APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-285/89-30 Operating License: DPR-40

Docket: 50-285

Licensee: Omaha Public Power District (OPPD)
444 South 16th Street Mall
Omaha, Nebraska 68102-2247

Facility Name: Fort Calhoun Station

Inspection At: Fort Calhoun Station, Blair, Nebraska

Inspection Conducted: July 24-28, 1989

Inspector: for K. C. Stewart, Reactor Inspector, Materials and Quality Programs Section, Division of Reactor Safety — Date 8/23/89

Approved: for T. Barnes, Chief, Materials and Quality Programs Section, Division of Reactor Safety — Date 8/23/89

Inspection Summary

Inspection Conducted July 24-28, 1989 (Report 50-285/89-30)

Areas Inspected: Routine, unannounced inspection of the implementation of corrective actions in response to NRC Bulletin 87-02 concerning fastener testing and the review of procedures/controls established to assure implementation of 10 CFR Part 21 requirements.

Results: In general, the licensee's documentation files reflected responsiveness to Bulletin 87-02 and subsequent Supplements 1 and 2. Tests performed on selected safety-related fasteners indicated all samples met the specific material specification requirements and therefore, no corrective action by the licensee was deemed necessary.

Laboratory test conducted on nonsafety, unmarked fasteners produced results in noncompliance with SAE J 429 Grade 5. These noncompliances were attributed to previous purchasing methods which were without specific QA requirements and/or receipt inspection for nonsafety-related fasteners. The licensee has removed all unidentifiable fasteners from warehouse stock and has revised purchase order and receiving inspection procedures to preclude recurrences.

The licensee's evaluation concluded that no failures of fasteners have occurred in 15 years of plant operations, and the likelihood of a nonsafety fastener failure in a nonsafety system, creating a significant safety-related operability problem, is remote. Thus, the licensee's effort to identify all possible locations where the unmarked fasteners may have been used is not warranted.

The licensee's established implementing procedures and controls to ensure the reporting of defects and noncompliances appear to be adequate to assure implementation of 10 CFR 21 requirements.

No violations or deviations were identified.

DETAILS

1. Persons Contacted

OPPD

*C. F. Simmons, Licensing Engineer
*D. J. Matthews, Supervisor, Station Licensing
*A. W. Richard, Assistant Plant Manager
*J. E. Zelfel, Operations QA

NRC

*T. Reis, Resident Inspector

The inspector also interviewed other licensee personnel during the inspection.

*Denotes those persons that attended the exit interview on July 28, 1989.

2. Followup Inspection - Bulletin 87-02 - Fastener Testing and Corrective Actions (TI 2500/27)

The NRC issued NRC Compliance Bulletin 87-02 on November 6, 1987. This bulletin required licensees and construction permit holders to review their receipt inspection requirements and controls for vendor-supplied fasteners and independently determine, through testing, whether fasteners (studs, bolts, cap screws, and nuts) in stores at their facilities met applicable mechanical and chemical specification requirements. Response to Bulletin 87-02 was required within 60 days of its receipt.

On April 22, 1988, the NRC issued Bulletin 87-02, Supplement 1 which requested licensees and construction permit holders to submit information regarding the vendors which have supplied safety-related or nonsafety-related fasteners within the last 10 years. This information was to include the name and address of the manufacturer or supplier, and specification of the fastener provided.

On June 10, 1988, the NRC issued Bulletin 87-02, Supplement 2, which superseded the requirements of Bulletin 87-02, Supplement 1. Supplement 2 required addressees to provide within 90 days of receipt of Supplement 1:

"1. A list of the suppliers and manufacturers from which safety-related ferrous fasteners 1/4 inch in diameter or greater may have been purchased, within the past 10 years, including addresses. For those fasteners purchased from fastener suppliers and/or original equipment

manufacturers, any available information that identifies the manufacturer or subtier supplier of the fasteners also should be provided. Approved Vendor List or Qualified Supplier Lists are the intended sources for this information. Addressees are not required to search purchase order files, contact subcontractors to obtain the information, or submit data on fasteners supplied as part of the original component.

