Creating a National Pipeline Mapping System: A Joint Government/Industry Effort

NPMS Workshop Series

Workshop Agenda

This Morning:

- What is the NPMS?
- Why do we need the NPMS?
- Why participate?
- How will the data be used?
- How did we get here?

Agenda Continued

This Afternoon and Tomorrow Morning:

- Standards for Pipeline and LNG Operator Submissions

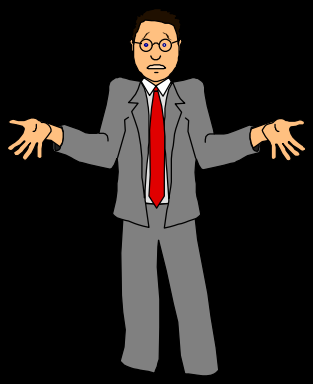
Tomorrow Afternoon:

- Standards for the NPMS National and State Repositories

What is the NPMS?

- A digital mapping system that will provide:
  - Key information about pipelines & their proximity to places we must protect.
  - Government & industry a common decision framework for pipeline data.
  - One national standard for pipeline mapping data.

Why do we need a National Pipeline Mapping System?



Why do we need a NPMS?

- Expectations and perceptions
- Credibility
- Changing technology
- Decentralized oversight to regional and state level
- Alternative Regulatory Approaches

Alternative Regulatory Approaches

- Risk based
- Integrity based
- Performance based
- Customer focused

Federal Needs

- Enhance ability to determine the level of safety.
- Provide information on pipelines potentially impacted by regulation & assist in the performance of regulatory responsibilities.
- Provide access to a central source of data.
- Integrate pipeline location information with other data.

Federal Needs

- Assess potential response situations.
- Support planning activities.
- Align data with the Federal Geographic Data Committee Standards.
- Respond to Congressional, federal, state & public requests.

State Needs

- Assist in the performance of regulatory responsibilities.
- Respond to information requests.
- Coordinate data sharing.
- Right-of-way planning & permitting issues.

Industry's Needs

- Build on existing pipeline maps & other company resources
- Structure system to evolve with industry's mapping capability
- Data requested from industry should add value to current industry needs

Common Needs of Government & Industry

- Design a reasonably accurate mapping system that shows pipeline transmission systems & liquefied natural gas facilities in the U.S.
- Implement a cost-effective method to exchange pipeline location data.
- Minimize burden on industry to supply data to multiple government agencies.

Common Needs of Government & Industry

- Increase ability to access information & respond to emergency situations.
- Standardize pipeline location data.
- Protect confidential & proprietary business information.

What do we Value in Common?

- Data Quality
  - Coverage
  - Basic Attributes for each Pipeline
  - Positional Accuracy
  - Metadata
- Usability and Format
- Maintainable
- Ease of Implementation

What do we Value in Common?

Coverage:

- Comprehensive national view.
- Complete representation to the extent possible.
- Gas & liquid transmission pipelines & liquefied natural gas (LNG) facilities.

What do we Value in Common?

- Basic Attributes for each Pipeline
  - Operator Name
  - Product
  - Location
  - System ID

What do we Value in Common?

- Positional Accuracy
  - Relative pipeline location accuracy of within 500 feet of the pipeline centerline.
  - Achievable for most pipeline segments.

What do we Value in Common?

- Metadata
  - Pipeline location collection techniques & accuracy levels.
  - Sources used to build the digital data or create the paper submittal.
  - Timeliness of the data.
  - Quality control measures used.
  - Contact Responsible for data development.

What do we Value in Common?

- Usability
  - Must be in a format than can be displayed & used with other data layers.
  - Base data layer should be USGS 1:24,000 or their largest available scale.

What do we Value in Common?

- Format
  - Suitable for spatial analysis within a Geographic Information System (GIS).
  - Topological.
  - Common standards for submitting the data.

What do we Value in Common?

- Maintainable
  - This will be a significant ongoing effort.
  - Must be able to easily update database as changes take place.
  - Upgrade accuracy as better data becomes available.
  - Aim for currency.

What do we Value in Common?

