

Managing Challenges with Pipeline Seam Welds



Event Summary Report

The Westin Arlington Gateway

Arlington, VA

July 20, 2011

Event Foreword:

Recent pipeline incidents involving seam weld anomalies are driving a stronger focus on better managing these challenges. U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) and the National Association of Pipeline Safety Representatives (NAPSR) held this important event after a careful and thorough review of inspection reporting and incident findings. In addition, this event is another measure in PHMSA's efforts to address the Secretary of Transportation's "Call to Action to Address Pipeline Infrastructure Risks, Drive for More Aggressive Safety Efforts and to Be More Transparent when executing these Safety Measures."

This event was designed to provide an open forum for exchanging information on the challenges associated with pipeline seam welds. Specifically the forum facilitated individual, panel and working group discussions for the following objectives:

- Further determining "What is the nature and extent of the issue?" from industry and government data.
- Presenting perspectives on how anomalies in seam welds are identified and managed employing risk assessments, technology and standards or best practices.
- Presenting the scope of a recently awarded PHMSA research study on Seam Welds.
- Providing specifically designed working groups to further craft the scope for this PHMSA research study and other related topics.

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Executive Summary

PHMSA and NAPSRS were very pleased with the event turnout. More than 250 representatives from U.S. and Canadian Federal pipeline safety regulatory agencies and State/Provincial agencies, standards developing organizations, technology vendors, service providers, pipeline operators and trade organizations, steel pipeline manufacturers, independent contractors and the general public attended and participated at this event. There were several stated objectives for this event but the overarching goal of documenting the challenges with pipeline seam welds and the constraints with managing and mitigating them was achieved.

The agenda was diverse in perspective and comprised of two panels, individual presentations, and three working groups focused on improving the understanding of seam weld challenges and providing input for expanding the scope of an active research project to better address these challenges.

Seam weld challenges clearly remain to be fully addressed, but stakeholders have taken major steps in managing these threats over the past several decades. Hydrotesting was the preferred method to find threats in seam welds for most operators, but recent improvements with in-line inspection technology were noted as well. Actions taken by regulators and standards developing organizations have also kept a focus on mitigating threats associated with seam weld defects.

It was recognized that efforts to address mitigating threats associated with Low Frequency Electric Resistance Welded (LFERW) pipe have been viewed as largely successful. However it was also noted that there is a need to now refocus efforts on other threats in seam welds that are generally recognized to be more difficult to detect and manage. To be successful, it will take targeted policy, investments in research to improve technology, and additional training by the greater pipeline safety stakeholder community.

The event also introduced a new focus on the consequence of failure from seam threats, instead of focusing primarily on event frequency, especially on how these considerations impact risk assessments. The perspective coming from national incident data shows that seam weld failures occur infrequently but have resulted in several high consequence events. Risk assessments need to evaluate event frequency and consequence in a balanced way, in order to assure that resources are applied, and appropriate preventive and mitigative actions are taken, to prevent future serious incidents.

Finally, the panel presentations and three working groups provided data and recommendations for an ongoing research project sponsored by PHMSA. The data and recommendations described later in this report will be under consideration by PHMSA for adjusting the scope of ongoing research, setting future regulatory policy, and development of actions plans in cooperation with the pipeline industry and standards developing organizations.

Introduction

The event was well attended by a diverse group of stakeholders representing a good balance of technical perspectives. Over 250 persons attended the Managing Challenges with Pipeline Seam Weld event held on Wednesday, July 20, 2011 at the Westin Arlington Gateway Hotel in Arlington, VA.

The agenda was designed to provide a balanced set of perspectives from regulators, independent experts, steel pipe manufacturers, and the pipeline industry. The event achieved this goal. This report summarizes the challenges with pipeline seam weld threats and the constraints with managing and mitigating those threats. Policy was not crafted at this event. Input from attendees was provided to better substantiate future policy.

After the panel discussions, the focus turned to the recently awarded research project funded by PHMSA. Brian Leis from Battelle Memorial Institute was introduced as the recipient of the research award in partnership with DNV and Kiefner and Associates. This important project can play a role in addressing additional seam weld challenges.

Kinder Morgan presented a promising approach for refining the analysis of ILI tool data to more reliably find cracks in pipeline seams. It has taken several years of a continual improvement process for KM to develop the current level of confidence with its assessment protocol (referred to as KMAP). It was noted that KMAP is a data intensive process that places a strong emphasis on “knowing your system” and analyzing tool variances over time. Kinder Morgan also offered to share their experience and perspectives with using KMAP.

The event concluded with three different working group sessions. Each working group was charged with discussing a specific aspect of the seam weld issue and providing input and recommendations to improve understanding of, and management of, seam weld threats.

Working Group #1/ Identifying Gaps in Risk Assessments

- How do gaps in data impact risks with seam weld challenges?
- How do you know you do not have remaining threats from seam welds?
- Are there recommended practices that are relevant here or needed?

Working Group #2/ Identifying Gaps in Technology

- What technologies are available for detecting and characterizing seam weld threats?
- What is the effectiveness and the limitations of current in-line inspection crack tools with respect to finding and characterizing ERW seam anomalies?
- What suggested improvements can be made to the in-line inspection guidance tables in API 1160, NACE 0102, and ASME B31.8S?

Working Group #3/ Identifying Gaps with Assessment Methods

- How do you know which assessment method is the correct one to use?
- What are the pro/cons for available assessment methods?

- How can hydrostatic testing procedures (including "spike" tests) in API1110 or in 49 CFR192 and 49 CFR195 be improved to eliminate potentially growing small flaws before they grow large enough to fail in service?
- How can improved modeling approaches better predict failure pressures when using ASME B31G, API 579, and NG-18 for mitigating selective seam corrosion pressure-cycle-induced fatigue?

Please refer to the Appendix A for a summary of each working group.

All presentations are posted on the following website as a future reference for interested stakeholders.

<http://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=71>

Ongoing Related Research

In May 2011, PHMSA awarded a targeted research project addressing specifically the challenges with LFERW pipe. An excellent team was assembled with high confidence that the scope can be expanded upon to include additional seam weld challenges. Input directly coming from this event will be considered by PHMSA for entertaining the modification of the current project scope.

The below information summarizes the current project focus.

Project Title: Comprehensive Study to Understand Longitudinal ERW Seam Failures

Main Objective: Three primary objectives –

1. Integrate industry and PHMSA data to quantify vintage seam failure statistics with focus on LFERW seams
2. Understand longitudinal ERW seam failures and on that basis quantify the effectiveness of inspection and hydrotesting to manage integrity and ensure safety to avoid/eliminate catastrophic failures
3. Combine outcomes of the first two objectives to help favorably close National Transportation Safety Board (NTSB) Recommendation P-09-1

More project related information is available at the below URL.

<http://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=390>

APPENDIX A

Working Group Summaries

WG #1/Identifying Gaps in Risk Assessments

Recommendations:

- There would be benefit in establishing a better and more comprehensive system for sharing lessons learned from incidents, failure analyses, etc. Current approaches for information sharing, to the extent that they occur, do not always address the level of technical detail needed to be effective.
- More technical agreement and consistency is needed to establish appropriate thresholds or trigger points where previously presumed stable threats (such as seam defects) should be treated as unstable.
- More technical guidance is needed for conducting meaningful risk assessments that have practical application.

Summary of WG:

Terry Boss (INGAA) led a working group of approximately 125 persons in an open discussion/brainstorming session.

WG #2/Identifying Gaps in Technology

Recommendations:

What technologies are available for detecting and characterizing seam weld threats?

