Gas Distribution Industry Use of Data

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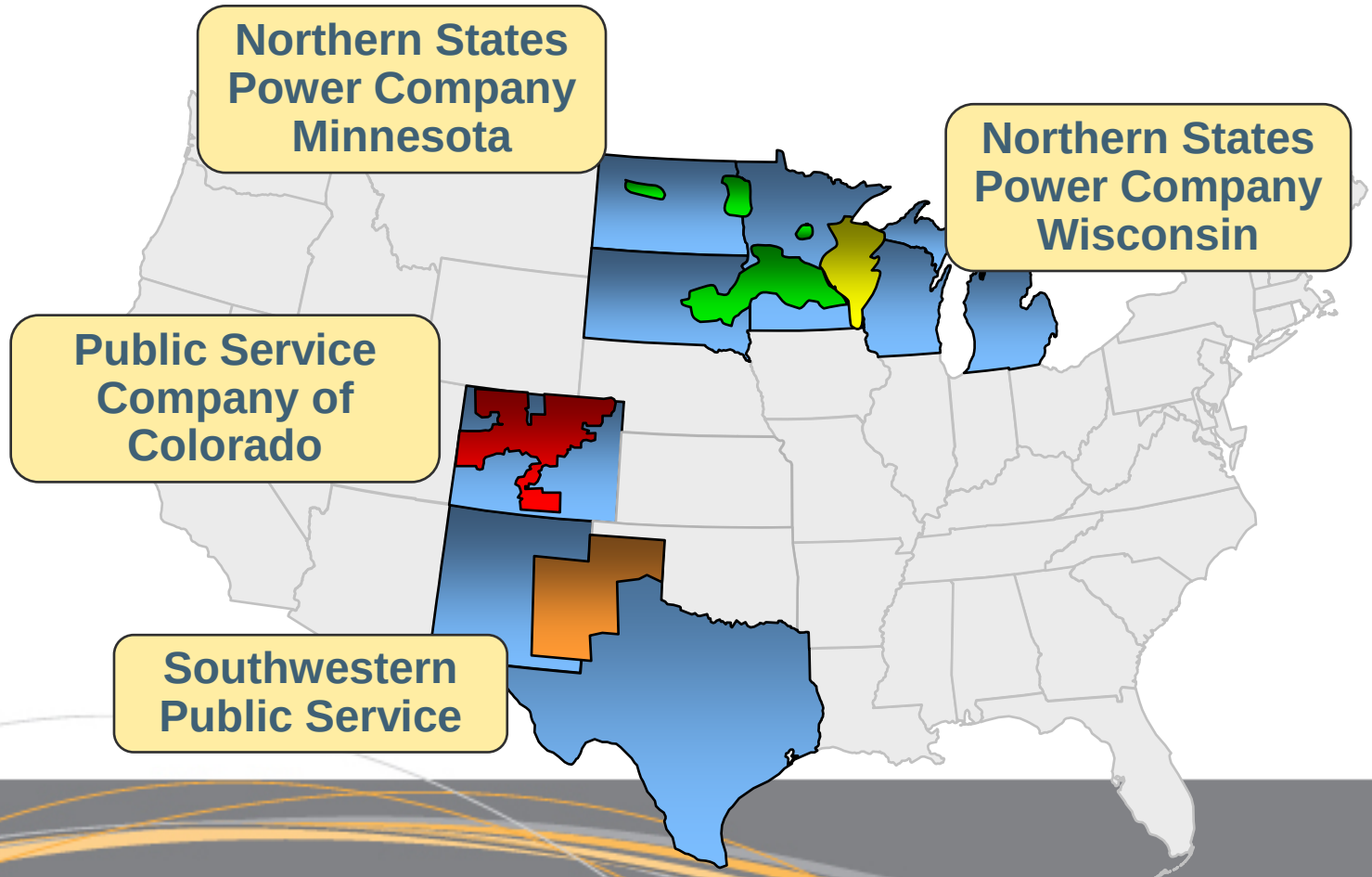
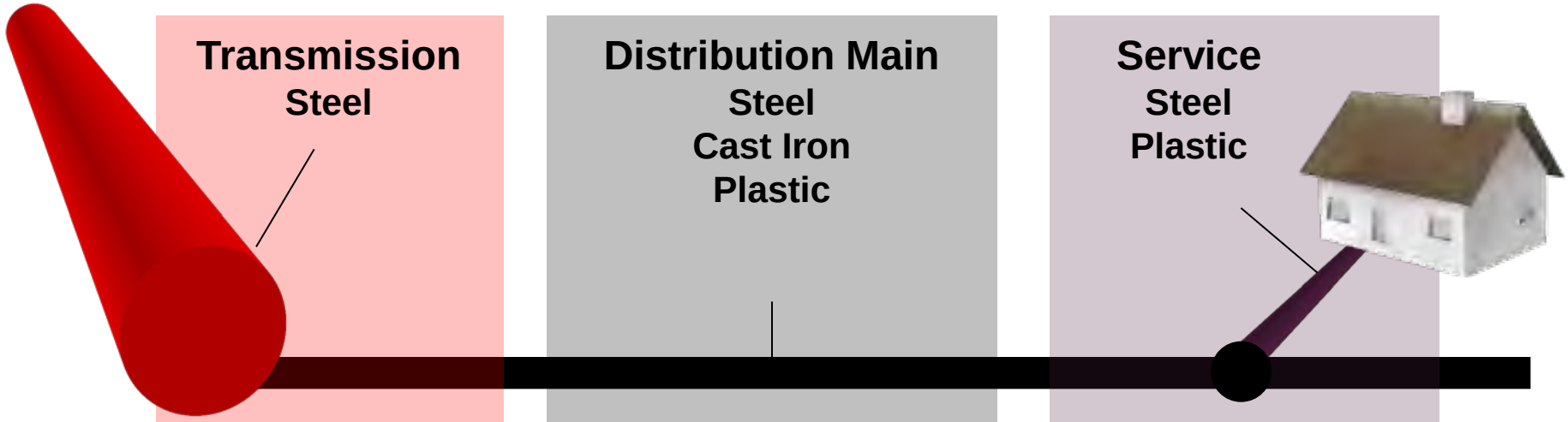
Objectives

