l4	Number refers to data element 2 in record D.l.

Logical Record Type D--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
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 which are attached to the line segment (t≥0)	INTEGER*2	I6	39	44	Absence of classification attribute codes is indicated by t=0.
D.2	9	Number (k) of pairs of text characters which are attached to the line segment (k≥0)	INTEGER*2	I6	45	50	k=0. Not currently used.
	---	Filler	---	---	51	144	94 spaces
E.1 to[2] E.n	1	A (v,2) array containing an ordered sequence of coordinate pairs which define the image presentation of a line element	INTEGER*2	v(2I6)	1		Coordinates are expressed in internal file reference system, in units of thousandths of an inch. The array is stored by row.
---	---	Filler	---	---	---	144	0 to 132 spaces

[2]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.l[3] to F.n	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 l32 spaces

[3]The number of feature (attribute) codes, "t" is given in the D.1 and D.2 records. The F record is an array of t(2I6) codes of which a maximum of l2(2I6) will fit on a l44 character ASCII record. The space filler will vary depending on the value of "t". If "t" is an integer multiple of l2 there will be no spaces as filler at the end of the record.

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 characters (bytes). Bytes 1-72 of each record may 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.

Four types of records are considered header records:

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

Seven types of records are considered data records:

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

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

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

2. Data records

Node identification record		Repeated	
Node-to-line linkage record(s)		for each	
Attribute code record(s)		node within a	
Text record(s)		data category	
Area identification record		Repeated	Repeated
Area-to-line linkage record(s)		for each	for each
Attribute code record(s)		area within a	data category
Text record(s)		data category	
Line identification records		Repeated	
Coordinate string record(s)	for each		
Attribute code record(s)		line within a	
Text record(s)		data category	

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

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	Descriptive text.
2	1	Name of digital cartographic unit	ALPHA	A40	1	40	When practical, the name of the source map followed by the State two-character designators.
---	---	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=photo-inspection, L=limited revision).
2	4	Scale of original source material	INTEGER*4	I8	53	60	Scale denominator of source material, for example, 24000.
---		Filler	---		61	63	3 spaces

*The logical record length for the optional distribution format is 80 bytes, with 8 spaces of blank fill in bytes 73-80 of each record which may be used for a record sequence number.

FILE IDENTIFICATION AND DESCRIPTION RECORDS--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
2	5	Arbitrary quad number (24K files)	ALPHA	---	64	66	Quad number assigned for USGS internal use.
2		Filler	---	---	67	72	6 spaces
3		Filler	---	---	l	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 contour intervals exist. (Selected overlays.)
3	2	Comma	ALPHA	A1	46	46	Comma separator
3	3	Largest primary bathymetric contour interval	ALPHA	A4	47	50	Largest primary bathy-metric interval, followed by the interval unit (1=feet, 2=meters, 3=fathoms). Present only if two or more primary intervals exist.
---	---	Filler					1 space
3	4	Smallest primary contour interval	ALPHA	A4	52	55	Smallest or only primary contour interval, followed by the interval unit (1= feet, 2=meters). (Selected overlays.)
3	5	Comma	ALPHA	A1	56	56	Comma separator

FILE IDENTIFICATION AND DESCRIPTION RECORDS--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
3	6	Smallest primary bathymetric contour interval	ALPHA	A4	57	60	Smallest or only primary bathymetric interval, followed by the interval unit (1=feet, 2=meters, 3=fathoms).
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
3	11	EDGEWS	ALPHA	A1	65	65	Status flag for west edge, values are: b = unchecked, 0 = passed, 1 = alignment discontinuity, 2 = attribute discontinuity, 3 = attribute and alignment discontinuity.
3	12	EDGEWR	ALPHA	A1	66	66	Reason for EDGEWS, values are: b = unchecked, 4 = adjacent data do not exist, 5 = adjacent data unavailable, 6 = temporal discontinuity, 7 = attribute mismatch valid, 8 = paneling unauthorized.
3	13	EDGENS	ALPHA	A1	67	67	Status flag for north edge, values = b,0,1,2, or 3 as above.
3	14	EDGENR	ALPHA	A1	68	68	Reason for EDGENS, values are b,4,5,6,7, or 8 as above.
3	15	EDGEES	ALPHA	A1	69	69	Status flag for east edge Values are b,0,1,2, or 3 as above.

FILE IDENTIFICATION AND DESCRIPTION RECORDS--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
3	16	EDGEER	ALPHA	A1	70	70	Reason for EDGEES. Values are b,4,5,6,7, or 8 as above.
3	17	EDGESS	ALPHA	A1	71	71	Status flag for south edge. Values are b,0,1,2, or 3 as above.
3	18	EDGESR	ALPHA	A1	72	72	Reason for EDGESS. Values are b,4,5,6,7, or 8 as above.
4	1	DLG level code	INTEGER*2	I6	1	6	Code=3, DLG-3
4	2	Code defining ground planimetric reference system	INTEGER*2	I6	7	12	Code=1, UTM
4	3	Code defining zone in ground planimetric reference system	INTEGER*2	I6	13	18	Codes for UTM coordinate zones are given in appendix C.
4	4	Code defining units of measure for ground planimetric coordinates throughout the file	INTEGER*2	I6	19	24	Code=2, meters
4	5	Resolution	REAL*4	D18.11	25	42	The true ground distance corresponding to one unit (0.001 inch at map scale) in the file internal coordinate system used in data collection.

Scale	Resolutions
1:24,000	0.61 M
1.25,000	0.635 M
1:48,000	1.22 M
1:62,500	1.587 M

FILE IDENTIFICATION AND DESCRIPTION RECORDS--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
4	6	Number of file-to-map transformation parameters	INTEGER*2	I6	43	48	Usually 4.
4	7	Number of accuracy/ miscellaneous records	INTEGER*2	I6	49	54	Currently=0, none included
4	8	Number (n) of sides in the polygon which define the coverage of the cell. Number (n) also defines the number of control-points	INTEGER*2	I6	55	60	n = 4.
4	9	Number (q) of categories in the DLG file	INTEGER*2	I6	61	66	Value of q may be from 1 to 32. The value will be 1.
---	---	Filler	---	---	67	72	6 spaces
5-9	1	Projection parameters for map transformation	REAL*8	3D24.15	l	72	Three parameters on each of 5 records. Parameters for the UTM projection are given in Appendix C.
10	1	Internal file-to-map projection transformation parameters	REAL*4	4Dl8.ll	1	72	A transformation of this type is not required, since coordinates are expressed in a ground planimetric coordinate system (usually UTM). These parameters are however, valid for trans-formation as described in record B.1, data element 1, of the standard format.

CONTROL-POINT IDENTIFICATION RECORDS

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
1-n	1	Control-point label	ALPHA	A2	1	2	"SW," "NW," "NE," or "SE" for four quadrangle corners.
		Filler			3	6	4 spaces
	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 appropriate zone of the ground planimetric coordinate system.
	5	Y coordinate	REAL*4	F12.2	49	60	In units in the appropriate zone of 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	1	Category name	ALPHA	A20	1	20	The first 4 characters are unique.
	2	Attribute format codes	INTEGER*2	I4	21	24	Blank or zero (0) indicates default (2I6) attribute formatting in major-minor pairs.
	3	Number of nodes referenced in file	INTEGER*2	I6	25	30	Number of nodes referenced in file as start and end nodes of lines.
	4	Actual number of nodes in file	INTEGER*2	I6	31	36	Only if some or all node records were excluded from the file, would this number be different from data element 3.
		Filler	---	---	37	37	1 space
	5	Presence of node-to-area linkage records	INTEGER*2	I1	38	38	Flag=0, node-to-area linkage records not present.[1]
	6	Presence of node-to-line linkage records	INTEGER*2	I1	39	39	Flag=1, node-to-line linkage records are included.[1]
	---	Filler	---	---	40	40	1 zero or space
	7	Number of areas referenced in file	INTEGER*2	I6	41	46	Number of areas referenced in file as areas left and areas right of lines.

[1]The flags for lists present or absent are the current default values, and are the only current values used.

DATA CATEGORY IDENTIFICATION RECORDS--continued

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
1-q	8	Actual number of areas in file	INTEGER*2	I6	47	52	Only if some or all area records were excluded from the file would the number be different from the data element 7.
	---	Filler	---	---	53	53	1 space
	9	Presence of area-to-node linkage records	INTEGER*2	I1	54	54	Flag=0, area-to-node linkage records not present.[1]
	10	Presence of area-to-line linkage records	INTEGER*2	I1	55	55	Flag=1, area-to-line linkage records are included.[1]
	11	Presence of area-coordinate lists	INTEGER*2	I1	56	56	Flag=0, area-coordinate lists not present.[1]
	12	Number of lines referenced in file	INTEGER*2	I6	57	62	Number of lines referenced in area-to-line and node-to-line records.
	13	Actual number of lines in file	INTEGER*2	I6	63	68	Only if some lines were excluded from the file would this number be different from data element 12.
	---	Filler	---	---	69	71	3 spaces
	14	Presence of line-coordinate lists	INTEGER*2	I1	72	72	Flag=1, line-coordinate lists are included.[1]

[1]The flags for lists present or absent are the current default values, and are the only current values used.

NODE AND AREA IDENTIFICATION RECORDS

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
	1	Record type	ALPHA	Al	1	1	"N" or "A"
	2	Element internal ID number	INTEGER*2	I5	2	6	This number is positive and sequential from 1-n within each category and element type.
	3	Coordinates of node point or representative point for area	REAL*4	2Fl2.2	7	30	The area point is usually, but not always within the polygon it represents.
	4	Number of elements in an area list (for nodes), or in a node list (for areas)	INTEGER*2	I6	31	36	Blank or zero (0). These lists are not currently included.
	5	Number of elements in line segment list	INTEGER*2	I6	37	42	Number of line segments that intersect at the node, or bound the area.
	6	Number of x,y or lat-long points in area-coordinate list	INTEGER*2	I6	43	48	Blank or zero (0). These lists are not currently included.
	7	Number of attribute codes listed	INTEGER*2	I6	49	54	Number of attribute codes listed.
	8	Number of text characters listed	INTEGER*2	I6	55	60	Zero (0). There are no text attributes for 7.5- and 15-minute DLG data.
	9	Number of islands within area	INTEGER*2	I6	61	66	Area records only, 6 spaces for node records.
---	---	Filler	---	---	67	72	6 spaces

NODE-TO-LINE LINKAGE RECORDS

FORTRAN FORMAT (12I6), for each node: The list consists of line segment internal ID numbers (which appear in bytes 2-6 of the line identification records). The line segments which begin at this node are included in the list as positive ID numbers. The line segments which terminate at this node are included as negative ID numbers. There is no logical order to the list.

AREA-TO-LINE LINKAGE RECORDS

FORTRAN format (12I6), for each area: The list consists of line segment internal ID numbers (which appear in bytes 2-6 of the line identification records) and, for those areas with islands (indicated by bytes 61-66 of the area's first record), zero (0) elements marking the beginning of islands. Line segments with this area to the right are included as positive ID numbers. Line segments 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 of an area is still a clockwise direction in reference to the area itself). A zero (0) element is inserted in the list before each island sublist.

LINE IDENTIFICATION RECORDS

Record Number	Data Element	Contents	Type (Fortran Notation)	Format	Starting Byte	Ending Byte	Comment
	1	Record type		A1	1	1	"L"
	2	Element internal ID number		I5	2	6	This number is positive and sequential from 1-n within each category and element type.
	3	Starting node		I6	7	12	Internal ID number. This refers to data element 2 of the node identification record.
	4	Ending node		I6	13	18	Internal ID number. This refers to data element 2 of the node identification record.
	5	Left area		I6	19	24	Internal ID number. This refers to data element 2 of the area identification record.
	6	Right area		I6	25	30	Internal ID number. This refers to data element 2 of the area identification record.
	---	Filler		---	31	42	12 spaces
	7	Number of x,y coordinates listed		I6	43	48	Number of coordinate pairs listed.
	8	Number of attribute codes listed		I6	49	54	Number of attribute codes (or two element attribute pairs) listed.
	9	Number of text characters listed		I6	55	60	Zero (0). There are no text data associated with 7.5- and 15-minute DLG data.

COORDINATE STRING RECORDS

FORTRAN format (3(2Fl2.2)): The coordinates are in appropriate units in the designated ground planimetric coordinate system (usually meters in UTM). The file-to-map projection parameters in Header record 10 are set to (l.0,0.0,0.0,0.0) for real map projection coordinates (the transformation formulas still apply).

CODE RECORDS

As major-minor code attribute 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 C.--Map Projection Parameters Universal Transverse Mercator (UTM)

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 Cartographic Transformation Package (GCTP).

When the ground coordinate system of a DLG is the Universal Transverse Mercator system, as in the case for all DLG's digitized from 1:24,000scale maps, only the first two of the 15 parameter fields are used:

1.	Longitude of any point in UTM zone.	Normally placed at the
2.	Latitude of any point in UTM zone.	center of the DLG cell.
3-15.	Not used (=0).	

