**National Mapping Program**
**Technical Instructions**

# Part 2
# 1:24,000-Scale Digital Line Graphs

## Standards for the Preparation of Digital Geospatial Metadata

**U.S. Department of the Interior**
**U.S. Geological Survey**
**National Mapping Division**

Standards for the Preparation of Digital Geospatial Metadata
Part 2: 1:24,000-Scale Digital Line Graphs

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Standards for the Preparation of Digital Geospatial Metadata
Part 2: 1:24,000-Scale Digital Line Graphs

1.        IDENTIFICATION INFORMATION

          Identification information provides basic information about the data
          set, including the title, geographic area covered, currentness, and
          rules for using the data.  Required elements of metadata are those
          necessary for identification of the data set and include citation,
          description, time period of content, status, spatial domain,
          keywords, access constraints, and use constraints.    The
          identification information is a mandatory element of the data set
          metadata.

1.1       CITATION

          The citation is the recommended reference to be used for the data
          set.  The citation information is composed of the following items:

            originator - name of organization that developed the data set

            publication date - the date when the data set is published or
            otherwise made available for release

            title - the name by which the data set is known

            geospatial data presentation form - mode in which the geospatial
            data are represented.  This element usually identifies types of
            cartographic data in hardcopy form; no reference is made to
            digital files or media in this element.  Vector data digitized
            from a map would not have a presentation form if no particular
            means was intended by the originator.

            publication information - publication detail for published data
            sets.  For National Mapping Division (NMD) data, the publisher is
            always the U.S. Geological Survey and the publication place always
            appears as Reston VA.

              publication place - name of the city (and State) where the data
              set was published or released.

> publisher - name of the organization that published the data set.

## 1.1.1 <u>Example</u>

**Identification_Information:**
  **Citation:**
    **Citation_Information:**
      **Originator**: *U.S. Geological Survey*
      **Publication_Date:** archive date (year or year and month) in Sales Data Base (SDB); format YYYY or YYYYMM
      **Title:** the Geographic Cell Names Data Base designation for the 1:24,000-scale quadrangle and the State(s)
      Publication_Information:
        **Publication_Place**: *Reston VA*
        **Publisher**: *U.S. Geological Survey*

## 1.2 DESCRIPTION

This element consists of an abstract, the purpose of the data set, and any optional supplemental information.

> abstract - a brief narrative summary of the data set

> purpose - a summary of the reasons why the data set was developed

> supplemental information - additional optional information about the data set (included as needed)

## 1.2.1 <u>Example</u>

**Abstract:**
*Digital line graph (DLG) data are digital representations, in vector format, of cartographic information. Map features are converted to digital form from maps and related sources. Large-scale DLG data are derived from USGS 1:20,000-, 1:24,000-, and*

*1:25,000-scale 7.5-minute topographic quadrangle maps. Large-scale DLG data are available in nine categories: (1) hypsography, (2) hydrography, (3) vegetative surface cover, (4) nonvegetative features, (5) boundaries, (6) survey control and markers, (7) transportation, (8) manmade features, and (9) Public Land Survey System. All DLG data distributed by the USGS are DLG - Level 3 (DLG-3), which means the data contain a full range of attribute codes, have full topological structuring, and have passed certain quality-control checks.*

**Purpose:**

*DLG's depict information about geographic features on or near the surface of the Earth, terrain, and political and administrative units. These data were collected as part of the National Mapping Program.*

1.3       TIME PERIOD OF CONTENT

This element may be  a single date/time, multiple dates/times, or a range of dates/times and a currentness reference.

   single date/time - the means of encoding a single date and time
      calendar date - the year representing the latest date of information in the data set

   range of dates/times - the means of encoding a range of dates and times
      beginning date - the first year (and optionally month or month and day) of the event

      ending date - the last year (and optionally month or month and day) of the event

      currentness reference - the basis on which content currentness is determined; for example, ground condition

1.3.1      <u>Example</u>


**Time_Period_of_Content:**
  **Time_Period_Information:**
    **Single_Date/Time:**
      **Calendar_Date:** the latest date (year or year and month) present in the DLG-3 header  (may be a photorevision date or photoinspection date) format YYYY or  YYYYMM
    **Currentness_Reference:** *ground condition*


1.4      STATUS


This element includes the progress, maintenance, and update frequency information.

  progress - the state of the data set

  maintenance and update frequency - the frequency with which changes and additions are made to the data set after the initial data set is completed


1.4.1      <u>Example</u>


**Progress:** *complete*
**Maintenance_and_Update_Frequency:** *irregular*


1.5      SPATIAL DOMAIN


This element shows the areal coverage of the data set.  The limits are given in latitude-longitude values in decimal degrees. Longitudes in the Western Hemisphere are preceded by a minus (-) sign.  For data sets that include a complete band of latitude around the Earth, the west bounding coordinate is assigned the value of minus (-)180.0 and the east bounding coordinate is assigned the value 180.0.  Data sets with overedge coverage are referenced to the nominal tile coordinates in the NDCDB.

bounding coordinates - the latitude and longitude values for the data set in the following order:

west bounding coordinate: the westernmost longitude of the data set

east bounding coordinate: the easternmost longitude of the data set

north bounding coordinate: the northernmost latitude of the data set

south bounding coordinate: the southernmost latitude of the data set

1.5.1    Example

**Spatial_Domain:**
  **Bounding _Coordinates:** (do not include overedge)
    **West_Bounding_Coordinate:** western longitude in decimal degrees
    **East_Bounding_Coordinate:** eastern longitude in decimal degrees
    **North_Bounding_Coordinate:** northern latitude in decimal degrees
    **South_Bounding_Coordinate:** southern latitude in decimal degrees

