

LETTER REPORT

INVESTIGATION ON A FEEDWATER REDUCER FROM FARLEY UNIT 1

Carl J. Czajkowski

Brookhaven National Laboratory
Department of Nuclear Energy
Upton, New York 11973

JULY 1984

8505170587 850506
PDR ADOCK 05000348
Q PDR

INTRODUCTION

In February 1984, during an ultrasonic inspection on the welds between the feedwater piping reducers and the steam generator feedwater nozzles at Farley Unit 1, linear indications were detected in the reducer base material. Since similar indications had been reported earlier by the U. S. Nuclear Regulatory Commission (USNRC) in IE Bulletin 79-13; a feedwater reducer (#1B) was sent to Brookhaven National Laboratory (BNL) for confirmatory failure analysis. The analysis was to consist of scanning electron microscopy (SEM) of the fracture surfaces to evaluate the mode of fracture.

Evaluation

Upon receipt at BNL, the reducer was uncrated and photographed (Figure 1.) The reducer was also evaluated by BNL Health Physics personnel for contamination and radiation dose rate.

After completion of the health physics evaluation, the reducer was machined approximately 8" back from the extrados end of the nozzle. This cut was made in order to facilitate the examination of the extrados end. This cut was made dry. Scrappings were also taken from the inside surface of the reducer at this time for the SEM evaluation.

Visual examination of the extrados end of the reducer revealed no linear indications so a dye penetrant examination was performed using spotcheck brand (all Formula B) penetrant Type SKL-HF/SKL-S, developed type SKD-NF and cleaner/remover type SKC-NF. After two applications of the process with no indications revealed, it was concluded that the indications had probably been inadvertently removed during the reducer's removal from the nozzle.

The scrappings were evaluated by Energy Dispersive Spectroscopy (EDS) for chemical analysis. It can be seen on Figures 2 and 2A that the scrappings consisted of Fe, Ni, Cu, Zn, Sn with Si present on one scan.

Work was discontinued on the reducer at this point of the investigation.



Figure 1 Photograph of feedwater reducer 1B from Farley Unit 1.
Arrow points to extrados end of reducer.

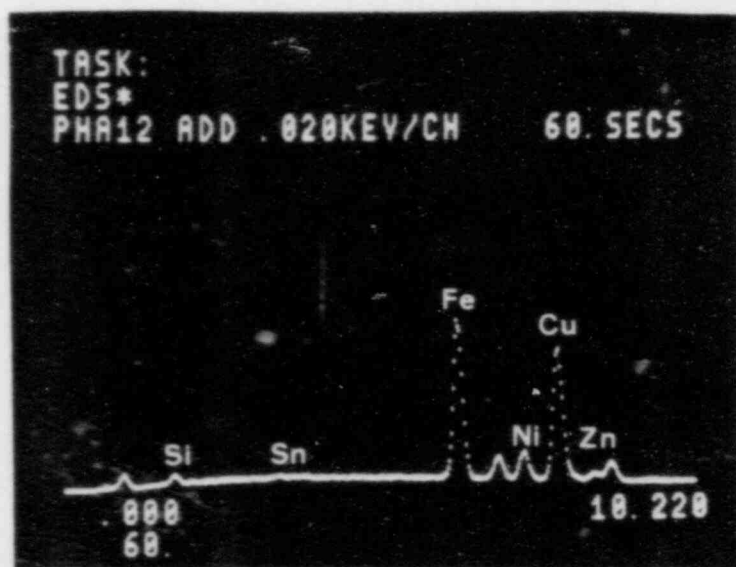


Figure 2a EDS scan of scrapings for constituents.

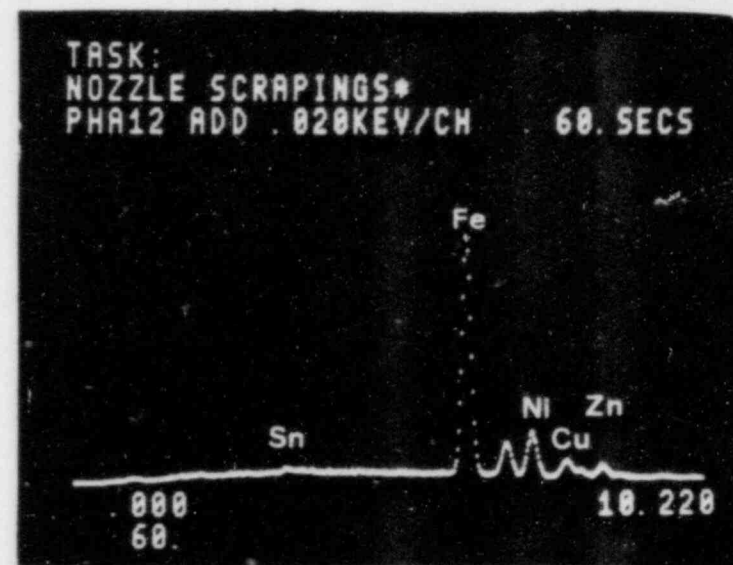


Figure 2b Second EDS scan for chemical analysis of scrapings.