A transformation to or from UTM using GCTP can be controlled by specifying the UTM zone or by supplying the geographic coordinate in parameters 1 and 2, from which the UTM zone is computed by GCTP. In a DLG file, the parameters are encoded as packed, degrees-minutes-seconds (DMS) as follows:

degrees * 1000000 + minutes * 1000 + seconds

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.

Codes for UTM Coordinate Zones

West Longitude (degrees)	Zone
180-174	1
174-168	2
168-162	3
162-156	4
156-150	5
150-144	6
144-138	7
138-132	8
132-126	9
126-120	10
120-114	11
114-108	12
108-102	13
102- 96	14
96- 90	15
90- 84	16
84- 78	17
78- 72	18
72- 66	19
66- 60	20

APPENDIX D.--DLG Attribute Codes

DATA CATEGORY	TYPE OF CODE	MAJOR MINOR APPLICATION	CODE	CODE	DESCRIPTION
Hypsography	Feature identification	Nodes	020	NONE	
		Areas	020	0100	Void area
		Lines	020	0200	Contour (index or intermediate)
				0201	Carrying contour
				0202	Supplementary contour
				0203	Continuation contour
				0204	Auxiliary contour
				0205	Bathymetric contour
				0206	Depth curve
				0207	Watershed divides
				0299	Processing line
		Points (degenerate lines)	020	0300	Spot elevation, less than third order
			020	0301	Spot elevation, less than third order, not at ground level
		Multiple element types	020	NONE	
	Descriptive	Multiple element types	020	0600-0609	Decimal fractions of feet or meters
				0610	Approximate
				0611	Depression
				0612	Glacier or snow field
				0613	Underwater
				0614	Best estimate of contour elevation value
			020	0000	Photorevised feature
	Parameter	Multiple element types	02N	----	Elevation in whole feet or meters, right-justified
			029	00--	Coincident feature

DATA CATEGORY	TYPE OF CODE	MAJOR APPLICATION	MINOR CODE	CODE	DESCRIPTION
Hydrography	Feature identification	Nodes	050	0001	Upper origin of stream
				0002	Upper origin of stream at water body
				0003	Sink, channel no longer evident
				0004	Stream entering water body
				0005	Stream exiting water body
		Areas	050	0100	Alkali flat
				0101	Reservoir
				0102	Covered reservoir
				0103	Glacier or permanent snowfield
				0104	Salt evaporator
				0105	Inundation area
				0106	Fish hatchery or farm
				0107	Industrial water impoundment
				0108	Area to be submerged
				0109	Sewage disposal pond or filtration beds
				0110	Tailings pond or settling basin
				0111	Marsh, wetland, swamp, bog
				0112	Mangrove area
				0113	Rice field
				0114	Cranberry bog
				0115	Flats (tidal, mud, sand, gravel)
				0116	Bays, estuaries, gulfs, oceans, seas
				0117	Shoal
				0118	Soda evaporator
				0119	Duck Pond
		Lines	050	0200	Shoreline
				0201	Manmade shoreline
				0202	Closure line
				0203	Indefinite shoreline
				0204	Apparent limit
				0205	Outline of a Carolina bay
				0206	Danger curve
				0207	Apparent shoreline
				0208	Sounding datum
				0209	Low water line
				0299	Processing line

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Hydrography (cont'd.)	Feature identification	Points (degenerate lines)	050	0300	Spring
				0301	Non-flowing well
				0302	Flowing well
				0303	Riser
				0304	Geyser
				0305	Windmill
				0306	Cistern
		Multiple element types	050	0400	Rapids
				0401	Falls
				0402	Gravel pit or quarry filled with water
				0403	Gaging station
				0404	Pumping station
				0405	Water intake
				0406	Dam or weir
				0407	Canal lock or sluice gate
				0408	Spillway
				0409	Gate (flood, tidal, head, check)
				0410	Rock
				0411	Crevasse
				0412	Stream
				0413	Braided stream
				0414	Ditch or canal
				0415	Aqueduct
				0416	Flume
				0417	Penstock
				0418	Siphon
				0419	Channel in water area
				0420	Wash or ephemeral drain
				0421	Lake or pond
				0422	Coral reef
				0423	Sand in open water
				0424	Spoil area
				0425	Fish ladders
				0426	Holiday area

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Hydrography (cont'd.)	Descriptive	Multiple element types	050	0601	Underground
				0602	Overpassing
				0603	Elevated
				0604	Tunnel
				0605	Right bank
				0606	Left bank
				0607	Under construction
				0608	Salt
				0609	Unsurveyed
				0610	Intermittent
				0611	Abandoned or discontinued
				0612	Submerged or sunken
				0613	Wooded
				0614	Dry
				0615	Mineral or hot (sulphur, alkali, etc.)
				0616	Navigable, transportation
				0617	Underpassing
				0618	Earthen construction
				0621-0629	Decimal fractions in feet or meters
			050	0000	Photorevised feature
	Parameter	Multiple element types	05N	----	Water surface elevation N=1 for feet, 2 for meters, 6 for feet below datum, and 7 for whale meters below datum. Elevation value in four spaces, right justified.
			053	0---	Angle of clockwise rotation (nearest whole degree)
			055	----	River mile, value in four spaces, right justified
			058	0000	Best estimate of classification or position
			059	00--	Coincident feature

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Vegetative Surface Cover	Feature identification	Nodes	070	NONE	
		Areas	070	0101	Woods or brushwood
				0102	Scrub
				0103	Orchard or plantation
				0104	Vineyard
				0105	Scattered trees
		Lines	070	0200	Closure line
			070	0299	Processing line
		Points	070	NONE	
		Multiple element types	070	NONE	
	Descriptive	Multiple element types	070	0000	Photorevised feature
	Parameter	Multiple element types	078	0000	Best estimate of position or classification
			079	00--	Coincident feature
Nonvegetative Features	Feature identification	Nodes	080	NONE	
		Areas	080	0100	Glacial moraine
				0101	Gravel beach
				0102	Sand beach
				0103	Shifting sand or dune area
				0104	Lava
		Lines	080	0299	Processing line
		Points (degenerate lines)	080	0300	Located surface feature

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Nonvegetative Features (cont'd.)	Feature identification (cont'd.)	Multiple element types	080	NONE	
	Descriptive	Multiple element types	080	0000	Photorevised feature
	Parameter	Multiple element types	088	0000	Best estimate of position or classification
			089	00--	Coincident feature
Boundaries	Feature identification	Nodes	090	0001	Monumented point on a boundary
		Areas	090	0100	Civil township, district, precinct, or barrio
				0101	Incorporated city, village, town, borough, or hamlet
				0103	National park, monument, lakeshore, seashore, parkway, battlefield, or recreation area
				0104	National forest or grassland
				0105	National wildlife refuge, game preserve, or fish hatchery
				0106	National scenic waterway, riverway, wild and scenic river, or wilderness area
				0107	Indian reservation
				0108	Military reservation
				0110	Federal prison
				0111	Miscellaneous Federal reservation
				0129	Miscellaneous State reservation
				0130	State park, recreation area, arboretum, or lake
				0131	State wildlife refuge, game preserve, or fish hatchery
				0132	State forest or grassland
				0133	State prison
				0134	County game preserve
				0135	Ahupuaa (Hawaii)
				0136	Homestead (Hawaii)

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Boundaries (cont'd.)	Feature identification (cont'd.)	Areas (cont'd.)	090	0150	Large park (city, county, or private)
				0151	Small park (city, county, or private)
				0197	Canada
				0198	Mexico
				0199	Open water
		Lines	090	0201	Indefinite (or approximate) boundary
				0202	Disputed boundary
				0203	Historical line
				0204	Boundary closure line
				0299	Processing line
		Points (degenerate lines)	090	0301	Reference monuments for boundary points
		Multiple element types	090	NONE	
	Descriptive	Multiple element types	090	0000	Photorevised feature
	Parameter	Multiple element types	091	00--	State or state equivalent FIPS code
			092	0---	County or county equivalent FIPS code
			095	----	Monument number
			099	00--	Coincident feature
Survey Control and Markers	Feature identification	Nodes	150	0300-0332	Node elements only when located on a closure line otherwise points (degenerate lines)
		Areas	150	0100	Void area
		Lines	150	0200	Closure line
		Points (degenerate lines)	150	0300	Horizontal control station, third order or better, permanent mark
				0301	Horizontal and vertical control station, third order or better
				0302	Horizontal control station, vertical angle bench mark (VABM)

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Survey Control and Markers (cont'd.)	Feature identification (cont'd.)	Points (degenerate lines)		0303	Horizontal control station, checked spot elevation
				0310	Vertical control station, third order or better, tablet
				0311	Vertical control station, recoverable mark, third order or better, no tablet
				0320	Boundary monument, third order or better, tablet
				0321	Boundary monument, third order or better, no tablet
				0330	Reference monument
				0331	U.S. Mineral or location monument
				0332	Other control point
		Multiple element types		NONE	
	Descriptive	Multiple element types	150	0000	Photorevised feature
			150	0601-0609	Fractions of elevation values
	Parameter	Multiple element types	151	----	State or state equivalent FIPS code
			152	----	County or county equivalent FIPS code
			153	----	Elevation in feet
			154	----	Elevation in meters
			156	----	Elevation minus 10,000, for elevations greater than 9,999 feet
			159	00--	Coincident feature
Transportation, Roads and Trails	Feature identification	Nodes	170	0001	Bridge abutment
				0002	Tunnel portal
				0004	Gate
				0005	Cul-de-sac
				0006	Dead end
				0007	Drawbridge

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads, and Trails (cont'd.)	Feature identification (cont'd.)	Areas	170	0100	Void area
		Lines	170	0201	Primary route, class 1, symbol undivided
				0202	Primary route, class 1, symbol divided by centerline
				0203	Primary route, class 1, divided, lanes separated
				0204	Primary route, class 1, one way, other than divided highway
				0205	Secondary route, class 2, symbol undivided
				0206	Secondary route, class 2, symbol divided by centerline
				0207	Secondary route, class 2, symbol divided, lanes separated
				0208	Secondary route, class 2, one way, other then divided highway
				0209	Road or street, class 3
				0210	Road or street, class 4
				0211	Trail, class 5, other than four-wheel-drive vehicle
				0212	Trail, class 5, four-wheel-drive vehicle
				0213	Footbridge
				0214	Road ferry crossing
				0215	Perimeter of parking area
				0216	Arbitrary extension of line (join or closure)
				0217	Road or street, class 3, symbol divided by centerline
				0218	Road or street, class 3, divided lanes separated
				0219	Road or street, class 4, one way
				0220	Closure line
				0221	Road or street, class 3, one way
				0222	Road in transition
				0299	Processing line
		Points (degenerate lines)		NONE	

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads, and Trails (cont'd.)	Feature identification (cont'd.)	Multiple element types	170	0401	Traffic circle
				0402	Cloverleaf or interchange
				0403	Toll gate, toll plaza or perimeter of toll plaza
				0404	Weigh station
				0405	Nonstandard section of road
	Descriptive	Multiple element types	170	0601	In tunnel
				0602	Overpassing, on bridge
				0603	Under construction, classification known
				0604	Under construction, classification unknown
				0605	Labeled "old railroad grade"
				0606	Submerged or in ford
				0607	Underpassing
				0608	Limited access
				0609	Toll road
				0610	Privately operated or controlled public access
				0611	Proposed
				0612	Double-decked
				0613	In service facility or rest area
				0614	Elevated
				0615	Bypass route
				0616	Alternate route
				0617	Business route
				0618	On drawbridge
				0619	Spur
				0620	Loop
				0621	Connector
				0622	Truck route
				0650	Road width 46-55 feet, 0.025 inches at 1:24,000
				0651	Road width 56-65 feet, 0.030 inches at 1:24,000
				0652	Road width 66-75 feet, 0.035 inches at 1:24,000

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads, and trails (cont'd.)	Descriptive (cont'd.)	Multiple element types (cont'd.)	170	0653	Road width 76-85 feet, 0.040 inches at 1:24,000
				0654	Road width 86-95 feet, 0.045 inches at 1:24,000
				0655	Road width 96-105 feet, 0.050 inches at 1:24,000
				0656	Road width 106-115 feet, 0.055 inches at 1:24,000
				0657	Road width 116-125 feet, 0.060 inches at 1:24,000
				0658	Road width 126-135 feet, 0.065 inches at 1:24,000
				0659	Road width 136-145 feet, 0.070 inches at 1:24,000
			170	0000	Photorevised feature
	Parameter	Multiple element types	171	----	Number of lanes
			172	----	Interstate route number
			173	----	U.S. route number
			174	----	State route number
			175	----	Reservation, park, or military route number
			176	----	County route
			177	XXYY	Alphabetic portion of any route number. Substitute numeric equivalent of alphabetic for XX and for YY as follows: 00 = blank, 01 = A, 02 = B, 03 = C, 04 = D, 05 = E, 06 = F, 07 = G, 08 = H, 09 = I, 10 = J, 11 = K, 12 = L, 13 = M, 14 = N, 15 = O, 16 = P, 17 = Q, 18 = R, 19 = S, 20 = T, 21 = U, 22 = V, 23 = W, 24 = X, 25 = Y, 26 = Z.

