

**Summary Report on**

# **Cased Pipeline Integrity Assessment Workshop**

**Rosemont, Illinois  
July 15 and 16, 2008**

*Sponsored by:*

*AGA - American Gas Association*

*APGA – American Public Gas Association*

*API – American Petroleum Institute*

*INGAA – Interstate Natural Gas Association of America*

*NACE International – National Association of Corrosion*

*Engineers International*

*NAPSR – National Association of Pipeline Safety*

*Representatives*

*PHMSA – Pipeline and Hazardous Material Safety  
Administration, US DOT*

# ***Casing Workshop Summary Report***

## **Executive Summary**

A joint steering committee including PHMSA, the National Association of Pipeline Safety Representatives (NAPSR), NACE International and several industry organizations (AGA – American Gas Association, APGA – American Public Gas Association, API – American Petroleum Institute, and INGAA – Interstate Natural Gas Association of America) sponsored, organized, planned and executed the Cased Pipeline Integrity Assessment workshop July 15<sup>th</sup> and 16<sup>th</sup>, 2008, in Rosemont, IL. The workshop brought together over 160 representatives from State and Federal regulatory agencies, domestic and international natural gas and hazardous liquid pipeline operators, standards developing organizations, researchers and technology vendors.

The steering committee included presentations on the regulatory aspects of assessing casings, how both gas and liquids operators were assessing cased piping in High Consequence Areas (HCA's), how service providers were assisting operators with assessments and how Research and Development (R&D) projects were developing additional tools to be used in assessing cased piping. Lastly, a group focused on how to change current engineering requirements for cased crossings at highways and railroads.

The workshop opened with a keynote address on the regulatory requirements from the 2002 Pipeline Safety Improvement Act and the resulting Gas and Liquid Integrity Management regulations in CFR 192 and 195 by Zach Barrett, the former Program Development Lead for Gas Integrity Management and currently the State Program Director for PHMSA/DOT. Mr. Barrett provided some details on why assessing cased segments was required under CFR 192 and 195 and some background on recent changes in the interpretation of the External Corrosion Direct Assessment (ECDA) standard and the use of "New Technology".

After the keynote speech by Mr. Barrett, several of the other sponsors (and stakeholders) made short presentations or statements. These included the NAPSR representative, the AGA representative, the INGAA representative, the API representative and the NACE representative. The AGA representative provided some quantification of the issue by saying that a survey of 26 AGA members found that there were, on average, 1.2 casings per mile of HCA and if all of the HCA mileage that AGA members have were considered, it would result in approximately 9,300 casings requiring assessment. The discussion was not so much as there are no tools or methods to assess cased crossings but rather the cost benefit and the total cost that would be incurred if direct examinations were required on every single segment; particularly for those segments which cannot be readily assessed by ILI or Pressure Test. AGA suggested that the group consider what elements should be involved in an ECDA procedure for cased segments. INGAA reiterated the same and if INGAA member mileage were included, it was estimated that the total number of casings in HCA's would be about 11,200 casings to be assessed by 2012. The INGAA representative reminded the group on how to assess the information at the meeting, so meaningful progress could be made at the workshop. API stated that their members were more concerned about the long term solution of casings in that they may no longer be necessary since steel technology has improved and engineering is able to better quantify the loads that highways

and railroads put on pipelines. All of the casings in HCA's in liquid pipelines have already been assessed, mainly via In-Line Inspection (ILI) techniques.

The NAPSIR and NACE representatives made statements that they both were hopeful that some concrete solutions would be forth coming out of this workshop. NACE had two technical committees involved in providing some guidance via consensus standards.

The next panel consisted of members of the NACE standards technical committees on ECDA and Cased Piping. The NACE ECDA standard is being re-written as required since it is 5 years old. The chairman of the committee provided some information on the changes and the timing to initiate the revised standard to be called NACE SP 0502-2008. Most of the changes will be minor and will mainly consist of clarifications of the standard such as better guidance for the number of direct examinations required by §5.10 and a clarification for note 3 on table 2. For the casing standard, NACE SP 0200-2008, the largest change was how electrolytic conditions are going to be designated. The standard will list them as electrolytic couplings and not contacts. The standard is mainly concerned with how casings are constructed and tested, but not how to assess the carrier pipes within a casing.

After the standards panel, there was an operator panel which consisted of several operators that have assessed cased crossings by ECDA and one that is utilizing "Other Technology", followed by multiple service provider panels grouped by type including those using ECDA, those using sound or electro-magnetic waves, and finally those tethered ILI devices.

The last panel of the day was for R & D initiatives that were currently on going. This research was either sponsored by industry, PHMSA, or both. Most organizations recognized the impact PHMSA and industry targeted R & D was making to assist in solving some of the issues.

The second day initially was going to have break out sessions in the morning to have additional discussion on operator assessment practices, service providers, research options and standards development; however the attendees voted overwhelmingly to have just one session and to have an open dialog between attendees on all of the above issues. This way all of the attendees could hear first hand the dialog and the discussions regarding casings assessment methods and other relevant information. There was then an afternoon panel on long term issues, including discussions on whether or not casings are still needed in some/all applications

The workshop was successful in opening a dialog amongst all relevant stakeholders to identify key challenges facing industry and regulators in assessing cased pipelines in order to meet regulatory requirements under the Gas and Liquid integrity management program, sharing information on current research efforts and pending revisions to relevant standards, and identifying potential solutions involving understanding of current regulations, regulatory changes, revised standards, revised operating practices and/or research practices that can help to meet the challenges.

