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: ADB-03-05 was reviewed and is documented in OMER 1 Appendix B. An SCC Program was developed by BP and is an ongoing program.

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: Non-significant and near-neutral SCC was found during targeted digs on the Renton-Portland 14" line in 2008. Risk indicators on this segment include > 60% SMYS operating pressures, susceptible pipeline coating (coal tar, tape, FBE), and environmental factors (within HCA).

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: BP has a written SCC program in place (posted during the Integrated Inspection in 2010).

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

Comments: SCC susceptibility determination is based on risk factors and field findings.

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

Comments: Yes - segments susceptible include RP14", FA16", AR16", AR20".

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

Comments: Yes - BP STP 32-199 - ILI Field Inspection Protocol (posted during the Integrated Inspection in 2010) includes specific guidance for examination and evaluation of SCC digs.

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

Comments: Yes - See OMER 1 P-195.422 G.7 and Exhibit RR-1 for remediation measures.

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: Prevention measures include comparing pipe/environmental/cp data, ongoing in-line inspection, and in-the-ditch inspection protocol BP STP 32-199.

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

Comments: Yes - See IMP Program: P-195.452f5 Continuous Evaluation & Assessment.

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.

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Comments: Not applicable.

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)