1.6      KEYWORDS

Words or phrases summarizing an aspect of the data set. This element is composed of theme, place, stratum, and temporal keywords. The NMD uses only the theme and place subelements.

theme - subjects covered by the data set

theme keyword thesaurus - reference to a formally registered thesaurus or similar authoritative source of theme keywords;

theme keyword - word or phrase commonly used to describe the content of the data set and type of digital data.

place - geographic locations covered by the data set

place keyword thesaurus - reference to a formally registered
thesaurus or a similar authoritative source of place keywords

place keyword - the geographic name of a location covered by a
data set; usually US and the two-letter abbreviation for the
State(s).  No reference is used for Canada and Mexico because
digital data outside the United States is not archived as part
of the data set.

1.6.1        Example

**Theme:**

   **Theme_Keyword_Thesaurus:** *none*

   **Theme_Keyword:** *digital line graph*

   **Theme_Keyword:** *DLG*

   **Theme_Keyword:** the feature category in the file header

Place:

   **Place_Keyword_Thesaurus:**

   *U.S. Department of Commerce, 1977, Countries, dependencies,
areas of special sovereignty, and their principal
administrative divisions (Federal Information Processing
Standard 10-3):Washington, D.C., National Institute of
Standards and Technology.*

   **Place_Keyword:** *US*

   **Place_Keyword_Thesaurus:**

   *Department of Commerce, 1987, Codes for the identification of
the States, the District of Columbia and the outlying areas Of
the United States, and associated areas (Federal Information
Processing Standard 5-2): Washington, D.C., National Institute
of Standards and Technology*

   **Place_Keyword:** the two-letter designation for the State(s) covered
(each State has a separate Place_Keyword entry)

1.7        ACCESS CONSTRAINTS

Access constraints are the restrictions and legal prerequisites for

accessing the data set, including constraints to protect privacy or
intellectual property or limitations on obtaining the data set.

1.7.1      Example

           **Access_Constraints:** *none*

1.8        USE CONSTRAINTS

           This element sets out the restrictions and legal prerequisites for
           using the data set after access is granted.

1.8.1      Example

           **Use_Constraints:**
             *None.   Acknowledgment of the U.S. Geological Survey would be*
             *appreciated for products derived from these data*

1.9        DATA SET CREDIT

           This element provides recognition of those who contributed to the
           data set.

1.9.1      Example

           Data_Set_Credit: include Federal or State  agencies, cooperators, or
           partnerships that contribute to the production of the data set

1.10       NATIVE DATA SET ENVIRONMENT

           This element provides a description of the data set in the
           producer's processing environment, including items such as the name
           of the software and version, the computer operating system, file
           name (including host-, path- and filenames), and the data set size.

1.10.1      <u>Example</u>

Native_Data_Set_Environment: include the software version and date,
hardware version and date, and the file size in bytes

2.            DATA QUALITY INFORMATION

Data quality information provides a general assessment of the quality of the data set.  Recommendations on information to be reported and tests to be performed are found in "Spatial Data Quality," chapter 1, part 3 *in* U.S. Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, D.C., National Institute of Standards and Technology.

2.1           ATTRIBUTE ACCURACY

Attribute accuracy is an assessment of the accuracy of the identification of entities and assignment of attribute values in the data set.

attribute accuracy report - the explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the test used

2.1.1     Example

**Attribute_Accuracy_Report:**
*Attribute accuracy is estimated to be 98.5 percent.  Attribute accuracy was tested by one or more of the following methods:*
*- manual comparison of the source with hard-copy plots*
*- symbolized display of the digital line graph on an interactive computer graphic system*
*- selected attributes that could not be visually verified on plots or on screen were interactively queried and verified on screen*
*In addition, U.S. Geological Survey (USGS) processing software tested the attributes against a master set of valid attributes for the category;  it also checked for selected valid attribute combinations and for valid attributes relative to topology and dimensionality.  All attribute data conform to the attribute codes current as of the date of digitizing.*

2.2        LOGICAL CONSISTENCY REPORT

This element provides an explanation of the fidelity of the relationships in the data set and the tests used.

2.2.1      <u>Example</u>

**Logical_Consistency_Report:**

*Topological requirements include the following: lines must begin and end at nodes, lines must connect to each other at nodes, lines do not extend through nodes, left and right areas are defined for each line element and are consistent throughout the file, and lines representing the limits of the file (neatline) are free of gaps.*

*The tests of logical consistency were performed by USGS processing software.  The neatline was generated by connecting the four corners of the digital file, as established during initialization of the digital file.  All data outside the enclosed region were ignored and all data crossing these geographically straight lines were clipped at the neatline.  Data within a specified tolerance of the neatline were snapped to the neatline.  Neatline straightening aligned the digitized edges of the digital data with the generated neatline; that is, with the longitude/latitude lines in geographic coordinates.  All internal areas were tested for closure using USGS software.*

2.3        COMPLETENESS REPORT

This element provides information about omissions, selection criteria, generalization, definitions used, and other rules used to derive the data set.  Use the appropriate description for the revision status of the data set.