- Industry Safety
- Data collection, use & reporting
  - Federal (PHMSA)
  - State
  - Internal
- Methods for collecting & analyzing data
- Data quality challenges & improvements

Service Territory



Gas System Infrastructure

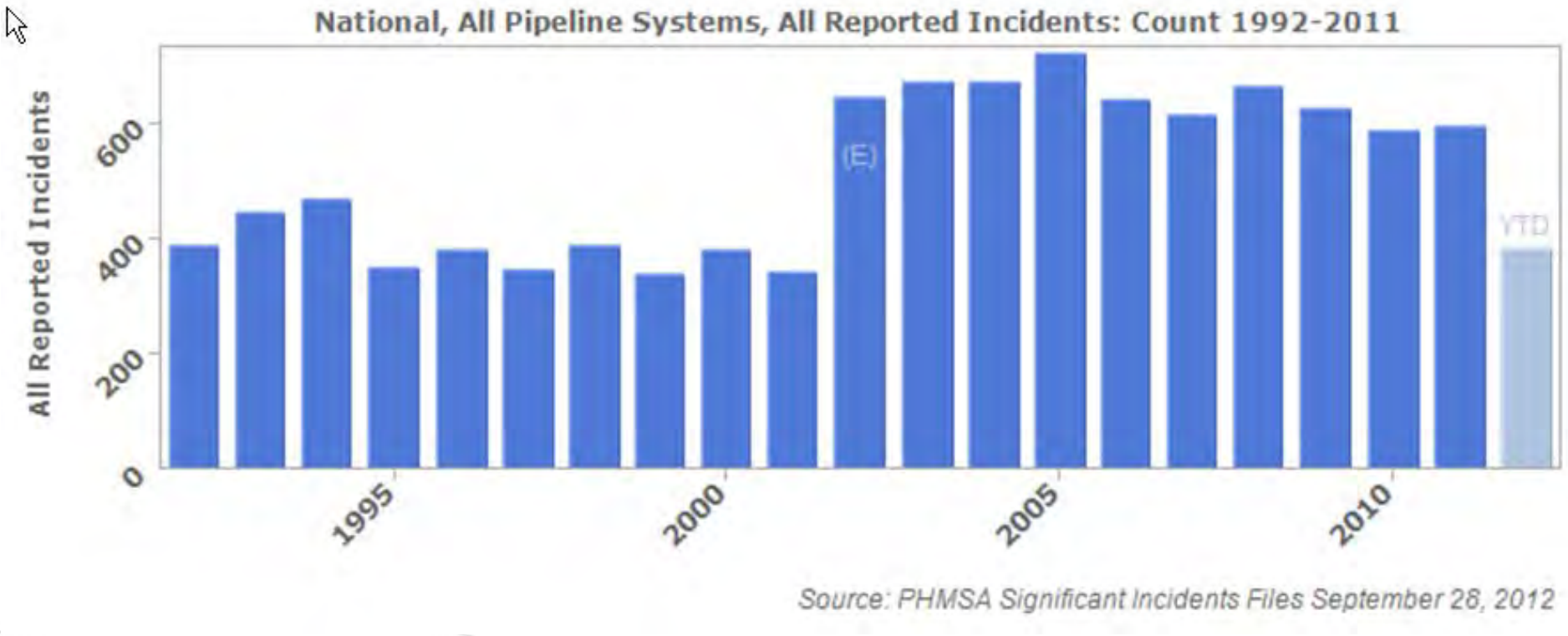


	Transmission Steel	Distribution Main Steel Cast Iron Plastic	Service Steel Plastic
PSCo	2,386 Miles	21,408 Miles	1,073,000 Services
NSPM	105 Miles	9,517 Miles	446,190 Services
NSPW	3 Miles	2,201 Miles	96,960 Services
SPS	4 Miles	-	-
TOTAL	2,598 Miles	33,126 Miles	1,615,910 Services

