



TRC Pipeline Services

Robert Drake, PE

Pipeline Incidents and Subsequent, Consequential Environmental Regulations

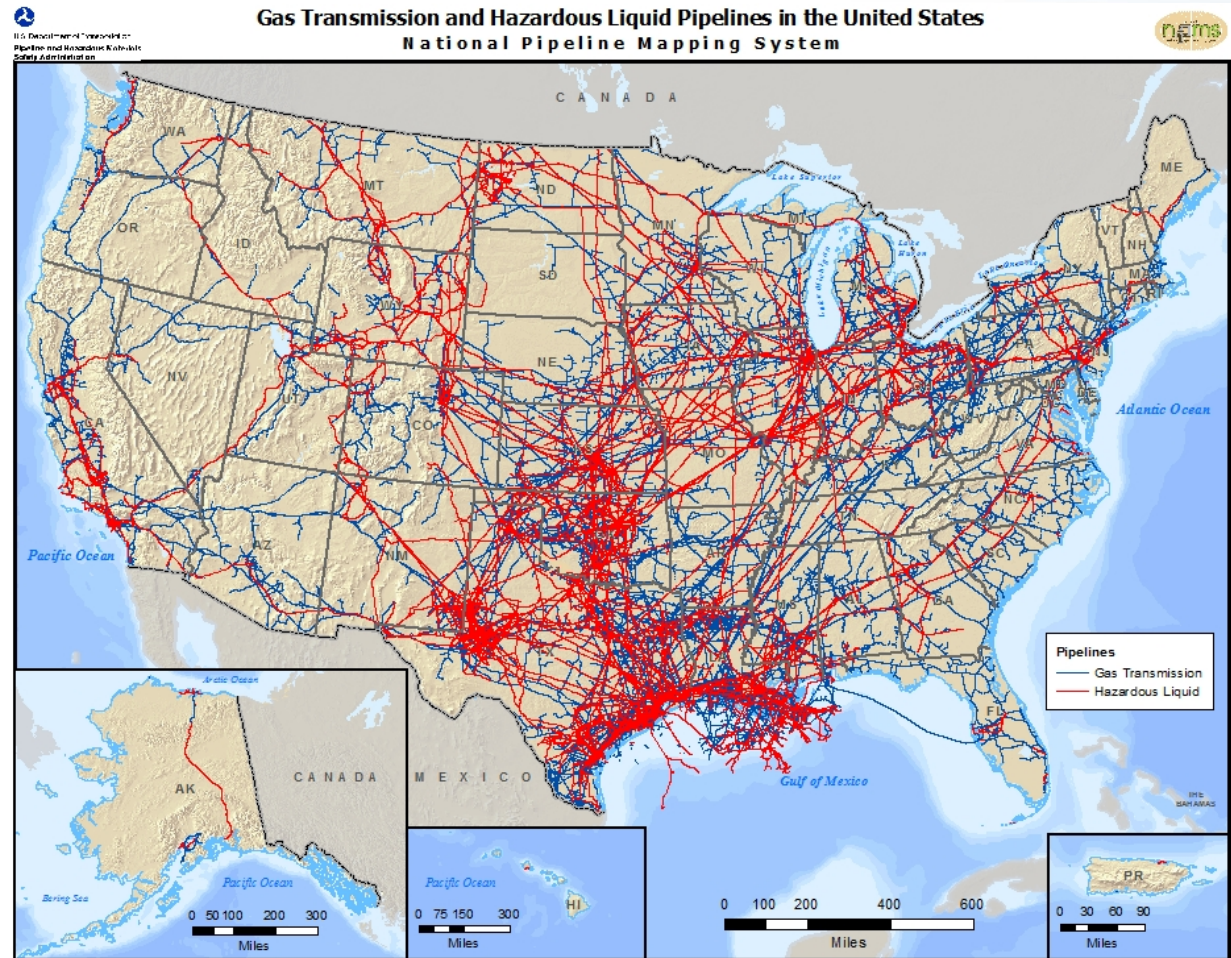
February 24, 2016

Pipelines in the US

- 160,000 Miles Hazardous Liquid
- 278,000 Miles Gas Transmission
- 20,000 Miles Gas Gathering
- 458,000 Miles Gas/Liquid Lines

Compared to:

- 1,850,000 Miles Gas Distribution
- Gas pipe inside of cities, residential areas.



