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SUBJECT: Forwards response to NRC 790119 request for addl info re Reload 7 licensing submittal for facility. Finds application of normal operating limits is conservative for coastdown. Describes cycle 6 startup test.

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

February 12, 1979

Division of Operating Reactors
Attn: Mr. Thomas A. Ippolito, Chief
Operating Reactors Branch #3
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Ippolito:

Re: Nine Mile Point Unit #1
Docket No. 50-220
DPR-63

Your letter of January 19, 1979 requested additional information regarding the Reload 7 licensing submittal for Nine Mile Point Unit 1. The attached information is in response to your request.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

R. R. Schneider
Vice President - Electric Production

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Responses to January 19, 1979

NUCLEAR REGULATORY COMMISSION QUESTIONS

Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

1. Question

It is stated in your submittal that power coastdown of Nine Mile Point Unit 1 beyond the end-of-cycle all rods out condition is permissable by reference to Section 5.2 of General Electric's approved "Generic Reload Fuel Application," NEDE-24011-P-A. Although the subject topical report addresses BWR reloads which utilize General Electric's retrofit 8x8R fuel assemblies, the conclusions appearing in Section 5.2 are based on an analysis of a core which involved neither 8x8R fuel nor an exposure history similar to Nine Mile Point during Cycle 6. Thus, we believe it is inappropriate to reference the subject analyses for your reload application. Accordingly, we request that either a plant-specific or bounding analyses be submitted which are equivalent to those referenced in Section 5.2 of the LTR and which are applicable to the Cycle 6 core of NMP-1.

Response

The normal operating limits which are presented in the Nine Mile Point Unit 1 Cycle 6 licensing submittal have been shown to be conservative when applied to the coastdown mode (References 1 and 2). The presence of retrofit fuel (8x8R) in the core will have no effect on the trends in the pressure margins and ΔCRP's shown in References 1 and 2. Therefore, application of the normal operating limits is conservative for coastdown.

Severity of the transient response of the core decreases continually during coastdown due to the dominant effect of the decreasing power level. Since the transient response calculations are based on a point reactor kinetics model as described in Reference 3, the primary input parameters (void coefficient and scram reactivity) are core average values and are not fuel type dependent. As shown in References 1 and 2, the void coefficient becomes less severe during coastdown and the scram reactivity becomes more severe with respect to impact on the transient analysis. The analysis shows, however, that the combined effect of the input parameter changes when coupled with the decrease in power level results in increased pressure and thermal margin.

The reactivity characteristics of 8x8R fuel are essentially identical to those of 8x8 fuel as shown in Reference 3. Because of this, the power versus exposure curve during coastdown will follow the same trend for both fuel types. In addition, the thermal response of the two fuel designs are essentially the same. Thus, the change in CPR during coastdown will have the same trend for both fuel types.

Response (Cont'd.)

Therefore, the transient result trends shown in References 1 and 2 will remain the same with the addition of 8x8R fuel to the core and the normal cycle operating limits will remain conservative during coastdown operation.

References


1. R. L. Bolger (CECO) letter to B. C. Rusche (NRC), "Quad Cities Station Unit 2 Proposed Amendment to Facility License No. DPR-30, Docket No. 50-265," dated June 11, 1976.

2. R. L. Bolger (CECO) letter to E. G. Case (NRC), "Dresden Station Unit 2 Proposed Amendment to Facility Operating License No. DPR-19 to Permit Power Coastdown for 70 percent Power to 40 percent Power, NRC Docket No. 50-237," dated June 6, 1977.

3. "General Electric Boiling Water Reactor Generic Reload Fuel Application," NEDO-24011, March 1978.

