

METRIC

MIL-PRF-0089049(NIMA)

24 November 1998

## PERFORMANCE SPECIFICATION

VECTOR PRODUCT FORMAT (VPF) PRODUCTS,  
GENERAL SPECIFICATION FOR

This specification is approved for interim use by the National Imagery and Mapping Agency.

## 1. SCOPE

1.1 Scope. This specification defines the format for all National Imagery and Mapping Agency (NIMA) products based on the Vector Product Format (VPF). Feature and attribute requirements, and other information for individual products are contained in the associated specifications (see 2.2.1). Additional associated specifications are in development and will be added when approved.

1.2 Purpose. This specification provides a description of the content, accuracy, data format, and design of all vector format products. Conformance to this specification will assure uniformity of treatment among all production elements engaged in a coordinated production and maintenance program for these products.

1.3 Classification. NIMA Vector data can be classified as either a standard product, or as a mission-specific data set. Standard products, as listed in Section 3.1, are pre-defined VPF formatted data sets, designed to support one or multiple specific intended uses. Mission-specific data sets are not pre-defined, but are requested by the user, and tailored to meet that user's specific geospatial information requirements.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are needed to meet the requirements specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, National Imagery and Mapping Agency, ATTN: Customer Support/COD, Mail Stop P-38, 12310 Sunrise Valley Drive, Reston, VA 20191-3449, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

AMSC N/A

Area MCGT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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## 2.2 Government documents

2.2.1 Specifications, standards, and handbooks The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the current Department of Defense Index of Specifications and Standards (DoDISS) and the supplement thereto, cited in the solicitation (see 6.2).

### STANDARDS

#### FEDERAL INFORMATION PROCESSING STANDARDS

FIPS 10-4 - Countries, Dependencies, Areas of Special Sovereignty, and Their Principal Administrative Divisions

#### DEPARTMENT OF DEFENSE

MIL-STD-600001 - Mapping, Charting & Geodesy Accuracy Standard  
 MIL-STD-2407 - Vector Product Format, 28 June 1996  
 MIL-STD-2414 - Bar Coding for Geospatial Products

### HANDBOOK

#### DEPARTMENT OF DEFENSE

MIL-HDBK-9660 - DOD Produced CD-ROM Products

#### NATO STANDARDIZATION AGREEMENTS (STANAGS)

STANAG 2211 - Geodetic Datums, Spheroids, Grids, and Cell References

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the DoD Single Stock Point (DODSSP), 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. Copies of Federal Information Processing Standards (FIPS) are available to Department of Defense activities from the DoD Single Stock Point (DODSSP). Others must request copies from the National Information Services, 5285 Port Royal Road, Springfield, VA 22161-2171.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DMA Technical Manual  
 (DMA TM) 8358.1 - Datums, Ellipsoids, Grids, and Grid Reference Systems

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NIMA Technical Report  
(NIMATR) 8350.2 WGS84- Department of Defense World  
Geodetic System  
  
NIMA Publication 150 - World Port Index

(Copies of the aforementioned publications are available from the  
Defense Logistics Agency)

Digital Geographic Information Exchange Standard (DIGEST), Part 4,  
Feature and Attribute Coding Catalogue (FACC), Version 2.0, June 1997

(DRAFT) NIMA Profile of the Digital Geographic Information Exchange  
Standard (DIGEST), Part 4, Feature and Attribute Coding Catalogue (FACC)

NIMA Instruction NI 8955.1 (DRAFT), NIMA CD-ROM Labeling and Packaging

(Copies of the above publications are available from the National  
Imagery and Mapping Agency, Interoperability Standards Division (SES), Mail  
Stop P-24, 12310 Sunrise Valley Drive, Reston, VA 20191-3449.)

DoD 2005.1M - Maritime Claims Reference Manual,  
DoS Office of the Geographer  
"Limits of the Seas"

(Copies of the aforementioned publications are available from the  
Department of State, Office of the Geographer)

2.3 Non-Government publications. The following documents form a part  
of this document to the extent specified herein. Unless otherwise specified,  
the issues of the documents which are DoD adopted are those listed in the  
issue of the DODISS cited in the solicitation. Unless otherwise specified,  
the issues of documents not listed in the DODISS are the issues of the  
documents cited in the solicitation (see 6.2).

ISO 9660. 1988 (E). International Organization for Standardization  
Information Processing - Volume and File Structure of CD-ROM for  
Information Interchange.

(Application for copies should be addressed to the American National  
Standards Institute, 1430 Broadway, New York, NY 10018.)

IHO MP004 Chart Specifications of the IHO

(Application for copies should be addressed to International  
Hydrographic Bureau, Monaco)

(Non-government standards and other publications are normally available  
from the organizations that prepare or distribute the documents. These  
documents also may be available in or through libraries or other information  
services.)

2.4 Order of precedence. In the event of a conflict between the text  
of this document and the references cited herein (except for related  
associated specifications or specification sheets) the text of this document  
takes precedence. Nothing in this document, however, supersedes applicable  
laws and regulations unless a specific exemption has been obtained.

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## 3. REQUIREMENTS

3.1 Associated specifications. The individual item requirements shall be as specified herein and in accordance with the applicable associated specification (See 2.2.1). In the event of any conflict between the requirements of this specification and the associated specification, the latter shall govern. The following is a list of published or projected associated specifications that will be covered by this general specification.

MIL-PRF-89049/1	Feature Foundation Data (FFD)
MIL-PRF-89049/2	Vector Map (VMAP)
MIL-PRF-89049/3	Digital Topographic Data (DTOP)
MIL-PRF-89049/4	Digital Nautical Chart (DNC) Version 2
MIL-PRF-89049/5	World Vector Shoreline Plus (WVSPPlus)
MIL-PRF-89049/6	Digital Topographic Data Minimum Essential Data Set (DTOP-MEDS)
MIL-PRF-89049/7	Littoral Warfare Data (LWD)
MIL-PRF-89049/8	Digital Flight Information Publication (DFLIP)
MIL-PRF-89049/9	Vector Vertical Obstruction Data (VVOD)
MIL-PRF-89049/10	Tactical Ocean Data Level 0 (TOD0)
MIL-PRF-89049/11	Tactical Ocean Data Level 1 (TOD1)
MIL-PRF-89049/12	Tactical Ocean Data Level 2 (TOD2)
MIL-PRF-89049/13	Vector Relocatable Target Assessment Data (VRTAD)

3.2 First article When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.3 Accuracy. Accuracy requirements for each individual VPF based product are defined in the associated specification for that product. Individual source accuracies are located in the Data Quality coverage for each specific product. The least accurate source value for any particular source used within a VPF product library is identified in the library's Data Quality Table.

3.4 Datum.

3.4.1 Horizontal datum. The horizontal datum for VPF based products shall be WGS84 as identified in NIMA TR 8350.2.

3.4.2 Vertical datum. The vertical datum for each VPF based product is defined in the associated specification for that product.

3.5 Data density levels. VPF data are collected at a density of detail that approximates that of the NIMA standard hardcopy products as shown in TABLE 1.

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TABLE 1. Data density equivalents.

VPF Product	Hardcopy Product Equivalent Level of Detail
<b>Vector Map</b>	
VMap Level 0	Operational Navigation Chart (1:1,000,000)
VMap Level 1	Joint Operations Graphics (1:250,000)
VMap Level 2	Topographic Line Maps (1:50,000 / 1:100,000)
UVMaP	City Graphics (1:25,000 and larger)
<b>Digital Nautical Chart</b>	
General library <sup>1</sup>	General Charts Smaller than 1:500,000
Coastal library <sup>1</sup>	Coastal Charts 1:75,000-1:500,000
Approach library <sup>1</sup>	Approach Charts 1:25,000-1:100,000
Harbor library <sup>1</sup>	Harbor Charts 1:50,000 and larger
<b>Terrain Products</b>	
DTOP	Topographic Line Maps or TTADB (1:50,000-1:100,000)
DTOP MEDS	Subset of DTOP
FFD	Variable (1:50,000 - 1:250,000)
<b>Other Products</b>	
World Vector Shoreline Plus	1:250,000/1:1M/1:3M/1:12M/1:40M/1:120M
DFLIP	FLIP (variable scales from 1:62,500 to 1:2,000,000)
LWD	Combat Chart/Amphibious Assault Chart (1:50,000/1:25,000 and larger)
TOD Level 0	U.S. Navy Operating Area Chart (OPAREA)
TOD Level 1	Bottom Contour Chart (BC)
TOD Level 2	Bathymetric Navigation Planning Chart (BNPC)
VVOD	N/A
VRTAD	N/A

Note 1. Multiple libraries contained on each DNC CD.

3.6 Database source and extent. The geographic extent of specific VPF based products is defined in the associated specifications.

3.7 Continuity. All VPF data are subject to the inclusion conditions specified in the product specific associated specifications.

3.7.1 Continuity between coverages. Thematic coverages shall be constructed in such a manner as to provide a logical positioning of features in the world (i.e. contours shall not overlap into oceans, roads shall not overlap into water, etc.).

3.7.2 Continuity between libraries. VPF based product databases are divided into libraries. VPF topology is defined within individual coverages of each library, not between libraries. Product requirements for feature match between libraries are defined in the associated specifications.

3.8 Thematic layer organization. VPF products are organized into thematic layers. Each thematic layer is stored as a single coverage within a VPF library. Specific coverages for each product are defined in the associated specification for each VPF product.

3.8.1 Product families. VPF products have been grouped into several related families of products (to date, Topographic, Hydrographic,

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Aeronautical, and Littoral). Within each product family, geospatial features have been placed in standardized coverages to the greatest degree practical, commensurate with unique product requirements (see TABLE 2). In certain cases, individual products have a requirement to show specific features in certain coverages to preserve topological relationships, or show features in multiple coverages, or may not show a coverage at all.

TABLE 2. Product coverages by VPF product family.

<b>Topographic</b>	<b>Hydrographic</b>	<b>Aeronautical</b>	<b>Littoral</b>
Boundaries	Cultural Landmarks	Airport	Aeronautical
Elevation	Earth Cover	Airspace	Coastline/Boundaries
Ground Obstacles	Environment	Airport Facility	Depth Information
Hydrography	Hydrography	Air Traffic Service	Elevation
Industry	Inland Waterways	Routes	Ground Obstacles
Physiography	Land Cover	Airport Diagram	Ground Transportation
Population	Limits	Military Training and Refueling Routes	Hydrographic Navaids
Slope/ Surface Configuration	Aids to Navigation	Obstructions	Hydrographic Dangers
Soil/Surface Material	Obstructions	Obstructions	Hydrography
Transportation	Port Facilities	Terminal Procedures	Hydrographic Limits
Utilities	Relief	Runway	Industry
Vegetation	Aeronautical	World Area Code	Inland Water
			Magnetics
			Ocean Environment
			Ports and Harbors
			Physiography
			Population
			Utilities
			Vegetation

3.8.2 Reference libraries. Coverages common to all reference libraries are the Library Reference (libref), Database Reference (dbref), Political Entities (polbnd), and Place Names (placenam).

### 3.9 Dimensions.

3.9.1 Unit of measure. The unit of measure for VPF is metric. However, some attributes in the DIGEST FACC (see 3.10) are defined in other units of measure (for example, feet, nautical miles).

3.9.2 Minimum sizes. The minimum sizes for extraction are product specific and are found in the associated specifications. They are identified by the use of minimum portrayal criteria and/or attribute definition.

3.10 Feature and attribute coding scheme. NIMA implements the Digital Geographic Information Exchange Standard (DIGEST), Part 4 - Feature and Attribute Coding Catalogue (FACC) for its VPF-based products. See APPENDIX F for information regarding the NIMA Profile of the DIGEST FACC, which contains FACC features and attributes that have been standardized for use in products covered by this specification. Refer to the associated specifications for a listing of FACC feature codes and attributes used for specific product thematic layers.

3.10.1 Null, unknown, not populated, not applicable, and other values. In certain circumstances, it may not be possible, or relevant to populate a particular data value. A general scheme for coding these values is shown below. In the event that DIGEST FACC values for unknown, not populated, not applicable, and other conflict with those shown below, NIMA vector products covered by this general specification will use the values shown below. For two attributes (Product Category - PRO values 997 and 998, and Slope Polygon Range - SPR value 0), FACC uses the numbers shown below for other purposes.

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In these two instances, the FACC values shall be used. Although coded attributes are stored in VPF as short integers, they use the coded attribute default values, rather than the short integer default values.

<u>Attribute type</u>	<u>Null*</u>	<u>Unknown</u>	<u>Not Populated</u>	<u>Not Applicable</u>	<u>Other</u>
Coded attribute:	-32768	0	997	998	999
Textual:					
Fixed Length:	"N/A"	"UNK"	"N_P"	"N_A"	"Other"
Variable Length:	0 length	"UNK"	"N_P"	"N_A"	"Other"
Integer:					
Short:	-32768	-32767	-32766	-32765	-32764
Long:	-2147483648	-2147483647	-2147483646	-2147483645	-2147483644
Floating point:					
Single precision:	NaN	-32767.0	-32766.0	-32765.0	-32764.0
Double precision:	NaN	-2147483647.0	-2147483646.0	-2147483645.0	-2147483644.0

\* See MIL-STD-2407, TABLE 62

3.10.1.1 Null value condition. Some feature classes may have attribute columns present in the feature table that are defined for some features, but not others. In this case a null value is entered for those attribute values when they do not apply to the feature code. Null is defined per data type in MIL-STD-2407 TABLE 62. For VPF derived from a source that does not support vertical elevation, vertical (elevation) values shall be populated with the VPF null (NaN) in the primitive tables, as defined in MIL-STD-2407, section 5.5.2, unless an elevation value is provided in the source material. NaN is not used as a Z attribute value, in these cases the value for "unknown" is used instead.

3.10.1.2 Unknown value condition. FACC supports the use of an attribute value which signifies an "unknown" condition. During data capture, it may not be possible to determine the value of an attribute using the inclusion conditions or collateral data sources. When FACC provides an attribute value to support the "unknown" condition, it must be used. In cases where the "0" value is already used to represent a valid number, an alternative value is used to represent the unknown condition. These values are defined in the appropriate value description tables (vdt) within the associated specifications.

3.10.1.3 Not populated condition. Some VPF products contain "value added" data, which NIMA will not collect, but a user of the data may wish to populate later. Space for this value added information has been defined in the VPF product table structure, but NIMA produced data will collect this data as "not populated", with the data fields filled in as indicated above. When used, these values are defined in the appropriate value description tables (vdt) within the associated specifications.

3.10.1.4 Not applicable condition. In some cases a FACC attribute contains a value for a "Not applicable" condition. This does not have the same meaning as "Unknown". For example, in VMap-1 the FACC Building feature, AL015, contains the attribute House of Worship Type (hwt). If the building has a Building Function Category attribute value (bfc) that is not equal to House of Worship (i.e., 7), then the FACC hwt attribute value 998 is entered for the feature indicating the "Not Applicable" condition. This condition is not the same as having an unknown building feature type. These values are defined in the appropriate value description tables (vdt) within the associated specifications.

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3.10.1.5 Other value condition. FACC also supports the use of an attribute value which signifies an "other" condition. An attribute of a feature be identifiable (not qualifying for "unknown") but may not be supported by values available for the particular product. When FACC provides an attribute value to support the "other" condition, it must be used. In cases where the "999" value is already used to represent a valid number, an alternative value is used to represent the unknown condition. These values are defined in the appropriate value description tables (vdt) within the associated specifications.

3.11 Coordinate system. VPF data shall be stored in standard decimal degrees. Horizontal coordinate resolution for geographic coordinates of the products defined by this specification are stored as shown in TABLE 3. Coordinates with southern and western hemispheres have a negative sign for latitude and longitude, respectively.



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TABLE 3. Product horizontal coordinate resolutions

<b>VPF Product</b>	<b>Horizontal Resolution</b>
<b>Vector Map</b>	
Vector Map Level 0	0.1 arc-seconds or 0.00002 decimal degrees
Vector Map Level 1	0.02 arc-seconds or 0.000005 decimal degrees
Vector Map Level 2	0.01 arc-seconds or 0.000002 decimal degrees
Urban Vector Map (UVMaP)	0.005 arc-seconds or 0.000001 decimal degrees
<b>Digital Nautical Chart</b>	
General library	0.02 arc-seconds or 0.000005 decimal degrees
Coastal library	0.02 arc-seconds or 0.000005 decimal degrees
Harbor library	0.01 arc-seconds or 0.000002 decimal degrees
Approach library	0.01 arc-seconds or 0.000002 decimal degrees
<b>Terrain Products</b>	
Digital Topographic Data (DTOP)	0.01 arc-seconds or 0.000002 decimal degrees
DTOP Mission Essential Data Set (MEDS)	0.01 arc-seconds or 0.000002 decimal degrees
Foundation Feature Data (FFD)	0.01 arc-seconds or 0.000002 decimal degrees
<b>Other Products</b>	
World Vector Shoreline Plus (WVSPPlus)	0.02 arc-seconds or 0.000005 decimal degrees
Digital Flight Information Publication (DFLIP)	0.01 arc-seconds or 0.000002 decimal degrees
Vector Vertical Obstruction Data (VVOD)	<b>TBD</b>
Littoral Warfare Data (LWD)	<b>TBD</b>
Tactical Ocean Data (TOD) Level 0	0.02 arc-seconds or 0.000005 decimal degrees
Tactical Ocean Data (TOD) Level 1	0.02 arc-seconds or 0.000005 decimal degrees
Tactical Ocean Data (TOD) Level 2	0.02 arc-seconds or 0.000005 decimal degrees
Vector Relocatable Target Assessment Data (VRTAD)	<b>TBD</b>

3.12 Data format. The products defined by this specification shall be produced in Vector Product Format (VPF), which provides a standard format for storing digital vector geographic data. Refer to the VPF MIL-STD-2407 for descriptions of VPF format and structure. This general specification defines the format of VPF files that are common to all VPF-based products. The associated specifications provide product specific implementation guidance for each product.

3.13 Database description. All VPF based products are designed as a series of databases, libraries and coverages as defined in MIL-STD-2407 Section 5.2.2. In addition to data libraries, each product also implements a Reference Library which is included on each CD-ROM. The Reference Library

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contains generalized data coverages to orient the user to the database. The VPF structure levels and a generalized product implementation are depicted in FIGURE 1. Multiple libraries may exist on one CD-ROM. Each library shall be fully contained on a single disc. Should a library exceed the maximum capacity of a CD-ROM the library shall be split into two separate libraries and may be packaged as a two CD set.