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads, and Trails (cont'd.)	Parameter (con't.)	Multiple element types (cont'd.)	178	0000	Best estimate of position or classification
			179	00--	Coincident feature
Transportation, Railroads	Feature identification	Nodes	180	0001	Bridge abutment
				0002	Tunnel portal
				0007	Drawbridge
		Areas	180	0100	Void area
		Lines	180	0201	Railroad
				0202	Railroad in street or road
				0204	Carline
				0205	Cog railroad, incline railway, logging tram
				0207	Railroad ferry crossing
				0208	Railroad siding
				0209	Perimeter or limit of yard
				0210	Arbitrary line extension (join, closure)
				0299	Processing line
		Points (degenerate lines)	180	NONE	
		Multiple element types	180	0400	Railroad station, perimeter of station
				0401	Turntable
				0402	Roundhouse
	Descriptive	Multiple element types	180	0601	In tunnel
				0602	Overpassing, on bridge
				0603	Abandoned
				0604	Dismantled
				0605	Underpassing
				0606	Narrow gauge
				0607	In snowshed or under structure
				0608	Under construction

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Railroads (cont'd.)	Descriptive (cont'd.)	Multiple element types (cont'd.)	180	0609	Elevated
				0610	Rapid transit
				0611	On drawbridge
				0612	Private
				0613	U.S. Government
				0614	Juxtaposition
			180	0000	Photorevised feature
	Parameter	Multiple element types	181	----	Number of tracks
			183	0---	Angle of clockwise rotation (nearest whole degree)
		types	188	0000	Best estimate of position or classification
			189	00--	Coincident feature
Transportation, Pipelines, Transmission Lines, Miscellaneous Transportation Features	Feature identification	Nodes	190	0001	End of transmission line at power station, substation, or hydroelectric plant
				0002	End of pipeline at oil or gas field
				0003	End of pipeline at refinery, depot, or tank farm
		Areas	190	NONE	
		Lines	190	0201	Pipeline
				0202	Power transmission line
				0203	Telephone or telegraph line
				0204	Aerial tramway, monorail, ski lift
				0205	Arbitrary extension closure line
		Points (degenerate lines)	190	0300	Seaplane anchorage
		Multiple element types	190	0400	Power station
				0401	Substation
				0402	Hydroelectric Plant

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Pipelines, Transmission Lines, Miscellaneous Transportation Features (cont'd.)	Feature Identification (cont'd.)	Multiple element types (cont'd.)	190	0403	Landing strip, airport, perimeter of airport
				0404	Heliport, perimeter of heliport
				0405	Launch complex, perimeter of launch complex
				0406	Pumping station (other than water)
				0407	Seaplane ramp or landing area
				0408	Measuring station, valve station
	Descriptive	Multiple element types	190	0600	Underground
				0601	Under construction
				0602	Abandoned
				0603	Above ground
				0604	Labeled "closed"
				0605	Unimproved, loose surface
				0606	Submerged
				0607	Nuclear
			190	0000	Photorevised feature
	Parameters	Multiple element types	193	0---	Angle of clockwise rotation (nearest whole degree)
			198	0000	Best estimate of position or classification
			199	00--	Coincident feature
Manmade Features	Feature identification	Nodes	200	NONE	
		Areas	200	0100	Church complex (convent, retreat, etc.)
				0101	School campus (university, college, etc.)
				0102	Hospital complex (sanatorium, nursing home, etc.)
				0103	Orphanage

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Manmade Features (cont'd.)	Feature identification (cont'd.)	Areas (cont'd.)	200	0104	Prison compound
				0105	Trailer park
				0120	Ski area
				0122	Athletic field
				0123	Golf course
				0124	Shopping center
				0125	Zoo
				0126	Drive-in theater
				0127	Race track, raceway
				0128	Playground
				0140	Marina
				0141	Cable area
				0150	Built-up, urban, or house-omission area
				0160	Industrial park
				0161	Materials storage area
				0162	Refinery or industrial plant
				0163	Tailings
				0164	Intricate surface area
				0165	Oil sump or sludge pit
				0180	Tank farm
				0181	Feedlot
				0182	Experimental farm
				0183	Proving grounds
				0184	Firing range
				0190	Void area
		Lines		0200	Conveyor
				0201	Boardwalk
				0202	Wall
				0203	Sea wall
				0206	Fence line
				0207	Flume (nonwater)
				0209	Sewer line
				0211	Coke ovens
				0212	Recreational slide
				0213	Screen (drive-in theatre)
				0214	Drag strip
				0215	Athletic track
				0250	Arbitrary closure line
				0299	Processing line

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Manmade Features (cont'd.)	Feature identification (cont'd.)	Points (degenerate lines)	200	0300	Grave site
				0301	Historical marker
				0302	Mine tunnel entrance or cave
				0303	Mine shaft
				0304	Prospect
				0305	Tower
				0306	Burner/stack
				0307	Drilled well
				0308	Cliff dwelling
				0309	Light
				0310	Brick kiln
				0311	Drill hole
				0312	Watermill
				0313	Anchorage
				0314	Guzzler
				0315	Located object, landmark object
		Multiple element types	200	0400	Class 1 building
				0401	Class 2 building
				0402	Church
				0403	School
				0404	Municipal building
				0405	Courthouse
				0406	Post office
				0407	City or town hall
				0408	Hospital
				0409	Prison
				0410	Town, village, settlement, locality, unincorporated village
				0411	Amphitheater
				0420	Cemetery
				0421	Sewage disposal plant
				0422	Waterworks
				0423	Oil reservoir
				0424	Drilled well field
				0425	Tank
				0426	Offshore oil or gas platform
				0427	Mine dump
				0428	Open pit mine
				0429	Quarry

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Manmade Features (cont'd.)	Feature identification (cont'd.)	Multiple element types (cont'd.)	200	0430	Strip mine
				0431	Land fill
				0432	Pit, unconsolidated material
				0433	Radio or television facility
				0434	Storage bin
				0435	Levee
				0436	Spoil bank
				0445	Fairgrounds
				0446	Rodeo grounds
				0447	Corral
				0448	Boat ramp
				0449	Campground, campsite
				0450	Fort
				0451	Swimming pool
				0452	Archaeological site, ruin
				0453	Recreation area, public use area
				0454	Picnic area
				0455	Port of entry
				0456	Stadium
				0465	Pile, dolphin, stump, or snag
				0466	Breakwater, jetty, pier, dock, causeway, or wharf
				0467	Exposed wreck or wreckage
				0468	Sunken wreck
				0469	Drydock
	Descriptive	Multiple element types	200	0601	Underground
				0602	Under construction
				0603	Abandoned
				0604	Water
				0605	Oil
				0606	Gas
				0607	Chemical
				0608	Covered
				0609	Gravel
				0610	Sand
				0611	Clay
				0612	Borrow

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Manmade Features (cont'd.)	Descriptive (cont'd.)	Multiple element types (cont'd.)	200	0613	Radio
				0614	Lookout
				0615	Unincorporated
				0616	No population
				0617	Submerged
				0618	Ruin
			200	0000	Photorevised feature
	Parameter	Multiple element types	203	0---	Angle of clockwise rotation (nearest whole degree)
			202	----	Width in mils of feature to scale
			208	0000	Best estimate of position or classification
			209	00--	Coincident feature or symbol
U.S. Public Land Survey System (PLSS)	Feature identification	Nodes	300	0001	U.S. Public Land Survey System section corner
				0002	Point on section line (no corner)
				0003	Closing corner
				0004	Meander corner
				0005	Auxiliary meander corner
				0006	Special meander corner
				0007	Witness corner
				0008	Witness point
				0009	Angle point
				0010	Location monument (includes amended monument and mineral monument)
				0011	Reference mark
				0012	Quarter-section corner
				0013	Tract corner
				0014	Land grant corner
				0015	Arbitrary section corner
		Nodes (identification procedures	300	0040	Corner identified in field
				0041	Corner with horizontal coordinates
				0042	Corner with elevation value

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
U.S. Public Land Survey System (PLSS) (cont'd)	Parameters	Areas			Select one parameter code from each of the following A, B, C, and D lists and/or consult list E.
					A. Origin of Survey
			306	00--	Insert two-digit code from Appendix K.
					B. Township number(s)
			30-	----	Insert 2 for north of the baseline or 3 for south of the baseline in first space. In the second space, insert a 0 for full township, 2 for l/4 township, 4 for l/2 township, or 6 for 3/4 township. Insert township number in the last three spaces, right justified.
					C. Range number(s)
			30-	----	Insert 4 for east of the principal meridian or 5 for west of the principal meridian in the first space. In the second space, insert a 0 for a full range, 2 for l/4 range, 4 for l/2 range, 6 for 3/4 range, 8 for duplicate to the north or east of the original township, or 9 for triplicate to the north or east of the original township. Insert range number in last three spaces, right justified.

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
U.S. Public Land Survey System (PLSS) (cont'd)	Parameters	Areas (cont'd.)			D. Section number
			301	----	In the first space, insert 0 for numeric section identifier, 1 for numeric portion of alphanumeric identifier, or 2 for alphabetic part of alphanumeric identifier. In the last three spaces, insert section number or numeric representation of alphabetic character (01-26), right justified.
					E. Land grant identifier
			307	----	In the first space, insert the appropriate number:
				0	for numeric grant identifier
				1	for numeric portion of alphanumeric identifier
				2	for alphabetic portion of alphanumeric identifier
				3	for alphabetic identifier
				4	for identifier of named grant in Arizona
				5	for identifier of named grant in California
				6	for identifier of named grant in Colorado
				7	for identifier of named grant in New Mexico
					In the last three spaces after 0-3 above, insert the grant number or numeric representation of the alphabetic character (01-26), right-justified. In the last three spaces after 4-7 above, insert the three-digit code of the named grant as designated in Appendix L.

APPENDIX D.--DLG Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
U.S. Public Land Survey System (PLSS) (cont'd)	Parameters	Areas (cont'd)			F. Excluded areas
			300	0100	Indian lands
				0101	Homestead entries
				0102	Donation land claims
				0103	Land grants; civil colonies
				0104	Private extension of public land survey
				0105	Area of public and private survey

				overlap
			0106	Overlapping land grants
			0107	Military reservation
			0198	Water
			0199	Unsurveyed area
Feature identification	Lines	300	0201	Approximate position (within 200 feet)
			0202	Protracted position
			0203	Arbitrary closure line
			0204	Base line
			0205	Claim line, grant line
	Points (degenerate lines)	300	0300	Location monument
			0301	Isolated found section corner
			0302	Witness corner (off surveyed line)
Parameter	Multiple element types	308	0000	Best estimate of classification and/or position
		309	00--	Coincident feature or symbol

APPENDIX E.--Coordinate Conversion

This appendix illustrates the procedure for converting the internal file coordinates of the standard DLG format to the ground planimetric UTM reference coordinates. The formulas for this conversion, representing a simple offset, rotation, and scale, are as follows:

$$X = Alx + A2y + A3, \text{ and}$$
$$Y = Aly - A2x + A4,$$

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

The parameters for these formulas (Al, 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 UTM zone l0 coordinate values. The parameters are as follows:

A1 = 0.60959440759
A2 = -0.0028817856942
A3 = 538248.79341
A4 = 4240374.4556

The internal file coordinates to be converted are as follows:

	x	y
1st pair	-8971	-11376
2nd pair	-8955	11375
3rd pair	8955	11376
4th pair	8971	-11376

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

$$X = (0.60959440759)\ (-8971) + (-0.0028817856942)\ (-11376) + (538248.79341)$$
$$= 5328l2.91$$

$$Y = (0.60959440759)\ (-11376) - (-0.0028817856942)\ (-8971) + (4240374.4556)$$
$$= 4233413.86$$

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

	X	Y
1st pair	532,812.91	4,233,413.86
2nd pair	532,757.10	4,247,282.79
3rd pair	543,674.93	4,247,335.01
4th pair	543,750.25	4,233,465.56

