

PERRY NUCLEAR POWER PLANT

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July 2, 1992
PY-CEI/NRR-1500 L

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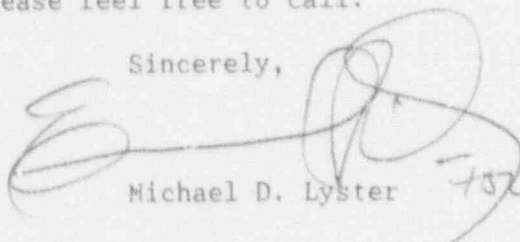
Perry Nuclear Power Plant
Docket No. 50-440
Reactor Vessel Structural Integrity,
10 CFR 50.54(f) (GL 92-01, Rev. 1)

Gentlemen:

In accordance with the reporting requirements of Generic Letter (GL) 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)," we are hereby submitting, in Attachment 1, the information requested for the Perry Nuclear Power Plant (PNPP) Unit 1.

If there are any questions, please feel free to call.

Sincerely,



Michael D. Lyster 732

MDL:CJF:sjs

Enc.

cc: NRC Project Manager
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Response to Reporting Requirements of
Generic Letter 92-01, Revision 1,
"Reactor Vessel Structural Integrity, 10 CFR 50.54(f)"

Generic Letter (GL) 92-01, Revision 1, asks several questions concerning reactor vessel structural integrity, specifically in regard to material surveillance. The requests for information and The Cleveland Electric Illuminating Company's (CEI) responses for the Perry Nuclear Power Plant (PNPP) Unit 1 are as follows:

Inquiry 1: Certain addressees are requested to provide the following information regarding Appendix H to 10 CFR Part 50:

Addressees who do not have a surveillance program meeting ASTM E 185-73, -79, or -82 and who do not have an integrated surveillance program approved by the NRC (see Enclosure 2), are requested to describe actions taken or to be taken to ensure compliance with Appendix H to 10 CFR Part 50. Addressees who plan to revise the surveillance program to meet Appendix H to 10 CFR Part 50 are requested to indicate when the revised program will be submitted to the NRC staff for review. If the surveillance program is not to be revised to meet Appendix H to 10 CFR Part 50, addressees are requested to indicate when they plan to request an exemption from Appendix H to 10 CFR Part 50 under 10 CFR 50.60(b).

Response 1: As identified in PNPP's Updated Safety Analysis Report (USAR), PNPP complies with ASTM E185-73 and 10 CFR Part 50, Appendices G and H. The ASME B&PV Code edition in effect on the purchase date of the PNPP Unit 1 reactor vessel was the 1971 Edition with Addenda through Winter 1972. Therefore, ASTM E185-73 is an acceptable edition of this document per Appendix H.I and H.II.B.1 of 10 CFR Part 50 for the period of time prior to the first capsule withdrawal. Per Letters PY-CEI/NRR-1188L dated September 14, 1990 and PY-CEI/NRR-1313L dated March 15, 1991 (CEI to NRC), we have requested a capsule withdrawal schedule for PNPP's three Unit 1 surveillance capsules that is consistent with ASTM E185-82, i.e., 6, 15 and 32 effective full power years (EFPY). This withdrawal schedule change request is currently awaiting NRC approval.

Inquiry 2: Certain addressees are requested to provide the following information regarding Appendix G to 10 CFR Part 50:

Addressees of plants for which the Charpy upper shelf energy is predicted to be less than 50 foot-pounds at the end of their licenses using the guidance in Paragraphs C.1.2 or C.2.2 in Regulatory Guide 1.99, Revision 2, are requested to provide to the NRC the Charpy upper shelf energy predicted for December 16, 1991, and for the end of their current license for the limiting beltline weld and

the plate or forging and are requested to describe the actions taken pursuant to Paragraphs IV.A.1 or V.C of Appendix G to 10 CFR Part 50.

- b. Addressees whose reactor vessels are constructed to an ASME Code earlier than the Summer 1972 Addenda of the 1971 Edition are requested to describe the consideration given to the following material properties in their evaluations performed pursuant to 10 CFR 50.61 and Paragraph III.A of 10 CFR Part 50, Appendix G:
- (1) the results from all Charpy and drop weight tests for all unirradiated beltline materials, the unirradiated reference temperature for each beltline material, and the method of determining the unirradiated reference temperature from the Charpy and drop weight test;
 - (2) the heat treatment received by all beltline and surveillance materials;
 - (3) the heat number for each beltline plate or forging and the heat number of wire and flux lot number used to fabricate each beltline weld;
 - (4) the heat number for each surveillance plate or forging and the heat number of wire and flux lot number used to fabricate the surveillance weld;
 - (5) the chemical composition, in particular the weight in percent of copper, nickel, phosphorous, and sulfur for each beltline and surveillance material; and
 - (6) the heat number of the wire used for determining the weld metal chemical composition if different than Item (3) above.