## Summary of Top Issues and Potential Solutions to Address

Some of the top issues identified by the workshop attendees, including potential solutions to address, include the following:

- **Cost/Benefit of Assessment**
  - Issue: Although there are methods to assess casings that can not be taken out of service or have ILI runs, the cost is prohibitive and the benefit may not be substantial with regards to safety. There was a fairly wide range in average cost per assessment, from as a low as \$20k to as high as \$290k in more urban areas and/or more challenging assessments where multiple technologies had to be used.
  - How to address: While operators are moving forward with ECDA procedures for cased pipe segments based on their interpretation of the current requirements included in NACE RP0502, they are hearing concerns expressed by PHMSA and would want to know what PHMSA's technical expectations are on the application of ECDA for cased segments. Many in industry feel that PHMSA needs to be able to justify the use of these new technologies and their high cost before mandating that operators must excavate and perform a direct examination on each cased crossing, and/or help invest in research to develop technologies to fill current gaps. If requirements are imposed, many in industry would want to know as soon as possible.
  
- **Standards Development:**
  - Issue: While there was general agreement amongst attendees that a lot of work goes into writing standards, the committee membership includes solid technical expertise, and the revisions are steps in the right direction, there is still room for improvement. Namely, there are no standards on casings that currently address several major issues such as do electrolytic coupled conditions allow for cathodic protection to reach the carrier pipe and if so are there certain conditions that must be met. Furthermore when standards are revised, many in industry would like to see more expedient adoption by PHMSA.
  - How to address:
    - There should be more involvement by everyone, both in industry and PHMSA, in the standards committees. PHMSA admitted there has been a lack of presence on related committees mainly due to staff turnover/transition. However, it has just recently assigned individuals to be part of these committees. Industry attendees at the workshop who are not currently involved but are interested in taking part should consider the invite for participation by the NACE standards panel. Contact one of the presenters for more information.
    - When revisions to standards are made, including the current revisions to SP0502 and SP0200, can PHMSA explore some means to adopt more quickly? The attendees acknowledged it can take time to officially incorporate by reference in the regulations, but if PHMSA agrees to the changes in a given revision, an interim letter of intent to propose to incorporate by reference could help.

- Risks of Casings:
  - Issue: There was some disagreement between some gas and liquid pipeline industry attendees on whether casings reduce the risk or increase the risk of accidents. Many in the local distribution gas industry believe that cased crossings substantially reduce the risk of failures in pipelines due to mitigating some of the outside force threat. This may be true in very congested areas where there are many underground utilities present. Conversely, interstate natural gas transmission pipeline companies had previously sponsored research in the 1990's at GRI to eliminate the need for crossings at railroads and highways. Many in the liquid industry agree with the gas industry that casings do mitigate other types of threats such as outside force or third party damage when compared to uncased pipe of the same characteristics (wall thickness, depth of cover, etc). However, many in the liquid pipeline industry believe that casings on crossings increase the risk for corrosion threats and more importantly contribute to potential personnel safety threats during maintenance and/or repair activities associated with casings.
  - How to address:
    - Additional discussion, perhaps via a task group, is needed to clarify which threats are present that affect both industries and which are unique to a particular industry and the installation/in-service conditions for the material being transported. In the course of the discussion, it may help to share additional field assessment data/experiences from operators and service providers.
    - Many from the liquid pipeline industry would like to have alternative methods of doing road and railroad crossings for liquid lines that do not require that the pipeline be cased. This requires discussion not only at PHMSA, but also other DOT agencies like FRA and FHWA, associations like AREMA, and discussions with States. The previous work completed at GRI can be the basis of this initiative.
  
- Incident Data:
  - Issue: Related to risk, there was some discrepancy on the amount of incidents where casings were involved. This appeared to be due to disagreement on appropriate threshold levels for classification or whether the installation or in-service conditions around the casing was part of the root cause(s), a contributing factor, or neither.
  - How to Address: This may be another opportunity for a focused task group. PHMSA will first review its internal data including narratives to see where casings were involved according to the submissions, and then share with the task group to see how the data collection/analysis can be improved. The present PHMSA reportable incident report is in the process of being revised and could have some clarifying information added to the form.
  
- Clarification by PHMSA:
  - Issue: In addition to those areas outlined above, there is a need for clarification by PHMSA in a number of other areas involving the regulations, applications of standards, and other guidelines.

- How to Address: PHMSA was forthright in the limitations of what it can do from a regulatory perspective, particularly given the pending changes in Administrations and other political agenda items this year. However, there may be opportunities that exist through clarification letters, interpretations, special permits/waivers, and/or training.

### The Next Steps

PHMSA will review all of the comments and questions presented at the workshop and will formulate a strategy of going forward. Such a strategy may consist of forming a new working technical committee(s) to investigate some of the options, focused research to determine if there are any additional methods of assessment, or having smaller follow-up meetings with stakeholder groups. PHMSA will work with industry to set up these task groups and/or provide point(s) of contact for each initiative ASAP, particularly for some of the more time-sensitive items. In the meantime, where appropriate, PHMSA is willing to take part in panel(s) or update presentations for upcoming meetings, teleconferences, and workshops/conferences organized by stakeholder groups.

Background documents, presentations, and additional supporting materials are provided in this document and also available at: <https://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=54> .

## **Background**

### **Workshop Objectives, Approach, Organization and Sponsorship**

#### **What was the workshop designed to achieve?**

The workshop was designed to open a dialog amongst all stakeholders regarding the difficulty and possible solutions for assessing cased pipelines. Both State and Federal regulators, standards committees from NACE, inter and intra state gas transmission operators, hazardous liquid operators, research and development organizations, consultants, service providers and the general public were invited to participate. Many of the trade organizations representing pipeline operators also attended (AGA, INGAA, and API).

The workshop was successful in identifying key challenges facing industry and regulators in assessing cased pipelines in order to meet regulatory requirements under the Gas and Liquid integrity management program.

#### **How was the workshop organized?**

The first day including presentations and short Q&A on background of the regulatory integrity requirements, a technical update by both operators and service providers, an overview of research of new technology, inspection issues and the current integrity inspection positions and status of the stakeholders represented, followed by panels presenting on and discussing current NACE standards, approaches and assessment methodologies being used for cased pipeline segments, and research completed or underway.

