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MEMORANDUM FOR: Saul Levine, Director, Office of Nuclear Regulatory Research

FROM: Harold R. Denton, Director, Office of Nuclear Reactor Regulation

SUBJECT: USE OF INCOLOY 800 IN FORT ST. VRAIN STEAM GENERATORS

In your memorandum of December 1, 1978, "Status Report on Incoloy 800H," you transmitted a report prepared by Brookhaven National Laboratory dated September 6, 1978 pertaining to concerns about the use of Incoloy 800 in the Fort St. Vrain steam generators. Also, you recommended that a review of quality assurance procedures should be made to determine that complete inspection of the Incoloy components for adequate grain size is provided.

We have reviewed both the FSAR and reports from the inspectors of the then Division of Compliance, Region IV. We find that the FSAR recognized the use of Grade 2 for high temperature components, particularly the support structure for reheater and superheater tubing (FSAR Table 4.2-8). We also find that the Division of Compliance investigated quality assurance procedures to assure that an acceptably large grain size should be found for Grade 2 material. A summary of these Compliance reports follows.

A four day inspection visit from January 12 through 16, 1970 was made of the General Iron Works plant in Denver, Colorado, with a report of the inspection forwarded by John W. Flora to J. P. O'Reilly on March 6, 1970. The team reported that the Ni-Fe-Cr pressure tubing (called Sanicro-31, but essentially Incoloy 800) supplied by Sandvik satisfied all the requirements of General Atomic's manufacturing specifications, including grade checking by metallographic examination for grain size. Sulzer was contracted by GA to perform the quality assurance function on all Sandvik supplied tubing. The March 6 report also stated that "several Sulzer reports were reviewed and found to be very detailed and comprehensive, indicating excellent quality control."

A problem, however, was found with some of the Incoloy 800 plate material used for the tubing support structures made by the General Iron Works. In one case the plate material had been ordered and fabricated as Grade 1 and later reheated by solution annealing to convert the structure to Grade 2. On investigation the inspectors found that some questions remained on certifications of the various plate materials received and on the heat

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treatment procedure of the structure reannealed. A follow-up report (J. P. O'Reilly to R. S. Boyd, May 22, 1970) stated that the solution annealing process was to be duplicated using a spare component to demonstrate the adequacy of the heat treatment. The report also stated that recertification of the Incoloy plate material, supplied from three different vendors, was in progress. On August 13, 1970 a report was transmitted from John W. Flora to James P. O'Reilly where it was stated that the resolution annealing of support structure components had been duplicated. Specimens from various areas of the heat treated components were examined metallurgically with the conclusion that "... a satisfactory solution annealed condition had been obtained throughout the structure." It was also reported that the recertification program had been completed.

Based on our review of the inspection reports referenced above we conclude that there is reasonable assurance that the proper grades of Incoloy 800 were used in the Fort St. Vrain reactor. We do not believe it is necessary to further review the quality assurance procedures related to this investigation or, as recommended by Brookhaven, re-evaluate the data base used to design the Fort St. Vrain steam generator.

Original Signed by
H. R. Denton
Harold R. Denton, Director
Office of Nuclear Reactor Regulation

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