ANL-AFCI-206

OSMOSE Experiment Representativity Studies

Nuclear Engineering Division

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by
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September 27, 2007

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Abstract

The OSMOSE experimental program, carried out at the MINERVE facility by the CEA-Cadarache (France), aims at producing very accurate reactivity-sample worth measurements for a series of actinides in various spectra, from very thermalized to very fast. In order to qualify the relevant experimental configurations for the achievement of the proposed goals, calculations have been performed to investigate the similarity of the flux spectra at the sample position of different OSMOSE configurations with the neutron energy distributions characterizing existing thermal and fast reactors proposed under the advanced reactor programs Gen-IV, GNEP and NGNP.

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I. Introduction

The OSMOSE program aims at improving the neutronic predictions of advanced nuclear fuels through measurements in the MINERVE facility at the CEA-Cadarache (France) on samples containing the following separated actinides: Th-232, U-233, U-234, U-235, U-236, U-238, Np-237, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Am-241, Am-243, Cm-244 and Cm-245. The goal of the experimental measurements is to produce a database of reactivity-worth measurements in different neutron spectra for the separated heavy nuclides. This database can then be used as a benchmark for integral reactivity-worth measurements to verify and validate reactor analysis codes and integral cross-section values for the isotopes tested.

In particular, the OSMOSE experimental program will produce very accurate sample reactivity-worth measurements for a series of actinides in various spectra, from very thermalized to very fast. The objective of the analytical program is to make use of the experimental data to establish deficiencies in the basic nuclear data libraries, identify their origins, and provide guidelines for nuclear data improvements in coordination with international programs.

To achieve the proposed goals, seven different neutron spectra can be created in the MINERVE facility: UO_2 dissolved in water (representative of over-moderated LWR systems), UO_2 matrix in water (representative of LWRs), a mixed oxide fuel matrix, two thermal spectra containing large epithermal components (representative of under-moderated reactors), a moderated fast spectrum (representative of fast reactors which have some slowing down in moderators such as lead-bismuth or sodium), and a very hard spectrum (representative of fast reactors with little moderation from reactor coolant). The different spectra are achieved by changing the experimental lattice within the MINERVE reactor. The experimental lattice is the replaceable central part of MINERVE, which establishes the spectrum at the sample location. This configuration leads to a uniform well-behaved system so that the reactor configuration is in the fundamental mode.

In fact, an important property of the oscillation experiments performed in the OSMOSE program is that the neutron flux at the sample location has reached the asymptotic fundamental mode of the MINERVE lattice. This property allows the use of simple spatial methods for the analysis (e.g. a lattice code with axial buckling representing the leakage), without loss of accuracy. The computational challenge is then reduced to the need of an appropriate cross-section processing and of accurate resonance shielding algorithms.

In the present study, calculations have been performed to investigate the similarity of the flux spectra at the sample position of different OSMOSE configurations with the neutron energy distributions characterizing existing thermal and fast reactors proposed under the advanced reactor programs Gen-IV, GNEP and NGNP.

II. Theoretical approach

Besides the direct comparison of calculated values, the similarity between the investigated systems with respect to selected parameters can be performed with a representativity approach as well. This methodology implies the use of sensitivity coefficients based on Generalized Perturbation Theory (GPT) **[1-3]**. According to this approach, a representativity factor r_{RE} can be defined to quantify the similarity between a reactor and an experimental configuration with respect to a selected parameter **[4]**:

$$r_{RE} = \frac{\left(S_{I,R}^{T} D S_{I,E}\right)}{\left[\left(S_{I,R}^{T} D S_{I,R}\right)\left(S_{I,E}^{T} D S_{I,E}\right)\right]^{1/2}} \qquad \text{Eq. 1}$$

where $S_{I,R}$ and $S_{I,E}$ are the sensitivity coefficient vectors of the parameter I under study, for the reactor and the experiment, respectively, and D is the dispersion matrix containing the nuclear data covariances. From **Eq. 1** it is observed that the parameter r_{RE} is closer to the optimum value $r_{RE} = 1$ as $S_{I,R}$ and $S_{I,E}$ become similar.

The representativity factor can also be used to get an estimate of how the dispersion ΔI_1^2 in the calculation of an integral reactor parameter I is reduced, if an integral experiment E is performed:

$$\Delta I_1^2 = \Delta I_0^2 \left(1 - r_{RE}^2\right), \qquad \text{Eq. 2}$$

where ΔI_0^2 is the original dispersion:

$$\Delta I_0^2 = S_{I,R}^T D S_{I,R} \,. \qquad \text{Eq. 3}$$

In addition to k_{eff}, in the present study a representativity analysis is performed with respect to the parameters $\eta = \frac{\nu\Sigma_f \Phi}{\Sigma_a \Phi}$ calculated at the sample location of the experimental configurations and in relevant core positions of actual thermal and fast reactors. In addition to the study of flux spectrum similarities, the parameter η has been also selected for another purpose: if $\nu\Sigma_f$ and Σ_a are the sample cross-sections, it would be perhaps possible to get information on the performed measurements of the reactivity changes subsequent to the sample substitution in the OSMOSE configurations.

The formulas for the k_{eff} and η sensitivity coefficients are presented in the following:

$$S_k = \frac{\partial k}{\partial \sigma} \cdot \frac{\sigma}{k} = -\frac{k}{I_f} \left\{ \left\langle \Phi^*, \left(\frac{\partial A}{\partial \sigma} - \frac{1}{k} \frac{\partial F}{\partial \sigma} \right) \Phi \right\rangle \right\} \qquad \text{Eq. 4}$$

$$S_\eta = \frac{\sigma}{\eta} \frac{d\eta}{d\sigma} = \frac{\sigma}{\eta} \left\{ \frac{\partial \eta}{\partial \sigma} - \left\langle \Psi^*, \left(\frac{\partial A}{\partial \sigma} - \frac{1}{k} \frac{\partial F}{\partial \sigma} \right) \Phi \right\rangle \right\} = \left\{ S_{\eta,D} - S_{\eta,I} \right\} \qquad \text{Eq. 5}$$

where ψ* is the importance function solution of the equation:

$$\left(A^* - \frac{1}{k} F^* \right) \tilde{\Psi}^* = \frac{1}{\eta} \frac{\partial \eta}{\partial \Phi} = \frac{\nu\Sigma_f(\vec{r}, E)}{\langle \nu\Sigma_f \Phi \rangle} - \frac{\Sigma_a(\vec{r}, E)}{\langle \Sigma_a \Phi \rangle} \qquad \text{Eq. 6}$$

with $\tilde{\Psi}^* = \frac{\Psi^*}{\eta}$. Additionally, in **Eq. 5**:

$$S_{\eta,D} = \frac{\sigma}{\eta} \cdot \frac{\partial \eta}{\partial \sigma} = \left(S_{\eta,D}\right)_{i,g,d} = \frac{\sigma}{\eta} \left(\frac{\left(\langle \nu\Sigma_f \Phi \rangle\right)_{i,g}}{\langle \nu\Sigma_f \Phi \rangle} - \frac{\left(\langle \Sigma_a \Phi \rangle\right)_{i,g,d}}{\langle \Sigma_a \Phi \rangle} \right)_{\substack{\text{i=isotope} \\ \text{g=energy group} \\ \text{d=reactor domain}}} \qquad \text{Eq. 7}$$

is the direct term of the sensitivity coefficients accounting of the variations on η directly due to the variations of detector cross-sections $\nu\Sigma_f$ and Σ_a. In the present study, the direct term $S_{\eta,D}$ has been neglected assuming that no variation is associated with the detector cross-sections. $S_{\eta,I}$ is the indirect term of the sensitivity coefficients, accounting for the variations on η due to the change in the flux spectrum determined by the cross-section variations.

III. Systems under Study

The OSMOSE configurations considered in the present analysis are characterized by four different lattices aiming at reproducing a typical PWR (R1-UO_2 configuration), an over-moderated UO_2 (R2-UO_2), a PWR MOX (R1-MOX), and an epithermal (MORGANE-R, MR) spectrum at the center of the MINERVE cores. The lattices configurations and compositions are presented in **Appendix A**.

The representativity study has been performed with respect to the same reactors recently investigated within the OECD Subgroup 26 for an extensive uncertainty/target accuracy assessment in order to define priority needs in nuclear data improvements **[5]**: an Advanced Burner Test Reactor (ABTR), a Sodium-cooled Fast Reactor (SFR), a large sodium-cooled fast reactor, referred as EFR, a Gas-cooled Fast Reactor (GFR), a Lead-cooled Fast Reactor (LFR), an Accelerator-Driven System (ADS), and an extended burnup (100 GWd/t) Pressurized

Water Reactor (PWR). Geometry and homogenized compositions of the selected reactors are presented in **Appendix B**. The main features of each reactor are as follows:

1. ABTR: 250 MW_{th} – Na cooled; U-TRU-10Zr fuel; HT9(75%)-Na(15%) reflector; enrichment: 17%, MA: <1%; irradiation cycle: 109.8 days (4 months at 90% capacity);
2. SFR: (Burner: CR=0.25) 840 MW_{th} – Na cooled; U-TRU-Zr metallic alloy fuel; SS reflector; enrichment: 56%, MA: 10%; irradiation cycle: 155 days;
3. EFR: 3600 MW_{th} – Na cooled; U-TRU oxide fuel; U blanket; enrichment: 22%, MA: 1%; irradiation cycle: 1700 days;
4. GFR: 2400 MW_e – He cooled; SiC - (U-TRU)C fuel; Zr_3Si_2 reflector; enrichment: 17%, MA: 5%; irradiation cycle: 415 days;
5. LFR: 900 MW_{th} – Pb cooled; U-TRU-Zr metallic alloy fuel; Pb reflector; enrichment: 21%, MA: 2%; irradiation cycle: 310 days;
6. ADS: 377 MW_{th} – Pb-Bi cooled; TRU fuel; HT9(70%) Pb-Bi(30%) reflector; enrichment: 32%, MA: 67%; irradiation cycle: 366 days;
7. Extended BU PWR: enrichment: 8.5%; burnup: 100 GW d/Kg.

IV. Computational Tools and Strategies

All the sensitivity calculations have been performed with the ERANOS code system **[6]**, which allows one to calculate homogeneous and inhomogeneous solutions of the Boltzmann equations, generalized importance functions, and to perform perturbation and uncertainty analysis. The discrete ordinate module BISTRO **[7]** has been used to perform flux and generalized importance function calculations.

Flux spectra, η values and k_{eff} sensitivity coefficients have been calculated in S_4P_1 transport approximation, except for the LFR where the complete study has been performed in diffusion theory, due to convergence problems encountered in transport theory approximations. For all systems, the sensitivity coefficients related to η have been calculated using diffusion approximations which have been proven to be accurate enough for this type of analysis.

Cross-section data have been processed with the ECCO code **[8]** using the JEF3.1 library **[9]**. For most of the investigated reactors (except the ABTR and the PWR), homogenized cross-sections have been calculated, since heterogeneity effects on the cross-sections are rather small for the kind of study intended to be performed. For an accurate description of the neutron slowing down in thermal systems, the cross-sections have been produced over a 172 energy group structure.

V. Flux Spectra and η Calculated Values

Due to the features of the OSMOSE configurations, the study is performed only for the central region surrounding the sample location, in XY geometry, with reflection boundary conditions and an opportune buckling in order to characterize the leakage. As discussed in **Section I**, the reactor zones outside the selected region do not have any significant impact on the neutron energy distribution at the core center, where the samples are located. On the other hand, the calculation models used for the study of the selected reactors are consistent with those adopted in the previous studies **[4]**.

Table 1 summarizes the calculated k_{eff} of each investigated system.

Table 1. Calculated k_{eff} (Reactivity) of the OSMOSE Configurations and Reactors

OSMOSE Configurations	
R1-UO2	0.999976 (-2.4 pcm)
R2-UO2	0.999982 (-1.8 pcm)
R1-MOX	0.999958 (-4.2 pcm)
MORGANE-R	1.000021 (2.1 pcm)
Advanced Reactor Configurations	
ABTR	1.04295 (4118.1 pcm)
SFR	1.065548 (6151.6 pcm)
EFR	1.115667 (10367.5 pcm)
GFR	1.015783 (1553.8 pcm)
LFR	1.025412 (2478.2 pcm)
ADS	0.978075 (-2241.6 pcm)
PWR	1.52869 (34584.5 pcm)

The initial analysis has been devoted to the energy distribution of the direct and adjoint fluxes. The flux spectra have been calculated at the core center, except for the few reactors (like the ABTR) where at that position a control rod is in place. In these cases, an opportune point of the inner core, far from spectral perturbations induced by the central assembly, was selected for the calculation. For the OSMOSE configurations, the fluxes have been calculated without a sample in place (at the sample position there is only water), according to the representation of **Figures 23, 26, 29, 32** for the R1-UO_2, R2-UO_2, R1-MOX and MR configurations respectively. This choice has been made to avoid for similarity purposes the explicit description of the sample channel in the reactor models; on the other hand, it is demonstrated (see **Appendix C**) that the presence of the samples in the OSMOSE calculation model does not affect the flux spectrum at the core center of the MINERVE cores.

The flux spectra are presented in **Figures 1** to **22** for each system under study. It can be observed that for all fast reactors, the fraction of neutrons below 1 keV is practically negligible and the peak of the distribution is at ~100 – 200 keV. In the case of the OSMOSE configurations, the flux spectra below 1 keV is still relevant. As expected, the R1-UO_2 and R2-UO_2 configurations show a peak in the thermal energy range. Additionally, for the four OSMOSE configurations the peak of the distributions is at ~1 MeV and it becomes more pronounced in the case of R1-MOX and MR configurations. Finally, the OSMOSE flux spectra look much more similar to PWR spectra (especially in the case of the R1-UO_2 and R2-UO_2 configurations) than to the neutron energy distributions typical of fast systems.

