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Constellation Energy

January 14, 2005

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 2; Docket No. 50-318
Request for Relaxation from NRC Revised Order EA-03-009, "Issuance of First Revised NRC Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors"

REFERENCE: (a) Letter from R. William Borchard (NRC) to Holders of Licenses for Operating Pressurized Water Reactors, 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"

Calvert Cliffs Nuclear Power Plant hereby submits Attachment (1), a request for relaxation from certain inspection requirements of Reference (a), Section IV.C(5)(b)(i).

Calvert Cliffs Nuclear Power Plant will begin a refueling outage for Unit 2 in mid February 2005. Inspection of the reactor vessel head penetration nozzles, as required by Reference (a), is scheduled to begin shortly after the start of the refueling outage. The required inspections are scheduled to be completed on March 5, 2005. Specific nozzle locations requiring relaxation of inspection requirements will be provided at that time. We request approval of this relaxation request as soon as possible after your receipt of this data.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

GV/MJY//bjd

Attachment: (1) Request for Relaxation of Revised Order Requirement IV.C(5)(b)(i) for Calvert Cliffs Nuclear Power Plant Unit 2

A101

cc: J. Petro, Esquire
J. E. Silberg, Esquire
R. V. Guzman, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR
S. D. Bloom, NRC

ATTACHMENT (1)

REQUEST FOR RELAXATION OF REVISED ORDER REQUIREMENT IV.C(5)(b)(i) FOR CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2

Calvert Cliffs Nuclear Power Plant, Inc.
January 14, 2005

ATTACHMENT (1)

REQUEST FOR RELAXATION OF REVISED ORDER REQUIREMENT IV.C(5)(b)(i) FOR CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2

RELAXATION REQUEST:

Pursuant to the procedure specified in Section IV.F(2) of Nuclear Regulatory Commission (NRC) Revised Order EA-03-009 (Reference 1), Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP) hereby submits a request for relaxation from certain inspection requirements of the Revised Order, specifically, the relaxation request involves a requirement in Section IV.C(5)(b)(i) of the Revised Order as described below.

RELAXATION REQUEST 1:

A. Revised Order Requirement from Which Relaxation is Requested:

We request relaxation from the requirement in Section IV.C(5)(b)(i) of the Revised Order for ultrasonic testing of each Reactor Pressure Vessel (RPV) head penetration nozzle (i.e., nozzle base material) from two inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis).

B. Specific Penetration Nozzles for Which Relaxation is Requested:

In accordance with the requirements of Reference (1), our plan calls for ultrasonic test (UT) examinations of 100% of the Calvert Cliffs Unit 2 head penetrations in the area above the J-groove welds. However, physical restrictions exist for some portions of the UT examinations. Specifically, the control element drive mechanism (CEDM) penetrations have guide/thermal sleeves installed inside the CEDM penetration to position the CEDM shaft. There is a counterbore step on the inside diameter of the nozzle above the J-groove weld. This results in an annular gap of approximately 0.175 inches between the nozzle and the thermal sleeve that reduces to 0.123 inches above the counterbore step. The thin "gap scanning" (blade) UT probe fits into the larger gap but cannot fit into the smaller gap.

Units 1 and 2 have identical geometries for reactor vessel head nozzle design and fabrication. During the inspection on Unit 1 in 2004, only 17 nozzles required relaxation from the requirements in Reference (1).

The specific nozzles for which relaxation is requested, and the actual inspection extent achieved for each nozzle will be provided during the inspection.