APPENDIX F.--Sample DLG Data File (Standard Distribution Format)
(Each 144-character record is shown as two consecutive 72-character lines.)

```
GLEN ELLEN                                        1968    24000

     3     1    10  -0.122033045000000D 09   0.380180450000000D 08   0.0
                    0.0                       0.0
   0.0                    0.0                    0.0
   0.0                    0.0                    0.0
   0.0                    0.0                    0.0
   0.0                      2   0.610000000000000D 00     0     4
  -0.122625000000000D 03   0.382500000000000D 02  -0.122625000000000D 03
   0.383750000000000D 02  -0.122500000000000D 03   0.383750000000000D 02
  -0.122500000000000D 03   0.382500000000000D 02

   0.609594407590000D 00  -0.288178569420000D-02   0.538248793410000D 06
   0.424037445560000D 07     4
SW -8971-11376NW -8955 11375NE  8955 11376SE  8971-11376

     1

BOUNDARIES (24&25)     795    16   795     7   530    20

N       1 -8971-11376     0     0

N       2 -8955 11375     0     0

N       3  8955 11376     0     0

N       4  8971-11376     0     0

N       5 -8966  3203     0     0

N       6  2101 11374     0     0

N       7  5832 11376     0     0

N       8  7513 11376     0     0

N       9  8956  7494     0     0

N      10  8961  2884     0     0

N      11  3469 10371     0     0

N      12  5530  9112     0     0

N      13 -3115-10127     0     0

N      14  7520 11175     1     0

    90     1
```

```
N     15 -1450  4596     1     0
    90     1
N     16   895  4984     1     0
    90     1
A      1    22   253     1     0
     0     0
A      2 -4738  7527     2     0
    91     6    92    97

A      3  8325 10166     2     0
    91     6    92    97
A      4  4728 10834     3     0
    91     6    92    97    90   113
A      5  6463  8917     3     0
    91     6    92    97    90   113
A      6   161 -1378     3     0
    91     6    92    97    90   113
A      7 -3058-10280     4     0
    91     6    92    97    90   113    90   130
L      1     1     5     1     6     2     0     0
 -8971-11376 -8966  3203
L      2     5     2     1     2     2     0     0
 -8966  3203 -8955 11375
L      3     2     6     1     2     2     0     0
 -8955 11375  2101 11374
```

```
L      4     6     7     1     2     4     0     0
  2101 11374  5832 11376
L      5     7     8     1     2     5     2     0
  5832 11376  7513 11376
L      6     8     3     1     3     2     0     0
  7513 11376  8955 11376
L      7     3     9     1     3     2     0     0
  8955 11376  8956  7494
L      8     9    10     1     5     2     0     0
  8956  7494  8961  2884
L      9    10     4     1     6     2     0     0
  8961  2884  8971-11376
L     10     4     1     1     6     2     0     0
  8971-11376 -8971-11376
L     11    13    13     7     6     6     0     0
 -3115-10127 -3189-10286 -2985-10432 -2890-10296 -2943-10236 -3115-10127
L     12     5    15     2     6     4     2     0
 -8966  3203 -5538   798 -1933  5820 -1450  4596
    99    30    90   203
L     13    15    16     2     6     2     2     0
 -1450  4596   895  4984
    99    30    90   203
L     14    14     8     5     3     2     2     0
  7520 11175  7513 11376
    99    30    90   203
```

APPENDIX F.--Sample DLG Data File (Standard Distribution Format)--continued
(Each 144-character record is shown as two consecutive 72-character lines.)

```
L      15     14      9      3      5      5      2      0

   7520 11175  7532 10014  7228  9681  7318  8896  8956  7494

     99     30     90   203

L      16     16     11      2      6   116      2      0

         895  4984    403   5222   275   5186    261  5244    247   5272   188   5344
         166  5364    146   5388   117   5441    107  5501    110   5561   104   5591
         106  5621    122   5681   144   5769    169  5829    199   5882   236   5931
         257  5952    313   5979   336   5999    350  6028    362   6087   362   6147
         352  6208    350   6238   355   6268    372  6295    415   6339   427   6367
         487  6471    496   6500   482   6682    491  6742    496   6803   510   6891
         512  6921    507   6955   507   6984    516  7015    530   7040   553   7062
         629  7111    656   7124   686   7132    741  7160    800   7179   858   7205
         921  7210    982   7223  1011   7236   1026  7261   1068   7309  1119   7386
        1181  7491   1228   7529  1254   7543   1285  7548   1316   7558  1339   7577

...etc....
```

APPENDIX G.--Sample DLG Data File (Optional Distribution Format)
(Each 80-character record is shown as a single line.)

```
USGS-NMD  DLG DATA - CHARACTER FORMAT - 09-29-82 VERSION
GLEN ELLEN                                      1968    24000

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  -0.122033045000000D+09   0.380180450000000D+08   0.0
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   0.0                     0.0                     0.0
   0.0                     0.0                     0.0
   0.0                     0.0                     0.0
 0.10000000000D+01 0.0               0.0               0.0
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NW       38.375000 -122.625000         532757.10  4247282.79
NE       38.375000 -122.500000         543674.93  4247335.01
SE       38.250000 -122.500000         543750.25  4233465.56
BOUNDARIES (24&25)     0    16    16 010     7     7 010    20    20   1
N    1   532812.91  4233413.86           2           0     0
     1   -10
N    2   532757.10  4247282.79           2           0     0
    -2     3
N    3   543674.93  4247335.01           2           0     0
    -6     7
N    4   543750.25  4233465.56           2           0     0
    -9    10
N    5   532773.94  4242301.15           3           0     0
    -1     2    12
N    6   539496.77  4247314.04           3           0     0
    -3     4    17
N    7   541771.16  4247326.01           3           0     0
    -4     5   -19
N    8   542795.89  4247330.85           3           0     0
    -5     6   -14
N    9   543686.72  4244968.57           3           0     0
    -7     8   -15
N   10   543703.06  4242158.35           3           0     0
    -8     9   -20
N   11   540333.59  4246706.56           3           0     0
   -16   -17    18
N   12   541593.59  4245945.02           3           0     0
   -18    19    20
N   13   536379.09  4234192.12           2           0     0
    11   -11
N   14   542800.74  4247208.34           2           1     0
    14    15
    90     1
N   15   537351.64  4243171.97           2           1     0
   -12    13
    90     1
N   16   538780.02  4243415.25           2           1     0
   -13    16
    90     1
```

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A    1   538261.48  4240528.75          10     0     1     0     0
   -10    -9    -8    -7    -6    -5    -4    -3    -2    -1
     0     0
A    2   535338.84  4244949.22           6     0     2     0     0
   -12     2     3    17   -16   -13
    91     6    92    97
A    3   543294.37  4246595.58           4     0     2     0     0
   -15    14     6     7
    91     6    92    97
A    4   541099.73  4246992.43           4     0     3     0     0
   -17     4   -19   -18
    91     6    92    97    90   113
A    5   542162.91  4245828.83           6     0     3     0     0
    19     5   -14    15     8   -20
    91     6    92    97    90   113
A    6   538350.91  4239534.90          10     0     3     0     1
    10     1    12    13    16    18    20     9     0    11
    91     6    92    97    90   113
A    7   536414.28  4234099.01           1     0     4     0     0
   -11
    91     6    92    97    90   113    90   130
L    1     1     5     1     6                 2     0     0
   532812.91  4233413.86   532773.94  4242301.15
L    2     5     2     1     2                 2     0     0
   532773.94  4242301.15   532757.10  4247282.79
L    3     2     6     1     2                 2     0     0
   532757.10  4247282.79   539496.77  4247314.04
L    4     6     7     1     4                 2     0     0
   539496.77  4247314.04   541771.16  4247326.01
L    5     7     8     1     5                 2     0     0
   541771.16  4247326.01   542795.89  4247330.85
L    6     8     3     1     3                 2     0     0
   542795.89  4247330.85   543674.93  4247335.01
L    7     3     9     1     3                 2     0     0
   543674.93  4247335.01   543686.72  4244968.57
L    8     9    10     1     5                 2     0     0
   543686.72  4244968.57   543703.06  4242158.35
L    9    10     4     1     6                 2     0     0
   543703.06  4242158.35   543750.25  4233465.56
L   10     4     1     1     6                 2     0     0
   543750.25  4233465.56   532812.91  4233413.86
L   11    13    13     7     6                 6     0     0
   536379.09  4234192.12   536334.44  4234094.98   536459.22  4234006.56
   536516.74  4234089.74   536484.26  4234126.17   536379.09  4234192.12
L   12     5    15     2     6                 4     2     0
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   537351.64  4243171.97
    99    30    90   203
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L   13    15    16     2     6                  2     2     0
   537351.64  4243171.97   538780.02  4243415.25
    99    30    90   203
L   14    14     8     5     3                  2     2     0
   542800.74  4247208.34   542795.89  4247330.85
    99    30    90   203
L   15    14     9     3     5                  5     2     0
   542800.74  4247208.34   542811.40  4246500.64   542627.04  4246296.77
   542684.17  4245818.50   543686.72  4244968.57
    99    30    90   203