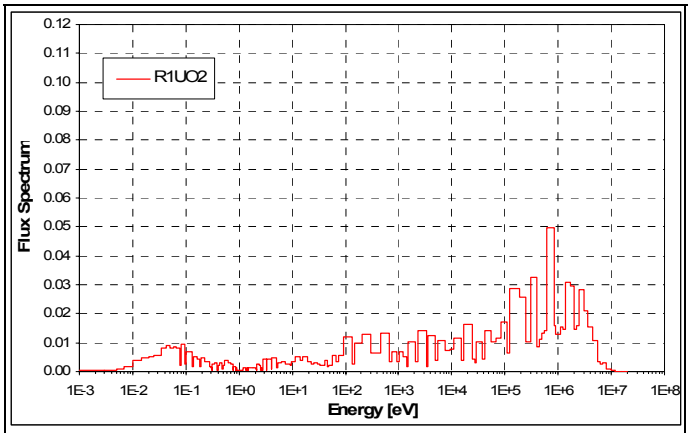

Figure 1: OSMOSE R1-UO_2 Direct Flux Spectrum

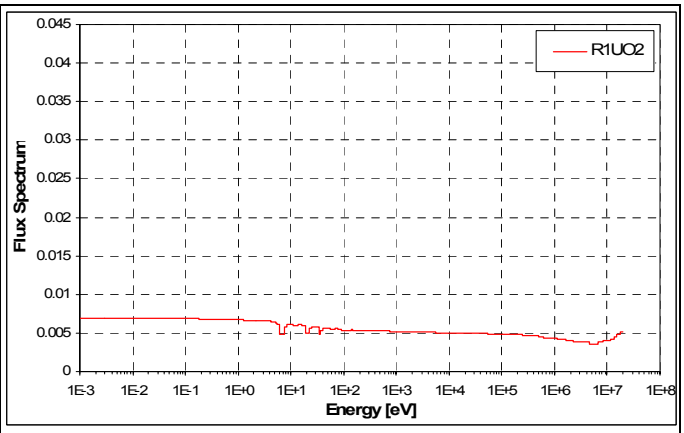

Figure 2: OSMOSE R1-UO_2 Adjoint Flux Spectrum

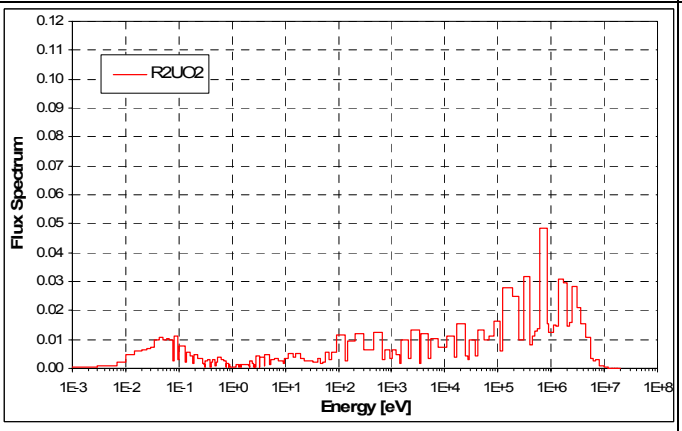

Figure 3: OSMOSE R2-UO_2 Direct Flux Spectrum

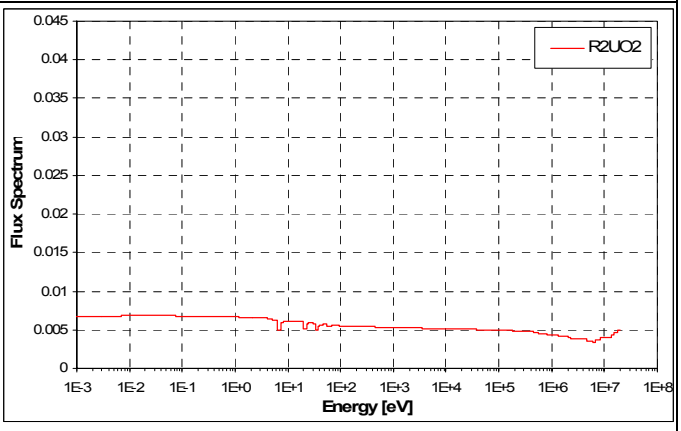

Figure 4: OSMOSE R2-UO_2 Adjoint Flux Spectrum

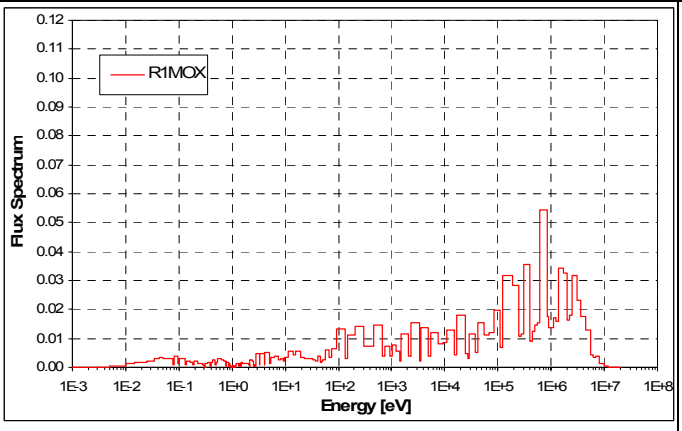

Figure 5: OSMOSE R1-MOX Direct Flux Spectrum

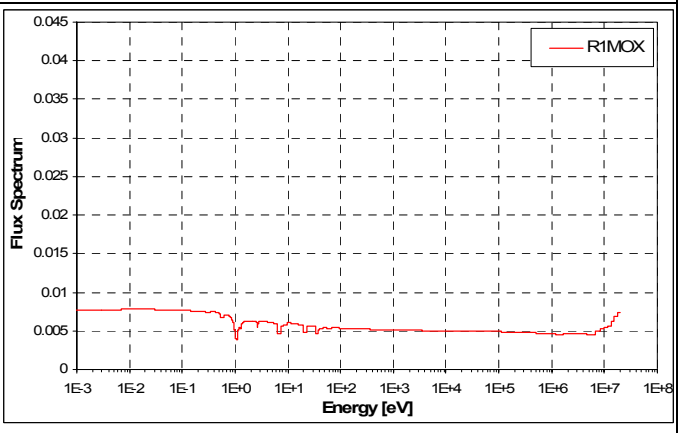

Figure 6: OSMOSE R1-MOX Adjoint Flux Spectrum

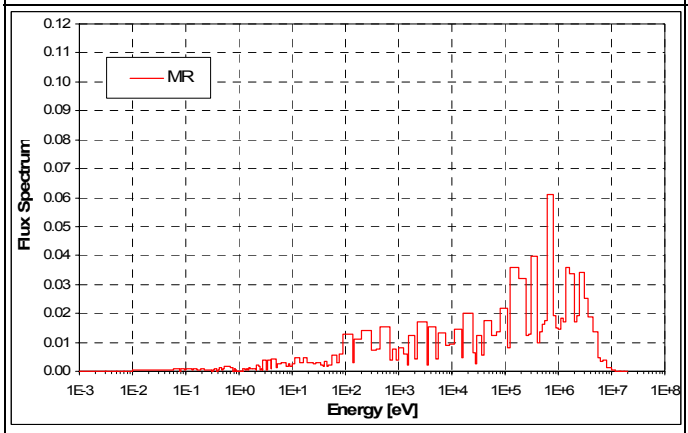

Figure 7: OSMOSE MR Direct Flux Spectrum

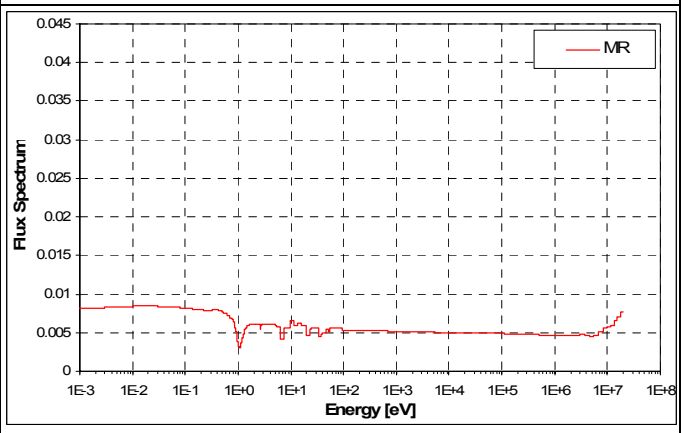

Figure 8: OSMOSE MR Adjoint Flux Spectrum

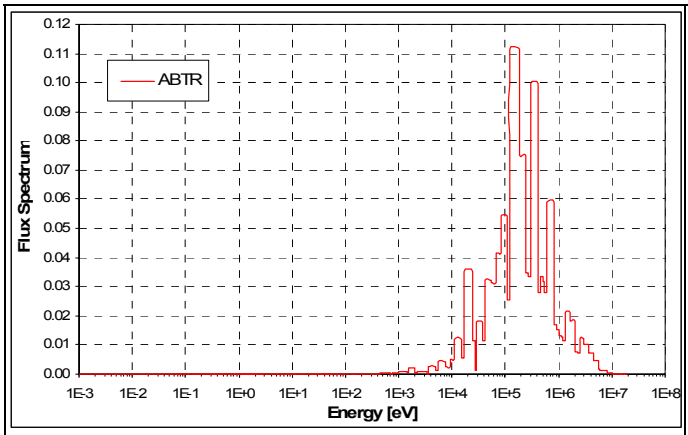

Figure 9: ABTR Direct Flux Spectrum

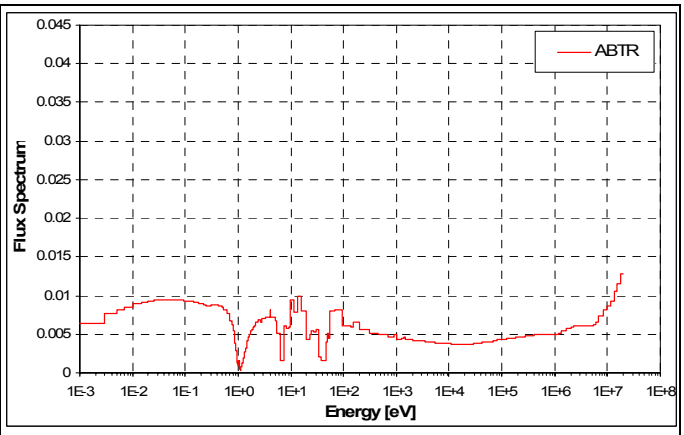

Figure 10: ABTR Adjoint Flux Spectrum

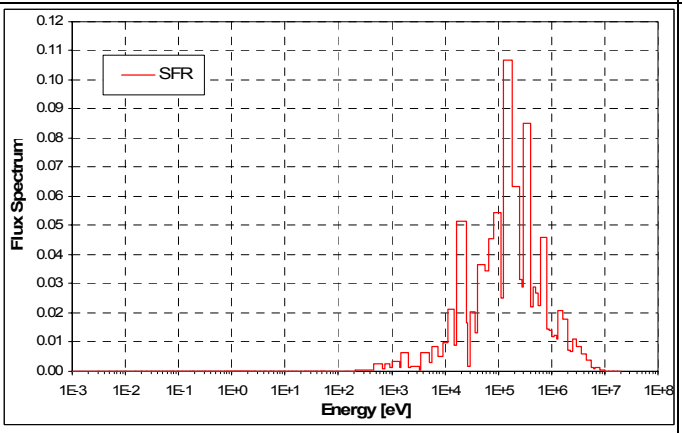

Figure 11: SFR Direct Flux Spectrum

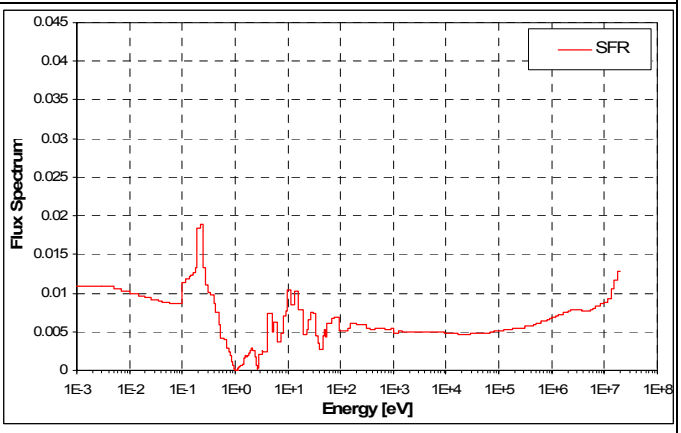

Figure 12: SFR Adjoint Flux Spectrum

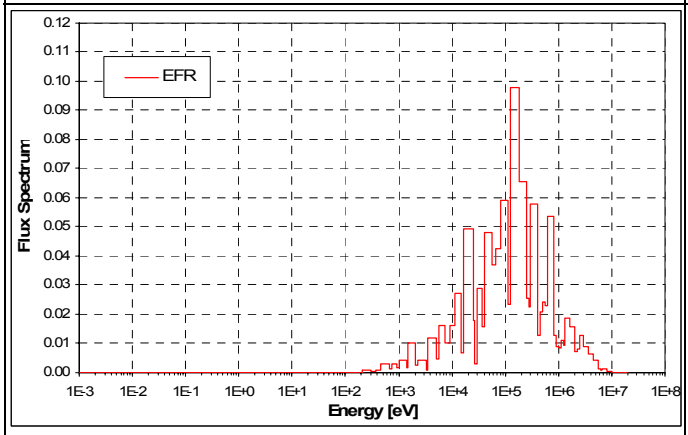

Figure 13: EFR Direct Flux Spectrum

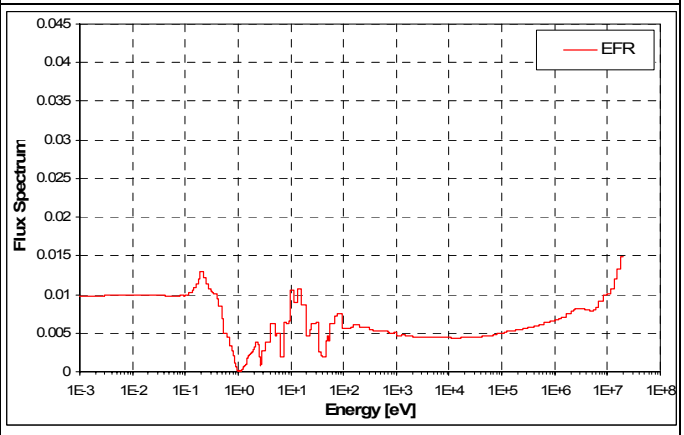

Figure 14: EFR Adjoint Flux Spectrum

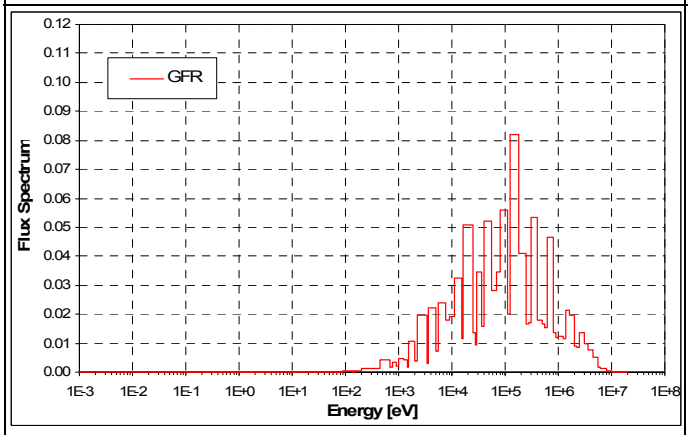

Figure 15: GFR Direct Flux Spectrum

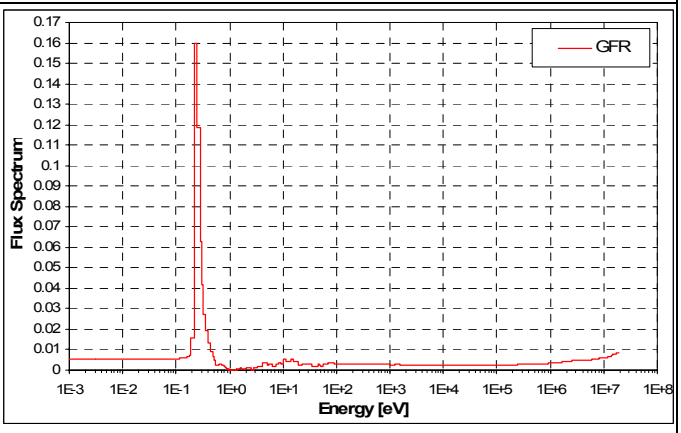

Figure 16: GFR Adjoint Flux Spectrum

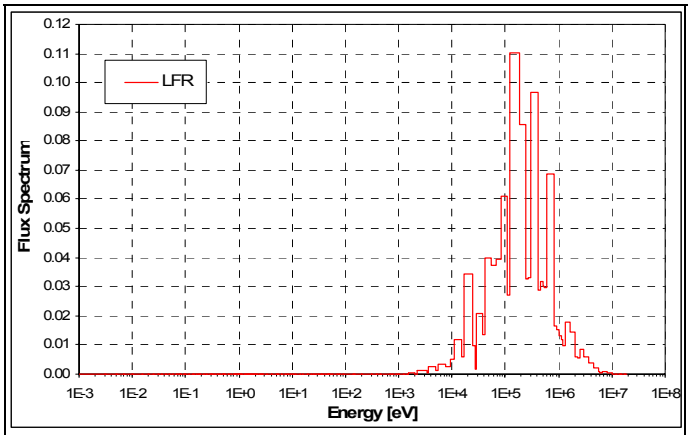

Figure 17: LFR Direct Flux Spectrum

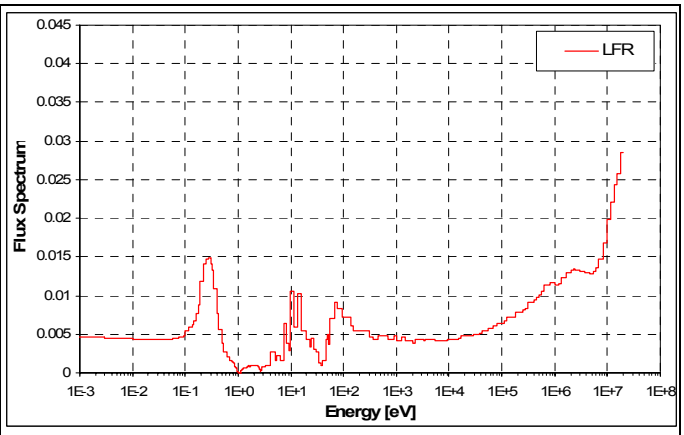

Figure 18: LFR Adjoint Flux Spectrum

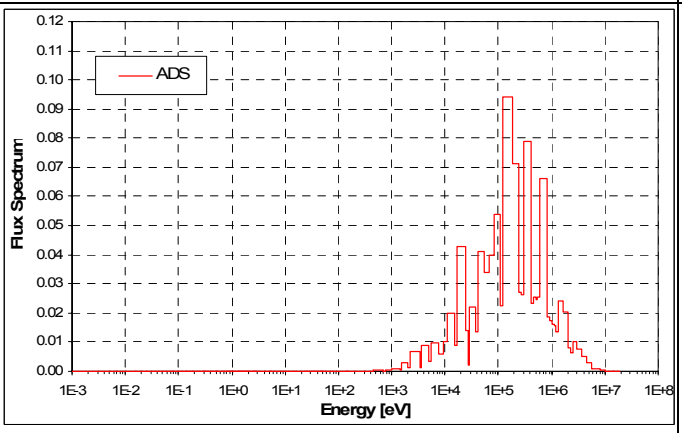

Figure 19: ADS Direct Flux Spectrum

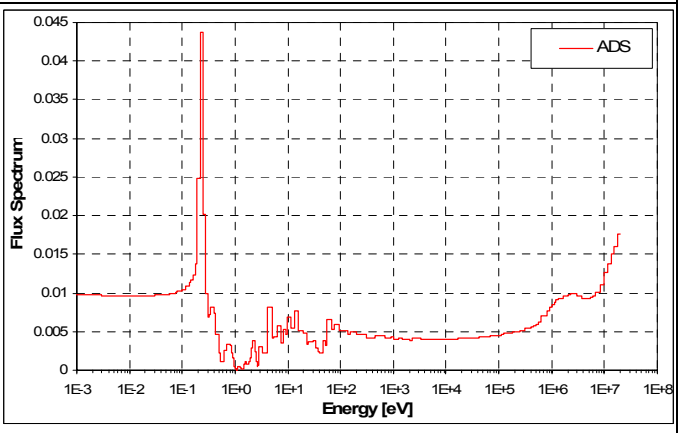

Figure 20: ADS Adjoint Flux Spectrum

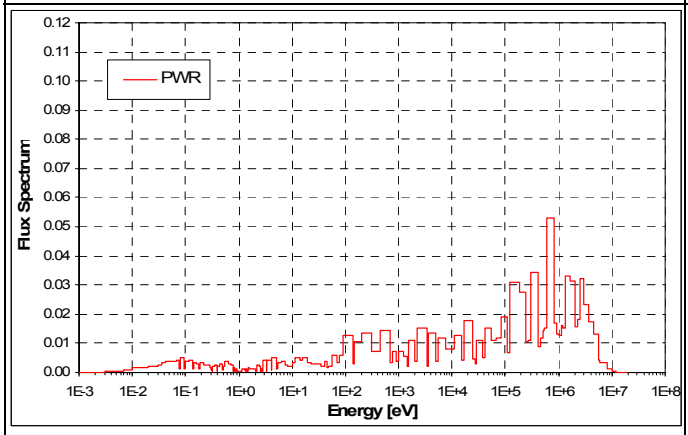

Figure 21: PWR Direct Flux Spectrum

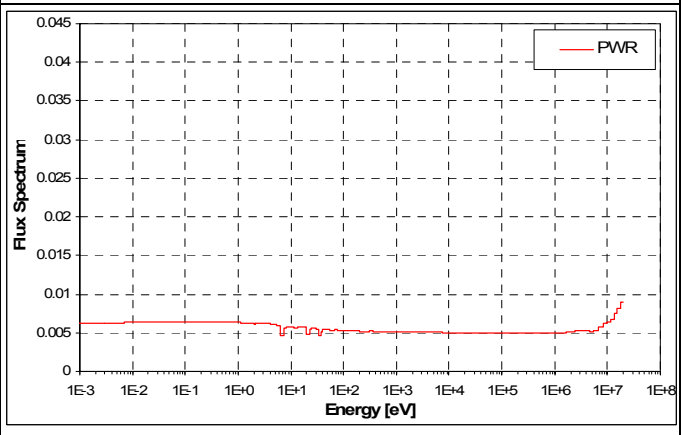

Figure 22: PWR Adjoint Flux Spectrum

In addition to the neutron flux spectra, calculations have been also performed for the parameter η. As anticipated in **Section II**, the goal is that this parameter be calculated with the sample cross-sections $\nu\Sigma_f$ and Σ_a. Since the investigated systems are modeled without sample in place, the parameter η is calculated with the cross-sections generated by a separate heterogeneous cell calculation. In the case of the OSMOSE configurations, the cell scheme for this calculation corresponds to the representations of **Figures 23, 26, 29, 32** after introduction of the sample in the center (see respectively **Figures 25, 28, 31, 34**), while for the reactors, an RZ cell calculation is performed according to **Figure 35**, where the sample is surrounded by an opportune zone with the core homogenized compositions. The values calculated for the parameter η are shown in **Table 2**.

To summarize, the parameter $\eta = \frac{\nu\Sigma_f\Phi}{\Sigma_a\Phi}$ is calculated with the macroscopic cross-sections $\nu\Sigma_f$ and Σ_a of the sample pin in the heterogeneous cell calculation described above, while the fluxes are obtained

from the reactor and experimental configuration models without a sample in place and calculated at the same locations of the neutron spectrum distributions previously discussed. In **Appendix C**, it is demonstrated that for the OSMOSE configurations the parameters η obtained by using the fluxes calculated with or without the sample in place do not show a significant difference.

Table 2. Calculated η

Sample	R1-UO_2	R2-UO_2	R1-MOX	MR	ABTR	SFR	EFR	GFR	LFR	ADS	PWR
Th232	0.0430	0.0394	0.0670	0.0926	0.1210	0.0865	0.0764	0.0757	0.0831	0.0923	0.0624
UTh	0.7559	0.7770	0.5751	0.4653	0.6334	0.4960	0.4656	0.4761	0.4891	0.5128	0.6885
U234	0.7547	0.7733	0.5843	0.4825	0.6755	0.5327	0.5005	0.5126	0.5273	0.5503	0.6928
URE	1.5135	1.5441	1.2291	0.9168	0.9424	0.8165	0.7870	0.7940	0.8312	0.8250	1.3795
UO_2	0.8216	0.8401	0.6329	0.5140	0.6605	0.5215	0.4915	0.5054	0.5105	0.5362	0.7585
Np237_1	0.7801	0.7993	0.6038	0.4969	0.6631	0.5227	0.4918	0.5047	0.5142	0.5389	0.7175
Np237_2	0.6269	0.6473	0.4960	0.4308	0.6750	0.5284	0.4930	0.5017	0.5315	0.5516	0.5703
Pu238	0.8126	0.8163	0.6815	0.5737	0.7720	0.6228	0.5861	0.5936	0.6320	0.6412	0.7904
