

National Pipeline Mapping System

*Standards for
Pipeline and Liquefied Natural Gas
Operator Submissions*

March 1999



prepared by the

U.S. Department of Transportation



Office of Pipeline Safety
400 7th Street, S.W.
Washington, D.C. 20590
www.npms.rspa.dot.gov

National Pipeline Mapping System

*Standards for
Pipeline and Liquefied Natural Gas
Operator Submissions*

prepared by the

U.S. Department of Transportation



Office of Pipeline Safety
400 7th Street, S.W.
Washington, D.C. 20590
www.npms.rspa.dot.gov

March 1999

Table of Contents

Section	Page
List of Acronyms.....	iv
Preface	v
OPS Contacts.....	v
Internet Addresses	v
NPMS Repositories	vi
1. Introduction.....	1
1.1 Regulatory Requirement.....	1
1.2 Development of NPMS and Standards for Data Submission.....	2
1.3 NPMS Structure	2
1.4 Submission of Data	3
1.5 Working with State Repositories	4
1.5.1 Active State Repositories.....	4
1.5.2 Special Instructions for California Pipeline Operators	4
1.5.3 Special Instructions for States with Existing Pipeline Data..	4
1.6 Distribution of NPMS Data.....	5
1.7 About These Standards	5
2. General Requirements (Key Terms and Definitions)	7
2.1 NPMS File Naming Conventions.....	10
2.2 Types of NPMS Submissions	10
3. Attribute Data	13
3.1 Required and Optional Attributes	13
3.2 Rules for Attribute Data Input	13
3.2.1 Understanding Pipeline System and Pipeline Segment Attributes	16
3.3 Building the Attribute Data File.....	16
3.4 Using the <i>NPMS Attribute Data Template</i>	17
3.4.1 System Requirements	17
3.4.2 Installation Instructions.....	17
3.4.3 Step-By-Step User Instructions	18
4. Geospatial Data (Digital or Hard-Copy Maps).....	23
4.1 General Requirements for Digital Geospatial Data	23
4.2 Digital Submission Techniques	24
4.2.1 ESRI ARC/INFO Format Data Submissions.....	24
4.2.2 ESRI ArcView Format Data Submissions.....	25
4.2.3 Intergraph Corporation's FRAMME Data Submissions	25
4.2.4 Intergraph/Bentley Corporation's Microstation and non-FRAMME Data Submissions	26

National Pipeline Mapping System

4.2.5	MapInfo Data Submissions.....	26
4.2.6	AutoCAD Data Submissions	27
4.2.7	Smallworld Data Submissions	27
4.2.8	Generic (ASCII) Digital Data Submissions	28
4.3	Hard-Copy Submissions.....	30
4.3.1	Pipeline Drafting Requirements.....	30
4.3.2	LNG Facility Drafting Requirements	30
4.3.3	Annotating Pipeline and LNG Attribute Data.....	30
4.3.4	Requirements for Hard-Copy Mapping	31
5.	Metadata	33
5.1	Background	33
5.2	Distribution of Metadata and Confidentiality	34
5.3	<i>NPMS Metadata Template</i>	34
5.4	Using The <i>NPMS Metadata Template</i>	34
5.4.1	System Requirements.....	34
5.4.2	Installation Instructions.....	34
5.4.3	Metadata Entry.....	35
5.4.4	Metadata Samples	35
6.	Submitting the Data	37
6.1	Operator Submission Checklist.....	37
6.1.1	Attribute Data Submissions	37
6.1.2	Hard-Copy Geospatial Data Submissions.....	37
6.1.3	Digital Geospatial Data Submissions.....	37
6.1.4	Metadata Submissions	38
6.2	Packaging and Sending Data.....	38
Appendices		
A.	Hard-Copy Attribute Data Sample Submission.....	A-1
B.	Metadata Example for Hard-Copy and Digital Geospatial Data Submissions.....	B-1
C.	Glossary	C-1

List of Exhibits and Attachments

Exhibits

Exhibit 1-1.	Sample Data Submission Scenario.....	3
Exhibit 1-2	State Repositories are Shown Shaded	4
Exhibit 2-1.	Sample of the Three Types of NPMS Data.....	7
Exhibit 2-2.	Sample of Annotated Pipeline System.....	8
Exhibit 2-3.	A Pipeline System Consisting of Three Pipeline Segments	8

Exhibit 2-4. Sample Annotation of Pipeline Intersection and Pipeline Crossing	9
Exhibit 3-1. Attribute Field Definitions for Pipeline Features	14
Exhibit 3-2. Attribute Field Definitions for LNG Facilities.....	15
Exhibit 3-3. Attribute Data Entry Screen	18
Exhibit 3-4. Pipeline Attributes Data Entry Screen	19
Exhibit 3-5. Message Indicating Path and Filename of Saved File.....	20
Exhibit 3-6. LNG Facility Attributes Data Entry Screen	21
Exhibit 4-1. Geospatial File Containing Pipeline Information.....	28
Exhibit 4-2. Geospatial File Containing LNG Point Information.....	29
Exhibit A-1. Sample Hard-Copy Map	A-1
Exhibit A-2. Sample Pipeline Attribute Data.....	A-2
Exhibit A-3. Sample LNG Attribute Data.....	A-2

Attachments

Five-Step Submission Guide.....	oversized foldout
Sample Map.....	oversized foldout
Operator Submission Checklist.....	accompanies foldouts

National Pipeline Mapping System

List of Acronyms

AA	anhydrous ammonia
AGA	American Gas Association
API	American Petroleum Institute
ASCII	American Standard Code for Information Interchange
BTS	Bureau of Transportation Statistics, U.S. Department of Transportation
CAD	computer-aided drafting
CADD	computer-aided drafting and design
CO ₂	carbon dioxide
CRD	crude oil
DLG	Digital Line Graph
DOE	Department of Energy
DOS	disk operating system
DRG	digital raster graphic
DXF	Drawing Exchange Format
EMT	Empty
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FTP site	file transfer protocol site
GIS	geographic information system
GPS	global positioning system
HG	hydrogen gas
HVL	highly volatile liquid
INGAA	Interstate Natural Gas Association of America
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LUT	look-up-table
MIF	MapInfo Interchange File
MQAT	Joint Government-Industry Pipeline Mapping Quality Action Team
NAD 27, 83	North American Datum (of 1927 or 1983)
NG	natural gas
NGL	natural gas liquids
NPMS	National Pipeline Mapping System
OMB	Office of Management and Budget
OPS	Office of Pipeline Safety, U.S. Department of Transportation
PRD	product
ROW	right-of-way
SEF	standard exchange format
SMYS	specified minimum yield strength
USDOT	U.S. Department of Transportation
USGS	United States Geological Survey
UTM	Universal Transverse Mercator

Preface

This document was prepared by the second Joint Government/Industry Pipeline Mapping Quality Action Team (MQAT II). The team was sponsored by the U.S. Department of Transportation's (USDOT) Office of Pipeline Safety (OPS), American Petroleum Institute (API), American Gas Association (AGA), and Interstate Natural Gas Association of America (INGAA). Representatives on the team included the OPS; Bureau of Transportation Statistics (BTS); U.S. Department of Energy (USDOE); U.S. Geological Survey (USGS); Federal Energy Regulatory Commission (FERC); state representatives from California, Louisiana, New York, and Texas; and representatives from the pipeline industry.

If you have questions regarding this document, please contact one of the following representatives from the Office of Pipeline Safety:

OPS Contacts

Steve Fischer

U.S. Department of Transportation
Office of Pipeline Safety
400 7th Street, S.W.
Washington, D.C. 20590
202-366-6267
steven.fischer@rspa.dot.gov

Christina Sames

U.S. Department of Transportation
Office of Pipeline Safety
400 7th Street, S.W.
Washington, D.C. 20590
202-366-4561
christina.sames@rspa.dot.gov

Internet Addresses

National Pipeline Mapping System – www.npms.rspa.dot.gov

Bureau of Transportation Statistics – www.bts.gov

Federal Energy Regulatory Commission – www.ferc.fed.us

Federal Geographic Data Committee – www.fgdc.gov

Office of Pipeline Safety – ops.dot.gov

Research and Special Programs Administration – www.rspa.dot.gov

U.S. Department of Energy – www.doe.gov

U.S. Department of Transportation – www.dot.gov

U.S. Geological Survey – www.usgs.gov

NPMS Repositories

National Repository

Barney Krucoff
Project Manager
NPMS National Repository
Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304
703-960-8800 • fax 703-960-9125
npms-nr@mbakercorp.com
www.npms.rspa.dot.gov

California Repository

(Liquid pipelines only)

Mike Byrne
Pipeline Mapping Coordinator
California State Fire Marshal
Pipeline Safety Division
1131 "S" Street
Sacramento, CA 95814
916-445-8363 • fax 916-445-8526
npmsca@csfm-pipeline-safety.com
www.fire.ca.gov

Kansas Repository

Wayne Page
GIS Administrator
Kansas Corporation Commission
1500 SW Arrowhead Road
Topeka, KS 66606
785-271-3299 • fax 785-271-3357
npms-ks@kcc.state.ks.us
www.kcc.state.ks.us

Kentucky Repository

Ruth Rowles
GIS Administrator
Kentucky Public Service Commission
730 Schenkel Lane
Frankfort, KY 40601
502-564-3940 ext. 451
fax 502-564-1582
npms-ky@mail.state.ky.us
www.psc.state.ky.us

Louisiana Repository

John Snead
Cartographic Manager
Louisiana Geological Survey
210 Howe-Russell Geoscience Complex
Louisiana State University
Baton Rouge, LA 70803
225-388-3454 • fax 225-334-2527
npms-la@lsu.edu
www.lgs.lsu.edu

Minnesota Repository

John Hoshal
GIS Applications Manager
Land Management Information
Center (LMIC)
Suite 330, 658 Cedar St.
St. Paul, MN 55155
651-296-1202 • fax 651-296-1212
npms-mn@mnplan.state.mn.us
www.lmic.state.mn.us

New Jersey Repository

John Paynter
GIS Specialist
New Jersey Board of Public Utilities
Division of Services Evaluation
Two Gateway Center 9th Floor
Newark, NJ 07102
973-648-2278 • fax 973-648-2242
npms-nj@bpu.state.nj.us

Oklahoma Repository

David P. Brown
GIS Analyst
Geo Information Systems
University of Oklahoma
1818 W. Lindsey, Suite A105
Norman, OK 73069-4160
405-325-3131 • fax 405-579-5985
npms-ok@ou.edu
www.geo.ou.edu

Pennsylvania Repository

Rebecca Reinhold
Cartographer
Indiana University of Pennsylvania
Spatial Sciences Research Center
41 Robert Shaw Center
650 S. 13th St.
Indiana, PA 15705-1081
724-357-2251 • *fax* 724-357-3768
npms-pa@grove.iup.edu
www.ssrc.iup.edu

Texas Repository

Lorelei Weitzel
Assistant Director for Customer
Applications
Railroad Commission of Texas
Information Technology Services
Division
P.O. Box 12967
Austin, TX 78701-2967
512-463-7244 • *fax* 512-463-8488
npms-tx@rrc.state.tx.us
www.rrc.state.tx.us

U.S. Department of Transportation

Steve Fischer
GIS Coordinator
U.S. Department of Transportation
Office of Pipeline Safety
400 7th Street SW
Washington, DC 20590
202-366-6267 • *fax* 202-366-4566
steven.fischer@rspa.dot.gov

For OPS_ID Information, contact

Lisa Kokoszka
Management and Program Analyst
Office of Pipeline Safety
202-366-4554
lisa.kokoszka@rspa.dot.gov

1. Introduction

The U.S. Department of Transportation's (USDOT) Office of Pipeline Safety (OPS) has been working with other federal and state agencies and the pipeline industry to create a National Pipeline Mapping System (NPMS). The NPMS will be a full-featured geographic information system (GIS). When complete, this system will contain the location and selected attributes of **natural gas transmission lines** and **hazardous liquid trunklines**, and **liquefied natural gas (LNG) facilities** operating in the United States, including offshore. At this time, the OPS does not plan to collect data on service lines, distribution lines, gathering lines, flow lines, or spur lines.

The OPS will work with other government agencies and private organizations to add other relevant data layers to the system. These include layers on population, unusually sensitive areas, natural disaster probability areas, high consequence areas, hydrography, and transportation networks. The OPS will use the system to 1) depict pipelines in relation to the public and national resources, 2) coordinate information with other government agencies, 3) better prepare for a possible pipeline release, and 4) work with other government agencies and industries during a release.

The NPMS will be built and maintained using information voluntarily supplied by firms that operate pipeline and LNG facilities. Operators will be asked to provide three types of data: **geospatial data**, **attribute data**, and **metadata**.

1.1 Regulatory Requirement

The Accountable Pipeline Safety and Partnership Act states that the OPS must adopt rules requiring a pipeline operator to create and maintain accurate maps that identify the location of the operator's natural gas transmission, significant distribution, and major hazardous liquid pipeline facilities in the state; a description of the characteristics of the operator's pipelines in the state; a description of the products transported through the operator's pipelines; and any other information that the OPS considers useful to inform a state of the presence of pipeline facilities and operations in the state. In addition, this information is to be made available by the operators to the OPS and appropriate state officials upon request.

The OPS is requesting that operators voluntarily submit reasonably accurate location data on natural gas transmission pipelines, hazardous liquid pipelines, and LNG facilities operating in the United States. It is requested that the data have a **minimal** positional accuracy of ± 500 feet of its known geographic location. Research indicates that most operators can easily achieve ± 500 -foot accuracy with current in-house data records. The OPS plans to meet the intent of Congress through this voluntary initiative.

National Pipeline Mapping System

1.2 Development of NPMS and Standards for Data Submission

A Joint Government-Industry Pipeline Mapping Quality Action Team (MQAT II) was formed to work with the OPS on creating the digital pipeline location and attribute layer of the NPMS. The team was sponsored by the OPS, American Petroleum Institute (API), American Gas Association (AGA), and Interstate Natural Gas Association of America (INGAA), and included representatives from multiple federal and state government agencies, and the natural gas and hazardous liquid pipeline industry.

MQAT II drafted these standards and incorporated appropriate recommendations from outside entities, including comments from mapping vendors, pipeline operators, and state agencies outside the MQAT II. The standards underwent two pilot tests. These tests helped to determine the

- ◆ ability of pipeline operators to submit data that meet the standards,
- ◆ problems they encountered while trying to meet the standards,
- ◆ cost and effort required to meet the standards,
- ◆ usability of data formats other than those in the standards, and
- ◆ ability of the pilot repositories to process the submitted data based on the draft standards.

To the greatest extent possible, MQAT II has resolved the problems encountered in both pilot tests in an effort to further minimize the time and effort required to meet the standards. The majority of the operators and repositories that participated in the pilot tests stated that the standards were understandable and could be met without an undue burden on their company.