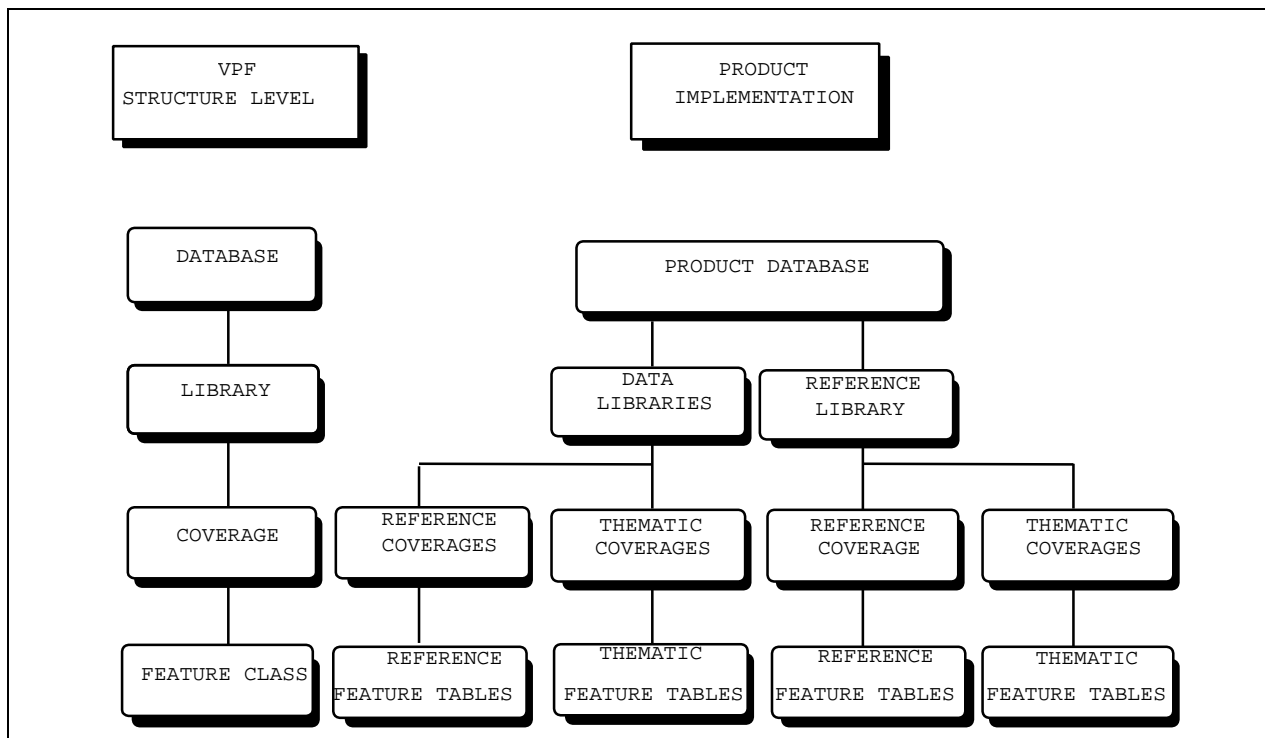


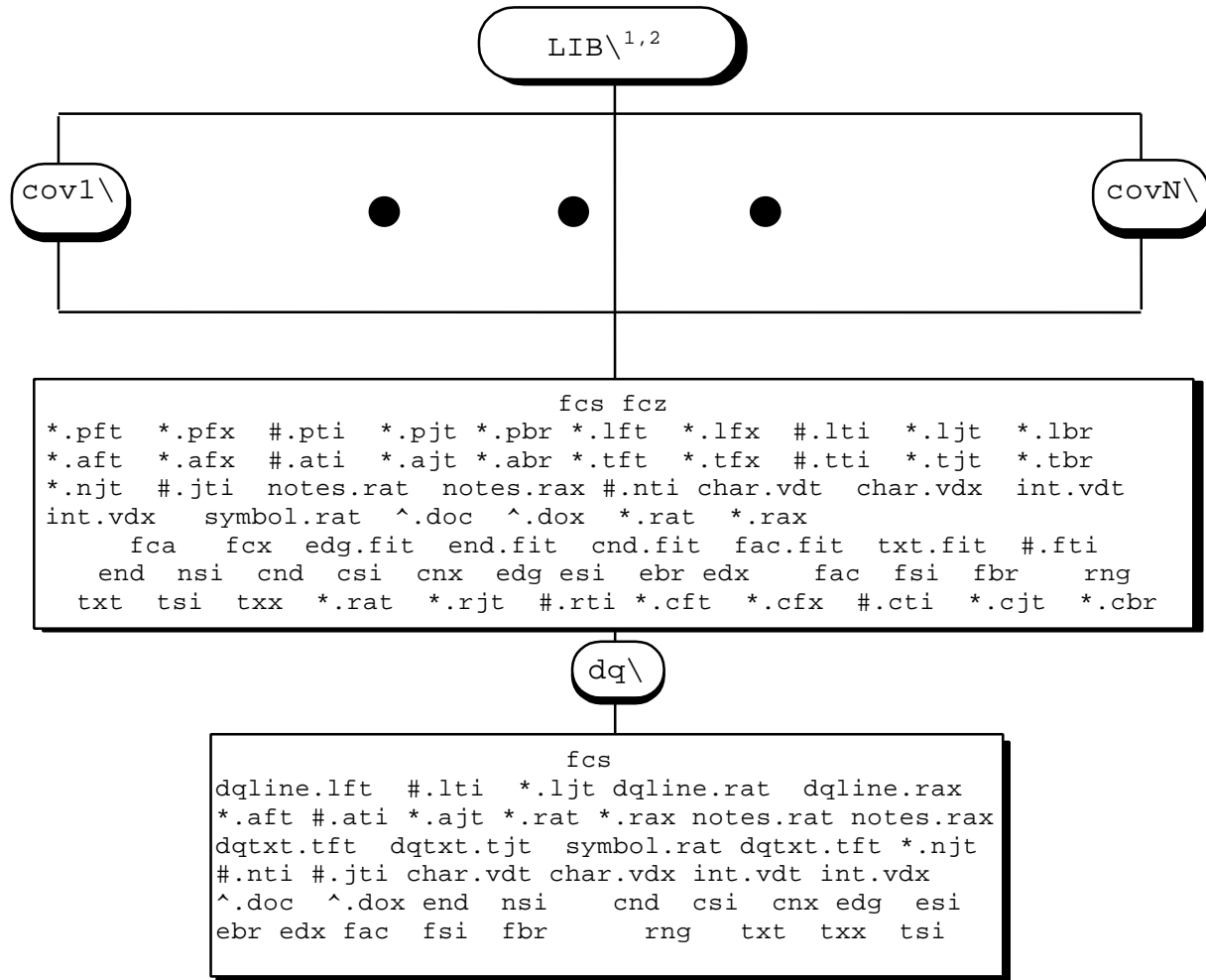
FIGURE 1. VPF structure levels and generalized implementation.

3.14 VPF file structure. VPF based products implement files as defined in MIL-STD-2407 Section 5.2.1.

3.14.1 Directories. The directory structure, tables, and indices used by each product are identified by the data level overview diagram shown in FIGURE 2.

3.14.2 VPF tables. Implementation of VPF tables is defined in the VPF MIL-STD-2407 section 5.3, and Section 3.16 herein.

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## NOTES:

1 This is a representative library directory name.

2 The combination of tables and indices in each coverage defined by this diagram represents the maximum required mix of coverages and tables/indices within a coverage. The actual coverages and coverage table/indices will vary by product. The coverages and mix of feature tables and, therefore, primitives and indices for each product are defined in the associated specifications. Within a library, coverage directories shall not be included if data does not exist for that coverage within that library's geographic extent.

^ The caret is replaced with the feature class name or attribute for which the doc file was created.

\* The asterisk is replaced with the prefix of the point, line or area feature class name.

# The pound is replaced with the prefix of the thematic index name, which is based on the column name to which the index refers.

FIGURE 2. VPF data library overview.

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### 3.14.3 Indices.

3.14.3.1 Thematic Indices. Encapsulation of thematic indices is defined in the VPF MIL-STD-2407 section 5.4. Specific implementation and naming of thematic indices is defined below. Thematic indices in feature tables, feature to primitive join tables, feature to feature join tables and feature to related attribute join tables shall be named based on the column to which they apply appended with the Thematic Index ID Number defined for the base feature class table (see associated specifications). Thematic indices for feature index tables (fit) shall be named as defined in section 3.14.3.4 below. The extensions on thematic index file names will vary depending upon the type of file containing the column for which the thematic index is being defined.

3.14.3.1.1 Thematic indices in feature class tables. When multiple f\_codes are defined for a single feature class table, a thematic index shall be associated with the "f\_code" column in that feature class table. Thematic indices may also be placed on attributes in feature class tables to expedite queries on feature/attribute/value combinations. Thematic indices shall also be placed on tile\_id and <prim>\_id in feature tables that do not implement feature to primitive join tables. See TABLES 8 through 21 for general direction in naming thematic indices in feature tables and see Appendix E and the associated specifications for product specific implementation of additional feature table thematic indices. The thematic index file extension shall be one of .pti, .lti, .ati, .tti, or .cti depending on the type of the feature class table for which the index is being defined.

3.14.3.1.2 Thematic indices in join tables. Thematic indices shall be associated with all columns in the join tables (with the exception of the id column). This includes feature to primitive join tables, feature to related attribute table join tables, and feature to feature join tables (complex join tables). See TABLES 6 through 21 for general direction in naming thematic indices in join tables and see the associated specifications for additional product specific implementation of join table thematic indices. The thematic index file extension shall be .jti for feature-to-primitive join tables and feature-to-feature join tables, .nti for the notes related attribute join tables and .rti for other related attribute join tables.

3.14.3.1.3 Thematic indices in feature index tables. Thematic indices shall be associated with all columns in the feature index tables (with the exception of the id column). See TABLE 4 for direction in naming thematic indices in fit's. The thematic index file extension shall be .fti.

3.14.3.2 Variable-length indices. Encapsulation and implementation of variable-length indices is defined in MIL-STD-2407 section 5.4. Naming of variable-length indices is defined in MIL-STD-2407 section 5.3.1.2.

3.14.3.3 Spatial indices. Encapsulation of spatial indices is defined in MIL-STD-2407 section 5.4. A corresponding spatial index file shall be implemented for each type of primitive table present in the VPF directory structure. Naming of spatial indices is defined in MIL-STD-2407 section 5.3.1.2.

3.14.3.4 Feature indices. A feature index shall be created for each data coverage in a VPF data library except for the libref, tileref and dq coverages. The index is composed of a Feature Class Attribute table (fca, as defined for each coverage in the associated specification) and a feature index table (\*.fit, see TABLE 4) for each primitive type in a coverage that has a feature table associated. The feature index tables shall be named as <prim>.fit, where "prim" is replaced with one of end, cnd, edg, fac or txt.

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TABLE 4. Format for feature index table.

Thematic Layer: <applicable layer> (e.g., Coastline/Boundaries or Elevation)  
 Coverage Name: <any coverage> (e.g., clb or ele)  
 Table Description: Feature Index Table  
 Table Name: <prim>.fit (e.g., cnd.fit or fac.fit)

```
{Header length}L;
Feature Index Table;-;
id=I,1,P,Row Identifier,-,-,-,:
prim_id=I,1,N,Primitive ID,-,*pid.fti1,-,:
tile_id2=S,1,N,Tile Reference ID,-,*tid.fti1,-,:
fc_id=I,1,N,Feature Class ID,-,*fcid.fti1,-,:
feature_id=I,1,N,Feature ID,-,*fid.fti1,-,:;
```

## NOTES:

1. The \* is replaced with the name of the primitive table for which the fit is being defined.
2. This column is not present in untiled coverages.

3.14.4 Naming conventions. VPF file naming conventions are defined in MIL-STD-2407 TABLES 13, 14, and 15. Product specific file names are defined in the associated specifications.

3.15 Directory organization

3.15.1 Regional databases VPF based products consist of one or more regional database(s). Each CD-ROM shall contain a single database directory and two or more library directories including one reference library and at least one data library. Each CD-ROM within a regional database area shall contain the database header and library attribute tables. Each data library contains a mix of reference coverages and thematic coverages.

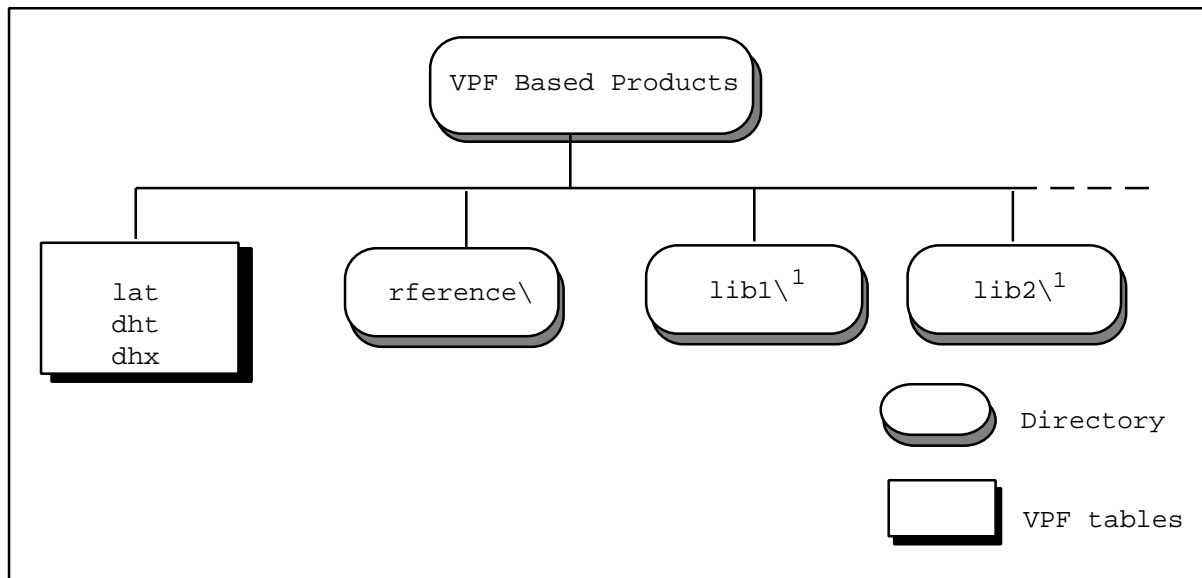
3.15.2 Thematic coverages. A thematic coverage is defined as a group of features combined together which share some common relationship. The reference library directory (reference) shall contain thematic coverage directories which are provided to assist users in orienting themselves in relation to the global position of the data found within that library. These coverages are not tiled. Data library directories shall contain thematic coverage directories which may be tiled. See section 3.17 for specific information concerning tiling.

3.16 Vector product implementation in VPF. Vector products implement all mandatory data structures from MIL-STD-2407 at the database level (Section 5.3.6), library level (Section 5.3.5) and at the coverage level (Section 5.3.4). Implementation guidance of mandatory metadata tables is provided in APPENDICES B through D of this specification. The following sections describe table options used by VPF products. Additional product specific options are defined in the associated specifications.

3.16.1 Database directory files. VPF based products are composed of one or more regional databases that have their own unique database directory metadata files. Each database directory shall contain the following database level metadata files: Database Header Table (dht), a Library Attribute Table (lat) and Database Header Table variable length index (dhx). The content and

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format of these tables is defined in MIL-STD-2407. Specific content information is located in APPENDIX B of this document. Additional guidance may be found in General and Technical guidance materials including product specific extraction guides. The appropriate regional database directory shall be present on each CD-ROM disc. A representation of the tables and files appearing in a VPF based product database is provided in FIGURE 3.

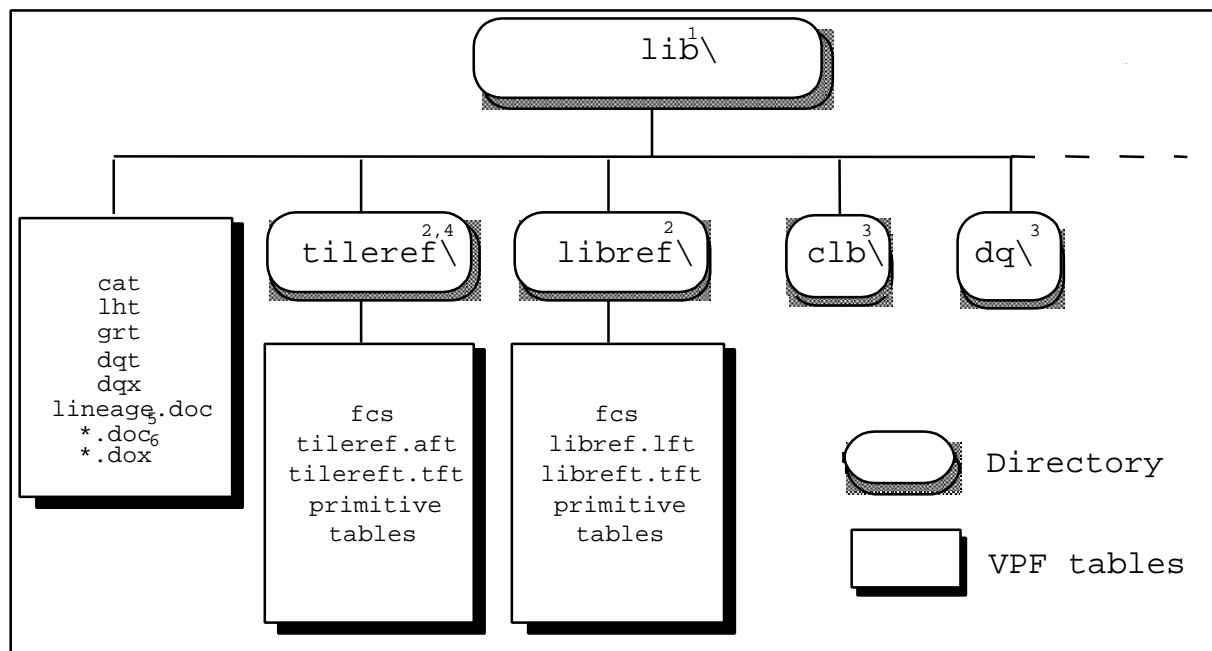


NOTE 1: These are representative directory names for VPF based libraries.

FIGURE 3. VPF based product database directory.

3.16.2 Library directory files. The contents of each VPF based product library are stored in a subdirectory within a database directory. The entire contents of one or more VPF libraries shall be contained on a CD-ROM. Library directory names reflect the content of the library and will be provided to the producer as part of the source package. A representation of the tables and files present in a library is given in FIGURES 4 and 5.

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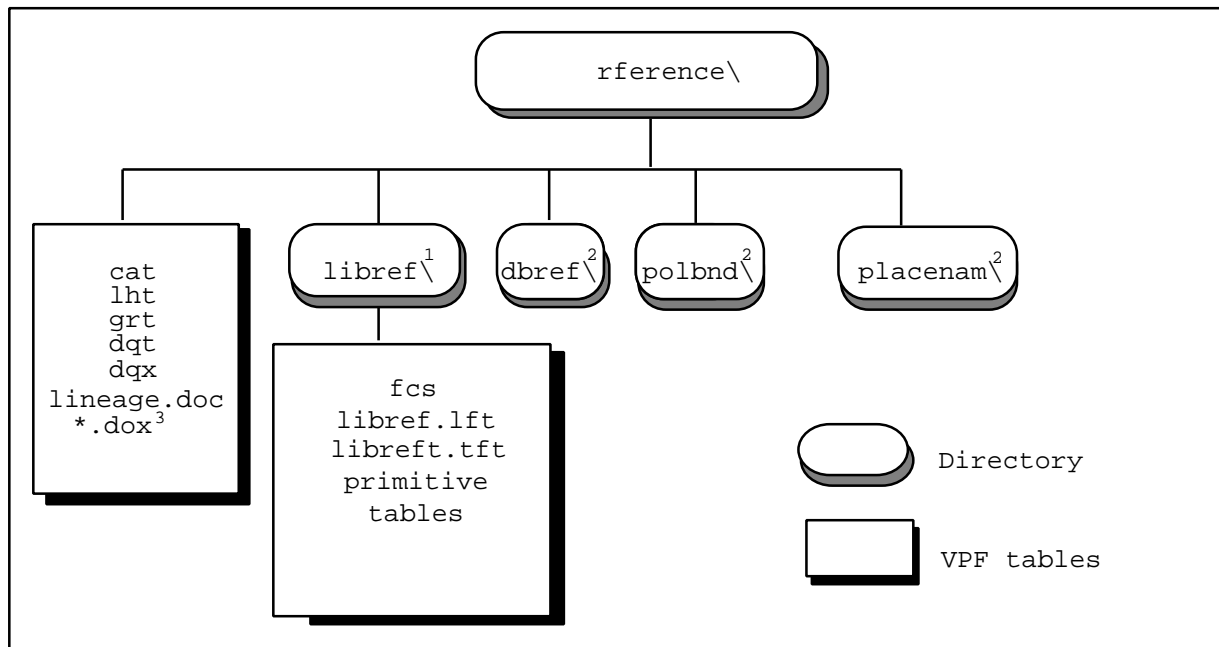


## NOTES:

1. This is a representative directory name for a VPF based product library.
2. These represent reference coverage directories.
3. These represent thematic coverage directories.
4. This coverage is required only when a library is tiled.
5. \*.doc file allows for the implementation of an optional glossary.doc file for translation of non-English text.
6. \*.dox file required for variable length lineage.doc file.

FIGURE 4. VPF based product data library structure.

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## NOTES:

1. Reference coverage directories.
2. Thematic coverage directories.
3. \*.dox file required for variable length lineage.doc file.

FIGURE 5. VPF based product reference library structure.

3.16.2.1 Library metadata. Each library directory shall contain the four mandatory metadata tables (coverage attribute table (cat), library header table (lht), geographic reference table (grt), and the data quality table (dqt)), a lineage narrative table (lineage.doc) and variable length indices (dqx) and (dox), as required by tables containing variable length fields. Content and format for the cat, lat, grt, and dqt, are defined in MIL-STD-2407 Section 5.3.5. Specific content information is located in APPENDIX D of this document. Additional guidance may be found in General and Technical guidance materials including product specific extraction guides.