"2. For nonsafety-related fasteners the same information as required in the first two sentences of Item 1, above, except that a) the time of interest is for fasteners procured in the last 5 years, and b) the search of available records in this case should include purchase orders unless the licensee utilizes approved vendor lists or qualified supplier lists in procuring nonsafety-related fasteners. This information collection is understood to be on a best-effort basis. Further, addressees are not required to contact subcontractors to obtain the information or to submit data on fasteners supplied as part of an original component."

The objectives of this area of the inspection were to verify that the licensee has complied with the testing of fasteners, as required by Bulletin 87-02 (including the Supplements 1 and 2), and that corrective action has been taken by the licensee for any significantly out of specification material found during testing of safety-related fasteners.

Finding - Document Review

As requested by Bulletin 87-02, the licensee, with the participation of the senior NRC resident inspector, selected from warehouse stores, a sample of 10 safety-related fasteners (random sizes of bolts, studs, and/or cap screws) and 10 nonsafety-related fasteners (random sizes of bolts, studs, and/or cap screws). Corresponding nuts (one-for-one) were also selected.

The 40 threaded fasteners were submitted to Taussig Metallurgical Laboratory, Skokie, Illinois, for the various tests to determine conformance with their applicable material specifications. The ten externally threaded safety-related fasteners were marked FC-C1 through FC-C10, and were subjected to tension testing. The associated nuts were identified as Samples FC-C1N through FC-C10N. All nonsafety-related externally threaded fasteners and nuts required hardness testing. All 40 samples were subjected to chemical analyses.

Material specifications applicable to the test samples included the following ASME/ASTM requirements:

- Safety-Related

  ASTM A193 B7/A194 2H
  ASTM A193 B8/A194 2H

ASTM A325 Tp1/A194 2H
ASTM A307 GRA/A675 GR60
ASTM A307/A194 2H

- Nonsafety

ASME SAE J429 GR5/SAE J995 GR5
ASTM A325 Tp1/A325-74
3/4" Nut, ASME A194-B8

A review of the initial test results, documented in Taussig Report 78153, dated December 30, 1987, revealed that one safety-related nut (Sample FC-C6N, A194 2H) failed to meet the .40 percent minimum carbon requirement of specification A194 2H. In addition, six nonsafety-related bolts (Samples FC-1, 2, 6, 7, 8, and 9) and one nut (Sample FC-4N) failed to meet ASTM/ASME specifications. The six nonsafety-related bolts failed to meet the SAE J429 Grade 5 specification range of 25-34 Rockwell "C," and the carbon content of .28-.55 percent. The one nonsafety-related nut was identified as in noncompliance with the A194-B8 specification for hardness (60-105 Rockwell "B").

In view of the failure of the safety-related nut (Sample FC-C6N) to meet the carbon content of ASTM A194 specifications, the remaining nuts in stores from the same lot were tagged as nonconforming and an additional 18 nuts (from the same lot of 48 total) were sent to the Taussig Laboratory for metallurgical tests for proof load, hardness, and chemical analysis. The resulting Taussig Test Report 78575, dated January 15, 1988, indicated that all 18 nuts met the ASTM A194 2H specifications. In addition, the licensee discovered that when the original 40 samples were returned from the Taussig Laboratory, safety-related nut, Sample FC-C6N, was found in the untested condition. Also, an extra nut originally shipped with Sample FC-C7N was found to have been tested twice. Sample FC-C6N was resubmitted to the test laboratory, tested, and found to meet the requirements for ASTM A194 2H fasteners. This information was contained in a revised response to Bulletin 87-02, dated March 23, 1988. The resulting retests indicate that no failures were attributed to samples selected from the safety-related fasteners in storage, therefore, no further corrective action on the bulletin was anticipated or planned relative to safety-related fasteners.

