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Docket Nos. 50-546/547

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MEMORANDUM FOR: M. D. Thornburg, Director, (Former) Division of Reactor Construction Inspection, IE

J. H. Sniezek, Director, Division of Resident and Regional Reactor Inspection, IE

FROM: R. E. Shewmaker, Senior Structural Engineer, IE

SUBJECT: RESULTS OF CONSTRUCTION VERIFICATION PROGRAM (CADWELDS) AT MARBLE HILL

The results of the construction verification program in the area of Cadwelds was contained as Section 6.0 in the "Final Report - Construction and Material Verification Program" submitted by a letter dated September 12, 1980. Region III personnel have been involved in the detailed review of these results and the resolution of the resulting problem.

As a result of continuing Headquarters involvement in the Marble Hill project I have been conducting an overview of the actions in this matter and I was requested to attend a meeting between RIII, Public Service of Indiana (PSI) and Sargent and Lundy (S&L) on November 10, 1980 in Chicago. Prior to that time a Region III position prepared by D. W. Hayes had been given in draft form (Enclosure 5) to the licensee. Several other pieces of correspondence have been written which addressed the subject and provided background for the position. These are enclosed as Enclosures 1-4. I felt that the position (Enclosure 5) if agreed to by the licensee could lead to resolution of the Cadwelding problem. The issues were discussed at the meeting but no final resolution was obtained. S&L's position and that of PSI is that the NRC is attempting to introduce a new parameter (splice strains) into what was the agreed to program. Enclosure 6 provides the written material presented by PSI and S&L at the meeting. Based on the following facts it is my position that the licensee has completed the program to verify the condition of the completed Cadwelds that are accessible as was outlined in the submittal of February 28, 1980 (the Brown Book).

My findings are that:

- 1. 500 out of 2431 re-examined failed visual inspection,

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- 2). this visual inspection program is required by the NRC per Regulatory Guide 1.10 as an in-process/production control supplemented by production cut-outs and sister splices being tensile tested,
- 3) if the licensee had been conducting proper production inspections, the rate of visual rejections would have dictated (for economic reasons) corrective action to the Cadwelding process as implemented at the Marble Hill site,
- 4) no corrective action was taken, so visually unacceptable Cadwelds continued to be made and these were not identified until after the NRC ordered the reinspection of completed work,
- 5) in addition there are some 7500 inaccessible Cadwelds (already incorporated into safety-related reinforced concrete structures) which are subject to question based on the visual results on the accessibles,
- 6) out of the total of 500 visually rejectable the licensee conducted tensile tests on 30, one of which failed to reach ultimate tensile requirements,
- 7) no other parameters were tested for or monitored in the licensee's additional testing, and
- 8) the licensee has rejected any further testing on the grounds that they have met the requirements.

I recommend the following possible course of action.

1. NRR (and SD) must be consulted or must develop new criteria to be used in this case since we now have conditions outside the scope of NRR requirements and national codes/standards since the problems were not found during the in-process inspections.
 2. This need for criteria should be handled by a formal TOLR to NRR with
 - a. no IE position on a possible set of acceptable criteria, or
 - b. an IE position with which concurrence might be obtained in order to reach a quick resolution.
 3. That IE arrange a meeting with NRR and SD on this matter to discuss the issues and to decide whether a meeting is necessary with PSI, S&L and ERICO prior to an NRC position being established to include how the embedded 7500 Cadwelds will be addressed.
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NOV 17 1980

- 4. Notify the licensee of the new criteria either by
 - a. a formal letter, which could be a 50.54(f), or
 - b. order him to complete certain actions.

I prefer 2b and 4b in this process. Another question at hand is how this relates to restart of safety-related concrete placement. I believe no concrete should be placed where any of the questionable 470 (500-30, less those cut out and tested) accessibles are located. With regard to the already embedded 7500, I believe the Order should remind the licensee that work in those areas is at his risk pending the resolution of the Cadweld question.

Since RIII still officially has the lead in this matter I assume you will take any necessary action in this matter. I am sending copies of my recommendations to RIII personnel involved in this issue.

If there are any questions please contact me.

R. E. Shewmaker
Senior Structural Engineer, IE

Enclosures:

- 1. Memo, D. W. Hayes to G. Fiorelli, 9/11/80
- 2. Memo, D. W. Hayes to G. Fiorelli, 9/15/80
- 3. Memo, G. Fiorelli, to D. W. Hayes, 9/17/80
- 4. Memo, G. Fiorelli to G. W. Reinmuth, 9/17/80
- 5. Draft Memo, D. W. Hayes & C. C. Williams to G. Fiorelli, 10/29/80
- 6. Material presented by PSI and S&L at a meeting with IE in Chicago on 11/10/80

cc/w enclosures:

- G. W. Reinmuth, IE H. Wong, IE
- E. L. Jordan, IE J. B. Henderson, IE

cc w/o enclosures:

- J. G. Keppler, RIII C. C. Williams, RIII
- G. Fiorelli, RIII E. Gallagher, RIII
- D. W. Hayes, RIII E. R. Schweibinz, RIII

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