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April 19, 2006

Subject: "Licensing Burnup Limits," (Non-Proprietary)

On April 10, 2006, Westinghouse supported an NRC audit of our FCEP process, specifically 2,000 MWD/MTU extensions to a burnup of 62,000 MWD/MTU Lead Rod Average Burnup. As part of the audit, Westinghouse made available several plant specific reload calcnotes for the audit and a description of our perspective of licensed burnup limits. It was requested that Westinghouse supply the description of our perspective of licensed burnup limits to the staff as part of the overall audit. Enclosed is a copy of Westinghouse's perspective of Licensed Burnup Limits. Westinghouse understands, that based on the NRC staff's audit of various reload calcnotes and the discussion of Westinghouse's perspective of Licensed Burnup Limits, that the NRC will in turn issue a letter to Westinghouse with your conclusions in the very near future.

As noted during the audit discussions and as documented in the enclosed writeup, your conclusions would be applicable to all traditional Westinghouse fuel designs, regardless of specific commercial or licensing nomenclature that has been given to the fuel, rod diameter or array designs, since all these designs have the same licensed Specified Acceptable Fuel Design Limits (SAFDLs) and the analyses are done with PAD 4.0 (WCAP-15063-P-A) which has been licensed to 62,000 MWD/MTU. This would include fuel designs that would comply with WCAP-9500-A (OFA), WCAP-10444-P-A (VANTAGE 5 / VANTAGE 5H), WCAP-12610-P-A (VANTAGE +), and those designs licensed through FCEP (WCAP-12488-A) such as RFA, RFA-2, 15x15 Upgrade, and the 14x14 422 VANTAGE + designs.

It was further discussed during the meeting last week, that addressing burnup limits in EPUs or other licensing amendment requests from a licensee, that were not specifically related to a fuel design, would not be needed since these other plant changes do not impact burnup limits. Confirmation of this understanding would be appreciated.

Correspondence with respect to this letter should be addressed to B. F. Maurer, Acting Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Acting Manager
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Enclosure

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"Licensing Burnup Limits," (Non-Proprietary)

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Licensing Burnup Limits

Burnup is a pseudo-limit which has been accepted over time as a measure of residence time the fuel has spent in the core. Fluence and irradiation damage are considered directly comparable parameters associated with damage to the fuel which is the true measure of impacts.

With respect to licensing a fuel product to a specified burnup limit, the Standard Review Plan section 4.2 is used. Some of the criteria are fuel rod related, while other criteria are fuel assembly related. The purpose of establishing and demonstrating that specified acceptable fuel design limits (SAFDLs) are met is to ensure that General Design Criteria 10 (GDC-10) is met. It also ensures that the fuel will not fail during Condition I and II events. While the fuel is not precluded from failing during Condition III and IV events, it must still meet certain criteria: 1) the number of predicted fuel failures should not be under-estimated to ensure the appropriate dose calculations are maintained, 2) no gross fuel dispersion, 3) structurally the assembly must still ensure the insertion of control rods to permit the safe shutdown of the reactor, and 4) structurally the assembly must maintain some semblance of its original structure to permit Long-Term Core Cooling.

These requirements have been met for traditional Westinghouse fuel through the licensing of SAFDLs and generic fuel topicals. The SAFDLs are reload driven and are checked as requirements for reload analyses. All traditional Westinghouse fuel has the same SAFDL limits, regardless of specific commercial or licensing nomenclature that has been given to the fuel, rod diameter or array designs. The fuel assembly design is generic and typically done at bounding conditions such that individual mechanical analyses are not required each reload. These analyses include time dependent impacts on the assembly, plant parameter impacts, and compatibility issues with expected co-resident fuel. These analyses are usually array driven (i.e., 17x17, 16x16, 15x15 and 14x14) but also account for the variances in plant parameters (2-loop, 3-loop, 4-loop) at limiting extremes for plant variables. Thus, the generic topical reports are truly generic in nature. For plant specific application of a generic licensed fuel product, these analyses are redone at the limiting extremes for the plant. These analyses are then the basis for UFSAR updates and potential Technical Specification changes (e.g., licensed correlations with their associated licensed limits).

The traditional Westinghouse fuel rod SAFDLs are noted on the following page. In addition to these SAFDLs, the DNB Correlation limits associated with each fuel design, the 10 CFR 50.46 LOCA criterion for Peak Clad Temperature less than 2200 °F, 17% localized equivalent clad reacted, and 1% core wide oxidation are also considered SAFDLs by Westinghouse.

The following is a listing of the fuel rod design criteria (SAFDLs) and their licensing basis.

Criterion	Original Basis	Revised/Reiterated Basis
Rod Internal Pressure	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
DNB Propagation	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1 WCAP-8963-P-A, Adden 1
Clad Stress (Steady State & Transient)	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Clad Strain (Steady State & Transient)	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Clad Corrosion (Clad Temperature & Hydriding)	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Fuel Temperature	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Clad Fatigue	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Fuel Rod Growth	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Clad Flattening	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1 WCAP-13589-A
Plenum Clad Collapse	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1
Clad Free Standing	WCAP-10125-P-A	WCAP-12488-A, WCAP-12610-P-A, WCAP-12610-P-A, Adden 1

WCAP-15063-P-A, Revision 1, with Errata (PAD 4.0) is used for determining the acceptability of the fuel rod design criteria (SAFDLs). WCAP-15063-P-A, Revision 1, with Errata (PAD 4.0) is licensed to 62,000 MWD/MTU.