From: Jeffrey Hixon RES
To: GFD@nrc.gov; MXB@nrc.gov
Date: Saturday, October 12, 2002 4:19PM
Subject: Fwd: Another Weld Data sheet for the Davis-Besse Reactor Head

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H-85

From: Robert Tregoning RES
To: Nilesh Chokshi
Date: Monday, October 21, 2002 8:40AM
Subject: DB Head needs

Nilesh:

We should get together to talk about this today, but here's some initial thoughts for justification:

NRC-RES currently has an ongoing testing program with ORNL to evaluate the structural intergrity failure models utilized in earlier analysis and also to investigate the effect of flaws on the predicted operating margin. The program will test flawed and unflawed unbacked cladding in order to simulate the DB cavity size and geometrical constraint. Ideally, the cladding testing material would mimic the six-wire (or other) process employed in DB construction. However, efforts to identify surrogate six-wire cladding materials through either existing surplus or mock-up creation have proven fruitless. Additionally, there is B&W information which indicates that the DB cavity erosion may actually reside in cladding which is manually deposited using SMAW. The six-wire SAW process was utilized on the outer circumference of the head. At approximately a 17" radius from the apex, six-wire automated process was transitioned to the SMAW for this top-center portion of the head. The DB cavity resides at least partly within this SMAW region. Also, if the B&W drawing is accurate, the crack location is close to the transition between the two processes, but also within the SMAW region.

Because of these uncertainties, ORNL is currently planning to utilize strip clad test specimens to conduct the majority of the testing program. Additional tests on actual DB material are plan to augment the strip cladding results to ensure the accuracy of the failure predictions for the DB margin assessment. Up to six tests on actual DB material are recommended: three from the SMAW cladding region and three from the six-wire SAW cladding region. The ORNL test specimen is currently 20" in diameter. While additional work is being conducted to determine the minimum test specimen that will serve as an appropriate DB surrogate, it seems prudent to plan for material assuming the current test size.

This background information leads to the following material request of six flame cut 22" diameter cylindrical slugs from DB for use in this testing program. Three of the slugs should be located within a radius of the apex which is inclusive of nozzles 1 through 9. The remaining three slugs should be located outside of this radius on the head. Additional machining and cleaning will be eventually required to create the final test specimens. The test specimen geometry is still evolving. However, the following specimen preparation is envisioned:

1. Decontamination of the cladding surface and cleaning of the surrounding ferritic material surfaces.
2. Removal of the HAZ caused by the flam cut.
3. Removal of the ferritic material backing to isolate the cladding within the specimen test section.
4. Machining to create the each test specimen geometry.

Any of these steps that FENOC would be willing to perform would of course be valuable.

Rob

CC: Deborah Jackson; Jeffrey Hixon; Mark Kirk; William Cullen