Pipeline Integrity Verification Process

Virginia's Experience

James M. Hotinger, PE

Assistant Director, Division of Utility and Railroad Safety

Virginia State Corporation Commission

Virginia's Experience with Integrity Verification

- These issues are not new. Integrity verification has been a concern for at least 46 years.
- From the Hearings before the Committee of Commerce, U. S. Senate, Ninetieth Congress, First Session on S. 1166, A Bill to Authorize the Secretary of Transportation to Prescribe Safety Regulations for the Transportation of Natural Gas by Pipeline, April 19, 1967 - Statement of Hon. Lee C. White, Chairman, Federal Power Commission
  - "The safety of older pipe in the ground is the most important safety issue today…"

Virginia's Experience with Integrity Verification

- From the Statement of the Chairman, Hon. Warren G. Magnuson, Committee of Commerce, U. S. Senate, Ninetieth Congress, during the First Session on S. 1166, A Bill to Authorize the Secretary of Transportation to Prescribe Safety Regulations for the Transportation of Natural Gas by Pipeline, April 19, 1967 while speaking on the application of B31.8 -1963 by industry:
  - "…There are currently no provisions for retesting existing facilities to find out if they are adequate for the pressure at which they are operating…"

Virginia's Experience with Integrity Verification

What did Industry representatives say at these same hearings 46 years ago?

- From the Statement of M. V. Burlingame, Senior Vice President, Natural Gas Pipeline Co. of America during the Hearings before the Committee of Commerce, U. S. Senate, Ninetieth Congress, First Session on S. 1166, A Bill to Authorize the Secretary of Transportation to Prescribe Safety Regulations for the Transportation of Natural Gas by Pipeline, April 20, 1967:

- "I think you will find from the record that many companies are already dealing with [changing population density] by either retesting, relaying, or doing whatever is necessary to see that the line is safe in the areas where population has increased."

Virginia's Experience with Integrity Verification

- Mr. Burlingame went on to say to the Committee:*
- "Equally impressive is the practice of retesting and re-evaluating pipelines where population occurs. Many companies have adopted this practice…and [this] practice consists of making periodic surveys to determine areas in which encroachment is…occurring. In the areas affected by encroachment, the design, operating pressure, previous test pressure, operating history and the conditions of the pipeline [are] reviewed. If the condition and/or operating history of the line is good, the line must be either tested to 90% of [SMYS] to prove its safety or the operating pressure of the line must be reduced. If the condition of the pipeline is questionable, then it must be replaced. It is these practices that account for the fact that older pipelines are not and will not be allowed to become a threat to public safety."
- *From the Statement of M. V. Burlingame, Senior Vice President, Natural Gas Pipeline Co. of America during the Hearings before the Committee of Commerce, U. S. Senate, Ninetieth Congress, First Session on S. 1166, A Bill to Authorize the Secretary of Transportation to Prescribe Safety Regulations for the Transportation of Natural Gas by Pipeline, April 20, 1967:

Virginia's Transmission System

- Natural Gas
  - Almost 3,000 miles ranging from 4 to 24 inches in diameter
- Liquid
  - More than 1,100 miles of pipe ranging from 6 to 36 inches in diameter

Virginia's Experience with Integrity Verification

January 4, 2011 – PHMSA's Advisory Bulletin (ADB-11-01) addressing, among other things, the need for companies to have accurate records demonstrating the appropriateness of the MAOP for transmission pipelines.

February 16, 2011 – The Division of Utility and Railroad Safety sends a letter to operators of gas transmission pipelines requesting all MAOP documentation be made available for review.

Information was reviewed in March and April, 2011. MAOP documentation was also reviewed for pipelines operating between 15-20% of SMYS.

Virginia's Experience with Integrity Verification

- 11 known issues verifying the adequacy of the MAOP for transmission pipelines
- Issues included lack of pressure test data, wall thickness or pipe strength information, or information on the fittings used.

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The affected pipelines had been placed into service as early as 1958. Most were placed into service between 1970 and 2000.

However, several transmission pipelines placed into service as late as 2010 were also missing information.

Virginia's Experience with Integrity Verification

Example 1:

- 6 miles of 12-inch X42 steel pipe installed in 1994
- Wall thickness – 0.375 inches
- Pressure tested and 493 psig MAOP established - 19.95% of SMYS
- Record review found 27 Grade B (35,000 psig) fittings in the work order documentation

Virginia's Experience with Integrity Verification

Example 1 (continued):

- Six exploratory digs on the fittings were conducted
- One of the six fittings was found to be Grade B

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Example 1 (continued):

- Pipeline was now considered transmission as it was operating at approximately 23.9% of SMYS with the Grade B fittings

Virginia's Experience with Integrity Verification

Example 1 (continued):

- Resolution – Lowered the MAOP to 410 psig, which is less than 20% of SMYS

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Example 2:

- 17 miles of 18-inch steel pipe operating with a 1,250 psig MAOP
- Issue was relative to documentation - pressure test information on the last three segments constructed was not clear as to the lengths of the tested segments.

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Example 2:

- Resolution – Hydrostatic testing plan being developed to pressure test the affected segments.

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Example 3:

- 23 miles of 6-inch steel pipe installed in 1958
  - One of the main sources of gas to a town
- Wall thickness – Unknown
- Pipe strength - Unknown
- Pressure test – No record found

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Example 3 (continued):

- Sampling plan developed to measure wall thickness
- Abandoned sections of the pipeline were excavated and removed for material testing
- Operating pressure lowered from 500 to 400 psig

Virginia's Experience with Integrity Verification

Example 3 (continued):

- Sampling plan – 95% confidence interval selected – all samples showed .188 wall
- Pipe section removed and tested demonstrated Grade B strength of 35,000 psig – operator took conservative approach and continued to use 24,000 psig for calculations

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Example 3 (continued):

- DCVG Survey conducted over entire pipeline
  - ECDA digs still being conducted
- CIS also performed and test stations were installed at low points along the pipeline

Virginia's Experience with Integrity Verification

Example 3 (continued):

Company plans to derate the pipeline by installing additional pipeline to reduce the need for higher pressure in the 6-inch pipeline.

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Example 3 (continued):

However, there is a remaining issue identified several weeks ago. Company continued to take wall thickness measurements whenever the pipe was exposed for any purpose, whether welding, repairing, or performing an ECDA inspection. A total of 561 measurements of the pipe wall thickness found .188 inches. The 562nd measurement found .156 inch wall thickness.

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Example 3 (continued):

Remaining Issue Resolution

Company currently evaluating statistical analysis to determine the effect of the single .156 wall pipe section and how much additional sampling may be required to evaluate if any other .156 wall pipe is in the system.

Virginia's Experience with Integrity Verification

- These examples demonstrate that integrity verification is a dynamic process and that the issues may be resolved. However, sometimes the process may have to go backwards several steps in order to continue to move forward.

Virginia's Experience with Integrity Verification

- Lack of knowledge of the pipeline characteristics and documentation that is missing can be overcome.

- However, it must be done through a verifiable, demonstrable process that provides the information required by Part 192 to establish the MAOP.

Questions?