Pipeline Protection:

The cost of keeping pipelines safe
Pipeline Protection:

The cost of keeping pipelines safe

Moderator:
Joe Leckie, Executive Administrator, Idaho Public Utilities Commission

Panelists:
Honorable Frances Koncilja — Colorado Public Utilities Commission
Lance Elroy — Operations Services Director, Intermountain Gas Company
David Mulligan — Senior Inspector for Western Region, Pipeline and Hazardous Materials Safety Administration
David Piroutek — Engineering Supervisor, Wyoming Public Service Commission
New Regulations and Natural Gas Underground Storage Facilities
The Good, Bad and Ugly

Frances Koncilja, Commissioner

DISCLAIMER: The views and opinions in this presentation reflect only those of one Commissioner and not necessarily the Colorado Public Utilities Commission.
The views expressed in this presentation are those of the presenter and do not necessarily reflect the views of the Colorado Public Utilities Commission or any other individual Commissioner.
Figure 1: An EV video camera image showing the parted casing located at 887.28 ft WLM
Figure 3: Sketch and field photo showing the upper and lower fish of the parted 7” casing (Joint 22)
Aliso Canyon Gas Leak: The fallout

**EVACUATION**
Thousands of families are forced to leave their homes.

**HOSPITALIZATION**
Odor causes fever, nose bleeds, nausea and other illness.

**BLACKOUTS**
California energy agencies warn of blackouts

---

**#1 119 109,000**

- **Biggest methane leak in U.S. history**
- **The number of days it took to plug the leak**
- **Metric tons of methane pollution emitted into the atmosphere**

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**CLIMATE DAMAGE + WASTED ENERGY**

- **Same annual near term climate damage as nearly 2 million cars**
- **Energy equal to burning 1 billion gallons of gasoline**
- **Same near term climate damage as 9 million metric tons of CO₂**

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http://blogs.edf.org/energyexchange/files/2017/02/AlisoAnniversary3.jpg
Location of Underground Gas Storage (UGS) Facilities

U.S. Underground Natural Gas Storage Facilities, by Type (December 31, 2015)

http://www.eia.gov/cfapps/ngs/maps/storage_2015.png
Underground NG Storage in Western States

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<th>U.S. Total</th>
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<td><strong>Interstate sites</strong></td>
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<td>Working Gas Capacity</td>
<td>2910 bcf</td>
<td>413 bcf</td>
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<tr>
<td><strong>Intrastate sites</strong></td>
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<td>Working Gas Capacity</td>
<td>1893 bcf</td>
<td>525 bcf</td>
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<tr>
<td><strong>Total # of UGS sites</strong></td>
<td>416</td>
<td>57</td>
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<tr>
<td>Working Gas Capacity</td>
<td>4803 bcf</td>
<td>938 bcf</td>
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Table above is based on 2016/2017 data. Note that based on 2015 data, PHMSA estimated that there are a total of 16,991 injection/withdrawal wells and pressure control/observation wells that would be subject its new rules.

Source: Energy Information Administration and Pipeline and Hazardous Materials Safety Administration. | GAO-18-89
Timeline (borrowed from PHMSA)
Impacts of PHMSA’s Interim Final Rule (IFR)

• UGS facilities are now subject to inspection by PHMSA, or a PHMSA certified state entity

• UGS operators must obtain an Operator ID from PHMSA and submit reports
  – Annual report with details about the operator, facility operational data and maintenance
  – Incident Reports
  – Safety-related condition reports

• Compliance with API Recommended Practices
49 CFR 192.12 - Underground natural gas storage facilities

• Must meet the operations, maintenance, integrity demonstration and verification, monitoring, threat and hazard identification, assessment, remediation, site security, emergency response and preparedness, and recordkeeping requirements and recommendations of API RP 1171, sections 8, 9, 10, and 11 by January 18, 2018.