Pipeline Regulatory Framework

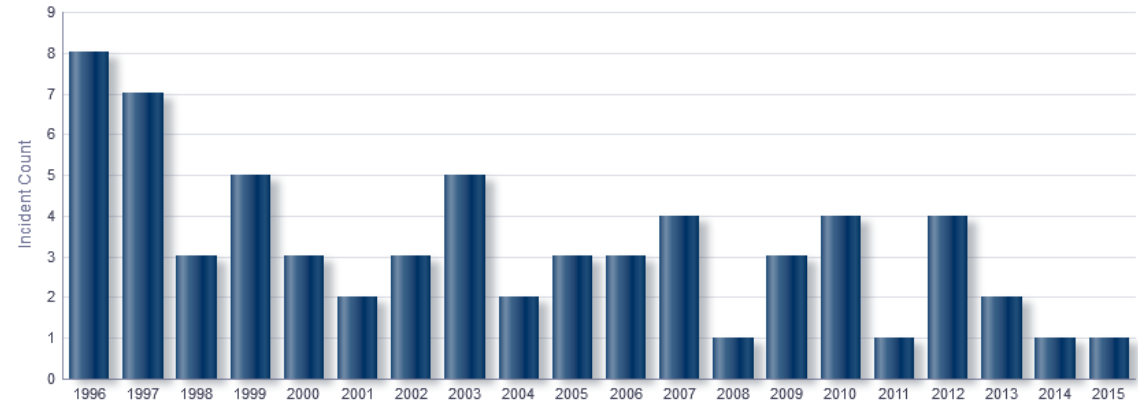
- Liquid and Natural Gas Pipelines
 - EPA
 - US DOT - PHMSA (Pipeline & Hazardous Materials Safety Admin)
 - Interstate pipeline
 - USACE (US Army Corp)
 - OSHA
 - State Environmental & Safety Regulations
 - State Public Utility Commission
 - Pipeline shared between PHMSA and State PUC
 - State Underground Utility Locating Agency (811)

Pipeline Incidents/Fatalities Iowa, Kan, Neb, Mo

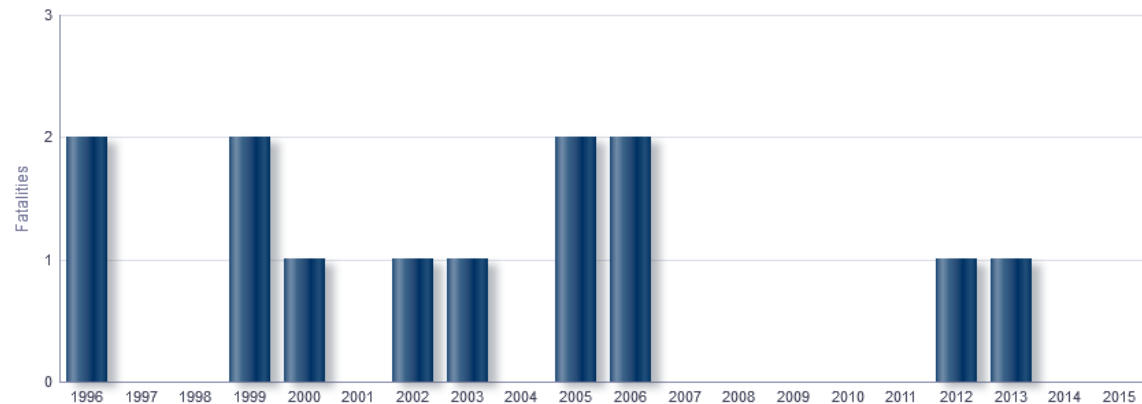


- Phmsa.dot.gov
- Major Reported Incidents
 - Death or Injury
 - \$50,000 Property Damage
 - Gas loss 3,000,000 cu-ft
 - LNG Facility Shut Down
 - Operator Judged Significant