Response 2a: The upper shelf energies (USE) of the beltline materials at PNPP Unit 1 are predicted to be greater than 50 ft-lbs at the end of the PNPP Unit 1 licensed operational period. The minimum USE of beltline plate and weld are predicted to be 75 ft-lbs and 88 ft-lbs respectively at the end of the PNPP Unit 1 license period. These values were determined using Regulatory Guide 1.99, Revision 2 and additional information obtained from flux wire dosimetry results obtained during Refueling Outage 1. This information was submitted to the NRC staff by Letter PY-CEI/NRR-1188L, dated September 14, 1990.

Response 2b: The PNPP Unit 1 reactor vessel was constructed to the 1971 Edition of the ASME Code, through Winter 1972 Addenda. Therefore, response to this inquiry is not required.

Inquiry 3.

Addressees are requested to provide the following information regarding commitments made to respond to GL 88-11:

- a. How the embrittlement effects of operating at an irradiation temperature (cold leg or recirculation suction temperature) below 525°F were considered. In particular licensees are requested to describe consideration given to determining the effect of lower irradiation temperature on the reference temperature and on the Charpy upper shelf energy.
- b. How their surveillance results on the predicted amount of embrittlement were considered.
- c. If a measured increase in reference temperature exceeds the mean-plus-two standard deviations predicted by Regulatory Guide 1.99, Revision 2, or if a measured decrease in Charpy upper shelf energy exceeds the value predicted using the guidance in Paragraph C.1.2 in Regulatory Guide 1.99, Revision 2, the licensee is requested to report the information and describe the effect of the surveillance results on the adjusted reference temperature and Charpy upper shelf energy for each beltline material as predicted for December 16, 1991, and for the end of its current license.

Response 3a: CEI utilized the assistance of the General Electric Company (GE) in performing the technical analysis required by Paragraph V.A. of 10 CFR Part 50, Appendix G, to predict the effects of neutron irradiation on PNPP's Unit 1 reactor vessel materials. This technical analysis fully complied with the methodology described in Revision 2 to Regulatory Guide (RG) 1.99 consistent with our commitments made in response to Generic Letter 88-11. Application of the RG 1.99 Revision 2 methodology resulted in the modification of the pressure-temperature limits contained in PNPP's Unit 1 Technical Specifications. The results of the technical analysis and the resulting License Amendment Application (Technical Specification Change Request) were submitted to the NRC staff for review and approval by letter PY-CEI/NRR-1188L dated September 14, 1990.

The GE technical analysis did not explicitly consider embrittlement effects of operating at irradiation temperatures below 525°F. This is consistent with the response presented to the NRC staff by the BWR Owners' Group during a meeting held on April 23, 1992. However, it is important to note that the normal steady-state full-power operating temperature (recirculation suction temperature) of PNPP Unit 1 is above 525°F. Plant operation below 525°F, which would generally be limited to plant startup and shutdown sequences, was considered insignificant, and therefore, the effects of operating below 525°F were not considered.

It should also be noted that PNPP Unit 1 is a relatively new plant, having completed only three operating cycles to date. As a relatively new plant, PNPP Unit 1 has to date experienced relatively low fluence at irradiation temperatures below 525°F. CEI has implemented a reactor vessel material surveillance program containing material specimen samples fully representative of PNPP's Unit 1 vessel materials (including base material, weld material and HAZ material), chemistry, composition, location and temperature. The surveillance coupons will detect any increased damage due to operating below 525°F, since they will be exposed to the same operating temperature as the reactor vessel.

Furthermore, as a result of the technical analysis performed in response to GL 88-11, which fully complies with the methodology provided in RG 1.99 Revision 2, CEI has proposed a conservative revision to the Technical Specification Pressure/Temperature limits and to the Reactor Vessel Material Surveillance Program - Withdrawal Schedule (reference letters PY-CEI/NRR-1188L and PY-CEI/NRR-1313L). The revised material specimen withdrawal schedule moves the withdrawal of the first specimen capsule up from 10 EFPY to 6 EFPY and the second up from 30 EFPY to 15 EFPY. Removal of the surveillance specimen capsules at such dates relatively early in the plant life will provide credible surveillance data enveloping those periods of time for plant operation below 525°F. In accordance with the normal surveillance program process, this data will be used and compared with the mean prediction method in Regulatory Guide 1.99 Revision 2 to determine whether the results using actual data exceed the predictions. If the results using actual plant data do not exceed the Reg. Guide predictions, the effects of plant operation below 525°F would be determined to be insignificant. On the other hand, if the results exceed the Reg. Guide predictions, the surveillance data will be utilized to update applicable plant operating limits.

Response 3b: There have been no surveillance specimen test results obtained to date. PNPP Unit 1 is at approximately 3.21 EFPY. The first surveillance capsule is scheduled to be withdrawn at 6 EFPY. As stated to the NRC staff in Letter PY-CEI/NRR-1188L, the surveillance capsule test results, obtained on a schedule consistent with that proposed for Table 4.4.6.1.3-1, will permit timely update to PNPP's Unit 1 pressure/temperature limits based on actual plant experience.

Response 3c: As stated above, no surveillance capsules have been withdrawn to date. Consequently, no measured test results have been obtained with which to make a judgment on the adjusted nil-ductility reference temperature or upper shelf energy values.