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OPPD
Omaha Public Power District

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February 16, 2006
LIC-06-0017

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D.C. 20555

References:
1. Docket No. 50-285
2. Letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk) dated October 28 2005, Relief Request for Use of "Radiography Using Phosphor Imaging Plate" (LIC-05-0122)
3. Letter from NRC (A. B. Wang) to OPPD (R.T. Ridenoure) dated February 9, 2006, "Request for Additional Information Related Relief Request for Use of "Radiography Using Phosphor Imaging Plate" (TAC No. MC8843), (NRC-06-0015)

SUBJECT: Response to Request for Additional Information for Fort Calhoun Station Unit No. 1 Relief Request for Use of "Radiography Using Phosphor Imaging Plate" (TAC No. MC8843)

The Omaha Public Power District (OPPD) previously submitted a relief request seeking NRC approval for the Fourth Interval Inservice Inspection Program to incorporate "Radiography Using Phosphor Imaging Plate," Reference 2. The Attachment to this letter provides the response to the NRC's additional questions presented in Reference 3 which requested clarification of code application, training of inspectors, and results of previous applications of this inspection process.

No commitments to the NRC are made in this letter.

If you require additional information, please contact Thomas C. Matthews at (402) 533-6938.

Sincerely,

S.K. Gambhir
Division Manager - Nuclear Projects

SKG/rlj

Attachment: OPPD Response to Request for Additional Information for Fort Calhoun Station Unit No. 1 Relief Request for Use of "Radiography Using Phosphor Imaging Plate"

cc: Director of Consumer Health Services, Department of Regulation and Licensure, Nebraska Health and Human Services, State of Nebraska

OPPD Response to Request for Additional Information
for
Fort Calhoun Station Unit No. 1
Relief Request for Use of
"Radiography Using Phosphor Imaging Plate"

NRC Question 1: *In Attachment 2 of the October 28, 2005 submittal, OPPD stated in the second paragraph of page 1 that the radiographic examinations of all but the containment liner will be performed to the requirements of ASME Section III, 1992 Edition, with no addenda. Provide justification for referencing this code edition as it is not consistent with the construction codes or Section XI codes referenced in Attachment 1 of the relief request submittal.*

OPPD Response to Question 1: ASME Section XI, 1998 Edition with addenda through the 2000 Addenda, Subsubarticle IWA-4540 requires that repair/replacement activities performed by welding on a Class 1, 2, or 3 pressure retaining boundary be subject to pressure test, unless exempted by paragraph IWA-4540(b). IWA-4540 allows this pressure test to be either a hydrostatic test (i.e., a test performed above normal operating pressure limits), or a system leakage test. System leakage test are performed at a pressure not less than the pressure corresponding to 100% rated reactor power for Class 1 components (IWB-5221). For Class 2 or 3 components, the system leakage test is conducted at the system pressure obtained while the system, or portion of the system, is in service performing its normal operating function or at the system pressure developed during a test conducted to verify system operability (IWC-5221, IWD-5221).

However, in order to exercise the system leakage test option, IWA-4540 requires that the nondestructive examination methodology and acceptance criteria of the 1992 Edition or later of Section III be met prior to return to service. OPPD has decided to exercise the system leakage test option for those piping welds subject to the pressure test requirements of IWA-4540. Therefore, it is required by IWA-4540 that the nondestructive examination methodology and acceptance criteria of the 1992 Edition or later of Section III be met prior to return to service.

NRC Question 2: *In Attachment 1 of your relief request, OPPD stated in item 3 of Applicable Code Requirement that "Other than additional training for examiners in the principles and processes of DR, the elements of the radiographic examination process remain unchanged." Identify which edition of the relevant code sections controls the performance of the radiographic examination process including examination procedures and its demonstration requirements, personnel qualification such as the interpretation of the radiographic image, extent of examination (and reexamination), and the acceptance criteria. Also discuss the potential differences in ISI requirements that may result from your use of various code editions as referenced by the construction codes, Section XI codes and the code edition pertaining to Mandatory Appendix VIII, "Radiography Using Phosphor Plate."*

OPPD Response to Question 2: The radiographic examination process of the welds will be controlled by a procedure implementing the requirements of the applicable construction codes for radiographic examination consistent with the alternative requested by Relief Request 10.

1) Neither of the construction codes nor Section XI directly establishes the requirements for obtaining the radiographic image of the weld or determining the acceptability of that image for interpretation. Section XI requires that the weld meet the requirements of a construction code (IWA-4221). The 1992 Edition of Section III (1992 Edition) states that "Radiographic examination shall be in accordance with Section V, Article 2..." (NB-5111). Section VIII, 1968 Edition (Section VIII) (UW-51(b)) states that "The weld shall be radiographed with a technique which will have sufficient sensitivity to indicate the features of the penetrameter as described in Par. UW-51(c)(8)..." Both of the construction codes maintain partial control over the penetrameter or image quality indicator (IQI). Additionally, Section VIII provides requirements for determining acceptable film density. Therefore, obtaining the radiographic image to ASME Section V, Article 2, Mandatory Appendix VIII, 2004 Edition with 2005 Addenda (MAVIII) is acceptable to Section XI and both construction codes, provided the specified requirements of each construction codes are satisfied.

