Casing Assessment Workshop

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PHMSA
July 15, 2008

Welcome

Planning Group:

PHMSA & NAPSR Co-hosting

AGA, INGAA, APGA, API, and NACE

Participants:

Operators and Service Providers - Thank You for your time and commitment to making the workshop a success.

Welcome

Safety Concerns:

Exit Locations

Announcements:

Cell Phones, Bathrooms, Agenda, etc.

Workshop Goals

- Provide forum for open dialog with stakeholders.
- Present PHMSA with information addressing issues with casings
- Communicate PHMSA issues regarding casing assessments
- Hear from industry, trade groups, and service providers challenges and possible solutions for addressing casing issues

Workshop Goals

- Identify potential gaps in both the regulations and R&D and begin discussion for resolving the gaps
- Increase understanding of all stakeholders – State and Federal Government, Industry, Trade Organizations, Service Providers, and the public.
- Explore both short term and long term solutions

Some Issues

- ECDA Process Applicable to Casings
- NACE Intent for each Casing to be its own ECDA Region (Table 1)
- What is the applicability of indirect inspection tools
  - ✓ Shorts/How Compare, Categorize, and prioritize readings for Direct Examination Step
  - ✓ How Locate Area to Examine

Some Issues

- Does filling casing eliminate the External Corrosion Threat
- How Compare, Categorize, and Prioritize Data
- How locate areas for Direct Examination Step
  - Coating Holidays – Direct Shorts, Electrolytic Shorts, Atmospheric Corrosion

Some Issues

- Are there situations casings are appropriate
- Considerations for extending interval between assessments for casings
- General Key Question Handout

Background

What Percent of Line Pipe is in a Casing and an HCA?

- PHMSA does not collect this information specific to HCAs
- Currently PHMSA does not have a field for reporting an incident occurred in a casing

Background

What Percent of Line Pipe is in a Casing and an HCA?

- AGA and INGAA will provide insight into the percentage of line pipe, in casings, in HCAs in their respective presentations
- Since 1985 there were 40 reports for Gas Transmission Pipelines and 80 reports for hazardous liquid lines where casings were mentioned in the comments section of the report.

Background

Gas Integrity Management Requirements

- 192.901- states the Gas Integrity Management regulations apply only to Gas Transmission Pipelines

Background

Gas Integrity Management Requirements

- 192.921(d)-
- Half of Covered Segments Assessed by December 17, 2007 “Highest Risk”
- Complete Assessment of Covered Segments by December 17, 2012

Background

Gas Integrity Management Requirements

- 192.921(a) requires operator's to assess line pipe **in an HCA** by one of the following methods:
  - ✓Internal Inspection Tool
  - ✓Pressure Test
  - ✓Direct Assessment
  - ✓Other Technology – 180 day Notification
  - ✓Can replace with new pipe

Background

Gas Integrity Management Requirements

- 192.919(b) requires operator's to align assessment methods with the threats to be assessed.
- Assessment tools must be capable of detecting threats within the HCA.

Background

Why Assess Line Pipe in Casings?

- IMP Regulation **requires all the line pipe in an HCA** [covered segment] to be assessed
- Line Pipe in Casings are **not excluded** from being assessed
- Have to assess for **threats** to Line Pipe in Casings

AGA Letter to PHMSA

April 18, 2007

Background

AGA April 2007 Letter and PHMSA Action

- October 25, 2007 Response:
  - ✓ Recognized it was generally acceptable to classify casings as low risk pipe for assessments.
  - ✓ Clarified HCA mileage could be reported as complete if casing, within an HCA, had not been assessed for 2007 deadline.

