

SUPPLEMENTAL SCC QUESTIONNAIRE
GAS TRANSMISSION OR LIQUID PIPELINE

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, TransCanada is aware of the SCC threat to pipelines and has identified SCC as a threat of concern to the GTN Pipelines.

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:

From discussion with GTN operational staff, there has not been any reported occurrence of SCC. The GTN A-Line is at risk as per ASME B311.8S (age of pipe > 10 years, operating stress > 60%, and coating other than FBE).

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, the Stress Corrosion Cracking Direct Assessment (SCCDA) Procedure in conjunction with other company standards, processes and procedures. TransCanada's SCCDA Procedure was audited by PHMSA and the WUTC in August/September 2010.

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

SUPPLEMENTAL SCC QUESTIONNAIRE
GAS TRANSMISSION OR LIQUID PIPELINE

Comments:

Yes, TransCanada completed a risk assessment of the entire pipeline system, not just the HCA's.

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

Comments:

Yes, mostly on the A-Line has been identified as SCC susceptible.

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

Comments:

TransCanada uses its own Threat Identification process to determine if SCC conditions are present. This process allows the company to evaluate the presence of SCC and its corresponding threat level (e.g. low, medium, high). Based on the threat level classification TransCanada will determine the type of assessment. Assessments have prescribed examination and evaluation procedures in place in order to assess the presence of SCC on TransCanada's system. To date, no SCC has been identified on the GTN system, despite the fact that TransCanada diligently looks for evidence of SCC on all opportunistic and targeted excavations.

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

Comments:

Yes, TransCanada has a procedure, 'Repair of Pipeline Defects and Imperfections'.

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?

SUPPLEMENTAL SCC QUESTIONNAIRE
GAS TRANSMISSION OR LIQUID PIPELINE

- Intelligent pigging program?
- Pipe re-coating?
- Operational changes?
- Inspection program?
- Other?

Comments:

TransCanada has preventative condition monitoring and mitigative options combined with re-assessment guidelines depending on SCC detected where there is an identified threat. In addition, TransCanada maintains adequate Cathodic Protection on the entire GTN system as per NACE guidelines and Federal Regulations.

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

Comments:

Yes, TransCanada utilizes a quantitative risk assessment process (PRIME) to model the threat of 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, the SCCDA plan includes reference to these risk indicators. As indicated, above the A-Line is recognized as a threat of SCC.

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 \geq 10 years
 - Operating stress $>$ 60% SMYS

SUPPLEMENTAL SCC QUESTIONNAIRE
GAS TRANSMISSION OR LIQUID PIPELINE

- 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/CuSO₄

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 \geq 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 CO₂ 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)