



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-369/91-12 and 50-370/91-12

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility name: McGuire 1 and 2

Inspection Conducted: May 6-10, 1991

Inspector: *[Signature]*
for L. Coley Jr.

5/20/91
Date Signed

Approved by: *[Signature]*
J. O. Blake, Chief
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

5/20/91
Date Signed

SUMMARY

Scope:

This special unannounced inspection was conducted in the areas of plant maintenance - main flange bolt replacement and retensioning of bolts to stop leakage at the main flange joint on the 1-D main coolant pump (MCP), review of radiographic film for ASME Code welds resulting from modifications on Units 1 and 2, and review of license implementation of Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants" and Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping".

Results:

In the areas inspected, violations or deviations were not identified.

The inspector's observation of corrective maintenance activities revealed excellent communications and team work between craft, engineering, and supervision. Personnel audited were very knowledgeable and performed their specific functions in a timely and technically effective manner. However, other areas examined by the inspector revealed minor procedural weaknesses that resulted in one Inspector Followup Item 50-369,370/91-12-01, paragraph 3, and three inspector concerns, paragraphs 3 and 4. Senior management was responsive to the inspectors concerns.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Goodman, Quality Assurance (QA)
- *L. Hentz, Maintenance Engineer
- *M. Hatley, Engineering Supervisor
- *L. Kunka, Compliance Engineer
- *T. McConnell, Station Manager
- *D. Motes, Engineering Supervisor
- *T. Pedersen, Compliance
- *S. Rosenau, Maintenance Engineer
- *R. Sharpe, Manager Compliance

Other licensee employees contacted during this inspection included craftsmen, engineers, technicians, and administrative personnel.

NRC Resident Inspectors

- *K. Van Doorn, Senior Resident Inspector

*Attended exit interview

2. Corrective Maintenance, Unit 1 (62700) MCP-1D Main Flange Bolt Replacement and Bolt Retensioning to Stop Leakage at the Main Flange Joint.

On April 25, 1991, McGuire Unit 1 was placed in cold shutdown to repair a lower motor bearing in the 1C-MCP. This bearing had been damaged when the low oil level alarm failed to activate. On April 30, 1991 during heatup for restart of Unit 1, operations noted that a main flange leak on MCP-1D, which had previously been observed leaking in 1988 and 1990 during cold shutdown but upon plant heatup had sealed itself, was not resealing during this heatup mode. The leakage observed was in the form of seepage past the thermal barrier gasket between bolts number 22 and 3. This is in the area where the component cooling water nozzles are welded on the thermal barrier flange. The leakage was visually detected by observing the wetted flange surface and the formation of boric acid crystals on the flange and bolts. The cause of the leakage was attributed primarily to the relaxation of main flange bolt load after several cycles of operation. When the inspector arrived on-site on May 6, 1991, the licensee had cleaned the main flange surface and had also replaced 23 of the 24 bolts with new bolts. The bolt replacement had been accomplished using the one for one exchange technique with the exception of bolt 22 which had become seized by the boric acid corrosion. The licensee had contacted Westinghouse to determine the acceptance criteria for reusing the old bolts at a later date and for guidance as to whether 23 properly installed bolts would meet the design criteria for pump operation. Westinghouse replied that 23 bolts did meet the design criteria for the pump. However, Westinghouse recommended that the licensee shim under the head of bolt

number 22 to provide some tension on the flange. When the licensee applied the acceptance criteria Westinghouse had given for reusing the old bolts, only 5 bolts were acceptable.

The inspector held discussions with the cognizant maintenance engineers, reviewed documentation of communications with Westinghouse, observed the craft retensioning the bolts, went with engineering to evaluate the old bolts that had been removed, reviewed the work order and the technical procedure for accomplishing the work, reviewed maintenance historical files for all of the MCPs in both units, reviewed bolt stretch calculations taken before the bolts were replaced and after the new bolts had been retensioned, and also held discussions with operations who had initially found the leakage during their inspection of reactor plant systems. As a result of the above actions and the satisfactory responses obtained, the inspector concluded that the licensee has a strong program for preventive and corrective maintenance of critical components. The licensee currently intends to recheck the bolt stretch for MCP-1D at the end of the present heat cycle and retension the new bolts as required. The Unit 1 refueling outage is scheduled for September of 1991.

Within the areas examined, no violation or deviation was identified.

3. Review of Radiographic Film for ASME Code Welds Units 1 and 2 (57090)

The inspector reviewed radiographs for the welds listed below to determine whether they were radiographed and evaluated in accordance with Duke's approved Radiographic Procedure, NDE-10, Revision 17 and the ASME Code. The applicable code for this review is a ASME Sections III and VI, 1980 Edition with Addenda through Winter 1982.

<u>Weld ID No.</u>	<u>Size</u>	<u>Comments</u>
SM1FWFT-5010-5	4"Dia. X .337"	Sat.
NV2FW178-84	4"Dia. X .216"	Sat.
INVP791-11	3"Dia. X .216"	Sat.
SH1FWFT-5000-5	4"Dia. X .337"	Sat.
NV2FW216-35	2"Dia. X .154"	Sat.
NV2FW216-48	2"Dia. X .154"	Sat.
NV2FW178-82	3"Dia. X .216"	Penetrameter in Weld
INVP791-10	3"Dia. X .216"	Sat.
NV2FW215-28	2"Dia. X .154"	Penetrameter in Weld
INVP741-7	3"Dia. X .216"	Sat.