- There is a need to develop a matrix of weld inspection technologies showing the types and sizes of imperfections that can be reliably detected with each type of technology for each types of seam weld.
- API 5T1 (currently under revision) should consider new R&D to support the revisions. The revision should also update the definitions of flaws and anomalies.
- A comprehensive specification is needed (possibly multiple specifications) to help operators know the kind and size of anomalies to look for.
- A multi-industry working group could be formed to study cracking related issues and share lessons learned across industries. The group could help untap all historical data, across various industries, which are pertinent to this problem.

- The in-line inspection guidance tables in API 1160, NACE 0102, and ASME B31.8S could be updated and improved. This could also address the differences between old construction and new construction with respect to integrity assessments and responses to assessment anomalies or indications.
- R&D needs to address in-line inspection to improve reliability of detection and sizing accuracy.
- New assessment techniques/methods such as air-coupled ultrasonics should be more fully developed and addressed in standards.
- Key ILI tool performance indicators should be studied to better understand the current limitations of tool performance (i.e., the 10-20% of defects not reliably or accurately detected).
- Specifications could be expanded to include pipe mill construction/fabrication NDE measurements and address transportation/movement, including material tracking.
- A strategic action plan could help focus efforts and accomplish more with finite number of resources.

Summary of WG:

Mark Piazza (PRCI) led a working group of approximately 60 persons. Three speakers presented their perspective on the challenge of detecting seam flaws and limitations of existing integrity assessment technology. Presentations were followed by open forum discussion.

Speaker 1: John Beaver (DNV) addressed the challenges of detecting flaws/anomalies in seams.

Speaker 2: Bruce Nestleroth addressed the challenges of discerning if the seam is good, bad or deteriorating based on ILI signals.

Speaker 3: Richard McNealy addressed the difficulty of detecting seam weld flaws using ILI technology.

Speaker 4: Pat Veith (BP) addressed strategies for all stakeholders to work together and avoid duplicated efforts and wasted resources.

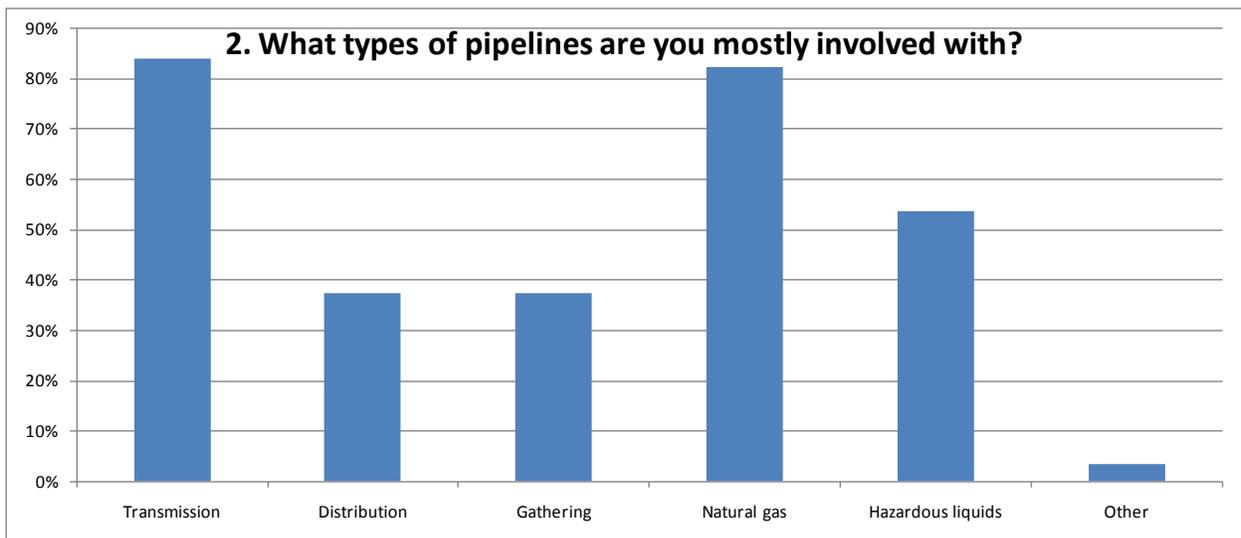
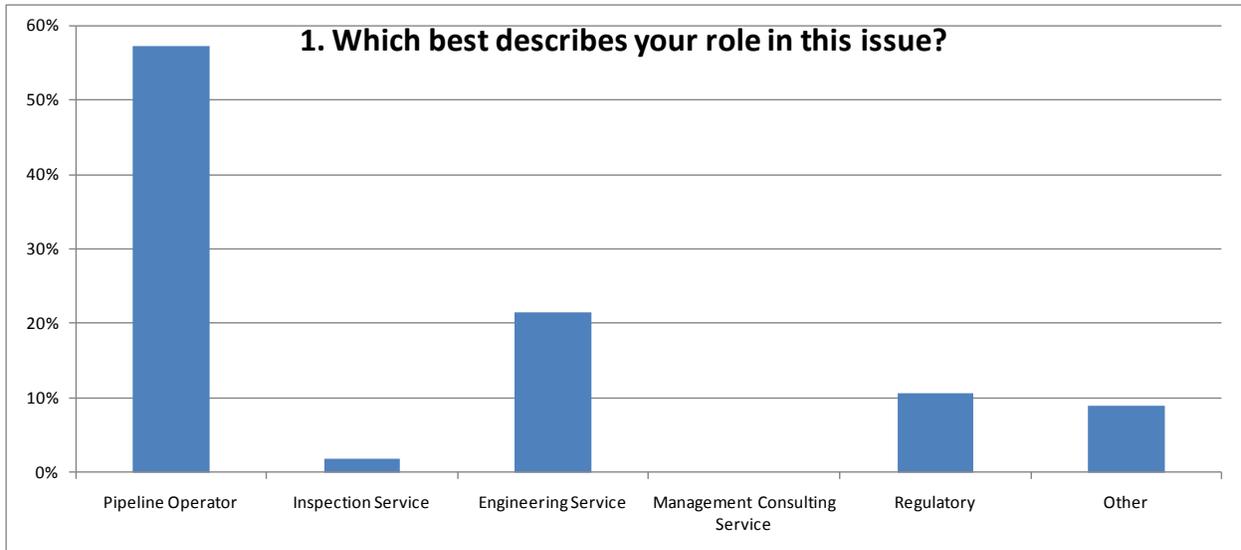
WG #3/Identifying Gaps with Assessment Methods

Recommendations:

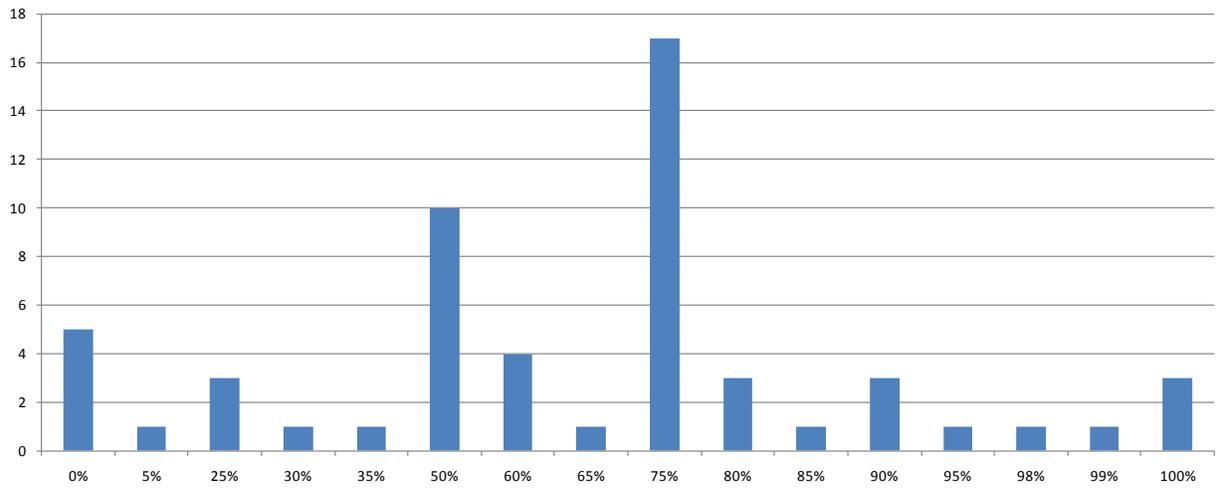
- No specific recommendations were provided by Working Group #3 (see summary discussion, below, for insights identified by the group)

Summary of WG:

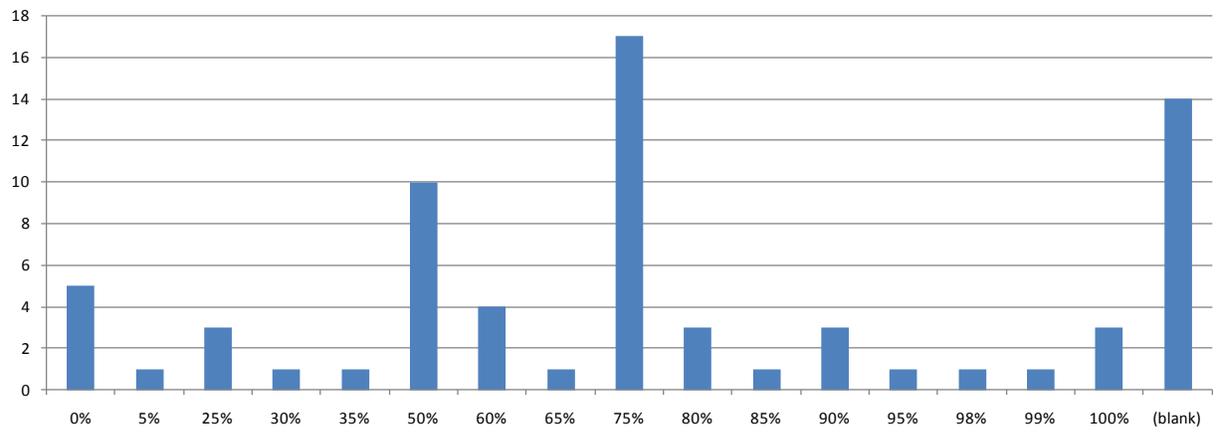
W. Kent Muhlbauer (WKM Consultancy) led a working group of approximately 60 persons representing various stakeholders. The session began with an audience survey. The results of this survey (see below) were compiled and charted during the panel presentations. These results were later presented to the audience and discussed.



3. Detection: How Confident Are You in Your Ability to Find All Injurious Defects?

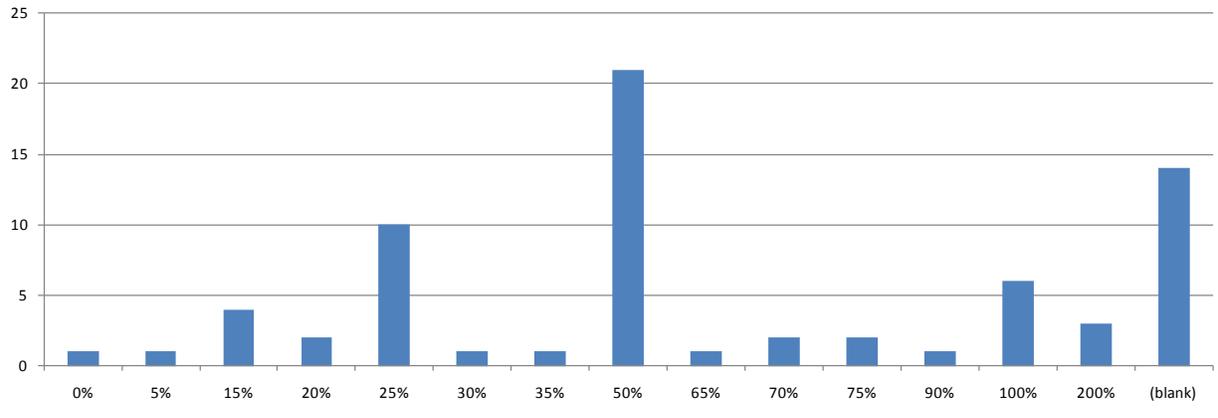


4. Detection: What Percentage of Defect Types of an Injurious Size can be Reliably Detected by the Most Robust ILI Technique?



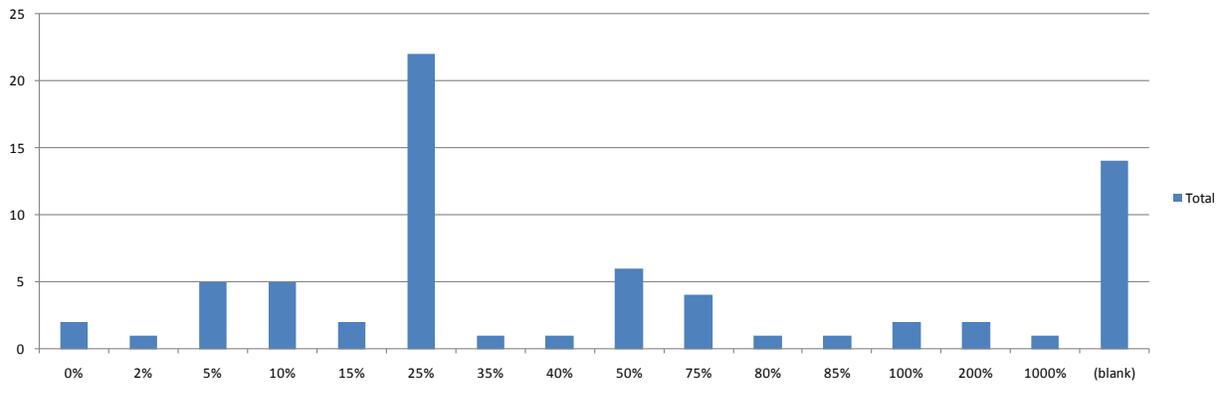
5. Characterizing: How confident are you in your ability to characterize (size) an identified defect?