The second day included open discussion on the above topics along with other issues not covered in the first day presentations. Long term issues included a presentation and discussion on whether or not casings are still needed in some/all applications.

The goal at the end of workshop was to develop a list of potential solutions that can address the issues through usage of new technology, understanding of and/or changes to the regulations, updating of standards, operating practices and/or research. While firm decisions on behalf of PHMSA could not be made at the end of the workshop, the list of potential solutions would be taken back to PHMSA (or to one of the other stakeholder organizations if specific to them) for further consideration on which solutions can be addressed and when.

### **How was the workshop sponsored?**

PHMSA, in coordination with a planning group of representatives from National Association of Pipeline Safety Representatives (NAPSR), American Gas Association (AGA), Interstate Natural Gas Association of America (INGAA), American Public Gas Association (APGA), American Petroleum Institute (API), and NACE International, facilitated the workshop. The focus of the workshop was for operators, trades and others bringing information to the table to address concerns with successfully using External Corrosion Direct Assessment (ECDA) integrity evaluation methods and use of other technologies to assess casings in High Consequence Areas (HCA's). However, other topics, such as long term issues were also discussed.

### **Workshop Overview**

The Cased Pipeline Integrity Assessment Workshop was held in Rosemont, IL on July 15-16, 2008. The 2-day event included roughly 160 representatives<sup>1</sup> from Federal and State government agencies; public representatives; research funding organizations; standards organizations; researchers; and pipeline operators from the U.S. and overseas. A list of attendees is in the Appendix B. The workshop's goals included identifying key challenges facing industry and regulators, sharing information on current methods of assessing cased crossings, current research efforts, and identifying research that can help to meet the challenges. Participating organizations expect to use the workshop results to help guide and focus their independent programs. All presentation material is posted publicly and available at: <https://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=54> .

### **Workshop**

#### **Key Note Speaker – Zach Barrett, PHMSA**

The gas and liquid integrity rules mandate that all line pipe in HCA's be assessed by certain dates. These assessments and the due dates were part of both the rule and the congressional mandate via the Pipeline Safety Improvement Act of 2002. The Act and the rule allow for four methods of assessment: ILI, pressure test, Direct Assessment, and 'Other Technology'. Most of the casings on interstate gas transmission and hazardous liquid pipelines have been assessed by either ILI or pressure testing. Casings on intra state gas transmission pipelines, which are typically single source feeds or were installed before provisions for ILI assessments were mandated, are difficult to assess. In an October 2007 response to an AGA letter dated April 2007, PHMSA clarified that most casings may be classified as low risk pipe and thus did not have to be assessed by the December 17, 2007 deadline for high risk pipelines. It further clarified that HCA mileage could be reported as complete even if casings within an HCA had not been assessed. It highlighted that PHMSA had several developmental efforts underway to support casing assessments including support for Guided Wave Ultrasonic Technique (GWUT) R & D. It

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<sup>1</sup> See Appendix B for a complete listing of attendees and statistics on the attendees

stated that PHMSA recognized some of the issues with filing notifications and would work with operators to speed the process and lastly recognized the NACE clarification in Table 2 note 3 as it applied to casing assessments. As with all ECDA assessments, a minimum of two complementary tools must be used and if a tool not listed in Appendix A of NACE RP 0502-2002 is used, the provisions of §192.925(b)(1)(ii) must be followed (the operator must have sufficient information to show the tool can assess the pipe properly, the technique or tool must be validated and there must be a procedure on the tools use). There are several integrity threats to cased line pipe which include poor construction techniques that may damage the coating, the lack of centralizers on older installations, atmospheric corrosion. Casings also may be a low point and a collection point for liquids entrained in the carrier and thus may be locations that internal corrosion may occur, depending on the gas composition, etc.

The use of ECDA to assess casings must follow NACE RP 0502-2002 which provides certain requirements such as placing cased crossings in separate ECDA regions and using two complimentary tools over the entire length of pipe which can reliably detect corrosion activity and/or coating holidays. The indications found by these tools must be aligned and compared so as to classify them per the NACE standard. Additional indirect inspection tools may be necessary for assessing casings. In April 2008, PHMSA responded to an April 2008 letter from AGA and agreed that GWUT was not explicitly required to assess casings, highlighted that the Integrity Management rule did not allow the use of risk assessment in lieu of an assessment, highlighted some development work on GWUT and suggested this workshop as a means of improving communications between all stakeholders and providing a forum for PHMSA to receive comments on casing assessments.

#### Comments and presentations from Industry Leaders

Following the comments by Mr. Barrett, several of the industry and other regulatory sponsors made opening comments or provided a short presentation.

Annamarie Robertson of Indiana represented NAPSRS and stated that 15% transmission pipelines are under state jurisdiction and that currently NAPSRS does not have a position on how casings need to be assessed (there were a total of 6 NAPSRS representatives in attendance at the workshop).

Andrew Lu of AGA framed the discussion from the perspective of AGA's members by estimating that Local Distribution Companies (LDCs) had 9,300 casings in HCA's and a high percentage are not piggable. Assuming each cost \$50,000 to assess, the AGA members would be spending \$465 million every 7 years to assess them for corrosion. This could be more than what was being spent on other work; was the benefit for this huge expenditure worth it? AGA contends that casings are safer than regular line pipe because the threat of outside force damage, the threat that is the major one to LDCs, is significantly reduced. Per AGA, a risk-based approach for casings would suggest that the rigor of the assessment should match the risk represented by the cased pipeline. Several member companies are moving forward and have implemented ECDA procedures for cased pipe segments. AGA emphasized that assessments do not have to be equivalent to one another.



Terry Boss of INGAA gave a few remarks stating that the following flow chart should be used to look at the issue of casing assessments: Perception → Facts→ Risk, where perception is a result of experience, facts are data driven, and risk should be looked at on an overall basis. Regulations and regulators are typically about the “what”, but in this case they need to be about the “why”.