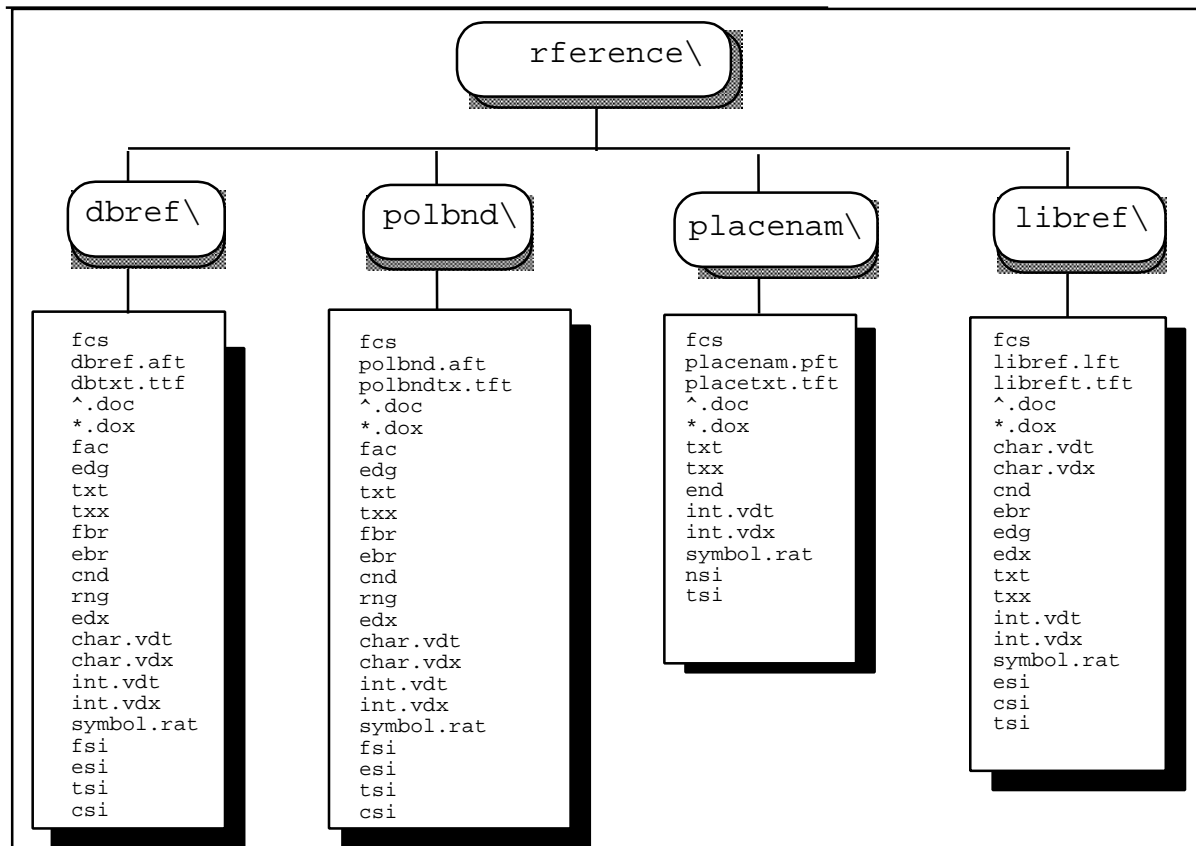
3.16.2.2 Narrative documentation tables. The lineage.doc table is a data quality file related to the dqt, which describes how the data was processed. It provides a textual description of the procedures used to collect the data in each library. The lineage.doc file will contain information on special processing techniques, verification procedures, and feature integration schemes. This information is common to all coverages in the library. Additional \*.doc table(s) are optional within the library level provided they contain information about the entire library. For example, some libraries may contain a glossary.doc file to provide a user with a translation of non-English terms.

3.16.2.3 Libref coverage. The libref coverage is defined in the MIL-STD-2407 Section 5.2.2.4.4. The libref coverage shall be implemented in all libraries and will be based on representative transportation, hydrography, and political/administrative boundary information in the library area as defined in the library attribute table (lat). Reference the associated specifications and APPENDIX C and D of this specification for product requirements.



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3.16.3 Coverage directory files. All coverages are contained within a library directory. All coverages within a library share the same coordinate system and are spatially registered to one another. Coverage directories shall not be included if data does not exist for that coverage within the library's geographic area. A library can contain a mix of tiled and untiled coverages as defined in MIL-STD-2407 Section 5.2.2.4. A list of the coverage directories implemented by NIMA vector products is shown in TABLE 2. Specifics on tables in the data coverages are found in the associated specifications. An example of VPF Reference library coverage tables and files is depicted in FIGURE 6.



## NOTE:

1. The asterisk (\*) is replaced with the prefix of the point, line, or area feature class name.
2. The caret (^) is replaced with the feature class name or attribute with which that doc file is associated.

FIGURE 6. Reference library overview.

3.16.3.1 Coverage metadata. The metadata tables and their content will vary with each coverage. Each coverage directory shall contain one feature class schema table (fcs). Coverages with tables using coded attributes shall contain value description table(s); character description table (char.vdt) for character coded, for example FACC codes, and integer value description (int.vdt) for integer coded attributes (ex. building function category (bfc)). All char.vdt and int.vdt will be tailored so as to contain only features and attributes which are specifically found within the library. Other optional metadata tables include documentation tables (e.g., \*.doc) that provide data quality and usability information in textual format pertaining to the

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coverage, a feature table, or an attribute column. Content and format for these tables are defined in MIL-STD-2407. Product-specific information is provided in the associated specifications. Additional guidance may be found in General and Technical guidance materials including product specific extraction guides.

a. Documentation tables. Documentation (or narrative) tables provide data quality and usability information that describes how the data was processed for a coverage. Topics can include processing tolerances, feature interpretation rules, and basic production quality assurance procedures. Three levels of documentation table may be present in a coverage. These levels include coverage, feature class, and attribute. The presence of documentation tables will vary with each coverage based on sources and data.

b. <Coverage> documentation table. Each coverage may have an optional documentation table. If present, this table shall be named so that the prefix contains the same name as the coverage, and the suffix is doc. This table may contain information that pertains to the lineage and data quality characteristics in general for all features for the coverage.

c. <Feature class> documentation table. Any feature class table may have an associated documentation table, <feature class>.doc, which is referenced in the feature class table header. Information in this table will pertain to all features in the feature class. The documentation table prefix will reflect the appropriate feature class.

d. <Attribute> documentation table. Any attribute column defined in a feature table may have an associated documentation table, <attribute>.doc, which is referenced in the table header and associated with the particular attribute column definition. This documentation table contains information pertaining to that attribute or its values for all features in the feature table. The documentation table prefix will reflect the appropriate attribute column name. If documentation tables are created for the same attribute column in multiple feature class tables within a coverage, each will have a separate documentation file identified by a unique prefix.

3.16.3.2 Coverage topology. The topology level of each coverage is specified in the coverage attribute table (cat) within each library. Topology is not supported between coverages.

#### 3.16.4 Feature class structure level.

3.16.4.1 Feature class definition. Feature class definitions with their associated features and attributes are provided in the associated specifications.

a. Number of feature classes. The complete set of possible feature classes within each coverage is described in the associated specifications; however, only those feature classes containing data shall be present in a coverage.

b. Text feature class. The text feature class may have an associated related attribute table called the symbol.rat. This table contains information that may be used to define the font, style, and point size of text strings. All text (both at the feature and primitive level) will be limited to the characters found in the Latin alphabet primary code table, FIGURE 24 of MIL-STD-2407.

3.16.4.2 Feature table structure and contents. All feature tables have the same structure. Each contains a row identifier column (or id) followed by an "f\_code" attribute column. An exception to this rule is found in the

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reference coverages (dbref.aft, polbnd.aft, placenam.pft, placetxt.tft, tileref.aft, and tileref.tft) which do not have an f\_code. The f\_code field for each record contains a five-character FACC code value. The heading of subsequent attribute columns, if present, is a three-character FACC attribute code. The attribute fields for each record will contain representative values for the corresponding f\_code. For the Reference library coverages and the tileref and libref coverages in the data library, the last column in every feature table is a primitive identifier column which contains primitive record identifier for the feature record. This column is identified as \*\_id (the \* is replaced with the end, cnd, edg, fac, or txt primitive table name). Examples of feature class tables for tiled and untiled coverages, and their associated join tables are illustrated in TABLES 8-21. All area and line feature classes in the data library thematic coverages shall implement the feature-to-primitive link using join tables per MIL-STD-2407 Section 5.3.3.2. For these feature classes, the tile\_id and prim\_id columns are located in the associated join table and not in the feature table. Point feature classes and text feature classes in the data library thematic coverages may or may not implement the feature-to-primitive link using join tables (see associated specifications). For point/text feature classes that implement join tables, the tile\_id and prim\_id columns are located in the associated join table, the same as for area and line feature classes. On point/text feature classes that do not implement join tables, the tile\_id and prim\_id columns are located in the feature table.

#### 3.16.4.2.1 Related attribute tables.

3.16.4.2.1.1 Notes related attribute tables. Notes related attribute tables (notes.rat) can be present in any data library thematic coverage when appropriate. These tables may appear in multiple coverages. The purpose of the notes related attribute table (notes.rat) is to capture, for each coverage, feature information not otherwise addressed in the existing point, line, or area feature attributes. Features are associated with entries in the notes.rat through an associated join table (\*.njt where \* is the feature class name). If the content of a particular notes.rat record applies to more than one feature in a coverage, the note should exist only once in the notes.rat and be referenced by its ID in the applicable join table records. Similarly, if more than one note applies to a feature, the feature\_id will be referenced in the appropriate join table records. No more than one notes.rat shall exist for each thematic coverage in the Data Library. If, within a feature class, no features reference the notes.rat, no \*.njt shall exist for that feature class. If no features in a coverage reference the notes.rat, no notes.rat shall exist for that coverage.

Within the Data Quality coverage, notes.rat will not be associated with the dqline.lft or dqarea.aft as these tables have their own associated related attribute tables and join tables. The notes.rat may, however, be associated with the dqvoida.aft. Tables 5 and 6 provide format information for the notes.rat and \*.njt tables.

3.16.4.2.1.2 Other related attribute tables. Related attribute tables may also be used to associate other information, such as a common name, with multiple features. See associated specifications for details concerning implementation of other related attribute tables.

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TABLE 5. Format for notes related attribute table.

Thematic Layer: <applicable layer> (e.g., Coastline/Boundaries or Elevation)  
 Coverage Name: <any coverage> (e.g., clb or ele)  
 Table Description: Notes Related Attribute Table  
 Table Name: notes.rat

```
{Header length}L;
Notes Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
note=T,*N,Additional Feature Attribute Information,-,-,-,;;
```

TABLE 6. Format for notes related join table.

Thematic Layer: <applicable layer> (e.g., Coastline/Boundaries or Elevation)  
 Coverage Name: <any coverage> (e.g., clb or ele)  
 Table Description: Notes Related Join Table  
 Table Name: \*.njt (e.g., markersp.njt or elevp.njt)

```
{Header length}L;
Notes Related Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*_id1=I,1,N,Feature Key,-,fidX.nti2,-,:
notes.rat_id=I,1,N, Related Attribute Table Row Identifier,-,notesX.nti2,-,:;
```

## NOTES:

1. The "\*" is replaced with the associated feature table name (e.g. markersp.pft or elevp.pft)
2. The "X" is replaced with the Thematic Index ID Number for the associated feature table.

3.16.4.2.2 Symbology. Feature symbology information is not stored in VPF. The symbology for the geometric features in a database is defined in the VPFVIEW or other application software. Diacritical marks and non-Roman characters for text are not incorporated in NIMA product databases. The text feature table in each coverage has an associated symbol related attribute table (symbol.rat), which provides information on how to symbolize text for representation on a plot or lithograph.

The symbol related attribute table (TABLE 7) may be present whenever a text feature table is present in a data coverage. The symbol.rat defines the fonts, font sizes, text style, and color for each text record specified in a text feature table. There is a many-to-one correspondence between the records in the text feature table and the symbol.rat.

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TABLE 7. Symbol related attribute table.

Thematic Layer: <applicable layer>  
 Coverage Name: <any coverage> (e.g., clb or ele)  
 Table Description: Symbol Related Attribute Table  
 Table Name: symbol.rat

```
{Header length}L;
Symbol Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
clt=S,1,N,Color of Text,int.vdt,-,-,:
fon=S,1,N,Type of Font,int.vdt,-,-,:
size=S,1,N,Font Size in Points,-,-,-,:
sty=S,1,N,Style of Text,int.vdt,-,-,;
```

<u>Column</u>	<u>Description</u>	<u>Value</u>	<u>Value Meaning</u>
id	Row Identifier	Sequential	beginning with 1
clt	Color of Text	1	Black
		2	Blue
		3	Red-brown
		4	Magenta
fon	Type of Font	1	Machine Default
size	Font Size in Points	4	
		5	
		6	
		7	
		8	
		9	
		10	
		12	
sty	Style of Text	1	Kern
		2	Proportional
		3	Constant

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TABLE 8. Format for a point feature table (lndfrmp.pft) in a tiled coverage.

{Header length}L; Landform Point Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; f_code=T,5,N,Facc Feature Code,char.vdt,f_codeX.pti <sup>2</sup> ,-,,: mcc=S,1,N,Material Composition Category,int.vdt,-,-,; rkf=S,1,N,Rock Formation Type,int.vdt,-,-,;:			
1	BJ060	103	-32768
2	DB160	-32768	3
:	:	:	:
n	n	n	n

## NOTES:

1. tile\_id and end\_id are found in the associated join table.
2. The "X" is replaced with the Thematic Index ID Number for the point feature table as defined in the associated specification

TABLE 9. Format for a point feature table (lndfrmp.pft) in an untiled coverage.

{Header length}L; Landform Point Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; f_code=T,5,N,Facc Feature Code,char.vdt,f_codeX.pti <sup>2</sup> ,-,,: mcc=S,1,N,Material Composition Category,int.vdt,-,-,; rkf=S,1,N,Rock Formation Type,int.vdt,-,-,;: end_id=I,1,N,Entity Node Primitive ID,-,endX_id.pti <sup>2</sup> ,-,,:;					
1	BJ060	103	-32768	1	1
2	DB160	-32768	3	2	2
:	:	:	:	:	:
n	n	n	n	n	n

## NOTES:

1. Primitive Id rows will not be present when join tables are implemented.
2. The "X" is replaced with the Thematic Index ID Number for the point feature table as defined in the associated specification.

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TABLE 10. Format for a point join table (lndfrmp.pjt).

```
{Header length}L;
Landform Point Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
lndfrmp.pft_id=I,1,N,Feature Key,-,lndfrmp.jti,-,:
tile_id=S,1,N,Tile Reference ID,-,tilX_id.jti1,-,:
end_id=I,1,N,Entity Node Primitive ID,i-,endX_id.jti1,-,:;
```

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the associated point feature table as defined in the associated specification.

TABLE 11. Format for a line feature table(bluffl.lft) in a tiled coverage.

```
{Header length}L;
Bluff Line Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
hgt=I,1,N,Height Above Surface Level (meters),int.vdt,-,-,:;
```

1	DB010	0
:	:	:
n	n	n

## NOTES:

1. Tile\_id and edg\_id are found in the associated join table.

TABLE 12. Format for a line feature table(bluffl.lft) in an untiled coverage.

```
{Header length}L;
Bluff Line Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
hgt=I,1,N,Height Above Surface Level (meters),int.vdt,-,-,:
edg_id=I,1,N,Edge Primitive ID,-,edgX_id.lti2,-,:;
```

1	DB010	0	1	1
:	:	:	:	:
n	n	n	n	n

## NOTES:

1. Primitive Id rows will not be present when join tables are implemented.

2. The "X" is replaced with the Thematic Index ID Number for the line feature table as defined in the associated specification.

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TABLE 13. Format for a line join table (bluffl.ljt).

```
{Header length}L;
Bluff Line Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
bluffl.lft_id=I,1,N,Feature Key,-,bluffl.jti,-,:
tile_id=S,1,N,Tile Reference ID,-,tilX_id.jti1,-,:
edg_id=I,1,N,Edge Primitive ID,-,edgX_id.jti1,-,:;
```

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the associated line feature table as defined in the associated specification.

TABLE 14. Format for a area feature table (grounda.aft) in a tiled coverage.

```
{Header length}L;
Ground Area Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,f_codeX.at2i,-,:
mcc=S,1,N,Material Composition,int.vdt,-,-,:;
```

1	DA010	46
2	DB135	-32768
:	:	:
n	n	n

## NOTES:

1. tile\_id and fac\_id are found in the associated join table.  
 2. The "X" is replaced with the Thematic Index ID Number for the area feature table as defined in the associated specification.

TABLE 15. Format for an area feature table (grounda.aft) in an untiled coverage.

```
{Header length}L;
Ground Area Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,f_codeX.at2i,-,:
mcc=S,1,N,Material Composition,int.vdt,-,-,:
fac_id=I,1,N,Face Primitive ID,-,facX_id.at2i,-,:;
```

1	DA010	46	1	2
2	DB135	-32768	2	3
:	:	:	:	:
n	n	n	n	n

## NOTES:

1. Primitive Id rows will not be present when join tables are implemented.  
 2. The "X" is replaced with the Thematic Index ID Number for the area feature table as defined in the associated specification.



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TABLE 16. Format for an area join table (grounda.ajt).

```
{Header length}L;
Ground Area Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
grounda.aft_id=I,1,N,Feature Key,-,grounda.jti,-,:
tile_id=S,1,N,Tile Reference ID,-,tilX_id.jti1,-,:
fac_id=I,1,N,Face Primitive ID,-,facX_id.jti1,-,:;
```

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the associated area feature table as defined in the associated specification.

TABLE 17. Format for a text feature table (hydrotxt.tft) in a tiled coverage.

```
{Header length}L;
Hydrography Text Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,-,f_codeX.tti2,-,:
symbol.rat_id=I,1,N,Symbol Identification,-,-,-,:;
```

1	ZD040	TBD <sup>1</sup>
2	ZD045	TBD <sup>1</sup>
:	:	:
n	n	n

## NOTES:

1. The tile\_id and txt\_id are found in the associated join table.  
 2. The "X" is replaced with the Thematic Index ID Number for the text feature table as defined in the associated specification.

TABLE 18. Format for a text feature table (hydrotxt.tft) in an untiled coverage.

```
{Header length}L;
Hydrography Text Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,-,f_codeX.tti2,-,:
symbol.rat_id=I,1,N,Symbol Identification,-,-,-,:
txt_id1=I,1,N,Text Primitive ID,-,txtX_id.tti2,-,:;
```

1	ZD040	TBD <sup>1</sup>	23
2	ZD045	TBD <sup>1</sup>	45
:	:	:	:
n	n	n	n

## NOTES:

1. Primitive Id rows will not be present when join tables are implemented.  
 2. The "X" is replaced with the Thematic Index ID Number for the text feature table as defined in the associated specification.

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TABLE 19. Format for a text join table (hydrotxt.tjt).

```
{Header length}L;
Hydrography Text Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
hydrotxt.tft_id=I,1,N,Feature Key,-,hydrotxt.jti,-,:
tile_id=S,1,N,Tile Reference ID,-,tilX_id.jti1,-,:
txt_id=I,1,N,Text Primitive ID,-,txtX_id.jti1,-,:;
```

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the associated text feature table as defined in the associated specification.

TABLE 20. Format for a complex feature table (mtrc.cft)

{Header length}L;				
Military Training Route Complex Feature Table;-;				
id=I,1,P,Row Identifier,-,-,-,:;				
f_code=T,5,N,FACC Feature Code,char.vdt,f_codeX.cti <sup>1</sup> ,-,:;				
eft=T,*N,Effective Times (From-To),char.vdt,-,-,:;				
ora=T,*N,Originating Activity,-,-,-,:;				
sca=T,*N,Scheduling Activity,-,-,-,:;				
1	GA010	UNK	UNK	UNK
:	:	:	:	:
n	n	n	n	n

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the complex feature table as defined in the associated specification.

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TABLE 21. Format for a complex join table (\*.cjt).

\*There will be a cjt for each base feature table that is a component of the complex feature. The prefix of the cjt tables will be the prefix of the base feature table.

```
{Header length}L;
MTR Action Node Complex Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
mtrc.cft_id=I,1,N,Complex Feature Key,-,cftX_Y.jti1,2,-,,:
mtractc.pft_id=I,1,N,Base Feature Key,-,*ftY_X.jti1,2,3,-,,:;
```

## NOTES:

1. The "X" is replaced with the Thematic Index ID Number for the associated complex feature table as defined in the associated specification.
2. The "Y" is replaced with the Thematic Index ID Number for the associated base feature table as defined in the associated specification.
3. The "\*" is replaced with one of p, l, a, c, or t depending on the type of the base feature table.

