your energy partner
OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

May 19, 2005
LIC-05-0065

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

References:
1. Docket No. 50-285
2. Letter from Samuel J. Collins (NRC) to Ross Ridenoure (OPPD) dated February 11, 2003, Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (EA-03-009) (NRC-03-025) (ML030380470)
3. Letter from R. William Borchardt (NRC) to Ross Ridenoure (OPPD) dated February 20, 2004, Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (NRC-04-0022) (ML040220181)
4. Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated May 14, 2005, Fort Calhoun Station Unit No. 1, Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (LIC-05-0057)
5. Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated May 17, 2005, Fort Calhoun Station Unit No. 1, Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (LIC-05-0062)
6. Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated May 18, 2005, Fort Calhoun Station Unit No. 1, Supplemental Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (LIC-05-0064)

SUBJECT: Fort Calhoun Station Unit No. 1, Supplemental Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

In References 4, 5, and 6 the Omaha Public Power District (OPPD) provided information in support of a relaxation request with respect to Reference 3. In a phone call on May 19, 2005, the

A101

NRC requested additional information concerning References 4 and 5. OPPD is providing the requested information as Attachment 1 to this letter.

OPPD requests that the NRC complete its review and approval of this relaxation request by May 25, 2005.

If you have any questions or require additional information, please contact Thomas R. Byrne at (402) 533-7368.

Sincerely,

R J Phelps 5-19-05

Ralph L. Phelps
Division Manager
Nuclear Engineering

RLP/TRB/trb

Attachment 1 - Supplemental Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

Attachment 1

Supplemental Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

Attachment 1

Supplemental Response to Request for Additional Information on the Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

NRC Question 1:

With regards to the Control Element Drive Mechanism (CEDM) Nozzle No. 25 relaxation request, assume a through-wall circumferential flaw in an 80 degree circumference (worst case scenario) is present in the uninspected area. Please provide discussion to confirm that it will take more than one operating cycle for a through-wall flaw of 80 degrees in circumference to propagate to 300 degrees, assuming 300 degree is the critical size. Also, please confirm that that Reference 8 [CEOG Report #CEN-614, "Safety Evaluation of the Potential for and Consequences of Reactor Vessel Head Penetration Alloy 600 OD Initiated Nozzle Cracking," December 1993] of Attachment 2 of Reference 2 is still applicable for Nozzle No. 25.

OPPD response:

EPRI Report MRP-104 (Reference 1) discusses the time for a flaw to grow through-wall, and then the time for a circumferential flaw to reach critical flaw length. Figure 1 (excerpted from Reference 1) shows the time in Combustion Engineering Plants for circumferential flaws to grow to various sizes in CEDM and In-Core Instrumentation (ICI) nozzles. OPPD has added lines to this figure to show the areas of interest as discussed below.

Applying the conditions seen in CEDM nozzle 25 at Fort Calhoun Station Unit No. 1 (FCS), the time to grow from 40.000 degrees (equivalent to 80 degrees in nozzle 25) to a conservative critical flaw length of 150.000 degrees (equivalent to 300 degrees in nozzle 25) is approximately 16 years. This is well in excess of one operating cycle. The 16 years is conservative on both ends. The hypothetical flaw is not through-wall at FCS, because the bare metal visual examination found no boric acid deposits. Also, 300 degrees is conservative, because it is less than the 330 - 350 degrees required for CE Plants to reach critical flaw length.

CEOG Report # CEN-614, "Safety Evaluation of the Potential for and Consequences of Reactor Vessel Head Penetration Alloy 600 OD Initiated Nozzle Cracking," December 1993 remains applicable for CEDM penetration nozzle 25 at FCS. Reference 1 is a more recent report that contains similar conclusions.

NRC Question 2:

Please provide a revised table, by nozzle number, summarizing the inspection areas for which relaxation is requested based on the three overlapping issues identified in Reference 2. Include information for CEDM nozzle 25.

OPPD response:

This is included as Table 1 to this attachment.

References:

1. EPRI MRP-104, Materials Reliability Program: RV Head Nozzle and Weld Safety Assessment for Westinghouse and Combustion Engineering Plants, April 2004.

2. Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated May 14, 2005, Fort Calhoun Station Unit No. 1, Revised Relaxation Request for First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (LIC-05-0057)

Attachment 1, Table 1

CEDM Nozzle	Percent (%) Inspection Coverage Obtained	Lowest Coverage Obtained (inches above J-groove weld)	Relaxation Requested (remaining distance in inches above the J-groove weld)	Applicability 1 - Lack of Vertical Scan Coverage 2 - CEDM Thermal Sleeve Tab Interference 3 - Mechanical Limits of Probe Delivery System	Bounding Total Stress Per Figures 1 though 7 of Attachment 2 of Reference 2[1]
6	99.01	1.75	0.25	1	≤ 12 ksi
7	98.62	1.73	0.27	1	≤ 12 ksi
8	99.38	1.83	0.17	1	≤ 12 ksi
10	99.09	1.77	0.23	1	≤ 12 ksi
12	99.30	1.73	0.27	1	≤ 12 ksi
14	99.27	1.74	0.26	1	≤ 12 ksi
19	99.22	1.49	0.51	1	≤ 12 ksi
22	98.94	1.75	0.25	1, 2	≤ 14 ksi
23	99.05	1.79	0.21	1, 2	≤ 14 ksi
24	98.81	1.87	0.13	1, 2	≤ 14 ksi
25	75.18	1.57 [2]	0.43 [2]	1, 2, and Thermal Sleeve Interference	≤ 14 ksi
26	97.79	1.61	0.39	1, 2	≤ 14 ksi
28	99.18	1.47	0.53	1, 2	≤ 14 ksi
29	99.77	1.89	0.11	1, 2	≤ 14 ksi
30	97.34	1.65	0.35	1, 2	≤ 14 ksi
31	99.53	1.81	0.19	1, 2	≤ 14 ksi
32	97.76	1.71	0.29	1, 2	≤ 14 ksi
33	96.99	1.59	0.41	1, 2	≤ 14 ksi
34	99.12	1.57	0.43	1, 2	≤ 14 ksi
35	99.25	1.83	0.17	1, 2	≤ 14 ksi
37	99.38	1.87	0.13	1, 2	≤ 14 ksi
38	94.85	1.42	0.58	1, 2, 3	≤ 15 ksi
39	93.35	1.26	0.74	1, 2, 3	≤ 15 ksi
40	93.61	1.06	0.94	1, 2, 3	≤ 15 ksi
41	93.20	1.06	0.94	1, 2, 3	≤ 15 ksi

