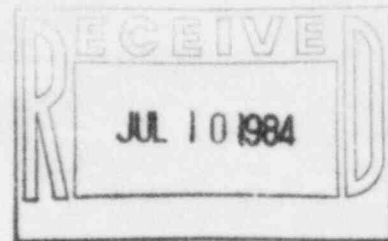


**Omaha Public Power District**  
1623 Harney Omaha, Nebraska 68102  
402/536-4000

July 2, 1984  
LIC-84-209

Mr. J. T. Collins, Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 1000  
Arlington, Texas 76011



- References: (1) Docket No. 50-285  
(2) IE Bulletin 82-02  
(3) Letter from W. C. Jones to J. T. Collins dated August 2, 1982 (LIC-82-269)

Dear Mr. Collins:

IE Bulletin 82-02

In a letter dated August 2, 1982, the District provided its response to Item 5 of IE Bulletin 82-02. IE Bulletin 82-02, Item 5, requested, in part, that licensees "identify those closures and connections, if any, where fastener lubricants and injection sealant materials have been or are being used and report on plant experience with these applications, particularly any instances of SCC of fasteners. Include types and composition of materials used." The District's response to Item 5 stated, in part, that "The Fort Calhoun Station approved maintenance procedures call for the use of NEVERSEIZE PURE NICKEL #65 on all threaded fasteners. To date, the District has experienced no problems related to use of NEVERSEIZE LUBRICANT." This letter provides the steps to be taken to correct the District's response relating to Item 5.

During the week of May 7-11, 1984, IE Inspectors conducted an inspection relating to the District's response to IE Bulletin 82-02. As a result of IE Inspection No. 84-12, it was brought to the District's attention that the response to IE Bulletin 82-02, Item 5, was not complete. When the District became aware that its response was not complete, steps were immediately taken to conduct a reinvestigation in order to gather sufficient information to enable the District to provide an update to the response to IE Bulletin 82-02, Item 5. However, two factors have delayed our update to the response. First, on May 16, 1984, the Fort Calhoun Station experienced a steam generator tube failure. Following this failure, all available resources were devoted to correcting and resolving issues relating to the steam generator tube failure, including preparation of reports to the Commission, preparation for meetings with the Commission, implementation of corrective actions, submittal of reports, and preparation of responses to the

Mr. J. T. Collins  
LIC-84-209  
Page Two

Commission's June 5, 1984 letter. Second, the preparation of a revised response was underway when the person developing the revised response encountered medical problems which required his hospitalization for an extended period of time. The individual is still under medical care at this time. The activities associated with the steam generator tube failure, coupled with the unavailability of a key person who was involved in the initial preparation of the District's response to IE Bulletin 82-02, delayed the completion of a revised response to the bulletin.

The following represents an overview of the procedures and practices that were in place at the time the response to IE Bulletin 82-02, Item 5, was prepared and how the response was handled in accordance with those procedures and practices.

Correspondence to and from the Commission is handled in accordance with Licensing Procedure DAS-L-03. This procedure calls for a review of incoming correspondence from the Commission by the Licensing Administrator to determine what action, if any, is required by the District. If action is required, then assignments are made (including due dates) to the appropriate department to ensure that the required action will be adequately addressed in a timely manner. This procedure calls for the assigned department, upon completion of the required action, to submit the response to the Licensing Department. The Licensing Department then reviews the department response to ensure that all required items are addressed, that all Commission rules and requirements, if any, have been met, and then prepares a final submittal based on the information provided. The procedure then calls for the final submittal to be distributed to key personnel, including the preparer's department, for review and approval. These reviews are documented and any comments on the final submittal are resolved by the Licensing Department. Upon resolution of the reviewers' comments, if any, the District's response is submitted to the Division Manager - Production Operations for his review and approval. Upon his signature, the document is transmitted to the Commission.

The response to IE Bulletin 82-02 was handled in accordance with the above mentioned procedure. The Licensing Administrator assigned the required action to the Technical Services Section. The assignment was given to a recently hired engineer within the Technical Services Section who had considerable previous utility engineering experience. During the development of the response, the engineer interviewed plant maintenance personnel familiar with maintenance procedures relating to the threaded fasteners on the reactor coolant system boundary. Based on those interviews, the engineer prepared the response to the bulletin. The response was signed by the Section Manager - Technical Services and sent to the Licensing Department. A final submittal was then prepared based on the information provided. This document was then distributed

Mr. J. T. Collins  
LIC-84-209  
Page Three

for review in accordance with the District's previously described review procedure. This response was reviewed by the Division Manager - Production Operations, Division Manager - Quality Assurance & Regulatory Affairs, Section Manager - Operations, Section Manager - Technical Services (designated alternate), Manager - Operations Technical Support Services, Manager - Administrative Services, Manager - Fort Calhoun Station (designated alternate), and Licensing Administrator. Reviewers' comments were resolved and, consequently, the District submitted the response signed under affidavit, as required by the bulletin.

