SUPPLEMENTAL SCC QUESTIONNAIRE
GAS TRANSMISSION OR LIQUID PIPELINE

Williams Gas Pipeline – West **OPID# 13845**
Sumas District **Unit # 8355**
Inspection Date: June 13 – 17, 2011

1. Pipeline Safety Advisory Bulletin - ADB-03-05 - October 8, 2003
   • Review Bulletin with operator, if operator is not familiar with.
   • Reference also Baker Stress Corrosion Cracking Study at:
   http://primis.phmsa.dot.gov/gasimp/docs/SCC_Report-Final_Report_with_Database.pdf

Comments: **Yes, Williams is aware of the bulletin. Baker Stress Corrosion Cracking report is used as a reference.**

2. Has the pipeline system ever experienced SCC (in service, out of service, leak, non-leak)?
   • Type of SCC?
     Classical - high pH
     Non-classical – low or near neutral pH
   • What are the known risk indicators that may have contributed to the SCC?

Comments: **Yes, the 26" (abandoned) mainline pipeline has experienced SCC rupture. Known indicators are stress, steel, coating degradation, and environment.**

3. Does the operator have a written program in place to evaluate the pipeline system for the presence of SCC? If no, have operator explain. If operator has not considered SCC as a possible safety risk, go to #10.

Comments: **Yes, when pipe is exposed, coating is evaluated and removed if corrosion is identified. As part of pipeline evaluation, NDT including magnetic particle inspection (MPI) is performed on damaged or suspect coating.**

4. Has/does the operator evaluate the pipeline system for the presence of SCC risk indicators?

Comments: **Yes, the 26" (idle) mainline showed presence of SCC. The 30" has been evaluated and although this line is in close proximity to the 26", the 30" has not shown susceptibility. Laterals in Sumas District have shown any susceptibility to SCC (less than 60% SMYSs) and no external environmentally assisted cracking has been found during MPI.**

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5. Has the operator identified pipeline segments that are susceptible to SCC?

Comments: **Yes, the Sumas District has been identified as susceptible, but no significant cracking indications have been found to date following UT, MFL and EMAT ILI tools.**

6. If conditions for SCC are present, are written inspection, examination and evaluation procedures in place?

Comments: **Yes, and the Integrity Specialist is contacted to verify the indications represent environmentally assisted cracking and uses ultrasonic for depth sizing. Frequently, the operator will utilize Phased Array Ultrasonic to obtain a more accurate crack tip depth. Each dig report contains photographic documentation of the site. The Integrity Specialist receives annual training on SCC evaluation.**

7. Does the operator have written remediation measures in place for addressing SCC when discovered?

Comments: **Yes, company procedures are in place with recommendation to contact the Integrity Specialist.**

8. What preventive measures has the operator taken to prevent recurrence of SCC?
    - Modeling?
        - Crack growth rate?
        - Comparing pipe/environ./cp data vs. established factors?
        - Other?
    - Hydrotest program?
    - Intelligent pigging program?
    - Pipe re-coating?
    - Operational changes?
    - Inspection program?
    - Other?

Comments: **At compressor stations additional cooling capacity has been installed at the discharge, ILI tools include crack detection tools and for exposed pipe examination include magnetic particle inspection and coating replacement.**

9. Does the operator incorporate the risk assessment of SCC into a comprehensive risk management program?

Comments: Yes, Williams IMP Risk model has identified locations that are susceptible to SCC.

Continue below for those operators who have not considered SCC as a possible safety risk.

10. Does the operator know of pipeline and right of way conditions that would match the risk indicators for either classical or non-classical SCC? See typical risk indicators below.

Comments: Yes, at known areas on the 26" (abandoned) mainline where classical and non-classical cracking has been found in the wet environments and near the discharge of the compressor stations.

High pH SCC Potential Risk Indicators

- Known SCC history (failure, non-failure, in service, and during testing)
- Pipeline and Coating Characteristics
- Steel grades X-52, X-60, X-65, X-70, and possibly X-42
  - Age ≥ 10 years
  - Operating stress > 60% SMYS
  - Pipe temperature >100 deg. F (typically < 20 miles d/s of compression)
  - Damaged pipe coating
- Soil Characteristics
  - Soil pH range: 8.5 to 11
  - Alkaline carbonate/bicarbonate solution in the soil
  - Elevated soil temperature contributing to elevated pipe temperature
- Polarized cathodic potential range: -600 to -750 mV, $Cu/CuSO_4$

Low or Near-Neutral pH SCC Potential Risk Indicators

- Known SCC history (failure, non-failure, in service, and during testing)
- Pipeline and Coating Characteristics
- Steel grades X-52, X-60, X-65, X-70, and possibly X-42
  - Age ≥ 10 years
  - Frequently associated with metallurgical features, such as mechanical damage, longitudinal seams, etc.
  - Protective coatings that may be susceptible to disbondment
    - Any coating **other than** correctly applied fusion bonded epoxy, field

applied epoxies, or coal tar urethane . . .

- Coal tar
- Asphalt enamels
- Tapes
- Others

- Soil Characteristics
  - Soil pH range: 4 to 8
  - Dissolved CO_2 and carbonate chemicals present in soil
  - Organic decay
  - Soil leaching (in rice fields, for example)

- "Normal" cathodic protection readings (disbonded coating shields the pipe from cp current)