Duquesne Light

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April 29, 1986

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Mr. Peter S. Tam, Project Manager
Project Directorate No. 2
Division of PWR Licensing - A
Washington, DC 20555
- Mail Stop 340 -

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Technical Specification 5.3.1; Fuel Assemblies

Gentlemen:

We were advised on April 25, 1986 by the Westinghouse Electric Corporation that a difference exists between our Technical Specifications and our fuel currently in use. Specifically, Technical Specification 5.3.1 states in part that each fuel rod shall contain a maximum total weight of 1766 grams uranium, however, based on Westinghouse's review of their records, some of our fuel rods exceed this value by up to 10 grams uranium. Recent improvements to the fuel design, (including chamfered pellets with a reduced dish and a nominal density increase) have increased fuel weight slightly.

The method utilized for determining the amount of uranium per fuel rod previously consisted of weighing a fuel assembly then dividing by the number of fuel rods to determine the grams uranium per fuel rod. More recently, Westinghouse technology has improved and weighing individual fuel rods to determine the weight of uranium has evolved. This resulted in improved accounting procedures. The review of the results of this accounting procedure has revealed that some fuel rods contain more grams uranium than permitted by Technical Specifications.

A number of safety analyses are affected indirectly by fuel weight, however, the analyses are more sensitive to fuel configuration, length, enrichment and physical design which are specified in the plant Technical Specifications. The Technical Specifications limit power and power distribution, thus controlling the fission rate and the rate of decay heat production. Fuel rod weight does not have any direct bearing on the power limits, power operating level, or decay heat rate. There are no expected observable changes in normal operation due to the noted fuel rod weight changes, and the remaining fuel parameters listed in the Technical Specifications are considered in the Reload Safety Evaluation.

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The attached safety evaluation, provided by Westinghouse and reviewed by the Duquesne Light Company, support the conclusion that there is no unreviewed safety question associated with operation of Beaver Valley Unit 1 with a fuel rod weight in excess of that defined in Section 5.3.1 of the Beaver Valley Unit No. 1 Technical Specifications.

In order to correct the difference which presently exists between our maximum fuel rod weight and our Technical Specifications, we will submit a Technical Specification change request to remove that reference to individual fuel rod uranium weight. It is our understanding that this value was deleted from the Farley Unit 2 Technical Specifications as part of Amendment No. 56 issued on April 22, 1986.

If you have any questions, please contact me or members of my staff.

Very truly yours,

J. J. Carey
Vice President, Nuclear

cc: Mr. W. M. Troskoski, Resident Inspector
U. S. Nuclear Regulatory Commission
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U. S. Nuclear Regulatory Commission
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U. S. Nuclear Regulatory Commission
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A T T A C H M E N T

Safety Evaluation Justifying Continued Operation With Uranium Rod Weight Discrepancy

The Design Features section of the Technical Specifications identifies a maximum total weight of uranium in each fuel rod. Due to fuel pellet design improvements such as chamfered pellets with reduced dish and a nominal density increase, the fuel weight has increased slightly. The actual uranium weight has no bearing on the power limits, power operating level or decay heat rate. Although a number of areas involving safety analysis are affected by fuel uranium weight, the areas of safety significance have their own limits which are reflected in the FSAR and Technical Specifications. Technical Specifications on power and power distribution control the fission rate and, hence, the rate of decay heat production. The composition of the fuel is closely monitored to assure acceptable fuel performance for such things as thermal conductivity, swelling, densification, etc. The important fuel parameters have been considered and are addressed in the following evaluation as pertaining to Westinghouse supplied components and services.

Seismic Effects on Fuel/Internals and New and Spent Fuel Storage Racks

The fuel rod uranium weight as stated in the Technical Specifications is not a direct input to the analyses of maximum seismic/LOCA fuel assembly dynamic response, seismic response of reactor vessel and internals, or seismic analyses of new and spent fuel storage racks.

Radiological Source Terms

Fission product generation is not sensitive to the mass of fuel involved but to the power level. As long as the power generated by the core is unaffected, there will be no significant impact on the radiological source terms.

Fuel Handling

Any postulated increase in the amount of uranium in the fuel rods would not have a significant impact on the fuel handling equipment. The spent fuel pit bridge and hoist is design with a load limit of approximately twice the weight of a nominal fuel assembly. The manipulator crane is provided with two load sensors. One load sensor provides primary protection of the fuel assemblies from structural damage if an assembly were to "hang-up". A second load sensor provides backup protection against high lift force with a setpoint above that of the first load sensor. If the setpoints were unchanged despite a slight overall increase in uranium weight, the impact would be to decrease the potential for fuel damage since reducing the difference between the fuel assembly weight and the lift force limit reduces the amount of stress the fuel assembly structure would be exposed to if the assembly were to "hang-up". The manipulator crane margin to capacity limit far exceeds any potential increase in assembly weight due to increases in the fuel rod uranium weight.

LOCA Safety Analysis

Uranium mass has no impact on ECCS LOCA analyses. LOCA analyses are sensitive to parameters such as pellet diameter, pellet-clad gap, stack height shrinking factor and pellet density as they relate to pellet temperature and volumetric heat generation. Fuel mass is not used in ECCS LOCA analyses.

Non-LOCA Safety Analysis

Individual fuel rod uranium weight, as reported in the Technical Specifications, is not explicitly modeled in any non-LOCA event. Total uranium present in the core is input into the transient analyses, but is generated using a methodology independent of the value presented in the Technical Specifications. Thus, any change in the number currently in the Technical Specifications does not impact the non-LOCA transient analyses.

Core Design

The mass of uranium is explicitly accounted for in the standard fuel rod design through appropriate modeling of the fuel pellet geometry and initial fuel density. Variations in uranium mass associated with allowable as-built variations but within the specification limits for the pellet dimensions and initial density are accounted for in the reactor core design analyses. The Technical Specification uranium mass value has no impact on margin to reactor core design criteria.

The conclusion of these evaluations is that there is no unreviewed safety question associated with operation of the unit(s) with a fuel rod weight in excess of that defined in Section 5.3.1 of the Technical Specifications.