3.16.5 Primitive tables and associated files. The primitive tables contained in any coverage are dependent on the coverage's topology level as defined in the coverage attribute table (cat) and the feature classes present in that coverage, and are illustrated in FIGURE 2. The foreign key columns contained in primitive tables shall be tailored to the coverage's topology level according to MIL-STD-2407 Section 5.3.2. Primitive level supporting files, defined in MIL-STD-2407 Section 5.4, are implemented as shown in the data level overview FIGURE (FIGURE 2) and defined in section 3.14 and below. TABLES 22 through 27 define the format to be used for VPF primitive tables in both tiled and untiled coverages. Table 28 defines the format to be used for all minimum bounding rectangle tables, either at the primitive level (ebr, fbr) or the feature level (\*.pbr, \*.lbr, \*.abr, \*.cbr, \*.tbr).

TABLE 22. Format for an entity node primitive table (end).

```
{Header length}L;
Entity Node Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*.pft_id1=I,1,N,Feature ID,-,-,-,:
containing_face2=I,1,N,Foreign Key to Face Table,-,-,-,:
coordinate=Z/C3,1,N,Coordinate of Entity Node,-,-,-,:;
```

## NOTES:

1. This column is only carried for point feature tables in the reference library coverages and in the tileref, libref, and dq coverages in the data library. All other thematic coverages in the data library shall carry the feature ID in the end.fit table.
2. This column shall exist only for coverages of level 3 topology
3. The Z coordinate type shall be used for coverages defined as 3-dimensional and the C coordinate type shall be used for coverages defined as 2-dimensional. See the appendices herein and the associated specifications for the appropriate product-specific definitions.

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TABLE 23. Format for a connected node primitive table (cnd).

```
{Header length}L;
Connected Node Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*.pft_id1=I,1,N,Feature ID,-,-,-,:
first_edge=I/K2,1,N,Foreign Key to Edge Table,-,-,-,:
coordinate=Z/C3,1,N,Coordinate of Connected Node,-,-,-,:;
```

## NOTES:

1. This column is only carried for node feature tables in the reference library coverages and in the tileref, libref, and dq coverages in the data library. All other thematic coverages in the data library shall carry the feature ID in the cnd.fit table.
2. Column type "K" is implemented for coverages that are tiled. Column type "I" is implemented for coverages that are untiled.
3. The Z coordinate type shall be used for coverages defined as 3-dimensional and the C coordinate type shall be used for coverages defined as 2-dimensional. See the appendices herein and the associated specification for the appropriate product-specific definitions.

TABLE 24. Format for an edge primitive table (edg).

```
{Header length}L;
Edge Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*.lft_id1=I,1,N,Feature ID,-,-,-,:
start_node=I,1,N,Start Node,-,-,-,:
end_node=I,1,N,End Node,-,-,-,:
right_face2=K/I3,1,N,Right Face,-,-,-,:
left_face2=K/I3,1,N,Left Face,-,-,-,:
right_edge=K/I3,1,N,Right Edge from End Node,-,-,-,:
left_edge=K/I3,1,N,Left Edge from Start Node,-,-,-,:
coordinates=Z/C4,*,N,Coordinates of Edge,-,-,-,:;
```

## NOTES:

1. This column is only carried for line feature tables in the reference library coverages and in the tileref, libref, and dq coverages in the data library. All other thematic coverages in the data library shall carry the feature ID in the edg.fit table.
2. This column shall exist only for coverages of level 3 topology
3. Column type "K" is implemented for coverages that are tiled. Column type "I" is implemented for coverages that are untiled.
4. The Z coordinate type shall be used for coverages defined as 3-dimensional and the C coordinate type shall be used for coverages defined as 2-dimensional. See the appendices herein and the associated specification for the appropriate dimensional definitions.

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TABLE 25. Format for a face primitive table (fac).

```
{Header length}L;
Face Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*.aft_id1=I,1,N,Feature ID,-,-,-,:
ring_ptr=I,1,N,Foreign Key to Ring Table,-,-,-,;;
```

## NOTES:

1. This column is only carried for area feature tables in the reference library coverages and in the tileref, libref, and dq coverages in the data library. All other thematic coverages in the data library shall carry the feature ID in the fac.fit table.

TABLE 26. Format for a ring table (rng).

```
{Header length}L;
Ring Table;-;
id=I,1,P,Row Identifier,-,-,-,:
face_id=I,1,N,Foreign Key to Face Table,-,-,-,:
start_edge=I,1,N,Foreign Key to Edge Table,-,-,-,;;
```

TABLE 27. Format for a text primitive table (txt).

```
{Header length}L;
Text Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
string=T,*N,Text String,-,-,-,:
shape_line=C,*N,Shape of Text String,-,-,-,;;
```

TABLE 28. Format for a bounding rectangle table (ebr, fbr, \*.pbr, \*.lbr, \*.abr, \*.cbr, \*.tbr).

```
{Header length}L;
Bounding Rectangle Table;-;
id=I,1,P,Row Identifier,-,-,-,:
xmin=F,1,N,Minimum X Coordinate,-,-,-,:
ymin=F,1,N,Minimum Y Coordinate,-,-,-,:
xmax=F,1,N,Maximum X Coordinate,-,-,-,:
ymax=F,1,N,Maximum Y Coordinate,-,-,-,;;
```

3.17 Tiling. Thematic data at the coverage level in each data library may be tiled in order to manage the large amounts of data. Tiling is defined in MIL-STD-2407 Sections 5.2.2.3.3 and 5.2.2.3.4. In current VPF based products, the reference library coverages as well as the data library reference coverages (tileref and libref) are not tiled. All data library

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thematic coverages may be tiled. Product specific tiling requirements are defined in each associated specification. The tileref coverage defines the tiling scheme for all tiled coverages in the library. Tile names are derived from linked pairs of GEOREF alphanumeric characters which represent the tile's coordinate location. When tiled, libraries shall be partitioned in a systematic tile structure based upon expected data density.

All coverages in a library share the same coordinate system. All tiled coverages in a library share the same tiling structure and GEOREF naming convention. Any coverage within a tiled library may be untiled. This would, typically, occur when that coverage only contains a limited number of feature occurrences for that library's geographic area. Although a coverage is said to be tiled, tiling of data actually occurs at the primitive level. Feature tables are stored intact directly under the coverage directory. Tile directories are located directly under the coverage directories. The primitive tables are created separately for each tile and are stored under the tile directories. There shall be no subdirectory carried in a coverage directory for any tile that is devoid of data in that coverage (topology levels 0,1,2). However, for topology level 3 coverages, the existence of face 1 requires a tile subdirectory reference MIL-STD-2407 Section 5.2.2.3.3. An example of the tiles table and file organization for a tiled coverage is depicted in FIGURE 7.

3.17.1 Tiling schemes. Libraries in a database will contain data in variable sized tiles as defined in the tileref of each library. A tiling scheme with tiles of various sizes is illustrated in this section. Typically, uniform tiles of a standard size will be used. A preferred tile size for each product is defined in the associated specifications. However, the tiling scheme may change by library when data density indicates that smaller or larger tiles are desirable. A combination of small and large tiles may be used within a library when appropriate. In addition, data coverages within a tiled library which contain a limited number of feature occurrences could be untiled, resulting in a combination of tiled and untiled data coverages for that library.

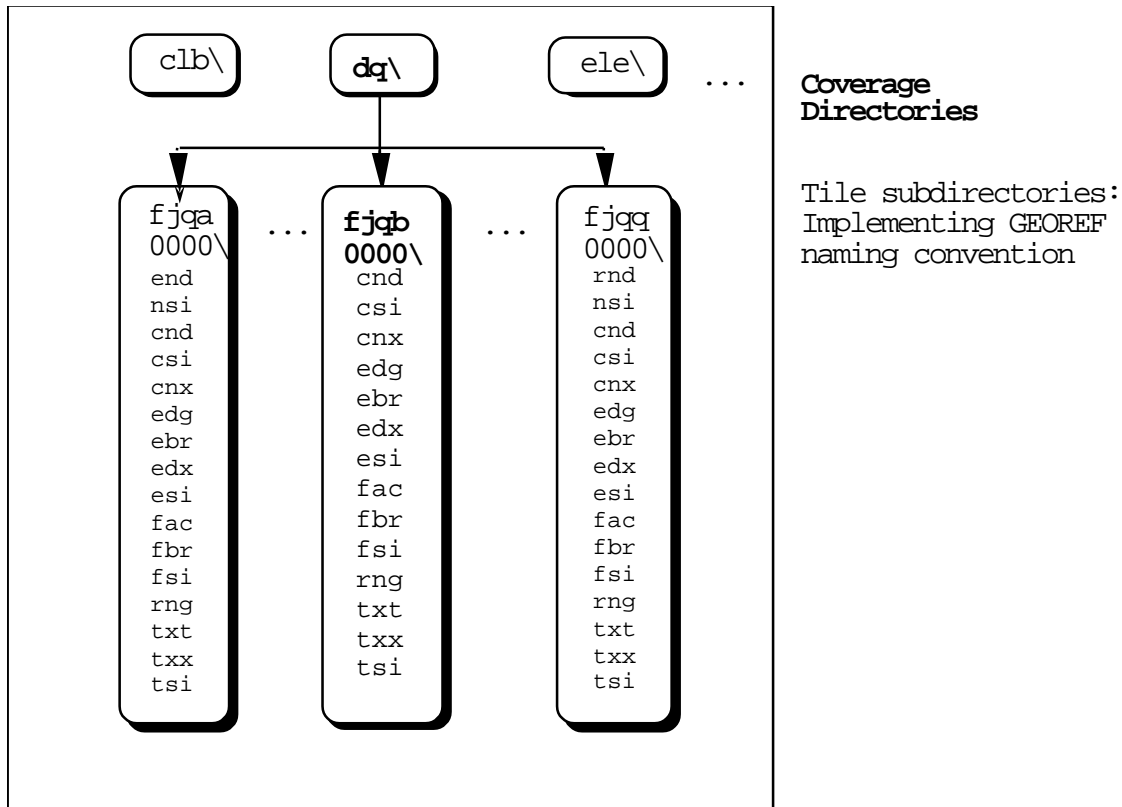
3.17.2 Tile directory description and naming. The first pair of letters in a tile name represents the coarsest, 15° by 15° standard GEOREF division, and represents the first coordinate pair identifying the tile name. The first letter represents the southwest coordinate in the x direction (longitude). The second letter represents the southwest coordinate in the y direction (latitude). There are a total of 288 15° by 15° cells globally (FIGURE 8).

The second pair of letters represents the 1° by 1° standard GEOREF divisions, and represents the second coordinate pair of the tile name. The first letter of this pair represents the x coordinate (longitude) of the southwest corner of the tile. There are a maximum of 15 subdivisions lettered from A to Q (omitting I and O) according to the 1° bands of GEOREF longitude zones. The second letter represents the y coordinate (latitude) of the southwest corner of the tile. There are a maximum of 15 subdivisions lettered from A to Q (omitting I and O) according to the 1° bands of GEOREF latitude zones. These letters partition each 15° by 15° GEOREF cell into a total of 225 1° by 1° cells (FIGURES 8 and 9) .

The fifth, sixth, seventh, and eighth characters in the name represent a GEOREF coordinate pair for the southwest corner of the tile. The coordinates are equivalent to arc minute values. These numbers use the GEOREF concept to represent this division. Both numbers of the coordinate pair are two characters in length. The first number in the pair represents the x coordinate (longitude) of the southwest corner of the tile. The second number represents the y coordinate (latitude) of the southwest corner of the tile.

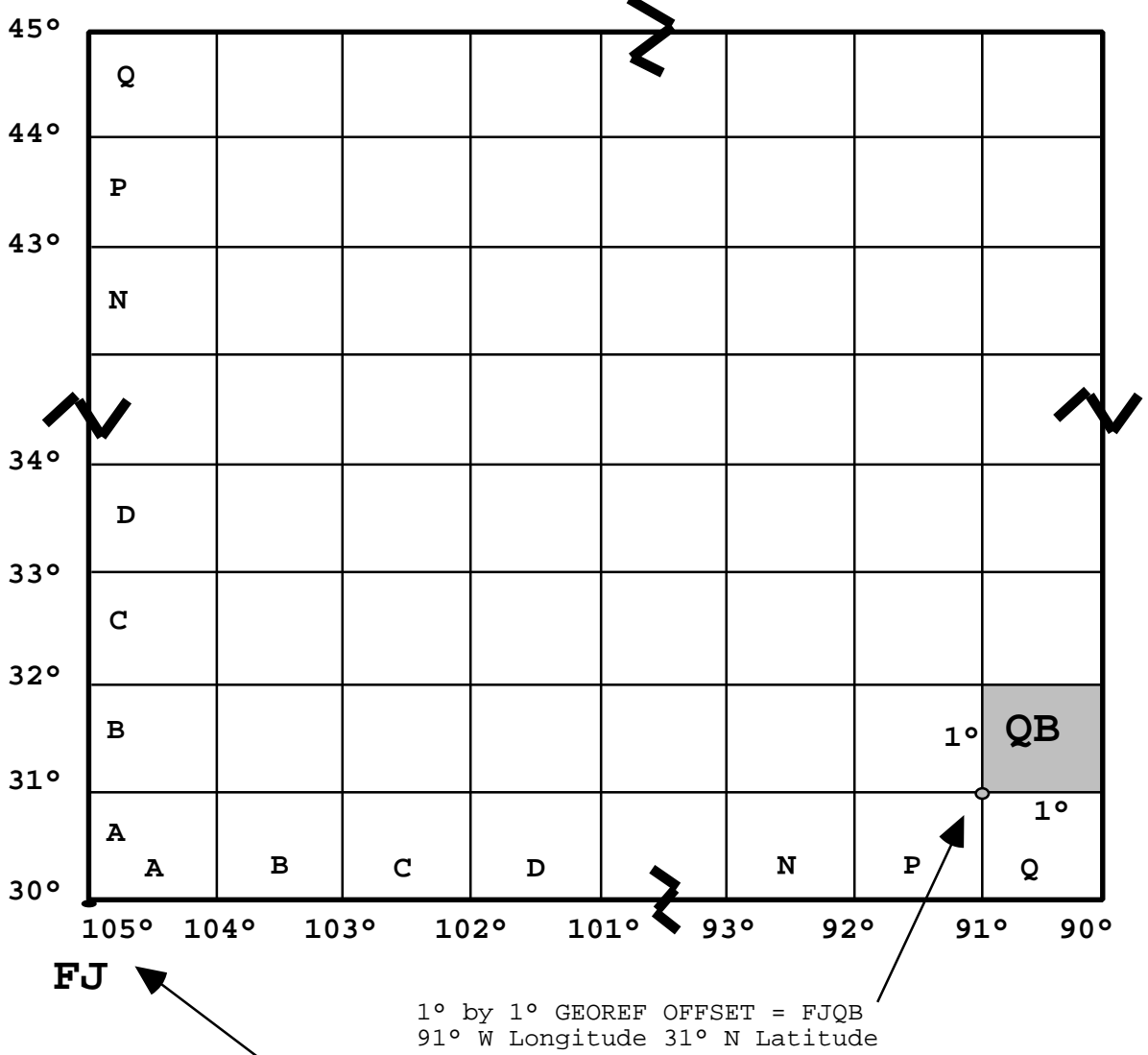
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Note that the x and y GEOREF coordinates are always positive, increasing from the southwest corner (origin) of the 1° by 1° cell. Therefore, in the western hemisphere, this x value is the "inverse" of the geographic longitude. Similarly in the southern hemisphere, the y value is the "inverse" of the latitude value. For example, the 15' by 15' tile name containing data located at 90°45' east longitude and 31°00' north latitude is FJQB1500 (FIGURES 7, 8 and 9). For irregular areas (for example, FJQB4530 in FIGURE 9), the southernmost point of the most western boundary is considered the southwest corner. Directory names shall be tailored by product, if required, in order to maintain an eight character limit. Directory names shall be subdivided into the minimal number of subdirectories to adequately define the directory path name. Directory hierarchy must be structured in such a manner that a directory filename does not exceed eight characters. In order to maintain this eight character limit additional directory levels may be required. A limit of 8 directory levels has been established by ISO 9660.

FIGURE 7. Tile directory hierarchy

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TILING SCHEME BASED ON GEOREF



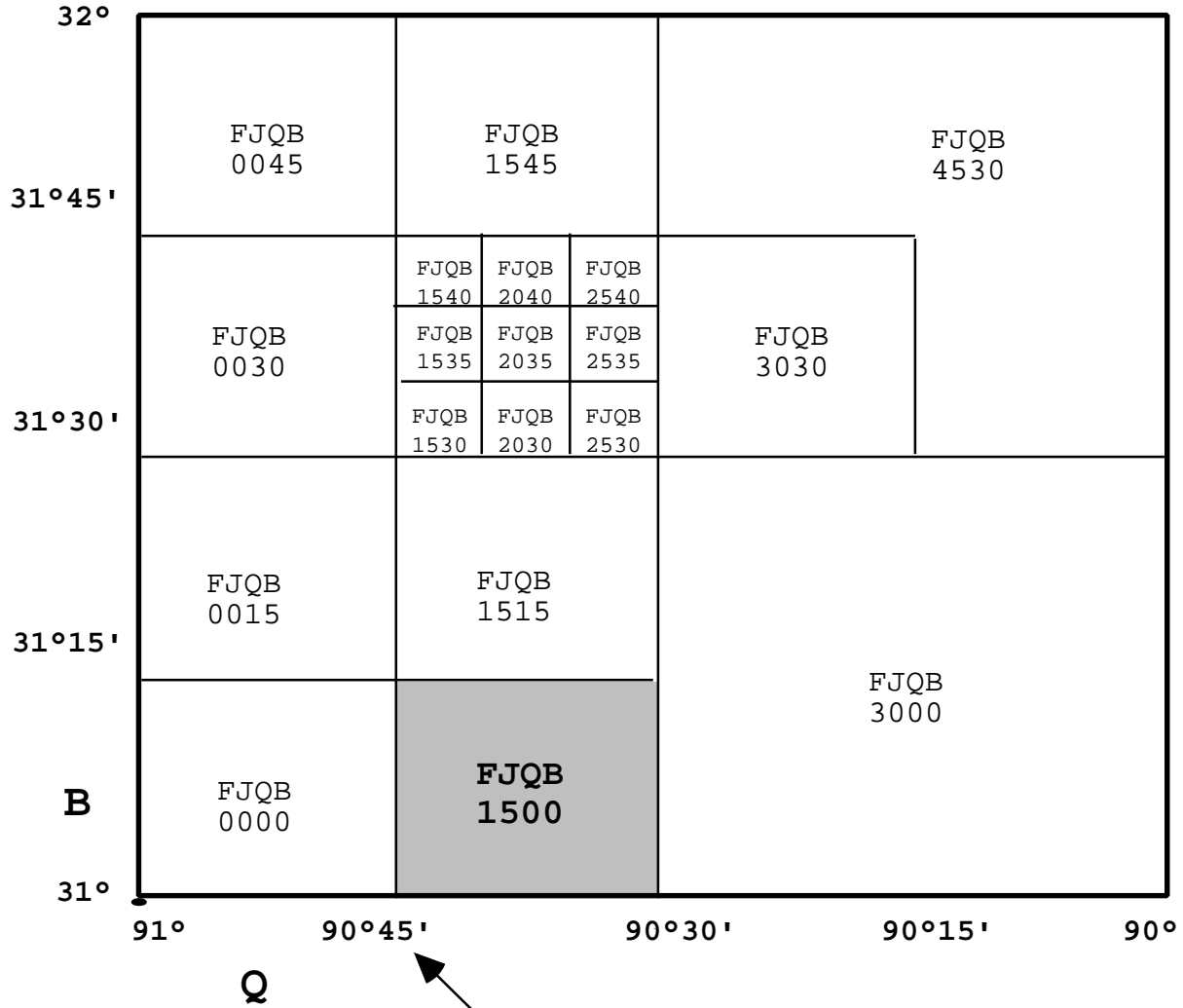
GEOREF 15° x 15° OFFSET = FJ  
105° W Longitude, 30° N Latitude

FIGURE 8. Coordinates for a 15° by 15° cell of GEOREF system (FJ).



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1° by 1° GEOREF OFFSET = FJQB  
 91° W Longitude 31° N Latitude



15' x 15' tile in VMap database  
 90°45' W Longitude 31° N Latitude

FIGURE 9. Example VMap tiles (FJQB1500) coordinates for GEOREF 1° by 1° cell of (FJQB).

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3.18 Distribution medium. VPF based products will be distributed on CD-ROM disc implementing ISO 9660 for CD-ROM formatting.