Pu239	1.4412	1.4600	1.1950	0.8852	0.8428	0.6918	0.6521	0.6547	0.7127	0.7073	1.3547
Pu240	0.5471	0.5782	0.4846	0.4331	0.6726	0.5309	0.4995	0.5125	0.5231	0.5473	0.4699
Pu241	1.1015	1.1227	0.8418	0.6349	0.7034	0.5652	0.5353	0.5483	0.5582	0.5786	1.0084
Pu242	0.6997	0.7269	0.5310	0.4351	0.6878	0.5418	0.5079	0.5200	0.5387	0.5616	0.6183
Am241_1	0.7373	0.7561	0.5869	0.4916	0.6611	0.5216	0.4913	0.5049	0.5115	0.5372	0.6815
Am241_2	0.5973	0.6154	0.5041	0.4485	0.6626	0.5222	0.4908	0.5040	0.5139	0.5396	0.5537

VI. Representativity Analysis

As already discussed in **Section II**, a representativity study has been performed between the OSMOSE configurations and the selected reactors with respect to the multiplication factors and the parameters η previously calculated.

Due to the unavailability of nuclear data covariance over the adopted 172 energy group structure, the representativity study has been performed without the use of a dispersion matrix: which was performed by setting D equal the unity matrix in **Eq. 1**. As a consequence, the present representativity analysis is based on the direct comparison of sensitivity profiles, without any filter due to specific nuclear data uncertainties: this is a good approach for deriving general conclusions that are not related to a specific data library.

Tables 3 shows the representativity factors for k_{eff}, while in **Appendix D** the sensitivity coefficients are presented by isotope, energy group and cross-section type for each system under study. It can be observed that low representativity factors are obtained in general with respect to k_{eff} between the OSMOSE configurations and all fast reactors, while a good representativity is shown as expected between the R1-UO_2 or R2-UO_2 configuration and the PWR. Looking at the sensitivity coefficients in **Appendix D**, it is observed that in the OSMOSE configurations, besides the U-235 (case of R1-UO_2 and R2-UO_2) or Pu-239 (case of R1-MOX and MR), an important role is also played by the hydrogen. For the fast reactors, the sensitivity profiles are practically always dominated by the Pu-239 components (in the case of the SFR the Minor Actinides (MA) contributions are also significant). The PWR shows sensitivity profiles very similar to those calculated for OSMOSE R1-UO_2 and R2-UO_2.

Table 3. Representativity Factors between OSMOSE and Reactors for k_{eff}

	R1-UO_2	**R2-UO_2**	**R1-MOX**	**MR**
R1-UO_2	1.0	0.9981	0.2476	0.1586
R2-UO_2	0.9981	1.0	0.2318	0.1421
R1-MOX	0.2476	0.2318	1.0	0.8710
MR	0.1586	0.1421	0.8710	1.0
ABTR	0.0293	0.0261	0.0712	0.1826
SFR	0.0131	0.0116	0.0493	0.1549
EFR	0.0355	0.0313	0.0843	0.2101
GFR	0.0547	0.0481	0.1125	0.2434
LFR	0.0251	0.0223	0.0632	0.1655
ADS	-0.0001	-0.0001	0.0254	0.1072
PWR	0.9479	0.9337	0.2390	0.1522

Tables 4 shows the representativity factors for the parameter η, while in **Appendix E** the sensitivity coefficients are presented by isotope, energy group and cross-section type for each system under study and for the samples Th232, UO_2, Np237_1, Pu239, Am241_1. As in the case of the multiplication factor, low representativity factors are obtained in general with respect to the parameter η between the OSMOSE configurations and all fast reactors, while a good representativity is shown as expected between the R1-UO_2 or R2-UO_2 configuration and the PWR. Looking at the sensitivity coefficients in **Appendix E**, it is observed that besides the fissile isotopes U-235 (case of R1-UO_2, R2-UO_2 and PWR), Pu-239 (case of R1-MOX, MR and all fast reactors) and minor actinides (case of SFR and ADS), a significant role (dominant in most of the cases) is played by the structural isotopes, as H (case of R1-UO_2, R2-UO_2 and PWR), Fe-56 (case of ABTR, SFR, EFR, ADS), Na-23 (case of ABTR, SFR, EFR), O-16 (case of EFR), C and Si-28 (case of GFR), Pb isotopes and B-10 (case of LFR). In fact, the fissile isotope sensitivity coefficients related to the fission reaction contribute to the numerator (for the production, with ν) and to the denominator (for the absorption, with $\Sigma_a = \Sigma_c + \Sigma_f$) of the parameter η with opposite sign, weakening as consequence the total effect.