L   16    16    11     2     6                116     2     0
   538780.02  4243415.25   538479.41  4243558.92   538401.49  4243536.60
   538392.79  4243571.92   538384.17  4243588.95   538348.00  4243632.67
   538334.53  4243644.80   538322.27  4243659.37   538304.44  4243691.60
   538298.17  4243728.14   538299.82  4243764.73   538296.08  4243783.00
   538297.21  4243801.29   538306.79  4243837.91   538319.95  4243891.62
   538335.02  4243928.27   538353.15  4243960.66   538375.57  4243990.64
   538388.31  4244003.50   538422.37  4244020.12   538436.33  4244032.38
   538444.78  4244050.10   538451.93  4244086.10   538451.75  4244122.68
   538445.48  4244159.83   538444.17  4244178.11   538447.14  4244196.42
   538457.42  4244212.92   538483.51  4244239.87   538490.74  4244256.97
   538527.02  4244320.54   538532.42  4244338.25   538523.36  4244449.15
   538528.68  4244485.76   538531.55  4244522.96   538539.83  4244576.64
   538540.96  4244594.93   538537.81  4244615.65   538537.73  4244633.32
   538543.13  4244652.25   538551.59  4244667.53   538565.55  4244681.00
   538611.74  4244711.09   538628.16  4244719.10   538646.42  4244724.06
   538679.87  4244741.29   538715.78  4244753.04   538751.06  4244769.06
   538789.45  4244772.29   538826.60  4244780.39   538844.24  4244788.39
   538853.31  4244803.68   538878.78  4244833.06   538909.64  4244880.14
   538947.14  4244944.33   538975.68  4244967.63   538991.49  4244976.24
   539010.37  4244979.38   539029.24  4244985.56   539043.21  4244997.21
.... etc.....
```

APPENDIX H.--Pre-1983 Hydrographic Attribute Codes

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Rivers and Streams	Feature identification	Nodes	030	0001	River/stream, upper origin
				0002	River/stream, upper origin of stream at water body
				0003	River/stream, stream junction
				0004	River/stream, stream intersection with bank/shore or estuary
				0005	River/stream, sink (stream goes underground or channel is not evident)
				0006	River/stream, change in stream classification/status
				0007	River/stream, point on stream or centerline
				0008	River/stream, stream-canal intersection
				0009	River/stream, canal-canal intersection
				0010	River/stream, end of canal
				0011	River/stream, canal-shoreline intersection
				0012	River/stream, canal over canal
				0013	River/stream, canal over stream
				0020	River/stream, stream road intersection
				0021	River/stream, stream railroad intersection
				0022	River/stream, stream trail intersection
				0023	River/stream, stream transmission line intersection
				0024	River/stream, stream pipeline intersection
				0025	River/stream, aqueduct over stream
				0026	River/stream, aqueduct over aqueduct
				0027	River/stream, stream tunnel intersection
				0028	River/stream, stream dam intersection
				0029	River/stream, spillway
				0030	River/stream, flood gate or gate

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Rivers and Streams (cont'd.)	Feature identification	Nodes (cont'd.)	030	0031	River/stream, tide gate
				0032	River/stream, falls
				0033	River/stream, end of rapids
				0034	River/stream, river mile mark
				0035	River/stream, tunnel portal
				0036	River/stream, end of siphon
				0037	River/stream, end of flume
				0038	River/stream, end of penstock
				0050	River/stream, point on bank/shore+
				0051	River/stream, shore/bank dam intersection
				0052	River/stream, gaging station
				0053	River/stream, pumping station
				0054	River/stream, small dam or weir
				0055	River/stream, water intake
		Areas	000	0000	Area outside graph
		Lines	030	0226	River/stream, penstock
				0227	River/stream, irrigation ditch
				0228	River/stream, irrigation canal
				0229	River/stream, abandoned canal
				0230	River/stream, canal on levee
				0250	River/stream, right bank, intermittent stream
				0251	River/stream, left bank, intermittent stream
				0252	River/stream, right bank, perennial stream
				0253	River/stream, left bank, perennial stream
				0254	River/stream, right bank, braided stream
				0255	River/stream, left bank, braided stream
				0256	River/stream, right bank, unsurveyed stream

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Rivers and Streams (cont'd.)	Feature identification	Lines (cont'd.)	030	0257	River/stream, left bank, unsurveyed stream
				0258	River/stream, right bank, sand wash
				0259	River/stream, left bank, sand wash
				0260	River/stream, right bank, submerged stream
				026l	River/stream, left bank, submerged stream
				0270	River/stream, shore of island
				027l	River/stream, shore of backwater
				0272	River/stream, bank along levee
				0273	River/stream, apparent shoreline (outer limits of vegetation)
				0274	River/stream, shoreline along pier, wharf, or jetty
				0280	River/stream, rapids
				0293	River/stream, canal centerline extended into lake or pond
				0294	River/stream, stream centerline - indefinite location
				0295	River/stream, stream centerline extended into marsh or swamp
				0296	River/stream, stream centerline extended into river
				0297	River/stream, stream centerline extended into lake or pond
				0298	River/stream, stream centerline extended underground
				0299	River/stream, closing line (water-water)
		Points (Degenerate Lines)		0350	Single-point feature, river/stream, small island or exposed rock
				0352	Single-point feature, river/stream, spillway
				0353	Single-point feature, river/stream, flood gate or gate
				0354	Single-point feature, river/stream, tide gate

APPENDIX H.--Pre-1983 Hydrographic Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Rivers and Streams (cont'd.)	Feature identification	Points (Degenerate lines) (cont'd.)	030	0355	Single-point feature, river/stream, river mile mark
				0356	Single-point feature, river/stream, gaging station
				0357	Single-point feature, river/stream, pumping station
				0358	Single-point feature, river/stream, water intake
		Multiple element types	030	0000	Feature added by photorevision methods
	Parameter	Multiple element types	03N	----	Elevation of water surface (right justified) N=1 for feet, N=2 for meters, N=6 for feet below datum
			03N	----	Water depth (right justified) N=3 for feet, N=4 for meters
			035	----	River mile (right justified)
			038	0000	Best estimate of classification and/or position
			039	00--	Coincident feature or symbol (enter first two digits of major code for category of coincident feature in blanks, right justified).
Water Bodies	Feature identification	Nodes	040	0001	Water body, point on shoreline
				0002	Water body, shoreline road intersection
				0003	Water body, shoreline railroad intersection
				0004	Water body, shoreline transmission line intersection
				0005	Water body, shoreline pipeline intersection

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Water Bodies (cont'd.)	Feature identification	Areas	000	0000	Area outside graph
			040	0100	Water body, perennial lake or pond
				0101	Water body, perennial salt lake or pond
				0102	Water body, intermittent lake or pond
				0103	Water body, intermittent salt lake or pond
				0104	Water body, dry lake or pond
				0105	Water body, alkali flat
				0106	Water body, reservoir
				0107	Water body, intermittent reservoir
				0110	Water body, glacier or snow field
				0111	Water body, crevasse area
				0120	Water body, salt evaporator
				0122	Water body, fish hatchery
				0123	Water body, area subject to controlled flooding for agriculture
				0124	Water body, industrial water impoundment
				0125	Water body, area to be submerged
				0126	Water body, fish farm or crawfish farm
				0127	Water body, sewage disposal pond
				0128	Water body, large water intake
				0129	Water body, tailings pond
				0130	Water body, wooded lake
				0150	Water body, island
				0199	Water body, area not in water body
				0200	Water body, shoreline
				0201	Water body, indefinite shoreline
				0202	Water body, shoreline along wall
				0203	Water body, shoreline along wharf, pier, or jetty
				0204	Water body, shoreline along dam
				0205	Water body, shoreline along causeway
				0210	Water body, edge of glacier or snowfield
				0211	Water body, edge of crevasse area
				0299	Water body, closure line (water-water)

APPENDIX H.--Pre-1983 Hydrographic Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Water Bodies (cont'd.)	Feature identification	Lines (cont'd.)	040	0300	Single-point feature, water body, spring
				0301	Single-point feature, water body, nonflowing well
				0302	Single-point feature, water body, flowing well
				0350	Single-point feature, water body, small island or exposed rock
				0351	Single-point feature, water body, small perennial pond
				0352	Single-point feature, water body, small intermittent pond
				0353	Single-point feature, water body, riser or glory hole
				0354	Single-point feature, water body, brine or salt well
				0355	Single-point feature, water body, sulphur well
				0356	Single-point feature, water body, geyser
		Multiple element types	040	0000	Feature added by photorevision method
	Parameter	Multiple element types	04N	----	Water surface elevation (right justified) N=1 for feet, N=2 for meters, N=6 for feet below datum
			04N	----	Water depth (right justified) N=3 for feet, N=4 for meters
			048	0000	Best estimate of classification and/or position
			049	00--	Coincident feature or symbol (enter first two digits of major code for category of coincident feature in blanks, right justified)

APPENDIX I.--Pre-1985 Transportation Attribute Codes

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads	Feature identification	Nodes	100	0001	Road intersection
				0002	Road intersection (grade separation, no interchange)
				0003	Road intersection (grade separation with interchange)
				0004	Road intersection (grade separation, partial interchange)
				0005	Road-railroad intersection
				0006	Road-railroad intersection (grade separation)
				0007	Road-stream intersection (fixed bridge/culvert)
				0008	Road-stream intersection (movable bridge)
				0009	Road-trail intersection
				0010	Trail-trail intersection
				0011	Bridge abutment
				0012	Tunnel portal
				0013	Road-transmission line intersection
				0014	Road-pipeline intersection
				0015	Ferry landing
				0016	Change in road classification/status
				0017	Structure over road
				0018	Ford
				0019	Low water bridge
				0020	Toll gate
				0021	Traffic circle
				0022	Cul-de-sac
				0023	Gate
				0024	Road-canal intersection (where canal is a transportation feature)
				0030	Foot or bicycle bridge over road
				0050	Point on road
				0051	End of road/trail
				0060	Port of entry
				0061	U.S. Customs