PHMSA Pipeline Incidents: Count (1996-2015)
 Incident Type: Serious System Type: ALL State: IOWA,KANSAS,MISSOURI,NEBRASKA



PHMSA Pipeline Incidents: Fatalities (1996-2015)
 Incident Type: Serious System Type: ALL State: IOWA,KANSAS,MISSOURI,NEBRASKA



Environmental Issues with Pipeline Incidents

• SoCal Gas – Porter Ranch California (2016)

- Discovered Oct 23, 2015
- Underground Gas Storage Well Leaking Methane
- Depleted 1938 Oil/Gas Field
- Greenhouse Gas 72x more potent than CO₂
- Diminished Air Quality in the surrounding areas.
- Leak Permanently Stopped
 - Feb 18, 2016

- Complaints of
 - Headaches
 - Nausea
 - Respiratory Problems



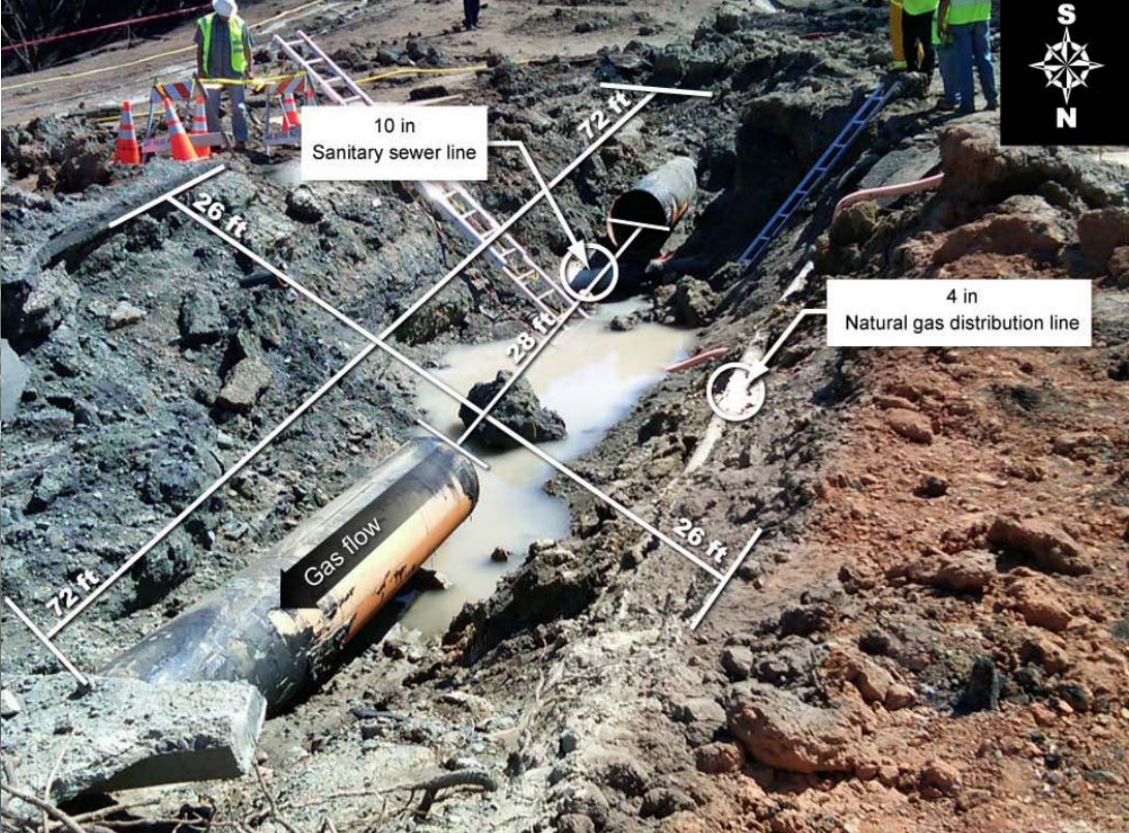
Regulatory Changes

- State Senate Bill introduced.
 - \$25,000 max penalty to \$25,000/day.
 - Automatic shutoff systems on all wells
 - Continuous monitoring of wells within 10,000 feet of homes/schools
- US Energy Secretary Ernest Moniz (Feb 17)
 - Need for New Gas Storage Regulations
- South Coast Air Quality Management District filed civil complaint
 - Suit seeks up to \$250,000/day