Background

AGA April 2007 Letter and PHMSA Action

- October 25, 2007 Response:
  - ✓ Highlighted our development efforts for Guided Wave Technology to support casing assessment.
  - ✓ Highlighted our efforts for assisting operators with success “Other Technology” applications.
  - ✓ Recognized NACE clarification of ECDA application to cased pipe **with properly supported engineering and implementation plans.**

Background

AGA April 2007 Letter and PHMSA Action

- October 25, 2007 Response – Engineering Procedures and Implementation Plans Must:
  - ✓Demonstrate Applicability
  - ✓Validation Basis
  - ✓Equipment Used
  - ✓Application Procedure
  - ✓Utilization of Data

  [Per 192.925(b)(1)(ii)]

Background

Integrity Threats to Cased Pipe

December 2007, Interstate 20 in Louisiana

Background

Integrity Threats to Cased Line Pipe

- **External Corrosion**
  - Failed end-seals traps moisture inside casings
  - Coating damage leads to corrosion
    - poor construction techniques
    - lack of centralizers
  - Direct “hard” contacts and electrolytic shorts of cathodic protection system leads to corrosion
  - Atmospheric Corrosion

Background

Integrity Threats to Cased Line Pipe

- **Internal Corrosion**
  - Casing are generally low points, such as under highways or rail crossings, could accumulate liquids.
- **SCC**
  - Same as other pipe

Background

Integrity Threats to Cased Line Pipe

- Seam issues the same
- Girth weld issues the same
- Construction issues may be increased due to alignment issues

Background

Integrity Threats to Cased Line Pipe

- Outside Force Damage [i.e. Excavation Damage] Threat not eliminated but reduced, there have been instances of TPD to carrier pipes in casings but they are rare.

Background

Threat Summary Casing Integrity Threats

- Time Dependent Threats
  - ✓ Yes, Internal Corrosion, SCC, External Corrosion
- Time Independent Threats
  - ✓ Yes, Seam issues, Girth welds, Construction techniques with Alignment, Coating Damage, Same as Line Pipe
- Random Threats
  - ✓ Maybe, Outside Force Damage, i.e. Third Party Damage, Reduced due to protection by casing

Background

A Little More on External Corrosion

- If the carrier pipe is completely isolated from the casing and there are no coating holidays there is no threat from external corrosion.
- If there are coating holidays:
  - Atmospheric corrosion concern.
  - Direct or Electrolytic short - external corrosion concern.

Background

Shorted Casings

- **Direct (hard) Short** – Metal to Metal contact between the carrier pipe and the casing caused by misalignment, settling or movement of the carrier pipe or casing.
- **Electrolytic (resistive) Short** – Contact between carrier pipe at a holiday to the casing via an electrolyte, i.e. water, soil, debris, etc.

Background

<u>Shorted Casings</u> - Direct (hard)

- May drain cathodic protection potentials away from carrier pipe to casing and thus lower potentials to where corrosion can occur.

Background

<u>Shorted Casings</u> - Electrolytic (resistive)

- Typically caused by a failure of the casing end seals. Some times due to debris getting into casing via vents. May cause corrosion cell formation.

Casing Assessment

Direct Assessment - ECDA Application:

- 192.923 - How is Direct Assessment Used and for What Threats
  - ✓ Limits use as **primary** assessment method to External Corrosion, Internal Corrosion, and SCC
  - ✓ Also References Standards:
    - NACE RPO502-2002 ECDA Standard
    - ASME/ANSI B31.8S-2004

Casing Assessment

NACE RPO502-2002 ECDA Pre-assessment

- 3.3.2 If there are locations along a pipeline segment at which indirect inspections are not practical, for example, at **certain cased road crossings**, the ECDA process may be applied if the pipeline operator uses **other methods** of assessing the integrity of the location.

Casing Assessment

NACE RPO502-2002 ECDA Pre-assessment

- 3.3.2.1 The other methods of assessing integrity must be **tailored to the specific conditions** at the location and shall be selected to provide an appropriate level of confidence in integrity.

Casing Assessment

NACE RPO502-2002 ECDA Pre-assessment

- Two Complimentary Tools
  - Strengths of one must complement the weaknesses of the other (Section 3.4.1.2)
  - Tools must be selected to reliably detect corrosion activity and/or coating holidays (Section 3.4.1.1)
  - Must obtain readings along the entire length of pipe (Sections 1.2.2.2; 4.2.1.1; 4.1.2 and 4.2.2)
  - Must align, compare, and classify indications from two tools (Sections 4.1.2.2; 4.3.2)