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads (cont'd)	Feature identification	Areas	000	0000	Area outside graph
		Lines	100	N201	Primary route, hard surface (undivided)
				N202	Primary route, hard surface (divided, 25' or less)
				N203	Primary route, hard surface (divided, 25' or more)
				N204	Primary route, hard surface (one-way traffic)
				N205	Secondary route, hard surface (one-way traffic)
				N206	Secondary route, hard surface
				N207	Improved light duty
				N208	Unimproved dirt
				N209	Trail
				N210	4-wheel-drive vehicle trail
				N211	Urban streets
				N212	Foot trail
				N213	Bridle trail
				N214	Pack trail
				N215	Historical trail
				N216	Bicycle trail
				N217	Primary route, hard surface (interchange road)
				N218	Secondary route, hard surface (interchange road)
				N219	Improved light-duty interchange road
				N220	Secondary route, divided
				N222	Road or street, class 3, divided by centerline
				N223	Road or street, class 3, divided, lanes separated
				N240	Ferry crossing
				N241	Road through parking area
				N250	Perimeter of parking area
				N293	Road or trail subject to inundation
				N294	Road or trail on dam

APPENDIX I.--Pre-1985 Transportation Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Roads (cont'd.)	Feature identification (cont'd.)	Lines (cont'd.)	100	N295	Road or trail on bridge
				N296	Road or trail on levee
				N297	Road or trail tunnel under ground
				N298	Road or trail tunnel under water
				N299	Road or trail under construction
					N=0 for unrestricted access, N=1 for limited access, N=2 for toll road, N=3 for privately operated or controlled public access, N=4 for proposed road, N=5 for abandoned road
		Points (degenerate lines)	100	030l	Roadside or wayside park
				0302	Rest area
				0303	Overlook
				0304	Weigh station
				0305	Service facility
		Multiple element types	100	0000	Feature added by photorevision methods
	Parameter	Multiple element types	101	00--	Number of lanes, right justified
			102	0---	Interstate route number, right justified
			103	0---	U.S. route number, right justified
			104	----	State route number, right justified
			105	----	Reservation, park, or military route number, right justified
			106	----	County route number, right justified
			108	0000	Best estimate of classification and/or position
			109	0---	Coincident feature or symbol (enter first two digits of major code for category of coincident feature in blanks, right justified)

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Railroads	Feature identification	Nodes	110	0001	Railroad intersection
				0002	Railroad intersection (grade separation)
				0003	Siding junction
				0004	Station
				0005	Railroad-road intersection
				0006	Railroad-road intersection (grade separation)
				0007	Railroad-stream intersection (fixed bridge/culvert)
				0008	Railroad-stream intersection (movable bridge)
				0009	Railroad-trail intersection
				0010	Bridge abutment
				0011	Tunnel portal
				0012	Railroad-transmission line intersection
				0013	Railroad-pipeline intersection
				0014	Ferry landing
				0015	Change in railroad classification/ status
				0016	Structure over railroad
				0017	Turntable
				0018	Turntable and roundhouse
				0019	Point within yard
				0049	Crossover
				0050	Point on railroad
				0051	End of railroad
		Areas	000	0000	Area outside graph
		Lines	110	N201	Single track standard gage
				N202	Double track, standard gage
				N203	3-track, standard gage
				N204	4-track, standard gage
				N205	5 or more tracks, standard gage
				N206	Siding, standard gage
				N211	Single track, narrow gage

APPENDIX I.--Pre-1985 Transportation Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Transportation, Railroads (cont'd.)	Feature identification (cont'd.)	Lines (cont'd.)	110	N2l2	Double track, narrow gage
				N2l3	3-track, narrow gage
				N2l4	4-track, narrow gage
				N2l5	5 or more tracks, narrow gage
				N2l6	Siding, narrow gage
				N220	Carline or surface rapid transit
				N22l	Elevated rapid transit
				N230	Industrial or mine railroad
				N240	Ferry crossing
				N24l	Railroad through yard
				N250	Perimeter of yard
				N294	Railroad on pier
				N295	Railroad on bridge
				N296	Railroad on levee
				N297	Railroad tunnel under ground
				N298	Railroad tunnel underwater
				N299	Railroad in snowshed
					N=0 for normal use, N=1 for under construction, N=2 for abandoned, N=3 for dismantled
		Points (degenerate lines)	NONE		
		Multiple element types	l10	0000	Feature added by photorevision methods
	Parameter	Multiple element types	l18	0000	Best estimate of classification and/or position
			l19	00--	Coincident feature or symbol (enter first two digits of major code for category of coincident feature, right justified).
Pipelines, Transmission Lines	Feature identification	Nodes	l30	000l	Transmission line intersection
				0002	Pipeline intersection
				0003	Transmission line - pipeline intersection

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Pipelines, Transmission Lines	Feature identification (cont'd.)	Nodes (cont'd.)	130	0004	Transmission line - road intersection
				0005	Pipeline - road intersection
				0006	Transmission line - railroad intersection
				0007	Pipeline - stream intersection
				0008	Transmission line - stream intersection
				0009	Pipeline - stream intersection
				0010	Transmission line - telephone/ telegraph line intersection
				0011	Pipeline - bank/shore intersection
				0012	Transmission line - telephone/ telegraph line intersection
				0013	Pipeline - telephone/telegraph line intersection
				0014	Pumping station
				0015	Substation
				0016	Steel tower
				0020	Change in classification/status
				0030	Angle point on transmission line
				0031	Angle point on pipeline
				0032	Point on transmission line
				0033	Point on pipeline
				0034	End of transmission line
				0035	End of pipeline
				0036	End of transmission line at power station or substation
				0037	End of pipeline at refinery/oil-gas field
		Areas	000	0000	Area outside graph
		Lines	130	0201	Single- or double-pole powerline
				0202	Steel tower powerline
				0203	Single- or double-pole powerline extended over water
				0204	Steel tower powerline extended over water

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Pipelines, Transmission Lines (cont'd.)	Feature identification (cont'd.)	Lines (cont'd.)	130	0205	Single- or double-pole powerline extended into urban area
				0206	Steel tower powerline extended into urban area
				0211	Pipeline (under ground)
				0212	Pipeline (above ground)
				0213	Pipeline (under water)
				0214	Pipeline (above water)
				0215	Pipeline, through siphon
				0216	Pipeline, through flume
				0217	Pipeline extended into urban area
				0221	Telephone or telegraph line
		Points	NONE		
		Multiple element types	130	0000	Feature added by photorevision methods
	Parameter	Multiple element types	138	0000	Best estimate of classification and/or position
			139	00--	Coincident feature or symbol (enter first two digits of major code for category of coincident feature, right justified).
			139	01--	Assumed position next to parallel feature or symbol (enter first two digits of major code for category of parallel feature, right justified).

APPENDIX J.--Pre-1985 Other Significant Cultural Feature Attribute Codes

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Other Significant Cultural Features	Feature identification	Node	140	0001	End point of linear manmade feature
				0002	Point on linear manmade feature
		Area	140	0100	Large class 1 building
				0101	Large class 2 building
				0102	Large church
				0103	Church complex (convent, retreat, etc.)
				0104	Large school
				0105	School campus (univ., college, etc.)
				0106	Large municipal building
				0107	Large court house
				0108	Large post office
				0109	Large city or town hall
				0110	Large hospital
				0111	Hospital complex (sanatorium, VA hospital, etc.)
				0112	Orphanage
				0126	Large cemetery
				0127	Large power plant
				0128	Large power substation
				0129	Large sewage disposal plant
				0130	Large waterworks
				0131	Trailer park
				0132	Stadium
				0133	Athletic fields
				0134	Shopping center
				0135	Zoo
				0136	Golf course
				0138	Fairground
				0139	Rodeo grounds
				0140	Corral
				0141	Race track
				0142	Drag strip
				0143	Ski area
				0144	Drive-in theater
				0145	Marina

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Other Significant Cultural Features (cont'd.)	Feature identification	Node (cont'd)	140	0146	Large boat ramp
				0147	Large dam
				0148	Large campground, recreation area, public use area, or access area (other than National or State)
				0149	Covered water reservoir
				0150	Large fort
				0151	Airport or landing strip
				0152	Abandoned airport
				0153	Prison compound
				0164	Urban tint
				0165	Unincorporated village (populated)
				0166	Locality (no population)
				0167	Industrial park
				0168	Large spoil bank
				0169	Industrial materials storage area
				0170	Oil or gas field
				0171	Large water tank
				0172	Large tank
				0173	Refinery or gas plant
				0174	Chemical plant
				0175	Nuclear plant
				0176	Gas storage area (underground)
				0177	Kilns
				0178	Charcoal ovens
				0179	Mine dump (tailings)
				0180	Open surface mine or quarry
				0182	Land fills
				0183	Disturbed areas
				0184	Sludge or slurry disposal
				0185	Oil sump or sludge pit
				0186	Large ruins
				0187	Tank farm
				0188	Feedlot
				0189	Experimental farm
				0190	Proving grounds
				0191	Firing range
				0192	Missile launch complex

APPENDIX J.--Pre-1985 Other Significant Cultural Feature Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Other Significant Cultural Features (cont'd.)	Feature identification	Node (cont'd)	140	0193	Piles, dolphins, stumps, or snags
				0194	Exposed wreckage
				0195	Cable area
				0196	Breakwater, pier, wharf
				0197	Covered pier or wharf
				0199	Area outside manmade feature
		Lines	140	0240	Ski lift
				0241	Tram way
				0242	Snow shed
				0243	Conveyor
				0279	Coke oven
				0282	Linear strip mine
				0291	Boardwalk
				0292	Wall
				0293	Causeway
				0294	Levee
				0295	Sea wall
				0296	Breakwater, pier, jetty, or wharf
		Points (degenerate lines)	140	0300	Class 1 building
				0301	Class 2 building
				0302	Church
				0303	School
				0304	Municipal building
				0305	Court house
				0306	Post office
				0307	City or town hall
				0308	Power plant
				0309	Fort
				0310	Power substation
				0311	Sewage disposal plant
				0312	Pumping station
				0313	Hospital
				0314	Waterworks
				0315	Swimming pool