   OPPD is requesting permission to use the requirements of MAVIII as the radiographic examination technique. In the case of the 1992 Edition, MAVIII will be implemented except where the requirements governing the use of IQIs of the 1992 Edition conflict with the requirements of MAVIII. In that case, the requirements of the 1992 Edition will govern.

   In a similar manner, the requirements of MAVIII will be used to meet the requirements of UW-51(b). Because of the differences in technology between film and phosphor imaging plate radiographic examination, MAVIII eliminates some specific requirements within Article 2 for determining the acceptability of the radiograph image based on density. Similar requirements within UW-51 concerning density and the measurement of density will not be implemented as part of this request for relief. The elimination of these density requirements from UW-51 will be consistent with the elimination of these requirements from Article 2 by MAVIII. These additional requirements will be implemented in meeting the radiographic examination of the containment liner. In addition, if the requirements of UW-51, concerning the utilization of penetrameters (IQIs), conflict with the requirements of MAVIII, then the requirements of UW-51 will govern.

2) The requirements of MAVIII require demonstration of the image quality indicator requirements of the written procedures on production or technique radiographs using phosphor imaging plates (VIII-221.2). The 1992 Edition requires that all nondestructive examinations be performed in accordance with detail written procedures proven by actual demonstration to the satisfaction of the Inspector (NB-5112). Both of these demonstration requirements will be met. Compliance with these demonstration requirements meets the applicable requirements of Section XI and Section VIII.

3) The personnel qualifications will be in accordance with the requirements of the NB-5521 of ASME III (1992 Edition) Edition for the radiographic examination of all welds. This meets the requirements of Section VIII or Section XI, IWA-4421, where the construction code is referenced. Additional training in the use of phosphors image plate technology and the interpretation of the associate radiographic image will be provided to inspectors. These requirements will be part of the procedure governing the qualification and certification of nondestructive examination inspectors. The determination of an acceptable radiographic image and the interpretation of the results will only be performed by inspectors who are certified in accordance with the governing procedure.

4) Each of the construction codes specifies the requirements establishing the extent of examination and reexamination, and the acceptance criteria. Neither Section XI nor MAVIII specifies requirements addressing these aspects of the radiographic examination process. These requirements of the appropriate construction code will be met based upon the component being examined.

NRC Question 3: *Provide details regarding the information provided by OPPD's primary contractor that has demonstrated to OPPD that DR, using phosphor imaging plates will provide acceptable level of quality and safety. Provide information to support the conclusion that the quality of DR examination results, using phosphor imaging plates, is (at a minimum) equivalent to that provided by film radiograph. If not, discuss the exceptions. Also discuss and provide the details of the evidence from previous field applications of DR that has demonstrated to OPPD that acceptable results can be achieved in the digital radiographic examinations that are scheduled to be performed in the fall 2006 Refueling Outage at FCS.*

OPPD Response Question 3: OPPD is confident that digital radiography can be demonstrated and proven to be applicable to the classes of welds listed in Attachment 1 of Reference 2 for the following reasons:

1) The use of DR with Phosphor Imaging Plates for code acceptance of welds was successfully performed at Arkansas Nuclear One - Unit 1 during their 2005/06 Steam Generator Replacement Outage.

2) Research has been performed by the primary contractor using DR with phosphor imaging plates on various piping thicknesses and diameters, and on various plate thicknesses; those radiographs using DR met the requirements of ASME V and ASME III for radiographic quality. The OPPD Level 3 Inspector has witnessed these demonstrations and has high confidence that the DR process using Phosphorous imaging screens will meet the requirements of ASME V MAVIII and ASME III. NB 5000 92 edition.

3) OPPD will establish a qualification process, in accordance with ASME Section V, MAVIII and ASME Section III NB 5000 92 Edition to demonstrate that the quality of

DR examination results, using phosphor imaging plates, will meet the requirements of ASME V Article 2 and MAVIII, and ASME Section III NB 5000.

OPPD has not made a judgment concerning the relative equivalency of DR TO film radiography. Either radiographic technique is capable of producing an acceptable radiographic image, i.e., the image quality being determined by the presentation of the penetrameter or image quality indicator. OPPD will demonstrate this DR process on mock ups of the components to prove that the DR process meets the requirements of ASME Section s III and V before using the DR process in the 2006 outage at the Fort Calhoun Station. This demonstration will involve mock ups of the actual components that will be radiographed. The mock ups will be the same diameter, same thickness, same product form and similar composition (the chemical composition may not be exactly the same but will always be similar) relative to the actual NSSS components to be radiographed. If demonstration on the mock up components cannot be satisfactorily demonstrated to meet the requirements of ASME V MAVIII and ASME Section III NB 5000, the DR process will not be used and the radiography will be performed using traditional film methods.