2. Question

It is the staff's position that adequate start-up physics testing be performed following each plant refueling in order to assure that the core conforms to the design, i.e. that the actual (measured) reload core configuration is consistent with the analysed reload core configuration. The staff currently has a study underway for the purpose of generically establishing requirements for minimum BWR startup physics test programs. Although this effort is not yet complete, we have concluded at this juncture that, in order to be acceptable, a BWR startup test program must include the following:

A. A visual inspection of the core including a photographic or videotape record.

B. A check of core power symmetry-by checking for mismatches between symmetric detectors.

C. Withdrawal and insertion of each control rod to check for criticality and mobility.

D. A comparison of predicted and measured critical insequence rod pattern for nonvoided conditions.

In view of the importance the staff places on the above four BWR startup physics program elements, we request that you provide a commitment to include them in the Nine Mile Point Unit 1 Cycle 6 startup program.

Additionally, in order that we may adequately assess the characteristics of the entire Nine Mile Point Unit 1 Cycle 6 startup test program, we request that you provide the following information:

- A description of the core loading verification (inspection) procedures to be followed for the core refueling including the number of independet checks to be made of the a) core loading, b) the intended core loading and c) the consistency between the two.

- A description of each startup physics test (including those indicated above).

- The acceptance criteria and basis for each test (including those indicated above) which provides assurance that the actual core conforms to the design.

- The actions to be taken for each test (including those indicated above) whenever the acceptance criteria are not satisfied.

Response

Niagara Mohawk has revised its Cycle 6 start-up test program for Nine Mile Point Unit 1. The Cycle 6 start-up test program will consist of the following elements:

1. Core loading verification.
2. Shutdown margin test.
3. Control rod drive scram time test.
4. Cold critical comparison with actual measurements.
5. Tip uncertainty calculation.

In addition to the aforementioned tests, you requested a criticality and mobility check be performed for each control rod in the core. Niagara Mohawk has determined that the results of test 2 above bound the results which would be obtained by determining the criticality characteristics of each control rod. Performing test 3 above will verify control rod mobility.

A description of each test, acceptance criteria and actions to be taken if acceptance criteria are not satisfied are summarized below:

1. Core Loading Verification - All fuel moves are specified by the Reactor Analyst Department. Operator's verify by checkoff that each fuel assembly is loaded in the correct core location. When the core is completely loaded, it is verified by the Reactor Analyst Department using an underwater TV system and video recorder. Two independent checks of the videotape are made by reactor analyst technicians to verify that the core is arranged as specified in the core map. If any discrepancies are discovered, the Reactor Analyst Supervisor or his assistant is notified immediately and appropriate corrections are instituted to assure compliance with the required core loading.

2. Shutdown Margin Test - With the core at its most reactive condition, cold and xenon-free, the strongest control rod is fully withdrawn. A second control rod is withdrawn to a position which inserts an amount of reactivity at least equal to the required margin of 0.25%$\Delta$K. The reactor is required to remain subcritical throughout the test. If the shutdown margin criteria is not met, the unit will be shutdown and the condition evaluated.

3. Control Rod Drive Scram Time Test - Each control blade is individually scrammed. A recording is made of control blade position versus time. From these recordings the average scram insertion times corresponding to 5, 20, 50 and 90 percent insertion into the core is obtained. The individual and average scram insertion times are compared to the acceptance criteria contained in the Technical Specifications. If this criteria is not met, appropriate action will be taken (either repair or re-evaluation) to assure plant safety is not affected.

Response (Cont'd.)

4. Cold Critical Comparison with Actual Measurements - A beginning of cycle critical control rod pattern will be calculated. Per the NMP-1 Technical Specifications, the actual critical control rod pattern will be compared against the predicted. The acceptance criteria is $\pm$ 1%$\Delta$K. If this limit is exceeded, the reactor shall be shutdown until the cause has been evaluated.

5. TIP Uncertainty Calculation - TIP uncertainty consists of a random noise component and a geometric component. Measurement of these components will be obtained by taking repetitive TIP readings at TIP location which are symmetrical about the core diagonal of fuel loaded symmetrically. The total TIP uncertainty will be calculated from this data. The criterion for the averaged total TIP uncertainty is 9.0 percent. If the uncertainty is equal to or greater than this value, appropriate analysis will be performed to determine if the MCPR safety limit should be adjusted.

A start-up test report documenting the test results will be provided to NRC within 90 days of completion of the tests.