3.18.1 CD ROM labeling and packaging. CD ROM labeling, and labeling on the cardboard sleeve, or jewel case liner/information booklet, as applicable, shall be in accordance with NI 8955.1, NIMA CD-ROM Labeling and Packaging. Method of packaging (cardboard sleeve or jewel case) shall be as specified in the contract (see 5.1).

3.18.2 CD labeling. Labeling of VPF based product CDs shall be in accordance with NI 8955.1.

3.18.2.1 Product specific items. The CD label shall contain the specific information as identified in individual source packages or the associated product specifications.

3.18.2.2 Volume identifier. This should be identical to the eleven characters of the Volume Identifier (first eleven characters of the ISO 9660 Volume Identifier (32 characters available)) written on the header of the disk (see MIL-HDBK-9660).

3.18.3 Information booklet. Information booklets shall be provided for all VPF based product CDs. Labeling of the information booklet covers shall be in accordance with NI 8955.1. When used in conjunction with the jewel case, the front cover of the information booklet also serves as the front cover of the case.

3.18.3.1 Information booklet text. The interior pages of the information booklet shall contain the following statement:

"USERS SHOULD REFER CORRECTIONS, ADDITIONS, AND COMMENTS TO THE NIMA CUSTOMER HELP DESK: 1-800-455-0899, COMMERCIAL 314-260-1236, DSN 490-1236, OR WRITE TO: DIRECTOR, NATIONAL IMAGERY AND MAPPING AGENCY, ATTN: CUSTOMER SUPPORT/COD, 12310 SUNRISE VALLEY DRIVE, RESTON, VA 20191-3449."

Other information contained in the information booklet is specified in the associated specifications.

3.18.4 Jewel case liner (back cover of case). Labeling of the jewel case liner shall be in accordance with NI 8955.1.

3.18.5 Cardboard sleeve mailer. If a cardboard mailing sleeve is specified in the contract, it shall be labeled in accordance with NI 8955.1.

3.18.6 Bar coding on CD-ROM cases. The National Stock Number (NSN) bar code, NIMA Reference Number, and edition/effective date on the front of the CD-ROM case shall be shown in accordance with NI 8955.1, and MIL-STD-2414.

3.19 CD ROM Packaging.

3.19.1 Packaging container. The outer container shall be used to distribute and store VPF based product materials. The outer container shall consist of a cushioned plastic. The database name and a bar code shall be present on the outer container. The entire outer container shall be shrink-wrapped prior to shipping.

3.19.2 Package information. A packing list shall be included in the product package to notify a user of the contents of the VPF based data.

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3.19.3 Installation instructions. Installation instructions shall be provided on a separate sheet in the package, or as part of the jewel case insert.

3.20 Security.

3.20.1 Security classification. The security classification of the products generated by the use of these specifications will be the lowest category practicable. When it is necessary to assign a security classification to the product, it shall be in accordance with established national security procedures.

Specific classification of data is dependent on the geographic location of the data portrayed. When multiple areas (i.e. tiles, libraries) are written to a CD, the compact disc will carry the classification of the highest classified dataset contained by that CD.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2)
- b. Conformance inspection (see 4.3)

4.2 First article inspection. When a first article inspection is required, the product shall be examined as specified in 4.3.1, and the construction record reviewed for compliance with 4.3.2 and 4.3.3.

4.3 Conformance inspection. Conformance inspection shall include the examinations of 4.3.1, 4.3.2 and 4.3.3.

4.3.1 Review of data extraction records. Records relevant to the data extraction shall be maintained. The records shall document sources, decisions regarding reconciliation of conflicting data, etc. Records shall be reviewed concurrently with visual examinations (see 4.3.2) to ensure that proper cartographic procedures have been followed.

4.3.2 Visual review. The digital data shall be examined for defects and errors as specified by the contract or Government. Any defects or errors detected shall be corrected. Defects detected during the inspection of the digital file shall be evaluated by NIMA for criticality, and suitable corrective action.

4.3.3 VPF compliance. Data shall be inspected for conformance to the product specifications in accordance with NIMA quality control procedures. The inspection shall also verify compliance of the data format per MIL-STD-2407. Defects detected during the inspection of the digital file shall be evaluated by NIMA for criticality, and suitable corrective action.

5. PACKAGING

5.1 Packaging. For acquisitions purposes, the packaging requirements shall be as specified in the contract or order. When actual packaging of material is to be performed by DoD personnel, these personnel shall contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or

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Defense Agency, or within the Military Department's Systems Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1. General usage. VPF based products are intended for use as general purpose databases which can support GIS applications. Individual products provide a wide range of resolutions from high resolution to low resolution to support specific user needs. Refer to the individual product associated specifications for a more detailed description of intended use.

Some of the associated products covered by this general specification will be military unique, because they are intended to support the planning and execution of military operations, and will contain data that is either classified, or that will have a distribution restricted to DoD only. Others may be made available to the public. Regardless of whether or not the product has application in the commercial sector, the format (directory structures, libraries, coverages, tables, table header information, etc.) of VPF data sets must be defined for application software to access and use the data.

6.2. Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issue of the DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. When a first article is required (see 3.1 and 4.2).
- d. Packaging requirements (see 5.1).

6.3. Supersession. This section is not applicable to this specification.

6.4. Definitions. Refer to MIL-STD-2407 for definition of terms used in this specification that are not defined below.

6.4.1. Absolute horizontal accuracy. This represents the difference between the recorded horizontal coordinates of features and their true positions with respect to the World Geodetic System (WGS). Absolute horizontal accuracy is expressed as a circular error at 90 percent probability (.9p).

6.4.2. Absolute vertical accuracy. This represents the difference between an assigned elevation and the true elevation at a specific point. In this comparison, both elevations must be referenced to the same vertical datum. Absolute vertical accuracy is expressed as a linear error at 90 percent probability (.9p).

6.4.3. Circular error (CE). An accuracy figure representing the stated percentage of probability that any point expressed as a function of two linear components (e.g., horizontal position) will be within the given figure.

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6.4.4 Linear error (LE). A one dimensional error (such as an error in elevation) defined by the normal distribution function.

6.5 Acronyms.

ANSI	American National Standards Institute
ASCC	Air Standardization Coordinating Committee Agreements
CD-ROM	Compact Disc - Read Only Memory
CE	Circular Error
DMA	Defense Mapping Agency
DoD	Department of Defense
DODISS	Department of Defense Index of Specifications and Standards
DODSSP	DoD Single Stock Point for Specifications and Standards
DOS	Disk Operating System
FACC	Feature Attribute Coding Catalog
GEOREF	Geographic Reference System
GIS	Geographic Information System
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
LE	Linear Error
MC&G	Mapping, Charting, and Geodesy
MSL	Mean Sea Level
NIMA	National Imagery and Mapping Agency
QA	Quality Assurance
QC	Quality Control
STANAG	NATO Standardization Agreement
TLM	Topographic Line Map
VMap	Vector Map
VPF	Vector Product Format
WGS	World Geodetic System

6.6 Subject term (key word) listing.

Chart  
 FACC  
 GEOREF  
 GIS  
 Map  
 Thematic layer  
 Vector  
 VPF  
 WGS84

6.7 Standardization agreements. Certain provisions of this specification are the subject of international standardization agreements. When amendment, revision, or cancellation of this specification is proposed that will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels,

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including departmental standardization offices, to change the agreement or make other appropriate accommodations.

6.7.1 NATO standardization agreements (STANAGs)

STANAG 2211, "Geodetic Datums, Spheroids, Grids, and Cell References".

6.8 Interoperability. The VPF based products are designed to support interoperability. As such it is highly recommended that systems for production and data use be designed in such a manner as to implement the VPF standard. Systems built to implement individual product specifications do not afford the same level of flexibility and interoperability as those designed to implement the VPF MIL-STD-2407.

6.9 NIMA customer help desk. For questions concerning this or other NIMA products, services, or specifications, please telephone the NIMA Customer Help Desk at 1-800-455-0899, Commercial 314-260-1236, or DSN 490-1236.

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## APPENDIX A

## VPF DATA DICTIONARY ORGANIZATION

## A.1 SCOPE

This appendix contains the data dictionary organization for VPF based products. It is a mandatory part of this specification. The information contained herein is intended for compliance.

## A.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

## A.3 VPF DATA DICTIONARY ORGANIZATION

A.3.1 Data dictionary organization. The data provided in this appendix are organized according to VPF structure levels. The database tables appear first; they are described in Appendix B. The information provided in database tables applies to the entire database. The database contains two types of libraries: the reference library described in Appendix C, and data libraries (containing the product data) described in Appendix D. Appendix C contains the reference library VPF library level tables, the reference coverage (libref) and the data coverages. Appendix D contains the data library VPF library level tables and the reference coverages (tileref and libref). Appendix E contains a complete description of the Data Quality coverage. The Data Quality coverage is common among all VPF based products.

For this data dictionary, a brief description of each feature table is provided. All VPF tables consist of a header that is followed by the actual record contents. This appendix contains examples of the records that may be contained in actual tables. The data structure and contents for both the metadata tables and feature tables that may be present within a coverage are defined in this appendix. Tables not described in this appendix are described in MIL-STD-2407. The format of metadata tables (such as documentation tables) is defined in MIL-STD-2407 section 5.3.5 - 5.3.8, the format and structure of index files are defined in MIL-STD-2407 section 5.4 and the format and structure of primitive tables are defined in MIL-STD-2407 sections 5.3.2 and 5.4.

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## APPENDIX A

A.3.2 Notes regarding table format.

a. The header portion of each table (top half of each illustration) defines the entries required for the VPF table header; the content portion (bottom half) of each table provides sample record entries for the data fields.

b. A semicolon (;) is a separator for the four components of a header.

c. The colon (:) indicates the end of a column definition.

d. Carriage returns are embedded in the text for readability only. All header information shall be a continuous string of characters with no carriage returns.

e. For more information on the format of a VPF table, see section 3.13 of this document and VPF MIL-STD-2407 section 5.2.

f. For tables with a large number of columns and only one record entry (i.e., dht, lht, grt), the backslash character (\) at the end of a line in the data records section indicates that the record entry is continued for each column for that record; no carriage returns are implied. This format permits the data records for a large number of columns to be represented so that they may fit on a page of this appendix.

g. Those records that vary from product to product or from library to library are identified in the tables.



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## APPENDIX B

## PRODUCT DATABASE VPF TABLES AND CONTENTS

## B.1 SCOPE

This appendix describes the structure and content of each VPF table in the VPF based product database directories. It is a mandatory part of this Specification. The information contained herein is intended for compliance.

## B.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

## B.3 DATABASE VPF TABLES AND CONTENTS

B.3.1 Database metadata tables. The database directory file name is the root directory for VPF based data on a CD-ROM. Metadata files at the database level are as follows:

```
"product specific" database directory file
  lat                library attribute table
  dht                database header table
  dhx                dht variable length index
```

B.3.1.1 Library attribute table (lat). The lat contains the geographic extent (minimum bounding rectangle) of each library in the database (TABLE B-1). Where individual libraries have not been completely defined for a database the lat table will contain a listing of only those libraries completed or defined to date.

TABLE B-1. Format and content for library attribute table.

{Header length}L; Library Attribute Table;-;					
id=I,1,U,Row Identifier,-,-,-,:					
library_name=T,8,P,Library name,-,-,-,:					
xmin=F,1,N,Westernmost longitude,-,-,-,:					
ymin=F,1,N,Southernmost latitude,-,-,-,:					
xmax=F,1,N,Easternmost longitude,-,-,-,:					
ymax=F,1,N,Northernmost latitude,-,-,-,:					
1	rference	-180.0	-90.0	180.0	90.0
2	eastus <sup>1</sup>	-90.0	30.0	-75.0	45.0
3	westus <sup>1</sup>	-120.0	30.0	-105.0	45.0
4	northus <sup>1</sup>	-90.0	60.0	-75.0	45.0
:	:	:	:	:	:
n	n	n	n	n	n

NOTE 1: The names and extent of the libraries are only examples, actual names will be provided as part of the source package.

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B.3.1.2 Database header table. The dht describes the database (TABLE B-2).

TABLE B-2. Format and Content for Database Header Table (dht).

<pre> {Header length}L; Database Header Table;-1; id=I,1,P,Row Identifier,-,-,-: vpf_version=T,10,N,VPF version number,-,-,-: database_name=T,8,N,Directory name of this database,-,-,-: database_desc=T,100,N,Description of this database,-,-,-: media_standard=T,20,N,Media Standard,-,-,-: originator=T,50,N,Producer of this database,-,-,-: addressee=T,100,N,Address of the producer,-,-,-: media_volumes=T,4,N,Number of Volumes in this database,-,-,-: seq_numbers=T,*N,The Sequential Number(s) in this database,-,-,-: num_data_sets=T,4,N,Number of Libraries,-,-,-: security_class=T,1,N,Security Classification,-,-,-: downgrading=T,3,N,Downgrading,-,-,-: downgrade_date=D,1,N,Date,-,-,-: releasability=T,20,N,Releasability restrictions of data,-,-,-: transmittal_id=T,1,N,Unique Transmittal Identifier,-,-,-: edition_number=T,10,N,Edition Number of this database,-,-,-: edition_date=D,1,N,Date of edition,-,-,-:; 1\ 9606\ VMAPLV2 (product specific)\ General-purpose, high-resolution database to support GIS applications. (product specific)\ ISO 9660\ NATIONAL IMAGERY AND MAPPING AGENCY\ ATTN: NIMA Customer Support/COD, Mail Stop P-38, 12310 Sunrise Valley Drive, Reston, VA 20191-3449\ 1\ 1\ 1\ U\ NO\ 00000000000000.\ LIMITED DISTRIBUTION\ 1\ 1\ 199305000000000. </pre>
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NOTE 1: UVMaP and WVSPPlus will contain a disclaimer.doc associated with the database header table. See the VMap and WVSPPlus associated specifications for specific examples.

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APPENDIX C

REFERENCE LIBRARY

C.1 SCOPE

This appendix contains the structure and content of each VPF table in a reference library directory. It is a mandatory part of this Specification. The information contained herein is intended for compliance.

C.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

C.3 REFERENCE LIBRARY

Each database will contain an untiled reference library named rference which will be included on each distribution CD. This library will contain smaller scale coverages (TABLE C-1) which show a generalized extent of the database. Each coverage contains reference information designed to orient the user to the location and extent of the database and the libraries in it. The reference library will be 2-dimensional.

TABLE C-1. rference library coverages.

Library Reference coverage	libref
Database Reference coverage	dbref
Political Entities coverage	polbnd
Place Names coverage	placenam

The structure and content of each VPF table in a reference library directory are provided in this section.

C.3.1 Metadata tables. The rference library shall contain the following metadata tables at the library level.

rference	directory file
cat	coverage attribute table
lht	library header table
dqt	data quality table
dqx	dqt variable length index
grt	geographic reference table
lineage.doc	documentation table
glossary.doc	documentation table
*.dox	variable length index required by *.doc tables containing variable length fields

C.3.1.1 Coverage attribute table. The following coverage attribute table (cat) shall be present in the rference library. TABLE C-2 depicts the records that are present in the cat.

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TABLE C-2. Format and content for reference coverage attribute table (cat).

<pre>{Header length}L; Coverage Attribute Table;-; id=I,1,U,Row Identifier,-,-,-,: coverage_name=T,8,P,Coverage name,-,-,-,: description=T,50,N,Coverage description,-,-,-,: level=I,1,N,Topology level,-,-,-,;</pre>			
1	libref	Library Reference	2
2	dbref	Database Reference	3
3	polbnd	Political Entities	3
4	placenam	Place Names	0

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C.3.1.2 Library header table. A library header table (lht) shall be present in the reference library. The format and sample content of the library header table for each library is presented in TABLE C-3.

TABLE C-3. Format and content for reference library header table (lht).

<pre>{Header length}L; Library Header Table;-1; id=I,1,P,Row Identifier,-,-,-: product_type=T,12,N,Product Type,-,-,-: library_name=T,12,N,Name,-,-,-: description=T,100,N,Description of the library,-,-,-: data_struct_code=T,1,N,Data Structure Code,-,-,-: scale=I,1,N,Scale of the library,-,-,-: source_series=T,15,N,Series,-,-,-:2 source_id=T,30,N,Identifier of the source reference,-,-,-:2 source_edition=T,20,N,Edition number of the source,-,-,-:2 source_name=T,100,N,Name of library source,-,-,-:2 source_date=D,1,N,Source Date,-,-,-:2 security_class=T,1,N,Security Classification,-,-,-: downgrading=T,3,N,Downgrading,-,-,-: downgrading_date=D,1,N,Date,-,-,-: releasability=T,20,N,Releasability,-,-,-;</pre>
<pre>1\ VMAP LEVEL 2 (product specific)\ reference\ Small-scale data to give users a geographic reference of VMap Level 2 database. (product specific)\ 8\ 1000000\ DCW/VMAPO\ VMAPO sasaus (data specific)\ EDITION1/EDITION2\ Digital Chart of the World and VMap0 South Asia Australia library (data specific)\ 19920701000000.\ U\ NA\ 0000000000000000.\ LIMITED DISTRIBUTION</pre>

NOTES:

1. An optional glossary.doc may be required through the Individual Library Instructions (ILIs). If implemented, the format of the glossary.doc shall conform to the same format as the lineage.doc (Table C-6) with the exception that the table description in the header shall read "Glossary Documentation Table". When implemented, the glossary.doc name will be shown in the table header: "Library Header Table;glossary.doc;"

2. When multiple sources are used to create a library, a new record (row in the lht) will be created for each source being defined.

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C.3.1.3 Geographic reference table. A geographic reference table (grt) shall be present in the reference library. The record content of this table may vary for each library. The format and sample content of the geographic reference table for each library is presented in TABLE C-4.

TABLE C-4. Format and content for a reference geographic reference table (grt).

<pre> {Header length}L; Geographic Reference Table;-; id=I,1,P,Row Identifier,-,-,-; data_type=T,3,N,Data Type,-,-,-; units=T,3,N,Units of Measure code for coordinates in library,-,-,-; ellipsoid_name=T,15,N,Ellipsoid,-,-,-; ellipsoid_detail=T,50,N,Ellipsoid Details,-,-,-; vert_datum_name=T,15,N,Vertical Datum Reference,-,-,-:1 vert_datum_code=T,4,N,Vertical Datum Code,-,-,-:1 sound_datum_name=T,15,N,Sounding Datum,-,-,-:1 sound_datum_code=T,4,N,Sounding Datum Code,-,-,-:1 geo_datum_name=T,15,N,Datum Geodetic Name,-,-,-: geo_datum_code=T,4,N,Datum Geodetic Code,-,-,-: projection_name=T,20,N,Projection Name,-,-,-; 1\ GEO\ M\ WGS 84\ A=6378137 B=6356752 METERS\ MEAN SEA LEVEL (product specific)\ 015\ N/A\ N/A\ WGS 84\ WGE\ DEC DEG UNPROJECTED\ </pre>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

NOTE 1. When multiple sources are used to create a library, a new record (row in the grt) will be created for each source being defined.

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C.3.1.4 Data quality table. A data quality table (dqt) shall be in the library directory for the reference library. The record content of this table may vary for each library. The format and a sample content of the dqt for each library is presented in TABLE C-5.

TABLE C-5. Format and Content for reference data quality table (dqt).