• Must establish and follow written procedures for operations, maintenance, and emergencies implementing the requirements of API RP 1170 and API RP 1171, and incorporate such procedures into their written procedures for operations, maintenance, and emergencies established pursuant to § 192.605.
• API 1170: Design and Operation of Solution-mined Salt Caverns Used for Natural Gas Storage

• API 1171: Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs

• They cover the design and operation of salt cavern storage and the design, construction, operation, monitoring and maintenance of depleted hydrocarbon and aquifer reservoirs.

• Risk-based approach to well integrity management advocated in API 1171 includes five steps: 1) Data Collection, Documentation and Review, 2) Hazard and Threat Identification, 3) Risk Assessment, 4) Risk Treatment - Developing Preventive and Mitigative Measures, and 5) Periodic Review and Reassessment.

http://apps.weatherford.com/Integrity/media/WFT251449.pdf
API RP 1171

Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs, First Edition

STANDARD by American Petroleum Institute, 09/01/2015

View all product details

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Underground Gas Storage In Colorado

• 11 storage sites total
  – 7 interstate (FERC/PHMSA)
  – 4 intrastate (COPUC)
    ➢ 3 owned by Public Service Company of Colorado (PSCo) and 1 owned by Rocky Mountain Natural Gas (RMRG/Black Hills)

• Both PSCo and RMNG sites required integrity upgrades

• PSCo considers storage integrity as “ordinary course of business” (but is still seeking to extend its integrity rider for other pipeline safety projects)

• RMNG is requesting cost recovery under existing “System Safety and Integrity Rider” (SSIR)
• 2017 Rate Case (Proceeding No. 17AL-0654G)
• Included request to extend System Safety and Integrity Rider (SSIR) for five years
• Added new category: SIMP (Storage Integrity Management Program)
• Proposed 5 year integrity plan totaled about $50 million
  – included $11.5 million in storage-related projects
  – projects listed involved evaluation and replacement of downhole safety valves, evaluation of casings, re-work of wells “as needed” and replacement of one well

• Settlement agreement approved SSIR extension but required process and reporting improvements
  – Including an annual report that also provides a copy of the Company’s most recent PHMSA Annual Report and updated risk score for underground storage field projects
Selected Resources

7. https://www.regulations.gov/contentStreamer?documentId=PHMSA-2016-0016-0005&attachmentNumber=1&contentType=pdf
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2015 to September 2015</td>
<td>• The American Petroleum Institute (API) releases industry-recommended practices for natural gas storage</td>
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| October 2015 to February 2016 | • October 2015: A natural gas leak is detected at the Aliso Canyon Underground Storage Facility outside Los Angeles, California  
• November 2015: After several unsuccessful attempts to stop the leak at Aliso Canyon, the site operator begins drilling a second well to intercept and stop the leak underground  
• February 2016: The Aliso Canyon site operator completes the relief well and stops the leak                                                                 |
| February 2016        | • The Department of Transportation’s (DOT) PHMSA advises operators to voluntarily follow API recommended practices                           |
| April 2016           | • The Department of Energy (DOE) and PHMSA form a task force to examine the Aliso Canyon incident and to develop recommendations on how similar incidents could be prevented in the future |
| June 2016            | • Congress passes and the President signs the Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, which formalized by statute the task force formed by DOE and PHMSA to study natural gas storage safety, and directs DOT to issue minimum standards for natural gas storage safety |
| November 2016        | • PHMSA publishes a notice of its proposed fee structure, stating that it plans to annually charge operators up to $8 million in fees to fund its enforcement work, and requests public comments |
| December 2016        | • PHMSA issues an interim final rule containing minimum safety standards based on API recommended practices, and requests public comments on the standards |
| January 2017         | • Interim final rule containing minimum safety standards goes into effect                                                                 |
| April 2017           | • PHMSA finalizes its fee structure for operators                                                                                     |
| June 2017            | • In response to a petition for reconsideration, PHMSA publishes a notice stating that it intends to address the issues raised by comments it collected from industry and the public, and that it will not issue certain enforcement citations to operators until January 2019  
• Following an appropriation provision allowing PHMSA to obligate up to $8 million from fees for its natural gas safety enforcement program, PHMSA collects about $2 million and plans to collect the remaining $6 million in the coming months |