Peter Lidiak represented API and said the issue was not as immediate as for the gas industry since all of the API operators have had to complete all of their assessments already, but long term API did not believe that casings were necessary and in some instances may be creating additional risks to pipelines.

There were no representatives who identified themselves from organizations representing the general public.

Panel Discussions

NACE Standards, Moderator - Joe Mataich, PHMSA

<b>Presentation Name</b>	<b>Presenter</b>	<b>Affiliation</b>
SP0502-2008 ECDA	Bob Fassett	PG&E
SP0200-2008 Casings	Jeff Didas	Colonial Pipeline
Panel Q&A	Alan Eastman	Mears Corp
Panel Q&A	Virgil Wallace	Williams
Panel Q&A	Garry Matocha	Spectra Energy

Some questions raised to the panel from the floor:

- Atmospheric corrosion in casings needs to be addressed
- The changes in §5.10 will result only in guidance and not a change in the required number of direct examinations
- One consultant is working on a CDA standard; how will this fit in with both the ECDA and Casing standards?
- The standards need to capture the why and not just the what
- The standards committee is using management of change to make the changes so everyone will be documented and justified
- Table 2 in RP 0502 needs to be expanded to include GWUT
- Will PHMSA accept the changed standards as reference standards in a reasonable amount of time (PHMSA representatives went over how the acceptance of revised standards needs to be accomplished).
- The definition of electrolytic shorts has been changed because NACE does not believe they exist, that type of condition is now called electrolytic condition or coupling.

Operators, Approaches and assessment methodologies, Moderator - Andrew Lu, AGA

<b>Presentation Name</b>	<b>Presenter</b>	<b>Affiliation</b>
Discussion on operator issues, everyday concerns, data issues, economics of inspecting cased pipe, including some case studies	Dave Merte	Northeast Gas Association (NGA), Central Hudson Gas & Electric
LDC using ECDA	Bob Fassett	Pacific Gas & Electric

LDC using ECDA	Ken Davis	Ameren
Pipeline operator relying on "Other Technology"	Scott Meierotto	Laclede
Interstate operator	Garry Matocha	Spectra Energy

Some questions raised to the panel from the floor:

- How many incidents have there been with casings? Per one commenter there have been only two serious incidents, per another commenter there have been only 6 total incidents and per another there have been over 11 serious incidents.
- With all of the work that goes into assessing a casing, are we creating additional risks for the general public due to traffic accidents and traffic issues?
- How are we going to perform reassessments if we take the first 3' out each time and how will reassessments be performed if the casing annular space is filled with an inert wax?
- What are risks to the workers, the public, automobiles and others compared to the overall low risk of casings, are there more injuries because of the assessments rather than potential casing issues?
- Since the cost benefit curve was never done for assessing casings, how about stopping the assessments and use the money saved for other worthwhile O & M expenditures that are beneficial?
- Some of the ECDA indirect inspection tools can confirm a shorted condition and there have been 12 incidents with casings and at least 6 due to corrosion since the mid 1980's or so.
- Once a cased segment has been assessed and integrity of the carrier pipe has been confirmed, some operators are filling the casing annulus with wax. After the casing annulus is filled with wax, or another dielectric material, does the operator need to assess the cased segment periodically? Assuming the filling was done properly, and the threat of corrosion is removed, can the operator determine that the pipe segment no longer needs to be assessed as a cased segment?

Service Providers, Approaches and assessment methodologies being used for cased pipeline segments, Moderator - Drew Hevle, El Paso

<b>Presentation Name</b>	<b>Presenter</b>	<b>Affiliation</b>
Guided Wave	Paul Jackson	Plant Integrity
Guided Wave	Craig Chaney	Structural Integrity
Guided Wave	Walter "Grady" Ferguson	Impro
Electro Magnetic Waves	Rob Geib	Profile Technologies
Direct Assessment	Larry Rankin	Corrpro
Direct Assessment	Alan Eastman	Mears
Direct Assessment	Kurt M. Lawson	CC Technologies
Tethered ILI	Brian Parker	Rosen
Tethered ILI	Lonnie Brown	Baker Hughes

Some questions raised to the panel from the floor:

- Is PHMSA going to allow GWUT to move to categorizing indications with immediate, scheduled and monitored like with ECDA?

- Profile Technologies EMW does not find % wall loss but rather corrosion products and shorts
- Teletest is really a 1-2-3 type of machine and not a Go, No-Go. It may not be 100% but it can do some categorizations
- GUL is more than a screening tool, soon it is going to be able to size indications and it will be validated.
- Do ECDA techniques work with coated casings or just with bare casings?
- There is still a debate if there are more indications at the ends of a casing due to more oxygen or if they are just more severe there?
- How well casings and carrier piping is coated can affect the ECDA results on determining metallic shorts and electrolytic couplings.
- Filling a bare casing with electrolyte will make it behave just like the carrier pipe was in soil; you can find the coating holidays and locate them.
- The standards committee needs to be involved in sorting out how to assess carrier pipes in casings
- On filling a casing, the type of water and the amount of iron present is important. City water may not work well; may need to buffer it to both add salts to improve conductivity and prevent corrosion.
- Can tethered ILI devices see not only the casings but also coupons that are attached to the pipeline?
- Do tethered ILI devices need special launchers and receivers?
  - No, just a 45 degree offset will do it
- On the robot, can this bypass some gas so an area can be supplied that is downstream?
- How does either the robot or a tethered ILI device know it has assessed the entire circumference?

Research, Moderator - Bob Smith, PHMSA

<b>Presentation Name</b>	<b>Presenter</b>	<b>Affiliation</b>
R & D Efforts	Mark Piazza	PRCI
Casing R & D	Maureen Droessler and Daniel Ersoy	OTD and GTI
R & D Efforts	Daphne D'Zurko	NYSEARCH
North American Casing Research Program	Alicia Farag, and Daphne D'Zurko	GTI and NYSEARCH

Some questions raised to the panel from the floor:  
There were no questions raised.

