



Nuclear Reactor Laboratory

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RSC 1078

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: Docket 50-156, License R-74
Submission of Revised Dose Estimates
for License Renewal to Facility License No. R-74,
University Of Wisconsin Nuclear Reactor
TAC No. ME1585

Dear Sirs:

On April 10, 2009, the University of Wisconsin Nuclear Reactor (UWNR) submitted revised dose estimates for the conversion from high enriched uranium (HEU) fuel to low enriched uranium (LEU) fuel in response to the Commission's request for additional information, specifically RAI #43, dated February 26, 2009. Following telephone communications with Commission staff on February 3, 2011 it was agreed to provide revised dose estimates for all analyzed accident scenarios, including those not addressed in RAI #43. For completeness, a comprehensive summary of all revised doses have been compiled below.

The dose calculations reflect the LEU 30/20 core design as well as methodologies of calculation in the LEU Conversion Analysis Safety Analysis Report (LEU SAR) as supplemented by letter dated April 10, 2009. The results reported in the LEU SAR were updated to use more appropriate fission product release fractions. The LEU SAR calculated the release fraction based on the maximum centerline temperature, but a more accurate approach is to use an effective release fraction calculated by volume integrating the release fraction equation across the fuel temperature distribution, both axial and radial. This is appropriate since the release fraction measurements were made

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on small isothermal fuel samples (General Atomics, "The U-ZrH_x Alloy: Its Properties and Use in TRIGA Fuels," GA E-117-833, February 1980, page 5-5). The revised release fractions are 7.825E-5 BOL, 7.630E-5 MOL, and 6.125E-5 EOL, approximately 10% of the values listed in chapter 13 of the LEU SAR.

The table numbering represents the original numbering in the LEU SAR.

Table 13.1.6 MHA Total Occupational Dose during 5 minute evacuation

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	10	N/A	N/A
Revised HEU Analysis	20.3	2,110	83.7
LEU BOL Analysis	36.1	3,730	148
LEU MOL Analysis	34.6	3,670	145
LEU EOL Analysis	27.4	2,960	116

Table 13.1.8 MHA Building Occupant Doses for Ground Release

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	N/A	N/A	N/A
Revised HEU Analysis	1.26	131	5.18
LEU BOL Analysis	2.24	231	9.16
LEU MOL Analysis	2.14	227	8.95
LEU EOL Analysis	1.70	183	7.20

Table 13.1.9 MHA Dose to Outside Building

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	0.153	1,019	30.7
Revised HEU Analysis	1.35	141	5.58
LEU BOL Analysis	2.41	249	9.86
LEU MOL Analysis	2.31	245	9.64
LEU EOL Analysis	1.83	198	7.75

Table 13.1.11 Near MHA with Pool Intact Occupational Dose during 5 minute evacuation

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	N/A	18,900	N/A
Revised HEU Analysis	7.32	211	13.7
LEU BOL Analysis	13.1	373	24.2
LEU MOL Analysis	12.4	367	23.4
LEU EOL Analysis	9.69	296	18.6

Table 13.1.12 Near MHA with Pool Intact Building Occupant Doses for Ground Release

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	N/A	N/A	N/A
Revised HEU Analysis	0.453	13.1	0.845
LEU BOL Analysis	0.808	23.1	1.50
LEU MOL Analysis	0.768	22.7	1.45
LEU EOL Analysis	0.600	18.3	1.15

Table 13.1.13 Near MHA With Pool Intact Dose to Outside Building

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	0.084	102	3.14
Revised HEU Analysis	0.488	14.1	0.911
LEU BOL Analysis	0.870	24.9	1.62
LEU MOL Analysis	0.827	24.5	1.56
LEU EOL Analysis	0.646	19.8	1.24

Table 13.1.15 Near MHA With Ventilation Intact: Dose to Outside Building

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	N/A	N/A	N/A
Revised HEU Analysis	0.0049	0.506	0.0200
LEU BOL Analysis	0.0087	0.893	0.0354
LEU MOL Analysis	0.0083	0.879	0.0347
LEU EOL Analysis	0.0066	0.710	0.0279

Table 13.1.16 Near MHA With Pool and Ventilation Intact: Dose to Outside Building

	External Dose (mrem)	Thyroid Dose (mrem)	TEDE (mrem)
Previous HEU SAR	0.006	10.0	0.306
Revised HEU Analysis	0.0018	0.0506	0.0033
LEU BOL Analysis	0.0031	0.0893	0.0058
LEU MOL Analysis	0.0030	0.0879	0.0056
LEU EOL Analysis	0.00232	0.0710	0.0045

I certify under penalty of perjury that the foregoing is true and correct.

Sincerely,



Robert J. Agasie
Reactor Director

Executed on: 2/8/2011