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OTHER TRANSACTION AGREEMENT DTRS56-02-T-0001, SwRI® PROJECT 14.06162

"APPLICATION OF REMOTE-FIELD EDDY CURRENT (RFEC) TESTING TO INSPECTION OF UNPIGGABLE PIPELINES"

Many pipelines contain internal restrictions that do not allow the passage of inspection pigs that use conventional inspection technology. The purpose of this project is to investigate the feasibility of a remote-field eddy current (RFEC) inspection method that utilizes either a unique collapsible excitation coil or a small rigid excitation coil that can pass through internal pipeline restrictions.

Task 2, RFEC Coil Design, involves the modeling and design of RFEC coils to accommodate the size constraints imposed by internal restrictions. Concepts for a collapsible excitation coil were shown in the first status report. This is composed of six hinged segments, each consisting of an individual coil. Before proceeding with fabrication of this segmented coil, a single RFEC coil of conventional design (e.g. one coil of a diameter slightly smaller than the inside diameter of the pipe) was designed and fabricated for use in a 12-inch-diameter pipe specimen. This coil, along with a sensor to measure the radial magnetic field component, was configured with the breadboard test system described in the previous report. The system is currently being tested in the pipe specimen to provide a baseline RFEC response representative of a conventional RFEC system. This will prove the design of the coil windings and sensors and assure proper functioning of the RFEC system. The same coil winding parameters will then be used for the segmented coils. With this approach, the flaw responses of the segmented coil system can be directly compared to a conventional system.

Task 3, Breadboard System, involves development of a laboratory breadboard RFEC system and preparation of a test specimen. A 20-foot-long piece of grade X-42, 0.375-inch-wall, seamless pipe was purchased for use as a test specimen. Simulated corrosion defects having a diameter of 2 inches and depths of 25, 50, and 75 percent of the pipe wall thickness were manufactured in the outside surface of the pipe.

Support structure for the RFEC breadboard system was designed and fabricated as described in the previous report. The excitation coil and sensor coil were mounted on this fixture for scanning in the pipe specimen. Instrumentation was set up for driving the RFEC excitation coil and acquiring signals from the sensor as the breadboard system is scanned in the pipe.

In Task 4, RFEC Evaluation, signals are being obtained from the defects in the pipe specimen.

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