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Subject: davis-besse generating station.

corrosion of reactor head.

i have read two articles in new york times attributing this problem to boric acid contained in the leaking primary coolant.

i'm not certain of the materials involved, but one of the new york times articles indicated the head was constructed from carbon steel, lined with stainless steel. if this is true, there are two reasons boric acid is not likely to have caused the corrosive attack:

- 1) boric acid is an extremely weak acid
- 2) boric acid has a boiling point of 572°F

i have no exact knowledge of the reactor head temperature; i assume it would be close to that of the primary coolant. thus, boric acid would probably evaporate from the surface of the reactor head without doing any harm.

the primary coolant inherently contains lithium hydroxide; this has a melting point of 842°F. thus, water and boric acid would evaporate from the reactor head, leaving a highly concentrated pool of lithium hydroxide. this does react with carbon steel, causing inter granular attack and "caustic embrittlement". this type of attack was observed in the old locomotive boilers in the crevices between the fire tubes and the tube sheet, (where boiling and concentration of caustic could occur); it caused dramatic failure of the tube sheet.

if this type of attack of the reactor head did in fact occur, metallographic analyses of cross sections of the affected area should reveal the typical inter granular attack of the grain boundaries, and x-ray diffraction analyses should indicate the presence of lithium ferroate, a bi-product of the iron-lithium reaction. the presence of this compound would indicate high concentrations of lithium hydroxide did occur.

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p. scr. since 1947 and until i retired about 20 years ago i worked exclusively i the field of coolant and materials technology in fossil and nuclear generating plants. (i'm not looking for a job).