The previously described review procedure has proven in the past to be an effective and reliable method of assuring the accuracy and completeness of the District's responses to the Commission. As with any procedure or practice, there are isolated cases where breakdowns may occur and the desired results are not always achieved. The District firmly believes that this is the situation which existed in this case. The District believes that the procedures and practices for the receipt of correspondence from the Commission, preparation of responses, and the review of those responses in place at the time the response to IE Bulletin 82-02 was prepared are indeed thorough and effective. However, plans have been made to review these procedures and practices with the intention of implementing improvements which will assist in assuring that opportunities to introduce errors are reduced or eliminated. This review will be completed by July 31, 1984 and any revisions or changes in procedures or practices will be implemented as soon as practical thereafter.

Since the time when the response to IE Bulletin 82-02 was prepared, the District has implemented or is implementing the following three programs which have the potential for assisting personnel in the accumulation of information for development of responses to the Commission. The first program is the computerized records management system which has been implemented and is functional at the present time. The second program is the computerized history and maintenance planning system which is presently in the process of being implemented. The third program relates to controlling of vendor information. The details of this program are addressed in the NUTAC report on vendor information (Generic Letter 83-28, Section 2.2.2). This NUTAC report describes an alternative program to address Generic Letter 83-28, Section 2.2.2. In general, the NUTAC program consists of the following three major areas: active participation in the Nuclear Plant Reliability Data System (NPRDS), active participation in the Significant Event Evaluation and Information Network (SEE-IN), and internal handling procedures for equipment technical information. The District is presently reviewing the NUTAC report in an attempt to determine exactly the extent that can be implemented. When

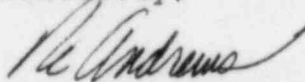
Mr. J. T. Collins  
LIC-84-209  
Page Four

implemented, the above mentioned improvements can be utilized in the development of District responses relating to equipment history, equipment maintenance, equipment operation, and vendor information.

Attachment 1 is submitted to reinforce and document the District's compliance with Regulatory Guide 1.65 (October, 1973) relating to reactor vessel studs. This attachment gives a point-by-point review of Regulatory Guide 1.65 and how the District addresses each point. An analysis was previously performed in February, 1983 in order to exclude the reactor vessel head closure studs from requirements of IE Bulletin 82-02. The District believes this attachment adequately demonstrates compliance with Regulatory Guide 1.65 (October, 1973).

The District is presently investigating, for the time period beginning with the start of commercial operation of the Fort Calhoun Station up to the present time, the types of lubricants which have been used on bolted closures of the RCPB components. These components were identified in the District's response (LIC-82-269) dated August 2, 1982 to Item 5 of IE Bulletin 82-02. The above mentioned investigation, based on information contained in maintenance records, will be completed by August 15, 1984.

Sincerely,



R. L. Andrews  
Division Manager  
Nuclear Production

RLA/JJF:jmm

cc: LeBoeuf, Lamb, Leiby & MacRae  
1333 New Hampshire Avenue, N.W.  
Washington, D.C. 20036

Mr. E. G. Tourigny, Project Manager  
Mr. L. A. Yandell, Senior Resident  
Inspector

## Attachment 1

### Compliance with Regulatory Guide 1.65 (Oct. 1973) Relating to Reactor Vessel Studs

This attachment provides a point by point review of Regulatory Guide 1.65 (Oct. 1973) and the examination and maintenance methods practiced by the District in demonstration of the District's commitment to this Regulatory Guide.

#### Reg. Guide Section C.1.a. States:

##### 1. Bolting Materials

- a. Reactor vessel closure stud bolting should be fabricated from materials which have adequate toughness throughout the life cycle of the reactor. Stud bolting should meet the requirements set forth in Subsection NB, "Requirements for Class 1 Components," Section III of the ASME Code. Bolting materials should meet the requirements of one of the following ASME specifications:

- (1) SA-540 Grade B-23 and B-24 bar (AISI 4340).
- (2) SA-193 Grade B-7 bar (AISI 4140, 4142, 4145).
- (3) SA-194 Grade 7 (nuts for bolting) (AISI 4140, 4142, 4145).
- (4) SA-320 Grade L-43 bar (AISI 4340).

#### Response

The Combustion Engineering Reactor Pressure Vessel Manual and the material certification records indicate that the reactor vessel closure studs were fabricated of material meeting the requirements of ASME SA-540, Grade B-24. Nuts and washers were fabricated from requirements of ASME SA-540, Grade B-23.

#### Reg. Guide Section C.1.b.(1) States:

- b. The requirements of the specification in paragraph C.1.a should be supplemented by the following:

- (1) The maximum measured ultimate tensile strength of the stud bolting material should not exceed 170 ksi.