<pre>{Header length}L; Data Quality Table;lineage.doc; id=I,1,P,Row Identifier,-,-,-,: vpf_level=T,8,N,VPF Level,-,-,-,: vpf_level_name=T,8,N,Name of VPF Level,-,-,-,: feature_complete=T,*N,Feature Completeness Percent,-,-,-,: attrib_complete=T,*N,Attribute Completeness Percent,-,-,-,: logical_consist=T,*N,Logical Consistency,-,-,-,: edition_num=T,8,N,Edition Number,-,-,-,: creation_date=D,1,N,Creation Date,-,-,-,: revision_date=D,1,N,Revision Date,-,-,-,: spec_name=T,*N,Product Specification Name,-,-,-,: spec_date=D,1,N,Product Specification Date,-,-,-,: earliest_source=D,1,N,Date of Earliest Source,-,-,-,: latest_source=D,1,N,Date of Latest Source,-,-,-,: collection_spec=T,*N,Collection Specification Name,-,-,-,: abs_horiz_acc=T,4,N,Absolute Horizontal Accuracy of VPF Level,-,-,-,: abs_horiz_units=T,20,N,Unit of Measure for Absolute Horizontal Accuracy,-,-,-,: abs_vert_acc=T,4,N,Absolute Vertical Accuracy of VPF Level,-,-,-,: abs_vert_units=T,20,N,Unit of Measure for Absolute Vertical Accuracy,-,-,-,: rel_horiz_acc=T,4,N,Point to Point Horizontal Accuracy of VPF Level,-,-,-,: rel_horiz_units=T,20,N,Unit of Measure for Point to Point Horizontal Accuracy,-,-,-,: rel_vert_acc=T,4,N,Point to Point Vertical Accuracy of VPF Level,-,-,-,: rel_vert_units=T,20,N,Unit of Measure for Point to Point Vertical Accuracy,-,-,-,: comments=T,*N,Miscellaneous Comments,-,-,-,;</pre>
<pre>1\ LIBRARY\ reference\ All features in this library are captured from the source materials and generalized as necessary to depict referential information.\ All features in this library have valid attribute codes assigned to them in accordance with this specification.\ All data are topologically correct. No duplicate features are present within a coverage. All areas are completely described as extracted from the source materials. No undershoots or overshoots are present. All data were consistently captured using the rules described in the documentation table associated with this table and in the various feature table narrative files present at the coverage level within the library.\ 1\ 19950630000000.(data specific)\ 00000000000000.(data specific)\ TODO Performance Specification MIL-PRF-89049/10 (data specific)\ 199604150000000.(product specific)\ 00000000000000.(data specific)\ 00000000000000.(data specific)\ TODO MIL-PRF-89049/10 (data specific)\ 750\ METERS\ 168\ METERS\ 750\ METERS\ 0\ N/A\ Additional descriptions of data lineage are available in the documentation table associated with this data quality table (called lineage.doc).</pre>

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C.3.1.5 Lineage narrative table. Information regarding the data contained in the library is captured in the lineage.doc file, TABLE C-6. Specific lineage.doc information is found in the general and technical documents including product specific extraction guides.

TABLE C-6. Format and content for lineage documentation table (lineage.doc).

<pre>{Header length}L; Lineage Documentation Table;-; id=I,1,P,Row Identifier,-,-,-; text=T,*N,Text information,-,-,-;:</pre>	
1	This table describes characteristics of the feature data within this library. Three subjects are discussed: 1) special "automation techniques, 2) source materials, and 3) database" design issues. The table does not contain a full description of the data production process.
:	:
n	...

C.3.2 Reference coverage (libref). Each reference library shall contain a reference coverage named library reference.

C.3.2.1 Library reference coverage directory and files. The library reference coverage directory contains the following files:

rference	library directory file
libref	coverage directory file
char.vdt	character value description table
char.vdx	character vdt variable length index
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when symbol.rat is present)
cnd	connected node table
csi	connected node spatial index
ebr	edge bounding rectangle table
edg	edge primitive table
edx	edge variable length index
esi	edge spatial index
fcs	feature class schema table
libref.lft	library reference line feature table
libreft.tft	library reference text feature table (optional)
tsi	text spatial index (only when txt is present)
txt	text primitive table (only when tft is present)
txx	text variable length index (only when txt is present)
symbol.rat	symbology related attribute table (only when tft is present)



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C.3.2.1.1 Library reference feature class schema table. A feature class schema table shall be present in the library reference coverage. The format and content of the fcs are presented in TABLE C-7.

TABLE C-7. Content and format for libref feature class schema table (fcs).

Thematic Layer: Library Reference  
Coverage Name: libref  
Table Description: Library Reference Feature Class Schema Table  
Table Name: fcs

{Header length}L; Library Reference Feature Class Schema Table;-; id=I,1,P,Row Identifier,-,-,-,; feature_class=T,8,N,Name of Feature Class,-,-,-,; table1=T,12,N,First Table,-,-,-,; table1_key=T,15,N,Column Name in First Table,-,-,-,; table2=T,12,N,Second Table,-,-,-,; table2_key=T,6,N,Column Name in Second Table,-,-,-,;					
1	libref	libref.lft	edg_id	edg	id
2	libref	edg	libref.lft_id	libref.lft	id
3	libref	libref.tft	txt_id	txt	id
4	libref	txt	id	libref.tft	txt_id
5	libref	libref.tft	symbol.rat_id	symbol.rat	id

C.3.2.1.2 Library reference feature tables. The feature tables implemented in the library reference coverage are specified in TABLES C-8 and C-9. Thematic indices will not be implemented in the library reference coverage feature tables.

TABLE C-8. Format and content for libref line feature table (libref.lft).

Thematic Layer: Library Reference  
Coverage Name: libref  
Table Description: Library Reference Line Feature Table  
Table Name: libref.lft

{Header length}L; Library Reference Line Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; f_code=T,5,N,FACC Feature Code,char.vdt,-,-,; edg_id=I,1,N,Edge Primitive ID,-,-,-,;		
1	AP030	1
2	BA010	2
3	FA000	3
:	:	:
n	n	n

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TABLE C-9. Format and content for libref text feature table (libref.tft).

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Text Feature Table  
 Table Name: libref.tft

<pre>{Header length}L; Library Reference Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-; f_code=T,5,N,FACC Feature Code,char.vdt,-,-,: txt_id=I,1,N,Text Primitive ID,-,-,-; symbol.rat_id=I,1,N,Symbol Identification,-,-,-;</pre>			
1	ZD040	1	1
2	ZD040	2	10
3	ZD045	3	35
:	:	:	:
n	n	n	n

C.3.2.1.3 Library reference primitive tables. The format of the primitive tables in the library reference coverage directory is defined in section 3.16.5. Although the text feature table is optional, a sample text primitive table is presented to show sample values for the STRING column (TABLE C-10).

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TABLE C-10. Format and example of content for LIBREF text primitive table (txt).

Thematic Layer: Library Reference  
Coverage Name: libref  
Table Description: Text Primitive Table  
Table Name: txt

{Header length}L; Text Primitive Table;-; id=I,1,P,Row Identifier,-,-,-,; string=T,*N,Text String,-,-,-,; shape_line=C,*N,Shape of Text String,-,-,-,;		
1	DUBLIN <sup>1</sup>	-6.211609,53.662006
:	:	:
n	n	n

NOTE 1. The names and extent of the libraries, or other geographic identifiers.

C.3.2.1.4 Library reference value description tables. A character value description table shall be present in the library reference coverage. The format and content of the char.vdt are presented in TABLE C-11. An integer value description table shall be optionally present in the library reference coverage when the symbol.rat is present, meaning that the text feature table is present as well. The format and content of the int.vdt are presented in TABLE C-12.

TABLE C-11. Library reference character value description table.

Thematic Layer: Library Reference  
Coverage Name: libref  
Table Description: Library Reference Character Value Description Table  
Table Name: char.vdt

{Header length}L; Library Reference Character Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,; table=T,12,N,Name of the Feature Table,-,-,-,; attribute=T,6,N,Column Name,-,-,-,; value=T,5,N,Unique Value of Attribute,-,-,-,; description=T,*N,Description of Value,-,-,-,;				
1	libref.lft	f_code	AP030	Road
2	libref.lft	f_code	BA010	Coastline/Shoreline
3	libref.lft	f_code	BH140	River/Stream
4	libref.lft	f_code	FA000	Administrative Boundary
5	libref.tft	f_code	ZD040	Named Location
6	libref.tft	f_code	ZD045	Text Description

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TABLE C-12. Library reference integer value description table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Integer Value Description  
 Table  
 Table Name: int.vdt

{Header length}L; Library Reference Integer Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,; table=T,12,N,Name of the Feature Table,-,-,-,; attribute=T,3,N,Column Name,-,-,-,; value=S,1,N,Unique Value of Attribute,-,-,-,; description=T,*N,Description of Value,-,-,-,;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

C.3.3 Data coverages. Data coverages for the rference library are the: database reference coverage (dbref), the political entities coverage (polbnd) and the placenames coverage (placenam). For each coverage, the feature class schema table is described first, followed by the feature tables. The type and content of documentation tables will vary with each coverage. For each feature table, the attribute names, description, and attribute values are also represented. A summary of the rference coverages (both reference and data) and feature classes is presented in TABLE C-13.

The structure and content of each VPF table in the rference library data coverages are provided in this section. The format of the primitive tables in the reference library data coverage is defined in section 3.16.5.

Thematic indices are not implemented in the feature tables in the data coverages of the rference library.

TABLE C-13. Rference library feature table(s) in coverages.

Coverage name	Point	Feature Classes		
		Line	Area	Text
libref <sup>1</sup>		libref.lft		libreft.tft
dbref			dbref.aft	dbtxt.tft
polbnd			polbnd.aft	polbndtx.tft
placenam	placenam.pft			placetxt.tft

NOTE 1: Described in Appendix C.3.2

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C.3.3.1 Database reference coverage (dbref) directory and files. This coverage contains the generalized small-scale outlines of each data library in the database. The files in this coverage are presented in TABLES C-14 to C-18. The database reference coverage directory contains the following files:

dbref	directory file
char.vdt	character value description table
char.vdx	character vdt variable length index
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when int.vdt is present)
cnl	connected node primitive table
csi	connected node spatial index
ebr	edge bounding rectangle table
edg	edge primitive table
edx	edge variable length index
esi	edge spatial index
fac	face primitive table
fbr	face bounding rectangle table
fcs	feature class schema table
fsi	face spatial index
rng	ring table
dbref.aft	database reference area feature table
dbtxt.tft	database reference text feature table (optional)
tsi	text spatial index (only when a txt is present)
txt	text primitive table (only when a tft is present)
txx	text variable length index (only when a txt is present)
symbol.rat	symbology related attribute table (only when tft is present)

TABLE C-14. Content and format for dbref coverage feature class schema table.

Thematic Layer:	Database Reference
Coverage Name:	dbref
Table Description:	Database Reference Feature Class Schema Table
Table Name:	fcs

{Header length}L;					
Database Reference Feature Class Schema Table;-;					
id=I,1,P,Row Identifier,-,-,-;					
feature_class=T,8,N,Name of Feature Class,-,-,-;					
table1=T,12,N,First Table,-,-,-;					
table1_key=T,15,N,Column Name in First Table,-,-,-;					
table2=T,12,N,Second Table,-,-,-;					
table2_key=T,6,N,Column Name in Second Table,-,-,-;					
1	dbref	dbref.aft	fac_id	fac	id
2	dbref	fac	dbref.aft_id	dbref.aft	id
3	dbtxt	dbtxt.tft	txt_id	txt	id
4	dbtxt	txt	id	dbtxt.tft	txt_id
5	dbtxt	dbtxt.tft	symbol.rat_id	symbol.rat	id

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APPENDIX CTABLE C-15. dbref area feature table.

Thematic Layer: Database Reference  
 Coverage Name: dbref  
 Table Description: Database Reference Area Feature Table  
 Table Name: dbref.aft

{Header length}L; Database Reference Area Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; library_name=T,8,N,Library Name,-,-,-,; fac_id=I,1,N,Face Primitive ID,-,-,-,;			
1	BOLIVIAH <sup>1</sup>		2
2	TEXASH <sup>1</sup>		3
3	:		4
:	:		:
n	n		n

NOTE 1: Library names will vary by product.

TABLE C-16. dbref text feature table.

Thematic Layer: Database Reference  
 Coverage Name: dbref  
 Table Description: Database Reference Text Feature Table  
 Table Name: dbtxt.tft

{Header length}L; Database Reference Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; f_code=T,5,N,FACC Feature Code,char.vdt,-,-,; txt_id=I,1,N,Text Primitive ID,-,-,-,; symbol.rat_id=I,1,N,Symbol Identification,-,-,-,;			
1	ZD040	1	1
:	:	:	:
n	n	n	n

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APPENDIX CTABLE C-17. dbref character value description table.

Thematic Layer: Database Reference  
 Coverage Name: dbref  
 Table Description: Database Reference Character Value  
 Description Table  
 Table Name: char.vdt

{Header length}L; Database Reference Character Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,; table=T,12,N,Name of the Feature Table,-,-,-,; attribute=T,6,N,Column Name,-,-,-,; value=T,5,N,Unique Value of Attribute,-,-,-,; description=T,*N,Description of Value,-,-,-,;;				
1	dbtxt.tft	f_code	ZD040	Named Location
2	dbtxt.tft	f_code	ZD045	Text Description

TABLE C-18. dbref integer value description table.

Thematic Layer: Database Reference  
 Coverage Name: dbref  
 Table Description: Database Reference Integer Value Description  
 Table  
 Table Name: int.vdt

{Header length}L; Database Reference Integer Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,; table=T,12,N,Name of the Feature Table,-,-,-,; attribute=T,3,N,Column Name,-,-,-,; value=S,1,N,Unique Value of Attribute,-,-,-,; description=T,*N,Description of Value,-,-,-,;;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

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C.3.3.2 Political entities coverage (polbnd) directory and files. This coverage contains the generalized small-scale outlines of the political entities in the database. The files for this coverage are described in TABLES C-19 to C-23. The political entities coverage directory contains the following files:

polbnd	directory file
char.vdt	character value description table
char.vtx	character vdt variable length index
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when int.vdt is present)
cnd	connected node primitive table
csi	connected node spatial index
ebr	edge bounding rectangle table
edg	edge primitive table
edx	edge variable length index
esi	edge spatial index
fac	face primitive table
fbr	face bounding rectangle table
fcs	feature class schema table
fsi	face spatial index
rng	ring table
polbnd.aft	political entities area feature table
polbndtx.tft	political entities text feature table (optional)
tsi	text spatial index (only when a txt is present)
txt	text primitive table (only when a tft is present)
txx	text variable length index (only when a txt is present)
symbol.rat	symbology related attribute table (only when a tft is present)

TABLE C-19. Content and format for polbnd coverage feature class schema table.

Thematic Layer: Political Entities  
Coverage Name: polbnd  
Table Description: Political Entities Feature Class Schema Table  
Table Name: fcs

{Header length}L; Political Entities Feature Class Schema Table;-; id=I,1,P,Row Identifier,-,-,-,; feature_class=T,8,N,Name of Feature Class,-,-,-,; table1=T,12,N,First Table,-,-,-,; table1_key=T,15,N,Column Name in First Table,-,-,-,; table2=T,12,N,Second Table,-,-,-,; table2_key=T,6,N,Column Name in Second Table,-,-,-,;					
1	polbnd	polbnd.aft	fac_id	fac	id
2	polbnd	fac	polbnd.aft_id	polbnd.aft	id
3	polbndtx	polbndtx.tft	txt_id	txt	id
4	polbndtx	txt	id	polbndtx.tft	txt_id
5	polbndtx	polbndtx.tft	symbol.rat_id	symbol.rat	id



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TABLE C-20. polbnd area feature table.

Thematic Layer: Political Entities  
 Coverage Name: polbnd  
 Table Description: Political Entities Area Feature Table  
 Table Name: polbnd.aft

{Header length}L; Political Entities Area Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; country_name=T,*N,Political Entity Name,-,-,-,; fac_id=I,1,N,Face Primitive ID,-,-,-,;		
1	United States of America	2
2	Canada	3
3	Mexico	4
4	:	5
:	:	:
n	n	n

TABLE C-21. polbnd text feature table.

Thematic Layer: Political Entities  
 Coverage Name: polbnd  
 Table Description: Political Entities Text Feature Table  
 Table Name: polbndtx.tft

{Header length}L; Political Entities Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; f_code=T,5,N,FACC Feature Code,char.vdt,-,-,; txt_id=I,1,N,Text Primitive ID,-,-,-,; symbol.rat_id=I,1,N,Symbol Identification,-,-,-,;			
1	ZD040	1	10
:	:	:	:
n	n	n	n

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APPENDIX CTABLE C-22. polbnd character value description table.

Thematic Layer: Political Entities  
 Coverage Name: polbnd  
 Table Description: Political Entities Character Value  
 Description Table  
 Table Name: char.vdt

{Header length}L; Political Entities Character Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-,:				
table=T,12,N,Name of the Feature Table,-,-,-,:				
attribute=T,6,N,Column Name,-,-,-,:				
value=T,5,N,Unique Value of Attribute,-,-,-,:				
description=T,*N,Description of Value,-,-,-,;				
1	polbndtx.tft	f_code	ZD040	Named Location
2	polbndtx.tft	f_code	ZD045	Text Description

TABLE C-23. polbnd integer value description table.

Thematic Layer: Political Entities  
 Coverage Name: polbnd  
 Table Description: Political Entities Integer Value Description  
 Table  
 Table Name: int.vdt

{Header length}L; Political Entities Integer Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-,:				
table=T,12,N,Name of the Feature Table,-,-,-,:				
attribute=T,3,N,Column Name,-,-,-,:				
value=S,1,N,Unique Value of Attribute,-,-,-,:				
description=T,*N,Description of Value,-,-,-,;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

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C.3.3.3 Place name coverage (placenam) directory and files. This coverage contains named places in the database. The files for this coverage are described in Tables C-24 to C-27. The place names coverage directory contains the following files:

placenam	directory file
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when int.vdt is present)
end	entity node primitive table
nsi	entity node spatial index
fcs	feature class schema table
placenam.pft	places point feature table
placetxt.tft	places text feature table (optional)
tsi	text spatial index (only when a txt is present)
txt	text primitive table (only when a tft is present)
txx	text variable length index (only when a txt is present)
symbol.rat	symbology related attribute table (only when a tft is present)

TABLE C-24. Content and format for placenam coverage feature class schema table.

Thematic Layer: Place Names  
Coverage Name: placenam  
Table Description: Place Names Feature Class Schema Table  
Table Name: fcs

<pre>{Header length}L; Place Names Feature Class Schema Table;-; id=I,1,P,Row Identifier,-,-,-; feature_class=T,8,N,Name of Feature Class,-,-,-; table1=T,12,N,First Table,-,-,-; table1_key=T,15,N,Column Name in First Table,-,-,-; table2=T,12,N,Second Table,-,-,-; table2_key=T,6,N,Column Name in Second Table,-,-,-;;</pre>					
1	placenam	placenam.pft	end_id	end	id
2	placenam	end	placenam.pft_id	placenam.pft	id
3	placetxt	placetxt.tft	txt_id	txt	id
4	placetxt	txt	id	placetxt.tft	txt_id
5	placetxt	placetxt.tft	symbol.rat_id	symbol.rat	id

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TABLE C-25. placenam point feature table.

Thematic Layer: Place Names  
 Coverage Name: placenam  
 Table Description: Place Names Point Feature Table  
 Table Name: placenam.pft

{Header length}L; Place Names Point Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; place_name=T,40,N,Place Name,-,-,-,; end_id=I,1,N,Entity Node Primitive ID,-,-,-,;:			
1		Gulf of Mexico <sup>1</sup>	1
2		Fairfax <sup>1</sup>	2
3		Redlands <sup>1</sup>	3
4		Lake Superior <sup>1</sup>	4
:		:	:
n		n	n

NOTE 1: Representative place names.

TABLE C-26. placenam text feature table.

Thematic Layer: Place Names  
 Coverage Name: placenam  
 Table Description: Place Names Text Feature Table  
 Table Name: placetxt.tft

{Header length}L; Place Names Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-,; name=T,20,N,Place Name,-,-,-,; txt_id=I,1,N,Text Primitive ID,-,-,-,; symbol.rat_id=I,1,N,Symbol Identification,-,-,-,;:				
1	Richmond		1	1
2	Fairfax		2	6
3	Baltimore		3	8
:	:		:	:
n	n		n	n

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APPENDIX CTABLE C-27. placenam integer value description table.

Thematic Layer: Place Names  
 Coverage Name: placenam  
 Table Description: Place Names Integer Value Description Table  
 Table Name: int.vdt

{Header length}L;				
Place Names Integer Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-,:				
table=T,12,N,Name of the Feature Table,-,-,-,:				
attribute=T,3,N,Column Name,-,-,-,:				
value=S,1,N,Unique Value of Attribute,-,-,-,:				
description=T,*,N,Description of Value,-,-,-,;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

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DATA LIBRARY

D.1 SCOPE

This appendix contains the structure and content of each metadata and reference coverage table in a data library of the database. It is a mandatory part of this specification. Data coverage tables are defined in the associated specifications. The information contained herein is intended for compliance.

D.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

D.3 DATA LIBRARY

The structure and content of each table in a data library of the database are provided in this section. The actual record contents of the metadata tables will vary with each library.

Each library is represented as a directory file.

D.3.1 Library metadata tables. Each data library shall contain the following metadata tables at the library level.

lib_147 <sup>1</sup>	directory file
cat	coverage attribute table
dqt	data quality table
dqx	data quality index file
grt	geographic reference table
lht	library header table
lineage.doc	an optional documentation table
glossary.doc	an optional documentation table
*.dox	variable length index required by *.doc tables containing variable length fields

NOTE 1: Representative directory name for a library.