### 2<sup>nd</sup> Day Open Discussion Sessions<sup>2</sup>

Initially there were going to be three or four break out sessions covering operator assessment practices, service providers, research options and possibly standards; however the attendees voted overwhelmingly to have just one session and to have an open dialog between attendees on

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<sup>2</sup> Appendix A has a complete listing of all the comments and questions raised during the open discussion session. This list includes verbal comments and written comments given to the workshop organizers during the workshop. Additional comments may be received on the workshop website.

all of the above issues. This way all of the attendees could hear first hand the dialog and the discussions regarding casings assessment methods and other relevant information.

At the start of this dialog session Mr. Barrett reviewed how difficult it is for PHMSA to change regulations and the underlying legal frame work. One issue on moving ahead is that with the change in administrations in Washington, there will be a no change period to allow the new administration to get up to speed and this time period could be as long as year or more. To change the underlying legal frame work would need Congress to act. Recent history regarding the 7 year reassessment interval shows that this could be a very long timeframe even if there is sufficient technical justification, which may not be available at this time. Also, PHMSA’s authority is for interstate pipelines; the states have authority for intrastate pipelines through certification from PHMSA. The states are allowed to have more stringent regulations for pipelines operating in their respective states. Regarding the standards, PHMSA has a process that must be followed to include new standards and revised standards if they are to be incorporated by reference in the regulations. This process defines how PHMSA may include these and requires not only a review by PHMSA but public noticing and comment periods. Any standard that improves safety and provides specificity in implementation is a help.

In Appendix A, there is a listing of the questions and comments presented both verbally and via writing during the one breakout session. PHMSA is reviewing all of them and will formulate some proposed next steps from this input.

At the request of several attendees the 18 Check Points for Guided Wave Ultrasonic Testing (GWUT) were reviewed in detail.

Long Term Solutions

<b>Presentation Name</b>	<b>Presenter</b>	<b>Affiliation</b>
Introduction and Overview	Jake Haase	Colonial
Casings present potential increased risks to Integrity	Frank Gonzales	Buckeye
Panel Q&A	Peter Katchmar	PHMSA-Western Region

Some questions raised to the panel from the floor:

- Although two of the panel members stated that casings may increase the risk of failure in a carrier pipe, one organization believes just the opposite is true for gas transmission pipelines.
- Some operators have worked with state agencies that regulate highways and railroads and have had success in removing the mandate for casing such crossings; they have used an argument that improved strength of steels, directional boring and other technical improvements make the use of casings unnecessary for protecting safety.
- Another comment was made in regard to mandating vents on casings since these seem to create many of the problems, such as allowing breathing of humid air that promotes atmospheric corrosion, a pathway for debris to enter a casings, etc.

### Summary Challenges

The main theme from industry indicates that although there are methods to assess casings that can not be taken out of service or have ILI runs, the cost is prohibitive and the benefit may not be substantial with regards to safety. There was a fairly wide range in average cost per assessment; from as a low as \$20k to as high as \$290k in more urban areas and/or more challenging assessments where multiple technologies had to be used. Many in industry contend these costs were not considered in the regulatory evaluation/cost benefit analysis of the gas transmission integrity management regulation. Many in industry feel that PHMSA needs to be able to justify the use of these new technologies and their high cost before mandating that operators must excavate and perform a direct examination for each cased crossing.

Another challenge is that there is no standard on casings with regard to several major issues such as do electrolytic coupled conditions allow for cathodic protection to reach the carrier pipe and if so are there certain conditions that must be met? Also, are there any additional technologies besides the ones presented at the workshop that can be used to assess cased crossings and provide additional information? (one technology that was discussed was flooding the casing with an electrolyte and then using the standard ECDA indirect inspection tools)

There seems to be some disagreement between the gas and liquid pipeline industry on whether casings reduce the risk or increase the risk of accidents. Many in the gas industry believe that cased crossings substantially reduce the risk of failures in pipelines due to mitigating some of the outside force threat. Many in the liquid industry agree with the gas industry that casings do mitigate other types of threats such as outside force or third party damage when compared to uncased pipe of the same characteristics (wall thickness, depth of cover, etc). However, many in the liquid pipeline industry also believe that casings on crossings increase the risk for corrosion threats and more importantly contribute to potential personnel safety threats during maintenance and/or repair activities associated with casings.

Related to risk, there was also some discrepancy on the amount of incidents where casings were involved. This appeared to be either due to disagreement on appropriate threshold levels for classification, or whether it's appropriate enough to determine the installation or in-service conditions around the casing was part of the root cause, a contributing factor, or neither.

In general, most attendees agreed that cased crossings do require some changes either in current regulations or future regulations and PHMSA and industry need to work together to provide guidance to operators on how to assess these areas.

### The Next Steps

PHMSA will review all of the comments and questions presented at the workshop and will formulate a strategy of going forward. Such a strategy may consist of forming a new working technical committee to investigate some of the options, focused research to determine if there are any additional methods of assessment, etc.

A few of the key themes that seemed to be the most interest of the attendees were:

- What is going to be the reassessment interval for casings and will it follow the other line pipe requirements?

- How will filling a casing with a dielectric change the assessment, reassessment and threat matrix?
- How can filled casing be assessed, if they need to be, especially casing already filled but not previously assessed?
- How will PHMSA (and the states) help in eliminating the casing requirement for highways and railroads?
- Will there be any relief to assessing all casings in HCA's for gas operators prior to December 17, 2012 (liquid operators have already had to have all casings assessed)?
- Will PHMSA work with industry to fund R & D to find technical solutions to assessing casings?
- Will PHMSA assist the standards writing organizations, such as ASME and NACE to develop guidance and standards for assessing casings in HCA's?