2.3.1      <u>Example</u>

**Completeness_Report:** (use the appropriate statement)

*For Digital Revision Status = Not revised:*
*Data completeness reflects the content of the source graphic.*
*Features may have been eliminated or generalized on the source*
*graphic, because of scale and legibility constraints.*

*For Digital Revision Status = Limited Update*
*This file has undergone limited update digital revision.  The file*
*contains only (1) those features that are photoidentifiable on*
*monoscopic source, supplemented with limited ancillary source, and*
*(2) those features, present on the original source graphic, that*
*cannot be reliably photoidentified but that are not considered*
*particularly prone to change.*

*For Digital Revision Status = Standard Update*
*This file has undergone standard update digital revision. The data*
*completeness of this file meets NMD standards for feature content.*

2.4        POSITIONAL ACCURACY

The element provides an assessment of the accuracy of the positions
of spatial objects in both horizontal and vertical positions.

horizontal positional accuracy - an estimate of accuracy of the
horizontal positions of the spatial objects

horizontal positional accuracy report - an explanation of the
accuracy of the horizontal coordinate measurements and a
description of the tests used.  Use the appropriate description
for the revision status of the data set.

vertical positional accuracy - the estimate of accuracy of the
vertical position in the data set

vertical positional accuracy report - an explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Use the appropriate description for the data set theme keyword and the revision status.


2.4.1    <u>Example</u>


**Positional_Accuracy:**
  **Horizontal_Positional_Accuracy:**
  **Horizontal_Positional_Accuracy_Report:** (use the appropriate statement)
  *For Digital Revision Status = Not revised:*
  *Horizontal positional accuracy is based upon the use of USGS source quadrangles that are compiled to meet National Map Accuracy Standards (NMAS). NMAS horizontal accuracy requires that at least 90 percent of points tested are within 0.02 inch of the true position. The digital data are estimated to contain a horizontal positional error of less than or equal to 0.003 inch standard error in the two component directions relative to the source graphic. Comparison to the graphic source is used as a control to assess digital positional accuracy. Cartographic offsets may be present on the graphic source, because of scale and legibility constraints. Digital map elements require edge alignment between data sets. Data along each quadrangle edge are tested against the data set for the adjacent quadrangle using USGS processing software; tests check for positional accuracy between data sets within a 0.02 inch tolerance. Features with like dimensionality that are within the tolerance are adjusted by moving the feature equally in both data sets. Features outside the tolerance are not moved. All disconnects are identified by edge matching flags that document the mismatch.*

  *For Digital Revision Status = Limited Update:*
  *This file has undergone limited update digital revision. Accuracy of these digital data meets the accuracy of the*

*source map. Digital map elements require edge alignment between data sets. Data along each quadrangle edge are tested against the data set for the adjacent quadrangle using USGS processing software; tests check for positional accuracy between data sets within a 0.02 inch tolerance. Features with like dimensionality that are within the tolerance are adjusted by moving the feature equally in both data sets. Features outside the tolerance are not moved. All disconnects are identified by edge matching flags that document the mismatch.*

*For Digital Revision Status = Standard Update:*
*This file has undergone standard update digital revision. Accuracy of these digital data meets the accuracy specifications in the National Map Accuracy Standards (NMAS). Digital map elements require edge alignment between data sets. Data along each quadrangle edge are tested against the data set for the adjacent quadrangle using USGS processing software; tests check for positional accuracy between data sets within a 0.02 inch tolerance. Features with like dimensionality that are within the tolerance are adjusted by moving the feature equally in both data sets. Features outside the tolerance are not moved. All disconnects are identified by edge matching flags that document the mismatch.*

**Vertical_Positional_Accuracy:**

**Vertical_Positional_Accuracy_Report:** (use the appropriate statement)

For Hypsography, Hydrography, and Survey Control and Markers Only:

*For Digital Revision Status = Not revised:*
*Vertical positional accuracy is based upon the use of USGS source quadrangles that are compiled to meet National Map Accuracy Standards (NMAS). NMAS vertical accuracy requires that at least 90 percent of well-defined points tested be within one-half contour interval of the correct value. Comparison to the graphic source is used as control to assess digital positional accuracy.*

*For Digital Revision Status = Limited Update*

*This file has undergone limited update digital revision. Contours and other elevation data have not been updated. The vertical accuracy should reflect the same accuracy as the source map except where coded with the obsolete contour code.*

*For Digital Revision Status = Standard Update:*

*This file has undergone standard update digital revision. Accuracy of these digital data meets the positional accuracy specifications in the National Map Accuracy Standards (NMAS).*

2.5        LINEAGE

This element contains information about how the data set was constructed, including the events, parameters, and source data.

source information – list of sources and a short discussion of the information contributed by each

source citation – reference for a source data set(includes the source citation abbreviation, originator, publication date, title, geospatial data presentation form, and publication information)

source scale denominator – the denominator of the representative fraction for the map scale

type of source media – medium of the source data set

source time period of content – time period(s) for which the source data set corresponds to ground condition (includes single or multiple date(s)/time(s) and calendar date)

source citation abbreviation – short-form alias for the source citation

source contribution – brief statement identifying the

information contributed by the source to the data set

process step - information about a single event

process description - an explanation of the event and related
parameters.  Use the description that is based on the revision
status of the data set.

