VALIDATING MAXIMUM ALLOWABLE OPERATING PRESSURES (MAOP) FOR PIPELINES

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AGENDA

• Introductions
• What is MAOP and what is all the fuss?
  • Definition/How calculated?
  • Issues/Considerations
• Regulatory Practices-Past, Present and Future
• What Utilities can do to get their house in order?
• Summary
• Questions/Answers
SPEAKER BACKGROUND

- 27 YEARS IN NATURAL GAS INDUSTRY; 19 YEARS SPENT AT UTILITIES IN OPERATIONS, MANAGEMENT AND ENGINEERING
- GIS MANAGER FOR AGL RESOURCES 1987-93
- DOMESTIC AND INTERNATIONAL EXPERTISE IN UTILITY RISK ASSESSMENTS and DUE DILIGENCE
- ADVISORY TO CALIFORNIA ENERGY COMMISSION (CEC) ON SAN BRUNO INCIDENT
SOLVING THE WORLD’S COMPLEX CHALLENGES

BLACK & VEATCH CORPORATION IS A LEADING GLOBAL ENGINEERING, CONSULTING AND CONSTRUCTION COMPANY

• Founded in 1915
• Global workforce of more than 9,000
• More than 100 offices worldwide
• Projects in more than 100 countries on 6 continents
• $2.6 billion in annual revenues in 2011
• Employee-owned corporation
Client Example: Pipeline Integrity Assignment

• We are PG&E’s lead partner for its GAS Transmission Asset Management System (GTAMS) Project

• The Project is to:
  • Provide an integrated automated records system for their transmission system
  • Provide the required pipeline data
  • Provide system for managing inspections, testing and maintenance and providing transparency and compliance.
  • Design and drive the mobile field systems and corporate systems through integration
  • Orchestrate the organization to a single enterprise integrated solution
What is MAOP and what is all the fuss?
Maximum Allowable Operating Pressure (MAOP)

• Definition from 49CFR192

“Maximum allowable operating pressure (MAOP) means the maximum pressure at which a pipeline or segment of a pipeline may be operated under this part.”

• How is MAOP Calculated?

<table>
<thead>
<tr>
<th>Class location</th>
<th>Factors¹, segment—</th>
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<tbody>
<tr>
<td></td>
<td>Installed before (Nov. 12, 1970)</td>
</tr>
<tr>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>1.25</td>
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<td>3</td>
<td>1.4</td>
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<tr>
<td>4</td>
<td>1.4</td>
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Maximum Allowable Operating Pressure (MAOP)

• MAOP is the key factor in any pipeline that could limit pressure and flow-regulates pipeline to the “weakest link”

• Transmission vs. Distribution
  • Class 3 and 4 Locations
  • Class 1 and 2 HCA locations

• Why is MAOP a big deal now?
Maximum Allowable Operating Pressure (MAOP)

- This is why.
RECENT PIPELINE INCIDENTS
ROOT CAUSES, ISSUES, COMMON THREADS

- Data Management
- Workforce Planning
- Aging Infrastructure
- Procedures
- Emergency Response
- Communication

Pipeline Incidents
Regulatory Practices—Past and Present
Accepted MAOP Validation Regulatory Practices - Past/Present

• Design pressure of the weakest element in the segment
• Pressure test
• Highest actual operating pressure in the 5 years prior to segment falling under 192 jurisdiction
• Maximum safe pressure considering the history of the segment, particularly known corrosion and actual operating pressure
• Typically affidavit by experienced operator accepted for initial pressure test or pressure during operation.
Accepted MAOP Validation Regulatory Practices - Future

- PHMSA Advisory Bulletin 11-01 “MAOP Reminder”
  - Reliable, Traceable, Verifiable and Complete
- PHMSA Advisory Bulletin 12-06 “MAOP Verification”
  - Submit data on pipelines:
    - With Verifiable records
    - Without records
  - Examples of what is Traceable, Verifiable and Complete
SO HOW DOES YOUR DATA STACK UP?

DATA
- Paper Maps and Records
- GIS
- Historical Files
- Job Records
- As-built Documents
- Missing Records
Traceable?

• Traceable records are those which can be clearly linked to original information about a pipeline segment or facility.

• Traceable records might include:
  • Pipe mill records, purchase requisition, or asbuilt documentation indicating minimum pipe yield strength, seam type, wall thickness and diameter.

• Careful attention should be given to records transcribed from original documents as they may contain errors. They should be verified and collaborated.
Verifiable?

• Verifiable records are those in which information is confirmed by other complementary, but separate, documentation.

• Verifiable records might include:
  
  • Contract specifications for a pressure test of a line segment complemented by pressure charts or field logs.
  
  • Purchase order to a pipe mill with pipe specifications verified by a metallurgical test of a coupon pulled from the same pipe segment.

• In general, the only acceptable use of an affidavit would be as a complementary document, prepared and signed at the time of the test or inspection.
Complete?

• Complete records are those in which the record is finalized as evidenced by a signature, date or other appropriate marking.

• For example:
  • a complete pressure testing record should identify a specific segment of pipe, who conducted the test, the duration of the test, the test medium, temperatures, accurate pressure readings, and elevation information as applicable.
  • An incomplete record might reflect that the pressure test was initiated, failed and restarted without conclusive indication of a successful test.
Complete?

- A record that cannot be specifically linked to an individual pipe segment is not a complete record for that segment.
- Incomplete or partial records are not an adequate basis for establishing MAOP or MOP. If records are unknown or unknowable, a more conservative approach is indicated.
What Utilities can do to get their house in order?
PRACTICAL STEPS UTILITY MANAGERS, STAFF CAN TAKE

• STEP 1: PERFORM AN ASSESSMENT OF EACH OF THESE AREAS

• STEP 2: DOCUMENT FINDINGS/GAPS

• STEP 3: MAKE A PLAN AND START WORK
ASSESSMENT STEPS-
WHAT, WHERE AND IS IT USABLE?

- What do you have?
- Where is it located?
- Is it Traceable, Verifiable and Complete?
- Included in Integrity Management Records?
- Identify Gaps

Perfect world-you have all MAOP records in a GIS database that are Traceable, Verifiable and Complete.
WHAT IS AN ACCEPTABLE DOCUMENT?

> Document Grading Matrix

– Focus on 3 key document types (Pipe Data, Hydrotest, Grandfathered Pipe)
– Rank source document quality (1: Excellent – 7: Poor)
Prioritize by importance i.e. HCAs, Leak rate, Corrosion issues, Class 3, 4 then Class 1,2

Develop template to document findings i.e. type record found, summary, procedure to scan or store.

Rainy day work

College students, temporary labor

One idea is to develop internal teams and make a competition for data collection and accuracy
ASSESSMENT STEPS- DEVELOPING A PLAN TO ESTABLISH MAOP

- Working by priority segments:
  - Decide which MAOP validation method is best suited for this segment
  - Develop plan to correct gaps including timeframe, assignments and dependencies
  - Periodic review

Regulators like to see a plan of what you will do even if there are gaps in what you have
Your data should be saved for the life of the pipeline.
Summary
SUMMARY

- Can’t Control Regulation
- Records vary by type and accuracy
- Limited Resources and Time
- What you can do-assess where you stand, identify gaps and make a plan to correct
- Preventative Review vs. Reactive Correction
- Don’t wait on regulatory mandates-make a plan and take steps
- FOCUS ON WHAT YOU CAN CONTROL AND TAKE ACTION
Questions? & Answers
Building a world of difference.

Together