APPENDIX J.--Pre-1985 Other Significant Cultural Feature Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Other Significant Cultural Features (cont'd.)	Feature identification	Points (degenerate lines) (cont'd)	140	0320	Radio facility
				0321	Radio tower
				0322	Lookout tower
				0323	Windmill
				0324	Heliport
				0330	Campsite
				0331	Picnic site
				0332	Grave site
				0333	Historical site or marker
				0334	Archeological site
				0335	Cliff dwelling
				0336	Cavern
				0337	Boat ramp
				0338	Dock/wharf
				0339	Fairground
				0340	Rodeo grounds
				0341	Corral
				0350	Quarry or pit (includes gravel, clay, sand, rock, etc.)
				0351	Mine tunnel entrance or cave
				0352	Mine shaft
				0353	Prospect
				0354	Burner/stack
				0355	Storage bin
				0360	Ruins
				0361	Pile, dolphin, stump or snag
				0362	Exposed wreck
				0380	Lock
				0381	Spillway
				0382	Drydock
				0384	Oil or gas well, drill hole, or drilling platform
				0385	Small tank
				0386	Small water tank

APPENDIX J.--Pre-1985 Other Significant Cultural Feature Attribute Codes--continued

DATA CATEGORY	TYPE OF CODE	APPLICATION	MAJOR CODE	MINOR CODE	DESCRIPTION
Other Significant Cultural Features (cont'd.)	Parameter	Multiple element types	141	00--	Under construction (enter year of map)
			142	00--	Abandoned or not in use (enter year of map)
			149	00--	Coincident feature or symbol (enter major code for category of coincident feature, right justified)

Code	Designation	Type	States	Date
01	First Principal	PM	OH,IN	1819
02	Second Principal PM	IL,IN		1805
03	Third Principal	PM	IL	1805
04	Fourth Principal	PM	IL	1815
05	Fifth Principal	PM	AR,IA,MN,MO,ND,SD	1815
06	Sixth Principal	PM	CO,KS,NE,SD,WY	1855
07	Black Hills	PM	SD	1878
08	Boise	PM	ID	1867
09	Chickasaw	PM	MS	1833
10	Choctaw	PM	MS	1821
11	Cimmaron	PM	OK	1881
12	Copper River	PM	AK	1905
13	Fairbanks	PM	AK	1910
14	Gila and Salt River	PM	AZ	1865
15	Humboldt	PM	CA	1853
16	Huntsville	PM	AL,MS	1807
17	Indian	PM	OK	1870
18	Louisiana	PM	LA	1807
19	Michigan	PM	MI,OH	1815
20	Principal	PM	MT	1867
21	Mount Diablo	PM	CA,NV	1851
22	Navajo	PM	AZ	1869
23	New Mexico Principal	PM	CO,NM	1855
24	St. Helena	PM	LA	1819
25	St. Stephens	PM	AL,MS	1805
26	Salt Lake	PM	UT	1855
27	San Bernard	PM	CA	1852
28	Seward	PM	AK	1911
29	Tallahasee	PM	FL,AL	1824
30	Uintah	PM	UT	1875
31	Ute	PM	CO	1880
32	Washington	PM	MS	1803
33	Willamette	PM	OR,WA	1851
34	Wind River	PM	WY	1875
35	Ohio River Survey	SN	OH	1785
36	Between the Miamis	SN	OH	1802
37	Muskingum River	SN	OH	1800
38	Ohio River Base SN	IN		1799
39	First Scioto River	SN	OH	1799
40	Second Scioto River	SN	OH	1799
41	Third Scioto River	SN	OH	1799
42	Ellicott's Line*			
43	Twelve-Mile Square	SN	OH	1805
44	Kateel River	PM	AK	1956
45	Umiat	PM	AK	1956
46	Fourth Principal	PM	MN,WI	1831
47	West of the Great Miami	SN	OH	1798
48	U.S. Military Survey	SN	OH	1797
99	Not Public Land Survey*			

* Not digitized; included only for compatibility with BLM table.

ARIZONA

001 ARIBACA
002 LUIS MARIA BACA FLOAT #3
003 LUIS MARIA BACA FLOAT #5
004 LOS NOGALES DE ELLAS
005 MARIA SANTISIMA DEL CARMEN
006 RANCHO DE MARTINEZ
007 SABINO OTERO ET AL
008 SAN BERNARDINO
009 SAN IGNACIO DE LA CANOA
010 SAN IGNACIO DEL BABOCOMARI
011 SAN JOSE DE SONOITA
012 SAN JUAN DE LAS BOQUILLAS Y NOGALES
013 SAN RAFAEL DE LA ZANJA
014 SAN RAFAEL DEL VALLE
015 TUMACACORI AND CALABAZAS
016 SAN RAFAEL DEL VALLE - COCHISE

CALIFORNIA

001 SAN BUENA VENTURA
002 EL PRIMER CANON
003 LA BARRANCA COLORADA
004 LAS FLORES
005 SAUCOS
006 RIO DE LOS MOLINOS
007 BOSQUEJO
008 CAPAY
009 ARROYO CHICO
010 RANCHO DE FARWELL
011 JACINTO
012 LLANO SECO
013 AGUAS FRIAS
014 ESQUON
015 FERNANDEZ
016 LARKINS CHILDRENS RANCHO
017 COLUSA
018 BOGA
019 HONCUT
020 NEW HELVETIA
021 JOHNSON RANCHO
022 JIMENO
023 YOKAYA
024 SANEL
025 GERMAN
026 MUNIZ
027 BODEGA
028 ESTERO AMERICANO
029 BLUCHER
030 LAGUNA DE SAN ANTONIO
031 SOULAJULE LANDS
032 NICASIO LANDS
033 PUNTA DE LOS REYES-RANDALL
034 PUNTA DE LOS REYES--SOBRANTE
035 LAS BAULINES
036 SAUCELITO
037 TOMALES Y BAULINES--PHELPS
038 TOMALES Y BAULINES--GARCIA
039 SAN GERONIMO (MARIN)
040 CANADA DE HERRERA
041 PUNTA DE QUENTIN
042 CORTE DE MADERA DEL PRESIDIO
043 SAN RAFAEL
044 SAN PEDRO SANTA MAGARITA Y LAS GALLINAS
045 SAN JOSE--PACHECO
046 NOVATO
047 CORTE MADERA DE NOVATO
048 OLOMPALI
049 PETALUMA
050 ROBLAR DE LA MISERIA
051 CANADA DE POGOLIMI
052 CANADA DE JONIVE
053 MOLINOS
054 SOTOYOME
055 TZABACO
056 RINCON DE MUSALACON
057 CASLAMAYOMI
058 GUENOC
059 COLLAYOMI
060 MALLACOMES OR MORISTUL
061 MALLACOMES Y PLAN D AGUA CALIENTE
062 SAN MIGUEL--WEST
063 CABEZA DE SANTA ROSA
064 LLANO DE SANTA ROSA
065 COTATE

CALIFORNIA (CONT.)

066 LOS GUILICOS
067 AGUA CALIENTE (SONOMA)
068 PUEBLO LANDS OF SONOMA
069 LAC
070 S F SOLAND IN SONOMA MISSION
071 SONOMA CITY LOT IN
072 HUICHICA
073 RINCON DE LOS CARNEROS
074 ENTRE NAPA
075 TULUCAY
076 NAPA
077 YAJOME
078 CAYMUS
079 CARNE HUMANA
080 LA JOTA
081 LOCOALLOMI
082 CATACULA
083 LAS PUTAS
084 CANADA DE CAPAY
085 GUESISOSI
086 RIO JESUS MARIA
087 RIO DE LOS PUTOS
088 LOS PUTOS
089 CHIMILES
090 TOLENAS
091 SUISUN
092 LOS ULPINOS
093 SANJON DE LOS MOQUELUMNES
094 COSUMNES
095 OMOCHUMNES
096 DEL PASO
097 SAN JUAN
098 RIO DE LOS AMERICANOS
099 ARROYO SECO
100 CAMPO DE LOS FRANCESES
101 STANISLAUS RIVER
102 RANCHERIA DEL RIO ESTANISLAO
103 YOSEMITE & BIG TREE GRANTS
104 LAS MARIPOSAS
105 ORESTIMBA
106 RANCHO DEL PUERTO
107 EL PESCADERO--GRIMES
108 EL PESCADERO--PICO AND NAGLEE
109 CANADA DE LOS VAQUEROS
110 LOS MEGANOS
111 LOS MEDANOS
112 MONTE DEL DIABLO
113 LAS JUNTAS
114 CANADA DEL HAMBRE Y LOS BOLSAS
115 ARROYO DE LAS NUECES Y BOLBONES
116 SAN RAMON--CARPENTIER
117 SAN RAMON--NORRIS
118 SAN RAMON--AMADOR
119 SANTA RITA
120 LAS POSITAS
121 VALLE DE SAN JOSE--SUNOL & BERNAL
122 SAN LORENZO--CASTRO
123 LAGUNA DE LOS PALOS COLORADOS
124 ACALANES
125 LA BOCA DE LA CANADA DEL PINOLE
126 PINOLE
127 SAN PABLO
128 SAN ANTONIO--V & D PERALTA
129 SAN ANTONIO--A M PERALTA
130 SAN ANTONIO--Y PERALTA
131 SAN LEANDRO
132 SAN LORENZO--SOTO
133 ARROYO DE LA ALEMEDA
134 POTRERO DE LOS CERRITOS
135 MISSION SAN JOSE
136 AGUA CALIENTE (ALAMEDA & SANTA CLARA)
137 TULARCITOS--HIGUERA
138 MILPITAS--ALVISO
139 RINCON DE LOS ESTEROS-WHITE
140 RINCON DE LOS ESTEROS-BERREYESA
141 RINCON DE LOS ESTEROS-ALVISO
142 EMBARCADERO DE SANTA CLARA
143 ULISTAC
144 PASTORIA DE LAS BORREGAS
145 POSOLMI
146 RINCON DE SAN FRANCISQUITO
147 RINCONADA DEL ARROYO DE SAN FRANCISQUITO
148 PULGAS
149 SAN MATEO
150 BURI BURI
151 CANADA DE GUADALUPE VISITACION Y RODEO VIEJO

CALIFORNIA (CONT.)

152 CANADA DE GUADALUPE Y RODEO VIEJO
153 RINCON DE LAS SALINAS Y POTRERO VIEJO
154 SAN MIGUEL--NOE
155 PUEBLO LANDS OF SAN FRANCISCO
156 MISSION DOLORES
157 MISSION DOLORES 50 VARA LOT IN DE HARO
158 MISSION DOLORES--BERNAL
159 OJO DE AGUA DE FIGUEROA S F
160 MISSION DOLORES SUERTE IN
161 MISSION DOLORES
162 SAN FRANCISCO
163 LAGUNA DE LA MERCED
164 SAN PEDRO--SANCHEZ
165 CORRAL DE TIERRA--PALOMARES
166 CORRAL DE TIERRA--VASQUEZ
167 FELIZ
168 CANADA DE RAYMUNDO
169 MIRAMONTES
170 CANADA DE VERDE Y ARROYO DE LA PURISIMA
171 SAN GREGORIO--RODRIGUEZ
172 SAN GREGORIO--CASTRO
173 EL CORTE DE MADERA
174 SAN FRANCISQUITO--RODRIGUEZ
175 LA PURISIMA CONCEPCION
176 SAN ANTONIO--MESA
177 SANTA CLARA TR NR--ENRIGHT
178 EL POTRERO DE SANTA CLARA
179 PUEBLO LANDS OF SAN JOSE
180 PALA
181 CANADA DE PALA
182 LOS HUECOS
183 YERBA BUENA
184 SANTA TERESA
185 SAN JUAN BAUTISTA
186 LOS COCHES (SANTA CLARA)
187 QUITO
188 SANTA CLARA MISSION TR
189 SANTA CLARA COUNTY--BENNETT
190 SAN ANTONIO OR PESCADERO
191 BUTANO
192 RINCONADA DE LOS GATOS
193 CANADA DE LOS CAPITANCILLOS
194 LOS CAPITANCILLOS
195 SAN VICENTE--BERREYESA
196 LA LAGUNA SECA
197 CANADA DE SAN FELIPE Y LAS ANIMAS
198 SANJON DE SANTA RITA
199 OJO DE AGUA DE LA COCHE
200 LAS UVAS
201 SHOQUEL AUGMENTATION
202 SAN AUGUSTIN
203 ZAYANTA
204 SAN VICENTE--ESCARRILLA
205 PUNTA DEL ANO NUEVO
206 AGUA PUERCA Y LAS TRANCAS
207 REFUGIO
208 CANADA DEL RINCON EN EL RIO SAN LORENZO
209 LA CARBONERA
210 SANTA CRUZ MISSION
211 TRES OJOS DE AGUA
212 MESA DE OJO DE AGUA
213 POTRERO Y RINCON DE SAN PADRO DE REGLADO
214 ARROYO DEL RODEO
215 SHOQUEL
216 APTOS
217 LAGUNA DE LAS CALABASAS
218 LOS CORRALITOS
219 SAN ANDRES
220 BOLSA DEL PAJARO
221 BOLSA DE SAN CAYETANO
222 VEGA DEL RIO DEL PAJARO
223 SALSIPUEDES
224 LAS ANIMAS
225 SOLIS
226 SAN FRANCISCO DE LAS LLAGAS
227 LA POLKA
228 SAN YSIDRO--GILROY
229 SAN YSIDRO--ORTEGA
230 LLANO DEL TEQUISQUITA
231 BOLSA DE SAN FELIPE
232 SAN JOAQUIN (SAN BENITO)
233 AUSAYMAS Y SAN FELIPE
234 SAN LUIS GONZAGA
235 PANOCHE DE SAN JUAN Y LOS CARRISALITOS

CALIFORNIA (CONT.)

236 REAL DE LAS AGUILAS
237 SANTA ANA Y QUIEN SABE
238 SAN JUSTO
239 LOMERIAS MUERTAS
240 MISSION SAN JUAN BAUTISTA
241 JURISTA
242 LAS AROMITAS Y AGUA CALIENTE
243 CANADA DE LA CARPENTERIA
244 LOS CARNEROS--LITTLEJOHN
245 BOLSA NUEVA Y MORO COJO
246 LOS CARNEROS--MCDOUGAL
247 SAN JUAN BAUTISTA TR NR
248 SAN JUAN BAUTISTA--BREEN
249 LOS VERGELES
250 CIENEGA DEL GABILAN
251 LA NATIVIDAD
252 BOLSA DE LAS ESCORPINAS
253 LOS GATOS OR SANTA RITA
254 BOLSA DEL POTRERO Y MORO COJO
255 RINCON DE LAS SALINAS
256 MONTEREY CITY
257 LAS SALINAS
258 MONTEREY COUNTY--CASTRO
259 EL TUCHO
260 TWO SUERTES
261 RINCON DE SANJON
262 MONTEREY COUNTY--COCKS
263 NACIONAL
264 SAUSAL
265 EL ALISAL--BERNAL
266 LLANO DE BUENA VISTA
267 EL ALISAL--HARTNELL
268 CIENEGA DE LOS PAICINES
269 ENCINAL Y BUENA ESPERANZA
270 CHUALAR
271 ZANJONES
272 RINCON DE LA PUENTE DEL MONTE
273 GUADALUPE Y LLANITOS DE LOS CORREOS
274 BUENA VISTA
275 EL TORO
276 LAGUNA SECA
277 SAUCITO
278 NOCHE BUENA
279 PUNTA DE PINOS
280 EL PESCADERO--JACK
281 MISSION CARMELOCHORRO
282 AGUAJIT
283 CANADA DE LA SEGUNDA
284 JAMES MEADOWS TRACT
285 LOS LAURELLES--RANSOM
286 EL POTRERO DE SAN CARLOS
287 SAN FRANCISQUITO
288 EL SUR
289 LOS LAURELLES--BERONDA
290 CORRAL DE TIERRA--MCCOBB
291 LOS TULARCITOS--GOMEZ
292 PARAJE DE SANCHEZ
293 SAN VICENTE--MUNRASS
294 EX-MISSION SOLEDAD
295 MISSION SOLEDAD
296 LOS COCHES (MONTEREY)
297 ARROYO SECO--TORRE
298 POSA DE LOS OSITOS
299 SAN LORENZO--SOBERANES
300 SAN LORENZO--SANCHEZ
301 LAGUNA DE TACHE
302 SAN LORENZO--RANDALL
303 SAN BERNABE
304 SAN BENITO
305 SAN LUCAS
306 SAN BERNARDO--SOBERANES
307 MILPITAS
308 MISSION SAN ANTONIO
309 SAN MIGUELITO (MONTEREY)
310 EL PIOJO
311 LOS OJITOS
312 PLEYTO
313 MISSION SAN MIGUEL
314 CHOLAME
315 HUERHUERO
316 SANTA MARGARITA
317 ATASCADERO
318 ASUNCION
319 SANTA YSABEL (SAN LUIS OBISPO)
320 PASO DE ROBLES
321 PIEDRA BLANCA
322 SAN SIMEON
323 SANTA ROSA--ESTRADA
324 SAN GERONIMO (SAN LUIS OBISPO)
325 MORO Y CAYUCOS
326 SAN BERNARDO--CANE

CALIFORNIA (CONT.)

327 SAN LUISITO
328 EL CHORRO
329 POTRERO DE SAN LUIS OBISPO