source used citation abbreviation - the source citation
abbreviation (alias) of each data set used in the processing
step

process date - the date the process was completed

2.5.1      Example

**Lineage:**
  **Source_Information:**
    **Source_Citation:**
     **Citation_Information:**
        **Originator:** *U.S. Geological Survey* or other agency  or
        organization producing the source map
        **Publication_Date**: for USGS maps use the latest or only date
        in the lower right corner under the map title (may be a
        photorevision or photoinspection date; for other source maps
        use the latest date shown on the map; format YYYY
        **Title:** the Geographic Cell Names Data Base designation for
        the USGS source quadrangle or other agency or organization's
        name for the source map
        Geospatial_Data_Presentation_Form: *map*
        Publication_Information:
          **Publication_Place:** *Reston VA* or publication place for the
          other agency or organization producing the map
          **Publisher**: *U.S. Geological Survey* or other agency or
          organization producing the map
      Source_Scale_Denominator: *24,000* for USGS quadrangle or scale

of source map

**Type_of_Source_Media:** *stable base material*

**Source_Time_Period_of_Content:**

  **Time_Period_Information:**

    **Single_Date/Time:**

      **Calendar_Date:** same as used for publication date

  **Source_Currentness_Reference:** *ground condition*

**Source_Citation_Abbreviation:** *MAP1* (increment for each source map used in revision)

**Source_Contribution:** *spatial and attribute information*

**Source_Information:**

  **Source_Citation:** (repeat as needed for each image source, DOQ or other, used in the revision; change the calendar date as necessary and increment the Source_Citation_Abbreviation for each image source referenced)

    **Citation_Information:**

      **Originator:** *U.S. Geological Survey* or agency or organization responsible for the source image

      **Publication_Date:** date of the source image; format YYYYMMDD

      **Title:** If a DOQ is used, provide the Geographic Cell Names Data Base designation for the DOQ.  If other imagery is used, provide the name of the source image; for example, the scene identification of a satellite image or the identification number of a NAPP image

      Geospatial_Data_Presentation_Form: *remote-sensing image*

      Publication_Information:

        **Publication_Place:** *Reston VA* or publication place of the agency or organization responsible for the imagery

        **Publisher:** *U.S. Geological Survey* or the agency or organization responsible for the imagery

    Source_Scale_Denominator: *12,000* or the scale of other source imagery

    **Type_of_Source_Media:** Provide the appropriate media on which the source is supplied.  For example, DOQ's are supplied as digital files or on disk and NAPP photography is supplied on film positives.

**Source_Time_Period_of_Content:**

**Time_Period_Information:**

**Single_Date/Time:**

**Calendar_Date:** date of imagery; format YYYYMM or YYYYMMDD

**Source_Currentness_Reference:** *ground condition*

**Source_Citation_Abbreviation:** use the appropriate abbreviation as needed; for example, DOQ1, NAPP1, and so on

**Source_Contribution:** *Provides locational and attribute information for photoidentifiable features during revision.*

**Source_Information:**

**Source_Citation:** (repeat as needed for each digital source used in the revision; change the calendar date as necessary and increment the Source_Citation_Abbreviation for each digital source referenced)

**Citation_Information:**

**Originator:** *U.S. Geological Survey* or agency or organization responsible for the digital source

**Publication_Date:** date of the digital source; format YYYYMMDD

**Title:** If digital source is used, provide the name of the digital source ; for example, DLG layer, road file from a State Department of Transportation, commercial street atlas, and so on

Publication_Information:

**Publication_Place:** *Reston, VA* or the publication place of the agency or organization responsible for the imagery

**Publisher:** *US Geological Survey* or the agency or organization responsible for the imagery

Source_Scale_Denominator: scale of source digital file

**Type_of_Source_Media:** list the media on which the digital source is supplied.

**Source_Time_Period_of_Content:**

**Time_Period_Information:**

**Single_Date/Time:**

**Calendar_Date:** date of digital source; format YYYYMM or YYYYMMDD

**Source_Currentness_Reference:** *ground condition*

**Source_Citation_Abbreviation:** use the appropriate abbreviation as needed; for example, NMROADS, ATLAS1, and so on

**Source_Contribution:** *Provides locational and attribute information for photoidentifiable features during revision.*

**Process_Step:** (use the appropriate statement)

**Process_Description:**

*For Digital Revision Status = Not digitally revised:*

*This digital line graph was digitized from the USGS source quadrangle, by either the National Mapping Division, a cooperator, or a contractor. The digital data were produced by one of the following methods:*

*- scanning a stable-based copy of the graphic materials. The scanning process captured the digital data at a scanning resolution of 0.001 inch or less; the resulting raster data were vectorized and then attributed on an interactive editing station.*

*- scanning the paper map. The scanning process captured the digital data at a scanning resolution of 0.001 inch or less; the resulting raster data were vectorized and then attributed on an interactive editing station.*

*- scanning a stable-based copy of the graphic materials. The scanning process captured the digital data at a scanning resolution of 0.001 inch or less; the resulting raster data were then manually digitized and attributed on an interactive editing station.*

*- scanning the paper map. The scanning process captured the digital data at a scanning resolution of 0.001 inch or less, and the resulting raster data were then manually digitized and attributed on an interactive editing station.*

*- manually digitizing from a stable-based copy of the graphic material using a digitizing table to capture the digital data at a resolution of 0.001 inch or less; attribution was performed either as the data were digitized or on an interactive edit station after the digitizing was completed.*

*- manually digitizing from the paper map using a digitizing*

*table to capture the digital data at a resolution of 0.001 inch or less; attribution was performed either as the data were digitized or on an interactive edit station after the digitizing was completed.*