(1) Figures in Attachment 2 of Reference 2 are applicable to all above nozzle configurations.
(2) Only applicable to the scanned portion of CEDM nozzle 25 due to thermal sleeve interference.

Attachment 1, Figure 1

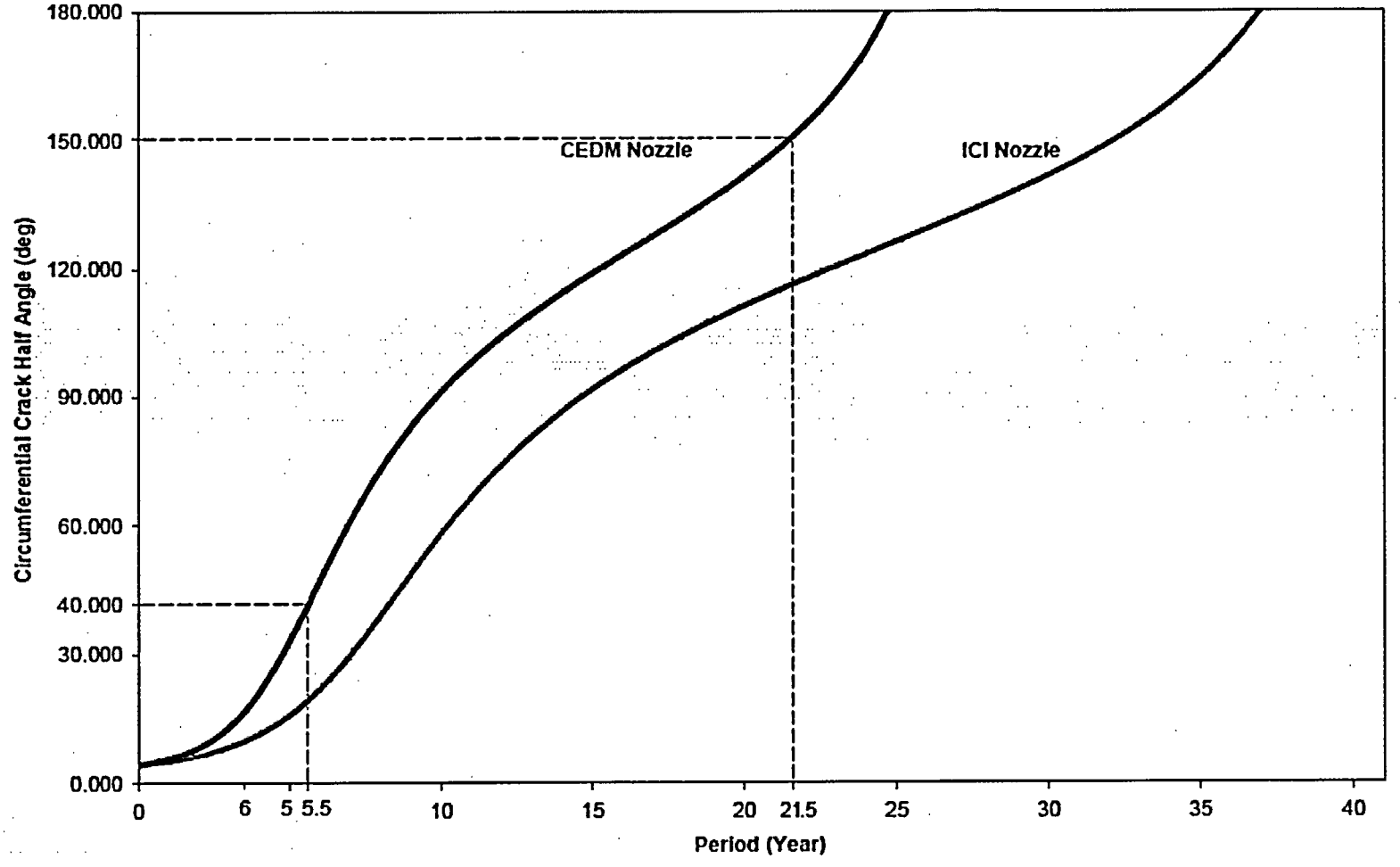

Figure 5-7
Through-Wall Circumferential Flaws Near the Top of the Attachment Weld for CEDM and ICI Nozzles - Crack Growth Predictions (MRP Factor of 2.0 Included)