Pipeline Integrity Management
Gas Transmission Pipelines

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Pipeline Integrity Management

- Our main goals
- Gas HCA - Final rule
- Gas IMP - NPRM
- Milestones
Our Main Goals

• Provide for increased assurance to the public
• Accelerate integrity assessment of pipelines in high consequence areas (HCA)
• Improve integrity management systems within companies
• Improve the government’s role in validating integrity management
Gas HCA – Final Rule
(High Consequence Areas)

- Class 3 and 4 locations
- Impact radius 300/660/1000* feet
  - = 1000 ft for pipe D > 30” & P > 1000 psi
  - = 300 ft for pipe D < 12” & P < 1200 psi
- Building or facility having persons who are difficult to evacuate (e.g., schools, hospitals, nursing homes, prisons)
- Places where people congregate (e.g., playgrounds, camping grounds, recreational facilities)
Gas IMP – NPRM
HCA Definitions (cont.)

- **New HCA component**: area of an impact circle of threshold radius 1000 ft or larger that has 20 or more buildings (large dia and hi press lines)

**Potential Impact Radius**: Use C-FER equation

**Threshold Radius**: Additional safety margin beyond C-FER calculated PIR

**Potential Impact Circle**: Contains 20 or more buildings within a circle of threshold radius 1000 ft, or hard to evacuate place in 300/660/1000 ft circle, or a place where people gather in 300/660/1000 ft circle

**Potential Impact Zone**: Determined by sliding ‘Potential Impact Circle’ along the pipe
Class Location Determination

- Class 1
- Class 3
- Class 4

46 buildings

660 ft

M.P. 0  M.P. 1  M.P. 2  M.P. 3
As buildings and facilities are identified, the distance is measured from the pipeline to the building.
Example of an HCA Segment

ABC Pipeline

- diameter = 24”
- pressure = 800 psi
- PIR = 468 ft (C-FER)
- TR = R = 660 ft

R = distance from closest point of prison to pipeline.

Distance of 660 ft. is specified in final rule 192.761(e)
Determining Potential Impact Zone

School

660 ft

ABC Pipeline

Pipe dia = 30 inch
MAOP = 1000 psi
PIR (C-FER) = 655 ft
TR = r = 660 ft
Potential Impact Circle (HCA example)

ABC Pipeline

20 buildings

TR=1000 ft

660 ft

660 ft

Note: HCA component of 20 or more buildings within a TR 1000 ft applies to large dia and hi press lines
Determining Threshold Radius

Potential Impact Radius (PIR)

- C-FER + 15%
- 4000 btu (Regulators)
- 5000 btu (C-FER)

Nominal Diameter
- 12 in
- 24 in
- 36 in
- 42 in

MAOP (psi)
- 400
- 600
- 800
- 1000
- 1200
- 1400

Potential Impact Zones
- 660 ft
- 1000 ft
- 1300 ft

4000 btu
5000 btu
1300 ft

Determining Threshold Radius (C-FER)
Continuous Sliding Mile (examples of MRA)

1 mile

46

HCA or MRA?
Examples of MRA

Class 3

ABC Pipeline

300 ft

MRA

Class 4

12” pipe, 700 psi

660 ft

300 ft

HCA

MRA
Gas IMP – NPRM
(Scope)

• All gas transmission lines including those transporting petroleum gas, hydrogen, or other gases covered under Part 192

• No gathering or distribution lines
**Gas IMP – NPRM**  
*(Elements)*

1. **Identify HCA segments** (12 months)
2. **Develop IMP framework** (12 months)
3. **Develop a plan** (12 months)
   - Baseline assessment & DA (if applicable)
   - Performance-Based option
4. **Identify and evaluate threats & Remedial actions**
5. **Continual evaluation and assessment**
6. **Preventive and mitigative measures**
7. **Performance measures & Record keeping**
8. **Management of change & Quality assurance**
9. **Communication plan; Copy of IMP to State**
10. **Environmental and safety risk during assessment**
Gas IMP - NPRM

Select Assessment Technology:

• Select technology best suited for type of threat
• Acceptable technologies: ILI, pressure testing, direct assessment (DA) & other equivalent technology
• DA- External Corrosion, Internal Corrosion & SCC
Gas IMP - NPRM
(Direct Assessment)

- DA is an integrity assessment method utilizing a process to evaluate certain threats (e.g. EC, IC, SCC) to a pipeline’s integrity.