D.3.1.1 Coverage attribute table. A coverage attribute table (cat) shall be present in every data library. TABLE D-1 depicts the format and a sample record content (in this case, FFD) of a data library cat. Each associated specification will define all possible cat records for a library. Actual records in a library's cat will be dependent on the existence of the coverages in that specific library.

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TABLE D-1. Format and sample content for coverage attribute table (cat).

<pre>{Header length}L; Coverage Attribute Table;-; id=I,1,U,Row Identifier,-,-,-,: coverage_name<sup>1</sup>=T,8,P,Coverage name,-,-,-,: description=T,24,N,Coverage description,-,-,-,: level<sup>2</sup>=I,1,N,Topology level,-,-,-,;</pre>			
1	libref	Library Reference	2
2	tileref	Tile Reference	3
3	bnd	Boundaries	3
4	dq	Data Quality	3
5	ele	Elevation	3
6	hyd	Hydrography	3
7	pop	Population	3
8	trn	Transportation	3
9	veg	Vegetation	3

NOTES:

1. This table depicts example coverages which may be present in a library (example above is for FFD, reference associated specifications for product specific coverage attribute tables). Presence of these coverages will vary with data availability. If library does not contain any data for a particular coverage, then the record describing the coverage will not be present.
2. The number in the level column represents the topology of each coverage.

D.3.1.2 Library header table. A library header table (lht) shall be present in every library. The format and sample content of the library header table for each library is presented in TABLE D-2. The record content of this table will vary for each library.

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APPENDIX DTABLE D-2. Format and content for example library header table (lht).

<pre> {Header length}L; Library Header Table;-1; id=I,1,P,Row Identifier,-,-,-,: product_type=T,12,N,Product Type,-,-,-,: library_name=T,12,N,Name,-,-,-,: description=T,100,N,Description of the library,-,-,-,: data_struct_code=T,1,N,Data Structure Code,-,-,-,: scale=I,1,N,Scale of the library,-,-,-,: source_series=T,15,N,Series,-,-,-,:<sup>2</sup> source_id=T,30,N,Identifier of the source reference,-,-,-,:<sup>2</sup> source_edition=T,20,N,Edition number of the source,-,-,-,:<sup>2</sup> source_name=T,100,N,Name of library source,-,-,-,:<sup>2</sup> source_date=D,1,N,Source Date,-,-,-,:<sup>2</sup> security_class=T,1,N,Security Classification,-,-,-,: downgrading=T,3,N,Downgrading,-,-,-,: downgrading_date=D,1,N,Date,-,-,-,: releasability=T,20,N,Releasability,-,-,-,:; </pre>
<pre> 1\ VMAP LEVEL 1 (product specific)\ lib_147<sup>3</sup>\ Digital data collected from 1:250,000-scale map sheet or other sources of similar resolution.(product specific)\ 8\ 250000 (product specific)\ SEE lineage.doc (product specific)\ SEE lineage.doc AND dqarea.aft (product specific)\ SAME AS ABOVE (product specific)\ SEE lineage.doc (product specific)\ 19920801000000. (data specific)\ U (data specific)\ NA\ 000000000000000.\ LIMITED DISTRIBUTION (data specific)\ </pre>

## NOTES:

1. An optional glossary.doc file may be required through the Individual Library Instructions (ILIs). If implemented, the format of the glossary.doc table shall be the same as the format for the lineage.doc table (TABLE D-5) with the exception that the table header description shall be "Glossary Documentation Table". When implemented, the glossary.doc name will be shown in the table header: "Library Header Table;glossary.doc;"
2. When multiple sources are used to create a library, a new record (new row in the lht) will be created for each source being defined.
3. Replace with appropriate record content for each library. Each line represents the record value for each defined column.



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D.3.1.3 Geographic reference table. A geographic reference table (grt) shall be present in every library. The record content of this table may vary for each library. The format and sample content of the geographic reference table for each library is presented in TABLE D-3.

TABLE D-3. Format and sample content for a geographic reference table (grt).

```
{Header length}L;
Geographic Reference Table;-;
id=I,1,P,Row Identifier,-,-,-,:
data_type=T,3,N,Data Type,-,-,-,:
units=T,3,N,Units of Measure code for coordinates in library,-,-,-,:
ellipsoid_name=T,15,N,Ellipsoid,-,-,-,:
ellipsoid_detail=T,50,N,Ellipsoid Details,-,-,-,:
vert_datum_name=T,15,N,Vertical Datum Reference,-,-,-,:1
vert_datum_code=T,4,N,Vertical Datum Code,-,-,-,:1
sound_datum_name=T,15,N,Sounding Datum,-,-,-,:1
sound_datum_code=T,4,N,Sounding Datum Code,-,-,-,:1
geo_datum_name=T,15,N,Datum Geodetic Name,-,-,-,:
geo_datum_code=T,4,N,Datum Geodetic Code,-,-,-,:
projection_name=T,20,N,Projection Name,-,-,-,;
```

```
1\
GEO\
M\
WGS 84\
A=6378137 B=6356752 METERS\
MEAN SEA LEVEL (product specific)\
015\
N/A\
N/A\
WGS 84\
WGE\
DEC DEG UNPROJECTED\
```

NOTE 1. When multiple sources are used to create a library, a new record (new row in the grt) will be created for each source being defined.

D.3.1.4 Data quality table. A data quality table (dqt) shall be present at the library-level for every library. The record content of this table may vary for each library. The format and sample content of the dqt for each library is presented in TABLE D-4.

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APPENDIX DTABLE D-4. Format and sample content for data quality table (dqt).

<pre> {Header length}L; Data Quality Table;lineage.doc; id=I,1,P,Row Identifier,-,-,-,: vpf_level=T,8,N,VPF Level,-,-,-,: vpf_level_name=T,8,N,Name of VPF Level,-,-,-,: feature_complete=T,*N,Feature Completeness Percent,-,-,-,: attrib_complete=T,*N,Attribute Completeness Percent,-,-,-,: logical_consist=T,*N,Logical Consistency,-,-,-,: edition_num=T,8,N,Edition Number,-,-,-,: creation_date=D,1,N,Creation Date,-,-,-,: revision_date=D,1,N,Revision Date,-,-,-,: spec_name=T,*N,Product Specification Name,-,-,-,: spec_date=D,1,N,Product Specification Date,-,-,-,: earliest_source=D,1,N,Date of Earliest Source,-,-,-,: latest_source=D,1,N,Date of Latest Source,-,-,-,: collection_spec=T,*N,Collection Specification Name,-,-,-,: abs_horiz_acc=T,4,N,Absolute Horizontal Accuracy of VPF Level,-,-,-,: abs_horiz_units=T,20,N,Unit of Measure for Absolute Horizontal Accuracy,-,-,-,: abs_vert_acc=T,4,N,Absolute Vertical Accuracy of VPF Level,-,-,-,: abs_vert_units=T,20,N,Unit of Measure for Absolute Vertical Accuracy,-,-,-,: rel_horiz_acc=T,4,N,Point to Point Horizontal Accuracy of VPF Level,-,-,-,: rel_horiz_units=T,20,N,Unit of Measure for Point to Point Horizontal Accuracy,-,-,-,: rel_vert_acc=T,4,N,Point to Point Vertical Accuracy of VPF Level,-,-,-,: rel_vert_units=T,20,N,Unit of Measure for Point to Point Vertical Accuracy,-,-,-,: comments=T,*N,Miscellaneous Comments,-,-,-,:; </pre>
<pre> 1\ LIBRARY\ lib_147<sup>1</sup>\ (data specific) All features in this library are captured from the source materials using the rules for feature extraction and inclusion conditions in accordance with this specification.\ All features in this library have valid attribute codes assigned to them in accordance with this specification.\ All data are topologically correct. No duplicate features are present within a coverage. All areas are completely described as extracted from the source materials. No undershoots or overshoots are present. All data were consistently captured using the rules described in the documentation table associated with this table and in the various feature table narrative files present at the coverage level within the library.\ 1\ 19920915000000. (Product specific)\ 00000000000000. (Product specific)\ VMap MILSPEC MIL-PRF-89049/2 (Product specific)\ 19961222000000. (Product specific)\ 19720801000000. (Product specific)\ 19801001000000. (Product specific)\ VMap MILSPEC MIL-PRF-89049/2 (Product specific)\ +/- (125)<sup>2</sup> meters: This figure represents the overall absolute horizontal accuracy in this library in accordance with this specification. (data specific)\ METERS\ +/- (100)<sup>2</sup> meters: This figure represents the overall vertical accuracy in this library in accordance with this specification. (data specific)\ METERS\ 0\ METERS\ 0\ METERS\ Additional descriptions of data lineage are available in the documentation table associated with this data quality table (called lineage.doc).\ </pre>

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## NOTES:

1. Replace with appropriate name for each library.
2. These values are for example only refer to section 3.3 for clarification.

D.3.1.5 Lineage narrative table. Information regarding the data contained in the library is captured in the lineage.doc file (TABLE D-5). Specific lineage.doc information is found in the general and technical documents including product specific extraction guides.

TABLE D-5. Format and sample content for lineage documentation table (lineage.doc).

<pre>{Header length}L; Lineage Documentation Table;-; id=I,1,P,Row Identifier,-,-,-: text=T,*N,Text information,-,-,-,;</pre>	
1	This table describes characteristics of the feature data within this coverage. Three subjects are discussed: 1) special "automation techniques, 2) feature coincidence, and 3) database" design issues. The table does not contain a full description of the data production process.
:	
n	...

D.3.2 Data library reference coverages and tables. The following reference coverages, including directory files and tables, apply to all tiled data libraries. These coverages are untiled and 2-dimensional.

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D.3.2.1 Tile Reference coverage (tileref) directory and files. The tile reference coverage directory contains the following files:

tileref	directory file
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when int.vdt is present)
cnd	connected node primitive table
csi	connected node spatial index
ebr	edge bounding rectangle table
edg	edge primitive table
edx	edge variable length index
esi	edge spatial index
fac	face primitive table
fbr	face bounding rectangle table
fcs	feature class schema table
fsi	face spatial index
rng	ring table
tileref.aft	tile reference area feature table
tilereft.tft	tile reference text feature table (optional)
tsi	text spatial index (only when a txt is present)
txt	text primitive table (only when a tft is present)
txx	text variable length index (only when a txt is present)
symbol.rat	symbology related attribute table (only when a tft is present)

D.3.2.1.1 Tile Reference feature class schema table. A feature class schema table shall be present in every tile reference coverage (tileref). The format and content of the fcs is presented in TABLE D-6. The record content of this table may vary for each tile reference coverage depending upon the presence or absence of a text feature class.

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APPENDIX DTABLE D-6. Content and format for tileref feature class schema table.

Thematic Layer: Tile Reference  
 Coverage Name: tileref  
 Table Description: Feature Class Schema Table  
 Table Name: fcs

{Header length}L; Tile Reference Feature Class Schema Table;-;					
id=I,1,P,Row Identifier,-,-,-,;					
feature_class=T,8,N,Name of Feature Class,-,-,-,;					
table1=T,12,N,First Table,-,-,-,;					
table1_key=T,15,N,Column Name in First Table,-,-,-,;					
table2=T,12,N,Second Table,-,-,-,;					
table2_key=T,6,N,Column Name in Second Table,-,-,-,;					
1	tileref	tileref.aft	fac_id	fac	id
2	tileref	fac	tileref.aft_id	tileref.aft	id
3	tilereft	tilereft.tft	txt_id	txt	id
4	tilereft	txt	id	tilereft.tft	txt_id
5	tilereft	tilereft.tft	symbol.rat_id	symbol.rat	id

D.3.2.1.2 Tile reference feature tables. The feature tables implemented in the tile reference coverage are specified in TABLES D-7 and D-8. The text feature table is optional. If it is present, there is a one-to-one correspondence between the records of the tile reference area feature table and text feature table. Thematic indices will not be implemented in the tile reference coverage feature tables.

TABLE D-7. Format and content for tileref area feature table.

Thematic Layer: Tile Reference  
 Coverage Name: tileref  
 Table Description: Tile Reference Area Feature Table  
 Table Name: tileref.aft

{Header length}L; Tile Reference Area Feature Table;-;		
id=I,1,P,Row Identifier,-,-,-,;		
tile_name=T,15,N,Library Tile Path Name,-,-,-,;		
fac_id=I,1,N,Face Primitive ID,-,-,-,;		
1		FJHB1500 <sup>1</sup>
2		FJHB1515 <sup>1</sup>
3		FJHB3030 <sup>1</sup>
4		FJHB3015 <sup>1</sup>
:		:
n		n

NOTE 1: The sample tile path names for libraries.

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APPENDIX DTABLE D-8. Format and content for tileref text feature table.

Thematic Layer: Tile Reference  
 Coverage Name: tileref  
 Table Description: Tile Reference Text Feature Table  
 Table Name: tilereft.tft

<pre>{Header length}L; Tile Reference Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-; tile_name=T,8,N,Tile Name,-,-,-; txt_id=I,1,N,Text Primitive ID,-,-,-; symbol.rat_id=I,1,N,Symbol Identification,-,-,-; </pre>			
1	FJHB1500	1	1
2	FJHB3030	2	1
3	:	3	1
:	:	:	:
n	n	n	n

D.3.2.1.3 Tile reference primitive tables. The format of the primitive tables in the tile reference coverage directory is described in section 3.16.5. Although the text feature table is optional, a sample text primitive table (TABLE D-9) is presented to show sample values for the STRING column. The structure and format of the variable-length index files and spatial index files are provided in section 3.14.3. The structure and format of the bounding rectangle tables are described in section 3.16.5.

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APPENDIX DTABLE D-9. Format and example of content for tileref text primitive table.

Thematic Layer: Tile Reference  
 Coverage Name: tileref  
 Table Description: Text Primitive Table  
 Table Name: txt

{Header length}L; Text Primitive Table;-; id=I,1,P,Row Identifier,-,-,-,; string=T,*N,Text String,-,-,-,; shape_line=C,*N,Shape of Text String,-,-,-,;		
1	\FJHB1500 <sup>1</sup>	-5.811609,43.662006
2	\FJHB1515 <sup>1</sup>	-8.574136,43.435287
3	\FJHB3030 <sup>1</sup>	-7.437326,42.881957
4	\FJHB3015 <sup>1</sup>	-6.835582,40.736553
:	:	:
n	n	n

NOTE 1: Sample tile path names for libraries.

TABLE D-10. Tile reference integer value description table.

Thematic Layer: Tile Reference  
 Coverage Name: tileref  
 Table Description: Tile Reference Integer Value Description Table  
 Table Name: int.vdt

{Header length}L; Tile Reference Integer Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,; table=T,12,N,Name of the Feature Table,-,-,-,; attribute=T,3,N,Column Name,-,-,-,; value=S,1,N,Unique Value of Attribute,-,-,-,; description=T,*N,Description of Value,-,-,-,;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

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D.3.2.2 Library Reference coverage directory and files. The library reference coverage directory contains the following files:

libref	directory file
int.vdt	integer value description table (only when symbol.rat is present)
int.vdx	integer vdt variable length index (only when int.vdt is present)
char.vdt	character value description table
char.vdx	character vdt variable length index
cnd	connected node primitive table
csi	connected node spatial index
ebr	edge bounding rectangle table
edg	edge primitive table
edx	edge variable length index
esi	edge spatial index
fcs	feature class schema table
libref.lft	library reference line feature table
libreft.tft	library reference text feature table (optional)
tsi	text spatial index (only when a txt is present)
txt	text primitive table (only when a tft is present)
txx	text variable length index (only when a txt is present)
symbol.rat	symbology related attribute table (only when a tft is present)

D.3.2.2.1 Library Reference feature class schema table. A feature class schema table shall be present in every library reference coverage (libref). The format and content of the fcs is presented in TABLE D-11. The record content of this table may vary for each library reference coverage, depending upon the presence or absence of a text feature class.



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APPENDIX DTABLE D-11. Content and format for libref feature class schema table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Feature Class Schema Table  
 Table Name: fcs

<pre>{Header length}L; Library Reference Feature Class Schema Table;-; id=I,1,P,Row Identifier,-,-,-,: feature_class=T,8,N,Name of Feature Class,-,-,-,: table1=T,12,N,First Table,-,-,-,: table1_key=T,15,N,Column Name in First Table,-,-,-,: table2=T,12,N,Second Table,-,-,-,: table2_key=T,6,N,Column Name in Second Table,-,-,-,;</pre>					
1	libref	libref.lft	edg_id	edg	id
2	libref	edg	libref.lft_id	libref.lft	id
3	libref	libref.tft	txt_id	txt	id
4	libref	txt	id	libref.tft	txt_id
5	libref	libref.tft	symbol.rat_id	symbol.rat	id

D.3.2.2.2 Library reference feature tables. The feature tables implemented in the library reference coverage are specified in TABLES D-12 and D-13. Thematic indices will not be implemented in the library reference coverage feature tables.

TABLE D-12. Format and content for libref line feature table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Line Feature Table  
 Table Name: libref.lft

<pre>{Header length}L; Library Reference Line Feature Table;-; id=I,1,P,Row Identifier,-,-,-,: f_code=T,5,N,FACC Feature Code,char.vdt,-,-,-,: edg_id=I,1,N,Edge Primitive ID,-,-,-,;</pre>		
1	FA000	1
2	BA010	2
3	AP030	3
:	:	:
n	n	n

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APPENDIX DTABLE D-13. Format and content for libref text feature table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Text Feature Table  
 Table Name: libref.tft

{Header length}L; Library Reference Text Feature Table;-; id=I,1,P,Row Identifier,-,-,-; f_code=T,5,N,FACC Feature Code,char.vdt,-,-,; txt_id=I,1,N,Text Primitive ID,-,-,-; symbol.rat_id=I,1,N,Symbol Identification,-,-,-,;			
1	ZD040	1	1
2	ZD040	2	2
3	ZD045	3	6
:	:	:	:
n	n	n	n

D.3.2.2.3 Library reference primitive tables. The format of the primitive tables in the library reference coverage directory is defined in section 3.16.5. Although the text feature table is optional, a sample text primitive table is presented to show sample values for the STRING column (TABLE D-14).

TABLE D-14. Format and example of the content for libref text primitive table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Text Primitive Table  
 Table Name: txt

{Header length}L; Text Primitive Table;-; id=I,1,P,Row Identifier,-,-,-; string=T,*N,Text String,-,-,-; shape_line=C,*N,Shape of Text String,-,-,-,;		
1	DUBLIN <sup>1</sup>	-6.811609,53.662006
:	:	:
n	n	n

NOTE 1: The names and extent of the product libraries, or other geographic identifiers.

D.3.2.2.4 Library reference value description tables. A character value description table shall be present in the library reference coverage. The format and content of the char.vdt are presented in TABLE D-15. An integer value description table shall be optionally present in the library reference coverage when the symbol.rat is present, meaning that the text feature table is present as well. The format and content of the int.vdt are presented in TABLE D-16.

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APPENDIX DTABLE D-15. Library reference character value description table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Character Value Description Table  
 Table Name: char.vdt

{Header length}L; Library Reference Character Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-,:				
table=T,12,N,Name of the Feature Table,-,-,-,:				
attribute=T,6,N,Column Name,-,-,-,:				
value=T,5,N,Unique Value of Attribute,-,-,-,:				
description=T,*N,Description of Value,-,-,-,;				
1	libref.lft	f_code	AP030	Road
2	libref.lft	f_code	BA010	Coastline/Shoreline
3	libref.lft	f_code	BH140	River/Stream
4	libref.lft	f_code	FA000	Administrative Boundary
5	libref.tft	f_code	ZD040	Named Location
6	libref.tft	f_code	ZD045	Text Description

TABLE D-16. Library reference integer value description table.

Thematic Layer: Library Reference  
 Coverage Name: libref  
 Table Description: Library Reference Integer Value Description Table  
 Table Name: int.vdt

{Header length}L; Library Reference Integer Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-,:				
table=T,12,N,Name of the Feature Table,-,-,-,:				
attribute=T,3,N,Column Name,-,-,-,:				
value=S,1,N,Unique Value of Attribute,-,-,-,:				
description=T,*N,Description of Value,-,-,-,;				
1	symbol.rat	fon	1	Machine Default
2	symbol.rat	sty	1	Kern
3	symbol.rat	sty	2	Proportional
4	symbol.rat	sty	3	Constant
5	symbol.rat	clt	1	Black
6	symbol.rat	clt	2	Blue
7	symbol.rat	clt	3	Red-Brown
8	symbol.rat	clt	4	Magenta

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## APPENDIX E

## DATA QUALITY COVERAGE

## E.1 SCOPE

This appendix contains the structure and content of the data quality coverage. This coverage is common among all VPF based products. It is a mandatory part of this specification. Data quality coverage tables are defined in this appendix. The information contained herein is intended for compliance.