*The determination of the DLG production method was based on various criteria, including feature density, feature symbology, and availability of production systems. Four control points corresponding to the four corners of the quadrangle were used for registration during data collection. An eight-parameter projective transformation was performed on the coordinates used in the data collection and editing systems to register the digital data to the internal coordinates used in the processing software, and a four-parameter linear transformation was performed from the processing software internal coordinates to Universal Transverse Mercator (UTM) grid coordinates. The DLG data were checked for position by one or more of the following processes:*
*- comparing plots of the digital data to the graphic source.*
*- comparing the digital data to the digital raster scan.*
*DLG data classification was checked by one or more of the following processes:*
*- comparing plots of the digital data to the graphic source*
*- comparing the digital data to the digital raster scan.*

**Source_Used_Citation_Abbreviation:** *MAP1*

**Process_Date:** The date (year or year and month) the DLG was entered into the Sales Data Base (SDB); format YYYY or YYYYMM

**Process_Step:**

**Process_Description:**

*For Digital Revision Status = Limited Update*
*This file has undergone limited update digital revision. Limited update revision uses a variety of sources, including monoscopic imagery, stereoscopic imagery, or other ancillary image or data sources, with no field verification.*

**Source_Used_Citation_Abbreviation:** refer to as many DOQ's or other source images as were named in the Source_Citation_Abbreviation above; for example, DOQ1, NAPP1, and so on

**Process_Date:** The date (year or year and month) the revised DLG was entered into the Sales Data Base (SDB); format YYYY or YYYYMM

**Process_Step:**

**Process_Description:**

*For Digital Revision Status = Standard Update*

*This file has undergone standard update digital revision. Standard update revision uses stereoscopic imagery as needed, in addition to monoscopic imagery, with field verification.*

**Source_Used_Citation_Abbreviation:** refer to as many DOQ's or other source images as were named in the Source_Citation_Abbreviation above; for example, DOQ1, NAPP1, and so on

**Process_Date:** The date (year or year and month) the revised DLG was entered into the Sales Data Base (SDB); format YYYY or YYYYMM

3.              SPATIAL DATA ORGANIZATION INFORMATION

Spatial data organization information identifies the mechanism used to represent spatial information in a data set.  This category of metadata describes point, vector, and raster objects.  The elements dealing with direct spatial references are required.  Elements dealing with indirect spatial references are applicable only to certain DLG-3 categories.  Point, vector, and raster object information is considered optional in the "Content Standards for Digital Geospatial Metadata" but is used by the USGS to provide further information to data users.

3.1             INDIRECT SPATIAL REFERENCE

This element provides the name of types of geographic features or other means by which locations are referenced in the data set.  Add this element only for the Public Land Survey System (PLSS), boundaries, and survey and control markers data sets.

3.1.1           Example

Indirect_Spatial_Reference:
  For PLSS:
  *U.S. Department of the Interior, Bureau of Land Management: U.S. Public Land Survey System*

  For Boundaries:
  *U.S. Department of Commerce, 1977, Countries, dependencies, areas of special sovereignty, and their principal administrative divisions (Federal Information Processing Standard 10-3): Washington, D.C., National Institute of Standards and Technology*

  *U.S. Department of Commerce, 1987, Codes for the identification of the States, the District of Columbia  and the outlying areas of the United States, and associated areas (Federal Information Processing Standard 5-2): Washington, D.C., National Institute of*

*Standards and Technology*

*U.S. Department of Commerce, 1990, Counties and equivalent entities of the United States, its possessions, and associated areas (Federal Information Processing Standard 6-4): Washington, D.C., National Institute of Standards and Technology*

For Survey Control and Markers:
*U.S. Department of Commerce, 1987, Codes for the identification of the States, the District of Columbia  and the outlying areas of the United States, and associated areas (Federal Information Processing Standard 5-2): Washington, D.C., National Institute of Standards and Technology*

*U.S. Department of Commerce, 1990, Counties and equivalent entities of the United States, its possessions, and associated areas (Federal Information Processing Standard 6-4): Washington, D.C., National Institute of Standards and Technology*

3.2        DIRECT SPATIAL REFERENCE METHOD

This element defines the type of data in the data set.  Data types are point, vector, or raster.

3.2.1        Point and Vector Object Information

This element provides the types and numbers of vector or nongridded point spatial objects in the data sets.

SDTS terms description - point and vector object information using the terminology and concepts from "Spatial Data Concepts," part 1, chapter 2, *in* U.S. Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, D.C., National Institute of Standards and Technology.  (The reference to SDTS is only to provide a set of terminology for the point and vector objects.)

SDTS point and vector object type - this element provides the name of point and vector spatial objects used to locate zero-, one-, and two-dimensional spatial locations in the data set. Points are zero-dimensional, vectors are one-dimensional, and chains and polygons are two-dimensional objects. Object types used by the NMD for DLG data are as follows:

entity point - point used for identifying the location of point features or areal features collapsed to a point, such as towers, buildings, or places

area point - representative point within an area usually carrying attribute information about the area

node, planar graph - a zero-dimensional object that is a topological junction of two or more chains, or an end point of a chain, represented as though it occurs on a planar surface

complete chain - a chain that explicitly references left and right polygons and start and end nodes

GT-polygon composed of chains - an area that is two dimensional, with associated geometry and topology bounded by chains that enclose one and only one aggregate spatial object

universe polygon composed of chains - the object that defines the part of the universe that is outside the "covered area" and completes the adjacency relationships of the perimeter chains

void polygon composed of chains - the polygon that defines part of the two-dimensional area bounded by other chains that is excluded from the interior of the universe polygon

point and vector object count - the total number of points or vectors occurring in the data set

3.2.1.1    <u>Example</u>

**Direct_Spatial_Reference_Method:** *Vector*
**Point_and_Vector_Object_Information:**
  **SDTS_Terms_Description:** (repeat as needed to reference all the different object types and counts in the data set)
    **SDTS_Point_and_Vector_Object_Type:** use the relevant terms for the data set
    Point_and_Vector_Object_Count:  use  counts  provided  by processing statistics

4.          SPATIAL REFERENCE INFORMATION

          Spatial reference information describes the reference frame for and
          the means of encoding coordinates in the data set.

