

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-354/89-18

Docket No. 50-354

License No. NPF-57 Priority Category

Licensee: Public Service Electric & Gas Company
Post Office Box 236
Hancocks Bridge, New Jersey 08038

Facility Name: Hope Creek Nuclear Generating Station

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: October 16-20, 1989

Inspectors: Robert A. McBrearty Nov. 3, 1989
R. A. McBrearty, Reactor Engineer, Materials & Processes Section, EB, DRS date

Approved by: Jack Strosnider 11/3/89
J. A. Strosnider, Chief, Materials & Processes Section, EB, DRS date

Inspection Summary: Inspection on October 16-20, 1989 (Report No. 50-354/89-18)

Areas Inspected: A routine unannounced inspection was conducted of inservice inspection activities to ascertain whether the licensee's activities were conducted in compliance with applicable ASME Code and regulatory requirements. In addition, the results of the water chemistry program and licensee actions regarding selection and control of component materials to minimize personnel exposure to radiation were reviewed.

Results: No violations were identified. One unresolved item was identified regarding the visual examination of steam dryer drain channels and support skirt and the quality of the video tape record of the examination.

Details

1.0 Persons Contacted

Public Service Electric & Gas Company

- *R. Beckwith, Station Licensing Engineer
- *R. F. Brandt, Inspection Services Engineer
- F. Cellmer, Radiation Protection Engineer
- *J. Clancy, Radiation Protection/Chemistry Manager
- *J. Di Marzio, Inservice Inspection Supervisor
- S. L. Feinstein, Maintenance Manager
- *R. F. Griffith, Sr., Manager - Station Quality Assurance/Quality Control
- *J. J. Hagan, General Manager - Hope Creek
- *P. J. Kudless, Manager, Site Services
- *E. Maloney, Station Quality Assurance
- *W. P. Treston, Inservice Inspection Services Supervisor
- T. W. Vannoy, Senior Chemistry Supervisor

General Electric Company

- R. Jaffe, NDE Level III Visual Examination
- D. Orton, Technician
- D. Thomas, Technical Supervisor

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- *J. R. Stair, Resident Inspector - Susquehanna

* Denotes those present at the exit meeting.

2.0 Procedure Review (73052)

Inservice inspection NDE procedures are developed by the vendor for use at Hope Creek and are approved by the licensee for use at the site. The inspector reviewed selected procedures to ascertain compliance with ASME Code and regulatory requirements and for technical adequacy for their intended use. The following procedures were selected for inspection:

- Procedure #SWRI-NDT-300-1, Revision 42, Deviation 3, "Dry Powder Magnetic Particle Examination"
- Procedure #SWRI-NDT-300-2, Revision 42, Deviation 4, "Florescent Magnetic Particle Examination"
- Procedure #SWRI-NDT-600-31, Revision 23, "Manual Ultrasonic Examination of Austenitic Pressure Piping Welds"

Ultrasonic examination procedure 600-31 is used for the examination of austenitic stainless steel piping systems and for the detection of intergranular stress corrosion cracking (IGSCC) and was determined to be acceptable for that purpose. The procedure contained no requirement that personnel implementing the procedure be trained and certified for the detection of IGSCC at the EPRI NDE Center at Charlotte, North Carolina. However, the licensee's ISI program plan states that EPRI qualified examiners will be used when it is appropriate and, after discussions with the inspector, agreed to clarify the requirement so that no doubt will exist regarding the licensee's intent to use qualified examiners. In practice EPRI qualified examiners have always performed IGSCC examinations at the facility. The inspector had no further questions regarding this matter.

The reviewed procedures were found to comply with applicable code and regulatory requirements and were deemed to be technically adequate for their intended use.

No violations were identified.

3.0 Observations of NDE (73753)

Remote, underwater visual examinations of reactor pressure vessel components were performed by General Electric Company inspection personnel. Examination results were recorded on video tape and were evaluated by a General Electric Company, Level III visual examiner.

The inspector observed video tapes of the visual examination of steam dryer drain channel welds H-3 and V-14 on drain channel 3, the steam dryer support skirt, and upper core spray "C" sparger. The results were recorded using an underwater remote video camera and, with the exception of the support skirt and weld H-3 examinations, were judged to be adequate regarding clarity and sharpness of image. The record of the steam dryer support skirt and drain channel horizontal weld H-3 were found to be of poor quality with much of the subject out of focus. Suspected indications were reported on the support skirt in the heat affected zone adjacent to weld H-3. The section of the skirt in question was reexamined after the surface was buffed with scotch brite. The tape of the reexamination was of much better quality than the original and confirmed the presence of indications. The results were referred to the General Electric Company at San Jose, California for further evaluation. The results of the G.E. evaluation were not available at the time the inspector left the site.

The General Electric Company issued SIL No. 474 on October 26, 1988 entitled, "Steam Dryer Drain Channel Cracking" to alert BWR owners of cracking in the welds that attach the drain channels to the steam dryer skirt. The notice also describes cracking which was discovered in the dryer skirt base material at the drain channel welds at one BWR facility. The notice went on to recommend that BWR owners visually examine the subject components during outages and that if cracks are detected, they should be repaired to prevent further growth of the cracks.