## E.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

## E.3 DATA LIBRARY

The structure and content of each table in a data quality coverage of the library are provided in this section. Each library in a database will have a separate data quality table reflecting the sources used to build the library and data quality information specific to the library.

E.3.1 Data quality coverage. A data quality coverage shall be implemented as shown in TABLES E-1 through E-11. This coverage contains information that affects the entire library. It may also contain information that pertains to particular coverages, feature classes, or even to particular features. For example, the line feature table `dqline.lft` (TABLE E-3) and line related attribute table `dqline.rat` (TABLE E-4) are used to describe data quality conditions that result from the edge matching of two sources. The dq coverage is tiled and 2-dimensional.

E.3.2. Data quality coverage directory and files. The data quality coverage directory contains the following files:

<code>dq</code>	directory file
<code>int.vdt</code>	integer value description table
<code>int.vdx</code>	integer vdt variable length index
<code>char.vdt</code>	character value description table
<code>char.vdx</code>	character vdt variable length index
<code>cnd</code>	connected node primitive table
<code>csi</code>	connected node spatial index
<code>cnx</code>	connected node variable length index
<code>ebr</code>	edge bounding rectangle table
<code>edg</code>	edge primitive table
<code>edx</code>	edge variable length index
<code>esi</code>	edge spatial index
<code>fac</code>	face primitive table
<code>fbr</code>	face bounding rectangle table
<code>fsi</code>	face spatial index
<code>rng</code>	ring table
<code>fcs</code>	feature class schema table
<code>dqline.lft</code>	data quality line feature table
<code>dqarea.aft</code>	data quality area feature table
<code>dqvoida.aft</code>	data quality void area feature table
<code>dqtxt.tft</code>	data quality text feature table (optional)
<code>tsi</code>	text spatial index (only when a txt is present)
<code>txt</code>	text primitive table (only when a tft is present)
<code>txx</code>	text variable length index (only when a txt is present)

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symbol.rat                      symbology related attribute table (only  
when tft is present)

TABLE E-1. Data quality character value description table.

Thematic Layer:                      Data Quality  
Coverage Name:                      dq  
Table Description:                    Data Quality Character Value Description Table  
Table Name:                          char.vdt

{Header length}L; Data Quality Character Value Description Table;-;				
id=I,1,P,Row Identifier -,-,-:				
table=T,12,N,Name of the Feature Table,-,-,-:				
attribute=T,6,N,Column Name,-,-,-:				
value=T,5,N,Unique Value of Attribute,-,-,-:				
description=T,*N,Description of Value,-,-,-,;				
1	dqvoida.aft	f_code	ZD020	Void Collection Area
2	dqtxt.tft	f_code	ZD045	Text Description

TABLE E-2. Data quality integer value description table.

Thematic Layer:                      Data Quality  
Coverage Name:                      dq  
Table Description:                    Data Quality Integer Value Description Table  
Table Name:                          int.vdt

{Header length}L; Data Quality Integer Value Description Table;-;				
id=I,1,P,Row Identifier,-,-,-:				
table=T,12,N,Name of the Feature Table,-,-,-:				
attribute=T,12,N,Column Name,-,-,-:				
value=S,1,N,Unique Value of Attribute,-,-,-:				
description=T,*N,Description of Value,-,-,-,;				
1	dqarea.aft	abs_horz_acc	-32767	Unknown
2	dqarea.aft	abs_vert_acc	-32767	Unknown
3	dqvoida.aft	vca	0	Unknown
4	dqvoida.aft	vca	2	Area Too Rough to Collect
5	dqvoida.aft	vca	3	No Available Imagery
6	dqvoida.aft	vca	6	No Available Map Source
7	dqvoida.aft	vca	7	No Suitable Imagery
8	dqvoida.aft	vct	0	Unknown
9	dqvoida.aft	vct	1	Relief
10	dqvoida.aft	vct	2	Other
11	symbol.rat	fon	1	Machine Default
12	symbol.rat	sty	1	Kern
13	symbol.rat	sty	2	Proportional
14	symbol.rat	sty	3	Constant
15	symbol.rat	clt	1	Black
16	symbol.rat	clt	2	Blue
17	symbol.rat	clt	3	Red-Brown
18	symbol.rat	clt	4	Magenta

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TABLE E-3. Data quality line feature table.

Thematic Layer: Data Quality  
 Coverage Name: dq  
 Feature Table Description: Data Quality Line Feature Table  
 Table Name: dqline.lft  
 Thematic Index ID Number: 1

```
{Header length}L;
Data Quality Line Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
source1=T,20,N,First Source Sheet or Data ID,-,1src1.lti,-,:
source2=T,20,N,Second Source Sheet or Data ID,-,2src1.lti,-,;;
```

<u>Column</u>	<u>Description</u>	<u>Value</u>	<u>Value Meaning</u>
id	Row Identifier	Sequential	beginning with 1
source1	First source sheet or data identifier		This item contains the name of the first map sheet number or other source where a line feature crosses or runs along the source boundary, and requires a data quality description (see dqline.rat). (e.g., 6446 II V782)
source2	Second source sheet or data identifier		This item contains the name of the second map sheet number or other source where a line feature crosses or runs along the source boundary, and requires a data quality description (see dqline.rat). (e.g., 6446 I V782)

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TABLE E-4. Data quality line related attribute table.

Thematic Layer: Data Quality  
 Coverage Name: dq  
 Table Description: Data Quality Line Related Attribute Table  
 Table Name: dqline.rat

```
(Header length) L;
Data Quality Line Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-;
layer=T,*N,Data Quality Thematic Layer,-,layer1.rti,-,:
dqdescr=T,*N,DQ Description for Line Feature,-,-,-;:
```

Column	Description	Value	Value Meaning
id	Row Identifier	Sequential	beginning with 1
layer	Data Quality Thematic Layer		This is the abbreviated thematic coverage name.
dqdescr	Data Quality Description for Area Feature		This item contains a text string describing specific conditions occurring within the coverage at the location identified by the dq linear feature. Typically this refers to edgematch problems observed between two source maps and identifies any steps taken to ameliorate the problem.

TABLE E-5. Format for data quality line related join table.

Thematic Layer: Data Quality  
 Coverage Name: dq  
 Table Description: Data Quality Line Related Join Table  
 Table Name: dqline.rjt

```
{Header length}L;
Data Quality Line Related Join Table;-;
id=I,1,P,Row Identifier,-,-,-;
dqline.lft_id=I,1,N,Feature Key,-,fid1.rti,-,:
dqline.rat_id=I,1,N,Related Attribute Table Row Identifier,rat1.rti,-,:;
```

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TABLE E-6. Data quality area feature table.

Thematic Layer: Data Quality  
 Coverage Name: dq  
 Table Description: Data Quality Area Feature Table  
 Table Name: dqarea.aft  
 Thematic Index ID Number: 2

```
{Header length}L;
Data Quality Area Feature Table;-;
id=I,1,P,Row Identifier,-,-,-:
source_id=T,20,N,Source ID Number,-,src_id2.ati,-,:
edition=T,10,N,Map Sheet Edition,-,edition2.ati,-,:
comp_date=D,1,N,Map Compilation Date,-,-,-:
rev_date=D,1,N,Map Revision Date,-,-,-:
print_date=D,1,N,Map Print Date,-,-,-:
source_info=T,* ,N,General Source Information,-,-,-:
abs_horz_acc=S,1,N,Absolute Horizontal Accuracy (meters),int.vdt,h_acc2.ati,-,:
abs_vert_acc=S,1,N,Absolute Vertical Accuracy (meters),int.vdt,v_acc2.ati,-,:;
```

Column	Description	Value	Value Meaning
id	Row Identifier	Sequential	beginning with 1
source_id	Source Identification Number		Alphanumeric String of the Map Sheet, or Source Name or Identification Number
edition	Map Sheet Edition		Alphanumeric String of the Map Sheet Edition
comp_date	Map Compilation Date		Appropriate date value or space character filled if null
rev_date	Map Revision Date		Appropriate date value or space character filled if null
print_date	Map Print Date		Appropriate date value or space character filled if null
source_info	General Source Information		Contains a description of conditions occurring in the database, such as sheet-wide phenomena, regional phenomena, or marginalia. "Character String of the Map Sheet Information" (e.g., "All roads are approximate alignment")
abs_horz_acc	Absolute Horizontal Accuracy (meters)		NIMA-specified absolute horizontal accuracy
		-32767 >= 1	Unknown



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TABLE E-6. Data quality area feature table (continued).

abs_vert_acc	Absolute Vertical Accuracy (meters)	NIMA-specified absolute vertical accuracy
	-32767	Unknown
	>= 1	

TABLE E-7. Data quality area related attribute table.

Thematic Layer:	Data Quality
Coverage Name:	dq
Table Description:	Data Quality Area Related Attribute Table
Table Name:	dqarea.rat

```
{Header length}L;
Data Quality Area Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-;
layer=T,*N,Data Quality Thematic Layer,-,layer2.rti,-,:
dqdescr=T,*N,DQ Description for Area Feature,-,-,-;:
```

<b>Column</b>	<b>Description</b>	<b>Value</b>	<b>Value Meaning</b>
id	Row Identifier	Sequential	beginning with 1
layer	Data Quality Thematic Layer		This is the abbreviated coverage name.
dqdescr	Data Quality Description for Area Feature		This item contains a text string describing specific conditions occurring within the coverage for the area identified by the dq area feature. Typically this refers to edgematch problems observed between two source maps and identifies any steps taken to ameliorate the problem.

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TABLE E-8. Format for data quality area related join table.

Thematic Layer: Data Quality  
Coverage Name: dq  
Table Description: Data Quality Area RAT Join Table  
Table Name: dqarea.rjt

```
{Header length}L;
Data Quality Area Related Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
dqarea.aft_id=I,1,N,Feature Key,-,fid2.rti,-,:
dqarea.rat_id=I,1,N,Related Attribute Table Row Identifier,-,rat2.rti,-,:;
```

TABLE E-9. Data quality void collection area feature table.

Thematic Layer: Data Quality  
Coverage Name: dq  
Table Description: Data Quality Void Collection Area Feature Table  
Table Name: dqvoida.aft  
Thematic Index ID Number: 3  
Portrayal Criteria: specific requirements for portrayal criteria are located in the associated specifications.

```
{Header length}L;
Data Quality Void Collection Area Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
vca=S,1,N,Void Collection Attribute,int.vdt,vca3.ati,-,:
vct=S,1,N,Void Collection Type,int.vdt,vct3.ati,-,:;
```

Column	Description	Value	Value Meaning	Applicable F_CODE for Attribute Value
id	Row Identifier	Sequential	beginning with 1	
f_code	FACC Feature Code	ZD020	Void Collection Area	
vca	Void Collection Attribute	0	Unknown	ZD020
		2	Area Too Rough to Collect	ZD020
		3	No Available Imagery	ZD020
		6	No Available Map Source	ZD020
		7	No Suitable Imagery	ZD020
vct	Void Collection Type	0	Unknown	ZD020
		1	Relief	ZD020
		2	Other	ZD020

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TABLE E-10. Data quality text feature table.

Thematic Layer: Data Quality  
 Coverage Name: dq  
 Table Description: Data Quality Text Feature Table  
 Table Name: dqtxt.tft

```
{Header length}L;
Data Quality Text Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
symbol.rat_id=I,1,N,Symbol Identification,-,-,-,;
```

<u>Column</u>	<u>Description</u>	<u>Value</u>	<u>Value Meaning</u>	<u>Applicable F_CODE for Attribute Value</u>
id	Row Identifier	Sequential beginning with 1		
f_code	FACC Feature Code	ZD045	Text Description	

symbol.rat\_id  
 Symbol Identification  
 (Refer to Symbol Related Attribute Table for selection of values)

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Thematic Layer: Data Quality  
 Coverage Name: dq  
 Table Description: Data Quality Feature Class Schema Table  
 Table Name: fcs

{Header length}L;					
Data Quality Feature Class Schema Table; ;					
id=I,1,P,Row Identifier,-,-,-,;					
feature_class=T,8,N,Name of Feature Class,-,-,-,;					
table1=T,12,N,First Table,-,-,-,;					
table1_key=T,15,N,Column Name in First Table,-,-,-,;					
table2=T,12,N,Second Table,-,-,-,;					
table2_key=T,15,N,Column Name in Second Table,-,-,-,;					
1	dqline	dqline.lft	id	dqline.ljt	dqline.lft_id
2	dqline	dqline.ljt	edg_id	edg	id
3	dqline	edg	id	dqline.ljt	edg_id
4	dqline	dqline.ljt	dqline.lft_id	dqline.lft	id
5	dqline	dqline.lft	id	dqline.rjt	dqline.lft_id
6	dqline	dqline.rjt	dqline.rat_id	dqline.rat	id
7	dqline	dqline.rat	id	dqline.rjt	dqline.rat_id
8	dqline	dqline.rjt	dqline.lft_id	dqline.lft	id
9	dqarea	dqarea.aft	id	dqarea.ajt	dqarea.aft_id
10	dqarea	dqarea.ajt	fac_id	fac	id
11	dqarea	fac	id	dqarea.ajt	fac_id
12	dqarea	dqarea.ajt	dqarea.aft_id	dqarea.aft	id
13	dqarea	dqarea.aft	id	dqarea.rjt	dqarea.aft_id
14	dqarea	dqarea.rjt	dqarea.rat_id	dqarea.rat	id
15	dqarea	dqarea.rat	id	dqarea.rjt	dqarea.rat_id
16	dqarea	dqarea.rjt	dqarea.aft_id	dqarea.aft	id
17	dqvoida	dqvoida.aft	id	dqvoida.ajt	dqvoida.aft_id
18	dqvoida	dqvoida.ajt	fac_id	fac	id
19	dqvoida	fac	id	dqvoida.ajt	fac_id
20	dqvoida	dqvoida.ajt	dqvoida.aft_id	dqvoida.aft	id
21	dqvoida	dqvoida.aft	id	dqvoida.njt	dqvoida.aft_id
22	dqvoida	dqvoida.njt	notes.rat_id	notes.rat	id
23	dqvoida	notes.rat	id	dqvoida.njt	notes.rat_id
24	dqvoida	dqvoida.njt	dqvoida.aft_id	dqvoida.aft	id
25	dqtxt	dqtxt.tft	id	dqtxt.tjt	dqtxt.tft_id
26	dqtxt	dqtxt.tjt	txt_id	txt	id
27	dqtxt	txt	id	dqtxt.tjt	txt_id
28	dqtxt	dqtxt.tjt	dqtxt.tft_id	dqtxt.tft	id
29	dqtxt	dqtxt.tft	symbol.rat_id	symbol.rat	id

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VECTOR PRODUCT FEATURE AND ATTRIBUTE GLOSSARY

F.1 SCOPE

F.1.1 Scope. This Appendix defines the requirement for the standardized feature and attribute content of NIMA vector products defined to date. Taxonomy is in accordance with the Digital Geographic Information Exchange Standard (DIGEST) Part 4, Feature and Attribute Coding Catalogue (FACC), Edition 2.0, June 1997. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

F.2 APPLICABLE DOCUMENTS

Digital Geographic Information Exchange Standard (DIGEST) Part 4, Feature and Attribute Coding Catalogue (FACC), Edition 2.0, June 1997

NIMA Profile of the Digital Geographic Information Exchange Standard (DIGEST) Part 4, Feature and Attribute Coding Catalogue (FACC)

(Copies of the above documents may be obtained from the National Imagery and Mapping Agency, ATTN: SES, Mail Stop P-24, 12310 Sunrise Valley Drive, Reston, VA 20191-3449.)

F.3 NIMA Profile of DIGEST FACC. The NIMA Profile of DIGEST FACC, or "NIMA FACC Glossary" is a profile (or subset\*) of the DIGEST FACC. The feature and attribute content of products governed by this general specification shall conform to the standardized features and attributes shown in the NIMA Profile of DIGEST FACC. As new products are developed, and additional feature/attribute requirements are identified, the new information shall be incorporated into NIMA Profile of DIGEST FACC in such a manner that it does not conflict with (i.e., duplicate, contradict, etc.) existing features and the attributes assigned to those features.

\* Except in those cases where new product requirements are driving proposed extensions (i.e., additions) to FACC.

F.4 Vector product feature standardization. The following paragraphs provide general information on the principles of data standardization used in developing the NIMA profile from the DIGEST FACC. Section F.4 does not contain requirements.

F.4.1 Rational for standardization. VPF products are no longer being used exclusively as stand-alone products, but rather as source data for geographic information systems (GIS), in which a user may have integrated in a single display or application a variety of data from several source products. The increasing use of vector product data in this manner has led to a need for a standardized feature and attribute dictionary that crosses traditional product lines.

F.4.2 Feature and Attribute Coding Catalog. The features and attributes contained in the NIMA Profile of DIGEST FACC are taken from the DIGEST Part 4, FACC. The DIGEST Part 4 FACC document is not a set glossary of features and their attributes, but rather as its name suggests, a catalog of various feature and attribute codes used by digital data products. Because it is structured this way, a single geospatial entity can in many cases be coded in several different ways to get to the same meaning. For example, a heliport may be described as

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a feature, GB035 Heliport, or as an attribute, APT 9 Heliport of feature GB005 Airport/Airfield. By allowing multiple paths to the same meaning, standardization is not enforced by the FACC document.

F.4.2.1 Numeric attributes. Numeric attributes appearing in the NIMA FACC Glossary, and in VPF products, conform to the FACC for the unit of measure, format, range and increment given in the FACC document. Where new product requirements have driven the need for existing FACC attributes to be shown in units other than what is currently in FACC, new attributes have been defined and proposed as additions to FACC.

F.4.2.2 Proposed changes to FACC. Certain features and attributes required by products covered in this specification are not included in the FACC. These either result from new product requirements, where features and attributes have not yet been developed, and in certain cases where errors or clarifications are necessary to existing FACC features, attributes and values to meet product requirements. Notation is made on a case by case basis to indicate corrections, clarifications, and extensions to be proposed to the Digital Geographic Information Working Group (DGIWG) FACC Working Party.

F.4.3 Standardized Feature Glossary. The purpose of the NIMA Profile of DIGEST FACC is to establish a single set of standard data elements for use by NIMA Vector Product Format (VPF) products. This is to ensure that between products, the same feature means the same thing, and each attribute of any particular feature has the same meaning for all products. The NIMA profile is not an essential element of a vector product format, since features, attributes, and attribute values are defined for any particular product in the character value description tables and integer value description tables found in each coverage. This glossary does however, provide a unified definition of all features and attributes used across multiple products, which is necessary for a product-independent data warehouse concept.

F.4.3.1 Principles of feature standardization. The main objective for the standardization of features is to establish a single feature/attribute combination for any particular geospatial feature. In the example of heliport cited above, the feature GB035 has been standardized, and the value APT 9 Heliport is not used on feature GB005. A review was also made of the feature definition as established by the FACC, to ensure that none of the attribution describing a feature was in conflict with the basic feature definition.

F.4.3.2 Principles of Attribute standardization. The main objectives of attribute standardization were twofold. The first was to ensure that various products would use the same attribute to describe the same information. The second was to ensure that the same attribute would not describe multiple concepts, on one product or across product lines. Coded attributes listed in the FACC are not necessarily restricted to single concepts. Since the Vector Product Format only allows a single attribute value for an attribute field to describe any particular geographic entity, it would be impossible to attribute a feature as both reported (EXS 3) and operational (EXS 28) using the EXS attribute alone. In the NIMA FACC Glossary, the attribute values have been deliberately restricted to single concepts. In this example, the feature would be described as reported (COE 3), and operational (EXS 28).

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F.4.3.2.1 Single value attributes. Certain VPF products require specific attributes to be carried by every feature in the product, for use by modeling and simulation applications. A limited number of these attributes have only a single value, for example: SMC 116 Water on feature BA040 Water (Except Inland).

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MIL-PRF-0089049 (NIMA)

CONCLUDING MATERIAL

Preparing Activity:  
NIMA - MP

Project MCGT-0299

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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**1. DOCUMENT NUMBER**  
MIL-PRF-0089049(NIMA)

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981124

**3. DOCUMENT TITLE**

Vector Product Format (VPF) Products, General Specification for

**4. NATURE OF CHANGE** (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

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