- Ease of Implementation
  - Timely procurement.
  - Affordable cost.
  - Leverage contributions.
  - Accessible to regulators.
  - Controlled access to public.

Who are our Partners?

- United States Geological Service
- Department of Energy
- Federal Energy Regulatory Commission
- Environmental Protection Agency
- States
- Industry

What are our Partners' Interest?

- United States Geological Service (USGS)
  - Access to location & attribute information on the nation's pipelines will greatly enhance their geospatial database.

What are our Partners' Interest?

- Department of Energy (DOE)
  - Integration of NPMS data into existing DOE/GIS applications will enhance their ability to address & evaluate the consequences of emergencies involving the U.S. pipeline infrastructure.

What are our Partners' Interest?

- Environmental Protection Agency (EPA)
  - EPA is using the NPMS standards to collect pipeline data for spill response & spill response planning and will share this information with OPS to help complete the NPMS.

What are our Partners' Interest?

- States:
  - California state law mandates that State Fire Marshals collect pipeline data in a format compatible with NPMS. Standardized pipeline data is necessary and important.

What are our Partners' Interest?

- States:
  - NPMS data will be of great benefit to them to obtain data needed to formulate plans & respond to emergencies.
  - Cost sharing of development will help to complete existing systems.

Why Participate?

- Partnership Works
  - Jointly considered needs
  - Thorough
  - Timely
  - Flexible
  - Cost effective

Voluntary participation vs. regulatory mandate.

- The Accountable Pipeline Safety & Partnership Act mandates that OPS adopt rules requiring pipeline operators to create & maintain accurate maps on:
  - Natural gas transmission pipelines.
  - Distribution pipelines.
  - Major liquid pipelines.

Voluntary vs. mandate continued

- A description of each pipeline, including gathering lines, such as:
  - An inventory of the age & material of the pipeline.
  - Leak history.
  - Diameter.
  - Products transported.
  - Any other information OPS considers useful.

Voluntary Participation:

- Fewer requirements than the mandate.
  - Gas transmission (as defined by US DOT) & liquid trunk pipeline information.
  - Active Liquefied Natural Gas (LNG) facility information.
  - Target goal of 500 feet for positional accuracy.
- Minimum burden on the operator.
- OPS plans to meet the intent of the mandate through voluntary participation by operators.

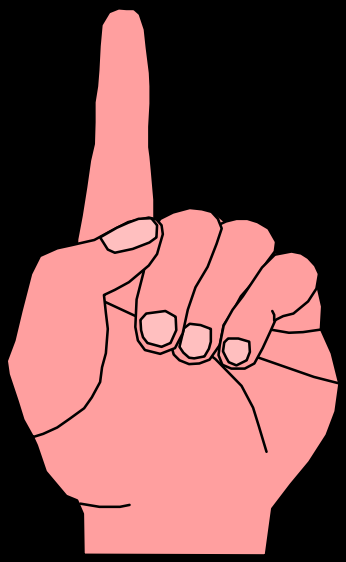
Strategies for a Voluntary Approach:

- Create pipeline data standards that are consistent with FGDC standards.
- Maintain flexibility in submitted formats.
- Continue the team approach.
- Expand communications about the program.

Strategies continued:

- Formalizing mapping partnerships with other federal & state agencies & industry.
- Creating a distributed mapping system that functions as a clearinghouse.
- Initiating a partnership with One Call Systems International.

Comprehensive One-Call Notification Act



Interests Supporting Passage

- American Gas Association
- American Petroleum Institute
- Association of Oil Pipelines
- Interstate Natural Gas Association of America
- National Association of Regulatory Utility Commissioners
- National Association of Pipelines Safety Representatives
- One Call Systems International
- U.S. Telephone Association
- U.S. Department of Transportation

Major Provisions of the Act

- Minimum standards for state one-call notification programs.
- Minimum compliance standards.
- A study on one-call system best practices.
- Grants to states who meet the minimum standards.

Provisions continued

- To Qualify for Future Grants, States Must:
  - Assess Risks to:
    - Public Safety
    - Environment
    - Vital Services
  - The NPMS will help states do risk assessment.

