

FOR FURTHER INFORMATION CONTACT:

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Background

This research program began in 1996. The first phase of the MFL technology research (DTRS56-96-C-0010, *In-Line Inspection Technologies for Mechanical Damage and Stress Corrosion Cracking (SCC) in Pipelines*, was fully funded by RSPA/OPS. Battelle worked with its research partners, SwRI and Iowa State University, to complete this phase of the research. GRI provided technical and project management assistance.

Magnetic flux leakage (MFL) is the most commonly used in-line inspection (ILI) technology for detecting pipe wall corrosion. Until about 1996, the technology was not capable of reliably detecting mechanical damage (gouges and scratches) or long, thin axial defects, both of which are common causes of pipeline failures.

Battelle designed an intelligent MFL in-line inspection tool ("smart pig") and was responsible for data acquisition and analysis using GRI's Pipeline Safety Simulation Facility (PSF) in Ohio. Natural and fabricated pipe samples with corrosion and other defects were used to evaluate the capabilities of the Battelle device. SwRI conducted mechanical testing and studied the feasibility of non-linear harmonics (NLH) for in-line inspection applications. The Iowa State University researchers attempted to develop a neural network analysis process to analyze MFL signals and determine by trained pattern recognition the extent of metallurgical damage. The 2000 final report on this part of research is available on the OPS Web site, at primis.rspa.dot.gov—click on > Pipeline Safety Research and Development > Recent Projects > R&D Database > Inline Inspection/Pigging and, finally, > In-Line Inspection Technologies for Mechanical Damage and SCC in Pipelines.

To continue this research, RSPA/OPS co-funded an additional \$1,180,000 for a 3-year project of advanced research and development. GTI was the program manager, and Battelle and SwRI were the research partners. The project, DTRS656-00-H-0004, *Better Understanding of Mechanical Damage*, focused on designing a smart pig

capable of circumferential (transverse) magnetization for detecting longitudinally oriented cracks, crack-like defects, and mechanical damage defects, particularly gouges. The project scope included the determination of criteria for assessing the relative severity of detected defects and advanced research in NLH tool design and analysis. As the research progressed, additional analyses and testing were identified that added value to the project.

The tentative agenda for the meeting is as follows.

Welcome—Stacey Gerard

Introduction, History and

Achievements—Gopala Vinjamuri

Fit with IMP Rule; Effective

Technologies—Keith Leewis

Statistics; Progress in Safety; SOA—

Harvey Haines

Mechanical Damage R&D—Harvey

Haines

Break

Project Organization and Overview—

Albert Teitsma

Battelle R&D MFL for Mechanical

Damage—Bruce Nestleroth

SwRI R&D for Nonlinear Harmonics—Al

Crouch

Technology Transfer—Alan Dean

Questions and Answers

Lunch

Mechanical Damage Detection/

Characterization—Graham Chell,

Bruce Nestleroth

Implementation of MFL Decoupling—

Alan Dean

Final Questions and Answers

Conclusions—Gopala Vinjamuri

Issued in Washington, DC, on October 3, 2003.

James K. O'Steen,

Deputy Associate Administrator for Pipeline Safety.

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DEPARTMENT OF TRANSPORTATION**Research and Special Programs Administration****Pipeline Safety: Stress Corrosion Cracking (SCC) Threat to Gas and Hazardous Liquid Pipelines**

AGENCY: Research and Special Programs Administration (RSPA), DOT.

ACTION: Notice; issuance of advisory bulletin.

SUMMARY: RSPA's Office of Pipeline Safety (OPS) is issuing this advisory notice to owners and operators of gas and hazardous liquid pipelines to consider the threat from stress corrosion

cracking (SCC) when developing and implementing Integrity Management Plans. Operators should determine whether their pipelines are susceptible to SCC and assess the impact of SCC on pipeline integrity. Based on this evaluation, an operator should prioritize application of additional in-line inspection and hydrostatic testing and take actions to remediate problem areas.

FOR FURTHER INFORMATION CONTACT:

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I. Advisory Bulletin (ADB-03-05)

To: Owners and Operators of Gas and Hazardous Liquid Pipeline Systems.

Subject: Stress Corrosion Cracking (SCC) Threat to Gas and Hazardous Liquid Pipelines.

Purpose: To advise owners and operators of natural gas and hazardous liquid pipeline systems to consider stress corrosion cracking as a possible safety risk on their pipeline systems and to include SCC assessment and remediation measures in their Integrity Management Plans.

Advisory: Each owner and operator of a gas or hazardous liquid pipeline system should assess the risk of stress corrosion cracking (SCC). Pipeline owners and operators should evaluate their systems for the presence of risk factors for high pH (9–11) SCC or near-neutral pH (6–8) SCC. Criteria for high pH SCC can be found in Appendix A3.3 of standard ASME B31.8S. If conditions for SCC are present, a written inspection, examination, and evaluation plan should be prepared and appropriate action should be taken in accordance with Appendix A3.4 of standard ASME B31.8S. RSPA/OPS will soon publish a final rule on the integrity management program for gas transmission pipelines in high consequence areas that incorporates requirements for addressing SCC threats by referencing Appendix A3 of standard ASME B31.8S. Although criteria and mitigation plans for near-neutral pH (6–8) SCC are not addressed in this standard, NACE International (NACE) is currently developing a standard on Direct Assessment of Stress Corrosion Cracking. Also, NACE will soon issue a technical committee report, *External Stress Corrosion Cracking of Underground Pipelines*, to provide information on SCC for hazardous liquid pipelines.