The inspector stated that the video tape record of the original examination was inadequate to detect cracks in many portions of the component. The licensee noted that the inspection was listed in the program as VT-3 which is conducted to determine the general mechanical and structural conditions of components and their supports, such as the presence of loose parts, debris, or abnormal corrosion products, wear, erosion, corrosion, and the loss of integrity at bolted or welded connections. The subject inspection was not required by the ASME Code; however, the visual examination specified by the ASME Code, Section XI for the detection of cracks is VT-1. When remote visual examination is used to perform VT-1 the Code requires that the remote system have a resolution capability at least equivalent to that attainable by direct visual examination. The system used for the steam dryer visual examination at Hope Creek was demonstrated to have excellent resolution capability, but that capability was not attained when the subject examination was performed. The question of whether VT-3 is the appropriate examination to find cracking on the steam dryer drain channel welds and on the support skirt is considered unresolved pending licensee evaluation and subsequent NRC review (354/89-18-01).

4.0 Quality Assurance

The licensee's QA organization performs surveillance of its inservice inspection contractors to ascertain that ISI activities are conducted in compliance with applicable Code and regulatory requirements. The following surveillance reports were selected for inspection:

- Station QA Surveillance Report No. 89-400
- Station QA Surveillance Report No. 89-426
- Station QA Surveillance Report No. 89-430
- Station QA Surveillance Report No. 89-433

The surveillances were performed during the period from September 26, 1989 to October 10, 1989 and concluded that applicable requirements were complied with. Areas included in the surveillances were the performance of examinations, procedure qualification, and NDE personnel qualification/certification records.

No violations were identified.

5.0 Nondestructive Examination (NDE) Personnel Qualification/Certification Records (73753)

Qualification/Certification records of Southwest Research Institute (SWRI) examination personnel, the licensee's ISI contractor, were selected for inspection to ascertain that the technicians were certified in accordance with SNT-TC-1A, the governing document. Records of those SWRI personnel who were responsible for the ultrasonic examination of austenitic stainless steel piping systems confirmed that they were trained and certified for

the detection of IGSCC at the EPRI NDE Center at Charlotte, North Carolina in accordance with provisions of NUREG-0313, Revision 2, and Generic Letter 88-01. That was further confirmed by the latest edition of the EPRI IGSCC Registry.

No violations were identified.

6.0 Water Chemistry (84750)

Water chemistry data were reviewed as part of this inspection. The methods of collecting and verifying the accuracy of these data was not included in the scope of this inspection.

The inspector reviewed the primary water chemistry data for the period of January 1989 through September 1989 and discussed these data with responsible individuals in the licensee's chemistry department. The sample point for monitoring the reactor water quality is at the reactor water sampling panel at elevation 145 in the reactor building.

The average conductivity per month of the primary water during the period reviewed ranged from 0.089 $\mu\text{s}/\text{cm}$ to 0.174 $\mu\text{s}/\text{cm}$ which was within the licensee's goal of 0.20 $\mu\text{s}/\text{cm}$. Chlorides were reported as ranging from 0.8 to 1.44 ppb and sulfate ranged from 3.1 to 4.22 ppb which were within the guidelines of 15 ppb for each. The conductivity value reported is an average for the highest daily value corrected for the average zinc concentration in reactor water. The values reported for sulfate and chloride are an average of the highest daily concentration.

Feedwater iron has been a source of contamination in the primary water system. Action by the licensee to reduce the contaminant resulted in a reduction from 11.8 ppb during the first fuel cycle to a level of 3-5 ppb during the second cycle. The improvement was accomplished with the aid of changes in the filtering capability. The licensee is presently considering the use of a monosphere resin, and will perform a feasibility study regarding the use of full flow side stream filtration to further improve its water chemistry. Additionally, the use of hydrogen water chemistry will be initiated at the plant to reduce the susceptibility of austenitic stainless steel piping systems to intergranular stress corrosion cracking.

7.0 Occupational Exposure (83750)

The licensee's program for selecting and controlling component materials to minimize personnel exposure to radiation include the following:

1. Prior to plant startup, the control blade pins and rollers were replaced with non-stellite materials.
2. Zinc injection is used as a means of controlling cobalt plate-out in piping systems.

3. Steps have been taken to reduce feedwater iron concentration. The licensee's actions have resulted in a reduction from approximately 11.8 parts per billion (ppb) during the first fuel cycle to 3-5 ppb during the second cycle.
4. The licensee has investigated the benefits of sub-system decontamination.

The licensee's corporate services group is represented on the EPRI Cobalt Reduction Task Force and the services group is investigating materials such as NO-REM and LO-REM as stellite replacement material. Precautions to control the spread of cobalt containing material are identified by the station administrative procedure SA-AP.ZZ-021(Q), Revision 4. Additionally, the checklist associated with design changes includes a cobalt reduction program which requires that the feasibility of using alternative materials containing lesser amounts of cobalt shall be considered in place of the specified alloy when that alloy contains significant amounts of cobalt which pose a potential problem.

Conclusion

The licensee has an ongoing, effective program to control and reduce personnel exposure to radiation. Representation on industry task groups assures that the licensee becomes aware of new exposure reduction methods and low cobalt containing materials as they become available.

8.0 Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, violations, or deviations. An unresolved item is discussed in paragraph 3 of this report.

9.0 Exit Meeting

The inspector met with licensee representatives, denoted in paragraph 1, on October 19, 1989 and at the conclusion of the inspection on October 20, 1989. The inspector summarized the scope and findings of the inspection.

At no time during the inspection was written material provided by the inspector to the licensee. The licensee did not indicate that proprietary information was involved within the scope of this inspection.