In reviewing the test data with regard to the nonsafety-related fasteners, it appears from the test data taken that only the SAE J429 steel was found to be in noncompliance with the SAE J429 Grade 5 specification. In addition, it was apparent from the fastener testing data sheet (Attachment 1 to OPPD letter LIC-88-023, dated January 19, 1988) for each sample, that the failures occurred only from sample lots of screws or nuts that were absent of any identifiable markings (specification and/or manufacturer). In discussing this observation with the cognizant licensee representative, the inspector was informed that the licensee's evaluation concluded, as evidenced by the hardness and chemical analysis, that the unmarked screws

or nuts were SAE Grade 2 rather than SAE Grade 5 as indicated by the licensee records. It was further pointed out by the licensee representative that prior purchase orders for nonsafety-related fasteners did not contain specific material specifications nor impose QA requirements on suppliers. All unmarked screws or nuts have been subsequently removed from the warehouse stores. This was partially verified by sampling stock locations during a warehouse walkdown by the inspector, accompanied by the licensee representative. Other corrective actions implemented include revisions to the warehouse receiving stock locations cards to assure only clearly identified SAE Grade 5 screws or nuts are accepted at the warehouse, and purchase orders contain more specific material specifications.

Licensee's Conclusion

As stated in an internal memorandum, "Engineering Evaluation on CQE and Non-CQE Fasteners," dated May 2, 1988, and response letter to NRC, dated March 23, 1988, the final results and engineering evaluations indicate that all safety-related fasteners were within specifications and thus, need not be subjected to further evaluation. The above evaluation memorandum further states that piping systems which could contain questionable fasteners would have been qualified through 15 years of service without failure. It is not apparent that failures have occurred as a result of fasteners being in noncompliance. Thus, the licensee concluded that any further evaluation of nonsafety-related fasteners was unwarranted. During subsequent discussions with the cognizant licensee representative, the inspector was informed that to evaluate further and to verify each bolting application in nonsafety components would be exceedingly burdensome, costly, and would not appear to be justifiable. In addition, the licensee believes that information provided in response to Bulletin 87-02 provides reasonable assurance that fasteners used at the Fort Calhoun Station meet the requisite specifications and that operability of safety-related components is not affected.

The licensee has performed an analysis of the requisite fastener testing and established an apparent cause. Corrective actions have been taken. These licensee actions appear appropriate and no further inspection of this matter is planned at this time.

3. 10 CFR Part 21 Review

The objective of this area of the inspection was to determine whether organizations and individuals subject to 10 CFR Part 21 regulations have established and are implementing procedures and controls to ensure the reporting of defects and noncompliances.

During the inspection, the inspector reviewed the following procedures:

- Quality Assurance Plan, Section 10.5, "10 CFR 21, Reporting of Defects and Noncompliances," Revision 3, dated August 1, 1988.

- QDP-19, "Quality Assurance and Quality Control Department Procedure," Revision 5, dated August 1, 1988.
- QP-19, "Product Engineering Division (PED) Quality Procedure," Interim Revision, dated July 1, 1988.
- NOD-QP-12, "Reporting of Defects and Noncompliance to the Nuclear Regulatory Commission," Revision 3, dated April 19, 1988.
- QP-26, "PED Quality Procedure," Revision 0, dated June 9, 1989.
- QP-6, "PED Quality Procedure," Revision 0, dated June 6, 1989.
- GE1-2, "General Engineering Instruction," Revision 1, dated July 19, 1988.

In addition to the above review, the inspector selected three items identified for review/evaluation applicable to potential 10 CFR 21 reportability requirements from a listing of current items in the review/evaluation process. Items selected were as follows:

- Item No. 89-0001, Check Valve, dated January 16, 1989.
- Item No. 89-003, Solenoid Valve, dated June 22, 1989.
- Item No. 89-006, Control Valve, dated June 26, 1989.

It was observed by the inspector that two of the items had been previously reported to the Commission by the specific vendor, wherein the third item (Item No. 89-006) is relative to vendor supplied components which require the licensee to review the applicability to their facility.

It appears that the items identified were consistent with the licensee's established procedures and that the information and data appear to be factual and complete. In addition, the findings indicated that substantial safety issues do not exist.

No violations or deviations were identified.

4. Exit Interview

The inspector met with Mr. A. W. Richard, Assistant Manager, Fort Calhoun Station, and other members of the licensee's staff on July 28, 1989. At this meeting, the inspector summarized the inspection findings. The licensee did not identify any proprietary information to the inspector.