Various state agencies currently request or require that operators submit pipeline and LNG data to them. Some state agencies are using the operators' data to create a digital pipeline and LNG layer for their state. NPMS does not supercede or replace state regulations. Operators must still comply with all applicable state regulations. To reduce duplication of existing data, the OPS has established contracts with California, Kansas, Kentucky, Louisiana, Minnesota, New Jersey, Oklahoma, Pennsylvania, and Texas to jointly fund this initiative. These states will act as state repositories for the NPMS.

1.3 NPMS Structure

The NPMS will consist of multiple state repositories and a single National Repository. The state repositories will process the information for pipeline and LNG facilities within their state boundaries, and the National Repository will process the information for all other areas. **The National Repository will serve as the final processing and storage facility for all pipeline data.** The National

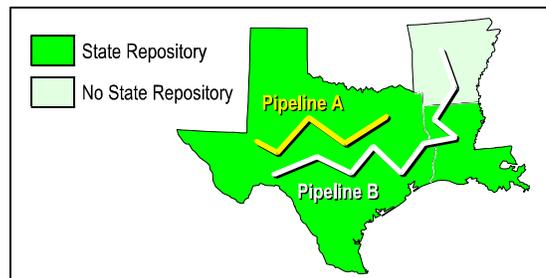
Repository will also be responsible for collecting data from participating state repositories to create a seamless national pipeline and LNG database. These repositories will process the data according to set standards to ensure consistency. All data will pass through a final series of quality control checks before the data are made available to users. The repository will produce a random sampling of check plots after incorporating the operator's geospatial data and attribute data into the repository. These check plots will be returned to the operator for review as part of the quality control process.

1.4 Submission of Data

Some NPMS submissions are to be sent to the National Repository; while others are to be sent to the appropriate state repository. Where to send a submission depends on whether the pipeline system(s) being submitted are intrastate or interstate and whether the pipeline system(s) are in an area covered by one of the nine state repositories. For guidelines on where to send data submissions, refer to Exhibit 1-1.

Pipeline Status State Repository Exists?	Intrastate Pipeline(s) (within the boundaries of a state, as shown in the graphic below for Pipeline A)		Interstate Pipeline(s) (connecting two or more states, as shown in graphic below for Pipeline B)	
	Sending Hard-Copy Submissions	Sending Digital Submissions	Sending Hard-Copy Submissions	Sending Digital Submissions
If state repository exists, send pipeline data submission to that state repository.	... send pipeline data submission to that state repository.	... divide pipeline data at state boundaries and send to the appropriate repository(ies).	... 1) send the entire pipeline data submission to the National Repository OR 2) divide pipeline data at state boundaries and send to the appropriate repository(ies).
If state repository does not exist, send pipeline data submission to the National Repository.	... send pipeline data submission to the National Repository.	... send the portion not covered by state repository(ies) to the National Repository.	... send the entire pipeline data submission to the National Repository.

**Exhibit 1-1 (above and right).
Sample data submission scenario.**



National Pipeline Mapping System

Operators will be asked to begin submitting data in April 1999. The OPS will work with pipeline operators to complete this initiative in a manner that corresponds with the operator's business needs. For example, if an operator is planning to create digital geospatial data for some or all of its pipeline or LNG facilities by 2001, the operator should inform the OPS and the repository, and should not submit hard-copy data for the portion where digital data will soon be available.

1.5 Working with State Repositories

1.5.1 Active State Repositories

Initially nine states, including California, Kansas, Kentucky, Louisiana, Minnesota, New Jersey, Oklahoma, Pennsylvania, and Texas will be NPMS state repositories (Exhibit 1-2). Contact information for the National Repository and state repositories is included in the Preface of these standards.

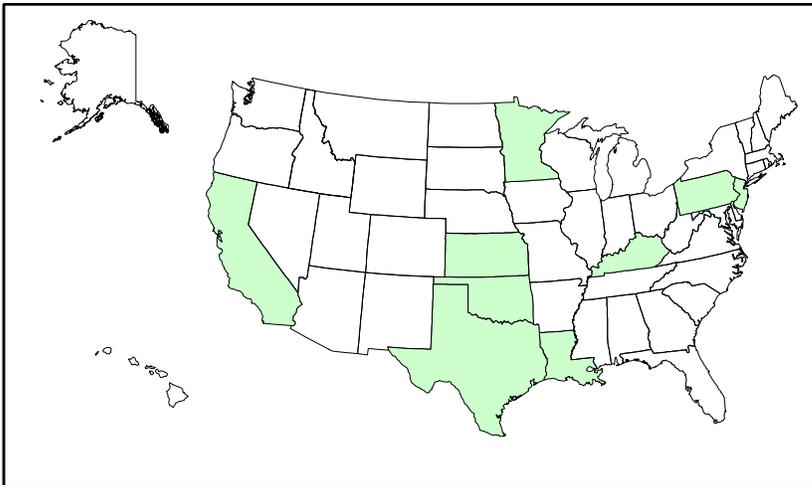


Exhibit 1-2. State repositories are shown shaded.

1.5.2 Special Instructions for California Pipeline Operators

Unlike other state repositories, the California State Fire Marshal, the agency that serves as the NPMS California State Repository, only collects data for hazardous liquid trunklines. Operators of natural gas transmission lines and LNG facilities in California should make NPMS submissions directly to the National Repository.

1.5.3 Special Instructions for States with Existing Pipeline Data

Texas, Louisiana, and Minnesota have been collecting geospatial and attribute data for pipelines for several years. If an operator already has pipeline mapping and information on file with one of these states, the state repository may be willing to make an NPMS submission on that firm's behalf. Contact the state

repository for details. In many cases, Texas, Louisiana, and Minnesota will need to collect additional information from the operator, particularly metadata, prior to completing an NPMS submission based on their existing records.

1.6 Distribution of NPMS Data

The pipeline and LNG layers of the NPMS will be made available to other government agencies, the pipeline industry, and the public to the extent required under the Freedom of Information Act. Other data layers on population, unusually sensitive areas, environmentally sensitive areas, transportation networks, natural disaster probability areas, and high consequence areas will be collected from various government and private sources and will be made available to the extent possible.

One of the goals of the NPMS is to assist operators in progressing toward a fully digitized environment. Upon request, digital pipeline and LNG facility data will be provided back to the contributing operator at no cost. The format of the digital data will be determined between the receiving operator and the sending repository. Repositories may charge fees for other products and services. The data contained in the NPMS are for reference purposes only and are not to be construed as actual survey-quality data or a replacement for contacting a one-call center.

1.7 About These Standards

These standards were created with input from the pipeline industry, government agencies, and the public. They address the submission of digital and hard-copy pipeline and LNG data to support the development of a reasonably accurate NPMS. The operator will be responsible for providing data that complies with these standards.

The OPS's goal is for the NPMS to be highly inclusive and to support operators who want to develop digital geospatial data. Operators who anticipate having difficulty meeting NPMS standards are encouraged to contact the appropriate repository rather than forego submissions. The repository will work with the operator and the OPS to formulate an acceptable submission.

The operator will not be required to respond to third parties that are contacting the repository with questions or issues regarding the operator's data. The operator will only be required to work with the state or the National Repository to ensure compliance with the standards and a smooth incorporation of the operator's data into the repository.

The repository will accept pipeline and LNG positional data that does not meet the requested ± 500 -foot level of accuracy. Every pipeline and LNG operator that

National Pipeline Mapping System

cannot currently provide the ± 500 -foot level of accuracy should be moving toward that goal. In the future, a ± 500 -foot accuracy or better may be required.

These standards serve as a guideline for preparing and submitting pipeline and LNG location and attribute data for inclusion in the NPMS repositories. The repositories understand that the availability of pipeline company maps and digital data varies among operators and that there is a need to be flexible when working with the pipeline operators. The repositories will review and approve variations of data submissions from this standard on a case-by-case basis.

The following sections discuss in detail the format, content, and quality of pipeline and LNG facility data that are to be submitted for inclusion into the NPMS. The standards provide guidelines for the submission of both digital and hard-copy data. The NPMS prefers that the data provided by the operator be in a digital format. If digital data are not available, then hard-copy submissions are acceptable. Three types of data are requested: **geospatial data** (location information), **attribute data** (descriptive information), and **metadata** (data about the data).

2. General Requirements (Key Terms and Definitions)

This section establishes general NPMS terms and requirements.

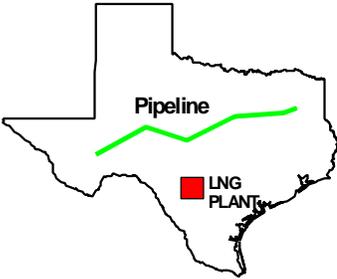
Geospatial Data	Attribute Data	Metadata						
<p>Digital or hard-copy maps with lines and/or points marking the location of pipelines and LNG facilities.</p> 	<p>A computer database containing descriptive information about pipelines or LNG facilities. There is one record in the database for each <i>pipeline segment</i>.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">Pipeline Attribute Table</td></tr> <tr><td style="text-align: center;">Descriptive Field 1</td></tr> <tr><td style="text-align: center;">Descriptive Field 2</td></tr> <tr><td style="text-align: center;">Descriptive Field ...</td></tr> <tr><td style="text-align: center;">LNG Attribute Table</td></tr> <tr><td style="text-align: center;">Descriptive Field 1 ...</td></tr> </table>	Pipeline Attribute Table	Descriptive Field 1	Descriptive Field 2	Descriptive Field ...	LNG Attribute Table	Descriptive Field 1 ...	<p>Descriptive information about how the geospatial and attribute data were prepared (i.e., data about data).</p> <p><i>“This map and database were prepared by ABC Pipeline Company using aerial photography and GPS...”</i></p>
Pipeline Attribute Table								
Descriptive Field 1								
Descriptive Field 2								
Descriptive Field ...								
LNG Attribute Table								
Descriptive Field 1 ...								

Exhibit 2-1. Sample of the three types of NPMS data.

The NPMS will include natural gas transmission lines, hazardous liquid trunklines, and LNG facilities. Information on other types of pipelines and facilities need not be submitted at this time.

Natural gas transmission line – A pipeline system, other than a gathering line, that

1. transports gas from a gathering line or storage facility to a distribution center, storage facility, or large-volume customer that is not downstream from a distribution center. A large-volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas.
2. operates at a hoop stress of 20 percent or more of specified minimum yield strength (SMYS). *or*
3. transports gas within a storage field.

Hazardous liquid – Petroleum, petroleum products, or anhydrous ammonia.

Hazardous liquid trunkline – A hazardous liquid transmission pipeline other than a flow line, gathering line, or in-plant pipeline.

National Pipeline Mapping System

Liquefied natural gas (LNG) – Natural gas or synthetic gas having methane as its major constituent that has been changed to a liquid or semi solid.

LNG facility – A pipeline facility that is used for liquefying or solidifying natural gas or transferring, storing, or vaporizing liquefied natural gas.

Pipeline system – All parts of a natural gas transmission line or hazardous liquid trunkline through which gas or hazardous liquid is transported. By definition, only one firm can operate a pipeline system. Operators should assign unique names to each of their pipeline systems. A pipeline system may have an unlimited number of branches. Each pipeline system must be represented by one or more **pipeline segments**.

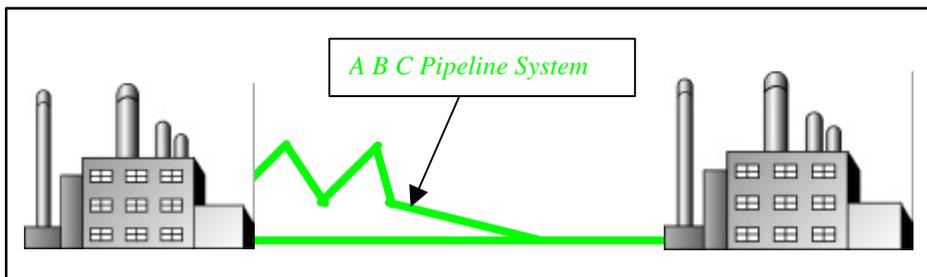


Exhibit 2-2. Sample of annotated pipeline system.

Pipeline segment – A linear feature representing part or all of a pipeline system on a digital or hard-copy map. A pipeline segment must have only two ends. No branches are allowed. A pipeline segment may be a straight line or may have any number of vertices. Each pipeline segment must be uniquely identified. The number of pipeline segments should be kept to the minimum needed to represent a pipeline system and its associated attributes. When submitting hard-copy maps, the beginning and ending points of each pipeline segment should be marked with a clear, visible dot. When submitting digital geospatial data, a unique line segment in the computer-aided drafting (CAD) or GIS data set should represent each pipeline segment.

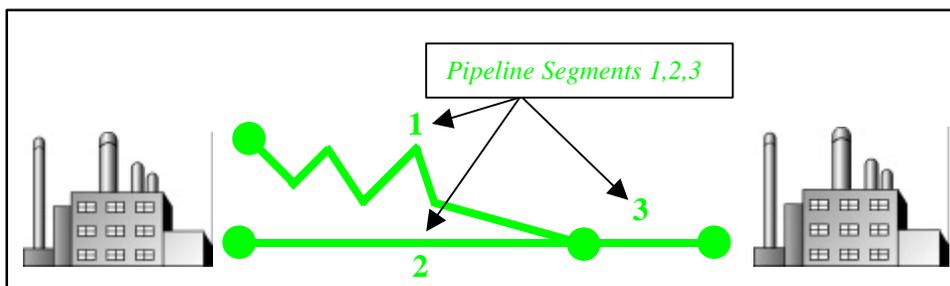


Exhibit 2-3. A pipeline system consisting of three pipeline segments.

A pipeline system should be broken into multiple pipeline segments for only two reasons:

1. to represent a branch or **intersection** with another pipeline segment, and/or
2. to allow for a change of associated attributes such as diameter.

Pipeline intersection – A point where a physical connection between two pipelines occurs. A commodity from one pipeline can flow into another pipeline(s), either through a branch within a pipeline system or a connection between two pipeline systems. When submitting hard-copy maps, intersections should be marked with a clear, visible dot. When submitting digital geospatial data, line segments in the CAD or GIS data set should be broken at the point of intersection. The intersection will be a common endpoint (node) representing the two pipeline segments

Pipeline crossing – A point where two or more pipelines cross, but where there is no physical connection between the pipelines. Pipeline segments should **not** be broken at pipeline crossings. Pipeline crossings should **not** be marked with a dot.

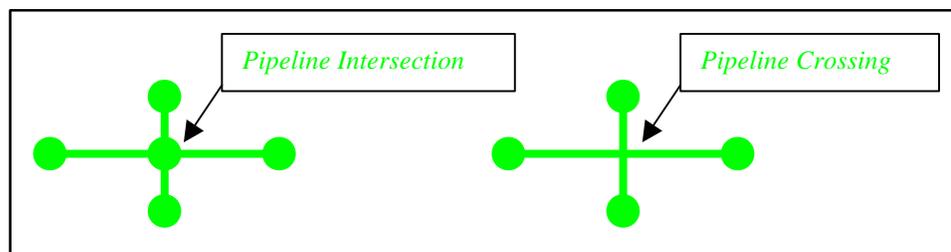


Exhibit 2-4. Sample annotation of pipeline intersection and pipeline crossing.