Table 4. Representativity Factors between OSMOSE R1-UO_2 and Reactors for η

Sample	**ABTR**	**SFR**	**EFR**	**GFR**	**LFR**	**ADS**	**PWR**
Th232	0.1952	0.0704	0.2474	0.2099	0.1630	0.0130	0.9448
UTh	0.0549	0.0197	0.0688	0.0581	0.0453	0.0035	0.9659
U234	0.0582	0.0210	0.0734	0.0619	0.0479	0.0037	0.9600
URE	0.0137	0.0048	0.0174	0.0147	0.0109	0.0009	0.9836
UO_2	0.0539	0.0193	0.0676	0.0567	0.0444	0.0035	0.9666
Np237_1	0.0574	0.0206	0.0721	0.0607	0.0472	0.0037	0.9634
Np237_2	0.0704	0.0257	0.0895	0.0762	0.0580	0.0045	0.9523
Pu238	0.0570	0.0206	0.0728	0.0618	0.0464	0.0036	0.9699
Pu239	0.0169	0.0060	0.0214	0.0184	0.0135	0.0011	0.9800
Pu240	0.0524	0.0188	0.0659	0.0555	0.0432	0.0033	0.9649
Pu241	0.0328	0.0117	0.0412	0.0346	0.0268	0.0021	0.9779
Pu242	0.0489	0.0177	0.0617	0.0523	0.0402	0.0031	0.9645
Am241_1	0.0619	0.0222	0.0777	0.0653	0.0510	0.0040	0.9598
Am241_2	0.0749	0.0270	0.0942	0.0795	0.0619	0.0048	0.9493

Table 5. Representativity Factors between OSMOSE R2-UO_2 and Reactors for η

Sample	ABTR	SFR	EFR	GFR	LFR	ADS	PWR
Th232	0.1772	0.0639	0.2266	0.1902	0.1480	0.0118	0.9297
UTh	0.0428	0.0154	0.0542	0.0453	0.0353	0.0028	0.9530
U234	0.0456	0.0165	0.0581	0.0485	0.0375	0.0029	0.9431
URE	0.0107	0.0038	0.0137	0.0115	0.0085	0.0007	0.9754
UO_2	0.0418	0.0150	0.0530	0.0440	0.0345	0.0027	0.9543
Np237_1	0.0446	0.0160	0.0565	0.0471	0.0367	0.0029	0.9499
Np237_2	0.0554	0.0202	0.0711	0.0599	0.0456	0.0035	0.9329
Pu238	0.0456	0.0164	0.0588	0.0494	0.0371	0.0029	0.9575
Pu239	0.0133	0.0047	0.0171	0.0145	0.0107	0.0009	0.9689
Pu240	0.0424	0.0153	0.0538	0.0449	0.0350	0.0027	0.9449
Pu241	0.0255	0.0091	0.0324	0.0268	0.0209	0.0017	0.9692
Pu242	0.0396	0.0143	0.0504	0.0423	0.0326	0.0025	0.9417
Am241_1	0.0481	0.0173	0.0609	0.0507	0.0396	0.0031	0.9449
Am241_2	0.0591	0.0213	0.0749	0.0626	0.0487	0.0038	0.9286

Table 6. Representativity Factors between OSMOSE R1-MOX and Reactors for η

Sample	ABTR	SFR	EFR	GFR	LFR	ADS	PWR
Th232	0.1976	0.0748	0.2421	0.2104	0.1659	0.0290	0.9302
Uth	0.0950	0.0357	0.1154	0.0993	0.0791	0.0132	0.9117
U234	0.0974	0.0368	0.1188	0.1022	0.0809	0.0135	0.9131
URE	0.0281	0.0103	0.0342	0.0290	0.0226	0.0039	0.7990
UO_2	0.0925	0.0347	0.1123	0.0960	0.0769	0.0129	0.9158
Np237_1	0.0972	0.0366	0.1183	0.1015	0.0808	0.0135	0.9103
Np237_2	0.1152	0.0440	0.1415	0.1231	0.0957	0.0159	0.8918
Pu238	0.0859	0.0324	0.1058	0.0918	0.0705	0.0119	0.9218
Pu239	0.0315	0.0117	0.0384	0.0330	0.0255	0.0044	0.8302
Pu240	0.1134	0.0427	0.1380	0.1185	0.0943	0.0157	0.6938
Pu241	0.0625	0.0234	0.0759	0.0645	0.0517	0.0087	0.8783
Pu242	0.0921	0.0349	0.1125	0.0972	0.0765	0.0127	0.8929
Am241_1	0.1013	0.0381	0.1231	0.1054	0.0842	0.0141	0.9092
Am241_2	0.1183	0.0447	0.1440	0.1240	0.0985	0.0163	0.8866

Table 7. Representativity Factors between OSMOSE MR and Reactors for η

Sample	ABTR	SFR	EFR	GFR	LFR	ADS	PWR
Th232	0.2622	0.1405	0.3216	0.2658	0.2106	0.0466	0.9190
UTh	0.2040	0.1066	0.2485	0.2052	0.1637	0.0344	0.8856
U234	0.2032	0.1063	0.2482	0.2051	0.1625	0.0340	0.8884
URE	0.0921	0.0466	0.1119	0.0924	0.0718	0.0151	0.7697
UO_2	0.1993	0.1040	0.2426	0.1988	0.1597	0.0336	0.8916
Np237_1	0.2047	0.1070	0.2496	0.2054	0.1640	0.0344	0.8873
Np237_2	0.2236	0.1176	0.2748	0.2302	0.1788	0.0370	0.8606
Pu238	0.1790	0.0931	0.2203	0.1843	0.1417	0.0295	0.9025
Pu239	0.0942	0.0482	0.1148	0.0960	0.0738	0.0155	0.8079
Pu240	0.2232	0.1166	0.2724	0.2244	0.1788	0.0374	0.6106
Pu241	0.1622	0.0843	0.1974	0.1616	0.1295	0.0273	0.8518
Pu242	0.1939	0.1016	0.2373	0.1971	0.1552	0.0321	0.8590
Am241_1	0.2078	0.1086	0.2531	0.2079	0.1666	0.0349	0.8881
Am241_2	0.2239	0.1172	0.2732	0.2255	0.1796	0.0375	0.8556

VII. Conclusions

The OSMOSE experimental program, carried out at the MINERVE facility by the CEA-Cadarache (France), aims at producing very accurate reactivity-sample worth measurements for a series of actinides in various spectra, from very thermalized to very fast. In order to qualify the relevant experimental configurations for the achievement of the proposed goals, calculations have been performed to investigate the similarity of the flux spectra at the sample position of different OSMOSE configurations with the neutron energy distributions characterizing existing thermal and fast reactors proposed under the advanced reactor programs Gen-IV, GNEP and NGNP. The OSMOSE configurations considered in the present analysis are characterized by four different lattices aiming at reproducing a typical PWR (R1-UO_2 configuration), an over-moderated UO_2 (R2-UO_2), a PWR MOX (R1-MOX), and an epithermal (MORGANE-R, MR) spectrum at the center of the MINERVE cores. On the other hand, the similarity study has been performed with respect to the same reactors recently investigated within the OECD Subgroup 26 for an extensive uncertainty/target accuracy assessment in order to define priority needs in nuclear data improvements: an Advanced Burner Test Reactor (ABTR), a Sodium-cooled Fast Reactor (SFR), a large sodium-cooled fast reactor, referred as EFR, a Gas-cooled Fast Reactor (GFR), a Lead-cooled Fast Reactor (LFR), an Accelerator-Driven System (ADS), and an extended burnup (100 GWd/t) Pressurized Water Reactor (PWR).

This similarity study can been carried out with a direct comparison of the integral parameters characterizing the systems under study, or better, using more sophisticated methods based on the "representativity" concept.

From the direct comparison of the flux spectra calculated at the core center, it has been observed that for all fast reactors, the fraction of neutrons below 1 keV is practically negligible and the peak of the distribution is at ~100 – 200 keV, while in the case of the OSMOSE configurations, the flux spectra below 1 keV is still relevant and the peak of the distributions is at ~1 MeV (becoming more pronounced in the case of R1-MOX and MR configurations). It is concluded that the OSMOSE flux spectra look much more similar to PWR spectra (especially in the case of the R1-UO_2 and R2-UO_2 configurations) than to the neutron energy distributions typical of fast systems.

Although the direct comparison of the flux spectra allows to identify affinities or discrepancies among the selected systems, it is not completely appropriate to quantify the relevance of the proposed experimental configurations for their similarity with actual reactors. For this purpose, a representativity study is carried out which is based on the comparison of sensitivity profiles associated to the integral parameters of interest. As results of the application of this methodology, a representativity factor ranging between 0 and 1 is used to quantify the similarity under investigation.

In addition to k_{eff}, a representativity analysis has been performed with respect to the parameters $\eta = \frac{\nu\Sigma_f \Phi}{\Sigma_a \Phi}$ calculated at the sample location of the experimental configurations and in relevant core positions of the actual thermal and fast reactors. The parameter η is calculated with the sample cross-sections $\nu\Sigma_f$ and Σ_a.

Low representativity factors (<0.2) have been obtained in general with respect to k_{eff} and the parameter η between the OSMOSE configurations and all fast reactors. As expected, a good representativity was obtained between the R1-UO_2 and R2-UO_2 configuration and a typical PWR. The obtained results lead to the conclusion that the reactivity worth measurements obtained from the four OSMOSE configurations (R1-UO2, R2-UO2, R1-MOX, and MORGANE-R) are not to be intended as measured in flux spectra characterizing actual fast reaxtors. It is expected that the other OSMOSE configurations would be more representive of fast reactors since the configurations include harder neutron spectra. However, representativity calculations have not been performed at this time. These calculations are planned in 2008.

Looking with more detail at the sensitivity coefficients for k_{eff}, it is observed that in the OSMOSE configurations, besides the U-235 (case of R1-UO_2 and R2-UO_2) or Pu-239 (case of R1-MOX and MR), an important role is also played by the hydrogen. For the fast reactors, the sensitivity profiles are practically always

dominated by the Pu-239 components (in the case of the SFR the minor actinides contributions are also significant). The PWR shows sensitivity profiles very similar to those calculated for OSMOSE R1-UO_2 and R2-UO_2.

Looking at the sensitivity coefficients for the parameter η, it is observed that besides the fissile isotopes U-235 (case of R1-UO_2, R2-UO_2 and PWR), Pu-239 (case of R1-MOX, MR and all fast reactors) and minor actinides (case of SFR and ADS), a significant role (dominant in most of the cases) is played by the structural isotopes, as H (case of R1-UO_2, R2-UO_2 and PWR), Fe-56 (case of ABTR, SFR, EFR, ADS), Na-23 (case of ABTR, SFR, EFR), O-16 (case of EFR), C and Si-28 (case of GFR), Pb isotopes and B-10 (case of LFR).

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9. JEF3.1, CEA Private Comunication.