330 HUERTA DE ROMUALDO
331 CANADA DE LOS OSOS Y PECHO Y ISLAY
332 LAGUNA
333 SAN LUIS OBISPO MISSION
334 RANCHITA DE SANTA FE
335 SAN MIGUELITO (SAN LUIS OBISPO)
336 PISMO
337 CORRAL DE PIEDRA
338 SANTA MANUELA
339 ARROYO GRANDE
340 HUASNA
341 CUYAMA--M A DE LA G Y LATAILLADE
342 CUYAMA--CESARIO LATAILLADE
343 SAN EMIDIO
344 EL TEJON
345 CASTAC
346 LOS ALAMOS Y AGUA CALIENTE
347 LA LIEBRE
348 SISQUOC
349 TEPUSQUET
350 SUEY
351 NIPOMO
352 BOLSA DE CHAMISAL
353 GUADALUPE
354 PUNTA DE LA LAGUNA
355 CASMALIA
356 JESUS MARIA
357 TODOS SANTOS Y SAN ANTONIO
358 LOS ALAMOS
359 TINAQUAIC
360 LA LAGUNA--GUTIERREZ
361 LA ZACA
362 CORRAL DE QUATI
363 CANADA DE LOS PINOS OR COLLEGE RANCHO
364 SAN MARCOS
365 TEQUEPIS
366 LOMAS DE LA PURIFICACION
367 NOJOQUI
368 MISSION OF SANTA YNEZ
369 SAN CARLOS DE JONATA
370 SANTA ROSA--COTA
371 SANTA RITA--MALO
372 MISSION LA PURISMA (SANTA BARBARA)
373 MISSION LA PURISMA
374 LOMPOC
375 PUNTA DE LA CONCEPCION
376 LA MISSION VIEJA DE LA PURISMA
377 CANADA DE SALSIPUEDES
378 SAN JULIAN
379 NUESTRA SENORA DEL REFUGIO
380 CANADA DEL CORRAL
381 LOS DOS PUEBLOS
382 LA GOLETA
383 LAS CIENEGAS
384 MISSION SANTA BARBARA
385 LAS POSITAS Y LA CALERA
386 PUEBLO LANDS OF SANTA BARBARA
387 EL RINCON--ARELLANES
388 SANTA ANA
389 OJAI
390 CANADA LARGA O VERDE
391 CANADA DE SAN MIGUELITO
392 MISSION SAN BUENAVENTURA
393 LOT MISSION SAN BUENAVENTURA
394 SAN MIGUEL-OLIVAS & LORENZANA
395 SANTA PAULA Y SATICOY
396 EX-MISSION SAN BUENAVENTURA LANDS OF
397 SESPE
398 TEMASCAL
399 SAN FRANCISCO
400 SIMI
401 LAS POSAS
402 SANTA CLARA DEL NORTE
403 RIO DE SANTA CLARA
404 SANTA CRUZ ISLAND OF
405 SANTA ROSA ISLAND OF
406 GUADALASCA
407 CALLEGUAS
408 EL CONEJO
409 EL ESCORPIO
410 EX-MISSION DE SAN FERNANDO
411 EL ENCINO
412 MISSION SAN FERNANDO
413 TUJUNGA
414 LA CANADA
415 SAN PASCUAL--GARFIAS

CALIFORNIA (CONT.)

416 SAN GABRIEL TR NR--COURTNEY
417 SAN GABRIEL TR NR--LEDESMA
418 LAND 1000 VARAS SQ--SEXTON
419 PROSPERO TRACT
420 SAN GABRIEL TR NR--WHITE
421 HUERTO DE CUATI
422 SAN PASCUAL--WILSON
423 SAN RAFAEL
424 PROVIDENCIA
425 CAHUENGA
426 LOS FELIS
427 LOS ANGELES CITY LANDS OF
428 LAS CIENEGAS
429 LA BREA
430 SAN ANTONIO OR RODEO DE LAS AGUAS
431 SAN JOSE DE BUENOS AYRES
432 SAN VICENTE Y SANTA MONICA
433 TOPANGA MALIBU SEQUIT
434 BALLONA
435 RINCON DE LOS BUEYES
436 CIENEGA O PASO DE LA TIJERA
437 AGUAJE DE LA CENTINELLA
438 SAUSAL REDONDO
439 LOS PALOS VERDES
440 SAN PEDRO--DOMINGUEZ
441 TAJAUTA
442 SAN ANTONIO--LUGO
443 LA MERCED
444 PORTRERO CHICO
445 PORTRERO GRANDE
446 POTRERO DE FELIPE LUGO
447 SAN FRANCISCO--DALTON
448 MISSION SAN GABRIEL
449 SAN GABRIEL TR NR--AGUILAR
450 SAN GABRIEL TR NR--SALES
451 SAN GABRIEL TR NR--SIMEON
452 SAN GABRIEL TR NR--SEXTON
453 SAN GABRIEL TR NR--DOMINGO
454 SANTA ANITA
455 AZUSA--DUARTE
456 AZUSA--DALTON
457 SAN JOSE ADDITION TO
458 SAN JOSE--DALTON ET AL
459 LOS NOGALES
460 LA PUENTE
461 RINCON DE LA BREA
462 LA HABRA
463 SANTA GERTRUDES--COLIMA
464 PASO DE BARTOLO--PICO
465 PASO DE BARTOLO--GUIRADO
466 SANTA GERTRUDES--MCFARLAND & DOWNEY
467 LOS CERRITOS
468 LOS ALIMITOS
469 LA BOLSA CHICA
470 SANTA CATALINA ISLAND
471 LAS BOLSAS
472 LOS COYOTES
473 SAN JUAN CAJON DE SANTA ANA
474 SANTIAGO DE SANTA ANA
475 CANON DE SANTA ANA
476 EL RINCON
477 SANTA ANA DEL CHINO
478 SANTA ANA DEL CHINO ADDITION
479 CUCAMONGA
480 MUSCUPIABE
481 SAN BERNARDINO
482 JURUPA--ROUBIDEAU
483 JURUPA--STEARNS
484 LA SIERRA--SEPULVEDA
485 LA SIERRA--YORBA
486 EL SOBRANTE DE SAN JACINTO
487 SAN JACINTO NUEVO Y POTRERO
488 SAN JACINTO & SAN GORGONIO TRACT BETWEEN
489 SAN JACINTO VIEJO
490 PAUBA
491 VALLEY O TEMECULA
492 TEMECULA
493 SANTA ROSA--MORINO
494 POTREROS SAN JUAN CAPISTRANO
495 LA LAGUNA--STEARNS
496 MISSION VIEJO OR LA PAZ
497 TRABUCO
498 CANADA DE LOS ALISOS
499 LOMAS DE SANTIAGO
500 SAN JOAQUIN (ORANGE)
501 NIGUEL
502 BOCA DE LA PLAYA
503 MISSION SAN JUAN CAPISTRANO 5 TR AT

CALIFORNIA (CONT.)

504 EX-MISSION SAN JUAN CAPISTRANO # TR AT
505 SANTA MARGARITA Y LAS FLORES
506 MONSERATE
507 PAUMA
508 VALLE DE SAN JOSE--PORTILLA
509 SAN JOSE DEL VALLE
510 SANTA YSABEL (SAN DIEGO)
511 VALLE DE SAN FELIPA
512 CUYAMACA
513 CANADA DE SAN VICENTE Y MESA DEL PADRE BARONA
514 VALLE DE PAMO OR SANTA MARIA
515 GUEJITO
516 RINCON DEL DIABLO
517 LOS VALLECITOS DE SAN MARCOS
518 BUENA VISTA
519 GUAJOME
520 EX-MISSION SAN LUIS REY 4 TRACTS
521 AGUA HEDIONDA
522 LOS ENCENITOS
523 SAN DIEGUITO
524 SAN BERNARDO--SNOOK
525 LOS PENASQUITOS
526 SAN DIEGO PUEBLO LANDS OF
527 SAN DIEGO ISLAND OR PENINSULA
528 LA NACION
529 OTAY--ESTUDILLO
530 OTAY--DOMINGUEZ
531 JAMACHO
532 MISSION SAN DIEGO
533 EX-MISSION SAN DIEGO 3 TR AT --CH PR
534 EL CAJON
535 CANADA DE LOS COCHES-INSIDE 534
536 EL CHAMISAL
537 LOS PRIETOS Y NAJALAYEGUA
538 CUCA OR EL POTRER
539 BOCA DE SANTA MONICA
540 ARROYO DE LA LAGUNA
541 JAMUL
542 PUEBLO LOT NO 6
543 CAMARITAS IN SAN FRANCISCO
545 LAS VIRGENES
546 CANADA DE LOS NOGALES
547 PASO DE BARTOLO--MCFARLAND & DOWNEY
548 PASO DE BARTOLO--SEPULVEDA
549 LAS CRUCES
550 EL SOBRANTE
551 CANADA DEL CORTE DE MADERA
552 SAN JOSE Y SUR CHIQUITO
553 ONE SUERTE
554 RESSIGHINI
556 100 VARA LOT AT SAN PEDRO
557 RANCHO AGUAS NIEVES
558 JUAN SILVAS
560 EX-MISSION SAN JOSE
561 AUGA JITA
562 APTOS
563 CANAL RANCH
564 GUADALUPE Y LLANITOS DE LOS CORREOS
565 LITTLE TEMECULA
566 MISSION LANDS (SAN LUIS OBISPO)
567 MISSION SAN DIEGO DE ACALA
568 MISSION SAN RAFAEL
569 NAVAJO
570 PESCADERO
571 POTRERO DE LA CIENAGA
572 POTRERO EL CARISO
573 POTRERO LOS PINOS
574 PUEBLO LANDS OF SAN DIEGO
575 SAN BERNARDINO
576 SAN VINCENTE
577 SANTA GERTRUDES
578 SANTA ROSA

COLORADO

001 BEAUBIEN AND MIRANDA
002 LUIS MARIA BACA NO. 4
003* LUIS MARIA B.
004 MONTROSE RES
005 SANGRE DE CRISTO
006 TIERRA AMARILLA
007 ZAPATO
008 DURANGO RESRV
009* SANGRE DE CRI.
010 NOLAN GRANT
011 VIGIL AND SAINT VRAIN
012* VIGIL AND SAINT VRAIN NO. 6

*Alternate representations as entered in the land records.

NEW MEXICO

001 AGUA SALADA
003 ALAMEDA
004 ALAMITOS
007 CASA COLORADA
008 ANGOSTURA
010 JOSE SUTTON
011 ANTON CHICO
2012 ANTONIO DE ABEYTA
013 ANTONIO GUTTIEREZ AND JOAQUIN SEDILLO
014 ANTONIO MARTINEZ
015 ANTONIO ORTIZ
018 PEDRO ARMENDARIS
021 ARROYO HONDO
022 ARROYO SECO
024 BARTOLOME FERNANDEZ
025 BARTOLOME SANCHEZ
026 MAXWELL
027 BELEN
028 BERNABE MONTANO
029 BERNALLILO
030 BLACK MESA
031 BOSQUE DEL APACHE
032 M AND S MONTOYA
033 BRAZITO
034 CAJA DEL RIO
035 CANADA DE COCHITI
036 CANADA DE LOS ALAMOS
037 ANTONIO SEDILLO
041 ANTONIO ARMENTA
042 CANON DE CARNUE
043 CANON DE CHAMA
044 CANON DEL AGUA
046 BACA LOCATION NUMBER TWO
047 CANON DE SAN DIEGO
049 NOLAN
050 SALVADOR GONZALES
051 GASPAR ORTIZ
052 CHILILI
056 DONA ANA BEND COLONY
057 MESILLA CIVIL COLONY
058 SANTO TOMAS DE YTURBIDE
059 REFUGIO COLONY
060 JUAN JOSE LOBATO
061 CRISTOVAL DE LA SERNA
062 CUBERO
063 CUYAMUNGUE PUEBLO
064 DABOLOS
068 ELENA GALLEGOS
069 PUEBLO OF SANTA ANA
072 JUAN BATISTA VALDEZ
074 ESTANCIA
076 FELIPE TAFOYA
077 FERNANDO DE TAOS
078 FRANCISCO MONTES VIGIL
079 GALISTEO
080 GIJOSA
081 BENJAMIN EDWARDS
082 GOTERA
087 IGNACIO CHAVEZ
088 JACONA
090 JOHN SCOLLY
091 JUAN DE GABALDON
092 SIERRA MOSCA
093 NUESTRA SENORA DE LA LUZ DE LAS LAGUNITAS
094 LAGUNA PUEBLO
096 LA MAJADA
098 LA SALINA
099 LAS VEGAS
101 LO DE PADILLA
102 LOS CERRILLOS
105 LOS FRIJOLES
107 LOS TRIGOS
108 ANTONIO SALAZAR
110 UNA DE GATO
111 MANZANO
113 MESITA DE JUANA LOPEZ
115 JUAN DE MESTAS
116 MORA
118 NICOLAS DURAN DE CHAVEZ
121 NUESTRA SENORA DEL ROSARIO SAN FERNANDO
124 OJO DEL BORREGO
125 OJO CALIENTE
126 OJO DE LA CABRA
127 OJO DEL ESPIRITU SANTO
129 OJO DE SAN JOSE
130 SAN MATEO SPRINGS
132 ORTIZ MINE
133 PABLO MONTOYA
134 PACHECO
135 PAGUATE PURCHASE
136 PAJARITO
137 PENA BLANCA
138 PETACA

NEW MEXICO (CONT.)

140 PIEDRE LUMBRE
141 PLAZA BLANCA
142 PLAZA COLORADA
143 POLVADERA
144 PRESTON BECK
145 PUEBLO OF ACOMA
146 PUEBLO OF COCHITI
148 PUEBLO OF ISLETA
149 PUEBLO OF JEMEZ
150 PUEBLO OF NAMBE
152 PECOS PUEBLO
153 PUEBLO OF PICURIS
154 PUEBLO OF POJOAQUE
156 PUEBLO OF SANDIA
157 PUEBLO OF SAN FELIPE
158 PUEBLO OF SAN ILDEFONSO
159 PUEBLO OF SAN JUAN
160 JOSE MANUEL SANCHEZ BACA
162 SANTA CLARA PUEBLO
163 PUEBLO OF SANTO DOMINGO
164 PUEBLO OF TAOS
165 PUEBLO OF TESUQUE
166 PUEBLO OF ZIA
167 PUEBLO OF ZUNI
168 RAMON VIGIL
180 RANCHO DEL RIO GRANDE
181 RANCHO EL RIJO
189 RIO COLORADO
192 RIO DE TESUQUE
195 RITO DE LOS
196 SAN ANTONIO DEL RIO COLORADO
197 SAN ANTONIO DE LAS HUERTAS
198 SAN CLEMENTE
199 SAN CRISTOVAL
200 SANGRE DE CRISTO
202 SAN JOAQUIN DEL NACIEMENTO
203 SAN MARCOS PUEBLO
204 SAN MIGUEL DEL BADO
205 SAN PEDRO
206 SANTA BARBARA
207 SANTA CRUZ
208 SANTO DOMINGO DE CUNDIYO
209 SANTE FE
211 SANTA ROSA DE CUBERO
213 SANTA TERESA
216 SANTIAGO RAMIREZ
218 SAN YSIDRO
219 SEBASTIAN DE VARGAS
220 SEVILLETA
221 SITIO DE JUANA LOPEZ
222 SITIO DE LOS CERRILLOS
223 SOCORRO
224 TAJIQUE
225 TALAYA HILL
226 TECOLOTE
227 TEJON
228 TIERRA AMARILLA
229 TOME
230 TORREON
231 TOWN OF ABIQUI
232 TOWN OF ALAMEDA
233 TOWN OF ALBUQUERQUE
237 TOWN OF ATRISCO
241 CEBOLLETA
242 SEBASTIAN MARTIN
243 TOWN OF CHIMITA
245 CIENEGUILLA
250 IGNACIO SANCHEZ VERGASA
251 TOWN OF LOS TRAMPAS
253 LUIS ARMENTA
257 SANTA ANA
258 BALTHAZAR BACA
259 TOWN OF TECOLATE
260 TOWN OF TEJON
262 LAS TRUCHAS
264 VALLECITO
265 BISHOP JOHN LAMY
266 AGUA NEGRA
267 JOSE PEREA
269 ALEXANDER VALLEY
270 ANTONIO CHAVEZ
271 NERIO ANTONIO MONTOYA
272 BACA LOCATION NUMBER ONE
274 JOSE TRUJILLO
275 ANTOINE LEROUX
276 ROGUE LOVATO
278 MARQUEZ AND PADILLA
279 CEBOLLA
280 JOSE F BACA Y TERRUS
281 JOAQUIN MESTAS
283 BACA Y PINO
285 PUEBLO OF SANTA CLARA
286 PUEBLOS OF SANTO DOMINGO AND SAN FELIPE
300 ZIA SANTA ANA AND JEMEZ
301 SERAFIN RAMIREZ
302 PUEBLO OF SANTA ANA

NEW MEXICO (CONT.)

303 ACOMA PURCHASE
304 BEAUBIEN & MIRANDA -- MAXWELL
305 ELRANCHITO GRANT
306 EL RITO
307 JUAN OTERO GRANT
308 LAS TRAMPAS GRANT
309 SHO 1235
310 SHO 1898

OTHER STATES

001 CLARK'S MILITARY GRANT (INDIANA)
002 FRENCH GRANT (OHIO)
003 FLEMING GRANT (FLORIDA)
004 DELESPINE GRANT (FLORIDA)
005 ARREDONDO GRANT (FLORIDA)
006 MOSES E LEVY (FLORIDA)
007 GOMEZ (FLORIDA)
008 HANSON (FLORIDA)
009 BERNARDO SEGUI (FLORIDA)
010 DOMINGO ACOSTA (FLORIDA)
011 WILLIAM GARVIN (FLORIDA)
012 PETER FOUCHARD (FLORIDA)
013 LUCAS CRAYON (FLORIDA)
014 JOHN H MC INTOSH (FLORIDA)
015 H M GOMEZ (FLORIDA)
016 ANTELM GAY (FLORIDA)
017 PABLO ROSETTE (FLORIDA)
018 JOHN LOW (FLORIDA)
019 JOSEPH WALES (FLORIDA)
020 CHARLES SIBBOLD (FLORIDA)
021 C E MC HARDY (FLORIDA)
022 JOSEPH GAUNT (FLORIDA)
023 GEORGE F CLARK (FLORIDA)
024 JANE MURRAY (FLORIDA)
025 JOHN BOLTON (FLORIDA)
026 SAMUEL BETTS (FLORIDA)
027 AMBROSE HULL (FLORIDA)
028 GERONIMO ALVAREZ (FLORIDA)
029 DORMAN (OHIO)