Pipeline corridor – A pipeline corridor is a linear area where two or more pipelines (either part of the same or different pipeline systems) are closely grouped in a single right-of-way. Pipeline corridors pose a cartographic challenge and the NPMS handles them differently on hard-copy and digital maps. On hard-copy maps, a single line with multiple annotations may represent the multiple pipelines within a pipeline corridor. In digital files, multiple lines are required, and each separate representation must be stored in individual layers or files. Whether submitting hard-copy or digital geospatial data, pipeline corridors should be clearly annotated particularly where pipelines join or exit the corridor.

2.1 NPMS File Naming Conventions

All NPMS repositories can read longer file names, but an attempt is made to use the disk operating system (DOS) 8.3 file naming convention. Operators are requested to use the following formula when assigning file names:

National Pipeline Mapping System

Type of File Code + OPS_ID + hyphen + 1-Digit Sequential Number + 3-Digit Alphanumeric Extension

Sample file name: G12345-1.DWG

Type of File Code (one-character, alpha):

G = Geospatial Data Only

A = Attribute Data Only

B = Both Geospatial and Attribute Data

(Also use “B” when different geospatial and attribute files should have the same name. For example, an export from ESRI’s ArcView software: B12345-1.SHP, B12345-1.SHX, B12345-1.DBF.)

M = Metadata

OPS_ID (five digits [maximum], numeric) – This is the identification number assigned by the Office of Pipeline Safety to pipeline and LNG facility operators, for user-fee purposes. The OPS_ID has five digits or fewer. If you don’t know your OPS_ID check the NPMS Web Site.

1-Digit Sequential Number (one-digit, numeric) – This is used to avoid assigning several files with the same file name

Extension (three-character default from software package) – Use the default extension for export from the software package (e.g., .DWG, .SHP, .DBF, etc.).

2.2 Types of NPMS Submissions

Operators must classify submissions according to one of the following types. Operators planning to make a submission that combines submission types should contact the repository(ies) to which the submission will be sent prior to preparing the submission. The various types of submissions are intended to facilitate maintenance of the NPMS and minimize the effort required by pipeline operators.

Additions – Additions contain **only** data that is new to the NPMS. All original submissions are additions. All additions should contain geospatial data, attribute data, and metadata. The revision codes (REVIS_CD) of all pipeline segments should be set to “A” for addition.

Modifications – Modifications should include **only** modified data. There are three types of NPMS modifications. Operators should inform the repository of the type of modification being made.

1. A **geospatial modification** is used if location data or location and attribute are to be modified. All geospatial modifications should contain

geospatial data, attribute data, and metadata. The revision codes (REVIS_CD) of all pipeline segments and/or LNG facilities should be set to “M” for modification or “D” for deletion.

2. An *attribute only modification* is used if modifications only affect pipeline or LNG facility attributes. Attribute only modifications should contain attribute data, metadata, and a letter identifying the effected pipeline systems (SYS_NM) or individual pipeline segments. The revision codes (REVIS_CD) of all pipeline segments and LNG facilities should be set to “M” for modification.
3. A *metadata only modification* is used if modifications only affect metadata. This might include a name change of the technical contact. Metadata only modifications should contain a complete replacement metadata file, and a letter identifying the effected pipeline systems (SYS_NM) or individual pipeline segments.

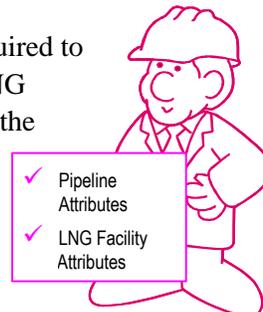
Change of Operator Report – The operators of any given pipeline system may change frequently. When this occurs, both the old and new operator of the pipeline system should report the change using the NPMS Web Site or send correspondence. Repositories will confirm the changes and update the NPMS mailing list.

Update Contact Information – To report name changes, address changes, or updates to other operator contact information, send a letter or e-mail to an NPMS repository, or connect to the NPMS Web Site and update the contact information online. Include your firm’s OPS_ID in all correspondence. Repositories will confirm the changes and update the NPMS mailing list.

Change Pipeline System Status – If any entire pipeline system operates sporadically or the transported commodities change, NPMS should be notified via the Web Site or by correspondence.

3. Attribute Data

When submitting data to the repository, the operator is required to provide descriptive information about the pipelines and LNG facilities. The attribute data is essential information about the pipeline or LNG facility such as its name and commodity transported. To simplify the submission, the required amount of attribute data has been kept to a minimum.



3.1 Required and Optional Attributes

Each pipeline segment or LNG facility submitted must be accompanied by a corresponding record and attribute database table. For information about required and optional attributes, refer to the following exhibits:

- ◆ For pipeline submissions, see Exhibit 3-1 for the attribute field definitions.
- ◆ For LNG submissions, see Exhibit 3-2 for the attribute field definitions.

3.2 Rules for Attribute Data Input

When submitting digital attribute information, adhere to the following rules:

1. Use only UPPERCASE when defining field names.
2. Use only UPPERCASE when inputting data into the attribute tables.
3. Omit all punctuation except for periods (.), spaces (), backslashes (\), colons (:), commas (,), hyphens (-), and underscores (_). Semicolons (;) should be used only as a delimiter when submitting attribute data in ASCII-delimited text files.
4. Use only NPMS-specified abbreviations.
5. Be consistent. Names and terms should be exactly replicated throughout a submission. For example, if a pipeline system is named Pennsylvania Line (SYS_NM = 'Pennsylvania Line'), the operator should consistently use the full and exact name. The operator should not use alternative names like "PENN Line," or "PA Line," or "Pennsylvania."
6. Use the correct OPS_ID. The OPS_ID is an accounting number assigned by the U.S. Department of Transportation, Office of Pipeline Safety to firms that operate pipelines and LNG facilities. If you do not know your firm's OPS_ID number, check with your firm's accounting department. A list of valid OPS_IDs is also posted on the NPMS Web Site.

National Pipeline Mapping System

OPER_LINK

Pipeline segment on hard-copy or digital map.

Field Name	Field Type ¹	Field Length	Short Description	Full Description	Acceptable Values ² (UPPERCASE)	Required Field
OPER_LINK	I	8	Unique Link ID	Link between the geospatial elements (pipeline segments) and their respective attribute records. Assigned by the operator or the operator's software package (i.e., COVER-ID, MSLINK_ID, etc.). Note the OPER_LINK and the PLINE_ID may be identical.	Positive integer	Y
OPS_ID	I	5	Operator Number	Accounting number assigned by the OPS to the company that physically operates the pipeline system. If you do not know your firm's OPS_ID, check with your accounting department or the NPMS Web Site	Positive integer	Y
OPER_NM	C	40	Operator Name	The company name that physically operates the pipeline system.	Character	Y
SYS_NM	C	40	System Name	Assigned by the operator. The operator's name for a functional grouping of pipelines.	Character	Y
SUBSYS_NM	C	40	Sub System Name	Assigned by the operator. A unique name for a smaller sub-section of a pipeline system. A subset of SYS_NM.	Character	N ³
PLINE_ID	C	20	Pipeline ID	Assigned by the operator. This is a identifier for a specific section of pipeline within a pipeline system.	Character	Y
DIAMETER	R	4	Diameter	Nominal diameter of the pipeline segment, in inches (two decimal places, ##.##).	Real Number	N ³
COMMODITY1	C	3	Commodity Category 1	Abbreviation for the primary commodity carried by the pipeline system. HG=hydrogen gas, CRD=crude oil, LPG=liquid petroleum gas, NG=natural gas, PRD=product, AA=anhydrous ammonia, CO2=carbon dioxide, NGL=natural gas liquids, HVL=highly volatile liquid, EMT=empty.	HG, CRD, LPG, NG, PRD, AA, CO2, NGL, HVL, EMT	Y
COMMODITY2	C	3	Commodity Category 2	Abbreviation for the secondary commodity carried by the pipeline system. HG=hydrogen gas, CRD=crude oil, LPG=liquid petroleum gas, NG=natural gas, PRD=product, AA=anhydrous ammonia, CO2=carbon dioxide, NGL=natural gas liquids, HVL=highly volatile liquid.	HG, CRD, LPG, NG, PRD, AA, CO2, NGL, HVL	N ³
COMMODITY3	C	3	Commodity Category 3	Abbreviation for the tertiary commodity carried by the pipeline system. HG=hydrogen gas, CRD=crude oil, LPG=liquid petroleum gas, NG=natural gas, PRD=product, AA=anhydrous ammonia, CO2=carbon dioxide, NGL=natural gas liquids, HVL=highly volatile liquid.	HG, CRD, LPG, NG, PRD, AA, CO2, NGL, HVL	N ³
CMDTY_DESC	C	40	Commodity Description	Descriptive information of the commodities carried by the pipeline system. For example, "NATURAL GAS" or "PROPANE."	Character	N ³
INTERSTATE	C	1	Interstate Designation	(Y)es / (N)o designator to identify if the pipeline system is an interstate pipeline. Y=Interstate, N=Intrastate. (Use OPS definition; see glossary).	Y, N	Y
STATUS_CD	C	1	Pipeline Status Code	Identifies the current status of the pipeline segment. I=in service, B=abandoned, R=retired.	I, B, R	Y
QUALITY_CD	C	1	Data Quality Code	Operator's estimate of the positional accuracy of the submitted pipeline segment. E=excellent: within 50 feet, V=very good: 50-300 feet, G=good: 301-500 feet, P=poor: 501-1000 feet, U=Unknown.	E, V, G, P, U	Y
REVIS_CD	C	1	Revision Code	Identifies this pipeline segment as an A=addition to the NPMS, or a M=modification to or D=deletion of a previous submission.	A, M, D	Y
META_NAME	C	12	Metadata File Name	The name of the metadata file associated with this data - DOS file naming convention (8.3 format).	File name	Y

NOTES: 1 I – Integer; C – Character; R – Real Number.

2 Field must be UPPERCASE.

3 N – in the "Required Field" column means that the operator does not have to submit data for that field. However, the operator still needs to include that field in the submitted tables to the repository.

Exhibit 3-1. Attribute field definitions for pipeline features.

OPER_LINK



LNG facility on hard-copy or digital map.

LNG FACILITY ATTRIBUTE TABLE

Field Name	Field Type ¹	Field Length	Short Description	Full Description	Acceptable Values ² (UPPERCASE)	Required Field
OPER_LINK	I	8	Unique Link ID	Link between the geospatial elements (points) and their respective attribute records. Assigned by the operator or the operator's software package (i.e., COVER-ID, MSLINK_ID, etc.). Note the OPER_LINK and the LNG_ID can be identical.	Positive integer	Y
OPS_ID	I	5	Operator Number	Accounting number assigned by the OPS to the company that physically operates the LNG facility. If you do not know your firm's OPS_ID check, with your accounting department.	Positive integer	Y
OPER_NM	C	40	Operator Name	The name of the company that physically operates the facility.	Character	Y
LNG_NM	C	40	LNG Facility Name	Assigned by the operator. The operator's name for the LNG facility.	Character	Y
LNG_ID	C	20	LNG Facility ID	Assigned by the operator. This is a unique identifier for a specific facility.	Character	Y
STATUS_CD	C	1	LNG Status Code	Identifies the current status of the facility. I=in service, B=abandoned, R=retired.	I, B, R	Y
QUALITY_CD	C	1	Data Quality Code	Operator's estimate of the positional accuracy of the submitted facility data. E=excellent: within 50 feet, V=very good: 50-300 feet, G=good: 301-500 feet, P=poor: 501-1000 feet, U=Unknown.	E, V, G, P, U	Y
REVIS_CD	C	1	Revision Code	Identifies this facility as an A=addition to the NPMS, or a M=modification to or D=deletion of a previous submission.	A, M, D	Y
META_NAME	C	12	Metadata File Name	The name of the metadata file associated with this data - DOS file naming convention (8.3 format).	File name	Y

NOTES: 1 I - Integer; C - Character.
2 Field must be UPPERCASE.

Exhibit 3-2. Attribute field definitions for LNG facilities.

National Pipeline Mapping System

3.2.1 Understanding Pipeline System and Pipeline Segment Attributes

Some NPMS attributes refer to entire pipeline systems, while other attributes may refer only a portion of a pipeline system. For example, the INTERSTATE field, obviously refers to the pipeline system as a whole, not its individual pipeline segments. Therefore, the INTERSTATE field must contain the same value for every pipeline segment that comprise a pipeline system. On the other hand, DIAMETER, for example, can change during the course of a pipeline system. In such cases, a new pipeline segment with the appropriate value for DIAMETER must be created.

Fields that must contain the same value for every pipeline segment that comprise a pipeline system include:

- OPS_ID
- OPER_NM
- SYS_NM
- COMMODITY1
- COMMODITY2
- COMMODITY3
- CMDTY_DESC
- INTERSTATE
- META_NAME

Fields that **may** contain a different value for each pipeline segment include:

- OPER_LINK (must be unique for each segment)
- SUB_SYS_NM
- PLINE_ID
- DIAMETER
- STATUS_CD
- REVIS_CD

3.3 Building the Attribute Data File

Attribute data may be provided in one of the following formats: common GIS export, DBASE (.DBF) format, Microsoft Access (.MDB), an American Standard Code for Information Interchange (ASCII) text file, or as annotation on a hard-copy map. In all cases operators should be careful to follow the field name, field type, and field length standards listed in Exhibits 3-1 and 3-2.

The Office of Pipeline Safety has developed an *NPMS Attribute Data Template*. The software operates on Windows personal computers and manages attribute data entry. The software produces properly formatted Microsoft Access files for NPMS submission.

- ◆ **Common GIS export format** – Operators using GIS systems can package attribute data with the associated geospatial data. Acceptable GIS formats

are discussed in Section 4.1, General Requirements for Digital Geospatial Data.

- ◆ **DBASE (.DBF) format** – Operators can create a .DBF file using one of the commercially available software packages that write to a .DBF file. Options include Excel, Access, Fox Pro, Lotus 123, Dbase, and Paradox.
- ◆ **Microsoft Access (.MDB)** – Operators can use the *NPMS Attribute Data Template* to create a properly formatted .MDB file for submission.
- ◆ **ASCII format** – The file should be semicolon-delimited.
- ◆ **Annotation format** – See Section 4.3, Hard-Copy Submissions, for procedures on annotating attributes on hard-copy maps.

3.4 Using The *NPMS Attribute Data Template*

The *NPMS Attribute Data Template* software is available at no cost. The software can be downloaded from the NPMS Web Site and is available on CD. The software simplifies the creation of NPMS attribute data by minimizing repetition and handling all formatting issues.

3.4.1 System Requirements

The system requirements are a 486 processor (or higher) personal computer that uses Microsoft Windows 95, 98, or Windows NT. The system should have at least 8 megabytes of RAM and a CD-ROM drive.