Casing Assessment

NACE RPO502-2002 ECDA Pre-assessment

- Two Complimentary Tools
  - Table 2 guide for selection of two indirect inspections tools indicated all indirect inspection tools are not applicable in casings or not applicable without additional considerations (Section 3.4.3 ref. Table 2)
  - Casings require separate ECDA Regions (Section 3.5.1.1.2 ref. Table 1)
  - Additional indirect inspection tools may be necessary (4.1.3 and Table 1)

Casing Assessment

NACE RPO502-2002 ECDA Pre-assessment

- Must use Engineering Assessment (NACE Clarification 05/18/07)
  - Construction Methods
  - Environment
  - Cathodic Protection
  - Service History
  - **Evaluation of Inspection Tools**

Casing Assessment

ECDA Application:

- Must use Engineering Assessment (PHMSA Letter to AGA 10/25/07)
  - Engineering Procedures & Implementation Plan
  - Demonstrate Applicability
  - Validation Basis
  - Equipment Used
  - Utilization of Data for Assessment

[Per 192.925(b)(1)(ii)]

PHMSA NACE PRESENTATION

January 28, 2008

Background

PHMSA Representative:

- ✓ Stated could use Guided Wave without Notification if coupled with indirect tools under ECDA – must follow the 18 points
- ✓ Stated if using ECDA should use Guided Wave as one of the indirect inspection tools
- ✓ PHMSA Representative – Good Hearted, Well Meaning, Reasonably Intelligent, Technically Sound, Good Looking, Caring, Etc. Etc……But should not have been so narrow as to specify guided wave.

AGA Letter to PHMSA

March 6, 2008

Background

AGA March 2008 Letter:

- ✓ Recognized NACE Clarification ECDA was applicable to casings
- ✓ Recognized Operators using ECDA for casings needed to justify validity of procedures
- ✓ Expressed concern with PHMSA representative stating guided wave would need to be one of the indirect inspection tools if using ECDA for casings.

Background

AGA March 2008 Letter:

- ✓ Made a case that the Stakeholders did not consider the difficulty or expense of assessing casings when drafting the rule.
- ✓ Encouraged PHMSA to get involved in additional research for assessing casings
- ✓ Highlighted there was no legal basis for requiring guided wave to be one of the indirect tools used for ECDA in casings.

Background

PHMSA April 2008 Response:

- ✓ Agreed there was nothing explicit in the rule requiring the use of Guided Wave as an indirect tool for assessing casings.
- ✓ Highlighted the rule did not allow a risk assessment for not assessing pipe in an HCA
- ✓ Highlighted our efforts for developing the guided wave technology
- ✓ Suggested this workshop

Casing Workshop

Thank You

Industry Perspective Next

AGA REGULATORY POSITION ON CASED PIPE ASSESSMENTS

JULY 15-16, 2008

ANDREW LU

American Gas Association

General Comments

- **The 10-year baseline period is fast approaching.**
- **Cased pipelines do not fit well into the regulations and consensus standards adopted.**
- **Operators are expending a significant amount of resources on cased pipeline segments.**
- **Remember that ILI, Pressure Testing and DA are <u>not</u> "equivalent" to one another and they do not need to be. Confusion lies in §192.921(a)(4) with "*other technology*."**
- **Q: What constitutes an acceptable form of baseline assessment for cased pipe segments that are <u>not</u> piggable or conducive to pressure testing?**

What do the existing regulations say?

- Let's first look at the statute….
- The 2002 Pipeline Safety Act says many things, but it does not say: 1) all pipelines must be assessed in the same manner; or 2) all assessment results must be quantitatively equivalent.
- Remember DOT is empowered to grant special permits.
- Sub part O essentially says all pipelines in HCAs must have a baseline assessment.
- For how to perform DA, it defers to NACE RP0502 and ASME B31.8S -- §192.923 and §192.925.
- Q: So what are the key components of "*a properly supported engineering procedure(s) and implementation plan(s)*" as noted in RP0502's Table 2, Footnote 3?

