TRC Pipeline Services

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Pipeline Incidents and Subsequent, Consequential Environmental Regulations

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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

![Graph showing pipeline incidents and fatalities from 1996 to 2015 for Iowa, Kan, Neb, and Mo.](image-url)
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/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.
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

- Manufacturing Related Defects
  - Defective pipe seam
  - Defective pipe
- Welding/Fabrication Related
  - Defective fabrication weld
  - Wrinle band or buckle
  - Stripped threads/broken pipe/coupling failure
- Equipment
  - Gasket O-ring failure
  - Control/relief equip. failure
  - Seal/pump packing failure
  - Miscellaneous
- Third Party Mechanical Damage
  - Damage inflicted by first, second, or third parties
  - Previously damaged pipe (delayed Failure mode)
  - Vandalism
- Incorrect Procedure
- Weather related & outside force
  - Cold weather
  - Lightning
  - Heavy rains or flood
  - Earth movements

Total Probability

Time Dependent
- External Corrosion
- Internal Corrosion
- Stress Corrosion Cracking

Stable

Time Independent
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
Questions?

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