- <https://youtu.be/exfJ8VPQDTY> (BW Aerial)
- <https://youtu.be/IAKiqy82GIQ> (Color IR of Hill)

San Bruno, California

- PG&E – Sept 9, 2010
- 30-inch diameter steel natural gas line

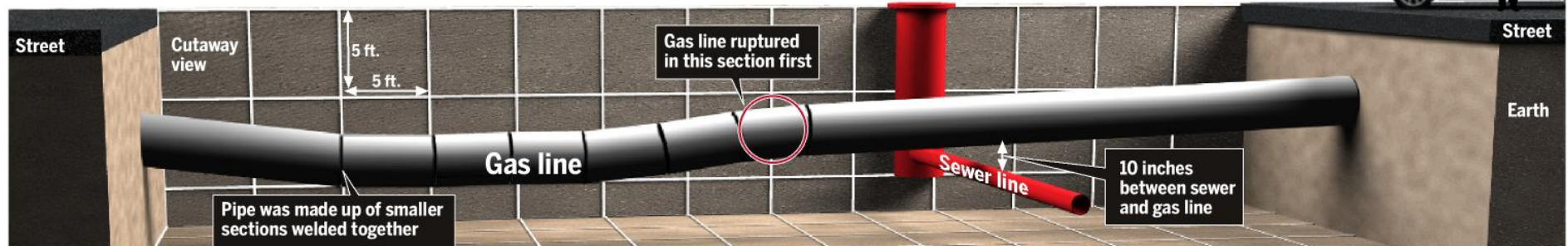


Regulatory Changes – San Bruno

- CPUC fine assessed at \$1.6 billion
- PG&E violated integrity management practices
- NTSB investigated
 - Recommendations to Secretary of Transportation
 - Expand Performance Based Safety Program & adequacy of Integrity Management Program
 - Assess PHMSA’s adequacy of inspection for (Leaks, Failures, Risk Models)
 - Assess PHMSA’s effective oversight of intrastate pipelines
 - Recommendations to PHMSA, Governor of Calif., CPUC, PG&E, AGA, INGAA

Report points finger at sewer line as probable cause

A state panel says ground shaking from a sewer line replacement project “most likely” caused stress on the welds that eventually failed, sparking an explosion that killed eight people.



Sources: Independent Review Panel and National Transportation Safety Board

PAI/MERCURY NEWS

Refugio State Beach, California

- May 19, 2015
- Plains All American 24-inch diameter crude oil line
- Corrosion leak, contaminated 7 miles of Pacific Coast Line
- \$90-\$300 million cleanup and settlement costs



Regulatory Changes – Refugio Oil Spill

- Ecologically Protected Areas
 - Diverse Marine Life Killed
 - Lobsters, Pelicans, Sea Lions, Birds, among others
 - Closure of Fisheries
 - Closure of Beaches

- California Legislation
 - Fire Marshall Review pipeline condition annually
 - Up from every 5 years.
 - Oil Spill Response Time Faster
 - Intrastate Pipeline to use best-know technology
 - Such as Automatic Shut-off valves.

- PHMSA
 - Filed Corrective Action Order
 - Suspend all operations of pipeline
 - Make pipeline safe
 - New Rules to prevent Inspection data discrepancies



PHMSA Proposed Rulemaking

- 2015– Hazardous Liquid Pipeline Safety
 - Response to 2010 Enbridge Oil Spill in Kalamazoo River, Mich. (\$765 million Cleanup)
 - Include non-HCA for Integrity Management
 - Require Inspection of pipelines affected by extreme weather, or events.
 - Leak Detection Standards, detection outside of HCA.
 - Increase In-Line Inspection usage, that affect HCA
 - Expand list of Immediate Repair Conditions of what pipeline damage is highest priority.

