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Model Modules to Assist Assessing and Controlling Stress Corrosion Cracking #126
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SCC is a mechanism of cracking that occurs where a tensile stress acts on a material susceptible to cracking in a given environment. For pipelines the tensile stress is pressure induced. The environment comprises ground water and various decaying matter that in the presence of typical levels of cathodic potential imposed for corrosion control produces varying amounts of carbonic acid, and carbonate and bicarbonate ions. Most line pipe steels have been found susceptible to cracking in such environments at sufficient stress and selected mixes of these constituents.

Cracking has historically been understood and controlled in environments dominated by carbonate and bicarbonate ions. As yet, cracking in the presence of carbonic acid where the pH is slightly acidic (pH order of 6) is ill understood. Tools need to be developed to help manage SCC for such ground-water environments. The objective of this project is to develop such tools.

Work thus far has focused on the mechanism for near-neutral SCC (NNSCC). We have completed the underlying literature assessment and began to finalize an electrochemical mechanism for NNSCC. We also have initiated experiments designed to establish the optimum condition for cracking kinetics via beaker studies. Work will continue on both aspects over the next several monthly reporting periods.