Appendix A. Experimental Model Description

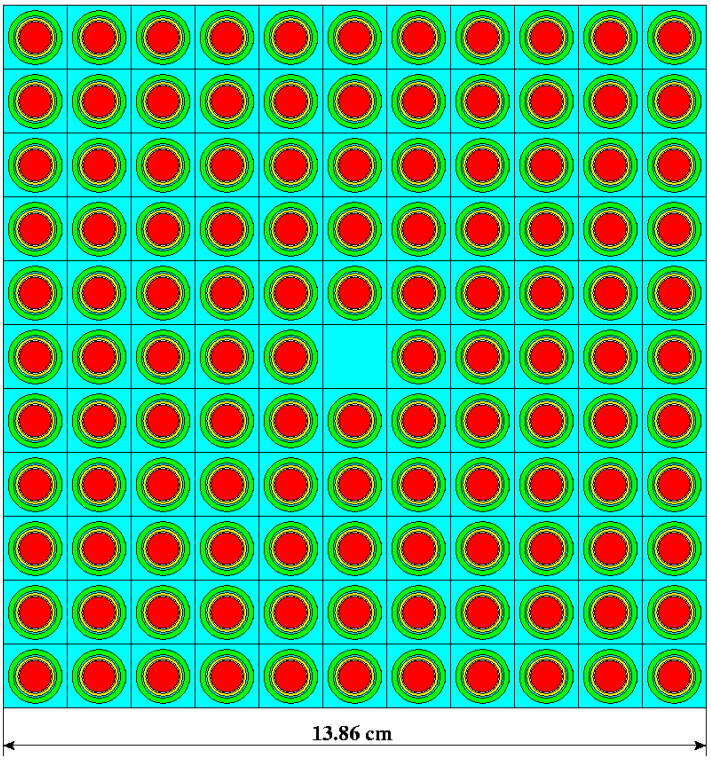


Figure 23: OSMOSE R1-UO_2

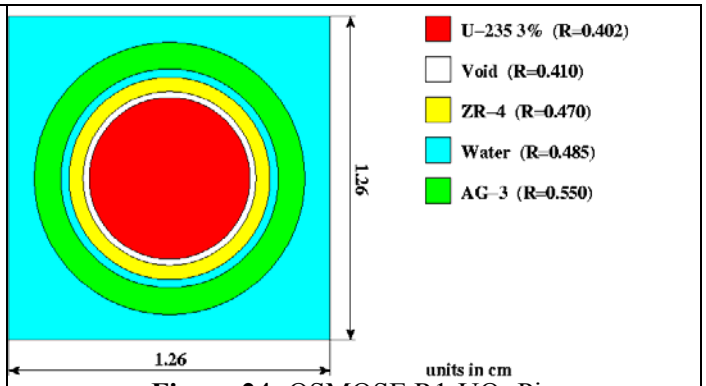


Figure 24: OSMOSE R1-UO_2 Pin

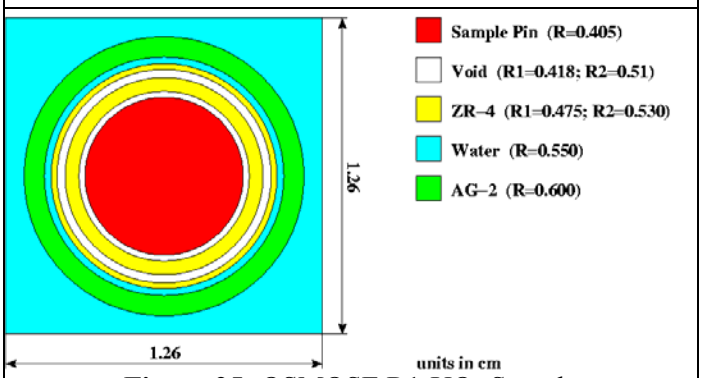


Figure 25: OSMOSE R1-UO_2 Sample

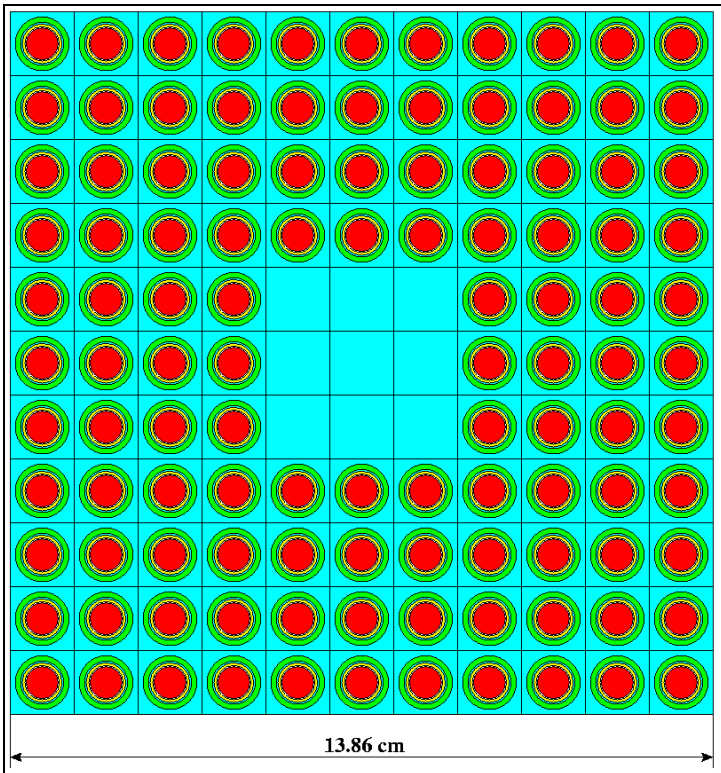


Figure 26: OSMOSE R2-UO_2

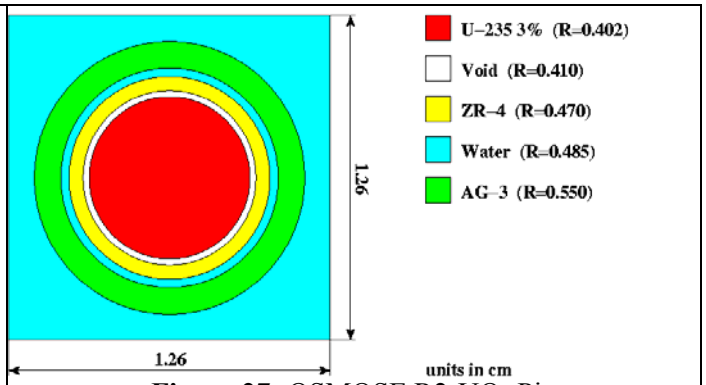


Figure 27: OSMOSE R2-UO_2 Pin

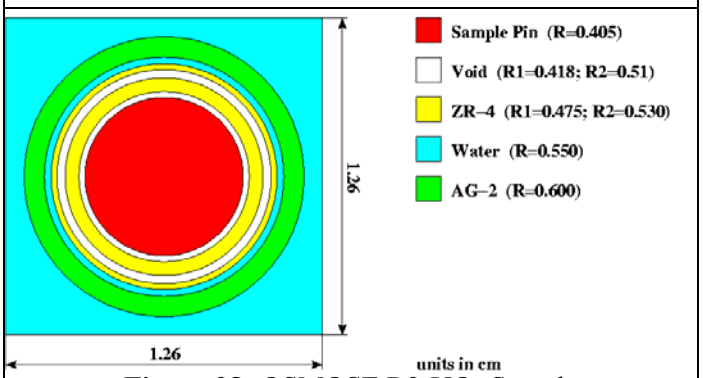


Figure 28: OSMOSE R2-UO_2 Sample

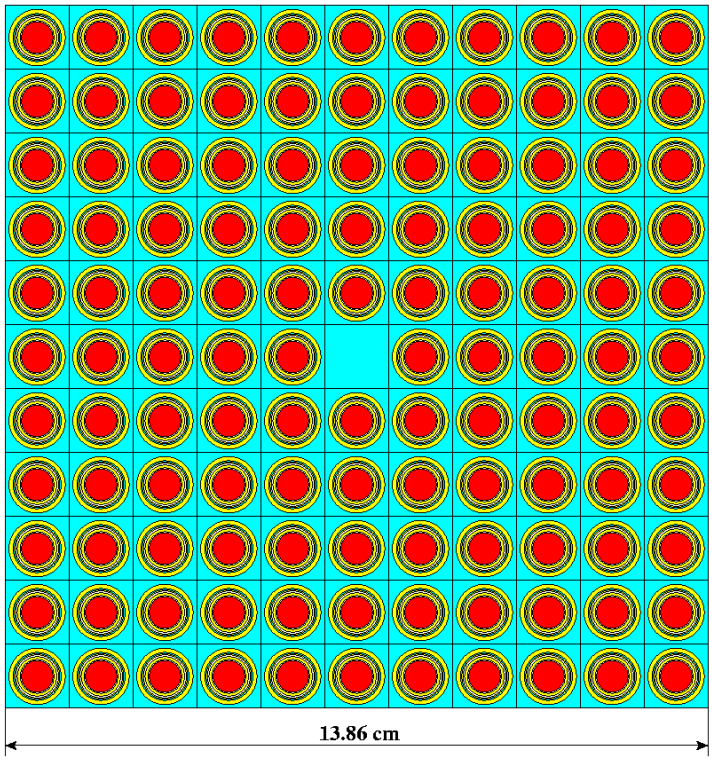


Figure 29: OSMOSE R1-MOX

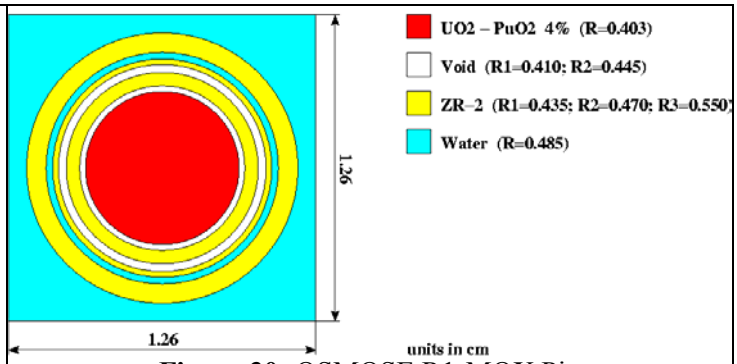


Figure 30: OSMOSE R1-MOX Pin

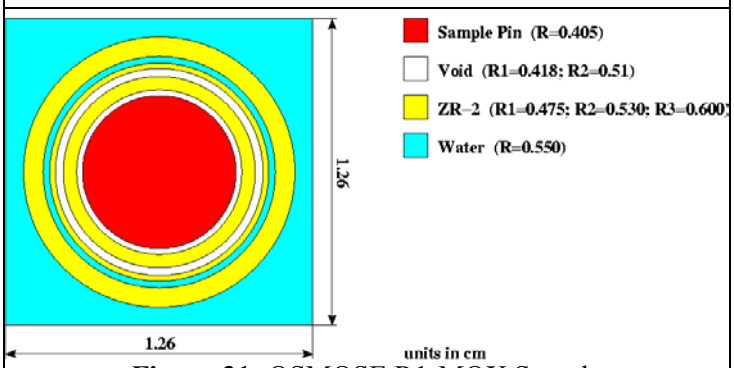


Figure 31: OSMOSE R1-MOX Sample

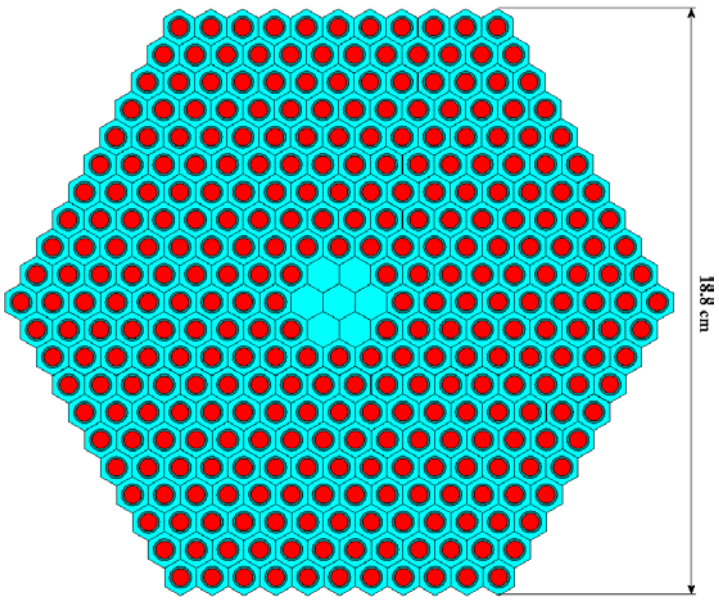


Figure 32: OSMOSE MR

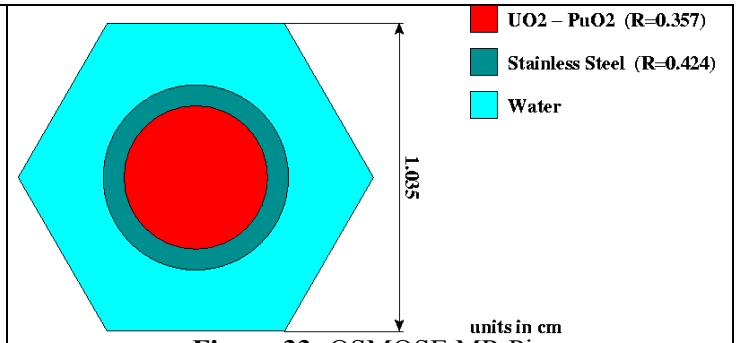


Figure 33: OSMOSE MR Pin

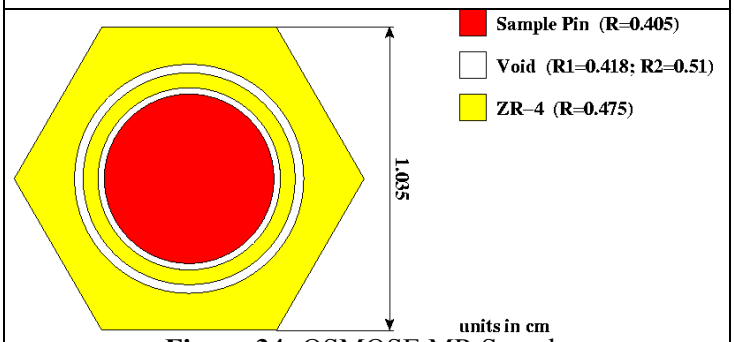


Figure 34: OSMOSE MR Sample

Table 8. OSMOSE Compositions [10^{24} at/cm^3]

U-235 3%		**UO_2-PuO_2 4%**		**UO_2-PuO_2**	
U234	4.61700E-6	U234	3.13900E-6	U235	4.43246E-5
U235	6.90000E-4	U235	1.58100E-4	U238	2.07966E-2
U236	5.49300E-6	U238	2.18000E-2	Pu238	2.86058E-6
U238	2.20000E-2	Pu239	6.38200E-4	Pu239	2.00020E-3
O16	4.64700E-2	Pu240	1.54300E-4	Pu240	4.43800E-4
WATER		Pu241	2.13300E-5	Pu241	3.69972E-5
H	6.64780E-2	Pu242	1.80100E-5	Pu242	1.25854E-5
O16	3.32390E-2	Am241	6.70600E-5	Am241	1.35274E-5
AIR		Np237	2.01200E-6	O16	4.59779E-2
O16	1.00000E-6	O16	4.57400E-2	**ZR-2**	
AG-3		**ZR-4**		Zr90	4.24800E-2
Al27	5.45700E-2	Zr90	4.25190E-2	hzrh	4.89900E-5
Mg24	1.95900E-3	Fe54	8.68300E-6	Fe54	5.58200E-6
Mn55	6.98800E-5	Fe56	1.36300E-4	Fe56	8.76300E-5
Fe56	5.47600E-5	Fe58	4.18900E-7	Fe58	2.69300E-7
Cr52	4.42200E-5	Cr52	7.59770E-5	Cr52	6.36600E-5
Ti48	2.40500E-5	O16	3.08600E-4	O16	3.08600E-4
Si28	1.09400E-4	C	4.44000E-5	C	4.44000E-5
Cu63	1.20830E-5	Hf178	1.10700E-6	Hf178	1.10700E-6

Table 9. OSMOSE Sample Compositions [10^{24} at/cm^3]

	Sample						
	Th232	**UTh**	**U234**	**URE**	**UO2**	**Np237/1**	**Np237/2**
U234		1.313E-6	1.689E-4	1.721E-5	1.389E-6	1.387E-6	1.388E-6
U235		1.580E-4	1.663E-4	9.417E-4	1.672E-4	1.669E-4	1.670E-4
U236		4.376E-7	5.124E-7	2.124E-4	4.631E-7	4.623E-7	4.626E-7
U238		2.172E-2	2.285E-2	2.235E-2	2.298E-2	2.295E-2	2.296E-2
Th232	2.354E-2	1.115E-3					
Np237						5.246E-5	3.153E-4
O16	4.710E-2	4.601E-2	4.639E-2	4.705E-2	4.632E-2	4.635E-2	4.691E-2
	Sample						
	Pu238	**Pu239**	**Pu240**	**Pu241**	**Pu242**	**Am241/1**	**Am241/2**
U234	4.835E-6	1.321E-6	1.377E-6	1.378E-6	1.341E-6	1.379E-6	1.375E-6
U235	1.645E-4	1.587E-4	1.657E-4	1.658E-4	1.614E-4	1.660E-4	1.655E-4
U236	4.567E-7	4.403E-7	4.639E-7	4.593E-7	4.470E-7	4.598E-7	4.584E-7
U238	2.261E-2	2.182E-2	2.278E-2	2.280E-2	2.219E-2	2.282E-2	2.275E-2
Th232							
Np237	4.590E-11	3.205E-12	3.390E-12	1.565E-14		1.335E-10	4.451E-10
Pu238	2.001E-4	3.618E-7	2.288E-8				
Pu239	3.520E-5	2.967E-4	1.226E-7				
Pu240	4.511E-6	6.684E-6	7.619E-5		3.917E-8		
Pu241	2.351E-7	8.110E-8	2.232E-7	5.415E-5			
Pu242	3.781E-7	3.038E-8	5.366E-8		2.447E-4		
Am241	2.589E-8	3.982E-9	6.775E-9	7.137E-9		3.043E-5	1.015E-4
O16	4.606E-2	4.458E-2	4.605E-2	4.605E-2	4.521E-2	4.606E-2	4.605E-2