Considerations for One-Call Systems Best Practices Study

- Effectiveness & accuracy of mapping programs used by one-call systems.
- Methods to encourage participation by excavators & facility operators.
- Investigate locating technologies.
- Extent of damage occurring due to untimely marking or mismarking of lines.

Respective Roles of:

- DAMQAT I

Education campaign for:

  - Excavators
  - Facility operators
  - Public

- DAMQAT II

Technology research on:

  - Locating
  - Mapping
  - Monitoring
  - System Communications

DAMQUAT & Mapping Joint Initiative

- Understand one-call system data needs.
- Gather support for using geographically referenced data consistent with NPMS for one-call location information.
- Raise awareness of the NPMS.
- Technology findings should lower lower cost of creating & obtaining digital data.

Conclusion:

- Benefits of this Approach
  - Standards for Quality Control
  - Clear leadership roles.
  - Leverage resources in public & private sectors.

Questions?

How will the Data in the NPMS be used?

What will the NPMS contain?

Location & attribute data on:

- Natural gas transmission pipelines
- Larger hazardous liquid pipelines &
- LNG facilities

The pipeline & LNG data will be created through a joint initiative between gov't agencies & the pipeline industry

What will the NPMS contain?

- The system will also contain other data layers, such as:
  - Unusually sensitive areas
  - Population densities
  - Natural disaster probability & consequences
  - Other transportation networks

OPS will create these layers or will obtain them from other gov't agencies or sources

The NPMS will help us to:

- Provide a more comprehensive national picture of the nation's pipelines & LNG facilities
- Focus inspection resources
- Plan for emergencies & natural disasters
- Decide if or where extra safety & environmental precautions are needed
- Exchange data with one another in a common format

Regulatory Question:
Do we adequately protect pipelines that cross railroads? Where do they cross in populated areas?

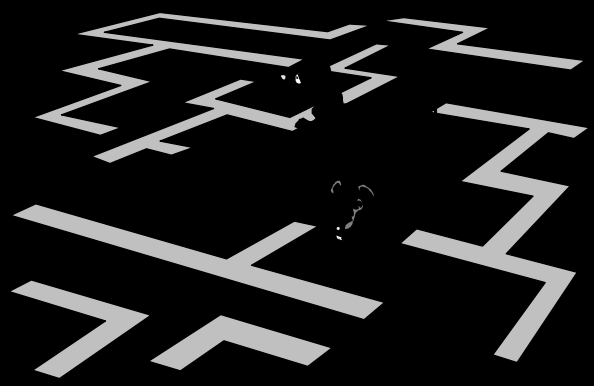
Emergency Response Question: The San Jacinto river is about to flood. What pipelines are in the area?

Pipeline Operators Crossing the San Jacinto River

Air Liquide America Corporation
Amerada Hess Corporation
Amoco Gas Company
Anadarko Petroleum Corporation
Arco Chemical Company
ARCO Pipeline Company
Chevron Chemical Company
Chevron Pipe Line Company
Chevron Products Company
Citgo Pipeline Company
Colonial Pipeline Company
Diamond Shamrock Refining & Marketing Co.
Dow Chemical U.S.A.
Enron Corporation
Enterprise Products Company
Explorer Pipeline Company
Exxon Chemical Americas
Exxon Pipeline Company
Gulf Coast National Gas Company
Houston Fuel Oil Terminal Company
Houston Lighting and Power Company
Houston Pipe Line Company
Houston Pipeline Company
Huntsman Corporation
Louisiana Pacific Corporation
Lyondell Petrochemical Company
Metador Pipeline Incorporated
Midcon Texas Pipeline Corporation
Midcon Texas Pipeline Corporation
Mobil Chemical Company
Montell USA- Incorporated
Natural Gas Pipeline Co. of America
Phillips Pipeline Company
Scurlock-Permian Corporation
Seadrift Pipeline Company
Seagull Energy Corporation
Seminole Pipeline Company
Shell Chemical Company
Shell Pipeline Corporation
TECO Pipeline Company
Tejas Gas Corporation
Texas Eastern Products Pipeline Company
Texas Eastern Transmission Corporation
Texas Pipeline Incorporated
Union Carbide Corporation
Valero Energy Corporation
Warren Petroleum Company

Inspection Prioritization:
Where are pipelines most vulnerable to a natural disaster & what pipelines cross those areas?

