



Nebraska Public Power District

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U. S. Nuclear Regulatory Commission
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Subject: Response to Questions on License Extension to 40 Years from
Operating License Issuance
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

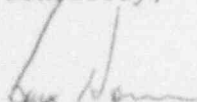
Reference: Letter from P. W. O'Connor to G. R. Horn, dated May 1, 1991,
"Extension of Operating License to 40 Years from the Date of
Issuance of the Operating License (TAC No. 74843)"

Gentlemen:

The letter referenced above requested additional information on the Reactor
Vessel Surveillance Program for Cooper Nuclear Station. The questions
transmitted by the reference and the District's response to them are contained
in the attachment.

If there are any questions concerning this information, please call.

Sincerely,


G. R. Horn
Nuclear Power
Group Manager

GRH/GRS:dls
Attachment

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV

NRC Resident Inspector
Cooper Nuclear Station

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Response to Questions on Extension of Cooper Nuclear Station's Operating License
to 40 Years From the Date of Issuance of the Operating License

- References: 1) Letter from P. W. O'Connor to G. R. Horn, dated May 1, 1991, "Extension of Operating License to 40 Years from the Date of Issuance of the Operating License (TAC No. 74843)."
- 2) Letter from G. A. Trevors to U. S. NRC dated July 6, 1987, "Reactor Vessel Material Surveillance Program."
- 3) General Electric Report MDE-103-0986, dated May 1987, "Cooper Nuclear Station Reactor Pressure Vessel Surveillance Materials Testing and Fracture Toughness Analysis" - Submitted as an enclosure to Reference 2.
- 4) Amendment No. 120 to the Cooper Nuclear Station Facility Operating License No. DPR-46 dated April 26, 1988, and enclosed Safety Evaluation.

The questions from Reference 1 are repeated below followed by the District's response.

Question No. 1

What is the peak neutron fluence and predicted mean value shift in Transition Temperature for each beltline material at the vessel inside surface using the neutron fluence predicted for January 18, 2014 and the method of calculating the Transition Temperature Shift in RG 1.99, Rev. 2?

Response

The neutron fluence at 32 Effective Full Power Years (EFPY) is 1.5×10^{18} n/cm² as given in Section 4.3 of Reference 3. This is the neutron fluence predicted for January 18, 2014, based on a 40 year operating life (starting with the issuance of the operating license, January 18, 1974) and a 0.8 utilization factor.

The shift in Transition Temperature for the most limiting beltline material at vessel end-of-life using the methodology of R. G. 1.99 Rev. 2 is 130°F. The initial Reference Temperature Values for the limiting material (plate) is 14°F as given in Reference 3. Reference 4 states that the end-of-life Reference Temperature for the limiting material using R.G. 1.99 Rev. 2 is 144°F. The shift is then 144°F-14°F or 130°F.

Question No. 2

Do the test results from the Surveillance Program agree with the calculated values in Question 1?

Response

As discussed in Reference 4, the measured increase in Reference Temperature for the plate material is slightly greater than the value predicted using the method

in R.G. 1.99, Rev. 2. The measured increase for the weld metal is less than the value predicted in R.G. 1.99, Rev. 2.

Question No. 3

Based on the answers in Questions 1 and 2, how many capsules are required and when must they be withdrawn to be in compliance with ASTM E185-82?

Response

Table 1 of ASTM E185-82 gives the minimum recommended number of surveillance capsules and their withdrawal schedule based on the predicted Transistion Temperature shift at the vessel inside surface. For a predicted shift of 130°F at vessel end-of-life (Response to Question 1) a minimum of four surveillance capsules is recommended. The withdrawal schedule has capsules being removed at three EFPY, six EFPY, 15 EFPY and at end-of-life (32 EFPY).

Question No. 4

Does the surveillance program in Technical Specification 4.6.A.3 comply with the capsule program described in the answer to Question 3?

Response

The surveillance program given in Technical Specifications is different than that given in the response to Question No. 3. Cooper Nuclear Station Technical Specification 4.6.A.3 states that the reactor vessel specimen and sample program shall conform to ASTM E185-73 to the degree possible. The schedule for withdrawal of the remaining two samples is based on ASTM E185-82 and is as follows:

Second Capsule:	15 EFPY
Third Capsule:	32 EFPY

Question No. 5

If TS 4.6.A.3 does not comply with the surveillance program requirements in ASTM E185-82, how does the licensee propose to change its Surveillance Program to comply with the intent of ASTM E185-82?

Response

The District will remove one of the remaining two Surveillance Capsules from the vessel during the fall 1991 refueling outage at which time the vessel will have reached approximately 11 EFPY. Irradiated specimens from this capsule will be reconstituted and reinstalled in the vessel the following refueling outage that is scheduled for Spring of 1993. This reconstituted specimen will provide an added, fourth surveillance capsule to conform with the guidance of ASTM E185-82. The reconstitution process will follow the recommendations of ASTM E1253-88, "Reconstitution of Irradiated Charpy Specimens" and will use arc stud welding to weld the end tabs to the irradiated material. Verification specimens will be fabricated from the remaining pieces of the base and weld metal and tested to confirm that the reconstitution process has not altered the Charpy properties of the material to be reinstalled in the vessel.

Analysis results from testing of the capsule withdrawn in Fall 1991, will be used to determine the withdrawal schedule for the third capsule. If the results are favorable, the third capsule may be removed at some time after the 15 EFPY time recommended in ASTM E185-82. Justification for any delay past 15 EFPY in withdrawing the third capsule will be provided after analysis of the second capsule specimens is complete.

The Surveillance Program contained in Technical Specification 4.6.A.3 will be revised accordingly when the pressure-temperature curves for plant operation and hydro are changed as a result of the analysis from the second capsule. Implementing the guidance of Generic Letter 91-01 will be considered at this time.