a. ILI Measurement, plus or minus

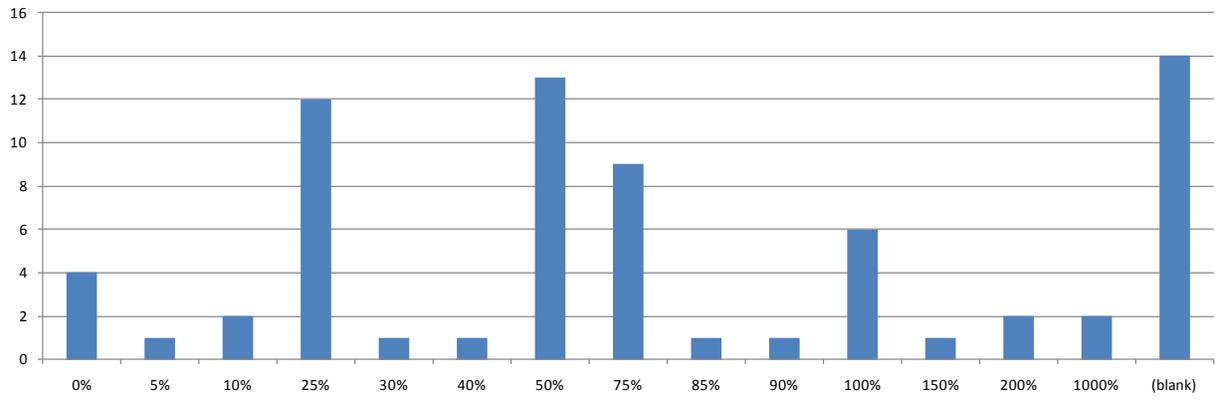


5. Characterizing: How confident are you in your ability to characterize (size) an identified defect?

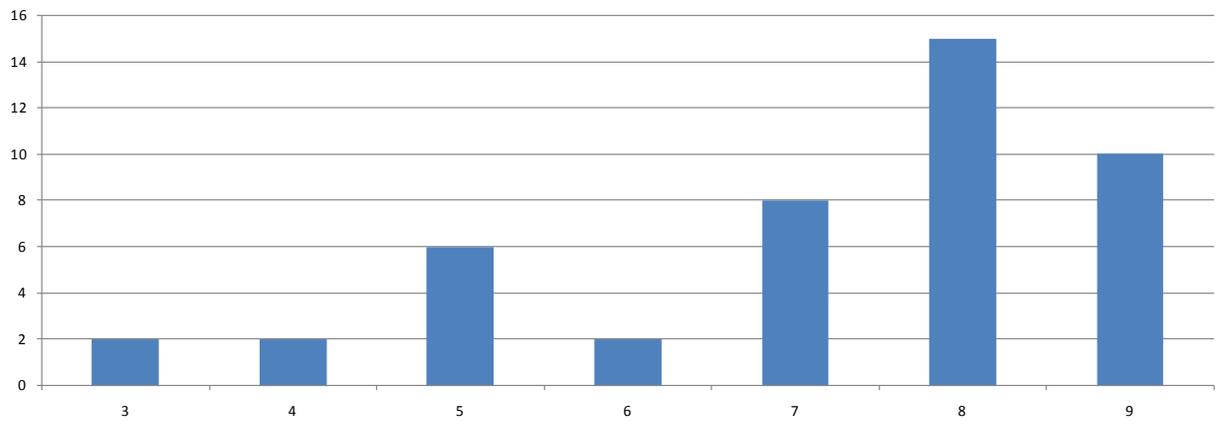
b. In-ditch Measurement, plus or minus



6. Forecasting: How confident are you in your ability to estimate the increase in failure potential, over time, for any identified and accurately-characterized (sized) defect?

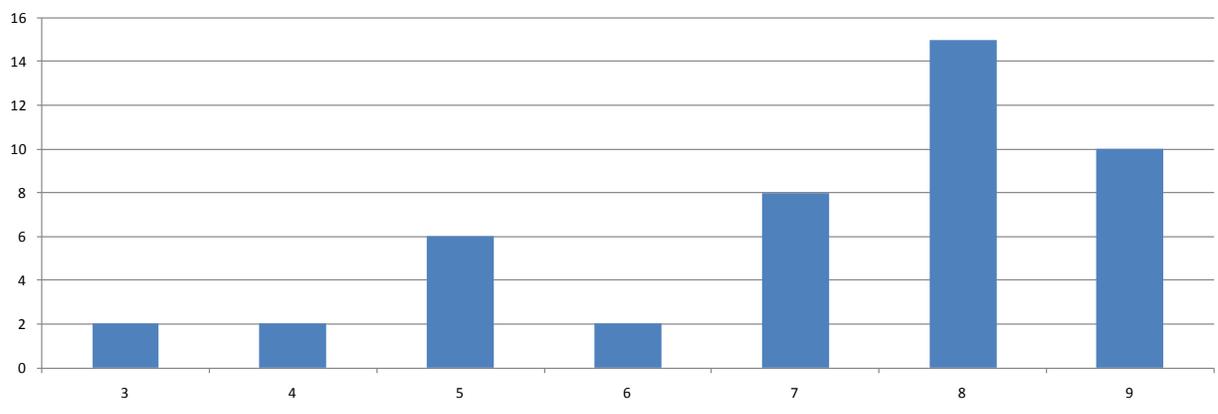


**7. Hydro-Testing: How much value is added to a pressure test by:
a. Increasing the test pressure**



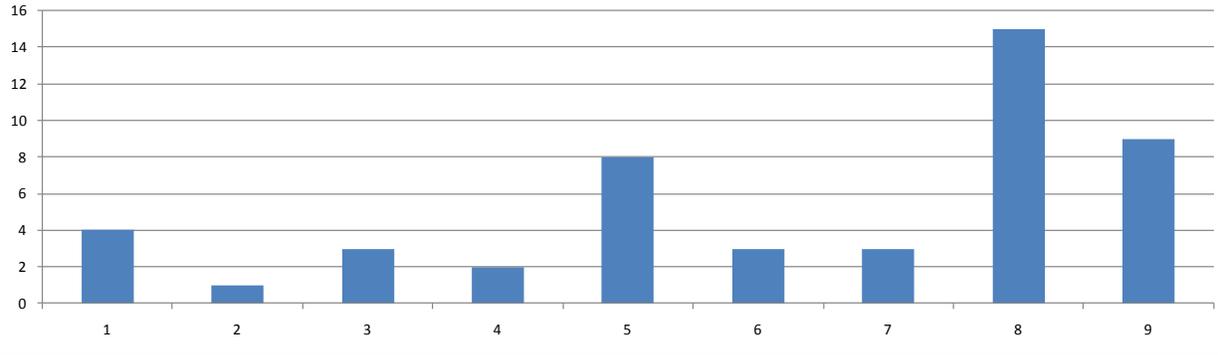
The given scale was from 1, meaning “none” or no value, to 9, meaning “substantial” value.

**7. Hydro-Testing: How much value is added to a pressure test by:
b. Increasing the hold time**



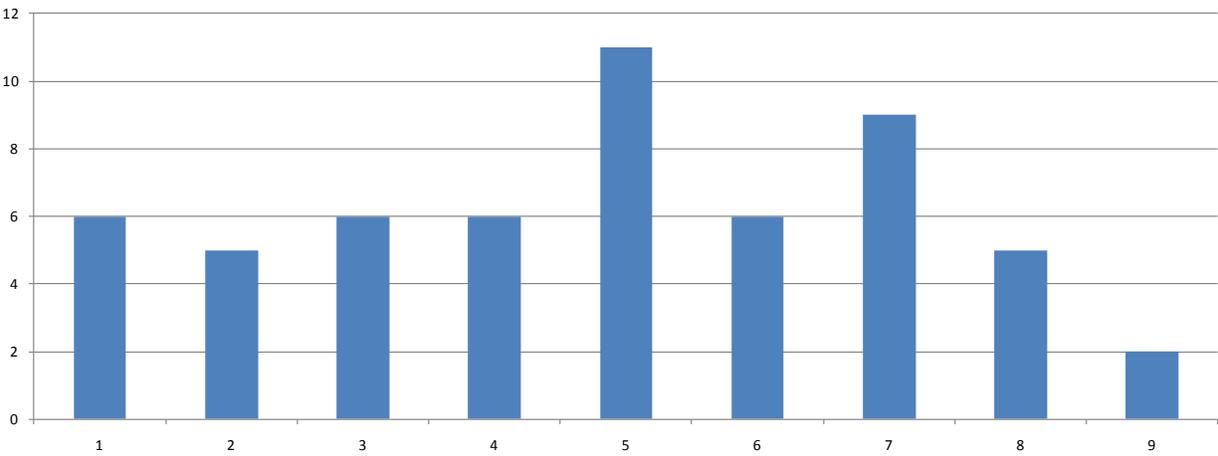
The given scale was from 1, meaning “none” or no value, to 9, meaning “substantial” value.