How did we get to this point?



Partnership

Joint Gov't-Industry Pipeline Mapping Quality Action Team (MQAT I)

Sponsors

- DOT, Office of Pipeline Safety
- American Petroleum Institute
- Interstate Natural Gas Association of America/ American Gas Association

Members

- Federal & State Agencies
- Natural Gas & Hazardous Liquid Pipeline Industry

Team Mission

Analyze the various mapping alternatives & determine a cost-effective strategy for creating a reasonably accurate depiction of hazardous liquid & natural gas transmission pipelines & LNG facilities operating in the U.S.

Team Research & Analysis

Pipeline Location Data & Mapping Initiatives:

- Pipeline Companies
- Federal agencies
- State agencies
- Private industry
- One-Call Systems

Conclusion

MQAT determined that the OPS could not access or purchase a national pipeline mapping system from existing available data sources. The available data sources:

- Did not meet all of the Team's specified criteria
- Were not both comprehensive & accurate
- In some cases, were proprietary & could not be modified

Team Recommendations

- Build a NPMS for efficient data exchange
- Create pipeline data standards that are consistent with FGDC standards
- Collect data from sources willing to meet the standards
- Maintain flexibility in submitted formats
- Continue effort - MQAT II

Next Step: MQAT II

Second Joint Gov't-Industry Pipeline Mapping Quality Action Team (MQAT II)

Team Sponsors:

- DOT, Office of Pipeline Safety
- American Petroleum Institute
- Interstate Natural Gas Assoc. of America

MQAT II Coordinating Team

- Office of Pipeline Safety
- American Petroleum Institute
- Interstate Natural Gas Assoc. of America
- Department of Energy
- 1 Representative each from the natural gas & hazardous liquid pipeline industry

MQAT II Technical Team

- Federal Agencies
  - Office of Pipeline Safety
  - DOT's Bureau of Transportation Statistics
  - U.S. Geological Survey
  - Department of Energy
  - Federal Energy Regulatory Commission
- State Agencies
  - Texas, California, Louisiana, New York

MQAT II Technical Team

- Natural Gas & Hazardous Liquid PL Industry
  - Duke Energy
  - Chevron Pipe Line
  - Tennessee Gas (an El Paso Energy Co.)
  - Conoco, Inc.
  - Natural Gas Pipeline Company

MQAT II Goals & Deliverables

- Create pipeline mapping standards that are consistent with FGDC standards.
- Pilot pipeline data exchange using the draft standards & pilot repositories
- Recommend options for a central repository for pipeline & LNG location data.
- Identify next steps for continuing the implementation of the NPMS

MQAT II Deliverables to Date

MQAT II Deliverables to Date

- Operator Submission Standards:
  - Geospatial Data (digital and paper)
  - Attribute Data
  - Metadata
- Repository Standards
- NPMS Model
- Criteria to evaluate potential repositories

Data Requested

- Natural gas transmission pipelines
- Liquid trunklines
- LNG facilities

Geospatial Data

- Digital Lat/Long coordinates that represent the actual pipeline location (Line data) & LNG facility (Point data)
- Hardcopy representation of the pipelines & LNG facilities.