Natural Gas Distribution Industry Safety Record

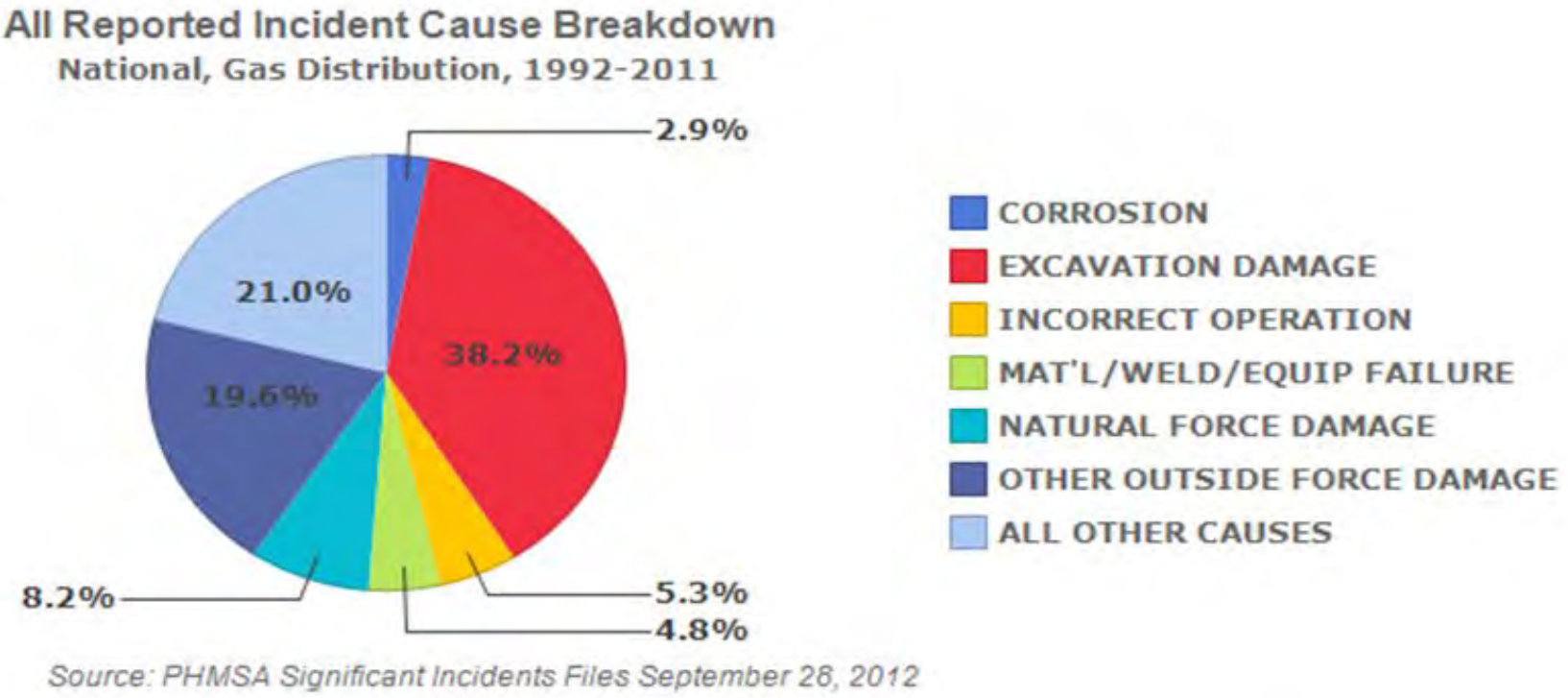
- 2.4 million miles distribution, transmission pipeline
- 71 million customers
- Pipeline miles and throughput increasing
- Incidents flat or declining last 10 years
- Excavation damages continues to be largest contributor