**7. Hydro-Testing: How much value is added to a pressure test by:
c. Incorporating a spike**



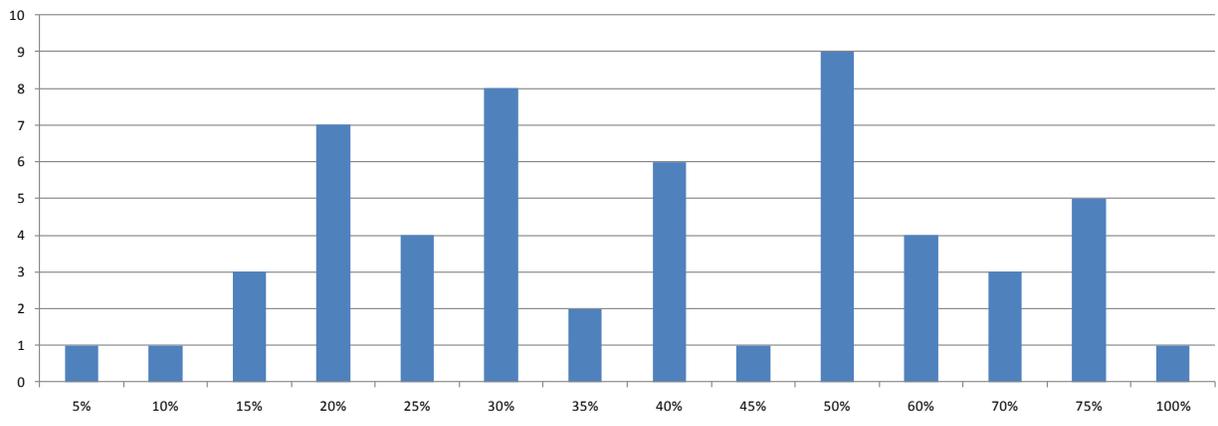
The given scale was from 1, meaning “none” or no value, to 9, meaning “substantial” value.

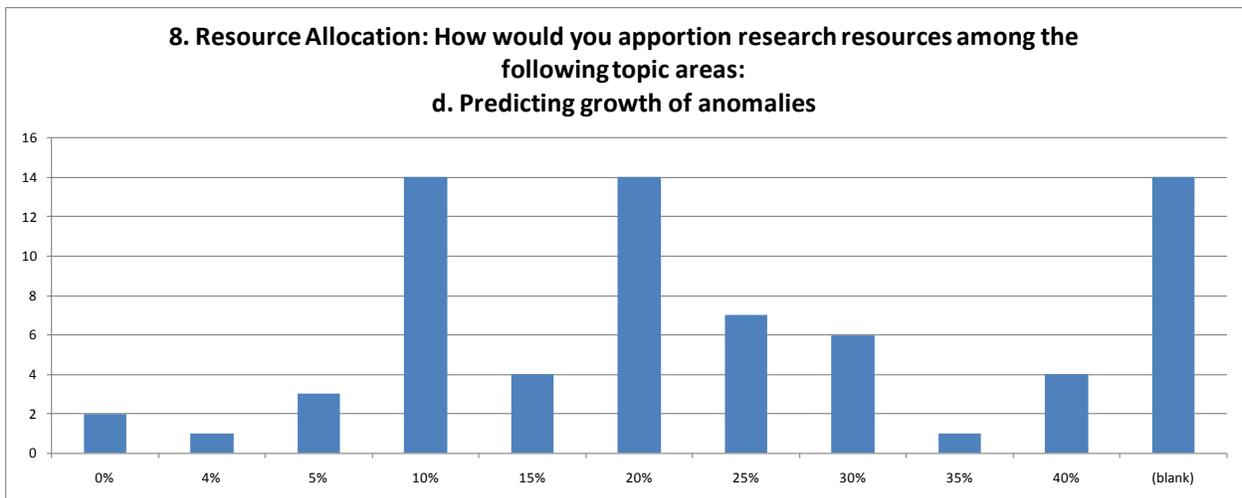
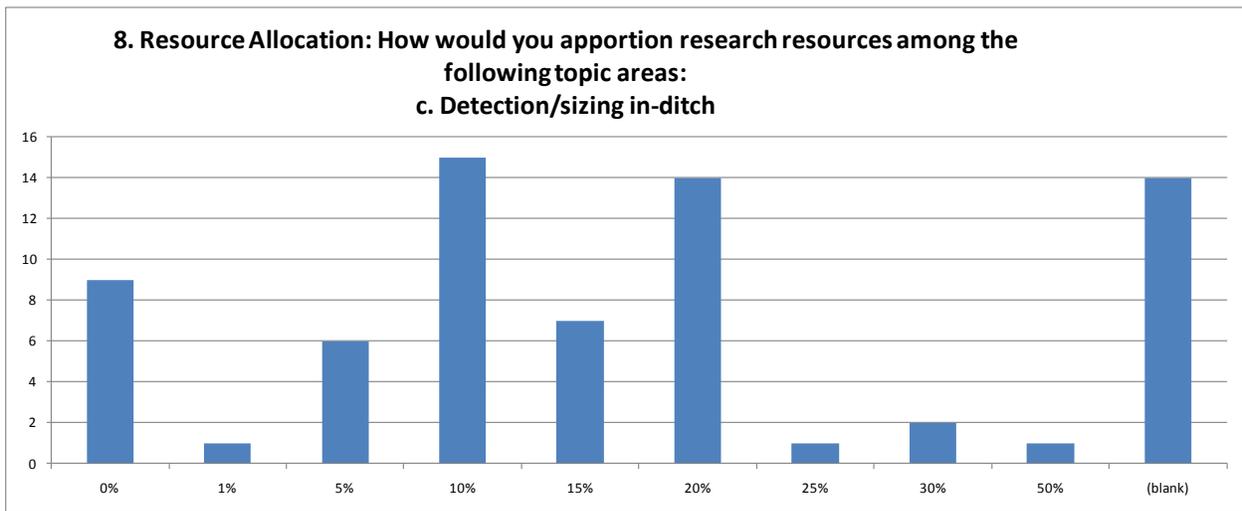
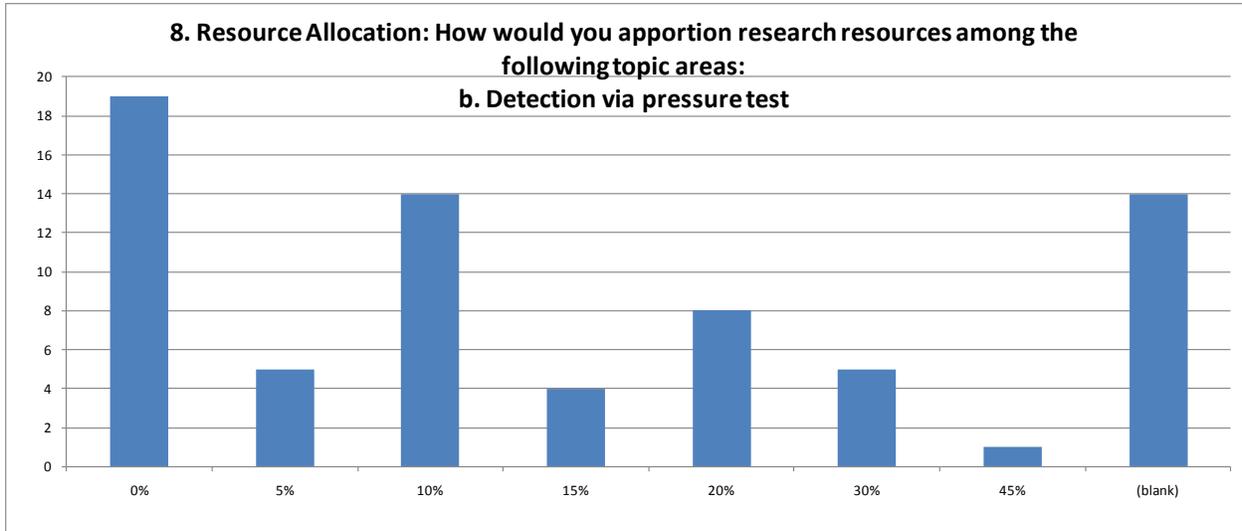
**7. Hydro-Testing: How much value is added to a pressure test by:
d. Controlling the rate of pressurization**