3.4.2 Installation Instructions

Before installing any version of NPMS software, close all open programs. Also, if you are running an older copy of the NPMS software and are attempting to install a new version that will overwrite the existing version, **uninstall the existing NPMS software** before proceeding with these steps.

From CD-ROM:

1. Insert CD-ROM.
2. From Windows Explorer, double click on Setup.exe.
3. Follow the on-screen installation instructions.

Note: The CD-ROM also contains these standards in Adobe Portable Document Format (.PDF) and Adobe Acrobat Reader, which is required to view or print the document.

From the Internet:

1. Create a directory on your system's hard drive called "C:\NPMS."
2. Download the file "NPMS.EXE" from the NPMS Web Site and copy the file in the C:\NPMS directory.

National Pipeline Mapping System

3. From Windows Explorer double click on NPMS.EXE. (NPMS.EXE is a group of compressed files. Double clicking will cause the file to uncompress.)
4. Double click on C:\NPMS\Setup.exe.
5. Follow the on-screen installation instructions.

3.4.3 Step-by-Step User Instructions

The *NPMS Attribute Data Template* simplifies data entry by minimizing repetition. To use the data template, perform the following steps:

1. **Start-up screen** – From the start menu, click on the NPMS Attribute icon to start the program.

The screenshot shows the NPMS Attribute Version 1.0b application window. At the top, the title bar reads "NPMS Attribute Version 1.0b". The main interface is a form with several sections. The top section contains "OPS_ID" with the value "31194" and "OPERATOR NAME" with a dropdown menu showing "ABC Pipeline Company". Below this is a section for submission type, with "EDIT EXISTING SUBMISSION" selected and a file path "C:\Program Files\NPMSattr\A31194-01.MDB" displayed next to a "BROWSE" button. The "CREATE NEW SUBMISSION (A31194-02.MDB)" option is unselected. A "Legend" section on the left has "Required Fields" selected. On the right, "PIPELINE SYSTEM ATTRIBUTES" is selected, and "LNG FACILITY ATTRIBUTES" is unselected. At the bottom right, there are "OK" and "EXIT" buttons.

Exhibit 3-3. Attribute data entry screen.

2. **Complete Screen 1** – Select the correct combination of Operator Name and OPS_ID for your firm. Decide if you want to edit an existing file or start a new file.
3. **Data storage** – NPMS data is stored in the same directory where the software was installed, usually the C:\Program Files\NPMS\ directory.

Note: If there is existing data for the operator you have selected and the submission is located in the current working directory, the default table for the chosen operator will appear in the “Browse” box, and “Edit Existing Submission” will be the default choice of action. If you are creating a new submission, select that option and a new table will be created for that operator submission you have chosen.

4. **Data entry** – Select attribute data entry for either pipeline systems or LNG facilities.

OPER_LINK	PIPELINE ID	SUBSYSTEM NAME	DIAM.	STATUS	DATA QUALITY	REVISION
345678	4321	AR LINE WEST BRANCH	8	IN SERVICE	GOOD: 301-500 FEET	ADDITION

Exhibit 3-4. Pipeline attributes data entry screen.

If “Pipeline System Attributes” was selected on the initial screen,

5. **Complete information for the pipeline system as a whole** – The upper section contains information that needs to be completed only once for each pipeline system. This includes the system name, information about the commodities transported by the system, the system’s interstate/intrastate status, and the associated metadata file created with the *NPMS Metadata Template*.
6. **Complete information for the associated pipeline segments** – When all the required information in the upper portion has been completed, go to the lower portion of the screen to add information about the individual pipeline segments that comprise the pipeline system. Remember each pipeline system must have at least one pipeline segment. The lower portion allows the operator to record information about items that may change during the course of the pipeline system such as PIPELINE_ID (PLINE_ID), SUBSYSTEM NAME (SUBSYS_NM), and DIAMETER. It is expected that when information does not change, values will be repeated for each pipeline segment. **However, OPER_LINK cannot be repeated. Each pipeline segment must have a unique OPER_LINK value.** To delete a pipeline segment, highlight the row by clicking on the far left side of the grid and pressing the delete key.

National Pipeline Mapping System

7. **Navigation buttons** – “Previous” and “Next” buttons allow forward and backward movement among previously added pipeline systems. The upper left corner of the form will indicate which system number you are on and how many systems exist. To add a system, click on the “Add” button and fill out the attribute data completely. If, at any time, you wish to cancel your addition, click on the “Cancel” button. You will return to the previous pipeline system, and the addition will not be saved.
8. **Complete data entry** – Upon completion, click on the “Save and Exit” button. A message will indicate that the file has been saved to a .MDB table in the current working directory. This file will be readable by the NPMS Attribute software. If the file is ever moved, keep track of where the file has been moved to and be sure to navigate to the .MDB file using the “Browse” feature on the initial NPMS attribute screen. Once returned to the initial screen, use the “Exit” button to exit the application.

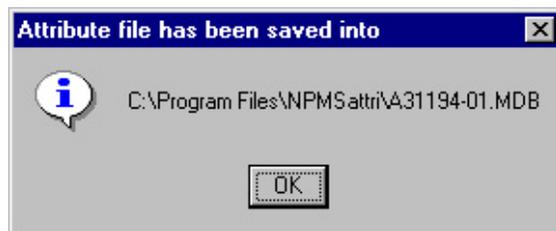


Exhibit 3-5. Message indicating path and filename of saved file.

If “LNG Facility Attributes” was selected on Screen 1,

1. Enter all required data for each LNG facility.
2. “Previous” and “Next” navigation buttons allow forward and backward movement among existing LNG facilities.
3. Use the “Add” button to add an LNG facility.
4. Use the “Cancel” button to cancel an LNG facility addition.
5. Use the “Delete” button to delete an existing LNG facility.
6. Upon completion, click on the “Save and Exit” button. A message will indicate that the file has been saved to a .MDB table in the current working directory. This file is readable by the NPMS attribute software. If the file is ever moved, keep track of where the file has been moved to and be sure to navigate to the .MDB file using the “Browse” feature on the initial NPMS attribute screen. Once returned to the initial screen, use the “Exit” button to exit the application.

The screenshot displays a software window titled "LNG Facility Attribute Data Entry Screen". The window contains several sections for data entry:

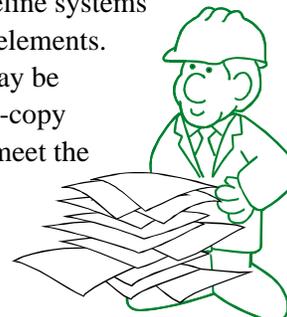
- OPERATOR:** Includes fields for "OPS_ID" (31194) and "OPERATOR NAME" (1).
- IDENTIFICATION:** Includes fields for "OPERATOR LINK" (S125), "LNG ID" (TEKARKANA LNG PLANT), and "LNG NAME" (TEKARKANA LINE LNG PLANT).
- CODES:** Includes dropdown menus for "STATUS" (IN SERVICE), "QUALITY" (VERY GOOD, 50,300 FEET), and "REVISION" (ADDITION).
- OTHER ATTRIBUTE:** Includes a "METADATA FILENAME" field (M31194.01.LMD8) and a "Browse" button.
- Legend:** A section with "Required Fields" and "Optional Fields" checkboxes.
- Buttons:** A row of buttons including "STOP/DISC", "NEXT", "ADD", "DELETE", "CANCEL", and "SAVE and EXIT".

Exhibit 3-6. LNG facility attributes data entry.

4. Geospatial Data (Digital or Hard-Copy Maps)



Geospatial data represent the pipeline systems (linear) and LNG facility (point) elements. Pipeline and LNG facility data may be submitted in either digital or hard-copy format. All submissions should meet the ± 500 -foot accuracy standard.



4.1 General Requirements for Digital Geospatial Data

1. The following discusses various requirements and formats that operators should meet when submitting digital geospatial data. Use a real world coordinate system based on North American Datum (NAD) 1983 or NAD 1927. Repositories accept unprojected data in decimal degrees and data that employs a common projection scheme such as Universal Transverse Mercator (UTM) or State Plane. Projected data may employ either English (feet) or metric (meters) measurement units. In all cases, clearly state the **datum, coordinate system/ projection, and measurement units** in the accompanying metadata.

Note: Digital data that does not employ real world coordinates such as CAD files that employ an origin point of 0,0 in the lower left hand corner of the drawing cannot be accepted by repositories.

2. Provide spatially accurate data. NPMS strives for minimum accuracy of ± 500 feet. Base maps or other source materials used to develop digital geospatial data submissions should have a scale of 1:24,000 (1" = 2,000') to 1:1,200 (1" = 100'). The spatial accuracy of the digital submission should be clearly stated in the accompanying metadata.
3. Always submit pipeline systems (lines) and LNG facilities (points) in separate files.
4. Submit only qualifying pipeline and LNG facility data. The submitted digital file should contain only pipeline segments representing natural gas transmission lines, hazardous liquid trunklines, and points representing LNG facilities. Separate all other data such as gathering lines, spur lines, valves, and base map data such as buildings, roads, property lines, political boundaries, scanned images, etc.

Note: Curves should be represented by a pipeline segment with as many vertices/shape points as is required to provide the appropriate cartographic appearance. CAD system arcs should be avoided.

5. Ensure that the reproduction and submission of any map or data does not violate existing copyright laws.

National Pipeline Mapping System

6. Review data for quality. Common problems include:
 - a. over shoots and under shoots at pipeline intersections,
 - b. stray points and lines that do not represent a pipeline or LNG facilities, often left from deleting non-NPMS data, and/or
 - c. duplicate points and lines.
7. Use commonly accepted digital media. All repositories accept CD-ROMs, diskettes, zip disks, and some repositories accept Internet transmissions. Check the NPMS Web Site for details.

4.2 Digital Submission Techniques

The instructions below provide general assistance to operators using some of the more popular GIS and CAD software packages. Some currently available GIS formats are not discussed, but may be acceptable. Operators interested in submitting data in a format not provided for in these instructions should contact the appropriate repository to determine its acceptability.

The instructions may not correspond to the exact version of the software package the operator is using, nor do they reflect any software customizations that may have been made. Operators who encounter problems are encouraged to contact their software vendor for technical support.

4.2.1 ESRI ARC/INFO Format Data Submissions

Data from ESRI's ARC/INFO may be submitted to the NPMS in **Export (.E00) format**. The following describes how coverages must be prepared before the data files are constructed to ensure that they are received and processed correctly.

Steps for preparing an Export (.E00) File follow:

1. Isolate the data to be submitted to the NPMS in a separate coverage.
2. Store the coverage as double precision. Use the Arc COPY command with DOUBLE option to create double-precision coverages.
3. If not already done, use the PROJECTDEFINE command to define the coverage's projection information.
4. If the attribute data are stored in an external Lookup Table (LUT), the NPMS requests that the attribute data be attached to the coverage to lessen the opportunity for data corruption. To attach the LUT files, use the Arc JOINITEM command based on some common identifier.
5. If not already present, create arc topology using the BUILD command for lines.
6. Use the Arc EXPORT to generate the .E00 file.
7. Submit the .E00 file to the NPMS.

4.2.2 ESRI ArcView Format Data Submissions

Operators may submit data to the NPMS using the shape file format of ESRI's ArcView desktop software. The following describes how shape files must be prepared:

1. Isolate the data to be submitted to the NPMS into a single line (pipeline) or point (LNG facility) theme.
2. Use the CONVERT-TO-SHAPEFILE command on the theme menu to export the data. This will create three files (.SHP, .SHX, .DBF).
3. Submit all three files, the .SHP (geospatial data file), the .SHX (index file), and the .DBF (attribute data file) for each shape theme to the NPMS.

4.2.3 Intergraph Corporation's FRAMME Data Submissions

Data from an Intergraph AM/FM/GIS system that uses the FRAMME database architecture can be provided to the NPMS in several different formats. However, the two that make the most sense for the NPMS requirements are 1) **Microsoft Access** format and 2) **FRAMME Loader SEF** format (a structured ASCII file format). The following describes these two approaches.

Microsoft Access Format. Intergraph offers a viewing/analysis product called GeoMedia that allows users to access and perform analysis operations on various GIS databases (including data stored in FRAMME, ARC/INFO, ArcView, Oracle Spatial Data Cartridge/Spatial Data Option, MGE, and Microsoft Access). **It can also extract data from any of these databases** and store it in a local Microsoft Access database file format. The process to create this Access file follows:

1. Make a warehouse connection to the GIS database (FRAMME).
2. Create an empty Access database file warehouse using GeoMedia.
3. Define the coordinate system of the Access warehouse to be Geographic (Lat/Long) and NAD 83 Datum. Many other coordinate system definitions are also supported.
4. Isolate the data to be submitted to the NPMS. A subset of the GIS data may be identified by means of attribute and/or spatial queries. This will create a named query set.
5. Import data from either the GIS database or from the named query set into the Access warehouse. On import, the data will be transformed from whatever native coordinate system it is stored in to the desired Geographic NAD83 format. The Access file will contain both feature attributes and graphic definitions.

National Pipeline Mapping System

FRAMME Loader SEF Format. FRAMME's normal method of bulk data import and export is a product module called FRAMME Loader. It supports both loading and unloading of ASCII text files. These text files must be in a structured format called Standard Exchange Format (SEF). The SEF file contains both feature attributes and graphic definitions. The basic process to create this SEF file follows:

1. From within FRAMME, isolate the data to be exported using the feature extraction process.
2. Unload the extracted data using FRAMME Loader capabilities.

4.2.4 Intergraph/Bentley Corporation's Microstation and non-FRAMME Data Submissions

Operators may submit geospatial data using Microstation/Intergraph systems. The following procedures have been developed to help operators submit this type of data.

Because it is difficult to attach attribute data to Microstation/Intergraph drawing files, the following tasks must be performed before providing data to the NPMS repositories:

1. Isolate the data to be submitted to the NPMS.
2. Annotate a unique item, OPER_LINK, for each pipeline or LNG facility as a text element in the drawing. The OPER_LINK value must be located adjacent to the pipeline or facility that it identifies.
3. Save the drawing as a .DGN file. Create an attribute data table using the *NPMS Attribute Data Template* software.
4. Enter the OPER_LINK identifier from the drawing and that pipeline's or facility's attribute data into the attribute table.
5. Submit both the .DGN and the attribute table to the NPMS. For the .DGN file, also submit a schema or template for the levels used.
6. Include in the associated metadata any special instructions, such as map units, scale, seed file, font types, etc. that are associated with the .DGN file to help the NPMS process the data.

4.2.5 MapInfo Data Submissions

Operators may submit data to the NPMS using the MapInfo Interchange File (MIF) format of MapInfo Corporation desktop software (Version 3 or higher). The **projection** must be noted: Category, Category Members, and Map Units (coordinate units, distance units, and area units).