Source: GAO analysis of PHMSA publications and documents | GAO-18-89
Top Acronyms regarding Underground Storage Facilities (USF)

2. DIMP - Distribution Integrity Management Program (2008)
3. SIMP – Storage Integrity Management Program (2016-2018)
4. AMRP - Accelerated Main Services Replacement Program
5. API - American Petroleum Institute
6. Btu - British thermal unit(s)
7. DOT - U.S. Department of Transportation
8. EIA - Energy Information Administration
9. GSIC - Gas Storage Inventory Cost
10. HSE - Health and Safety Executive
11. IOGCC - Intrastate Oil and Gas Compact Commission
12. IP - Informational Posting
13. LDC - local distribution company
14. LMP - locational marginal price
15. LNG - liquefied natural gas
16. LPG - liquid petroleum gas
17. MAOP - maximum allowable operating pressure
18. Mcf - thousand cubic feet
19. MMcf/d - million cubic feet per day
20. MTU - master terminal unit
21. NG - natural gas
22. PHMSA - Pipeline and Hazardous Materials Safety Administration
23. PIPES Act - Protecting our Infrastructure of Pipelines and Enhancing Safety Act
24. RIA – Regulatory Impact Analysis
25. RTU - remote terminal unit
26. SCADA - supervisory control and data acquisition (system)
27. SME - subject-matter expertise
28. Tcf - trillion cubic feet
29. UGS - underground gas storage

Example – XCEL BILL - ABOUT YOUR GAS RATES*†

Pipeline System Integrity Adjustments (PSIA)
All rate schedules are subject to the PSIA. The PSIA recovers the costs not collected through charges for base service of the Transmission Integrity Management Program ("TIMP"), the Distribution Integrity Management Program ("DIMP"), the Accelerated Main Renewal Program ("AMRP"), the Cellulose Acetate Butyrate ("CAB") Services Replacement Program, the Edwards to Meadow Mountain Pipeline and the West Main Replacement projects. The PSIA is subject to annual changes to be effective on January 1 of each year.

*Unit of Measurement for Electric Consumption is $/kWh. Unit of Measurement for Gas Consumption is $/Therm.
*All base rates, riders and adjustments are approved by the Colorado Public Utilities Commission (CPUC).

Source: [https://myaccount.xcelenergy.com/ebill/understandingbill_co.jsp](https://myaccount.xcelenergy.com/ebill/understandingbill_co.jsp)
Excess Flow Valves

Federal Regulatory Overview and Impact to Customers

Lance Elroy
Service Line
Third Party
Damages –
Highest Risk

EFV – Stops
Escaping Gas
EFV
Tripped Position

EFV
Open Position
Excess Flow Valve - Regulation Timeline

**Notification Required**
- New Customers

**Installation Required**
- Residential

- **1998**
  - Notification Required

- **2006**
  - Amdt. 192-113

- **2008**
  - Amdt. 192-121
  - ADB 08 04

- **2010**
  - Advisory
  - Install EFV

- **2017**
  - Required on all Services
  - EFV and Curb Valve

- **2006**
  - Congress
  - PIPES Act
  - Mandate
Overview of Current EFV Federal Requirements

EFV required on all service lines
- Less than 1,000 SCFH load
- Greater than 10 psig operating pressure

Must notify existing customers of the right to install an EFV
- Operator must install EFV upon request
- Cost of installation determined by Operator’s rate-setter

- Services not qualifying for EFV must have a manual shut-off valve installed
Cost Impact to Customers

New Customers

• Low cost when installed with new service
• Costs are included with service line
• Slight impact to rates

