

#### **Commercial Implications of Aging Pipeline Infrastructure**



#### "Aging Pipeline Infrastructure, San Bruno and the Mega Rule"

#### **Aging Transmission Infrastructure in U.S.**

- U.S. has ~ 300,000 miles of gas transmission pipelines with 168,000 miles being built before 1971 or 56% of transmission infrastructure
  - Some companies have transmission lines dating back to 1930's which are approaching 100 years old
- Majority of gas utilities and interstate/intrastate pipeline companies have transmission lines greater than 50 years old in service today



- Transmission pipelines move large volumes of gas at high pressure (>20% SMYS) and failures result in ruptures/explosions
  - > Higher risk to human life and property in populated areas around transmission lines
  - > Distribution lines operate at much lower pressures/pipe wall stresses and failures will typically leak
- Newly constructed transmission lines cost \$2 \$5 million per mile depending on diameter, population density, and terrain

#### San Bruno Event September 9, 2010 6:11 pm

- Pacific Gas & Electric 30" transmission pipeline ruptures and explodes in San Bruno, CA
  - 8 deaths and more than 50 injuries
  - Extensive news coverage in real time
  - On-going media stories about "hidden dangers of aging pipelines"
- Watershed Event for Gas Industry
  - Similar to "Three Mile Island" for nuclear industry



#### • San Bruno rupture costs PG&E over \$2.2 Billion in fines, lawsuits, costs

Does not include cost of compliance with new pipeline integrity regulations which PG&E has been on the forefront of early compliance



## **Congressional Action to San Bruno: Reauthorization of the Pipeline Safety Act of 2011**

- San Bruno gains national attention in news cycle which drives Congress to make more stringent regulatory requirements in the Pipeline Safety Act of 2011
- NTSB investigation of San Bruno reveals many deficiencies in PG&E integrity program, CPUC regulatory oversight, and PHMSA safety regulations for pre-1971 pipelines ("Grandfather Clause")
- Reauthorization of Pipeline Safety Act includes new requirements for transmission:
  - Doubling of penalties for non-compliance
  - Installation/spacing of ROV/ASV valves for isolation
  - Expand Integrity Management Programs (IMP) beyond HCA areas into MCA areas
  - Reconfirm Maximum Allowable Operating Pressure (MAOP) lines operating in HCA and MCA areas
  - > Elimination of "Grandfather Clause" for pre-1971 pipelines operating without critical records/pressure tests for MAOP
- Represents the most dramatic increase in pipeline safety regulations since the original Pipeline Safety Act of 1968

#### PHMSA # 2011-0023 "The Mega Rule"

- PHMSA Docket #2011-0023 converts the Pipeline Safety Act of 2011 from Congress into enforceable regulations on the gas pipeline industry
- Effective date of the "Mega Rule" is July 1, 2020
  - Time lapse from the Pipeline Safety Act of 2011 to final regulations in 2020 reveals the long struggle between industry and PHMSA to convert the Act into workable regulations
- "Mega Rule" has a 14-year timeframe for full compliance
  - 1<sup>st</sup> compliance milestone occurred on July 1, 2021, when utilities and pipeline companies had to complete their compliance plans and procedures
  - Pipeline compliance projects must be 50% completed by July 2028 and 100% completed by July 2035
- Compliance projects will create high demand for pipeline engineering/integrity, field testing/assessment, and pipeline construction services for next 14 years
  - Major challenge for industry resources and talent (retirement wave)

#### Major Focus of "Mega Rule" is pre-1971 Transmission Pipelines

- Under the original PSA of 1968, pipelines built prior to November 1970 that did not have sufficient material records and pressure tests to confirm MAOP were <u>exempted</u> from more stringent record and pressure testing requirements for pipelines built afterwards
  - Legacy transmission pipelines without records or pressure tests would historically establish MAOP based on actual Maximum Operating Pressures (MOP) from historic 5 years of operations prior to November 1970
  - > This exemption became known as the "Grandfather Clause"
- "Mega Rule" terminates exemption for aging "legacy" pipelines which now must have MAOP confirmed under modern regulatory standards with respect to material records and pressure testing
  - This requirement of the "Mega Rule" has the most dramatic and burdensome impact to pipeline operators
  - Analogous to making a **1957** Chevy comply with today's auto emissions, mileage, and safety standards



## "Mega Rule" Mandates Six MAOP Reconfirmation Methodologies (49 CFR Part 192.624 Subpart L)

- 1. Hydrostatic Pressure Test and TVC Records
  - Hydraulic pressure test up to 1.5 times MAOP + TVC Records
- 2. Pressure Reduction
  - Historic MOP divided by up to 1.5 (33% pressure drop)
- 3. Engineering Critical Assessment (ECA)
  - Engineering assessment of threats, loadings, operating conditions
- 4. Pipeline Replacement
  - Complete replacement of transmission pipeline preferred method
- 5. Pressure Reduction for Small Potential Impact Radius (PIR)
  - Smaller pressure reduction ~10% from MOP for pipelines with PIR < 150'</p>
- 6. Alternative Technology
  - > PHMSA left door open for emerging technologies to verify pipeline integrity and MAOP





# Hydrostatic Pressure Test and TVC Records

- Perform pressure test under 49 CFR Part 192.505 Subpart J
  - Perform hydrostatic pressure test and calculate MAOP by dividing test pressure by the greater of 1.25 or applicable class location factor:

Class Location (Steel > 100 psi)	Installed before Nov 1970	Installed before Jul 2020	Installed after Jul 2020
1	1.1	1.1	1.25
2	1.25	1.25	1.25
3	1.4	1.5	1.5
4	1.4	1.5	1.5



- Verify material properties of steel pipe/fittings with records (TVC)
  - Verify material properties records to verify pipe diameter, wall thickness, seam type, and steel grade (yield and ultimate tensile strength) are Traceable, Verifiable, and Complete (TVC)
  - If TVC records are incomplete, must obtain missing record data from testing of pipe steel samples tested in lab for tensile strength and field measurements of wall thickness and diameter
  - Steel samples taken from pressure test manifold connection points, pressure test failure points, direct assessments, and other pipeline repairs

#### **Impacts of "Mega Rule" to Gas Markets**

- Hydrostatic pressure tests, pipeline replacement projects, and ILI tool inspections ("Smart Pigging") will require scheduled <u>and</u> unscheduled outages
  Pipeline integrity work is performed during the off-peak summer maintenance and construction season
  - > During hydrostatic tests, pipeline segment is taken out of service for testing, repairs, and recommissioning
  - > Transmission line replacement requires outages for tie-in work and commissioning
  - > ILI tool runs reveal anomalies which, if critical, require immediate repairs and possible pressure reductions
- "Mega Rule" pipeline integrity maintenance outages will compete with storage injections and gas-fired generation during future off-peak seasons (2022)
  - Accelerated closures of coal plants will place more reliance on gas-fired generation
  - Increasing expansion of renewable energy (especially wind) will create more demand for dispatchable gas-fired generation
  - Scheduling conflicts between storage injections and scheduled pipeline outages will be overlayed with unscheduled outages and near instantaneous gas-fired generation demand

# QUESTIONS

#### **WHO WE ARE**

STRENGTH MORE THAN

> **B**,000 PROFESSIONALS

EXCELLENCE ENR RANKED TOP 5% DESIGN FIRMS

STABILITY

BLIRNS MEDONINELL SERVICE

ESTABLISHED

EMPLOYEE-OWNED



#### CREATE AMAZING.