

ENCLOSURE

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS, ALL UNITS
INVALID HEAT TREATMENT OF REACTOR PRESSURE VESSEL PEDESTAL STUDS
10CFR50.55(e) REPORT NO. 1 (FINAL)
NCR S-10

On September 12, 1979, TVA notified NRC-OIE Region II, Inspector W. B. Swan, of a potentially reportable 10CFR50.55(e) condition involving heat treatment of the reactor pressure vessel (RPV) pedestal studs in lots exceeding ASME Section III, Subsection NF 2345 requirements. This is the final report on the subject reportable deficiency.

Description of Deficiency

The 756 three inches in diameter by 23 inches long reactor pressure vessel pedestal studs (126 per unit) for TVA's Hartsville and Phipps Bend Nuclear Plants, fabricated by ACIMET Manufacturing Company (ACIMET) under subcontract from Lakeside Bridge and Steel (Lakeside) were heat treated by Addison Heat Treating Company, Cleveland, Ohio (Addison), in lots having weights from 9,000 to 13,000 pounds, exceeding the 6,000-pound maximum required by ASME Section III, Subsection NF 2345. These studs were fabricated from ASME SA-540, Grade B23, Class 4 material and are to be used to hold the reactor pressure vessel to the RPV pedestal.

ACIMET tested additional samples of the material in question after discovery of the deficiency and a large percentage of the samples failed the Charpy-V-notch test, indicating unacceptable notch sensitivity.

The first shipment of 126 studs was received at the Hartsville Nuclear Plant to be used on the unit A1 reactor pressure vessel support before discovery of the deficiency. These studs had not been installed at the time of discovery of the subject deficiency.

Cause of Deficiency

When ACIMET wrote the purchase order for the heat treatment of this material they mistakenly specified 10,000-pound maximum lot sizes in lieu of the 6,000-pound requirement. A subsequent internal review by ACIMET QA personnel discovered the error before the heat treatment and a correction to the purchase order was sent to the ACIMET manager of purchasing for transmittal to Addison. This correction was never officially transmitted to Addison as requested.

Addison, on their own behalf, did not follow the requirements of the original purchase order which specified five 10,000-pound maximum heat lots as seen from the 9,000- to 13,000-pound heat lots reported. When ACIMET asked for verification of the 6,000-pound maximum heat lots, Addison indicated the actual heat lot weights. ACIMET then generated their nonconforming materials report No. 170 to document this problem and informed Lakeside, who in turn informed TVA.

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Safety Implications

Additional testing of the deficient material showed unacceptable notch sensitivity. Unacceptable notch sensitivity indicates reduced resistance of the studs to crack propagation, which would increase the probability of brittle failure of the studs which could degrade the structural support of the reactor pressure vessel.

Corrective Action

TVA has returned to ACIMET the 126 deficient studs which were shipped to the Hartsville Nuclear Plant. ACIMET is in the process of having all 756 studs reheat treated at Nettleton Steel Company in 6,000 pounds maximum heat treat lots. Each lot of the materials thus reheat treated will be retested to a level equal to or greater than applicable ASME requirements. This reheat treatment will be complete by November 1, 1979.

Action Taken to Prevent Recurrence

ACIMET quality assurance personnel has informed appropriate engineering and purchasing personnel to be aware of the 6,000-pound lot requirement for future ASME purchase orders. ACIMET has deleted Addison from their approved vendors listing. Also, the ACIMET manager who failed to inform Addison of the corrected heat treatment requirement was discharged.

Lakeside audited ACIMET on September 26, 1979, and determined that ACIMET is qualified to provide material to ASME NCA 3800 requirements. Their audit indicated that this deficiency appears to be a "one time occurrence" and that corrective actions taken by ACIMET should prevent recurrence of this problem in the future.

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