Existing Customers

• High Cost to retrofit existing service lines
• Western States average cost is $1,600
• The requesting customer pays for installation
• Low number of requests
• Insignificant impact to rates
Risk Profile

Service Line Damage

Measurement of Failure

Time

Likelihood of Failure  Consequence of Failure
Conclusion

- EFV’s Effectively Mitigate Risk
- New Services are Nearly 100% Protected
- Highest Likelihood of Damage is in Early Years of Construction
- Low Cost EFV Installation for New Customers
- High Cost for Existing Customer EFV Installation
- Likelihood of Damage Decreases Over Time
- Low Number of Existing Customers Request EFV
- States with Capped EFV Cost to Existing Customers see Low Adoption Rates
PHMSA
Excavation Enforcement

NARUC Western Region
Boise, ID
June 2018

Dave Mulligan
Community Liaison
PHMSA Damage Prevention Program

- Rulemaking and Policies
- Promote prevention and safe digging practices among stakeholders
- Outreach - Training and Education
- Data collection and tracking
- Grants:
  - State Damage Prevention Grants
  - One Call Grants
- State program evaluations
- State assistance
- Enforcement – Operators and Excavators
Excavation Enforcement Background

• Excavation Enforcement Final Rule effective January 1, 2016

• PHMSA developed forms to conduct state one call law enforcement evaluations

• PHMSA developed initial framework to review, investigate, and possibly take enforcement actions for violation of Part 196 in states with inadequate enforcement of their one call law
State Excavation Damage Evaluation Criteria

- State have enforcement authority with civil penalties and use it?
- Have a reliable means of learning about damages?
- State require:
  - Excavators must call 811 before digging
  - Excavators must “respect the marks”
  - If damage to a pipeline occurs...
    - Excavator must report damage to operator at earliest practical moment
    - If release occurs, excavator must call 911
- Are exemptions from the DP law limited? Written justification of exemptions is required.
PHMSA 2016-Present

• 2017 State evaluation results mailed in May 2018
  • Decrease from 29 to 13 inadequate states

• Completed 2 rounds of 52 State evaluations and enforcement determinations

• Supported State stakeholder education and regulation development

• Completed refresh of State evaluation form
Pipeline Incidents By Cause

Causes of Pipeline Incidents - 2005 - Present
Time run: 5/30/2018 5:01:38 PM

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration
Portal Data as of 5/30/2018 3:46:10 PM
STATE: ALL INCIDENT TYPE: All
Pipeline Incidents Caused by Excavation Damage

Since 2005, pipeline operators have reported excavation damage as the cause of 951 incidents, resulting in 42 fatalities, 176 injuries requiring in-patient hospitalization, and 357,750,316 of property damage.
Excavation Damage Root Cause

Root Cause for Pipeline Incidents Caused by Excavation Damage 2010 - Present
Time run: 5/30/2018 5:01:38 PM

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration
Portal Data as of 5/30/2018 3:46:10 PM
STATE: ALL INCIDENT TYPE: All
Adequacy of One-Call Law Enforcement Programs
As of December 9, 2017

- Adequate (24)
- Inadequate (27)
- Contesting (1)

Map produced December 9, 2017 by the U.S. Department of Transportation (U.S. DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA)

Map provided as a reference only. PHMSA makes no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to this map for any purpose. PHMSA expressly disclaims liability for errors or omissions in the contents of this map.
Federal Penalties
For Excavation Damage

• You may be subject to federal penalties of up to $200k for each violation for each day the violation continues

• Maximum penalty up to $2M for a related series of violations.
PHMSA’s Approach to Federal Enforcement

• General philosophy:
  – Strategic and targeted enforcement on a limited basis; federal authority should be considered “backstop”
  – Primary goal: encourage change in State behavior (states should enforce their own laws)
  – PHMSA will enforce 49 CFR 196 (PHMSA cannot enforce state laws)
  – PHMSA cannot enforce in states with adequate programs
What Can PHMSA Enforce (Part 196)?

