TECHNOLOGY TRANSFER WORKSHOP:

PIPELINE BLOWDOWNS IN TRANSMISSION AND DISTRIBUTION

NOVEMBER 10, 2016 • HOUSTON, TEXAS

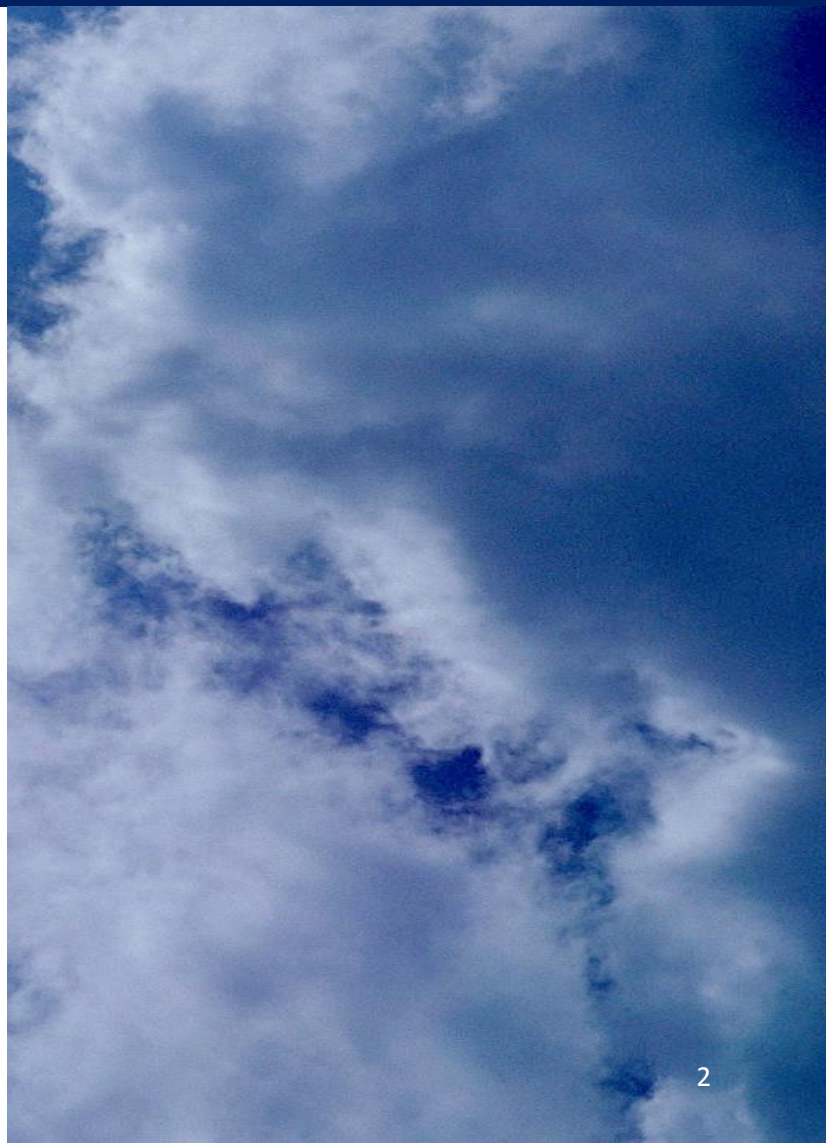
Case Study Comparisons against MJB&A report

"Pipeline Blowdown Emissions & Mitigation Options"

Deanna Haines, Director of Gas Engineering
Southern California Gas Company and San Diego Gas & Electric

Preview

- Who We Are
- Drivers
- Case Studies
- Summary



Who we are...

SoCalGas & SDG&E Territory

Both Utilities in service for over **135 years**

SoCalGas

- **Largest natural gas distribution** utility in the US
- Serve **12 counties** (over 500 communities) and more than **21 million** people
- Over **5.8** million gas meters

SDG&E

- Provides **electricity** and **natural gas** to **3.4 million** people from Orange County to the Mexican border.

Event Drivers

Total Transmission Events ~150 per year

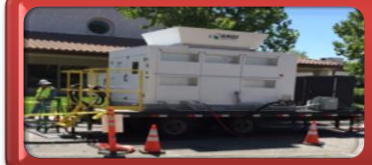
Routine Maintenance

- ✓ 30-Pipeline Integrity
- ✓ 60-Pipeline alterations

Pipeline Safety Enhancement plan

- ✓ 60-hydrotests, replacements

Blowdown Mitigation Options



Methane Capture System-re-purposed equipment from NGV program

Pressure Reduction Using Mobile Compressors-common

Transfer of Gas to Lower Pressure System-common

Isolate Small Section Using Stopples-infrequently

Flaring-haven't used this method (introduces new safety, fire risks not normally part of operation)