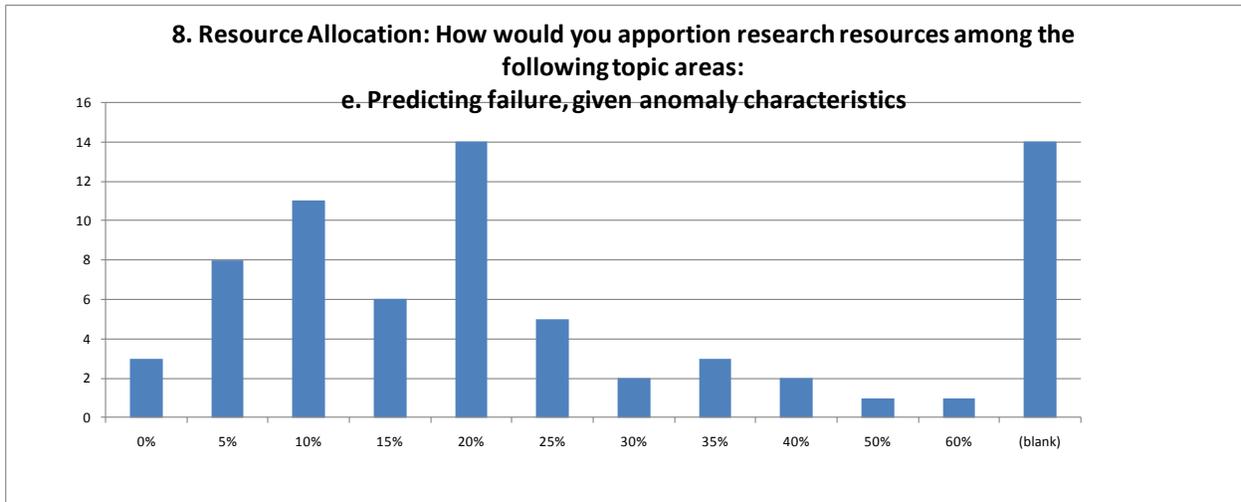


The given scale was from 1, meaning “none” or no value, to 9, meaning “substantial” value.

**8. Resource Allocation: How would you apportion research resources among the following topic areas:
a. Detection/sizing via ILI**







Five speakers gave presentations covering relevant topics and invited a brief period of questions and answers.

Speaker 1: David M. Wilson, ConocoPhillips Pipe Line Company

Speaker 2: W. Greg Morris, PE, Sr. Metallurgical Engineer, Kiefner & Associates, Inc.

Speaker 3: Dr. Weixing Chen, Department of Chemical and Materials Engineering University of Alberta

Speaker 4: Mark Stephens; C-FER Technologies

Speaker 5: Doug Chabino, Magellan

After brief discussion of audience survey results, a brainstorming session was initiated. In response to the question: "List decision criteria for determining assessment methodologies," over 50 decision criteria were listed on flip chart pages. Some audience members (respondents R1 through R12) volunteered to prioritize the 50+ criteria, based on their personal views. These were prioritized on a 1 to 5 scale with 1 being the highest priority. There was a great deal of overlap in criteria on the lists, but grouping and consolidation of criteria was not accomplished due to the time constraints. Therefore, the resulting prioritization also embodies some overlap. Nonetheless, some insight can be gleaned from the brainstorming results.

Decision Criteria For Determining Assessment Criteria & Ranking from Cards Received (1 through 5)												
Criteria	R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9	R 10	R 11	R 12
Threat Type	1	1			1	1	2		1			
PL Config	2					2						
Results Prev Assessment	3	5					1				5	
Schedule	4											
Flow Consideration	5		5			4						5

Criteria	R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9	R 10	R 11	R 12
Piggable		2	2		3					2		3
Can Line Be Taken Down		3			2		3					4
Desired Confid Level		4										
Cost		6					5			5		5
Avail Water / Ability To Dewater			2		4					3		
Consequences			3									
Pipe Geometry			4	5					5			3
Type Longseam				1				3				
Press Cycling				2							1	
Failure History				3				1				4
Age				4					2			
Scope Of Data					5							
Product Type						3				1	3	2
Threat Interaction							4					1
Operating History								2	4			4
Pipe Manufact								4	3			
Operating Stress								5			4	
Pipe Characteristics											2	
Reaction To Defects Found												1

APPENDIX B

Speaker Biographies (if available)

Jeff Wiese

Associate Administrator for Pipeline Safety, DOT/PHMSA

Jeff serves as the Associate Administrator for Pipeline Safety for the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the U.S. Department of Transportation. In this capacity, Mr. Wiese leads PHMSA's overall efforts to improve the design, construction, operation and maintenance, and spill response planning for the Nation's pipeline transportation system.

Previously Mr. Wiese served as PHMSA's Director of Program Development for pipeline safety where he led several programs to enhance PHMSA's pipeline safety damage prevention and community involvement initiatives, public awareness, field implementation of the Integrity Management Program rules, research and development, and the National Pipeline Mapping System. Mr. Wiese also directed budget development, user fee assessment, and oil spill planning and preparedness for PHMSA's pipeline safety program.

Prior to arriving at PHMSA, Mr. Wiese worked for fifteen years in matters related to offshore oil and gas safety for the Minerals Management Service including stints as Director of Safety and Environmental Management and Outer Continental Shelf (OCS) Performance Measures Programs as well as its Chief of Staff for Offshore Operations and Safety Management.

Alan Mayberry

Deputy Associate Administrator for Pipeline Field Operations, DOT/PHMSA

Alan's professional career spans over 30 in the energy industry and PHMSA. He began working for Atlanta Gas Light Company in Atlanta, Georgia right out of college. Having whetted his appetite for the natural gas business, after four years Alan moved on to Virginia Natural Gas in Norfolk, Virginia, where he continued gaining widely varied experiences in the natural gas industry from transmission pipeline systems through to the burner tip.