Data Collection
PHMSA – Incident Data



Source: PHMSA Significant Incidents Files September 28, 2012

Data Collection
PHMSA – Significant Incident Data



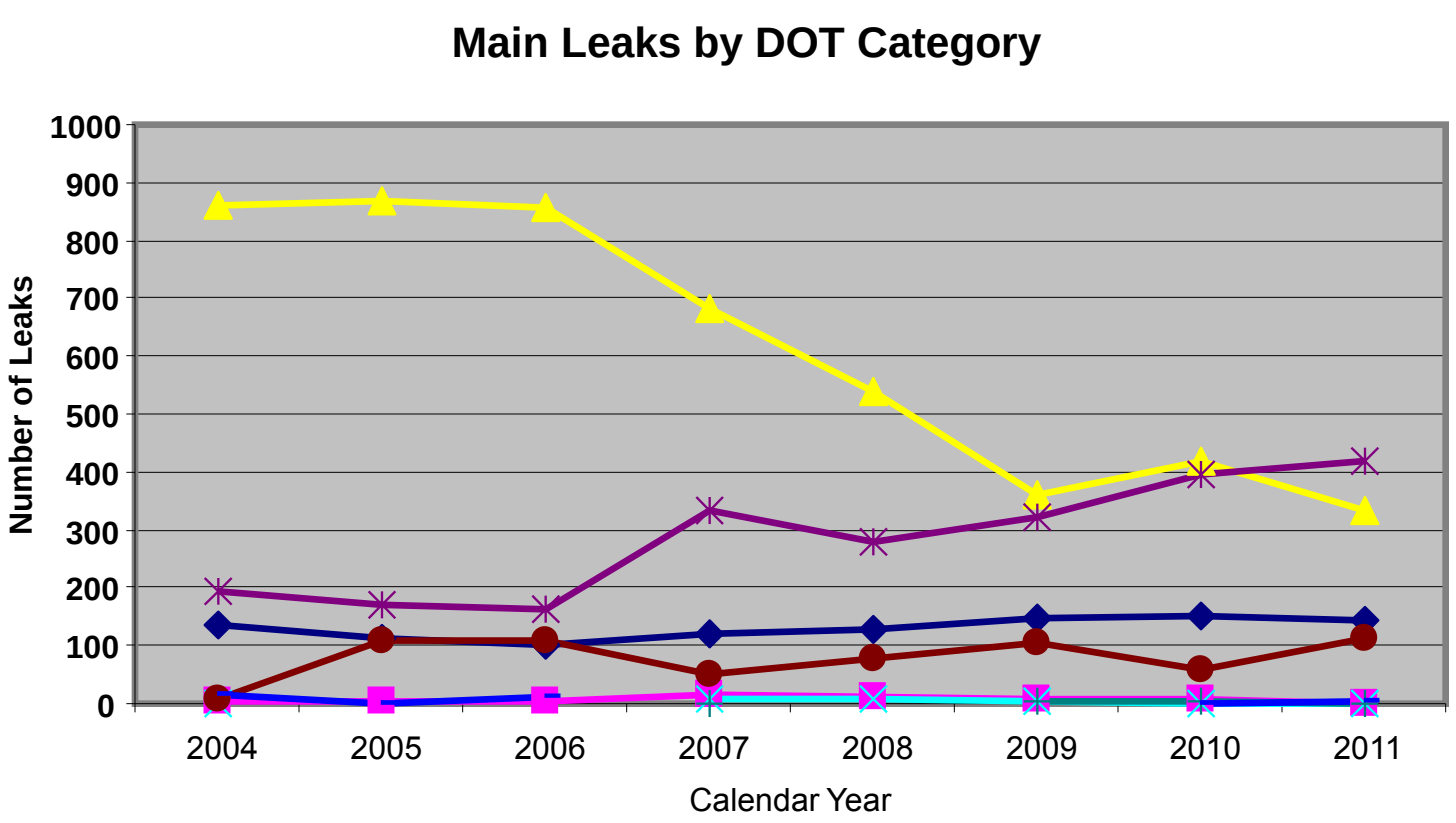
PHMSA Data Use
APGA SIF SHRIMP Risk Ranking Model

Reported Cause of Incidents & Failures 2005-2007	# of Incidents	# of Failures	Incidents/ 1000 Failures	Normalized to Corrosion
Corrosion	6	293,933	0.02	1
Excavation Damage	73	338,666	0.22	11
Incorrect Operations	8	30,145	0.27	13
Material Failure	8	147,384	0.05	3
Equipment Failure	6	140,442	0.04	2
Natural Force Damage	22	77,229	0.28	14
Other Outside Force Damage	39	37426	1.04	51
All Other Causes	N/A	N/A	N/A	