1. Isolate the data to be submitted to the NPMS in a separate table.
2. Export the table (Table[®] export).

3. Submit the MIF, MID, and projection (ASCII format) files for each table to the NPMS.

4.2.6 AutoCAD Data Submissions

Operators may submit geospatial data using AutoCAD systems containing geospatial data. The following procedures have been developed to assist operators in submitting this type of data.

1. Isolate the data to be submitted to the NPMS.
2. Because it is difficult to attach attribute data to CAD drawing files, the following tasks must be performed. Annotate a unique item, OPER_LINK, for each pipeline or LNG facility as a text element in the drawing. The OPER_LINK value must be located adjacent to the pipeline or facility that it identifies.
3. Save the drawing as a Version 12 AutoCAD .DWG file. Ensure that the drawings are saved in “model space” and not in “paper space.” In other words, all drawings should be x-referenced to the appropriate coordinate system before saving.
4. Create an attribute data table using the *NPMS Attribute Data Template* software. Add columns in the table for OPER_LINK and each of the attribute items required by the NPMS.
5. Enter the OPER_LINK identifier from the drawing and that pipeline’s or facility’s attribute data into the attribute table.
6. Submit both the .DWG and the attribute table to the NPMS. For the .DWG file, also submit a schema or template for the levels used.
7. Include in the associated metadata any special instructions, such as map units, scale, projection information, font types, etc. that are associated with the .DWG file to help the NPMS process the data.

By providing the AutoCAD and attribute data in these formats, the repositories will be able to use the OPER_LINK values to associate the pipeline and LNG facility features with their appropriate attributes.

4.2.7 Smallworld Data Submissions

Operators may submit geospatial data using Smallworld systems. The following procedures have been developed to assist operators in submitting this type of data. It is important to note that the data must conform to the datum, projection, scale, and control requirements outlined in these standards.

1. Isolate the data (real world objects) to be submitted to the NPMS.
2. Use the FME (Feature Manipulation Engine), an add-on package available from Smallworld or Safe Software Inc., to create an Arc/Info exchange (.E00) file.
3. Submit the .E00 file to the NPMS.

National Pipeline Mapping System

4.2.8 Generic (ASCII) Digital Data Submissions

This type of submission will include a geospatial file containing coordinate data, an attribute file containing information associated with the pipeline(s) or LNG facility(ies), and a metadata file describing the data.

The file formats for pipeline and LNG information are different. Both file formats are described below, including record layouts.

Geospatial File for Pipeline Digital Data Submissions. To submit digital data for pipelines, the operator will create files matching the following format. The file format will include the unique identifier (OPER_LINK) on one line, followed by a coordinate pair (longitude and latitude). Additional coordinate pairs will be listed in order of appearance along the line segment until all coordinate pairs are displayed. The final coordinate pair for the line segment is to be followed by the word "END." "END" designates the end of the coordinate information that comprises a line segment. Each line segment submitted must contain a minimum of two coordinate pairs to represent the beginning and end of a straight line. An additional "END" is required to designate the end of the file.

The unique identifier (OPER_LINK) will link the geospatial location to the attribute information for each pipeline submitted. Header information, as shown in Exhibit 4-1, should not be included in the submitted file.

OPER_LINK								LONGITUDE												LATITUDE														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32			
								1	5	1	-	9	4	.	5	7	6	4	1	5	3	2	.	9	1	1	6	5	8					
END								***																										
								1	5	2	-	9	4	.	4	5	6	4	1	5	3	3	.	0	0	1	6	5	8					
END								***																										
								1	5	3	-	9	4	.	4	5	7	8	0	1	3	2	.	9	9	9	9	1	6					
END								***																										
.																																		
.																																		
.																																		
								1	5	1	9	-	9	3	.	5	4	1	2	1	3	3	3	.	6	7	4	0	6	8				
END								***																										
END								***																										

Exhibit 4-1. Geospatial file containing pipeline information.

4.3 Hard-Copy Submissions

Operators may also submit the location of the pipeline or LNG location data on hard-copy maps. The following discusses various requirements and formats that operators should meet when submitting hard-copy geospatial data. All hard-copy submissions should conform to the ± 500 -foot accuracy standard.

4.3.1 Pipeline Drafting Requirements

The location of every major gas transmission pipeline and hazardous liquid trunkline (as defined by these standards) must be drafted onto the base map(s). The two options for depicting the pipelines are to

- ◆ designate individual pipelines on the maps or
- ◆ designate pipeline corridors with annotation that provides a unique identifier for each pipeline operating in the right-of-way.

The operator should draft a thin solid line using indelible ink to clearly delineate the location of the pipeline(s) or pipeline corridor. To make the lines readily identifiable for the repository, the operator should use a marker to highlight the drafted lines. If there are multiple pipelines or pipeline corridors on the same map, the operator should use different colored markers to distinguish them. This will allow the repository to clearly identify the pipeline(s) drawn and highlighted by the operator from roads and other pipeline systems. The beginning and the end of *pipeline segments* including *pipeline intersections* should be marked with a clear, visible dot. See Exhibit A-1 in Appendix A for an example.

4.3.2 LNG Facility Drafting Requirements

Every active LNG facility must be depicted on a base map(s). The operator should designate the approximate geographic center (within 500 feet) of the LNG facility by drafting a clear, visible square in indelible ink on the map. See Exhibit A-1 in Appendix A for an example.

4.3.3 Annotating Pipeline and LNG Attribute Data

It is preferred that operators submit pipeline and LNG attribute information using the *NPMS Attribute Data Template* or another acceptable digital format.

However, operators submitting hard-copy maps may also annotate the attributes directly onto the map. Each of the required attribute fields listed in Exhibit 3-1 and Exhibit 3-2 must be depicted on each map. This depiction must include the field name and the attribute information for that field. See Exhibits A-2 and A-3 in Appendix A for an example.

To identify pipeline contents, its status, the operator name, etc., as described in the attribute section, the submitting operator should label the pipelines on each map with the required attribute data. With the exception of `PLINE_ID`, if the

attribute data do not change, the operator needs to label the attributes only once per map. If an operator wants to submit digital attribute data instead of annotating each map, refer to Section 3, Attribute Data.

4.3.4 Requirements for Hard-Copy Mapping

1. **Use appropriate base maps:**
 - a. USGS topographic maps, 7.5 minute/1:24,000 scale (1" = 2000'), are the preferred base maps. Where 1:24,000 scale maps do not exist (e.g., Alaska, Puerto Rico, offshore), the operator should use the largest scale of USGS maps available. The entire quad sheet must be submitted (not cropped) so that all control points and marginalia are included.
 - b. Pipeline inventory and alignment sheets are acceptable only if they have a minimum of four georeferenced control points per sheet and have a scale between 1:24,000 (1" = 2,000') and 1:1,200 (1" = 100'). Operators who are unable to supply this quality of mapping should contact the repository before proceeding with their submittal. **Map sheets may not be larger than 36" x 48"**. Pipeline inventory and alignment sheets must clearly state the projection parameters, datum, and graphic scale.
 - c. Third-party base maps may be acceptable if they have a scale between 1:24,000 (1" = 2,000') and 1:1,200 (1" = 100') and have a minimum of four georeferenced control points. **Map sheets may not be larger than 36" x 48"**. Third-party maps must include the projection parameters, datum, and graphic scale in order to be acceptable.
2. **Copyright laws.** Ensure that the reproduction and submission of any map or data does not violate existing copyright laws.
3. **Label each pipeline system.** On each map sheet, label each pipeline system at least once. The label reads as follows SYS_NM = "System Name." The system name should be the name you use to identify the pipeline system being submitted.
4. **Label and mark each pipeline segment.** Each pipeline system is composed of one or more uniquely identified pipeline segments. The operator must clearly label each pipeline segment with a unique alphanumeric code, using the pipeline identifier, PLINE_ID. Pipeline segments may cross map sheets – there is no need to create new pipeline segments at sheet boundaries. The beginning and end of each pipeline segment should be marked with a clear, visible dot.

Note: If the operator chooses, individual pipeline segments may be used to represent changes in pipeline attributes. For example, pipeline systems may be broken into subsystems (SUBSYS_NM) to better identify the pipeline. The values of some other fields such as DIAMETER may also change during the course of pipeline system.

National Pipeline Mapping System

5. **Label and mark each pipeline intersection and corridor.** Each pipeline intersection should be marked with a clear, visible dot. Remember, it is possible for pipeline segments to cross, and not intersect. If many pipelines are grouped together in a corridor, list each PLINE-ID, and label each pipeline as it joins and exits the corridor.
6. **Build a legend in the margin of each map sheet.** The legend must include the operator name, names of the various pipelines systems or corridors on the map sheet, and the color used to highlight each pipeline system or pipeline corridor.
7. **Review for accuracy at sheet edges.** Do pipeline systems sheets match precisely across adjoining map sheets? If not, note the proper alignment on both map sheets. This process is known as edgematching.
8. **Sequential page number.** Number each quad using the page/page format (example: "1/34" or "1 of 34") to ensure inclusion of all map sheets.
9. **Do not use a photocopier to change base map size or scale.** The submitted maps may be original maps or reproductions. However, if submitting a reproduction, the submitted map will not be accepted if the scale has been modified from the original map scale.
10. **Do not submit maps sheets larger than 36" x 48".**
11. **Do not fold maps.** When transmitting maps to a repository, roll the maps in a tube. This will improve the accuracy of digitizing.

5. Metadata



Submission of metadata created with the *NPMS Metadata Template* is an NPMS requirement. Metadata describes the content, quality, condition, and other characteristics of data. That is, it provides additional background information such as descriptions, source materials, and points of contact. Metadata is simply data about the data.

Metadata must accompany all hard-copy and digital submissions sent to the NPMS. The operator will include information regarding the source and the quality of the data submission. The metadata will assist the repository and the end user of pipeline and LNG facility data. As a general rule, there should be one metadata file created for each pipeline system.

5.1 Background

Metadata was developed to help “insure an organization’s investment in data. As personnel change or time passes, information may be lost and the data may lose their value.”¹ Where metadata is not collected, future staff may not trust the data due to their unknown quality. Metadata also provides information necessary for data transfer. It will allow the receiver to process, interpret, and incorporate the data properly with another data set.

Executive Order 12906 requires that each federal agency use the Federal Geographic Data Committee (FGDC) Metadata Standard, “Content Standards for Digital Geospatial Metadata,” to document digital geospatial data that they produce. The FGDC is an interagency committee that promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis. The OPS must produce metadata compliant with the FGDC Metadata Standard.

The *FGDC Metadata Standard for Digital Geospatial Metadata* provides a standard format, specifies the requirements for data collection, and establishes a common set of terminology and definitions. The standard is somewhat complex and is composed of mandatory, mandatory if applicable, and optional sections. The OPS is collecting only mandatory information or information that is critical to clear understanding of the operator submittal.

¹ Content Standards for *Digital Geospatial Metadata Workbook*, Version 1.0, March 24, 1995.

National Pipeline Mapping System

5.2 Distribution of Metadata and Confidentiality

The NPMS repositories will process and distribute metadata according to FGDC standards. **However, operator contact information will not be distributed to third parties.**

5.3 NPMS Metadata Template

To simplify the operator's metadata submission, OPS has developed *NPMS Metadata Template* software. The software is available at no cost and can be downloaded from the NPMS Web Site. The *NPMS Metadata Template* has been customized from for NPMS submissions. Do not use other metadata software. Use of the *NPMS Metadata Template* is required.

5.4 Using The NPMS Metadata Template

The *NPMS Metadata Template* software is available at no cost. The software can be downloaded from the NPMS Web Site. It comes in the same software installation package as the *NPMS Attribute Data Template*.

5.4.1 System Requirements

The system requirements are a 486 processor (or higher) personal computer that uses Microsoft Windows 95, 98, or Windows NT. The system should have at least 8 megabytes of RAM and a CD-ROM drive.

5.4.2 Installation Instructions

From CD-ROM:

1. Insert CD-ROM.
2. From Windows Explorer, double click on Setup.exe.
3. Follow the on-screen installation instructions.

From the Internet:

1. Create a directory on your system's hard drive called "C:\NPMS."
2. Download the file "NPMS.EXE" from the NPMS Web Site, and copy the file in the C:\NPMS directory.
3. From Windows Explorer, double click on NPMS.EXE. (NPMS.EXE is a group of compressed files. Double clicking will cause the file to uncompress.)
4. Double click on C:\NPMS\Setup.exe.
5. Follow the on-screen installation instruction.

5.4.3 Metadata Entry

Use of the *NPMS Metadata Template* is mandatory. To use the data template, perform the following steps:

1. From the start menu, click on the NPMS Metadata icon to start the program.
2. Complete the start-up screen by entering the OPS_ID and the name of the operating firm, OPER_NM.
3. Follow the on-screen instructions to complete the template.

5.4.4 Metadata Samples

The *NPMS Metadata Template* asks slightly different questions depending on whether digital or hard-copy geospatial data is being submitted. Appendix B offers Metadata examples for hard-copy and digital geospatial data submissions, including screen captures.

6. Submitting The Data

These standards have provided guidelines for submitting attribute, geospatial, and metadata information on pipeline and LNG facilities. Operators should use the following checklist to verify that the data being submitted to the NPMS repository meets the standards and that all necessary information has been included.

6.1 Operator Submission Checklist

6.1.1 Attribute Data Submissions

- Have all required fields in each feature attribute record been completed?
- Does each attribute record have a unique link to its line or point element in a geospatial file or on the hard-copy map?
- Has the attribute data been created and formatted according to the NPMS standard?
- Does each geospatial element have an attribute record?

6.1.2 Hard-Copy Geospatial Data Submissions

- Are the maps USGS 1:24,000 topographic quadrangles or other NPMS-approved base maps?
- Have the maps been checked for scale and accuracy?
- Have the features been drafted on the map according to the NPMS standard?
- Have the maps been edgematched?
- Are the features identified and clearly labeled on the map?
- Are the features distinguishable from each other on the map?
- Does each map contain a legend and title identifying operator name and symbology used?

6.1.3 Digital Geospatial Data Submissions

- Have the features been digitized according to the NPMS standard?
- Are the linear features continuous without gaps or overshoots?
- Does each feature have a complete attribute record as defined in the NPMS standard?
- Has the attribute record been uniquely linked to the point or line feature?
- Has the submission file been exported and formatted according to the NPMS standard?
- If the attribute data is in a separate file, has this file been exported according to the NPMS standard?

National Pipeline Mapping System

Have the data files being submitted on media been approved by the NPMS?

Are the submitted data file names descriptive and unique, following NPMS guidelines?

Are all of the geospatial files included in this submission?

6.1.4 Metadata Submissions

Use the *NPMS Metadata Template* software.

Is the contact information current?

Has the file name of the digital metadata file been entered into the attribute data records?

Are the required sections of the metadata completed?

6.2 Packaging and Sending Data

1. Prepare a cover letter or transmittal form with contact information. Copy all digital file(s) including geospatial data, attribute data, and metadata to an NPMS-approved medium: diskettes, CD-ROMs, Iomega zip disks.
2. Roll hard copy maps and send in a tube. Do not send folded maps.
3. Mail submission to the appropriate NPMS repository.



or

If you have an all-digital submittal, transmit your data electronically, where available. Connect to the NPMS National Repository Web Site, www.npms.rspa.dot.gov for details.