Appendix B. Reactor Model Description

Table 10. ABTR Geometry and Homogenized Compositions [10^{24} at/cm^3]

	Inner Fuel	Middle Fuel	Outer Fuel	Lower Structure	Lower Reflector	Gas Plenum with Na Bond	Gas Plenum	Empty Control Rod	Control Rod Follower	Control Rod Absorber	Gas Plenum (Control Rod)	Reflector	Shield	Barrel
Na	7.148E-3	7.148E-3	7.148E-3	1.559E-2	7.148E-3	1.711E-2	7.148E-3	2.053E-2	1.105E-2	8.170E-3	8.170E-3	3.497E-3	3.857E-3	1.815E-2
Fe	1.618E-2	1.618E-2	1.618E-2	1.588E-2	4.743E-2	1.618E-2	1.618E-2	5.467E-3	2.762E-2	1.875E-2	1.875E-2	5.888E-2	2.124E-2	9.641E-3
Ni	9.976E-5	9.976E-5	9.976E-5	3.260E-3	2.924E-4	9.976E-5	9.976E-5	3.370E-5	4.582E-3	1.156E-4	1.156E-4	3.630E-4	1.309E-4	1.980E-3
Cr	2.406E-3	2.406E-3	2.406E-3	3.235E-3	7.052E-3	2.406E-3	2.406E-3	8.127E-4	5.326E-3	2.788E-3	2.788E-3	8.754E-3	3.158E-3	1.964E-3
Mn	1.066E-4	1.066E-4	1.066E-4	5.085E-4	3.124E-4	1.066E-4	1.066E-4	3.601E-5	7.453E-4	1.235E-4	1.235E-4	3.878E-4	1.399E-4	3.087E-4
Mo	5.505E-4	4.880E-4	5.530E-4	4.352E-4	3.334E-4	1.137E-4	1.137E-4	3.843E-5	6.456E-4	1.318E-4	1.318E-4	4.139E-4	1.493E-4	2.643E-4
C	-	-	-	-	-	-	-	-	-	1.422E-3	-	-	1.942E-3	-
B10	-	-	-	-	-	-	-	-	-	5.996E-3	-	-	8.191E-3	-
B11	-	-	-	-	-	-	-	-	-	2.414E-2	-	-	3.297E-2	-
Zr	3.263E-3	3.263E-3	3.263E-3											
U234	5.470E-9	4.486E-7	6.710E-9											
U235	1.443E-5	1.433E-5	1.421E-5											
U236	9.199E-7	8.718E-7	8.319E-7											
U238	9.048E-3	8.834E-3	8.643E-3											
Np237	1.718E-6	8.095E-5	1.399E-6											
Pu236	6.227E-12	4.061E-10	4.075E-12											
Pu238	4.289E-7	4.050E-5	4.418E-7											
Pu239	1.566E-3	1.053E-3	1.927E-3											
Pu240	1.673E-4	4.868E-4	2.041E-4											
Pu241	1.098E-5	1.317E-4	1.322E-5											
Pu242	7.849E-7	9.807E-5	9.224E-7											
Am241	6.357E-7	9.533E-5	9.966E-7											
Am242m	1.274E-8	2.610E-6	1.824E-8											
Am243	2.744E-8	1.952E-5	3.382E-8											
Cm242	2.107E-8	3.291E-6	2.519E-8											
Cm243	3.317E-10	1.093E-7	4.051E-10											
Cm244	2.161E-9	4.915E-6	2.474E-9											
Cm245	8.530E-11	4.372E-7	8.936E-11											
Cm246	1.168E-12	3.028E-8	1.077E-12											

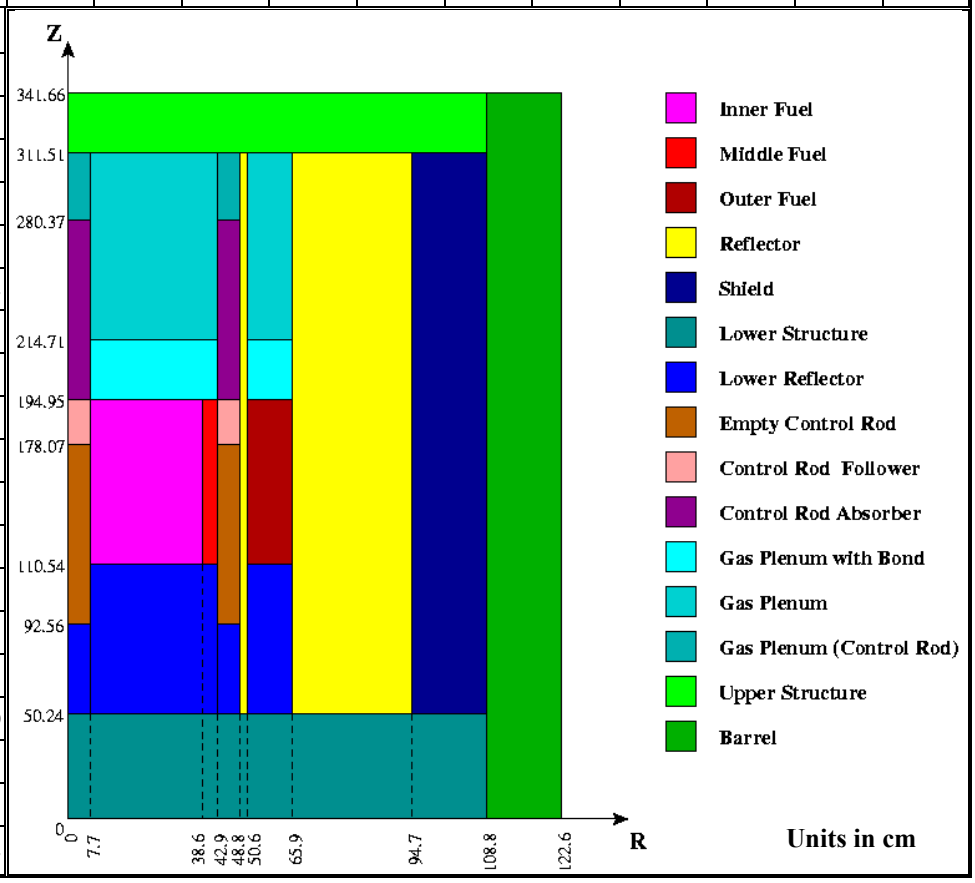
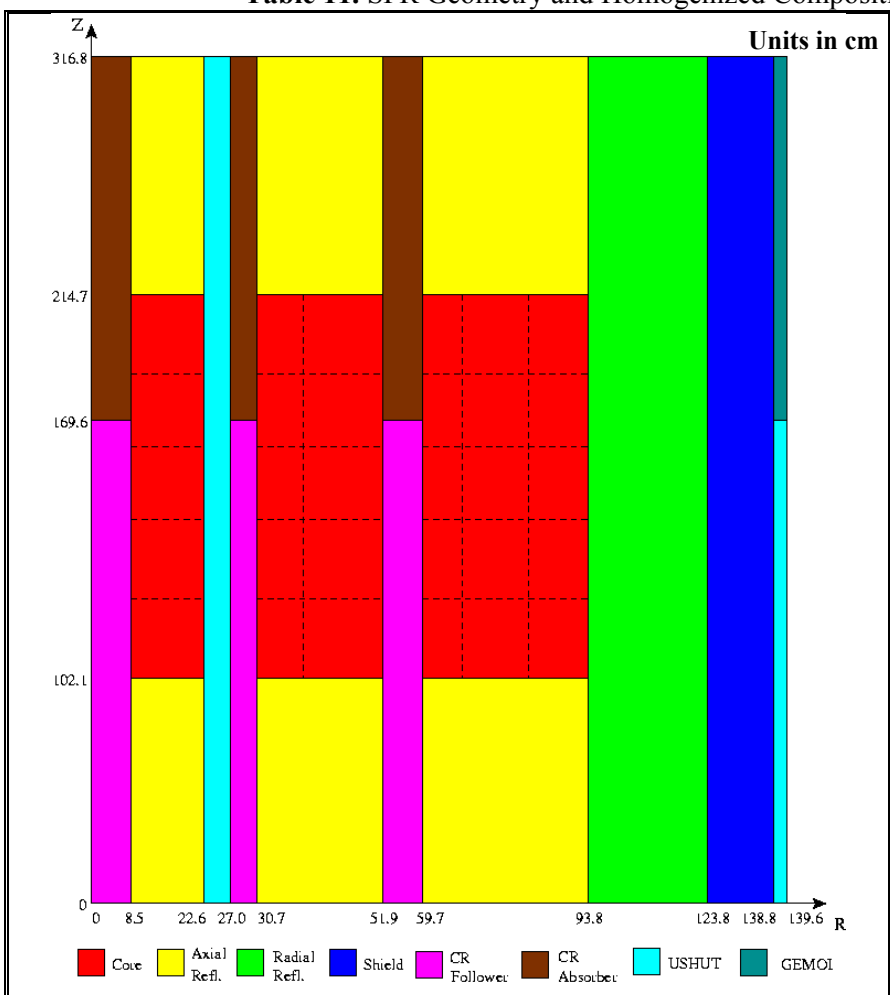


Table 11. SFR Geometry and Homogenized Compositions [10^{24} at/cm^3]

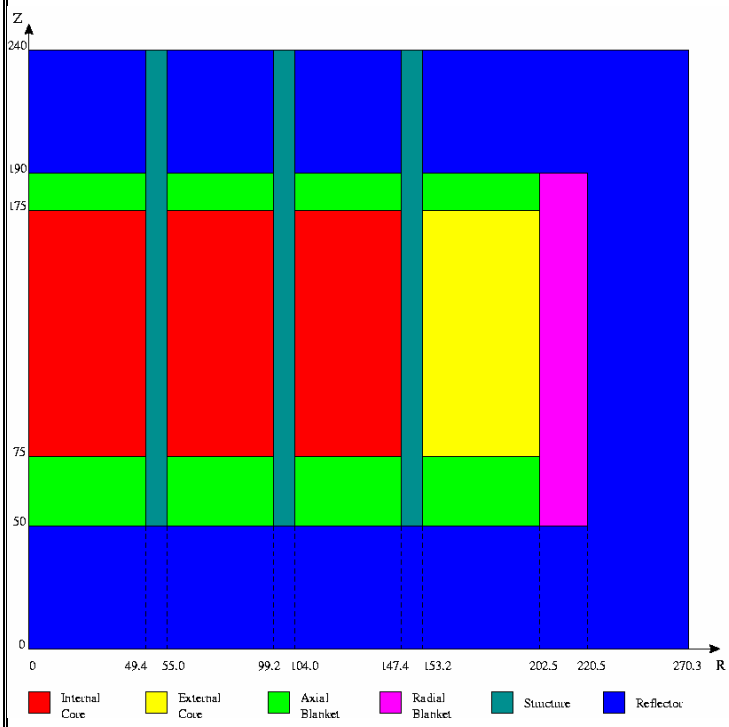


Average Fuel Compositions		
Isotope	**BOC**	**EOC**
U234	1.545E-5	1.531E-5
U235	5.030E-6	4.890E-6
U236	1.119E-5	1.109E-5
U238	1.697E-3	1.677E-3
Np237	8.626E-5	8.125E-5
Pu238	1.414E-4	1.382E-4
Pu239	7.325E-4	6.862E-4
Pu240	8.822E-4	8.589E-4
Pu241	1.610E-4	1.533E-4
Pu242	2.726E-4	2.674E-4
Am241	1.069E-4	1.019E-4
Am242m	7.408E-5	6.561E-5
Am243	9.517E-5	9.384E-5
Cm242	5.827E-6	6.134E-6
Cm243	5.688E-7	5.612E-7
Cm244	6.698E-5	6.747E-5
Cm245	1.738E-5	1.663E-5
Cm246	9.456E-6	9.336E-6
FP (*)	4.126E-4	6.631E-4
Fe	2.061E-2	2.061E-2
Cr	2.994E-3	2.994E-3
Ni	1.153E-4	1.153E-4
Mo	2.117E-4	2.117E-4
Zr	2.478E-3	2.478E-3
Na	1.099E-2	1.099E-2
Mn	2.218E-4	2.218E-4

Isotope	**Axial Refl. (Bottom)**	**Axial Refl. (Top)**	**Radial Refl.**	**Shield**	**CR Absorber**	**CR Follower**	**USHUT**	**GEM0I**
Fe	4.444E-2	1.909E-2	5.885E-2	1.789E-2	2.343E-2	2.343E-2	7.981E-3	7.981E-3
Cr	6.457E-3	2.774E-3	8.552E-3	2.599E-3	3.404E-3	3.404E-3	1.160E-3	1.160E-3
Ni	2.487E-4	1.068E-4	3.294E-4	1.001E-4	1.311E-4	1.311E-4	4.468E-5	4.468E-5
Mo	4.565E-4	1.961E-4	6.046E-4	1.837E-4	2.406E-4	2.406E-4	8.199E-5	8.199E-5
Na	8.120E-3	1.618E-2	3.635E-3	4.078E-3	6.493E-3	6.493E-3	1.968E-2	1.320E-3
Mn	4.783E-4	2.054E-4	6.335E-4	1.925E-4	2.521E-4	2.521E-4	8.591E-5	8.591E-5
B10				9.768E-3		6.326E-3		
B11				3.932E-2		2.546E-2		
C				1.227E-2		7.947E-3		

(*) Fission Products

Table 12. EFR Geometry and Homogenized Compositions [10^{24} at/cm^3]



