

JAN 21 1982

MEMORANDUM FOR: Richard H. Vollmer, Director
Division of Engineering

FROM: William V. Johnston, Assistant Director
Materials & Qualifications Engineering

SUBJECT: STATUS OF ACTIONS BY THE LICENSEE AND STAFF TO EVALUATE
THE CORROSION PROBLEMS FOUND IN THE TMI-1 STEAM GENERATORS

The corrosion which has been detected (apparently on the primary side of the tubes) in the steam generators (SG's) at TMI-1 may be different from the types of corrosion reported at other PWRs. Attached is a history/status of the SG corrosion problem at TMI-1. Based on the extent of degradation and the potential for corrosion of other pressure boundary materials, we are anticipating extensive efforts by both the utility and staff as indicated below.

A. Defining the Extent of Degradation

Utility - A 100% ECT is being conducted in the affected areas utilizing both standard probes and specialized probes to quantify the defects and establish plugging/sleeving patterns.

Staff - MTEB is evaluating the ECT data and has retained a consulting expert from ORNL to independently review the ECT data and verify its accuracy/applicability.

B. Identifying the Mechanism of Degradation

Utility - Has removed four steam generator tubes and is removing 10-15 more. These are being examined by B&W and independently at Battelle Columbus, with EPRI as consultants. Additionally, TMI-1 personnel are compiling both primary, and secondary water chemistry data for evaluation by B&W, EPRI and the licensee. Examinations of removed tubes will include: SEM, EDAX, X-ray fluorescence and diffraction.

Staff - CMEB and MTEB are evaluating the data from the removed tubes and CMEB will evaluate the primary and secondary water chemistry data when they are available. Additionally, CMEB is retaining independent consultants in the materials examination and corrosion areas to act as a review team. The

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4. That this corrosion may have occurred during cold shutdown and thus could progress rapidly through wall during a subsequent startup. To address this concern, the staff has recommended that at least two of the tubes, with partially thru wall defects which are removed, be tested for crack propagation. This testing is accomplished by installing the removed tubes in a model boiler with nominal primary and secondary water chemistry and operating them at standard temperature and pressure conditions. Model boiler facilities are available at B&W, W and CE, where this type of testing has been conducted in the past. The determination of the causative agent(s) along with a model boiler test utilizing actual degraded tubes from TMI-1 SG's are designed to answer the question of crack propagation.
5. That plugging of large groups of tubes in a OTSG may increase erosion-corrosion on the secondary side of the steam generator (see explanation in attachment). The B&W thermal hydraulic analysis to determine allowable power levels, along with a prudent shutdown/re-ECT program subsequent to startup will provide assurance that this potential problem is adequately addressed.

We have currently scheduled a meeting in Room P-118 for January 25, 1982, at 10:00 a.m. The licensee will provide an update on status of all efforts which they are conducting. Appropriate staff personnel, with our consultants, will be in attendance. Subsequent to the meeting, our consultants and staff members will visit the laboratories and site to independently verify the results and data which we have received to date and will receive at the meeting.

We have established a task force to resolve this problem. This task force consists of:

C. Y. Cheng - MTEB
Conrad McCracken - CMEB
Emmett Murphy - MTEB
Paul Wu - CMEB
Phil Grant - NRR TMI Site Office. Mr. Grant is an ex-B&W employee with extensive SG chemistry corrosion experience and will act as our onsite technical representative via the Project Manager.

Consultants - The below listed consultants, and others, are being contacted to participate on the task force:

- * - Robert Dillon; Battelle Northwest (Corrosion)
- * - C. V. Dodd; ORNL (Eddy Current Testing)
- John Griess; ORNL (Materials)
- * - Digby MacDonald; Ohio State (Corrosion)
- * - John Weeks; BNL (Chemistry)
- *Hugh Issacs; BNL
- *R. Van Royan; BNL

* Confirmed, will participate