Appendix A

Hard-Copy Attribute Data Sample Submission

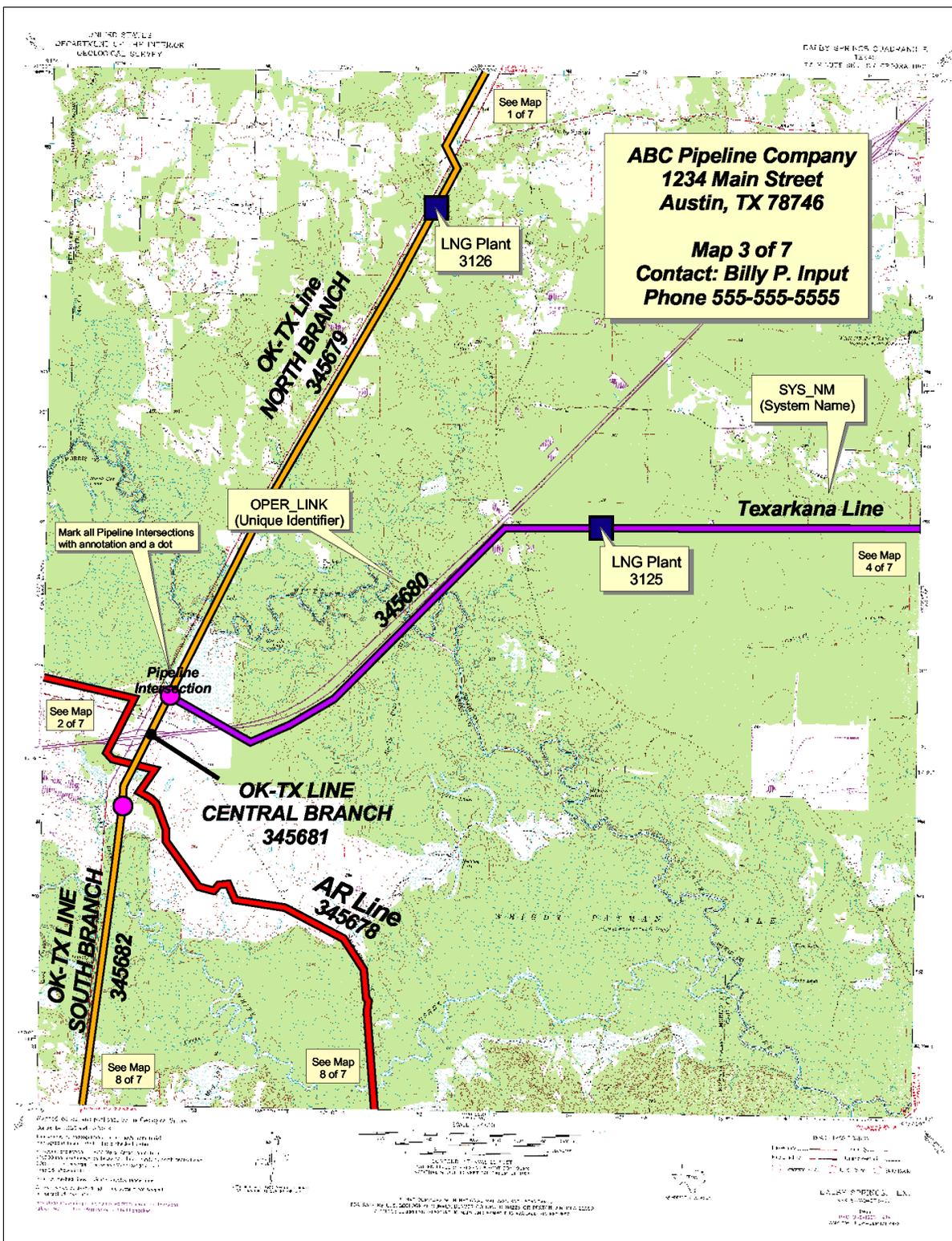


Exhibit A-1. Sample hard-copy map.

National Pipeline Mapping System

Provide digital attribute data for each pipeline and LNG facility. These attribute records relate to the hard-copy map shown on the previous page.

Pipeline Attribute Table	
<i>Sample Record</i>	
OPER_LINK	345678
OPS_ID	31194
OPER_NM	ABC PIPELINE COMPANY
SYS_NM	AR LINE
SUBSYS_NM	AR LINE WEST BRANCH
PLINE_ID	4321
DIAMETER	8.00
COMMODITY1	LPG
COMMODITY2	
COMMODITY3	
CMDTY_DESC	LIQUIFIED PETROLEUM GAS
INTERSTATE	Y
STATUS_CD	I
QUALITY_CD	G
REVIS_CD	A
META_NAME	M31194-1.MDB

Exhibit A-2. Sample pipeline attribute data.

LNG Facility Attribute Table	
<i>Sample Record</i>	
OPER_LINK	3125
OPS_ID	31194
OPER_NM	ABC PIPELINE COMPANY
LNG_NM	TEXARKANA LINE LNG PLANT
LNG_ID	TEXARKANA LNG PLANT
STATUS_CD	I
QUALITY_CD	V
REVIS_CD	A
META_NAME	M31194-1.MDB

Exhibit A-3. Sample LNG facility attribute data.

Appendix B

Metadata Example for Hard-Copy and Digital Geospatial Data Submissions

Metadata Example for Hard-Copy and Digital Geospatial Data Submissions

The NPMS provides free software to help operators create metadata. Use of the software is required. Metadata allows users of NPMS data to understand the history and limitations of information with which they are working. NPMS metadata also serves as the transmittal form for providing essential information that repositories use to process the data.

The *NPMS Metadata Template* creates a Microsoft Access .MDB file. Operators must send the .MDB file to a repository along with the rest of their NPMS submission. The 7-step template is similar to a hard-copy questionnaire. Operators should complete all required information on one screen before proceeding to the next screen. The application saves data automatically as it is entered. The name and location of the .MDB file to be created is established on the initial screen.

Initial Screen. The initial screen requires the user to select the correct OPS_ID for the submitting form. A list of valid operator names and OPS_IDs is provided. If unsure of your firm's OPS_ID, check with your accounting department. If you are unable to locate your OPS_ID, contact Lisa Kokoszaka, OPS Management and Program Analyst, at 202-366-4554. This screen also allows the user to either edit an existing metadata file or start a new file.

If there is existing data for the operator you have selected and the submission is located in the current working directory, the default table for the chosen operator will appear in the "Browse" box and "Edit Existing Submission" will be the default choice of action. Data fields shown with a yellow background are required; while data fields shown with a white background are optional.

The screenshot shows the NPMS Metadata Version 1.0b application window. The window title is "NPMS Metadata Version 1.0b". The interface includes the following elements:

- OPS_ID:** 31194
- OPERATOR:** ABC PIPELINE COMPANY (selected from a dropdown menu)
- Submission Options:**
 - EDIT EXISTING SUBMISSION: C:\Program Files\NPMSattr\M31194-01.MD (with a BROWSE button)
 - NEW SUBMISSION (M31194-02.MDB)
- Legend:**
 - Required Fields (highlighted in yellow)
 - Optional Fields (white background)
- Buttons:** OK and EXIT

National Pipeline Mapping System

Step 1. Step 1 collects contact information. Submitting operators must provide name, mailing address, phone number, and, if available, e-mail address of a primary contact, and may provide information for a technical contact. The primary contact must be an employee of the operating company. The technical contact may be a technical employee or an outside contractor. If repositories have questions about a submission, they will contact the technical representative first, then the primary representative.

The screen text will change from black to red indicating your cursor is on that field. Clicking on the “Next” button will advance the operator to Step 2.

The screenshot shows a software window titled "Metadata Entry - Step 1 of 7". The window contains the following fields and information:

- Operator:** OPS_ID 31194, Operator Name ABC Pipeline Company
- Primary NPMS Contact:**
 - First Name: Billy
 - Last Name: Input
 - Title: Pipeline Manager
 - Company Name: ABC pipeline Company
 - Address 1: 1234 Main Street
 - Address 2: (empty)
 - City: Austin
 - State: Texas
 - Zip Code: 78746
 - Work Phone: 555-555-5555
 - Ext: 5555
 - Fax Number: (empty)
 - E-Mail: binput@abcpline.com
- Technical Contact for This submission (Optional):**
 - First Name: Joe
 - Last Name: Output
 - Title: Technical Data Manager
 - Company Name: ABC pipeline Company
 - Address 1: 1234 Main Street
 - Address 2: Austin
 - City: (empty)
 - State: Texas
 - Zip Code: 7-8746
 - Work Phone: 555-555-5555
 - Ext: 5555
 - Fax Number: (empty)
 - E-Mail: joutput@abcpline.com
- Legend:** Required Fields (highlighted in yellow), Optional Fields
- Buttons:** Next >>, Save and Exit

Metadata Example for Hard-Copy and Digital Geospatial Data Submissions

Step 2. Step 2 asks questions about geospatial data quality, including positional accuracy. The appearance of subsequent screens will change depending on whether “hard-copy” or “digital” is selected in response to Question 2. Clicking on the “Next” button will advance the operator to Step 3.

Metadata Entry - Step 2 of 7

Operator
 OPS_ID 31194 Date of Submittal
 Operator Name ABC PIPELINE COMPANY 3/15/99

General Overview Part I

(1) Type of NPMS submittal? If this submittal meets more than one of the categories, please list each submittal separately.

Addition
 Spatial Modification
 Attribute Modification Only
 Metadata Modification Only

(2) Is submitted geospatial data in hard copy or digital format? Digital

(3) Briefly describe the contents of the submission. 7 USGS MAs with Pipeline and LNG Facility data added.

(4) The submitted pipeline and/or LNG facility data (as distinct from the base map or any other information that may have been included in your submittal) reflects conditions in the field as of. March 1999

(5) The submitted pipeline and/or LNG facility data was last modified on. March 1999

(6a) Have there been any significant changes in the field since the pipeline and/or LNG facility data was last modified? Yes No

(6b) If yes, please describe changes that are not reflected in the submittal.

Legend
 Required Fields Optional Fields

<< Back Next >> Save and Exit

National Pipeline Mapping System

Step 3. Step 3 continues questions from Step 2. Be sure to enter all required data. Clicking on the “Next” button will advance the operator to Step 4.

Metadata Entry - Step 3 of 7

Operator
OPS_ID 31194
Operator Name ABC Pipeline Company

Date of Submittal
3/15/99

General Overview Part II

(7) List the state(s) covered by the submitted data (use two-letter postal code, separated by comma). TX, AR

(8) What kind of quality checks were performed on the line/point data? Data was checked against a recent GPS Survey of points along the pipelines and LNG facilities.

(9) The positional accuracy of the pipeline centerline or LNG facility data is within (choose one). 0 to 50 feet

(10) Briefly describe how the positional accuracy value in Question 9 was determined: Horizontal positional accuracy for the data was tested by visual comparison and measurement of the source with hard

Legend
Required Fields Optional Fields

<< Back Next >> Save and Exit

Metadata Example for Hard-Copy and Digital Geospatial Data Submissions

Step 4. Step 4 asks questions about attribute data quality. Attribute file names are also to be listed. The “Browse” feature allows you to select up to five files simultaneously. It automatically fills in the attribute file fields, listing them 1–5, and sends them to the metadata. Clicking on the “Next” button will advance the operator to Step 5.

Metadata Entry - Step 4 of 7

Operator
 OPS_ID 31194 Date of Submittal
 Operator Name ABC Pipeline Company 3/15/99

Attribute Submittal Questions

(11) What kind of quality checks were performed on the submitted attribute data? Please, describe how the attributes were obtained and checked for correctness and proper linking to spatial data:

Attribute accuracy was checked by manual comparison of the source with hard-copy printouts; routines developed in the mapping system compared attribute values with a list of acceptable values.

If you are submitting digital attributes, also complete questions 12-14.

(12) Was the attribute data included as part of a geospatial digital file; e.g. is it included in an ESRI.E00 file, or a MapInfo .MIF file? Yes No

(13) Was the NPMS attribute data template used? Yes No

(14) Please list the names of file(s) that contain attribute data:

Attribute file 1 A31194-01.MDB
 Attribute file 2
 Attribute file 3
 Attribute file 4
 Attribute file 5

Browse
 Clear All File Names

Legend

<< Back Next >> Save and Exit

National Pipeline Mapping System

Step 5. Step 5 collects information on the coordinate system of the submitted data. All submittals must be in real world coordinates. Several lists are provided to assist operators in providing complete and accurate coordinate information. If you can not find an exact match for your coordinate system use the space provided by question 18 to include details. Clicking on the “Next” button will advance the operator to Step 6. If the dropdown pick lists do not provide a suitable response, you can key an alternate entry.

Metadata Entry - Step 5 of 7

Operator
OPS_ID 31194
Operator Name ABC Pipeline Company

Date of Submittal
3/15/99

Projection Questions

For the submitted digital geospatial data, please specify the following:

(15) What is the datum of the data? **NAD27**

(16) What are the measurement units of the data? **Feet**

(17a) What is the projection of the data ? **Universal Transverse**

(17b) If state plane, which State Plane zone?

(17c) If UTM, which UTM zone? **96W - 90W**

(18) Please, provide any general comments about projection information above.

Same as USGS 7.5 Minute (1:24k) Quadrangle Map.

Legend

Required Fields Optional Fields

<< Back Next >> Save and Exit

Metadata Example for Hard-Copy and Digital Geospatial Data Submissions

Step 6. The content of Step 6 varies depending on whether “hard-copy” or “digital” data was chosen in Step 1 (Question 2). The operator will be presented with questions that relate directly to a hard-copy or a digital submission. If the dropdown pick lists do not provide a suitable response, you can key an alternate entry.

Questions asked if submitting hard-copy geospatial data.

The screenshot shows a window titled "Metadata Entry - Step 6 of 7". At the top, there is a form for operator information: OPS_ID 31194, Date of Submittal 3/15/99, and Operator Name ABC Pipeline Company. Below this is a section titled "Hard-copy Submittal Questions". Question (19) asks "How many map sheets are being submitted?" with a text input field containing the number "7". Question (20) asks "What is the scale of the maps?" with a dropdown menu showing "1:24000 (1" = 2000)". At the bottom left, there is a "Legend" section with "Required Fields" and "Optional Fields" buttons. At the bottom center, there is a "<< Back" button.

