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### FEASIBILITY OF ON-LINE MONITORING OF STRESS CORROSION CRACKING IN ROTATING COMPONENTS

**Keywords:** COMPONENT RELIABILITY; STRESS CORROSION CRACKING; CORROSION MONITORING; CORROSION TESTING; ON-LINE MONITORING

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**Objectives:** To demonstrate the feasibility of sending electrochemical signals telemetrically between an instrumented stress corrosion cracking (SCC) specimen and a data acquisition system.

**Comments:** A method of SCC monitoring involving the measurement of electrochemical current noise (ECN), electrochemical potential noise (EPN), and zero resistance ammeter (ZRA) has been developed recently. In this demonstration, the test apparatus consisted of a working electrode - a compact tension specimen made from <sup>3</sup>CrMo steel - stressed in a 30 wt% sodium hydroxide solution at 75°C. Unstressed counter-electrodes of the same material, also immersed in the caustic solution close to the precracked region of the compact tension specimen, allowed measurement of the ECN, EPN, and ZRA signals generated during stress corrosion crack growth. A prototype single-channel data transmission unit received ECN signals from the electrodes and transmitted them telemetrically to the antenna of a signal receiver unit positioned a short distance away.

**Remarks/Potential for dose limitation:** SCC was detected in the specimens by means of the ECN signals received. The ECN signals were successfully digitized and transmitted at radio frequencies across an air gap to a receiver and decoder, where they were converted to signals suitable for conventional processing and storage. Future SCC detection systems based on this principle can significantly reduce the manual labor needed for SCC inspection, thereby reducing worker radiation dosage.

**References:** "Feasibility of On-Line Monitoring of Stress Corrosion Cracking in Rotating Components," EPRI TR-102537 Final Report, Electric Power Research Institute, Palo Alto, CA, June 1993.

**Duration:** from: 1991 to: 1993

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