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MANGAN,C.V. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards info re lead factor for neutron surveillance sample in reactor vessel,per NRC 841116 request,Info will be incorporated into Amend 17 to FSAR.

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NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

December 3, 1984
(NMP2L 0275)

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Schwencer:

Re: Nine Mile Point Unit 2
Docket No. 50-410

The Nuclear Regulatory Commission requested certain information in a letter dated November 16, 1984. This information relates to the lead factor for the Nine Mile Point neutron surveillance sample in the reactor vessel.

The enclosed information responds to your reuests and will be incorporated into Final Safety Analysis Report Amendment 17.

Very truly yours,

C. V. Mangan
Vice President
Nuclear Engineering & Licensing

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Enclosure
xc: Project File (2)

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Niagara Mohawk Power Corporation	)	Docket No. 50-410
	)	
(Nine Mile Point Unit 2)	)	

AFFIDAVIT

C. V. Mangan, being duly sworn, states that he is Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

C V Mangan

Subscribed and sworn to before me, a Notary Public in and for the State of New York and County of Onondaga, this 3 day of December, 1984.

Janis M Macro
Notary Public in and for
Onondaga County, New York

My Commission expires:

JANIS M. MACRO
Notary Public in the State of New York
Qualified in Onondaga County No. 4784555
My Commission Expires March 30, 1985

NRC-REQUEST

During an NRC conference call with Niagara Mohawk, the NRC indicated that we needed to provide some additional information regarding the lead factors for the Nine Mile Point Unit 2 surveillance coupon. Additionally, the NRC wanted some information relative to the justification for the lead factors for Nine Mile Point Unit 2 and their compliance with 10CFR50 Appendix H, whether test results from another reactor could be utilized for Nine Mile Point and whether there were constraints on relocating the Nine Mile Point Unit 2 surveillance capsules. These were followed by a letter dated November 16, 1984, which had specific requests. The information below addresses the staff concerns regarding the NMP-2 lead factors.

Response

1a) The Nine Mile Point Unit 2 neutron materials surveillance samples provide a reactor vessel neutron lead factor of 0.29 for the inside surface of the reactor vessel and 0.41 for the 1/4 T position.

1b) There should be no temperature difference between the capsule and RPV inner wall. The downcomer fluid flow, during normal operation, is very turbulent and well mixed before it reaches the vessel beltline. Any localized effect could, however, cause a temperature differential of no greater than $\pm$ 2°F.

1c) There is no significant neutron spectrum difference between the surveillance material and RPV inner wall. The calculated shift for any energy group above 1.0 MEV is $\pm$ 2.5% max.

Currently, 10CFR50 Appendix H requires that "surveillance specimen capsules must be located near the inside vessel wall in the belt line region so that the radiation history duplicates to the extent practical within the physical constraints of the system, the neutron spectrum, temperature history and maximum neutron fluence experienced by the reactor vessel inner surface."

For Nine Mile Point Unit 2, surveillance specimen baskets are located about the core mid-plane at azimuths (i.e., 3°, 177° and 183°) that are physically advantageous for specimen withdrawal and yet duplicate as much as possible the

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neutron spectrum and temperature history of the vessel inner surface. These locations were specifically located to ease removal and thus, reduce occupational radiation to the technicians removing the sample. Specifically, the holder was located to avoid interferences from the jet pumps, core spray lines and other reactor vessel internals to ensure that the vessel sample could be removed expeditiously.

The ASTM E185-73, ASTM E185-79 and ASTM 185-82 standards, which are incorporated by reference into 10CFR50 Appendix H, provide the standard practice for conducting surveillance tests for light water cooled nuclear power reactor vessels. This specification recommends that "the surveillance capsule lead factors (the ratio of the instantaneous neutron flux density at the specimen location to the maximum calculated neutron flux density at the inside surface of the reactor vessel wall) be in the range of 1 to 3." However, it is Niagara Mohawk's position that the effects of neutron radiation on RT_{NDT} and upper shelf energy can still be reliably predicted, given NMP-2's somewhat lower lead factor readings. Using Regulatory Guide 1.99 as a model, the results of the fracture toughness test data obtained from the specimens can be adjusted to the fluence levels that correspond to present and future periods of vessel service. Therefore, the NMP-2 surveillance program can effectively monitor changes in the fracture toughness properties of the beltline materials.

2a and b)

We have confirmed, based upon information from General Electric, that the capsule bracket can be moved to improve the lead factor ranges to about 0.8 to 0.9. However, this relocation could change the flux spectrum in certain energy ranges by as much as 40%. Further, moving the capsule bracket raises several other issues that have not yet been evaluated.

- Relocation of the surveillance holder will put it closer to jet pump and core annulus flow stream. This may require a redesign of the neutron surveillance holder.

- Annulus flow obstruction and flow induced vibration of the holder may change.

- The effect of annulus flow on the dosimeter, attached to the side of the holder and currently held by gravity, is unknown.

- There is a potential for interference of the holders for removal of a jet pump, and other internals for their repair.

2c) In accordance with 10CFR50 Appendix H, we intend to remove the first capsule within ten years of service. At that time, we will determine the shift and reference transition temperature in the specimen and reactor vessel. This assessment will be accomplished by extrapolation and using the Regulatory Guide 1.99 curve.

2d) Additionally, we have determined that several operating BWR plants with 251 series (764 bundle) vessels are available to provide supplemental surveillance data. These plants include Hanford 2 and LaSalle 1 and 2. The surveillance data for these plants could be utilized to supplement Nine Mile Point Unit 2 data.

Finally, we have determined that the NRC has previously accepted the current locations for another similar plant previously licensed. This includes a BWR-6 plant which we understand has a lead factor of 0.4.

In conclusion, we believe that the current location of the capsule meets the requirements of 10CFR50 Appendix H. However, we commit to supplement the data from Unit 2 with data from other operating BWR-5 251 series vessels. This supplemental data will be used to provide a trending estimate for Unit 2. The supplemental data evaluation will consider operational history, fluence values, neutron spectrum and material similarity.