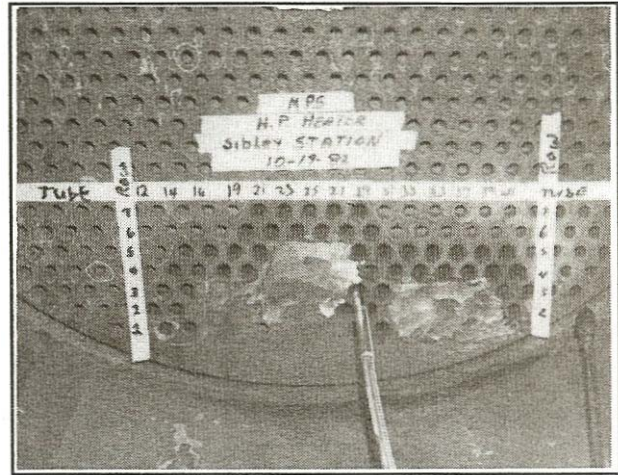


An Optimized Periodic Inspection Program For Condensers and Feedwater Heaters

STATUS AND PROBLEMS

Tube failures in steam plant surface condensers are a significant reliability problem for the electric power industry. Because large base-loaded units must be shut down for repair, tube failures in condensers result in an increase in replacement power costs. In addition, condenser leak from failed tubes has potentially harmful effects on major components such as steam generators and turbines. Tube failures in feedwater heaters can also lead to serious availability problems in three ways; replacement power costs for a forced outage when a feedwater heater cannot be isolated for repair, loss of unit efficiency when a feedwater heater is repaired with the unit on load, and secondary damage if the repair is delayed until a planned outage.

To reduce the number of tube failures and consequent leakage, periodic maintenance programs have used the nondestructive examination (NDE) method of eddy current testing (ET) to inspect the condition of the tubes from the water side. This NDE method can identify tubes that have experienced major degradation and should be plugged to prevent in-service failure. This method, and other NDE methods, has the potential for defining the cause of failures, pointing out potential problem areas, and supplying data needed to forecast re-tubing requirements. However, the use of NDE methods in plant maintenance of condensers and feedwater heaters is not standard practice and varies significantly throughout the utility industry. Variability of inspection results and difficulty in inspecting some types of tubing (Monel, Carbon Steel) have caused many utility sites to question the value of in-service inspection of heat transfer tubing from the water side.



TECHNICAL SERVICES

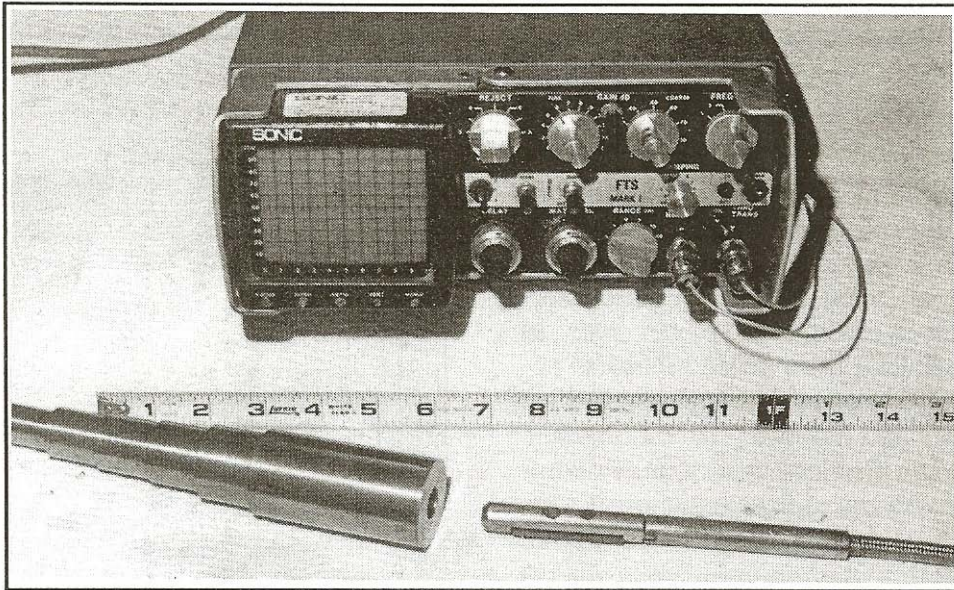
Recognizing the above problems, a number of utilities have enlisted the services of REINHART & ASSOCIATES, INC. (R&A) to develop a program to improve the availability of condensers and feedwater heaters through the optimized use of NDE methods as part of a periodic maintenance program. This service includes review and comment on existing utility maintenance programs and specific suggestions for improvement. In addition to review, R&A also offers detailed planning of maintenance programs involving the use of optimized NDE methods. In the area, the use of inspection data is enhanced for utility maintenance personnel through graphic displays of tube degradation, including tubes to be plugged and tubes to be monitored on subsequent inspections. This data can also be used to detect defect trends and plan and check remedial action.

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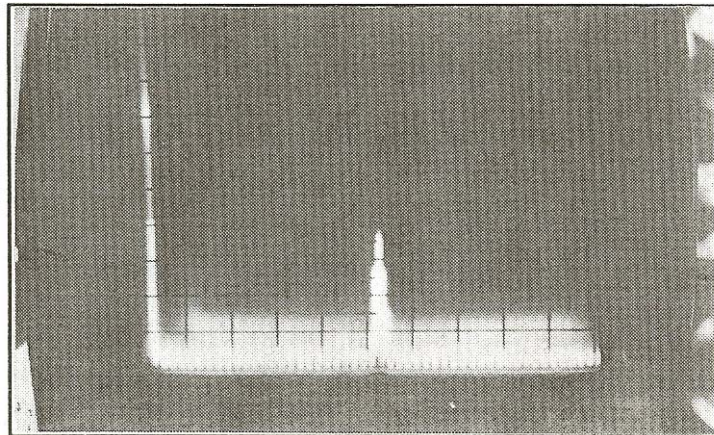
Nondestructive Evaluation Specialists



In addition to program planning, R&A offers inspection services using the latest NDE technology. Eddy current and ultrasonic test methods are used to inspect tubing from the inside diameter. Of particular interest to many utilities is the ability of R&A NDE systems to inspect all types of heat transfer tubing, including Monel and Carbon steel. Unique performance features of these recently developed NDE systems provide inspection information in and around tube support and tube sheet areas, detection and measurement of gradual wall thinning, and detection of circumferential cracks.



Ultrasonic scanning system for inspection of tubing.



Ultrasonic indication of 5% wall thinning in 3/4 inch OD Carbon steel feedwater heater tube.

For more information contact:



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