



College of Engineering  
Department of Nuclear Engineering  
Nuclear Reactor Program  
[www.ne.ncsu.edu/nrp](http://www.ne.ncsu.edu/nrp)

Campus Box 7909  
2500 Stinson Drive  
Raleigh, NC 27695-7909  
P: 919.515.7294

June 10, 2016

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC

**SUBJECT            RESPONSE SUBMITTAL 3 TO THE REQUEST FOR ADDITIONAL INFORMATION  
FOR TECHNICAL SPECIFICATION AMENDMENT 19 – USE OF 6% ENRICHED FUEL  
License No. R-120  
Docket No. 50-297**

Please find enclosed submittal 3 to the Request for Additional Information for the License Amendment Request related to the use of six percent enriched fuel (TAC NO. MF6088).

This submittal is an update to Table 3.2 found in "Examination of Mixed Enrichment Core Loading for the NCSU PULSTAR Reactor, Appendix A" to NC State University License Amendment for the Use of 6% Enriched Fuel. (ADAMS Accession No. ML15076A020)

If you have any questions regarding this amendment or require additional information, please contact Andrew Cook at (919) 515-4602 or [atcook@ncsu.edu](mailto:atcook@ncsu.edu).

I declare under penalty of perjury that the foregoing is true and correct. Executed on 10 June 2016.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ayman Hawari".

Ayman I. Hawari, Ph.D.  
Director, Nuclear Reactor Program  
North Carolina State University

Enclosures:      Submittal 3 – Response to Request for Additional Information

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**  
**FOR LICENSE AMENDMENT REQUEST FOR**  
**THE USE OF SIX PERCENT ENRICHED FUEL (TAC NO. MF6088)**

**SUBMITTAL 3**

**NORTH CAROLINA STATE UNIVERSITY**  
**LICENSE NO. R-120; DOCKET NO. 50-297**  
**June 10, 2016**

Core 8 of the PULSTAR reactor was reanalyzed using the same approach described in the document “Examination of Mixed Enrichment Core Loading for the NCSU PULSTAR Reactor, Appendix A to NC State University License Amendment for the Use of 6% Enriched Fuel. (ADAMS Accession No. ML15076A020)”. An updated Table 3.2 (of Appendix A) is presented below showing the results of the reanalysis. The updated core 8 information in the table are highlighted. The most recently available measured data are compared to the calculated (MCNP6) data corresponding to a similar burnup state of core 8 and to a flooded beamport #6. The outcome of core 8 reanalysis shows that the deviations between measurements and calculations are within 10% and are consistent with deviations observed for previous cores. In particular, the calculated SDM is within 3% of the measured value.

**Table 3.2. Summary of parameters for historic core configurations (For each core the right column is the MCNP value and the left column is the measured value). For the standard core the comparison is made based on pin power peaking factors as the measurement is more representative of this parameter.**

	Standard Core		Reflected Core 1		Reflected Core 3		Reflected Core 4		Reflected Core 5		Reflected Core 6		Reflected Core 7		Reflected Core 8	
	Meas	Calc	Meas	Calc	Meas	Calc	Meas	Calc	Meas	Calc	Meas	Calc	Meas	Calc	Meas	Calc
S1 (pcm)	4165	4596	4084	4286	2655	2910	2943	3193	2348	2665	2583	2460	2246	2499	2534	2709
S2 (pcm)	2631	2933	3185	3297	2267	2326	2502	2504	2961	3199	2808	3314	2695	3275	2901	3069
Reg (pcm)	2521	2769	2379	2623	3982	4029	3664	3784	2787	2982	2757	2842	2634	2927	2910	3165
Shim (pcm)	1644	1867	1899	2091	2961	3062	2696	2891	3727	3537	4492	3906	3982	3956	3641	3636
Gang (pcm)	9316	10299	9648	10205	8903	9265	9110	9481	8096	8846	8168	8616	7576	8701	8345	8943
SDM (pcm)	-3104	-3621	-3462	-3578	-2301	-2307	-3858	-4066	-3145	-3521	-3459	-3380	-2041	-2655	-3630	-3543
F <sub>Q</sub> <sup>A</sup>	2.8	2.69	2.07	1.84	2.1	1.84	1.80	1.71	1.62	1.71	1.90	1.76	1.89	1.90	1.76	1.84