#### Response

Material certifications for the reactor vessel closure studs indicate that the studs have an ultimate tensile strength of less than 170 ksi.

#### Reg. Guide Section C.1.b.(2) States:

- (2) Charpy V impact testing should be performed according to ASME SA-370, "Methods and Definitions for Mechanical Testing of Steel Products," and to be acceptable, the results must satisfy the requirements of Paragraph IV.A.4. of Appendix G to 10 CFR Part 50.

In case a test fails, one retest may be conducted according to subsubarticle NB-2350 of Section III, ASME Code.

### Response

Regulatory Guide 1.65 was issued in October, 1973, whereas the Fort Calhoun Station reactor vessel was designed and fabricated to the requirements of the 1965 edition of ASME Section III, including the 1967 Winter Addenda according to the Fort Calhoun Station USAR. Appendix G was not added to 10 CFR Part 50 until 38 FR 19014, July 17, 1973; this too post-dates the construction of the Fort Calhoun Station. Charpy V impact testing was performed in accordance with the appropriate Codes in effect at the time of fabrication of the bolting.

### Reg. Guide C.1.b.(3) States:

- (3) Stud bolting should not be metal-plated unless it has been demonstrated that the plating will not degrade the quality of the material in any significant way (e.g., corrosion, H<sub>2</sub> embrittlement) or reduce the quality of results attainable by the various required inspection procedures. The stud bolting may have a manganese phosphate (or other acceptable) surface treatment. Lubricants for the stud bolting are permissible provided they are stable at operating temperatures and are compatible with the bolting and vessel materials and the surrounding environment.

### Response

No metal plating was specified for the reactor vessel studs according to CE drawing E 232-420, Stud, Nut, and Washer Details. This drawing indicates that, following manufacture, the studs, nuts, and washers were to be "coated with an antigalling coating in accordance with C.E. M&P Spec. 4.4.4.1(a)." This drawing also states that "At installation, lubricate threads of studs, plugs, and bearing surfaces of nuts and washers with Super-Moly," which contains MoS<sub>2</sub>. The CE Reactor Vessel manual specifies the use of Super Moly lubricant for vessel head bolting.

The use of Super-Moly is also found by CE to be "acceptable for use on items which will not come in contact with primary coolant," per CEND-353, Rev. 6, Aug. 1977, Field Handling, Maintenance, and Storage Requirements for Combustion Engineering Furnished Equipment. That document was prepared by the Nuclear Power Services department of Combustion Engineering, Inc. Recent conversations with CE concerning the appropriate lubricants to use in another RCFB closure indicated that CE continues to recommend the use of a lubricant which contains MoS<sub>2</sub>.

Reg. Guide 1.65 cautions against the use of metal-plating on bolts which can lead to cracking or severe galling. It is interesting to note the Reg. Guide goes on to mention that "replacement stud bolts in Yankee Rowe which had a manganese phosphate surface treatment in combination with MoS<sub>2</sub> as a lubricant demonstrated superior resistance to galling when compared to the original silver-plated stud bolts."

Reg. Guide Sections C.2.a. and C.2.b. State:

2. Inspection

The nondestructive examination of the stud bolts and nuts should be performed according to subsubarticle NB-2580 of Section III of the ASME code as supplemented by the following:

- a. The stud bolts and nuts should be ultrasonically examined after final heat treatment and prior to threading.
- b. The ultrasonic examination (paragraph NB-2584) should be conducted according to ASME Specification SA-388, "Ultrasonic Examination of Heavy Steel Forgings."

Response

The material certification records indicate that the bars and tubes from which the bolting was fabricated were examined for defects using ultrasonic examination methods. In addition, the drawing CE 232-420 indicates that "Before and after threading, studs (PC No. 420-01) are to be magnaglow inspected in accordance with paragraphs N-626.3(b), Section III, ASME Code. Acceptance to be in accordance with Paragraph N-325, Section III, ASME Code." Again, the reactor vessel was designed and fabricated to the requirements of the 1965 edition of ASME Section III including the 1967 Winter Addenda. Thus, the studs were adequately examined for defects at the time of manufacture. In addition, all 48 reactor vessel closure studs have received Inservice Examination including magnetic particle and ultrasonic examination as required by and in accordance with the 1971 edition of ASME Section XI including the 1972 Summer Addenda and the 1974 edition including the 1975 Summer Addenda and the corresponding requirements of ASME Section V. The ultrasonic examinations have been performed from the center drilled hole extending the length of the studs. The requirements of the in-service inspection program supercede the inspection performed at the time of fabrication.

Reg. Guide Section C.2.c. States:

- c. The calibration standard used to establish the first back reflection for the ultrasonic testing should be based on good sound representative material. To assure that the material is representative, the selection of the standard should be based on a preliminary ultrasonic examination of a number of specimens (a minimum of three per standard).