4.1          HORIZONTAL COORDINATE SYSTEM DEFINITION

          The horizontal coordinate system definition provides the reference
          frame or system from which linear or angular distances are measured
          to locate the position a point occupies in the data set.   The
          element   provides   information   about   the   latitude/longitude
          resolution, map projection, and horizontal datum.

          planar - the quantities of distances, or distances and angles,
          that define the position of a point on a reference plane to which
          the surface of the Earth has been projected

             grid coordinate system - a plane-rectangular coordinate system
             that is usually based on, and mathematically adjusted to, a map
             projection   so   that   geographic   positions   can   be   readily
             transformed to and from plane coordinates.  Systems used by the
             NMD include Universal Transverse Mercator (UTM) and State Plane
             Coordinate System (SPCS) with zone identification.

             planar   coordinate   information   -   information   about   the
             coordinate system developed on the planar surface

                planar   coordinate   encoding   method   -   the   means   used   to
                represent horizontal positions; the NMD uses coordinate pairs
                for point and vector data, and rows and columns for grid
                coordinate system data sets

                coordinate   representation   -   the   method   of   recording   the
                position   of   a   point   by   measuring   its   distance   from
                perpendicular reference axes for methods using coordinate
                pairs   or   rows   and   columns;   values   for   the   abscissa   and
                ordinate   resolution   are   given in planar distance units of

measure (meters for data sets in coordinate pairs and grid
coordinate systems and arc-seconds for data sets in geographic
coordinate systems)

planar distance units - units of measure used for distances

geodetic model - parameters for the shape of the Earth; parameters
include horizontal datum name (North American Datum of 1927 or
North American Datum of 1983), ellipsoid name, semi-major axis,
and the denominator of the flattening ratio

## 4.1.1 <u>Example</u>

Horizontal_Coordinate_System_Definition:
  **Planar:**
    **Grid_Coordinate_System:**
      **Grid_Coordinate_System_Name:** *Universal Transverse Mercator*
        **Universal_Transverse_Mercator:**
        **UTM_Zone_Number:** use the UTM zone for the data set
        **Transverse_Mercator:**
          **Scale_Factor_at_Central_Meridian:** *0.9996*
          **Longitude_of_Central_Meridian:** use the central meridian
          for the zone the data set falls in
          **Latitude_of_Projection_Origin:** *0.0*
          **False_Easting:** *500000*
          **False_Northing:** *0.0*
    **Planar_Coordinate_Information:**
      **Planar_Coordinate_Encoding_Method:** *coordinate pair*
      **Coordinate_Representation:**
        **Abscissa_Resolution:** *0.61* [*0.635* for 1:25,000]
        **Ordinate_Resolution:** *0.61* [*0.635* for 1:25,000]
      **Planar_Distance_Units:** *meters*
    Geodetic_Model: (use appropriate datum and values)
      Horizontal_Datum_Name: *North American Datum 1927* or *North
      American Datum 1983*

> **Ellipsoid_Name:** for NAD27 use *Clark 1866*; for NAD83 use *Geodetic Reference System 80*
>
> **Semi-major_Axis:** for NAD27 use *6378206.4*; for NAD83 use *6378137.0*
>
> **Denominator_of_Flattening_Ratio:** for NAD27 use *294.98*; for NAD83 use *298.257*

4.2        VERTICAL COORDINATE SYSTEM DEFINITION

This element provides information on the reference frame or system from which vertical distances (altitudes or depths) are measured.

altitude system definition – the reference frame or system from which altitudes (elevations) are measured.  This element is used only for hypsography, hydrography, and survey control and markers DLG-3 categories.

altitude datum name – the name of the reference surface from which altitudes are measured

altitude resolution – minimum distance between two adjacent altitude values in altitude distance units; for DLG's, primary, secondary, and supplemental contour intervals

altitude distance units – units in which altitudes are measured

altitude encoding method – the means used to encode the altitudes

depth system definition – the reference system from which depths are measured.  The information includes the depth datum name, depth resolution, depth distance units, and depth encoding method. This information is applicable only to data sets that contain bathymetric data.

depth datum name – the surface of reference from which depths are measured

depth resolution - the minimum distance between adjacent depth values; primary and supplementary bathymetric interval for DLG's containing bathymetry

depth distance units - the units in which depths are recorded

depth encoding method - the means used to encode depths

4.2.1      Example

Vertical_Coordinate_System_Definition:
  Altitude_System_Definition:
    [for hypsography, hydrography, survey control and markers]
    **Altitude_Datum_Name:** *National Geodetic Vertical Datum of 1929*
    **Altitude_Resolution:** largest or only primary contour interval
    **Altitude_Resolution:** In areas of abrupt contrasts in relief, two primary contour intervals may be used in a data set.  This element is used for the second primary contour interval.
    **Altitude_Resolution:** supplemental contour interval
    **Altitude_Distance_Units:** *feet* or *meters*
    **Altitude_Encoding_Method:** *attribute values*
  Depth_System_Definition: (use the appropriate depth datum name)
    **Depth_Datum_Name:** *mean lower low water*
    **Depth_Resolution:** primary bathymetric contour interval
    **Depth_Resolution:** supplemental bathymetric contour interval
    **Depth_Distance_Units:** *meters*
    **Depth_Encoding_Method:** *attribute values*

Standards for the Preparation of Digital Geospatial Metadata
Part 2: 1:24,000-Scale Digital Line Graphs

5.          ENTITY AND ATTRIBUTE INFORMATION

          This element provides information about the information content of
          the data set, including entity types, their attributes, and the
          domains from which attribute values can be assigned.