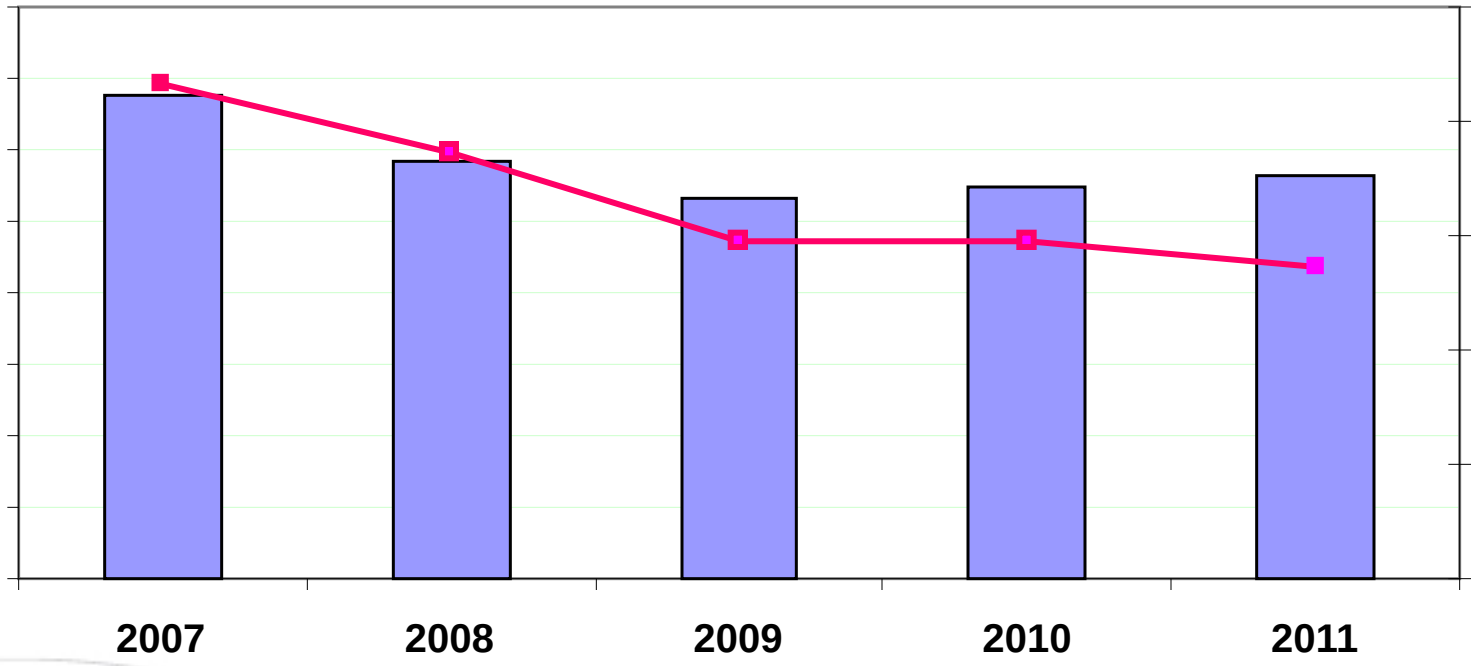
Data Reporting
PHMSA - Annual Report

- # excavation damages
- # excavation notification tickets received from one-call centers
- # hazardous leaks eliminated or repaired, categorized by material
- # hazardous leaks eliminated or repaired, categorized by cause
- # total leaks eliminated or repaired, categorized by cause

PHMSA Data Reporting
Leaks Eliminated/Repaired



Federal Data Reporting Excavation Risk



Distribution Integrity Management Program (DIMP) Reduce Excavation Risk

Primary Threat Category	Threat Subcategory	Measure to Reduce Risk	Performance Measure
Excavation Damage	Third Party Damage	Frequent Offender Program	Damages per 1000 locates
811 Know what's below. Call before you dig.		On-Time Ticket Performance	100% On-Time
		Directional Boring Training	Completion on Annual Basis
		Sewer Lateral Inspections	# of Inspections/Clears
		Sewer Policy/Contracts	Meet Implementation Date
		Public Outreach	# of Customer Mailings
Excavation Damage	First/Second Party Damage	Company Crew Training	Completion on Annual Basis

DIMP Plan
Reduce Corrosion Risk

Primary Threat Category	Threat Subcategory	Measure to Reduce Risk	Performance Measure
Corrosion	External	Pipe Replacement	# Miles Replaced
		Leak Survey	# Maps Surveyed
		Reduce System Down Time	# of Days System Down
		Troubleshooting	# of Days to Mitigate
		Additional Test Leads	# of Test Leads Installed
		Close Interval Survey	# of Surveys Performed
	Atmospheric	Additional Inspections	# of Inspections Performed

DIMP Plan
Additional Tracking Measures

- Cast iron replaced and remaining
- Bare steel replaced
- Older polymer plastic replaced
- Risk reduced by replacements
- Backlog of pending leaks (grade 2 and 3)
- Damages by cause and sector
- “How found” leaks