Alan's responsibilities also increased, moving from engineering and technical roles to leadership roles in engineering and operations. After 14 years at Virginia Natural Gas, Alan moved to the DC area and Washington Gas, where he held leadership positions in operations and engineering, and most recently as Manager, Project Management and Technical Services. While at Washington Gas, Alan served on the American Gas Association's Operations Safety and

Regulatory Action and Plastic Materials Committees. He also served on the board of directors for the Northeast Gas Distribution Council.

In 2006, Alan joined PHMSA's Office of Pipeline Safety as a senior engineer in the headquarters Office of Engineering and Emergency Support. Alan was appointed Director of the group in 2008. In his role as PHMSA's technical lead, Alan was responsible for supporting program and regional offices on pipeline issues to ensure uniform policies. Additionally, Alan coordinated the agency's response to pipeline incidents. In early 2010, Alan was appointed as the Deputy Associate Administrator for Field Operations.

Alan is a graduate of the University of Tennessee, Knoxville, with a Bachelor of Science degree in Civil Engineering. He's also a registered professional engineer in Virginia.

Jeffery Gilliam

Director of the Engineering and Research Division, DOT/PHMSA

Jeff has worked for PHMSA for eight years. Jeff manages the multiple responsibilities of the E&RD including technical projects, special permit review, congressional and management briefings on technical issues, LNG issues, and provides technical support to PHMSA regional offices. Jeff does participate as a member of the ASME B31.8 Operation and Maintenance Committee and his staff participates in API, ASME, ASTM, MSS, and NACE committees.

Jeff led both Liquid and Gas Integrity Management inspections throughout the United States including Alaska and Hawaii. During his career at PHMSA, Jeff has had increasing responsibilities as a project manager, team coordinator and has served in multiple roles for the Western Regional office of PHMSA. Prior to joining PHMSA, Jeff spent 13 years in the energy industry working directly for major gas transmission operators or working as a consultant in the Rocky Mountain region.

Jeff joined PHMSA in September of 2002 as a Sr. General Engineer/Project Manager focusing on the Integrity Management (IM) programs both Liquid and Gas. During his career at PHMSA, Jeff has had increasing responsibilities as a project manager, team coordinator and has served in multiple roles for the Western Region.

Jeff graduated from the University of Kentucky with a Bachelor of Science in Civil Engineering.

Randy Vaughn

Program Specialist, Texas Railroad Commission

Randy has spent nearly 35 years in the pipeline industry with the last 11 years dealing with regulatory issues for both industry and government.

Twenty-three years with *Shell Oil Company* – 2 years in refinery operations, 13 years in projects management, and 8 years in the technical engineering group as a corrosion specialist performing internal audits and technical writing.

Eight years with the *Railroad Commission of Texas* – 3 years as a pipeline safety auditor out of the Houston regional office, and currently as a state integrity management program lead working from both offices in Austin and Houston.

One year with *CenterPoint Energy* as a project manager in Houston.

Three years with *Kinder Morgan CO₂* as the Manager of regulatory compliance.

Joe Paviglianiti

Professional Leader Engineering, Canadian National Energy Board

Mr. Paviglianiti is an Engineering Technical Leader on the Integrity Management Team at the National Energy Board (NEB) in Calgary, Canada. Mr. Paviglianiti has 30 years of experience in the oil and gas industry. He worked in oil and gas facility construction for 14 years as an NDE technician before obtaining a B.Sc. in Civil Engineering from the University of Calgary. Joe has been with the NEB for over 14 years and his responsibilities include auditing and reviewing integrity management programs and engineering assessments and conducting failure investigations. In addition, he provides input into regulatory and standards development and is the current chairman of the Canadian Standards Association (CSA) Z662 oil and gas pipeline systems standard Technical Committee and the Canadian representative on the ISO TC67/SC2 committee. In addition, Joe is also on the executive of both the American Society of Mechanical Engineers (ASME) Pipeline System Division and the ASME International Pipeline Technology Institute.

Peter Lidiak

Pipeline Director

American Petroleum Institute

Peter has directed API's Pipeline Segment covering federal and state activities related to hazardous liquid pipeline safety, security, operations and environmental performance since July 2005. He has been with API since April 2000 working on environmental, fuels, refining, and pipeline issues. Prior to joining API, Peter worked in the Office of Transportation and Air Quality at U.S. EPA for 15 years. He is a graduate of Colgate University.

Terry Boss

Vice President, Environment, Safety & Operations

Interstate Natural Gas Association of America

Mr. Boss is a mechanical engineer by training. He joined Natural Gas Pipeline Company of America in 1974, where he held positions in field operations, construction, plant and pipeline safety, development engineering, computer engineering and pipeline safety. He joined the Gas Research Institute in 1993 as a principal technology manager in Transmission. His responsibilities there included the Non - Destructive Evaluation program and Pipeline O&M Program. In September 1995, Mr. Boss joined the Interstate Natural Gas Association of America (INGAA) as director of Environment, Safety and Operations. In 1996, Mr. Boss was promoted to Vice President, Environment, Safety and Operations and in 2001 to Senior Vice President.

Mr. Boss received his BS from Iowa State in 1974 and his MBA from Illinois Institute of Technology in 1986. He is responsible for regulatory policy in the areas of pipeline operations, pipeline safety and environment.

Bruce L. Paskett

Principal Compliance Engineer, NW Natural

Bruce Paskett is a graduate of Oregon State University where he earned a Bachelor of Science (BSME) Degree in Mechanical Engineering. Bruce has been a Registered Professional Engineer in the State of Oregon since 1987.

Bruce joined NW Natural in 1983. During his 28 years with the company, he has held a number of positions, including Manager of Engineering, Chief Engineer, Manager of Code Compliance and Principal Compliance Engineer. Bruce has been an active member of AGA's Operations

Safety Regulatory Action Committee (OSRAC) and Distribution Transmission Engineering (DTE) Committee for many years, and has been a Loaned Executive for the American Gas Association since the fall of 2009.

During his tenure at NW Natural, Bruce has worked extensively in pipeline safety and federal and state regulatory compliance initiatives. He was heavily involved in developing creative agreements with the Oregon Public Utility Commission for rate treatment mechanisms to replace the company's cast iron and bare steel piping infrastructure which was later expanded to an umbrella System Integrity Program (SIP) which incorporated the company's Transmission and Distribution Integrity Management Programs.

Bruce participated in development of the Transmission Integrity Management (TIMP) rule, and was heavily involved in efforts associated with the Distribution Integrity Management Program (DIMP) Rule, including the American Gas Foundation (AGF) Study, the PHMSA study on the Integrity Management for Gas Distribution, Report of Phase 1 Investigations, and the Gas Piping Technology Committee (GPTC) guidance for DIMP. As a Loaned Executive for AGA, Bruce continues to be involved in a broad spectrum of legislative and regulatory initiatives related to pipeline safety.

Alex Afaganis

Technical Sales Manager, Evraz, Inc. NA

Alex has over 21 years in the pipe manufacturing industry. He started his career at Stelco Research in Hamilton, Ontario developing high strength steels for the pipe industry with a major project involving the development of high toughness X80 steel. In 1997 he moved/transferred to Camrose Pipe (now Evraz Inc NA) in Camrose, Alberta where he was the Technical Services Manager for the ERW and SAW pipe mills there for 13 years developing and managing the quality assurance systems, directing pipe product and process development, and representing the company on specifications committees (including CSA Z662, API SC5, ASTM A01, E07, ISO TC67/SC2). A year and a half ago, Alex accepted a position as Technical Sales Manager in Calgary, Alberta where he acts as a technical liaison between the company and its customers while continuing his work on above noted standards organizations and other industry groups.