<u>Weld ID No.</u>	<u>Size</u>	<u>Comments</u>
1NVP791-8	3"Dia. X .216"	Sat.
1NVP791-9	3"Dia. X .216"	Sat.
SM1FWFT-5040-5	4"Dia. X .337"	Penetrameter in Weld
SM1FWFT-5050-5	4"Dia. X .337"	Sat.
SM1FWFT-5060-5	4"Dia. X .337"	Sat.
NV2FW178-79	3"Dia. X .216"	Penetrameter in Weld
NV2FW178-80	3"Dia. X .216"	Penetrameter in Weld
NV2FW178-81	3"Dia. X .216"	Penetrameter in Weld
NC2FWLT-5170-31	2.5"Dia. X .375"	Repair # Not Indicated
NC2FWLT-5150-31	2.5"Dia. X .375"	Repair # Not Indicated

The inspector's review of the above film revealed two concerns as noted above. The first concern which dealt with the placement of penetrameters on the welds is allowed by the licensee's approved procedure and the ASME Code when the geometric configuration makes it impractical to place the penetrameter adjacent to the weld. In the small bore piping delineated above adhering to the preferred code technique does sometime present a problem. Discussions with the radiographer who made the exposure indicated that he had first tried to make the exposure with the penetrameter adjacent to the weld, but could not achieved the proper sensitivity with the penetrameter in that position. However, the film readers sheet did not indicate that configuration was a problem and over half of the exposures with penetrameters in the weld were made on straight pipe. In subsequent discussions with DPC's Level III, Examiner, the inspector was informed that Radiographic Procedure NDE-10 would be revised to clarify the conditions and documentation need to justify impractical configurations for preferred code exposures techniques. This procedure enhancement will be tracked with Inspector Followup Item 50-369,370/91-12-01, Enhancement of Radiographic Procedure NDE-10.

The second inspector concern dealt with the fact that DPC per procedure tracks weld repairs by date. This is not an industry practice in fact, the identification label for each radiographic film at McGuire has an entry for the weld repair number which is left blank. The inspector review of the above film revealed two welds where multiple repairs were made on the same date. The inspector did not identify any evidence that incorrect film identification had occurred. However, a mix-up certainly could easily happen which could cause serious concerns about record integrity. The Level III indicated that this concern would be further evaluated.

Within the areas examined, no violation or deviation was identified.

4. Licensee Implementation of Generic Letter 88-05 and Generic Letter 90-05 (92701)

- a. Generic Letter 88-05, Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components In PWR Plants.

By letter dated March 17, 1988, the Nuclear Regulatory Commission (NRC) transmitted the subject Generic Letter 88-05 concerning the boric acid corrosion of carbon steel reactor pressure boundary components in pressurized water reactors (PWR). The NRC requested information to assess safe operations of PWRs when reactor coolant leaks below Technical Specification limits develop and the coolant containing dissolved boric acid comes in contact with and degrades low alloy carbon steel components. Furthermore, the NRC requested that all PWR licensees provide assurances that a program has been implemented consisting of systematic measures to ensure that the reactor pressure boundary will have an extremely low probability of abnormal leakage, rapidly propagating failure, or gross rupture. The program is intended to monitor small reactor coolant system leakages and to perform maintenance before the leakage could cause significant corrosion damage.

On May 23, 1988, Duke provided a partial response describing certain programs in place and submitted their a full response to Generic Letter 88-05 on August 1, 1988.

The inspector reviewed the Duke's responses to the generic letter, reviewed the licensee's implementing procedures, and held discussions with operations and engineering personnel concerning surveillances, responsible personnel and methods of documentation. During this review the inspector identified one procedure (Station Directive 3.1.4, paragraph E.) which stated in part, that the unit coordinator or his/her designee will perform a walk thru inspection of all accessible parts of the lower containment at the end of each outage. The coordinator or designee will identify any significant leakage and write work requests to correct significant leaks. This wording is not in keeping with the intent of Generic Letter 88-05, which is concerned about small leaks on significant components which may have high corrosion rates under operating conditions. This wording was discussed with senior plant management who agreed the wording was misleading and would be clarified. The inspector concluded the licensee had adequate implementing procedures to ensure boric acid leakage would be detected, evaluated, and corrected in a timely manner.

- b. Generic Letter 90-05, Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping

The inspector held discussions with cognizant engineers and reviewed documents which showed that the licensee had implemented Generic Letter 90-05 for the McGuire Nuclear Station Service Water Pipe Corrosion Program. However, the inspector found that similar instructions for the balance of the plant Code piping has not been implemented to date. The inspector discussed this concern with

senior plant management since in the past six months most temporary non-code repairs at plants in the Southeast have been on Class 1 and 2 piping systems. The inspector was informed by compliance that DPC Corporate Engineering is presently working on procedures that will properly implement this generic letter.

5. Exit Interview

The inspection scope and findings were summarized on May 10, 1991, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection results listed below. No dissenting comments were received from the licensee. Proprietary information is not contained in this report.

(Open) Inspector Followup Item No. 50-369,370/91-12-01, Enhancement of Radiographic Procedure NDE-10, paragraph 3.