C. Justification for Relaxation Request:

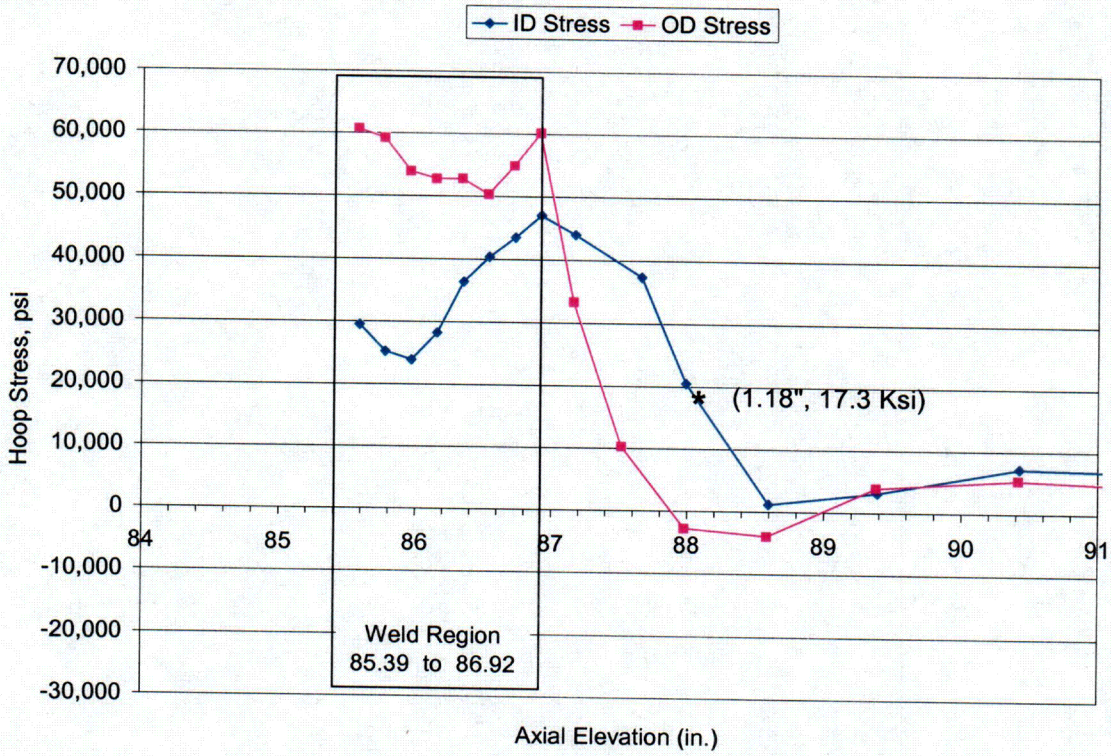
Compliance with the requirements specified in this order would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Previous experience with the inspection of both Units 1 and 2 RPV head confirms the inability to examine a full two inches above the J-groove weld for all scans of the CEDM nozzles using a blade probe. The additional requirements of the Revised Order do not in any way change the technical justification used in our earlier relaxation requests. The analysis and evaluation performed in support of the 2004 Unit 1 refueling outage relaxation request (References 2, 3, 4, and 5) remain valid and are applicable to the 2005 Unit 2 refueling outage relaxation request.

The primary impediment to effectively examining to the full extent (two inches above the highest point of the J-groove weld on a horizontal plant perpendicular to the nozzle axis) is the counterbore step on the inside diameter of the nozzle. It is possible to permanently remove the guide/thermal sleeves, allowing the insertion of a rotating ultrasonic probe to achieve full coverage. Reference (4) provides a breakdown for the hardship associated with the removal of the 17 nozzles during the 2004 Unit 2 refueling outage. An estimate of 17 nozzles requiring relief from inspection requirements during the 2005 Unit 1 refueling

outage is realistic because the inspection techniques and physical configuration are identical to the conditions encountered in 2004. During the 2005 Unit 2 refueling outage, the effort to remove and re-install thermal sleeves is estimated to result in additional radiation exposure of approximately 31 person-Rems and would cost approximately $7.5M.