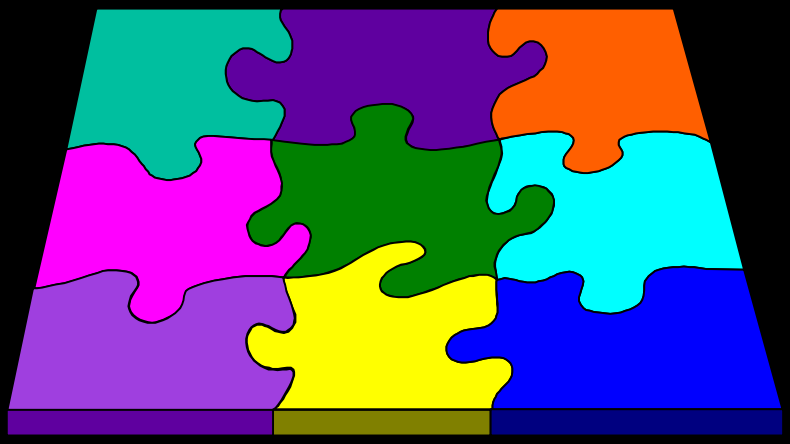
Attribute Data

- Company name
- Pipeline name
- Commodity
- Interstate or Intrastate
- Diameter
- Status (active, inactive, abandoned, retired, sold)

Metadata

- Describes the content, quality, condition, & other characteristics of the data.
- Operator submitted metadata will answer:
  - Who created the submitted data?
  - When and how was the data created?
  - What was the source of the data?
  - What is the spatial extent of the data?
- MQAT II has developed templates to help operators create & submit their metadata.

The NPMS Repositories:



The State Repository

- The NPMS will be made up of State Repositories and a National Repository.
- The State Repositories will be responsible for maintaining the data on pipelines within their state boundaries.
- The State Repositories will process & forward this data to the National Repository.

The National Repository

The National Repository will:

- Create & maintain pipeline data for areas without a State Repository.
- Process digital data received from interstate operators.
- Combine State & National Repository Data into a nation wide coverage.

Interstate operators submitting digital data have the option of sending data in mass to the national repository. Interstate operators submitting paper maps must submit their data to the individual state repositories.

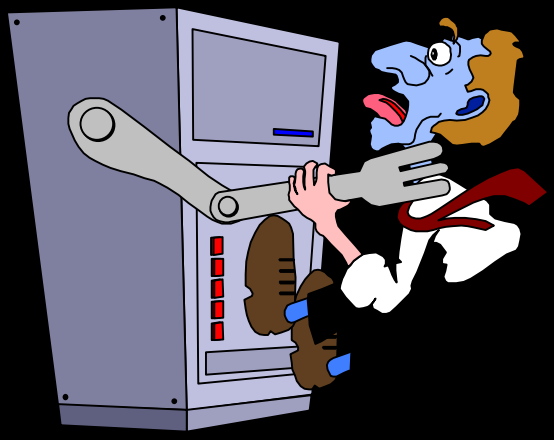
NPMS Pilot Testing

- Pilot Tested draft standards & repositories
- Test Parameters:
  - Operator's ability to send data that meets stds
  - Readability of submitted data formats
  - Attribute linking to graphics
  - Accuracy
  - Cost/Benefits
- Evaluated the test results & modified the NPMS standards & model accordingly

Multi-year Process

- Pipeline data improved over time.
- Many companies are migrating from paper to digital over time to meet other business needs.
- Gov't & industry are working together to create the NPMS in the most cost beneficial way

How Do You Go Digital & Survive?



Try these methods!

- Take GPS readings when you're working on or monitoring the pipeline (i.e. during cathodic protection readings)
- Use GPS instead of traditional surveying methods
- Create digital data for small projects
- Gradually convert data on existing paper maps & files to digital

Try these methods!

- Use USGS digital raster graphics (DRGs) or digital orthophotos with in-house maps to do “heads up” digitizing.
- If your alignment sheets are geographically referenced & have control points, you can digitize those sheets.
- Obtain your digital pipeline data in states that have collected & converted your paper maps.

Digital Data Allows Operators To:

- Perform spatial, operational & inventory analysis.
- Quickly modify, update, & archive data.
- Improve data quality, consistency, & accuracy.
- Reduce data access time.
- Decrease mapping production & maintenance expenses.
- Simplify reporting to state & federal agencies
- Increase productivity & reduce redundant information.

Web Sites

- http://ops.dot.gov

Information on the NPMS, MQAT I & II, the NPMS workshops, downloadable standards, & more

- http://www.rspa.gov

Under “Procurement Opportunities,” the call for bids to become State Repositories & the National Repository