State Data Reporting
Additional Reports

- Leaks per mile by pipe type and by division
- Cast iron report
- Damage prevention metrics
- Emergency Response metrics
- Quality of Service Plan: Gas leak permanent repair times

Internal Data Reporting Public Safety Index

Priority	KPI
Employee Safety	OSHA Recordable Incident Rate
Public Safety	Damages per 1000 locates
	E-1 Response Time
	Transmission Gas Assessments
Reliability	Unplanned Outages
Compliance	Multiple (Compliance audits, emergency drills)
Meet Earnings Target	$ O&M (M)
	$ Capital (M)

Internal Methods for Collecting Data Current & Future

- Paper forms
- Mobile devices
- Subject matter expert input
- Integrated systems
- Risk model

Internal Data Collection Risk Model

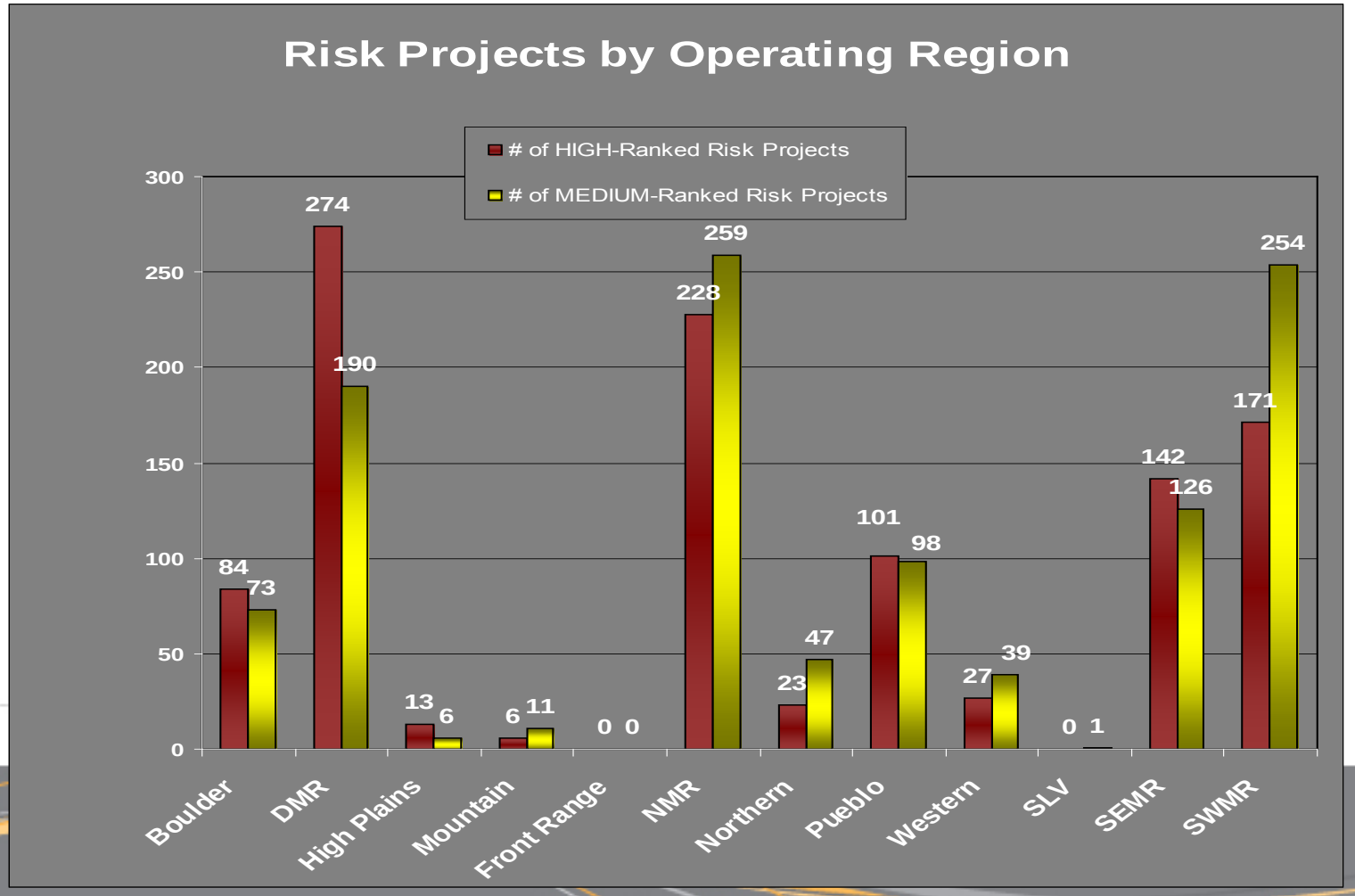
Risk Profile Factors

- Gas Volume Migration
- Cover Type & Depth
- Service Length
- Building use (e.g. hospital)
- Population Density
- Nearby Conduit
- Third Party Construction

Risk Failure Factors

- Leak History
- Material (type, size, pressure, year installed)
- Corrosion Extent
- Coating Type & Condition
- Joint Type
- Soil Type & Condition
- CP Faults
- Locate Requests

Internal Use of Data Risk Analysis



Internal Use of Data
Resource Planning

SERVICE_CENTER: 64-PUEBLO

CP Sections: X

Y	318	313	312	311	310	309	308	307	306	305	304	303	302	301	300	299	298	297	296	295	294	293	292	291	290	289	288	287	286	285	284	277	275	273	271	267	265	Grand Total
256	16											6																										22
254	1																																					1
253									6	1																												7
252								10	7	1	4		3		1																							26
251								3	13	3	7	3	9	3																								41
250							1	9	27	26	21	3	13	25	12																							137
249						1	2	8	2	31	43	1	9	13	11																							121