Statistics Based Upon AGA Survey for LDCs*

- ✓ # of cased segments in the U.S. is 9,300 for 8,000 HCA miles
- ✓ Respondents had between 0 and 750 cased pipe segments falling within an HCA
- ✓ On average, cased pipe makes up 2% of an operator's total pipe in HCA (in mileage).
- ✓ Cost just to excavate both ends of casing can be incredibly high.
- ✓ 38% indicated they have a procedure or were developing ECDA procedure to assess cased pipe segments.
- ✓ CIS, DCVG, ACVG, PCM/PCM A-Frame, GWUT were all noted as tools utilized in the ECDA procedure for cased pipe
- ✓ About 29% of casings have both ends under pavement because of road widening which has occurred in the past.
- ✓ 46% have a significant # of coated and cathodically protected casings

*Survey taken Summer of 2007 and 26 AGA members responded to it

How Much Integrity is Enough?

- The approach on casings for IMP may be different between operators due to several variables.
- There have been 6 reportable incidents involving pipelines in casings since 1970. What can we learn from them?
- Gain better understanding of what past research has found and what current research is finding.
- The risk level for each cased pipeline segment is different and based upon many factors. The rigor of assessment should match this risk.*
- Cost and service continuity must be considered along with technical issues.

Important Things to Consider

- What are the characteristics of an ECDA procedure which would meet the intent of RP0502, Table 2, Note 3?
- What does an effective ECDA process for cased pipelines look like and how is GWUT utilized?
- How might it deviate from an ECDA process for uncased pipe segments?
- What are the factors affecting the risk profile of cased pipe segments?
- What constitutes an acceptable form of baseline assessment for cased pipe segments that are <u>not</u> piggable or conducive to pressure testing?

Liquid Pipeline View on Cased Pipelines

Peter Lidiak
Director, Pipeline Segment

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Issues for Liquid Pipelines

Assessment not as much of an issue as for gas operators
- In general, cased liquid pipelines are piggable and so assessment is not the issue

Pros and Cons – there are risks with and without casings

Casings may not be necessary given any or all of the following:
- heavier walled pipe
- newer, stronger materials
- improved welding techniques
- and especially, when horizontally drilled at greater depths than cased crossings

Issues for Liquid Pipelines (cont'd)

Casings complicate inspection, maintenance and repairs

Potential integrity problems associated with casings

- Could interfere with corrosion protection systems
- Under certain conditions may promote corrosion
- Grounding can result in A/C induced or lightning-related defects/anomalies

Liquid Pipeline Interest for Future Action

Sound engineering design should be the basis for using or not using casings

Engage:

- Railroads
- Highway Agencies
- Regulators (federal, state, or local)

NACE International

PHMSA Casing Workshop

Chicago, IL
July 15, 2008

Leaders in Corrosion Control Technology

NACE's Mission

- Protecting People, Assets, and the Environment from the Effects of Corrosion

NACE Standards Activities

- ANSI-accredited standards developer
- 140+ standards
- Numerous standards on pipelines
  - Casing issues included
  - SP0200-2008
  - SP0502-2008

NACE INTERNATIONAL

NACE Standards Development

PHMSA Pipeline Casing Workshop

Chicago, IL
July 15, 2008

Standards Development Process

- All standards must be reviewed every 5 years
- If technical changes needed, revision required
- Same process followed as for new standards
- Task group reaches consensus on revisions

Standards Development Process

- Communication sent to all members of administrative and sponsoring Specific Technology Groups (STGs)
  - Members are asked whether they wish to vote on upcoming ballot
  - Members must provide interest classification
  - 4 weeks to respond
  - Other interested parties may vote on request

Standards Development Process

- Ballot distributed to all who responded "Yes"
- Votes are affirmative, negative, abstaining
- 4 weeks to respond
- Task group addresses negative votes and comments
  - Negative voters may be asked to withdraw based on:
    - Changes made to draft
    - Accepting task group's point of view

Standards Development Process

- If technical changes made or unresolved negatives,
  - Reballot required
  - Voters may change or reaffirm their votes

- If 90% affirmative vs. negative votes achieved, proceed to publication
  - Negative votes considered; voters receive written response to vote

Standards Development Process

- Publication approval by STG chairs, Technology Coordinator, TCC chair
- Editorial review by editorial committee
- Ratification by Board of Directors
- Publication on Web site and in print


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