5.1         OVERVIEW DESCRIPTION

          This element contains a summary of, and citation to the detailed
          description of, the information content of the data set. The NMD is
          using the summary overview description for digital products.

5.1.1       Entity and Attribute Overview

          This element provides a detailed summary of the information
          contained in a data set, including the attribute codes and the
          format of the attribute code for DLG's. The summary for raster
          files specifies the size and range of acceptable values for the data
          set. For gridded data sets, this element specifies the size of the
          integer value and the range of acceptable values.

5.1.1.1     Example

          **Overview_Description:**
            **Entity_and_Attribute_Overview:**
              *DLG-3 attribute codes are used to describe the physical and*
              *cultural characteristics of DLG node, line, and area elements.*
              *Attribute codes are used to reduce redundant information,*
              *provide enough reference information to support integration*
              *with larger data bases, and describe the relationships between*
              *cartographic elements. Each DLG element has one or more*
              *attribute codes composed of a three digit major code and a*
              *four-digit minor code. For example, in the 1: 24,000-scale DLG*
              *data, the line attribute code 050 0412 has a major code (050)*
              *meaning hydrography, with a minor code (0412) meaning stream.*

5.1.2          Entity and Attribute Detail Citation

This element provides the name of the actual reference standard for
the attribute codes and includes an FTP anonymous site Internet
address if the standards are available in soft copy.  This reference
is to the standards in use at the time the data set was created and
may or may not be the current version of the standard.

5.1.2.1     Example

**Entity_and_Attribute_Detail_Citation:**
*U.S. Department of the Interior, U.S. Geological Survey, 1987
Digital Line Graphs from 1:24,000-Scale Maps--Data Users Guide 1;
Reston, Va.*

*U.S. Department of the Interior, U.S. Geological Survey, 1990,
Standards for Digital Line Graphs, Part 3:  Attribute Codes:
Reston, Va.*

6.         DISTRIBUTION INFORMATION

           This element provides information about the distributor and means of
           obtaining the data set.  The NMD Data and Information Delivery
           office is responsible for maintaining and updating the information
           in this section.

6.1        DISTRIBUTOR
           This element provides information about the distributor from whom
           the data set can be obtained.

6.1.1      Example

           **Distributor:**
             **Contact_Information:**
               **Contact_Organization_Primary:**
                **Contact_Organization:**
                   *Earth Science Information Center, U.S. Geological Survey*
               **Contact_Address:**
                **Address_Type:** *mailing address*
                **Address:** *507 National Center*
                **City:** *Reston*
                **State_or_Province:** *VA*
                **Postal_Code:** *20192*
               **Contact_Voice_Telephone:** *1 800 USA MAPS*
               **Contact_Voice_Telephone:** *1 800 872 6277*
               **Contact_TDD/TDY_Telephone:** *703 648 4119*
               **Contact_Facsimile_Telephone:** *703 648 5548*
               **Contact_Electronic_Mail_Address:** *esicmail@usgs.gov*
               Hours_of_Service: *0800-1600 Monday -Friday*
               Contact_Instructions:
               *In addition to the ESIC at the address above, there are other*
               *ESIC offices throughout the country.  A full list of these*
               *offices is at:*
                 *http://mapping.er.usgs.gov/esic/esic_index.html*

6.2         RESOURCE DESCRIPTION

This element gives the name by which the distributor knows the data set.

6.2.1       Example

**Resource_Description:** *DLG large scale*

6.3         DISTRIBUTION LIABILITY

This element is the statement of liability assumed by the distributor for the data set.

6.3.1       Example

**Distribution_Liability:**
*Although these data have been processed successfully on a computer system at the U.S. Geological Survey (USGS), no warranty expressed or implied is made by the USGS regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. The USGS will warrant the delivery of this product in computer-readable format and will offer appropriate adjustment of credit when the product is determined unreadable by correctly adjusted computer input peripherals or when the physical medium is delivered in damaged condition. Requests for adjustment of credit must be made within 90 days from the date of this shipment from the ordering site.*

6.4         STANDARD ORDER PROCESS

This element details the common ways in which the data set can be obtained or received, and related instructions and fee information. It concerns data in digital form and provides digital transfer information, digital transfer options, offline and online ordering options, fees, and ordering instructions.  The format version date

is the date of the version in use when the data set was created.