General questions, potential solutions and or action items by stakeholder group:

- Standards:
  - How quickly can the revisions be made to the standards?
  - If this does help with the discussion, how quickly can PHMSA adopt the new revisions to the standards?
- Research:
  - Is there benefit in additional gap analysis and breaking out where additional research is needed?
  - If gaps still exist, what kind of funding and timeframe is required? Put another way, can this be accomplished by the 2012 deadline? Not just the research completed, but tech transfer, commercialization, and in the hands of operators in time?
  - If new technologies can be developed, will be cost-effective and reliable enough?
- Service Providers/Vendors:
  - Would the service providers/vendors/States/PHMSA regional personnel be open to a follow-up discussion with operators either via another meeting, webinar, or survey? While there was good discussion on thinking out of the box with certain scenarios, there were a number of questions still unanswered where an operator wanted to know which tool(s) to use given a particularly challenging scenario?
- Regulatory:
  - If additional data is needed before a decision can be made on regulatory changes/clarification, what data is needed?
  - Operators are moving forward with ECDA procedures given the present interpretation of regulations and guidelines. If PHMSA/States still need to weigh-in on what's required for an ECDA procedure, how soon can this be done?
  - Can training help clarify any remaining confusion, either built into current classes or through new classes at PHMSA TQ, part of NACE or other conferences, or through a taped webcast?
- Operators:
  - Some procedures appear to be more robust than others. Is there any opportunity for information sharing to help those with less robust procedures? How can this get done?

## **Appendix A**

### **Issues and Potential Solutions from Casing Assessment Workshop**

Chicago, July 15 and 16, 2008

(Note: Issues and Potential Solutions are not listed in any particular order with respect to relevance, perceived importance, or which are likely to be addressed first)

#### **Issues from Casing Workshop on 7-15 and 7-16-08**

- Are filled casings still subject to EC?
- If there are no indications is there a need to do a direct exam?
- Is atmospheric corrosion a threat? Need some R&D.
- What is the seriousness of the threat to cased pipe?
- Can casings be screened?
- Aboveground screening
- Push assessment of casings based on screening results?
- How do we assess a filled casing?
- How do you know the casing is completely filled?
- Why can't casings be handled like non-cased pipe regarding regions and use probability of issues via indirect inspection tools – such as AC attenuation, DCVG, ACVG, etc.?
- What happens to long casings where GWUT can't go all the way?
- Need agreement between operator and regulator on casing regions
- Need a definition of what is an ECDA assessment?
- Risk management said several times, but not discussed in more detail. How can we address?
- How to assess casings buried under roadways
- How to address/assess bad wax fillings?
- How will PHMSA use look beyond provision when casings in an HCA are an issue?
- What about internal corrosion in casings?
- How do you assess casings in excess of 100' to 120' long on a CTE coated pipeline?
- Can PHMSA consider revision the GWUT Checkpoints # 2 and #3 to allow an operator to shoot both ends and finds no defects (above the threshold) to allow a gap in the middle?
- Do filled casings eliminate external corrosion as a threat?
- PHMSA should minimize or eliminate atmospheric corrosion as a threat – industry history does not support and cause of previous incidents is probably incorrect.
- PHMSA should minimize casings as a risk.
- PHMSA should accept that casings can be in one region, if the same tools are used.
- What is the purpose of the vents on a casing?
- How are casings accurately located under concrete/asphalt, assuming ILI is not possible?
- What are the safety considerations for the carrier pipe when a casing is plastic?
- Would PHMSA consider allowing an extended schedule for assessment that hits 2012 deadline for top priority cased segments and later date for lower priority cased segments?
- The real threat to casings: If casings were not considered in original rule making cost/benefit analysis, costs per dig at ends of casings in urban areas approaches \$100K times 2 for casing digs alone.

- The above high costs were not anticipated originally and resources are limited to complete the quantity of work by 2012
  - What is the cost benefit
  - What is the amount of risk reduced
  - Are there provisions to either get a waiver or to extend baseline completion beyond 2012 for casings until the two above questions are resolved?
- Coal tar or attenuating coatings – would a good faith effort satisfy regulators or how can they be assessed?
- Does filling a casing with dielectric material stop corrosion even for a metallic short between casing and carrier pipe? Some suggest metallic short requires removal of short, electrolyte is excluded by the filler so one of 4 corrosion products is nonexistent.
- If DOT agrees with NACE SP0502-2008 edition by January 31, 2009, could PHMSA release a notice that they intend to propose to incorporate by reference (subject to public comment) 0502 latest edition? Could notice state that as long as company explains in a white paper why they changed DA assessment procedure then enforcement of old 0502 edition is suspended?
- Can permanently installed sensors be considered as a complete direct assessment?
- When will there be enough confidence in the IC & ECDA inspection process (once validated) to:
  - Drop 2 inspection process requirements
  - Allow the process to stand alone as ILI and not just screening
- Agree with a previous comment
  - Find them
  - Fix them
  - Fill them
  - Forget then (oops, monitor annually) for casings that won't be ILI inspected periodically
- Based on experience to date, should we be focusing the current level of resources on casings? Is there a benefit to be realized that is remotely close to being commensurate with the expenditure of resources? If not, let's find a simpler solution
- We are not satisfied with API's stand on liquid pipelines "Cased liquid pipelines are piggable and so assessment is not the issue". In the event a pipeline can not be in line inspected and ECDA is required, do the rules for gas operators apply to liquid operators?
- What is PHMSA stand on pipelines with internal liners? State regulators have notified us that pressure testing is insufficient and ECDA will also be required. Is this true, if true then what is an acceptable assessment on cased pipelines for liquid operators?
- Given all of the issues with assessing casings, is there still the expectation that they have to be assessed by 2012?
- Is the definition of "assessed" met by simply conduction above ground surveys or does it include directly assessing (excavation) the casing?
- Guided wave inspection: Issue the blind area around a weld, why weld signal screens – deflects signal. Thus deflects in and near a weld are difficult to detect. The blind area can be 5-7'.
- FAQ – Let's improve the definition of assessment. For casings, is it NACE 0502 or ASME B31.8S? Region, i.e. all one region or many (Keith Leewis).