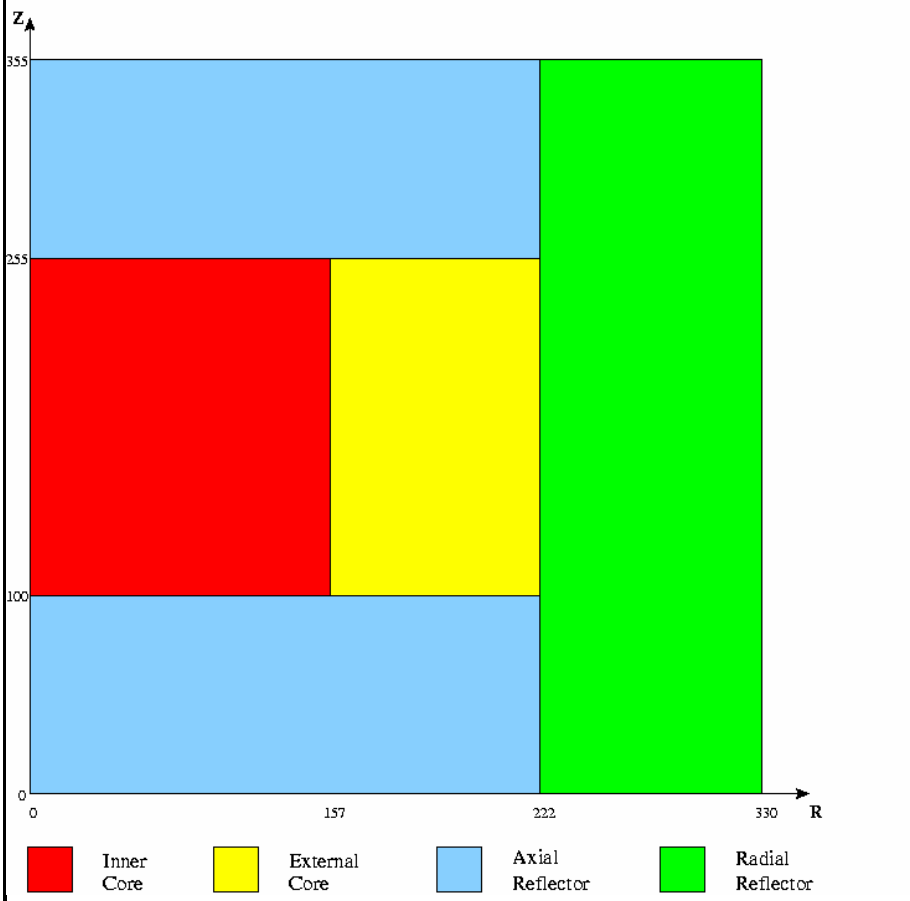
Units in cm

	Reflector	Structure		Reflector	Structure
Fe	2.759E-2	4.967E-3	Ti	1.957E-4	3.523E-5
Cr	6.536E-3	1.176E-3	Si	7.092E-4	1.277E-4
Ni	6.192E-3	1.115E-3	Mn	6.398E-4	1.152E-4
Mo	3.664E-4	6.595E-5	Na	1.093E-2	1.995E-2

	Average Fuel Compositions			
	Fuel		Blanket	
	BOC	EOC	BOC	EOC
U234	9.517E-6	7.239E-6	6.577E-8	5.542E-8
U235	5.975E-6	3.357E-6	8.748E-6	5.322E-6
U236	6.585E-6	6.347E-6	2.798E-6	3.273E-6
U238	6.613E-3	5.701E-3	9.555E-3	8.951E-3
Np237	9.356E-6	8.880E-6	1.089E-14	1.268E-6
Pu238	3.902E-5	3.561E-5	1.084E-14	2.887E-7
Pu239	1.109E-3	8.623E-4	1.079E-14	4.211E-4
Pu240	6.633E-4	6.015E-4	1.075E-14	4.081E-5
Pu241	6.598E-5	8.287E-5	1.070E-14	3.299E-6
Pu242	7.264E-5	6.870E-5	1.066E-14	1.621E-7
Am241	5.991E-5	3.354E-5	1.070E-14	2.032E-7
Am242m	2.974E-6	3.073E-6	1.066E-14	3.787E-9
Am243	1.685E-5	1.745E-5	1.062E-14	6.707E-9
Cm242	7.985E-9	2.774E-6	1.066E-14	8.353E-9
Cm243	4.087E-7	3.707E-7	1.062E-14	3.101E-10
Cm244	1.217E-5	1.554E-5	1.057E-14	8.114E-10
Cm245	2.816E-6	2.577E-6	1.053E-14	3.483E-11
Cm246	1.776E-6	1.544E-6	1.049E-14	6.773E-13
Cm247	1.893E-7	2.583E-7	1.044E-14	2.496E-14
Cm248	1.107E-7	1.587E-7	1.040E-14	1.021E-14
FP (*)	1.190E-13	2.474E-3	7.581E-14	2.764E-4
O	1.721E-2	1.721E-2	1.894E-2	1.894E-2
Fe	1.298E-2	1.298E-2	1.246E-2	1.246E-2
Cr	3.075E-3	3.075E-3	2.951E-3	2.951E-3
Ni	2.913E-3	2.913E-3	2.796E-3	2.796E-3
Mo	1.724E-4	1.724E-4	1.654E-4	1.654E-4
Ti	9.206E-5	9.206E-5	8.837E-5	8.837E-5
Si	3.336E-4	3.336E-4	3.203E-4	3.203E-4
Mn	3.010E-4	3.010E-4	2.889E-4	2.889E-4
Na	7.180E-3	7.180E-3	7.162E-3	7.162E-3

(*) Fission Products

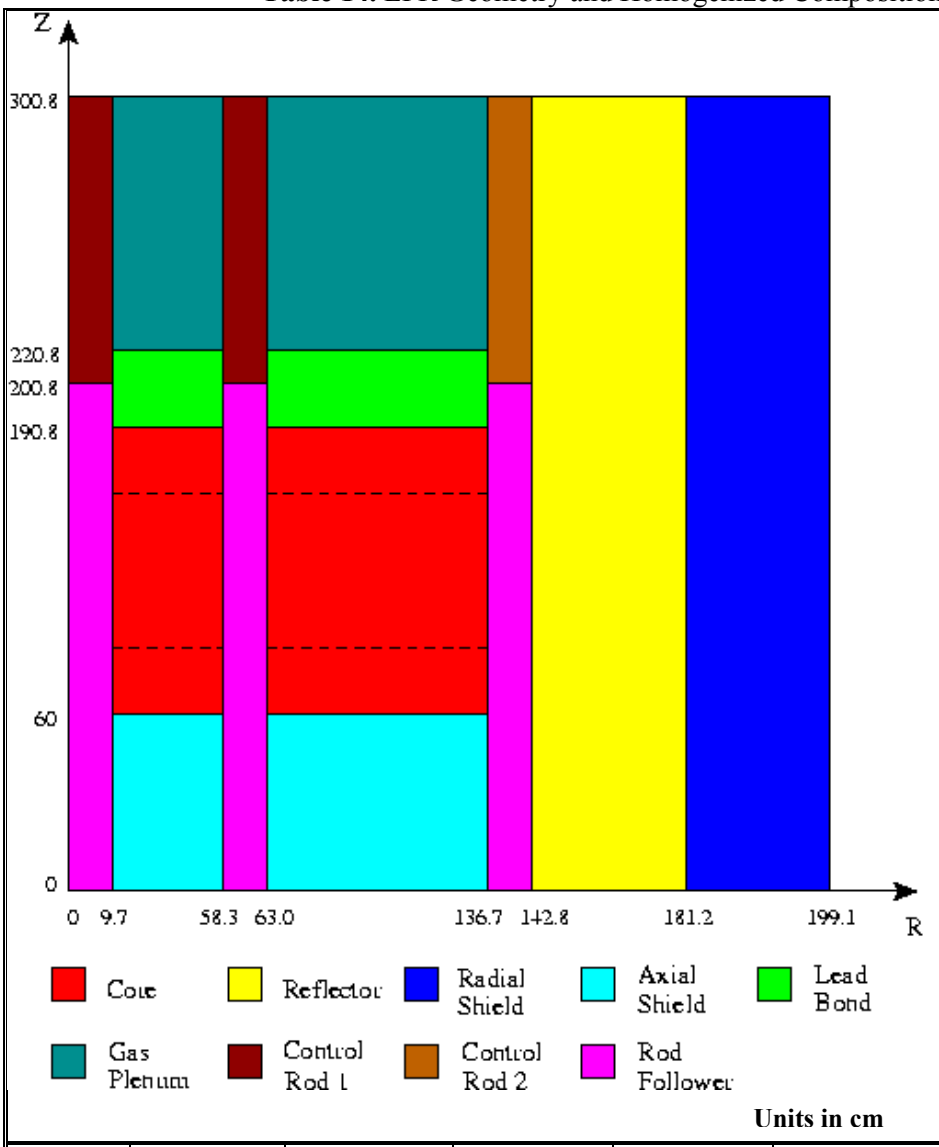
Table 13. GFR Geometry and Homogenized Compositions [10^{24} at/cm^3]



Average Fuel Compositions		
Isotope	**BOC**	**EOC**
U234	5.041E-15	3.515E-7
U235	3.323E-5	2.829E-5
U236	5.041E-15	1.163E-6
U238	4.715E-3	4.613E-3
Np237	4.939E-5	4.430E-5
Pu238	3.673E-5	4.503E-5
Pu239	4.855E-4	4.996E-4
Pu240	3.026E-4	3.031E-4
Pu241	8.362E-5	7.431E-5
Pu242	1.050E-4	1.051E-4
Am241	1.855E-4	1.640E-4
Am242m	7.007E-7	3.486E-6
Am243	4.597E-5	4.379E-5
Cm242	5.041E-8	7.094E-6
Cm243	2.067E-7	3.045E-7
Cm244	1.504E-5	1.829E-5
Cm245	3.680E-6	3.571E-6
Cm246	2.823E-7	3.450E-7
FP (*)	3.041E-14	2.147E-4
He4	2.140E-4	2.140E-4
Si	1.218E-2	1.218E-2
C	1.824E-2	1.824E-2
	Axial Refl.	**Radial Refl.**
Si	1.252E-2	1.252E-2
He4	2.140E-4	2.140E-4
Zr	1.878E-2	1.878E-2

(*) Fission Products

Table 14. LFR Geometry and Homogenized Compositions [10^{24} at/cm^3]



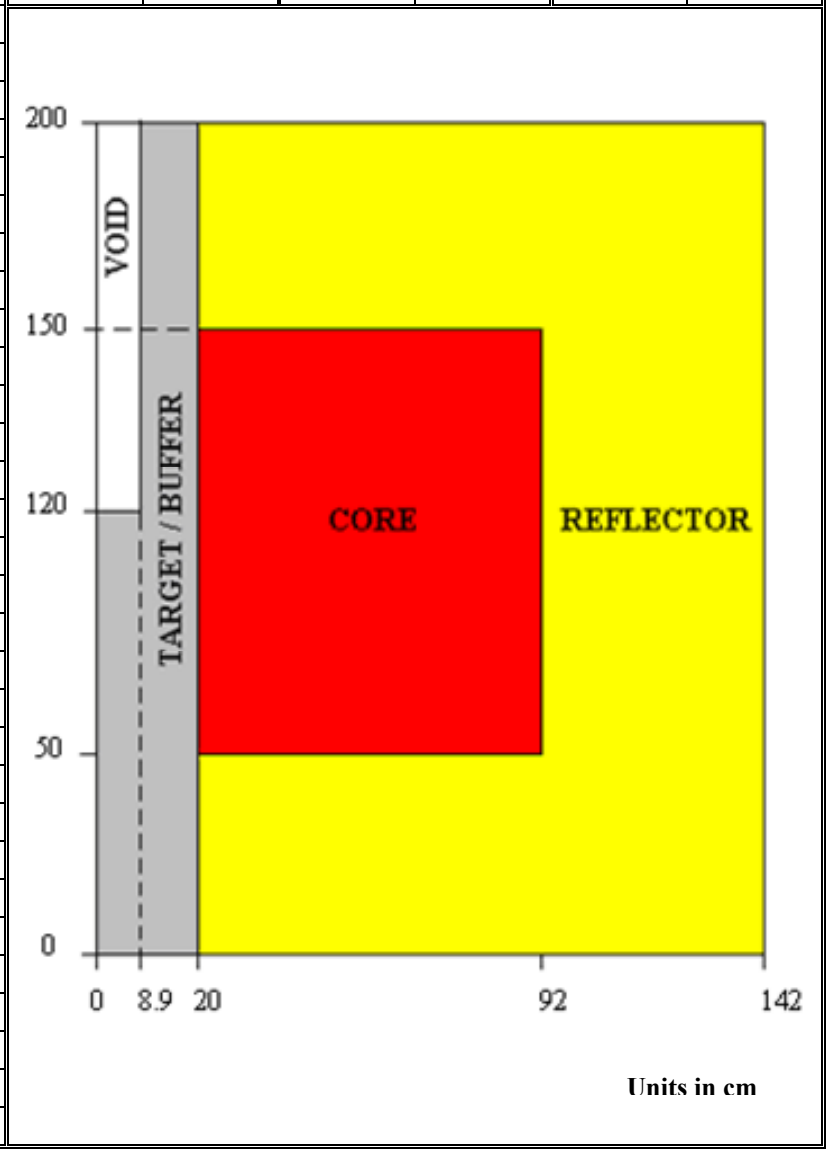
Average Fuel Compositions		
Isotope	**BOC**	**EOC**
U234	1.035E-5	1.025E-5
U235	7.754E-6	7.182E-6
U236	2.698E-5	2.659E-5
U238	4.686E-3	4.623E-3
Np237	3.436E-5	3.251E-5
Pu238	5.432E-5	5.380E-5
Pu239	6.332E-4	6.181E-4
Pu240	4.592E-4	4.501E-4
Pu241	5.229E-5	5.183E-5
Pu242	8.888E-5	8.751E-5
Am241	5.521E-5	5.203E-5
Am242m	3.702E-6	3.701E-6
Am243	2.652E-5	2.608E-5
Cm242	1.675E-6	2.150E-6
Cm243	1.338E-7	1.398E-7
Cm244	1.722E-5	1.754E-5
Cm245	5.066E-6	4.769E-6
Cm246	2.938E-6	2.910E-6
FP (*)	2.223E-4	4.136E-4
Zr	3.830E-3	3.830E-3
Pb	1.674E-2	1.674E-2
Fe	8.632E-3	8.632E-3
Ni	4.831E-5	4.831E-5
Cr	1.254E-3	1.254E-3
Mo	8.867E-5	8.867E-5
Mn55	9.291E-5	9.291E-5
B10	2.019E-4	2.019E-4
B11	2.172E-4	2.172E-4
C	1.217E-4	1.217E-4
Li7	6.782E-5	6.782E-5

Isotope	Reflector	Rad. Schield	Ax. Shield	Gas Plenum	Lead Bond	CR1	CR2	Follower
Pb	2.755E-2	3.841E-3	1.674E-2	1.674E-2	2.729E-2	1.248E-2	1.248E-2	2.755E-2
Fe	8.020E-3	6.270E-2	2.863E-2	8.632E-3	8.632E-3	2.184E-2	2.184E-2	8.020E-3
Ni	4.489E-5	3.509E-4	1.602E-4	4.831E-5	4.831E-5	1.222E-4	1.222E-4	4.489E-5
Cr	1.166E-3	9.111E-3	4.160E-3	1.254E-3	1.254E-3	3.173E-3	3.173E-3	1.165E-3
Mo	8.239E-5	6.441E-4	2.941E-4	8.867E-5	8.867E-5	2.243E-4	2.243E-4	8.239E-5
Mn55	8.633E-5	6.749E-4	3.081E-4	9.291E-5	9.291E-5	2.351E-4	2.351E-4	8.633E-5
B10						4.787E-3	1.082E-2	
B11						1.927E-2	1.323E-2	
C						6.014E-3	6.014E-3	