- Use of DA as primary method conditional
  - Other assessment methods cannot be applied
  - Substantial impact on consumers
  - Pipeline operates at MAOP <30% SMYS
  - Operator will excavates entire segment
Gas IMP - NPRM
(ECDA Region Defined)

- ECDA Regions not necessarily contiguous
- Similar physical characteristics
- Similar operating and corrosion history
- Similar expected future corrosion conditions
- Same indirect examination methods apply
- Regions can be redefined if observed conditions indicate appropriateness
ECDA Region Indications

ABC Pipeline

- **Severe indications**
  - Immediate action
  - Excavate all indications

- **Moderate indications**
  - Scheduled action
  - Excavate 2 high risk indications

- **Minor indications**
  - Monitored action
  - Excavate one high risk indication
Cathodic Protection (Close-Spaced)  ON/OFF CP Survey

CP Drop below 850mV

DCVG

External Calls from DCVG

Metal Loss

External Calls from ILI
Gas IMP - NPRM
(Confirmatory Direct Assessment)

• Confirmatory DA is a streamlined integrity assessment method that utilizes process steps similar to DA to evaluate for presence of corrosion and third party damage.

• If used, CDA Plan is required (ECDA example)
  Process similar to DA except:
  ° Indirect examination by one tool
  ° Excavation of all immediate action indications
  ° Excavation of one indication in the scheduled action category
  ° No excavation in the monitored indications
  ° Remediation similar to DA
Gas IMP - NPRM
(Baseline Assessment Intervals)

• Start date is December 17, 2002
  (Date of the new Pipeline Safety Law)

• Operators using ILI or pressure testing
  ◦ Must complete Baseline within 10 yrs
  ◦ 50% of covered pipe must be assessed within 5 Years (Focus on highest risk segments)
  ◦ Exception: “Moderate Risk Areas” must be assessed within 13 Years
Gas IMP - NPRM
Baseline Assessment Intervals (cont.)

• Operators using direct assessment
  ° Must complete Baseline within 7 yrs
  ° 50% of covered pipe must be assessed within 4 Yrs (Focus on highest risk segments)
  ° Exception: “Moderate Risk Areas” must be assessed within 10 Years
Gas IMP - NPRM
Baseline Assessment Intervals (Cont.)

• The use of prior assessments
  ° Integrity assessments satisfying requirements of this rule conducted subsequent to 12/17/97 may be used as the baseline
  ° The date of this earlier assessment is that when the reassessment interval begins
Gas IMP - NPRM

Actions to address integrity issues:

• Immediate repair conditions, 180-day remediation, and longer than 180-day remediations per OPS and ASME B31.8S std.
Gas IMP - NPRM

Preventive and Mitigative Measures

- Operators to consider additional actions specific to their systems to enhance public safety
- P & M measures include considering remote control valves or emergency shut-off valves, computerized monitoring and leak detection systems, extensive inspection and maintenance
- Reference ASME B31.8S std.
Gas IMP - NPRM
(Reassessment Intervals)

- Reassessment period (for segment) begins upon completion of previous assessment

- If interval is longer than 7 years, operator must conduct “Confirmatory Direct Assessment” within 7 years
Gas IMP - NPRM
Reassessment Intervals (cont.)

- Operators using ILI or pressure testing
  - Maximum interval of
    10 Yrs (Hoop stress ≥ 50% SMYS); or
    15 Yrs (Hoop stress < 50% SMYS)

- Operator using direct assessment
  - Maximum interval of
    5 Yrs (Sample Defect Excavated); or
    10 Yrs (All Defects Excavated)
**Gas IMP – NPRM**  
*(Performance Measures)*

**Monitor Effectiveness:**


- Four overall performance measures accessible to OPS and State
Gas IMP - NPRM
(Required 4 Performance Measures)

• Miles Assessed vs. Program Requirements
• Number of Immediate Repairs Completed
• Number of Scheduled Repairs Completed
• Number of Leaks, Failures, Incidents (by Cause)
Gas IMP - NPRM
(Public Comments Invited)

- Should rural buildings (e.g. rural churches, etc.) be designated as MRAs requiring less frequent assessments or enhanced P&M?
- Should we allow max. 20 yr reassessment interval (w/ a CDA – 7th and 14th yr) for pipe operating below 30% SMYS? (applicable to press test or ILI methods)
- Should we allow reassessment every 7 yrs by CDA method only for pipe operating below 20% SMYS?
- Should we allow 10 yr reassessment interval (by DA method) for pipe operating less than 30% SMYS, if the operator excavates and remediates at least highest risk anomalies?
- Should OPS accept NACE std. for DA (external corrosion) without extensive requirements?
Milestones

- Final Rule - HCA definition … 08/06/02
- NPRM - Gas IMP……………… 01/28/03
- NPRM - Mapping ………… Spring 2003
- Final Rule – Gas IMP ……….. 12/17/03