The screenshot shows a window titled "Metadata Entry - Step 6 of 7". At the top, there is a form for operator information: OPS_ID 31194, Date of Submittal 3/15/99, and Operator Name ABC Pipeline Company. Below this is a section titled "Digital GeoSpatial Submittal Questions". Question (19) asks "What is the primary computer hardware used to create this digital NPMS submission?" with a dropdown menu showing "NT Workstation". Question (20) asks "What operating System does that computer use?" with a dropdown menu showing "Windows NT". Question (21a) asks "What was the primary software used to create this digital NPMS submission?" with a dropdown menu showing "Arc/Info". Question (21b) asks "If 'other software', what is the name of the software?" with a text input field. Question (22) asks "What is the version number of the software?" with a text input field containing "7.1". Question (23) asks "What is the data format of this digital submission?" with a dropdown menu showing "E00". Question (24) asks "What media was used to send this digital submission to NPMS?" with a dropdown menu showing "Online". Question (25) asks "List the names of file(s) that contain the line/point data submission:". Below this, there are five text input fields for "Geospatial File 1" through "Geospatial File 5". The first field contains "A31194-01.MDB". To the right of these fields are "Browse" and "Clear All FileNames" buttons. At the bottom left, there is a "Legend" section with "Required Fields" and "Optional Fields" buttons. At the bottom center, there are "<< Back", "Next >>", and "Save and Exit" buttons.

Questions asked if submitting digital geospatial data.

National Pipeline Mapping System

Step 7. Step 7, the last screen, relates to the source material(s) used to create the submission. This screen is intended to gather information on the base maps and other sources of information used to prepare an NPMS submission. *Note: For this screen, if you have more than one data source, you can create more than one entry.* Additional source material entries can be created by clicking the “Add” button near the bottom of the screen in the “Source Material Navigation” box. “Previous” and “Next” buttons allow forward and backward movement through the source materials when there is more than one. Notice the source material number shown in the upper left of the “Source Material Description” box. The current source material and number of source materials is indicated here. Any source material can be deleted by pressing the “Delete” button. If the dropdown pick lists do not provide a suitable response, you can key an alternate entry. There is no need to submit source material descriptions for individual USGS quad sheets. You can go back the main body of the metadata questionnaire by clicking the “Back to Step 6” button.

This is the final step. When you click the “Save and Exit” button you will be prompted with the name and location of the NPMS metadata file you have created and taken back to the opening screen where you can start a new file, edit any existing metadata, or exit the program.

Operator
DPS_ID 31194
Operator Name ABC PIPELINE COMPANY

Date of Submittal
3/15/99

Source Material Description (#1 of 1)

What is the name of the organization(s) that created the source material?
ABC Pipeline Surveying Division

What is/are the date(s) of the source material(s)?
1988-1993

What is the source material?
Map from rechain survey books.

What is the source material media?
Mylar

Briefly describe how the source material was processed and incorporated into the creation or modification of this data set:

The survey books have four georeferenced control points on each sheet. These sheets provided the source for digitizing.

What is the datum of the source material?
NAD27

What is the scale of the source material (e.g. 1:24000)?
1:24000 (1'' = 2000')

Source Material Navigation

Previous Next Add Delete

Legend

Required Fields Optional Fields

Back to Step 6

Save and Exit

Appendix C

Glossary

A

Abandoned pipeline	A pipeline that is no longer connected to the system and is no longer maintained. The pipeline can be abandoned in place or by removal.
Accuracy	The degree of conformity with a recognized or established standard.
Accuracy (absolute)	The accuracy of a map in representing the geographic location of an object relative to its true location on the earth's surface. Absolute accuracy is based on geographic coordinates.
Accuracy (relative)	The accuracy of a map in representing the geographic location of an object relative to the locations of other objects.
Alignment sheet	A general-purpose drawing designed to be used by company personnel during the operation and maintenance of the pipeline.
Alphanumeric	Consists of a possible combination of letters, numbers, and punctuation symbols.
Area	A generic term for a bounded, continuous, two-dimensional object that may or may not include its boundary.
ASCII	<u>A</u> merican <u>S</u> tandard <u>C</u> ode for <u>I</u> nformation <u>I</u> nterchange. A popular standard for the exchange of alphanumeric data.
Attribute	A characteristic that helps to describe the data.

B

Base map	A map containing visible surface features and boundaries that is used for local reference.
----------------	--

C

CAD or CADD	<u>C</u> omputer <u>A</u> ided <u>D</u> rafting (CAD) and <u>D</u> esign (CADD). An automated system for the drafting and display of graphic oriented information.
Control point	A point of known horizontal position used in digitizing paper maps.
Conversion	The process of transforming information from one form to another, e.g., analog (paper) data into digital data.
Coordinates	Pairs of numbers expressing a known horizontal location on the earth's surface.

National Pipeline Mapping System

Crude oil Liquid petroleum out of the ground, as distinguished from refined oils manufactured from crude oil.

D–E

Database Structured collection of data defined for a particular use, user, system, or program; may be sequential, network, hierarchical, relational, or semantic.

Data capture The process of converting hard-copy maps into a digital format.

Data dictionary A listing of each data field and a definition or description of what is contained in that field.

Data set A collection of related data.

Datum (geodetic) The level surface to which elevations are referenced, such as mean sea level; frame of reference for measuring a location on the surface of the earth.

Digital The discreet numerical representation of data.

Digital centerline A series of connected data elements representing the pipeline.

Digital orthophotos A digital image of an aerial photograph in which the displacement caused by the camera tilt and by terrain has been corrected.

Digitize The process of converting hard-copy manual drawings into digital format.

Display A computer monitor screen or image produced on the screen.

DLG Digital Line Graphs. Digitized data from USGS base map categories, including transportation, hydrology, elevation contours, and public land survey boundaries.

DXF Drawing eXchange Format. A graphic file and data interchange standard.

F

Facilities Components of the pipeline system, such as the pipe, valves, and compressor stations.

FGDC Federal Geographic Data Committee. Established through OMB and charged with coordinating the development, use, sharing, and dissemination of geographic data.

File A collection of records (data) treated as a unit.

Format How information is stored: hard-copy or digital.

G

Geodetic control Surveying and monumental points on the earth's surface whose location is established in accordance with national standards.

Geographic Referring to coordinate systems, latitude/longitude or comparable geographic grid location reference.

Geospatial data Information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth.

GIS Geographic Information System. Computer hardware, software, and geographic data used to capture, store, update, maintain, analyze, and display graphically referenced information.

GPS Global Positioning System. Survey instrument/process using satellite-generated timing data to establish either ground or aerial coordinates.

Graphic element Points, lines, arcs, symbols, etc., which are displayable.

H

Hard-copy A permanent image such as a plot or printout.

Hardware The physical components of a computer system or network such as the computer, printer, plotter, and terminal.

Hazardous liquid Petroleum, petroleum products, or anhydrous ammonia.

Hazardous liquid trunkline A hazardous liquid transmission pipeline other than a flow line, gathering line, or in-plant pipeline.

Highly volatile liquid (HVL) A hazardous liquid that will form a vapor cloud when released to the atmosphere and has a vapor pressure exceeding 276 kPa (40 psia) at 37.8° C (100° F). Note: natural gas liquids are also HVLs.

National Pipeline Mapping System

I-K

- In-service pipeline A pipeline that transports natural gas or hazardous liquid, or is not currently transporting products but is maintained and can be brought back into service.
- Interstate pipeline A pipeline or part of a pipeline that is used in the transportation of natural gas, hazardous liquid, or carbon dioxide in interstate or foreign commerce across state boundaries.

L

- Latitude Distance measured north or south of the equator.
- Liquefied Natural Gas (LNG) Natural gas or synthetic gas having methane as its major constituent that has been changed to a liquid or semi solid.
- Liquefied petroleum gas (LPG) Butane and propane separated from natural gasoline and sold in liquid form as fuel. Also known as bottled gas and tank gas.
- LNG facility A pipeline facility that is used for 1) liquefying or solidifying natural gas, or 2) transferring, storing, or vaporizing liquefied natural gas.
- Longitude Distance measured east or west from a reference meridian (Greenwich).

M

- Media The physical devices used to record, store, or transmit data, i.e. CD-ROM, diskette, cartridge, tape.
- Metadata Descriptive information about data, such as the timeliness of the data, attribute sources, and accuracy of the data.
- MQAT Joint Government-Industry Pipeline Mapping Quality Action Team. Sponsored by OPS, API, and AGA/INGAA.

N

- NAD 27, 83 North American Datum (of 1927 or 1983). Two mathematical representations of the earth's surface.
- Natural gas liquid Also referred to as NGL. Can be ethane, butane, propane, or a propane-butane mix.

- Natural gas transmission line A pipeline system, other than a gathering line, that 1) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large-volume customer that is not downstream from a distribution center. A large-volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas. 2) Operates at a hoop stress of 20 percent or more of specified minimum yield strength (SMYS). or 3) Transports gas within a storage field.
- Nominal diameter A dimensionless designator of pipe that indicates the standard pipe size.

O

- Offshore pipeline A major natural gas transmission line or hazardous liquid trunkline on the outer continental shelf begins where production ends and transportation begins. For example, in state waters, a pipeline begins downstream of the outlet flange of each facility where either hydrocarbons are produced or where produced hydrocarbons are first separated, dehydrated, or otherwise processed – whichever facility is farther downstream.
- One-Call Service to notify underground utilities of planned excavations.
- Operator A person or firm who operates a pipeline system and engages in the transportation of gas or hazardous liquid. The operator may or may not also be the owner of the pipeline system.
- Orthophoto Photo with camera tilt and relief displacements removed, resulting in a scale-correct image.
- Overlay Simultaneously viewing two or more digital data sets of similar geographic areas.

P

- Petroleum..... Crude oil, condensate, natural gasoline, natural gas liquids, and liquefied petroleum gas.
- Petroleum product..... Flammable, toxic, or corrosive products obtained from distilling and processing crude oil, unfinished oils, natural gas liquids, blend stocks, and other miscellaneous hydrocarbon compounds.

National Pipeline Mapping System

- Pipeline corridor A linear area where two or more pipelines (either part of the same or different pipeline systems) are closely grouped in a single right-of-way. Pipeline corridors pose a cartographic challenge, and NPMS handles them differently on hard-copy and digital maps. On hard-copy maps, a single line with multiple annotations may represent pipeline corridors. In digital files, multiple lines are required, and operators should separate them into individual layers or files.
- Pipeline crossing A point where two or more pipelines cross, but where there is no physical connection between the pipelines. Pipeline segments should not be broken at pipeline crossings.
- Pipeline intersection A point where a physical connection between two pipelines occurs. A commodity from one pipeline can flow into another pipeline(s), either a branch within a pipeline system or a connection between two pipeline systems.
- Pipeline segment A linear feature representing part or all of a pipeline system on a digital or hard-copy map. A pipeline segment must have only two ends. No branches are allowed. A pipeline segment may be a straight line or may have any number of vertices. Each pipeline segment must be uniquely identified. The number of pipeline segments should be kept to the minimum needed to represent a pipeline system and its associated attributes. When submitting hard-copy maps, the beginning and ending points of each pipeline segment should be marked with a clear, visible dot. When submitting digital geospatial data, a unique line segment in the computer-aided drafting (CAD) or GIS data set should represent each pipeline segment.
- Pipeline system All parts of a major natural gas transmission line or hazardous liquid trunkline through which gas or hazardous liquid is transported. By definition, only one firm can operate a pipeline system. Operators should assign unique names to each of their pipeline systems. A pipeline system may have an unlimited number of branches. Each pipeline system must be represented by one or more pipeline segments.

Q

- Quadrangles (Quads) Typically refers to the USGS map sheets in the 7.5-minute quad series or the 15-minute quad series. Also known as topographic maps.
- Quality An essential or distinguishing characteristic needed for cartographic data to be fit for use.

R

Repository	An entity(s) designated to maintain, store, and warehouse NPMS data.
Retired pipeline	A pipeline that is still connected to the system but has been taken out of service and is no longer maintained. The operator plans to abandon the pipeline and is waiting for approval.
ROW	<u>Right-of-Way</u> . A section of land designated for use by one or more pipelines. The NPMS refers to ROWs as pipeline corridors.

S

Scale (large)	Small map area showing greater detail, e.g., 1:2,400 = 1" to 200'.
Scale (small)	Large map area with less detail, e.g., 1:100,000 = 1" to 8333'.
Software	General name for computer programs and programming languages.
Spatial data	Data about the location of objects and their relationship with one another.

T-Z

Thematic	The depiction of particular features or concepts.
Topographic maps	Map showing horizontal and vertical (contours) indicating lines of equal surface elevation.
Topography	Shape of configuration of the land surface. Represented by contour lines in map form.
Topology	Description of the geographic relationship of features, especially features that are adjacent to or connected to another feature.
Vector	Data composed of individual coordinate points and lines whose endpoints are defined by coordinate pairs.

Attachments

Five-Step Submission Guide **1**

Sample Map **2**

Operator Submission Checklist **3**

National Pipeline Mapping System



... A Five-Step Submission Guide

STEP 1 Determine Type of NPMS Submission



Do you operate a natural gas transmission pipeline, hazardous liquid trunkline, or LNG facility?
(See Key Terms and Definitions in the NPMS Operator Standards, Section 2.)

To determine if your pipeline or LNG facility is presently in NPMS, check the NPMS Web Site or contact an NPMS repository.

Have the pipeline or LNG facility data previously been submitted to NPMS by you or a previous operator?

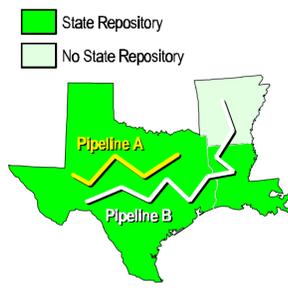
You should submit your pipeline and/or LNG facility data to the NPMS.

Stop here. No need to contribute to NPMS.

Is the attribute information about your pipelines and LNG facilities current?
To determine this, check the NPMS Web Site.
(Tip: Make note of the NPMS_SYS_IDS that apply to your pipeline systems and LNG facilities.)

NPMS repositories accept several types of modifications.
(See NPMS Operator Standards, Section 2.2.)

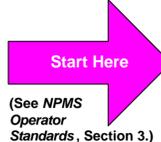
NPMS has several state repositories and a National Repository. Rules govern which repository should receive submissions. For a list of active state repositories, check the NPMS Web Site. This is a sample decision.



Pipeline System A falls entirely within the state of Texas. Therefore, the operating firm will make its submission to the Texas repository.
Pipeline System B crosses several state boundaries. Therefore, if the operating firm is submitting digital geospatial data, it may send the entire submission to the National Repository. However, if submitting hard-copy maps, the operator should make three NPMS submissions: one each to the Texas and Louisiana state repositories, and to the National Repository for the portion of the pipeline system in Arkansas, which does not have a state repository.

Go To Step 2.
(If you have a GIS, Steps 2 and 3 are combined.)

STEP 2 Prepare Attribute Data



Review NPMS data model:
Learn how map features, pipelines, and LNG facilities (line segments and points) relate to their attributes.
(See NPMS Operator Standards, Section 3.)