248							6	11	17	21	40	3	11	27	12	1	1						1	1				3					2					157
247							5	6	3	34	48	18	61	22	32	12	5	1				1	1	3	1		1											254
246					4	1	1	20	17	12	23	25	49	25	21	5	3	4			1	1	2	3	1			1				1	1					221
245				9	9	1	18	14	38	23	16	5	7	2								1	1															144
244		1	2	6	10	5	18	22	41	32	22	4					2	1			1			2			1									3	4	177
243				3	15	19	12	14	29	34	26	13	2	3					1	49		3				3	2	1	2	1	2							234
242					13	8	11	18	34	38	3		3	3				3		1	1					2	2					3	4	1	1			149
241				2		5	11	18	7	27	6						2	1	5	2		1	2				1		1	1	2							94
240				13	18	15	15	5	7	42	5						2	1	1												1							125
239				2	8	20	9		2	4																												45
238																			1	1																		2
Grand Total	17	1	2	35	77	75	109	158	250	329	264	81	167	123	89	18	15	11	8	53	3	7	7	9	2	5	7	5	3	2	5	4	7	1	1	3	4	1,957

Data Quality Challenges

- Legacy systems
- Evaluating technology
- Data integration
- Resources & expertise
- Investment
- Culture change
- Inconsistency in definitions

Challenges
Inconsistency in Definitions

- **Annual Report Instructions: “EXCAVATION DAMAGE: leak resulting from damage caused by earth moving or other equipment, tools or vehicles.”**
- **Incident Report Instructions: “OTHER OUTSIDE FORCE -- Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation. An example would be damage to a meter set caused by vehicle impact.“**

(Provided by APGA SIF)

Data Quality Improvements

- Consistent definitions and guidance
- QA/QC
- Technology
- Internal audits
- Continuous improvement
- Business processes
- Leading vs. lagging indicators

Summary

- Multiple Levels of Data Collection & Use
- Continuous Improvement
  - Data caution
  - Trust but verify
  - “Intellectual” data
  - Pursue technology
- Evolution of Risk
- Safety of the Industry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