- 2013 – Mandatory Automatic Shutoff Valves for Rupture Detection
 - Improve incident response
 - For Liquids HCA areas (Population, Sensitive Areas, Waterways)
 - For Gas Class 3 & 4 areas (46 or more houses/mile)

- 2011 – Revising Integrity Management for Gas
 - May remove class locations
 - Alter the definition of HCA (Population Areas)
 - Require Automatic Shutoff Valves



PHMSA Advisory Bulletins

- 2016 – Feb 11, Reminder of Snow & Ice Damage due to blockage of control equipment vents.
 - (18 days to respond to East Coast Blizzard)

- 2016 – Feb 5, Consider Underground Storage Facility Integrity,
 - (105 days to respond to Porter Ranch)

- 2016 – Jan 19, Reminder of Damage to Pipelines by Flooding,
 - 2011 (Nebraska - NuStar) 4,200 gallons Ammonia spill into Missouri River, Nebraska.
 - Pipe exposed by river scour from extreme flooding
 - 2011 (Iowa - Enterprise Products) released 28,000 gallons of gasoline into Missouri River
 - Pipe had fatigue crack growth from vortex shedding vibrations at exposure.
 - 2011 (Montana - ExxonMobil) 63,000 gallons crude oil released into Yellowstone River
 - Caused by River Scour and Channel Migration
 - 2015 (Montana - Bridger Pipeline) 28,000 gallons of crude oil into Yellowstone River
 - 100-ft of pipeline was exposed in river bottom.
 - Preemptive Reminders, Prior to the rainy season.

PHMSA Advisory Bulletins (Causing a Stir)

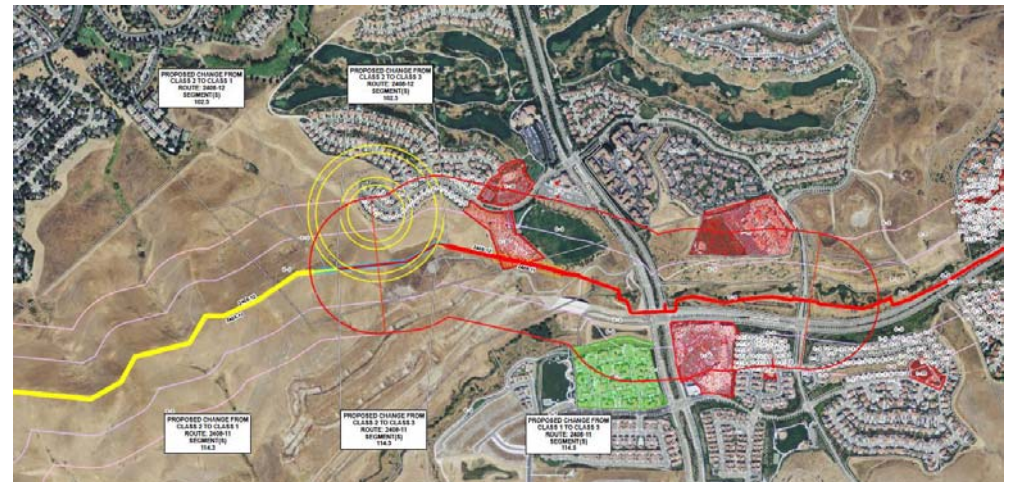
- 2011 – Using Record Evidence: Records be Traceable, Verifiable and Complete
 - For Establishing MAOP/MOP
 - In Response to PGE’s questionable records (San Bruno)
 - For Gas Class 3 & 4 areas
 - Reissued 2012-06
 - NTSB recommends PHMSA “to delete the grandfather clause” for MAOP establishment

- 2010 – Revise Procedures to Protect HCA for Liquid
 - Include non-HCA for Integrity Management
 - Leak Detection Standards
 - Valve Spacing Standards
 - Extend Regulation into currently Exempt pipes.

- 2011/2015 Code Interpretation of MAOP Determination–
 - California Public Utility Commission (CPUC)
 - No Longer accepts Grandfather Clause for MAOP, pipe must be pressure tested.