Response

The calibration standards used for ultrasonic examination during inservice exams complied with the ASME Section XI and Section V Codes in effect at the time of the individual examinations. The requirements of the in-service inspection program supercede the inspections performed at the time of fabrication.

Reg. Guide Section C.2.d. States:

- d. The magnetic particle or liquid penetrant examination (paragraph NB-2583) should be performed on the studs and nuts after final heat treatment and threading.

### Response

The drawing, CE 232-420, indicates that "All Fabrication Shall be in Accordance with ASME Boiler Code Section III." Again, the reactor vessel was designed and fabricated to the requirements of the 1965 edition of ASME Section III including the 1967 Winter Addenda. As stated previously, the drawing also indicates that the studs were to have been "magneglow inspected in accordance with paragraph N-626.3(b), Section III, ASME Code." This was to have been done both before and after threading. Also, all studs and nuts have been subsequently examined with the magnetic particle method through the inservice inspection program.

### Reg. Guide Section C.2.e. States:

- e. The requirements of paragraph NB-2585 should be applied to all closure stud bolts and nuts.

### Response

The Winter 1967 addenda of ASME Section III is indicated by the USAR to have been used to specify the design and fabrication requirements for the reactor vessel.

### Reg. Guide Section C.3 States:

#### 3. Protection Against Corrosion

During venting and filling of the pressure vessel and while the head is removed, the stud bolts and stud bolt holes in the vessel flange should be adequately protected from corrosion and contamination.

### Response

The Fort Calhoun maintenance and operating procedures contain measures to protect the stud bolts and vessel flange bolt holes from corrosion and contamination. The stud bolting remains with the vessel head when it is lifted (prior to reactor cavity flooding) to its storage location. This storage location is out of the reactor cavity and in a reasonably clean, dry and low traffic area. The vessel flange bolt holes are either filled with a corrosion inhibitor and plugged prior to flooding the reactor cavity or alignment pins are installed.

### Reg. Guide Section C.4.a. States:

#### 4. Inservice Inspection

The inservice examination of the pressure vessel stud bolting should be performed in accordance with the requirements of Section XI of the ASME Code as supplemented by the following:

- a. The inservice inspection should include a surface examination which should be in accordance with paragraph NB-2545 or NB-2546 of Section III of the ASME Code. For this inspection the studs should be removed from the pressure vessel.



## Response

In 1975, one third (16) of the sets of vessel bolting were examined using visual, magnetic particle, and ultrasonic methods in accordance with the 1971 edition of the ASME Section XI Code including the 1972 Summer Addenda. The magnetic particle examination results were evaluated in accordance with "the applicable portions of Section III of the ASME Code and any indications which exceed those criteria shall be reported to the customer for evaluation and/or disposition." No indications exceeding those criteria were found. In 1980, another 16 sets of vessel bolting were examined. Again, the examination procedure required notification of the customer for evaluation and/or disposition if an indication were found which exceeded criteria identical to the criteria found in paragraphs NB-2545 of Section III of the ASME Code. Indications which exceeded the Section III criteria (but not the Section XI criteria) were reported to OPPD by the ISI examiner. The indications were described as "tool marks," not cracks or corrosion and were found to be located at the very top of the stud in a non-stressed area or on outside surfaces of the nuts and determined by OPPD to be acceptable without repair. In 1981, the remaining 16 sets of vessel bolting were examined using the ultrasonic and magnetic particle methods completing 100% of the reactor vessel bolting exams. The examination procedure required notification of the customer for any indication which exceeded criteria identical to those found in Paragraph NB-2545 of the ASME Section III Code. Indications were described as "tool marks" and were found in non-stressed areas of the studs or on outside surfaces of the nuts. These were again determined to be acceptable without repair. All of the studs were removed from the vessel in order to accomplish the surface examinations.

### Reg. Guide Section C.4.b. States:

- b. Selection of the bolting material for each required inservice inspection should be based on a representative sample and on a reasonable geometric distribution.

## Response

During the first 10 years of service, 1/3 of the bolting was selected for each of the three series of inservice examinations. The selection was in a uniform fashion from the entire circumference of the vessel flange.

The District remains committed to the Inservice Inspection criteria of Reg. Guide 1.65. These criteria for representative sampling and for the requirements of paragraph NB-2545 for surface examination are being included in the current development of the inservice inspection program for the current 10 year inspection interval, 1983-1993.

The District believes that this point by point review of Reg. Guide 1.65 and the examination and maintenance methods practiced by the District shows "commitment" to the Reg. Guide as required by IE Bulletin 82-02 in order to exclude the reactor vessel head closure studs from the requirements of IE Bulletin 82-02.