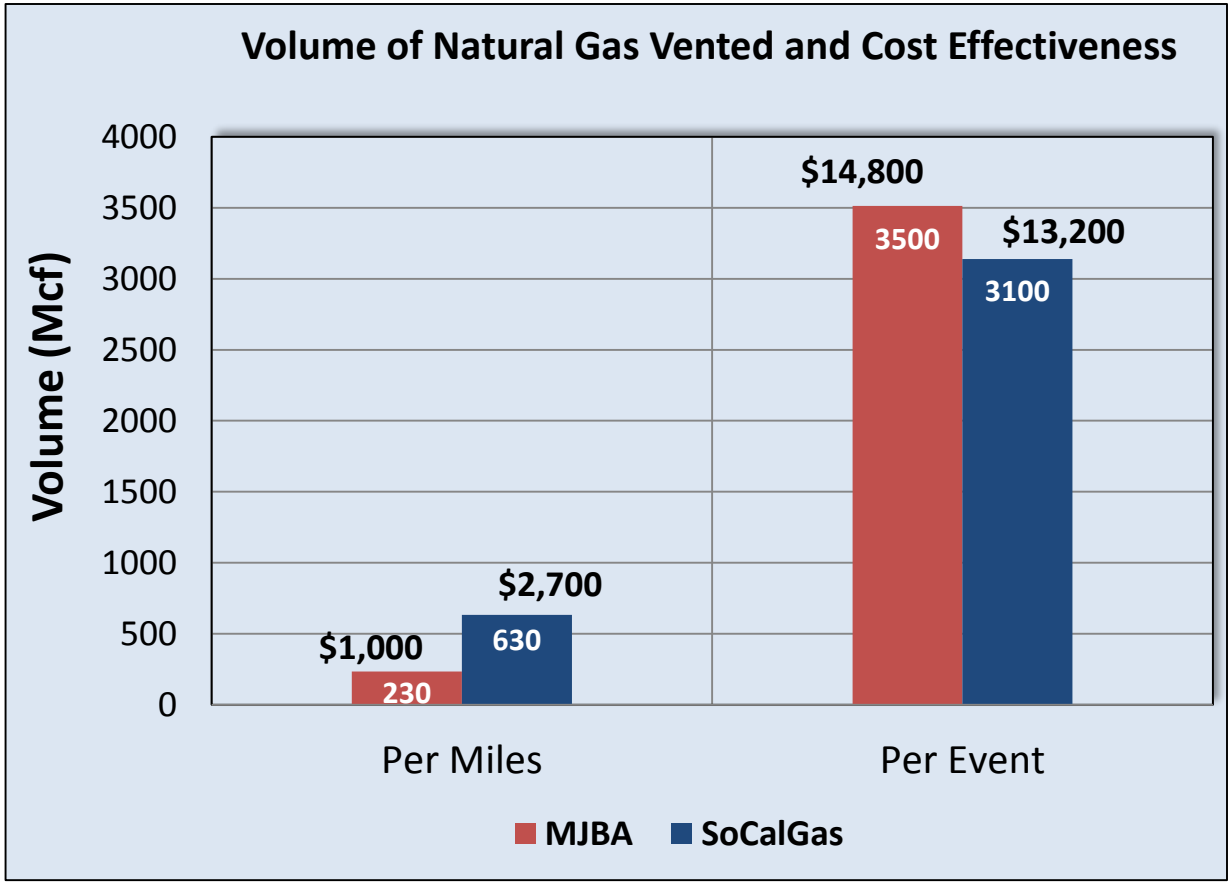
Blowdown Scenario Comparison

SoCalGas/SDG&E comparison against MJB&A report(*Pipeline Blowdown Emissions & Mitigation Options)*

Blowdown Scenarios			
	MJB&A (intrastate)	SoCalGas/SDG&E	unit
Average pipeline diameter	15.2	24.5	inches
Average pipeline pressure	400	412	psig
Blowdown Length	15	5	mi/event
Blowdown Volume	230	630	Mcf/mile
	3,500	3,100	Mcf/Event
Blowdown Methane Mass	5	13	MT/mi
	72	65	MT/event

Difference of our case compared to national averages starting and ending pressures, average length blowdown, average diameter of pipe, average $/MCF of methane saved(assume (95% methane).

Comparison-Cost Effectiveness ($/MCF methane reduced)



Difference of our case compared to national averages starting and ending pressures, average length blowdown, average diameter of pipe, average $/MCF of methane saved(assume (95% methane).