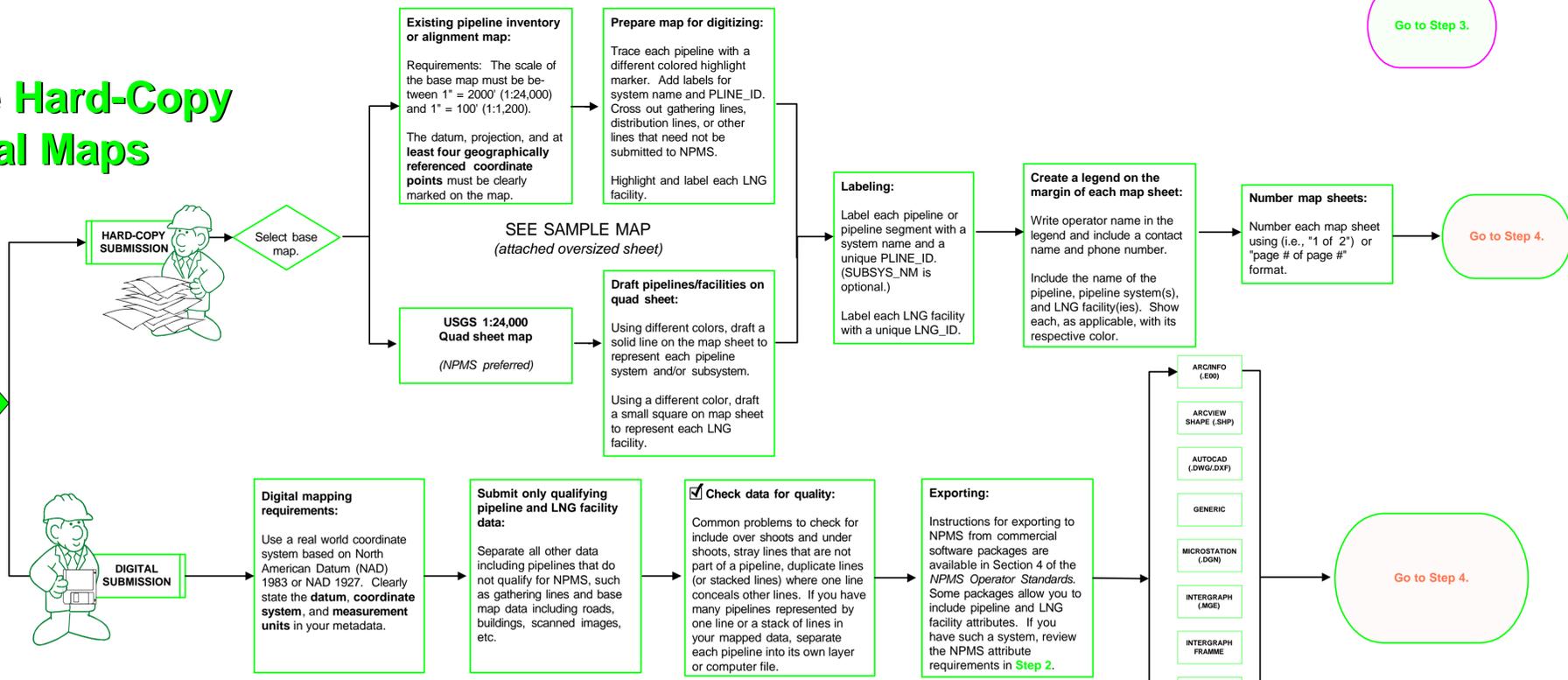
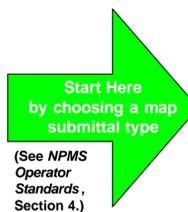
Pipeline Attributes					LNG Facility Attributes				
FIELD NAME	TYPE	LENGTH	DESCRIPTION	REQUIRED FIELD	FIELD NAME	TYPE	LENGTH	DESCRIPTION	REQUIRED FIELD
OPER_LINK	I	8	Unique Link ID	Y	OPER_LINK	I	8	Unique Link ID	Y
OPS_ID	I	8	Operator Number	Y	OPS_ID	I	5	Operator Number	Y
OPER_NM	C	40	Operator Name	Y	OPER_NM	C	40	Operator Name	Y
SYS_NM	C	40	System Name	Y	LNG_NM	C	40	LNG Facility Name	Y
SUBSYS_NM	C	40	Sub System Name	N	LNG_ID	C	20	LNG Facility ID	Y
PLINE_ID	C	20	Pipeline ID	Y	STATUS_CD	C	1	Pipeline Status Code	Y
DIAMETER	R	4	Diameter (##.##)	N	QUALITY_CD	C	1	Data Quality Code	Y
COMMODITY1	C	3	Commodity Category 1	Y	REVIS_CD	C	1	Revision Code	Y
COMMODITY2	C	3	Commodity Category 2	N	META_NAME	C	12	Metadata File Name	Y
COMMODITY3	C	3	Commodity Category 3	N					
CMDTY_DESC	C	40	Commodity Description	N					
INTERSTATE	C	1	Interstate Designation	Y					
STATUS_CD	C	1	Pipeline Status Code	Y					
QUALITY_CD	C	1	Data Quality Code	Y					
REVIS_CD	C	1	Revision Code	Y					
META_NAME	C	12	Metadata File Name	Y					

Rules for entering attribute data:
1. Use only UPPERCASE when defining field names.
2. Use only UPPERCASE when entering data into the attribute tables.
3. Omit all punctuation except for periods (.), spaces (), backslashes (\), colons (:), commas (,), hyphens (-), and underscores (_).

Build the pipeline and/or LNG facility attribute tables using:
- NPMS attribute data software (provided free on the NPMS Web Site).
- Use GIS software and include with digital map submittal.
- Use other commercial software to create a .DBF or semicolon-delimited ASCII file.

Go To Step 3.

STEP 3 Prepare Hard-Copy or Digital Maps



STEP 4 Prepare Metadata



NPMS metadata template:
1. Install NPMS metadata preparation software on a Microsoft® Windows®-based personal computer. If you do not have the software, you can download it from the NPMS Web Site.
2. Answer all the required questions.
3. Save the metadata file to diskette. Keep a copy of the metadata file. It will save time when making your next NPMS submission.



STEP 5 Check and Send Submission

Use checklist:
Complete the submission check list included in the NPMS Operator Standards.
(See NPMS Operator Standards, Section 6.)

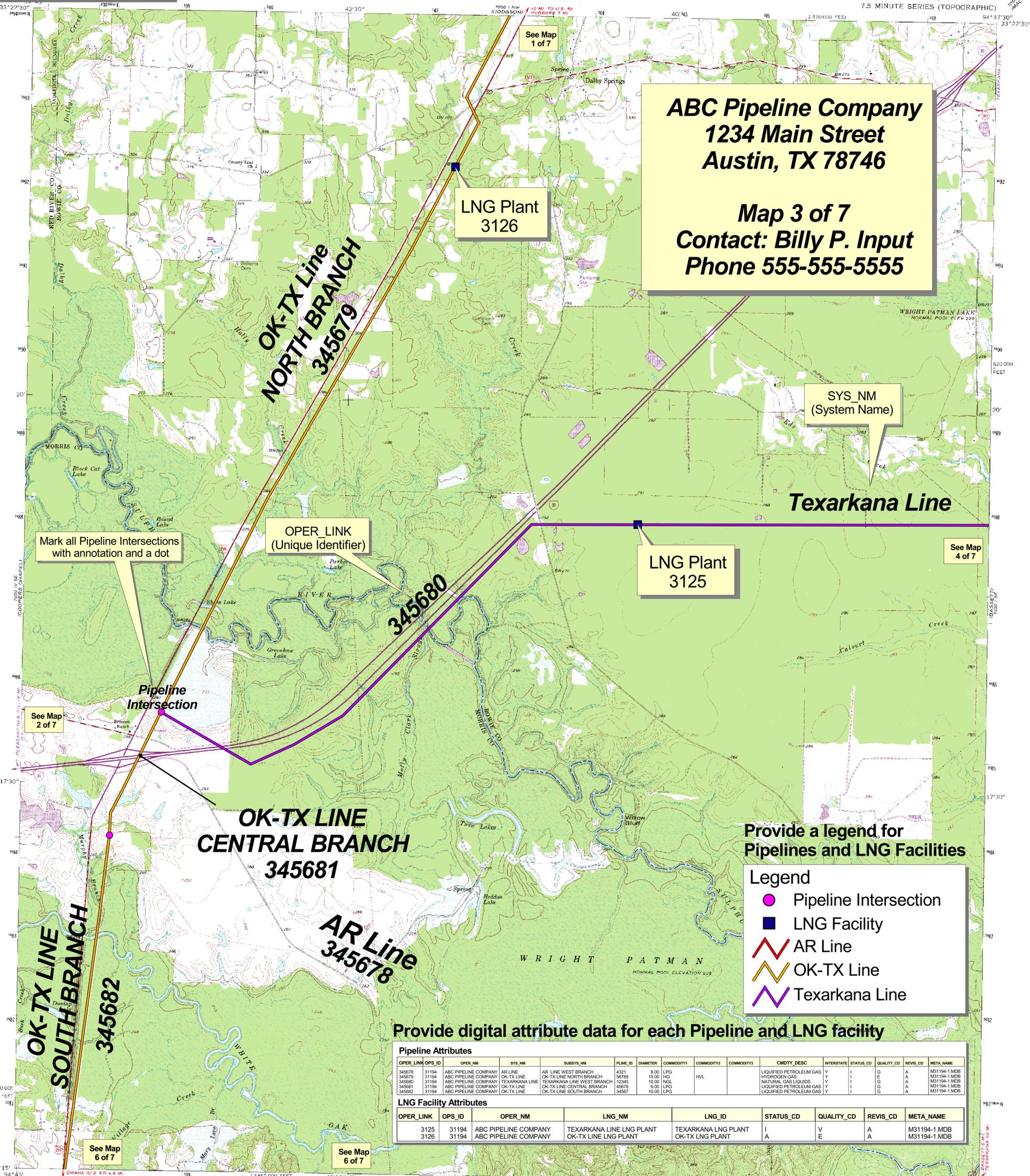
Package submission:
1. Prepare a cover letter or transmittal form with contact information.
2. Roll hard copy maps and send in a tube. Do not send folded maps.
3. Write all digital file(s) including geospatial data, attribute data, and metadata to NPMS-approved media: diskettes, CD-ROMs, Iomega® zip disks.
or
If you have an all-digital submittal, connect to the NPMS Web Site and submit your data electronically, where available.



SAMPLE

National Pipeline Mapping System
Paper Submission

DALBY SPRINGS QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)



ABC Pipeline Company
1234 Main Street
Austin, TX 78746

Map 3 of 7
Contact: Billy P. Input
Phone 555-555-5555

SYS_NM
(System Name)

Mark all Pipeline Intersections
with annotation and a dot

OPER_LINK
(Unique Identifier)

LNG Plant
3125

See Map
4 of 7

Provide a legend for
Pipelines and LNG Facilities

Legend

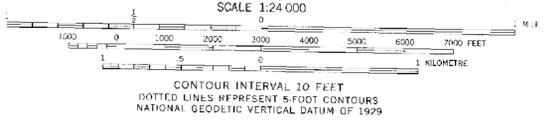
- Pipeline Intersection
- LNG Facility
- AR Line
- OK-TX Line
- Texarkana Line

Provide digital attribute data for each Pipeline and LNG facility

Pipeline Attributes										
OPER_LINK_ID	OPS_ID	OPER_NM	SYS_NM	SUBSYS_NM	PLINE_ID	DIAMETER	COMMODITY1	COMMODITY2	COMMODITY3	CMDTY_DESC
345678	31194	ABC PIPELINE COMPANY	AR LINE	AR LINE WEST BRANCH	4321	8.00	LPG	HVL		LIQUIFIED PETROLEUM GAS
345679	31194	ABC PIPELINE COMPANY	OK-TX LINE	OK-TX LINE NORTH BRANCH	56789	10.00	HG			HYDROGEN GAS
345680	31194	ABC PIPELINE COMPANY	TEXARKANA LINE	TEXARKANA LINE WEST BRANCH	12345	10.00	NGL			NATURAL GAS LIQUIDS
345681	31194	ABC PIPELINE COMPANY	OK-TX LINE	OK-TX LINE CENTRAL BRANCH	45678	8.00	LPG			LIQUIFIED PETROLEUM GAS
345682	31194	ABC PIPELINE COMPANY	OK-TX LINE	OK-TX LINE SOUTH BRANCH	34567	10.00	LPG			LIQUIFIED PETROLEUM GAS

LNG Facility Attributes						
OPER_LINK	OPS_ID	OPER_NM	LNG_NM	LNG_ID	STATUS_CD	QUALITY_CD
3125	31194	ABC PIPELINE COMPANY	TEXARKANA LINE LNG PLANT	TEXARKANA LNG PLANT	I	V
3126	31194	ABC PIPELINE COMPANY	OK-TX LINE LNG PLANT	OK-TX LNG PLANT	A	E

Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1964. Field checked 1965
Polyconic projection. 1927 North American datum
10,000-foot grid based on Texas coordinate system, north central zone
1:000,000 Universal Transverse Mercator grid ticks,
zone 15, shown in blue
Fine red dashed lines indicate selected fence lines
Areas covered by dashed light-blue pattern are subject
to controlled inundation
Revisions shown in purple compiled from aerial photographs
taken 1975. This information not field checked



ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
Incorporate Route U.S. Route State Route

DALBY SPRINGS, TEX.
N3315—W9437.5/7.5

1965
PHOTOREVISED 1975
AMS 7050 1 SW SERIES V882

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

National Pipeline Mapping System

Operator Submission Checklist



ATTRIBUTE DATA

- Have all required fields in each feature attribute record been completed?
- Does each attribute record have a unique link to its line or point element in a geospatial file or on the hard-copy map?
- Has the attribute data been created and formatted according to the NPMS standard?
- Does each geospatial element have an attribute record?

GEOSPATIAL DATA

Hard-Copy Submissions:

- Are the maps USGS 1:24,000 topographic quadrangles or other NPMS-approved base maps?
- Have the maps been checked for scale and accuracy?
- Have the features been drafted on the map according to the NPMS standard?
- Have the maps been edgematched?
- Are the features identified and clearly labeled on the map?
- Are the features distinguishable from each other on the map?
- Does each map contain a legend and title identifying operator name and symbology used?

Digital Submissions:

- Have the features been digitized according to the NPMS standard?
- Are the linear features continuous without gaps or overshoots?
- Does each feature have a complete attribute record as defined in the NPMS standard?
- Has the attribute record been uniquely linked to the point or line feature?
- Has the submission file been exported and formatted according to the NPMS standard?
- If the attribute data is in a separate file, has this file been exported according to the NPMS standard?
- Have the data files being submitted on media been approved by the NPMS?
- Are the submitted data file names descriptive and unique, following NPMS guidelines?
- Are all of the geospatial files included in this submission?

METADATA

- Use the NPMS-provided metadata template software.
- Is the contact information current?
- Has the file name of the digital metadata file been entered into the attribute data records?
- Are the required sections of the metadata completed?