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Enhancement of the Long-range Ultrasonic Method for the Detection of Degradation in Buried, Unpiggable Pipelines

The objective of this research was to improve and/or enhance a non-intrusive nondestructive technology already in use for pipeline inspections. This technique only requires access to the outside of the pipe. Refits and/or modifications are not necessary to assess the condition of a line using guided wave ultrasonic inspection. The research addressed three primary tasks:

1. To benchmark the test performance of the guided wave method against that of internal inspection vehicles (pigs) and to correlate guided wave data gathered in the field with the actual existing pipe conditions whenever the pipe is exposed for verification or removed for replacement.
2. Improving the guided wave ultrasonic capability to provide more quantitative data on anomalies that require interpretation.
3. And to introduce a new sound beam focusing technique for improved sensitivity and range of inspection.

Progress on this project over the last 24 months was in accordance with the objectives defined by the initial proposal. The following areas were investigated and the results are summarized as follows:

1. Guided Wave focusing was successfully initiated during the 5th quarter of the project. The focusing technique has now successfully moved from the laboratory to field applications. Necessary hardware and software modifications supporting this primary milestone are functional and in use on a day-to-day basis. The equipment and procedures have been validated during a blind trial conducted jointly by DOE and DOT and monitored by Battelle Columbus. Real field tests are continuing on in-service pipe with the reconfigured guided wave equipment set and software developed to facilitate sound focusing.
2. Guided wave inspections continue being performed on existing pipelines. Field situations where anomalies are identified are being evaluated by direct comparison, i.e., guided wave data vs. as-found pipe condition, whenever required or permitted by the pipeline owners. These data are being logged and described for further study. So far, 630 of feet of condemned pipe have been studied and the field results correlated with the actual pipe condition and six additional inspection-validation studies have been conducted. Additional validation inspections are now planned for the winter/spring of 2005.

Questions concerning this project should be directed to the Team Project Manager as follows:

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