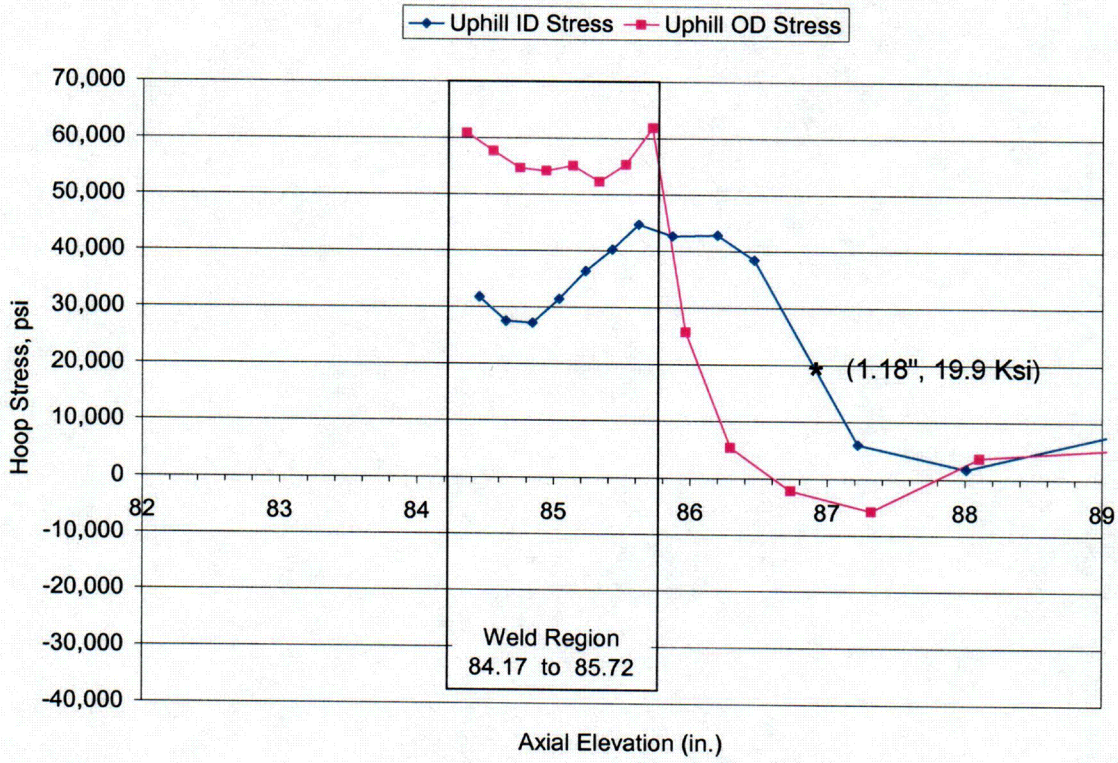
The proposed inspection (to a minimum distance of 1.2 inches above the highest point of the weld) will provide an acceptable level of quality and safety. Primary water stress corrosion cracking is driven by the residual stresses from weld shrinkage. The stresses that drive primary water stress corrosion cracking decay rapidly above the weld, as illustrated in the following graphs. The residual plus operating stresses are all below 20 ksi, both in the hoop and axial directions, at an elevation 1.2 inches above the highest point of the J-groove weld on every CEDM penetration on the Calvert Cliffs reactor vessel head (see References 3, 4, and 5). Therefore, primary water stress corrosion cracking is not expected to initiate in the small region that is the subject of this relaxation request.

The residual stress profiles are shown in the following plots. These stress profiles are similar to the ones provided in Reference (3). As described in Reference (3), these profiles show the rapid drop in residual stresses above the weld region.