Linda Daugherty

Deputy Associate Administrator for Pipeline Policy & Programs, DOT/PHMSA

Linda is the Deputy Associate Administrator for Policy and Programs for the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) Office of Pipeline Safety.

Linda joined PHMSA's Pipeline Safety Program in 1991 and has served in various operational and policy development functions.

As Director of the Southern Region from 2003 – 2010, Linda worked with the engineering, technical and administrative professionals in her office and the state pipeline safety offices to achieve agency goals through inspections, investigations, special permit and construction evaluation, enforcement and technical studies.

From 1994 - 2003, Linda managed the agency's Compliance and Enforcement program, served as the Department's pipeline security expert and coordinated the agency's response to pipeline accidents and national emergencies. Prior to joining PHMSA, Linda worked for a hazardous liquid pipeline company. She was responsible for oversight of the pipeline company's environmental compliance. Additionally, Linda served as the pipeline company's right-of-way agent and coordinated the company's damage prevention efforts throughout a seven state area.

Linda is a Chemical Engineer from the University of Missouri – Rolla (School of Mines).

Mike Pearson

Magellan Midstream Partners

Vice President of Technical Services Magellan Midstream Partners. Worked in various operational and technical leadership roles over the past 22 years for liquid pipeline operators. Has a bachelor's degree in Civil Engineering and is currently a member of the API Operation and Technical Group.

Sergio Limon

Mgr. Pipeline Integrity Group, Williams Pipeline

Has over 12 years of experience in pipeline structural integrity and management principles. He holds a B S and M Sc in mechanical engineering from the University of Utah with emphasis in fracture mechanics and materials. Sergio currently manages the pipeline integrity group at Williams Gas Pipeline- West in Salt Lake City, UT.

Chris Whitney

Manager, Pipeline Services - Eastern Pipelines in Houston, TX

Chris has a BS-Civil Engineering, Louisiana State University and over 30 years in Industry all with El Paso and predecessor companies.

Chris has been involved with the utilization of ILI tools and development of procedures for the past 25 years.

Marc Lamontagne

Lamontagne Pipeline Assessment Corporation

After completion of his Ph.D. in metallurgical engineering, Marc Lamontagne has worked in various engineering management and integrity management roles within pipeline operators and service providers over the past 15 years. His current role as Principal of Lamontagne Pipeline Assessment Corporation involves working with pipeline operators, service providers and regulators to provide guidance on the fitness for service of pipelines with respect to the various existing and potential threats. Lamontagne Pipeline Assessment Corporation considers the uniqueness in each pipeline to generate timely and appropriate mitigative responses.

Brian N. Leis

Senior Research Leader, Battelle Columbus Laboratory

Brian has a Ph.D., Civil Engineering, University of Waterloo, 1976 and currently the Senior Research Leader, Battelle Columbus Laboratory (2000 - present): One of seven in the senior-most technical position in the laboratory, charged with technology and project leadership in safety and integrity / life-cycle management of structural systems, with a focus on pipelines and in particular vintage systems. He is a primary developer of the external-corrosion direct assessment process, which now is standardized by NACE, and contributed extensively to the technical foundation for B31.8S.

He has in excess of 100 papers in journals on topics related to fracture and plastic collapse, and has written hundreds of reports on industry supported analyses.

Noel Duckworth

Director, Integrity Management, Products Pipelines, Kinder Morgan Energy Partners

Noel has a BS in Petroleum and Natural Gas Engineering from Texas A&I-Kingsville. Noel has a total of 54 years experience in the pipeline industry with heavy emphasis on Pipeline Integrity elements. Most significant over that time was development of and providing ILI services in the worldwide market as the concepts were perceived in the mid 1960's and later as a consultant to Industry and the Regulatory agencies on proficient use of ILI. Five years ago Noel joined Kinder Morgan and is currently the Director of their Products Pipeline Integrity Management Group.

Mark Piazza

Senior Program Manager, Operations & Integrity

Mark Piazza joined PRCI in 2008 as a Senior Program Manager. He is leading PRCI's Operations & Integrity Technical Committee for Pipeline Programs. Prior to joining PRCI, Mark held positions with several corporations as an Environmental Manager directing the development and execution of compliance and remediation programs, with emphasis on restoration of impacted resources. His prior work has included positions with PRCI members Colonial Pipeline Company and Total, S.A. (through Atofina Chemicals). Mark has served as a representative on external trade groups and industry consortia, including the American Chemistry Council (ACC) and the American Petroleum Institute (API). He has served as a volunteer in his local community, including service as Vice Chairman of the East Bradford Township (Pennsylvania) Environmental Advisory Council. Mark holds a Bachelor of Science degree in Geology, and is a licensed professional geologist.

Kent Muhlbauer

WKM Consultancy

Mr. Muhlbauer is an internationally recognized authority on pipeline risk management. In this field, he is an author, lecturer, consultant, and software developer. Techniques developed by Mr. Muhlbauer are in use by the largest pipeline operators in the U.S. and in pipeline operations in many other countries. Mr. Muhlbauer is an advisor to private industry, government agencies, and academia, as well as a frequently invited speaker at industry conferences worldwide. Mr. Muhlbauer also has an extensive background in pipeline design, operations, and maintenance, having held technical and management positions in a pipeline operating company for over 13 years prior to becoming a full time pipeline risk management consultant.

David M. Wilson

ConocoPhillips Pipe Line Company

David M. Wilson has a Mechanical Engineering degree from Iowa State University. His 33 year career with ConocoPhillips he has been involved with the various aspects of pipeline transportation. For the last 12 years, David has focused on pipeline integrity and was instrumental in the development and implementation of for ConocoPhillips' Integrity Management Plan, covering 11,000 miles of pipelines. In addition, David is active in industry groups, serving committees and teams in API, ASME and PRCI.

Harvey Haines

Kiefner & Associates, Inc.

Mr. Haines holds a BS and MS in Geophysics from the MIT. Mr. Haines joined Kiefner and Associates, Inc. in 2002 and manages pipeline integrity projects. His 25-years in the oil and gas industry includes 11 years with the Gas Research Institute focusing on development and use of NDE techniques for pipelines and oil and gas wells. One of his current studies is understanding ILI measurement error, and how that affects corrosion assessment with respect to B31G and RSTRENG.

Dr. Weixing Chen

Dr. Chen is a PhD and Professional Eng, University of Alberta.

Where he is a Professor in the Department of Chemical and Materials Engineering, He has 15 years of research and industrial experiences on environmentally-assisted cracking and mechanical properties of pipeline steels.

Doug Chabino

Director, Asset Integrity, Magellan Midstream Partners

He is a 1994 Graduate of Oklahoma State University and holds a B.S. in Chemical Engineering. With Magellan, Mr. Chabino oversees the Integrity Management Engineering and Risk Analysis, Integrity Testing and Rehabilitation, Corrosion Control, Tank Integrity, Regulatory Compliance, Damage Prevention, Public Awareness, One Call Programs, and Real Estate Services for approximately 10,700 miles of liquid pipelines in the central U.S.

Mark Stephens

C-FER Technologies

Mark Stephens is a Senior Consultant in C-FER's Pipelines and Structures Division. He has over 25 years of experience in the areas of advanced structural analysis, large-scale testing, and engineering system risk and reliability with an emphasis on pipelines. He has been actively involved in the development of North American pipeline standards and regulations pertaining to risk assessment, integrity management and limit states design.