Pipeline Integrity Engineering

- Based on compliance with PHMSA Parts 192 and 195
 - HCA, Class Location and EFRD (Emergency Flow Restricting Device) Studies and Mapping
 - Hydrostatic test, Direct Assessment and In-line Inspection Assessment Services
 - ILI Piggability studies, data reviews and anomaly repair engineering
 - AC Mitigation and CP Design studies
 - MAOP/MOP Calculation and validation services
 - Mock Audit and PHMSA/State audit services
 - IMP (Integrity Management Plan), ERP (Emergency Response Plan), and O&M manual development
 - Corrosion growth analysis
 - “Traceable, Verifiable and Complete”

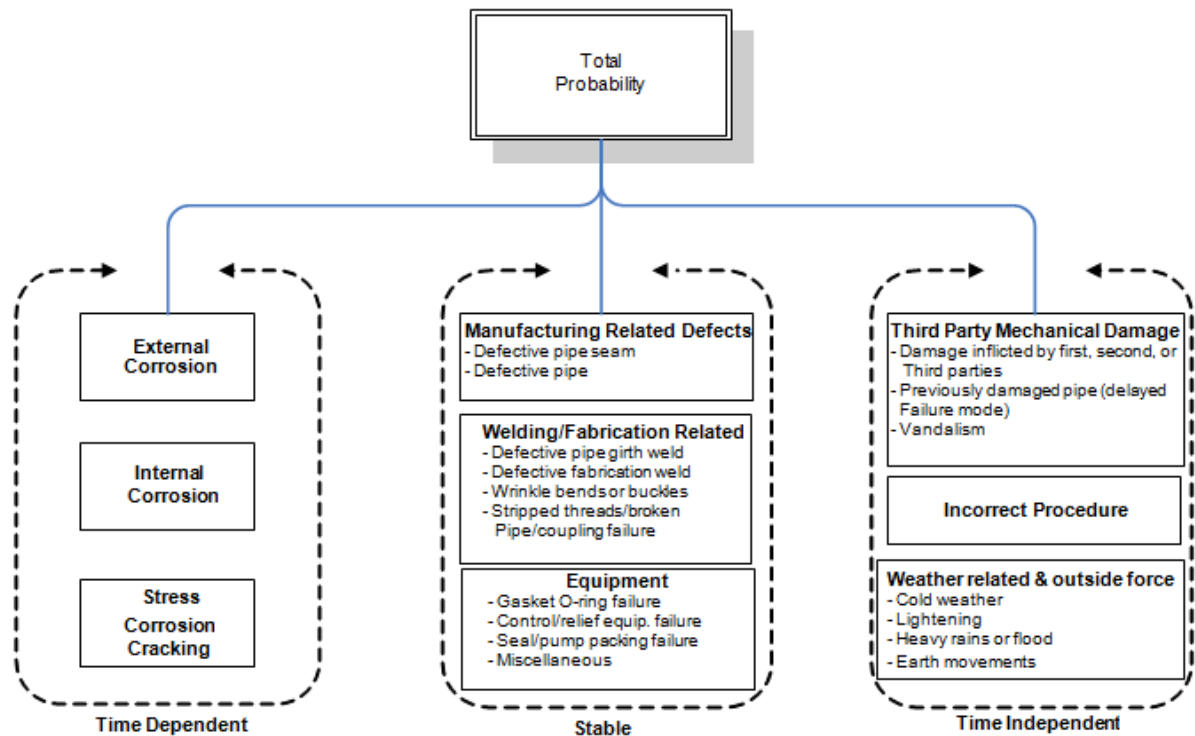


Pipeline Risk Assessment

- Based ASME B31.8S Managing System Integrity of Gas Pipelines
 - GIS Based Structure and Pipeline Centerline
 - PODS, APDM or other Pipeline Data model
 - RexTag, FEMA flood, National Highway Performance Monitoring System
 - Dynamic Segmentation
 - Python Scripting Algorithm
 - ArcGIS Displays & Mapping



Pipeline Integrity Threats Listed in ASME B31.8S



TRC & Pipeline Integrity Management



- TRC Integrity History
 - Willbros (Engineering, Land, Survey, Integrity) purchased 2015
 - MJ Harden Associates
 - Our people come from: Industry/Pipeline Operators/ESRI/Other

- TRC four divisions – 4000 employees
 - Pipeline Services - formerly Willbros Professional Services – 900 employees
 - Environmental
 - Infrastructure
 - Energy

Thank you

Questions?

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