6.4.1      Example

Standard_Order_Process:
  **Digital_Form:**
    **Digital_Transfer_Information:**
      **Format_Name:** *SDTS*
      **Format_Version_Date:** *199207*
      Format_Specification: *Topological Vector Profile*
    **Digital_Transfer_Option:**
      **Online_Option:**
        Computer_Contact_Information:
          Network_Address:
           Network_Resource_Name:
            *http://edcwww.cr.usgs.gov/glis/hyper/guide/24kdlgfig/*
            *states.html*
      **Online_Option:**
        Computer_Contact_Information:
          Network_Address:
            Network_Resource_Name:
             *ftp://edcftp.cr.usgs.gov/pub/data/DLG/24K*
      **Offline_Option:**
        **Offline_Media:** *CD-ROM*
        **Recording_Capacity:**
          **Recording_Density:** *250*
          **Recording_Density_Units:** *megabytes*
          **Recording_Format:** *ISO 9660*
        **Compatibility_Information:**
          *This CD-ROM can be used with all computer operating*
          *systems that support CD-ROM as a logical storage device.*
          *All text files on the disc are in ASCII format.  Data*
          *files are in ASCII or binary format.*
  **Digital_Form:**
    **Digital_Transfer_Information:**

          **Format_Name:** *DLG*

          **Format_Version_Date:** *198805*

          Format_Specification: *Optional*

        **Digital_Transfer_Option:**

         **Offline_Option:**

          **Offline_Media:** *CD-ROM*

          **Recording_Capacity:**

            **Recording_Density:** *250*

            **Recording_Density_Units:** *megabytes*

            **Recording_Format:** *ISO 9660*

            **Compatability_Information:**

            *This CD-ROM can be used with all computer operating systems that support CD-ROM as a logical storage device. All text files on the disc are in ASCII format. Data files are in ASCII or binary format.*

         **Offline_Option:**

          **Offline_Media:** *3480 cartridge tape*

           **Recording_Capacity:**

             **Recording_Density:** *250*

             **Recording_Density_Units:** *megabytes*

             **Recording_Format:** *ASCII; available unlabeled or with ANSI-standard labels; available block sizes are multiples of 80 characters ranging from 8,000 to 32,720 characters.*

         **Offline_Option:**

          **Offline_Media:** *8-mm cassette tape*

           **Recording_Capacity:**

             **Recording_Density:** *4.5 (high)*

             **Recording_Density:** *2.3 (low)*

             **Recording_Density_Units:** *gigabytes*

             **Recording_Format:** *ASCII; available unlabeled or with ANSI-standard labels; available block sizes are multiples of 80 characters ranging from 8,000 to 32,720 characters.*

      **Fees:**

> *The online copy of the data set (when available electronically) can be accessed without charge. Fees are subject to change. Call 1-800-USA-MAPS for current prices.*

Ordering_Instructions:

> *All nonstandard quadrangles with neatlines that extend beyond the standard unit size to accommodate overedge boundaries are collected as multiples of the standard unit size. Data covering a 7.5- by 8.5-minute quadrangle area would be sold as two 7.5-minute units.*

> *Each 7.5-minute unit is distributed as one 7.5-minute cell, except in high-density areas, where the 7.5-minute cells may be divided into two or more cells.*

> *The transportation 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. Although collected separately, the three files are distributed as a single unit. Orders for the transportation category for a given area will include all three files.*

7.              METADATA REFERENCE INFORMATION

                This element provides information on the currentness of the metadata
                information and the responsible party.  The information includes
                metadata creation date, contact, and metadata standard and version.
                Metadata reference information is a mandatory element of the data
                set metadata.

7.1             METADATA DATE

                This element gives the date that the metadata were created or last
                updated.

7.1.1           <u>Example</u>
                **Metadata_Date:** the date (year and month) the metadata are entered or
                updated in the Sales Data Base at EROS Data Center; format YYYYMM

7.2             METADATA CONTACT

                This element provides the name of the party responsible for the
                metadata information.

7.2.1           <u>Example</u>

                **Metadata_Contact:**
                  **Contact_Information:**
                   **Contact_Organization_Primary:**
                     **Contact_Organization:** *U.S. Geological Survey*
                       **Contact_Address:**
                         **Address_Type:** *mailing address*
                         Address: *Box 25046, Building 810*
                         Address: *Denver Federal Center, MS 504*
                         **City:** *Denver*
                         **State_or_Province:** *CO*
                         **Postal_Code:** *80225-0046*
                       **Contact_Voice_Telephone:** *303 202 4200*

           Contact_Facsimile_Telephone: *303 202 4188*

           Contact_Electronic_Mail_Address: *esic@rmmc1.cr.usgs.gov*

           Contact_Instructions:

             *This is the contact for information on DLG's for the following features: hydrography, PLSS, boundaries, hypsography, and culture.*

           **Contact_Address:**

             **Address_Type:** *mailing address*

             Address: *1400 Independence Road, MS 231*

             **City:** *Rolla*

             **State_or_Province:** *MO*

             **Postal_Code:** *65401-2602*

           **Contact_Voice_Telephone:** *573 308 3500*

           Contact_Facsimile_Telephone: *573 308 3615*

           Contact_Electronic_Mail_Address: *esic@mcdgs01.cr.usgs.gov*

           Contact_Instructions:

             *This is the contact for information on DLG's for the following features: transportation, vegetation, non-vegetative features, and survey control and markers.*

## 7.3      METADATA STANDARD NAME

This always refers to the FGDC standard in use at the time that the data set metadata were created.

### 7.3.1     Example

**Metadata_Standard_Name:** *Content Standards for Digital Geospatial Metadata*

## 7.4      METADATA STANDARD VERSION

This is the version of the FGDC standard in use at the time when the metadata were created.

### 7.4.1     Example

**Metadata_Standard_Version:** *19940608*