### **Some Possible Solutions from Casing workshop on 7-15 and 7-16-08**

- Use technology to solve the problem, i.e. GWUT w/ 18 points and tethered ILI
- A risk factor on casings may be differentiated between the carrier and the casing – the closer they are the more coating holidays there will be.
- Need to have data to get law/rule changed to exempt casings
- DA & Casings committees within NACE need to include NAPS & PHMSA representatives.
- Regulators need to participate in standards Committees
- Consider casings operating at below 30% SMYS low risk. If casing is reading up with no shorts, do not need direct assessment (i.e. dig).
- Conduct indirect survey of casings during wet season, do not introduce electrolyte into a potentially dry casing – in other words create a corrosive environment when none existed.
- How can I write and implement a DA procedure now that will be accepted by PHMSA in 3-5 years?
  - Solution A – Provide regulatory guidance on expected procedures, i.e. level of detail, threats 18 point Go, No-Go.
  - Solution B – Worst case audit finding if guidance is followed
- The themes of some of the panel discussions were that casings are safer in general (AGA) and probability of failure in cased pipes are around 40% less (NYSEARCH). This does not agree with other data analysis the commenter has seen. Note, the commenter did not have it present to display at the workshop, so follow-up is needed. The questions for possible solutions are:
  - Is there still a need to do more work on this basic issue?
  - Filling the casing (wax, fillers, etc.) is a promising solution to reducing corrosion. Is there a need to develop lab/field procedures for QA/QC of its performance especially long term durability
- Corrosion → fill casing with wax
- Fill casing with buffered solution and then use indirect inspection tools
- Seasonal Surveys
- Removing Vents
- More Screening GWUT? Indirect tools
- Follow the risk
- Change the environment
- ECDA Regions in casings
- Need some R&D to determine if atmospheric corrosion a threat?
- Does the group think that EC as a threat is eliminated in a filled casings? (majority yes). Will PHMSA mandate filling? (answer – no)
- PHMSA will take back to HQ and see where we can have positions
- Revise checkpoint 17 to eliminate “hydrostatic”
- The final panel on Future Issues made a case for not requiring casings for future crossings of highways, roads or railroads. Members of the audience discussed some recent successes made by operators and regulators at the state level concerning removing the requirement for casings. PHMSA needs to explore taking this to a national level and obtain a consensus document or MOU with the FRA and the FHWA that states the first design for a pipeline crossing a highway, road or railroads should be an uncased design.

Only if there are engineering concerns, e.g. unstable soils, should a casing design be considered. Note: Neither the FRA nor the FHWA appear to have regulations requiring pipelines to be cased. There appear to be only policy statements made from the national level to the states but the states can and do whatever they think is correct. There are numerous anecdotal statements concerning different pipeline operator's experience in dealing with state and local officials with respect to the use of casings. It appears that it depends on who one talks with within an agency instead of sound engineering judgment that is the decision maker.

**Appendix B**  
**Attendees at Casing Assessment Workshop**  
 Chicago, July 15 and 16, 2008

**Statistics**

<b>Summary of Reps</b>	<b>State Regulator</b>	<b>6</b>
	<b>Federal Regulator</b>	<b>8</b>
	<b>Trade</b>	<b>5</b>
	<b>Operator</b>	<b>97</b>
	<b>Service Provider/Vendor</b>	<b>34</b>
	<b>Researcher</b>	<b>12</b>
	<b>Technical Assoc/Standards*</b>	<b>1</b>
<b>Total</b>		<b>163</b>

\*Note there were 5 others in attendance representing NACE on the Standards Panel. As they were also representing either an Operator or Service Provider/Vendor, their numbers are covered under those categories.

**Registrant**

David Alleyne - Guided Ultrasonics Ltd  
 Milton Altenberg - Quest Integrity Group  
 Dana Arabie - Louisiana Dept of Natural Resources  
 Rick Arnold - Colonial Pipeline  
 Nicholas Ashcraft - Kiefner & Associates  
 Darrell Baker - Valero Energy  
 Zach Barrett – PHMSA  
 John Batchelder - Williams  
 Joseph Beerlly - PECO Energy  
 Michael Berg – RCP  
 David Berger - Cyclo/PHMSA  
 Ray Bingman - Vectren Energy Delivery  
 Eloy Blanco - MidAmerican Energy Company  
 Susan Borenstein - GTI  
 Terry Boss - INGAA  
 Leon Bowdoin - Hess LNG  
 Josh Brewer BGL - Asset Services  
 Lonnie Brown - Baker Hughes Pipeline Management Group  
 Royce Brown - CenterPoint Energy  
 Harry Bryant - NC Utilities Commission  
 Chris Brzowski - Southern Star Central gas Pipeline  
 James Card - TransCanada USPC  
 Leonardo M. Cardenas - BP Pipelines & Logistics  
 Todd Cash - Praxair  
 Craig Chaney - Structural Integrity Associates  
 David Chislea - Michigan PSC  
 Pat Convery - Hess LNG