• Failure to use one-call system before excavating. [196.103(a)]
• Failure to wait for the pipeline operator to arrive at the excavation site and establish and mark the location. [196.103(b)]
• Failure to excavate with proper regard for the marked location of pipelines. [196.103(c)]
• Failure to make additional use of one-call as necessary. [196.103(d)]
• Failure to promptly report any damage of a pipeline due to excavation activity to the pipeline operator. [196.107]
• Failure to promptly report any release of any PHMSA-regulated natural and other gas or hazardous liquid by calling the 911 emergency telephone number. [196.109]

Note: Pipeline operators and their contractors are subject to the excavation damage prevention requirements of 49 CFR Parts 192 and 195.
Resources for Excavation Enforcement

- Links under public website include:
  - PHMSA excavation enforcement rule language
  - State determinations
  - State pipeline excavation damage data
  - PHMSA Evaluation checklist
  - State Program Manager contact info
Pipeline Safety Management Systems

Western Conference of Public Service Commissioners
June 4, 2018

David W. Piroutek
Engineering Supervisor
Wyoming Public Service Commission
American Petroleum Institute (API) Recommended Practice (RP) 1173

- Following a major crude oil release near Marshall, MI, the Nat’l Transportation Safety Board’s July 2012 report recommended API develop a pipeline safety management system standard similar to API RP 750 for Process Safety Management.

- In December 2012 pipeline trade associations, federal and state regulators, and public pipeline and process safety experts began creating API RP 1173.
API RP 1173

- On July 8, 2015, API released API RP 1173 Pipeline Safety Management Systems. (PSMS)
- As an American National Standards Institute (ANSI) designated standards document, API RP 1173 became the U.S. national standard for PSMS.
API RP 1173 Safety Elements

RP 1173 is scalable to any sized operation, consisting of ten elements which companies can utilize to meet their individual requirements.

1. Leadership and Management Commitment
2. Stakeholder Engagement
3. Risk Management
4. Operational controls
5. Incident Investigation, Evaluation and Lessons Learned
6. Safety Assurance
7. Management Review and Continuous Improvement
8. Emergency Preparedness and Response
9. Competence, Awareness and Training
10. Documentation and Record Keeping
API RP 1173 Scalability

• API RP 1173 allows pipeline operators and local distribution companies to select the areas within their operation that they want to implement PSMS to improve existing programs.

• Using the 10 components in a rational Plan-Do-Check-Act (PDCA) cycle will help reduce incidents toward an overall goal of zero incidents.
Plan-Do-Check-Act Cycle

• Plan: Establish objectives and the processes necessary to deliver the results to reach the goal.
• Do: Execute the plan.
• Check: Compare actual results with expected results. Look for deviations from the expected results.
• Act: Taking steps to continuously improve process performance, including actions to correct any deviations from the expected goals. Analyze the differences between expected results and actual results, determine the cause of the deviations and apply changes to improve the process.
Plan-Do-Check-Act Cycle

• A continuous process where an improvement plan is developed, put into place, the results are measured and the plan is continued or changed as needed to achieve the expected outcomes.

• If the plan is not having the desired effects, it requires change.

• Deliberate improvements to the process are the key to improving outcomes and achieving the goal of zero incidents.
Affect on Rates (Short Term)

• Initial Costs will vary by company depending on:
  • Size of the company and scale of operations.
  • Strength of the company’s existing safety culture.
  • Complexity of integrating new and existing plans.
Affect on Rates (Long Term)

• As the program matures PSMS should reduce costs associated with incidents and events.
• Will become part of normal operations.
• Improve overall safety.
API RP 1173 is not in current Regulations

• API RP 1173 is not included in current PHMSA Pipeline Safety Regulations.
• Many current pipeline safety regulations do include aspects of PSMS already within them.
• States may adopt as a state regulation.
• Several larger utilities have already implemented PSMS.
Questions

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Thank you!

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