Case Study 1
Methane Capture System

Option	Pipeline Pressure		Blowdown Reduction	Reduction in CH4 Emitted	Gas Removal Rate	Duration of Mitigation Operation	Compressor Fuel use Natural Gas	CO2 Emissions
	Starting (psig)	Ending (psig)	%	Intrastate (MT/event)	(Mcf/hr)	Intrastate (hr/event)	Intrastate (Mcf/event)	Intrastate (MT/event)
Mobile Compressor (MJB&A)	400	80	80%	57.3	**500**	5.6	34	1.9
Methane Capture (SoCalGas/SDG&E)	370	38	90%	3.2	**31**	5	25	0.2

Methane Capture System using Compressed Natural Gas (CNG) tube trailer (reintroduce into pipeline)

- **2.5-miles of a 10-inch pipe in urban area**
  - **155-Mcf mitigated**
    - **130-Mcf stored in CNG tube trailer**
    - **25-Mcf used to power generator for compression**
  - **23-Mcf vented**

Case Study 2
Compress gas into parallel pipeline

Option	Pipeline Pressure		Blowdown Reduction	Reduction in CH4 Emitted	Gas Removal Rate	Duration of Mitigation Operation	Compressor Fuel use Natural Gas	CO2 Emissions
	Starting (psig)	Ending (psig)	%	Intrastate (MT/event)	(Mcf/hr)	Intrastate (hr/event)	Intrastate (Mcf/event)	Intrastate (MT/event)
Mobile Compressor (MJB&A)	400	80	80%	57.3	500	5.6	34	1.9
Mobile Compressor (SoCalGas/SDG&E)	357	61	83%	408.5	212	93		

Pressure Reduction with Mobile Compressors

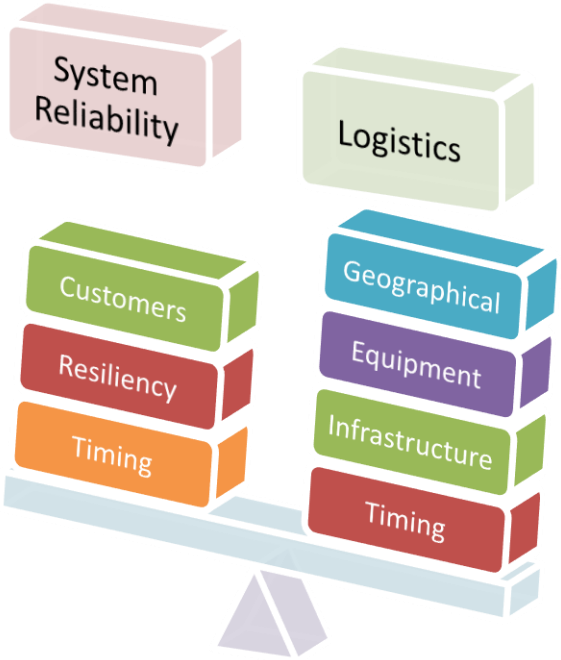
- 40-miles of 30-inch pipe in remote area
- 25,000-Mcf gas mitigated
  - (2) 300-hp portable compressors to compress gas into parallel pipeline.
- 5,000-Mcf gas vented to atmosphere

Case Study 3
Transfer to Lower Pressure System

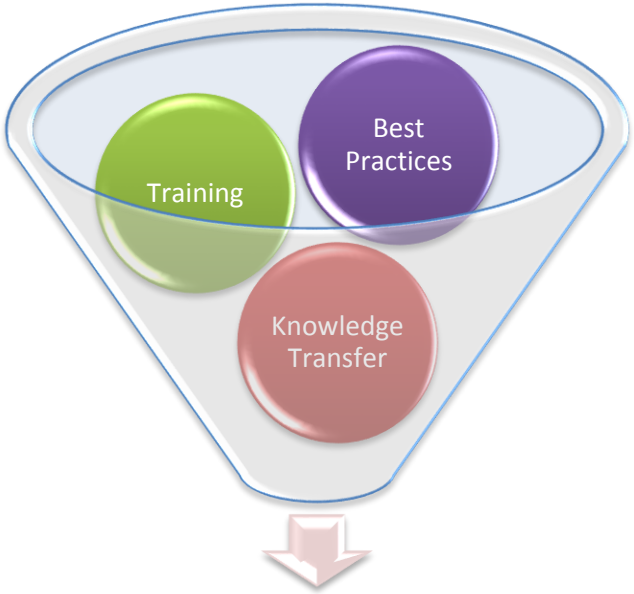
Option	Pipeline Pressure		Blowdown Reduction	Reduction in CH4 Emitted	Gas Removal Rate	Duration of Mitigation Operation	Compressor Fuel use Natural Gas	CO2 Emissions
	Starting (psig)	Ending (psig)	%	Intrastate (MT/event)	(Mcf/hr)	Intrastate (hr/event)	Intrastate (Mcf/event)	Intrastate (MT/event)
Mobile Compressor (MJB&A)	400	80	80%	57.3	**500**	5.6	34	1.9
Inject to Low Pressure System (SoCalGas/SDG&E)	400	45	89%	107.5	**13.4**	8	N/A	N/A

- **Utilize city gate or distribution station to reduce volume.**
  - **8-miles of 30-inch pipe**
  - **5,200 Mcf mitigated**
    - **Used medium pressure system to draw down**
  - **800 Mcf vented to atmosphere**

Summary



Key Constraints



Success Factors