Timothy Cook - Southwest Gas Corporation  
Kevin Cowan - Questar  
Jeff Creaney - EN Engineering  
Daphne D'Zurko - NYSEARCH/Northeast Gas Association  
Ian Daniel - Plant Integrity  
Kenneth E. Davis - Ameren  
Pat Davis - Praxair  
Jeffrey L. Didas - Colonial Pipeline Company  
Donald Edward Drake - ExxonMobil  
Maureen Droessler - Operations Technology Development  
Alan Eastman - Mears Group, Inc.  
Rojas Ed - IMPro Technologies  
Les R. Edwards - Williams Northwest Pipeline  
Thomas D. Emerson, Jr. - Explorer Pipeline  
Daniel A. Ersoy - Gas Technology Institute  
Paul Falgout - BP US Pipeline and Logistics  
Alicia Farag - GTI  
Khalid A. Farrag - Gas Technology Institute  
Robert Fassett - Pacific Gas & Electric  
Sean Ferguson - IMPro Technologies  
Walter Ferguson - IMPro Technologies  
Martin Fingerhut - Applus RTD  
Erica Fiset - Nicor Gas  
Parsi Fred - Gas Group  
Bob Gardner - Alabama Gas Corporation  
Robert Geib - Profile Technologies, Inc.  
Michael Gentry Marathon Pipeline LLC  
Mark Gluskin - Mears Group, Inc.  
Linda Goldberg - NACE International  
Frank Gonzales - Buckeye  
Ralph Graeser - PA PUC  
Glyn Hazelden - Hazelden Group  
Jake Haase - Colonial Pipeline Company  
Justin Hale - PECO  
Steven Jeff Hamlin - Northern Natural Gas Company  
Kimberly-Joy Harris - Enbridge Pipelines Co, Inc  
Steve Hartley - Alabama Gas Corporation  
Darren Hartman - Consumers Energy  
Andrew Hevle - El Paso Corporation  
Randy Hodge - PSNC  
Vincent Holohan - DOT - PHMSA  
Mary Holzmann - National Grid  
Jenny Hudson - EN Engineering  
Syed MT Hussein - Chevron Pipeline  
Carol Hynes - Nicor Gas  
Paul Jackson - Plant Integrity

Timothy Jenkins - Columbia Gas of Ohio  
David Johnson - Panhandle Energy  
Stephen Johnson - Praxair  
Edward Johnston - GTI  
Richard Kania - TransCanada PipeLines  
Chuck Kanoy - Vectren  
Peter Katchmar - PHMSA Western Region  
Danny Keck - BP Exploration, Alaska, Inc.  
Mark Keehan - We Energies  
Max Kieba - US DOT/PHMSA/OPS - HQ  
Philip Kingrey - Columbia Gas Transmission  
Peter Koch - BP Pipelines & Logistics  
Steve Koetting – Exxon Mobil Pipeline Company  
Maureen Kolkmeier - Atmos Energy  
James Kulczyk - National Fuel Gas  
Hegeon Kwun - Southwest Research Institute  
Kurt M. Lawson - CC Technologies  
Don Ledversis - NAPSR-Rhode Island Division of Public Utilities and Carriers  
Keith Leewis - P-PIC  
Peter T Lidiak - API  
Aida Lopez-Garrity - Kiefner and Associates  
Donald Lovett - Atmos Energy  
Andrew Lu - American Gas Association  
Reese Lucas - Washington Gas  
Reagan Monroe - BGE  
Richard Mack - Duke Energy  
Frank Maraia - Boardwalk Pipeline Partners  
William F. Marshall - Mears Group  
Eric Martin - Consumers Energy  
Joseph Mataich - DOT/PHMSA  
Garry Matocha - Spectra Energy  
Von McAllister - Kern River Gas Transmission Company  
David McQuilling - Panhandle Energy  
Scott Meierotto - Laclede Gas Company  
David Merte - Central Hudson Gas & Electric Corporation  
Michael Mertes - Nipsco  
Dave Misewicz - Kinder Morgan Inc.  
Scott Mundy - CenterPoint Energy  
Karl Norred - El Paso Corporation  
Rhett O'Briant - CenterPoint Energy  
Joseph O'Connell - BP America Production Co.  
Stefan Papenfuss - Quest Integrity Group  
Brian Parker - ROSEN  
Keith Parker - Dominion Transmission  
Kevin Michael Pastotnik - BP - US Pipeline and Logistics  
Rickey Payne - CenterPoint Energy Gas Transmission Co.

James Peiguss - Praxair, Inc  
Laurie Perry - Southern California Gas Company  
Mark Piazza - Pipeline Research Council International, Inc. (PRCI)  
Jerry Picha - Integrys Gas Group  
Joe Pikas - IMPro Technologies  
Victoria Plotkin - American Gas Association  
Brian Powell - NiSource, Inc.  
Frank Rampton - Trenton Corporation  
Larry G. Rankin - Corrpro Companies Inc.  
Todd Reaves - PetroChem Inspection Services  
Richard Reeves - Tapecoat/Royston  
Annmarie Robertson - Indiana Utility Regulatory Commission  
Dan Rowe - NIPSCO  
Jim Ryan - Praxair  
Robert Scott - We Energies  
Frank Song - Southwest Research Institute  
Frank Stauss - Consolidated Edison Of NY, Inc.  
Christina Sames - AGA  
Mike Sanders - BP Pipelines & Logistics  
John T. Schmidt - CC Technologies, Inc.  
Boyd L Schow - Kern River Gas Transmission Company  
Steve Schueneman - Puget Sound Energy  
Martyn Seconde - BP Pipelines and Logistics  
Michael J Sharkey - Advantica  
John G. Shore - Union Gas Ltd.  
Robert Smith - DOT/PHMSA  
Brian Lorne Snider - TechCorr Inspection and Engineering  
Joe Soltis - BP US Pipelines& Logistics  
Dane Spillers - Ameren  
Kathy Stevens - Peoples Gas, Chicago  
Greg Swank - BPXA  
Steve Turner - Enbridge  
Alberto Valdes - GE Oil and Gas - PII Pipeline Solutions  
AJ Valiaparambil - Sunoco Logistics Pipeline  
Virgil Wallace - Williams  
James Warner - Consumers Energy  
Rod Weber - Oneok North System L.L.C.  
Karen Weiss - DTE Energy - MichCon  
John West - DOT/PHMSA/TQ  
Joel Wilson - ConocoPhillips Pipeline Company  
John Wilson - Williams  
Stanley Wong - TransCanada Pipelines  
Gary Zellers - TD Williamson  
John Zurcher - P-PIC