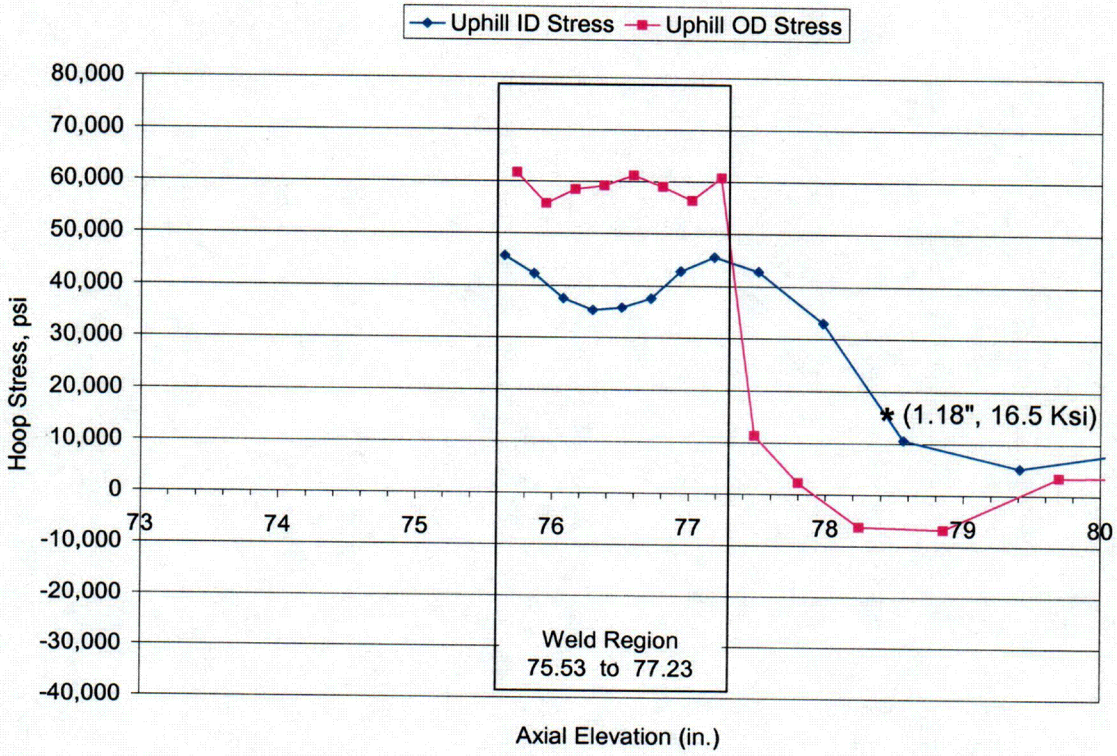


0° (Central) CEDM Nozzle Hoop Stress

C-01

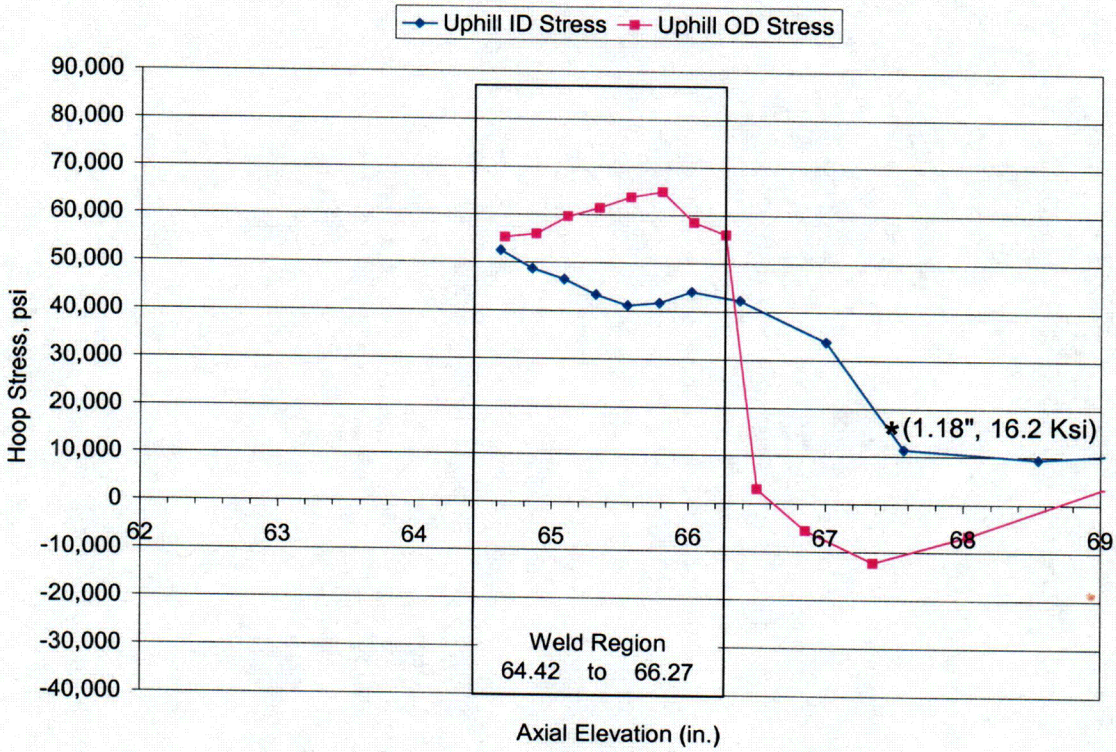


11.0° CEDM Nozzle Uphill Hoop Stress



29.0° CEDM Nozzle Uphill Hoop Stress

C-02



43° CEDM Nozzle Uphill Hoop Stress

CONCLUSION:

As described above, compliance with the Revised Order requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, in accordance with the provisions of Section IV.F(2) of the Revised Order, we request relaxation of the requirements described in Section IV.C(5)(b)(i).

REFERENCES:

(1) Letter from R. William Borchard (NRC) to Holders of Licenses for Operating Pressurized Water Reactors, 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"

(2) Letter from G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated January 30, 2004, "Request for Relaxation from NRC Order EA-03-009, Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors"

(3) Letter from G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated April 13, 2004, "Response to Request for Additional Information Regarding Interim Inspection Requirements for Reactor Pressure Vessel Heads (TAC No. MC1921)"

(4) Letter from G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated April 27, 2004, "Supplemental Data for Request for Relaxation from Interim Inspection Requirements for Reactor Pressure Vessel Heads (TAC No. MC1921)"

C-03

(5) Letter from C. F. Holden, Jr. (NRC) to G. Vanderheyden (CCNPP), dated May 4, 2004, "Calvert Cliffs Nuclear Power Plant Unit No. 1 – Relaxation of the Requirements of First Revised Order Modifying License (EA-03-009), Regarding Reactor Pressure Vessel Head Inspections (TAC No. MC1921)