(*) Fission Products

Table 15. ADMAB Geometry and Homogenized Compositions [10^{24} at/cm^3]

	Fuel		Reflector		Reflector		Reflector	
	BOC	**EOC**						
Np237	4.377E-4	3.971E-4	**Fe54**	2.990E-3	**Ni58**	1.977E-4	**Bi**	5.039E-3
Pu238	4.226E-5	9.415E-5	**Fe56**	4.560E-2	**Ni60**	7.305E-5	**W182**	2.140E-5
Pu239	5.051E-4	4.451E-4	**Fe57**	1.075E-3	**Ni61**	3.111E-6	**W183**	1.155E-5
Pu240	2.321E-4	2.399E-4	**Fe58**	1.344E-4	**Ni62**	9.724E-6	**W184**	2.465E-5
Pu241	1.232E-4	1.051E-4	**Cr50**	3.458E-4	**Ni64**	2.388E-6	**W186**	2.280E-5
Pu242	9.102E-5	1.006E-4	**Cr52**	6.422E-3	**Mo**	3.565E-4	**Target/Buffer**	
Am241	8.084E-4	7.220E-4	**Cr53**	7.134E-4	**Mn**	3.412E-4	**Pb**	1.320E-2
Am242m	1.089E-5	1.923E-5	**Cr54**	1.741E-4	**Pb**	4.075E-3	**Bi**	1.632E-2
Am243	5.827E-4	5.303E-4						
Cm242	4.079E-8	2.686E-5						
Cm243	3.326E-6	3.141E-6						
Cm244	2.371E-4	2.599E-4						
Cm245	3.164E-5	3.314E-5						
Cm246	5.355E-7	1.032E-6						
Zr	7.477E-3	7.477E-3						
N15	1.058E-2	1.058E-2						
Fe54	9.759E-4	9.759E-4						
Fe56	1.488E-2	1.488E-2						
Fe57	3.507E-4	3.507E-4						
Fe58	4.386E-5	4.386E-5						
Cr50	1.128E-4	1.128E-4						
Cr52	2.096E-3	2.096E-3						
Cr53	2.328E-4	2.328E-4						
Cr54	5.682E-5	5.682E-5						
Ni58	6.451E-5	6.451E-5						
Ni60	2.384E-5	2.384E-5						
Ni61	1.015E-6	1.015E-6						
Ni62	3.173E-6	3.173E-6						
Ni64	7.792E-7	7.792E-7						
Mo	1.163E-4	1.163E-4						
Mn	1.114E-4	1.114E-4						
Pb	6.360E-3	6.360E-3						
Bi	7.865E-3	7.865E-3						
W182	6.984E-6	6.984E-6						
W183	3.770E-6	3.770E-6						
W184	8.045E-6	8.045E-6						
W186	7.439E-6	7.439E-6						
FP (*)	-	2.636E-4						

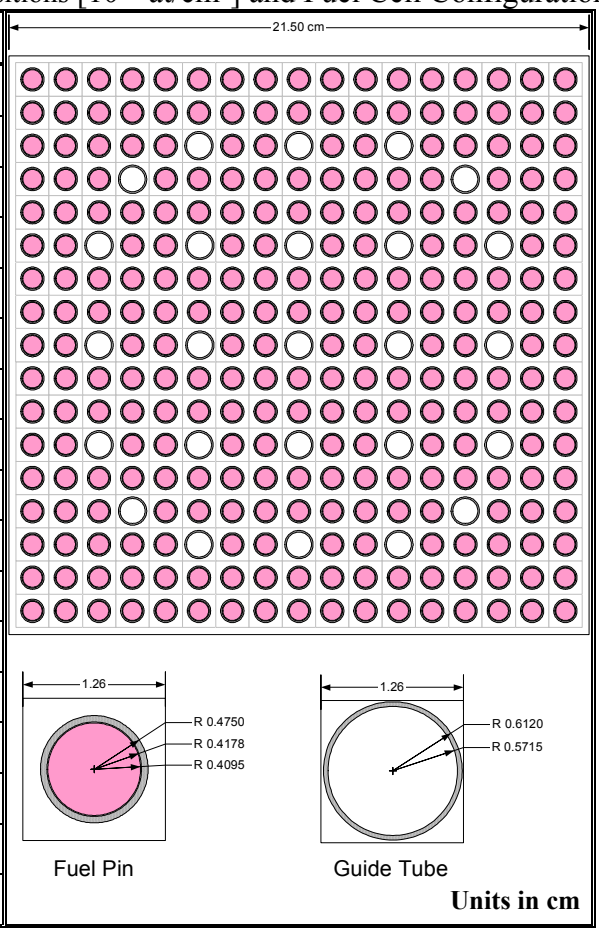


(*) Fission Products

Table 16. PWR Homogenized Compositions [10^{24} at/cm^3] and Fuel Cell Configuration

	BOC	EOC
U233	3.00874E-20	1.11230E-12
U234	3.00874E-20	1.33133E-07
U235	5.72117E-04	6.39785E-05
U236	3.00874E-20	8.30524E-05
U237	3.00874E-20	1.13755E-07
U238	6.15867E-03	5.75867E-03
Np237	3.00874E-20	9.53439E-06
Np239	3.00874E-20	5.80481E-07
Pu238	3.00874E-20	7.04225E-06
Pu239	3.00874E-20	5.06995E-05
Pu240	3.00874E-20	2.52296E-05
Pu241	3.00874E-20	1.70583E-05
Pu242	3.00874E-20	1.04317E-05
O	2.74355E-02	2.74355E-02
H	2.79357E-02	2.79357E-02
Zr	4.28183E-03	4.28183E-03
FP (*)	2.70787E-18	2.34418E-03

(*) Fission Products



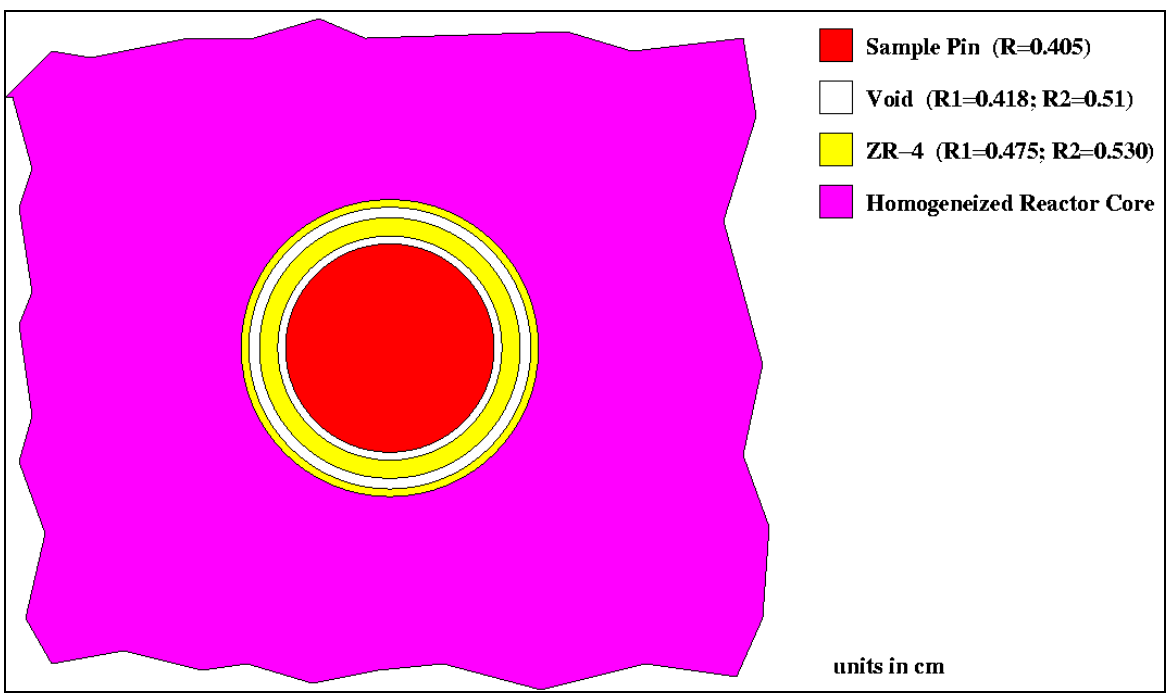


Figure 35: Reactor Sample Model (see **Tables 8** and **9** for the Compositions)

Appendix C. Investigation on Solutions Adopted for the Calculations

The presence of the samples in the OSMOSE calculation model does not affect the flux spectrum at the core center of the MINERVE cores.

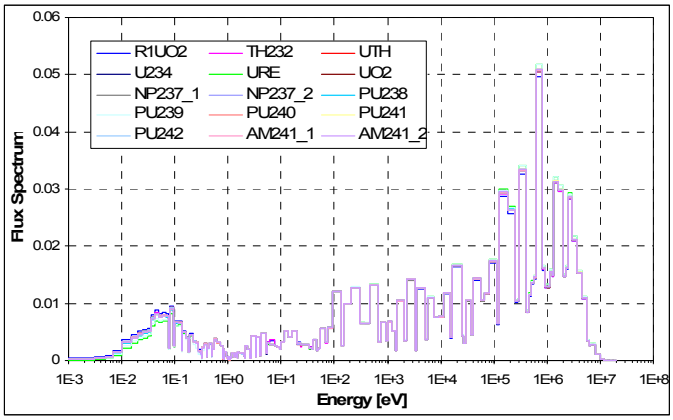


Figure 36: Impact on the Direct Flux Spectrum if Sample is in Place (R1-UO_2 → No Sample in Place)

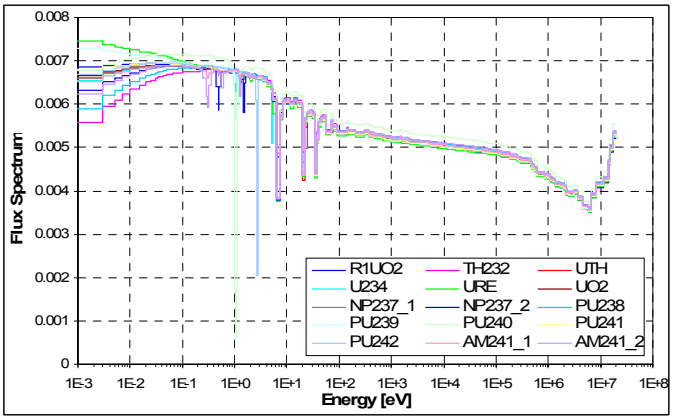


Figure 37: Impact on the Adjoint Flux Spectrum if Sample is in Place (R1-UO_2 → No Sample in Place)

In the OSMOSE configurations, the parameters η obtained by using the fluxes calculated with or without the sample in place do not show a significant difference.

Table 17. Calculated η for OSMOSE R1-UO_2

Sample	no sample in place (A)	sample in place (B)	(A-B)/A %
Th232	0.0430	0.0447	-3.9
UTh	0.7559	0.7769	-2.8
U234	0.7547	0.7798	-3.3
URE	1.5135	1.4697	2.9
UO_2	0.8216	0.8437	-2.7
Np237_1	0.7801	0.7987	-2.4
Np237_2	0.6269	0.6410	-2.3
Pu238	0.8126	0.8245	-1.5
Pu239	1.4412	1.4043	2.6
Pu240	0.5471	0.6772	-23.8
Pu241	1.1015	1.1129	-1.0
Pu242	0.6997	0.7713	-10.2
Am241_1	0.7373	0.7524	-2.0
Am241_2	0.5973	0.6095	-2.0

Appendix D. k_{eff} Sensitivity Coefficients

Table 18. k_{eff} R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	0.4	0.5	-	0.1	0.1	1.1
2	**6.07**	-0.2	2.7	3.9	1.8	1.3	-	9.5
3	**2.23**	-0.1	1.4	2.2	1.8	0.5	-	5.9
4	**1.35**	-0.5	0.3	0.5	5.1	0.3	-	5.8
5	**4.98e-1**	-0.4	0.1	0.2	2.6	-	-	2.7
6	**1.83e-1**	-0.3	0.1	0.2	1.6	-	-	1.6
7	**6.74e-2**	-0.5	0.1	0.2	1.4	-	-	1.1
8	**2.48e-2**	-0.7	0.1	0.2	1.4	-	-	1.0
9	**9.12e-3**	-1.4	0.2	0.4	2.2	-	-	1.5
10	**2.04e-3**	-2.0	0.4	0.8	2.6	-	-	1.9
11	**4.54e-4**	-7.5	2.0	4.4	7.3	-	-	6.2
12	**2.26e-5**	-8.5	1.1	2.8	8.3	-	-	3.7
13	**4.00e-6**	-2.0	1.2	3.5	2.0	-	-	4.7
14	**5.40e-7**	-5.6	5.5	17.1	1.0	-	-	18.0
15	**1.00e-7**	-18.9	19.8	63.1	-0.1	-	-	63.9
Total		-48.6	35.3	100.0	39.3	2.3	0.1	128.4

Table 19. k_{eff} R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	0.4	0.5	-	0.1	0.1	1.0
2	**6.07**	-0.2	2.5	3.7	2.2	1.4	-	9.5
3	**2.23**	-0.1	1.3	2.1	2.1	0.5	-	5.9
4	**1.35**	-0.5	0.3	0.4	5.3	0.3	-	5.9
5	**4.98e-1**	-0.3	0.1	0.2	2.7	-	-	2.7
6	**1.83e-1**	-0.3	0.1	0.2	1.6	-	-	1.6
7	**6.74e-2**	-0.5	0.1	0.1	1.3	-	-	1.1
8	**2.48e-2**	-0.6	0.1	0.2	1.3	-	-	1.0
9	**9.12e-3**	-1.2	0.2	0.4	2.1	-	-	1.4
10	**2.04e-3**	-1.7	0.3	0.7	2.4	-	-	1.8
11	**4.54e-4**	-6.6	1.7	3.8	6.7	-	-	5.6
12	**2.26e-5**	-7.6	1.0	2.4	7.5	-	-	3.4
13	**4.00e-6**	-1.8	1.1	3.1	1.9	-	-	4.3
14	**5.40e-7**	-5.3	5.4	15.9	0.9	-	-	16.8
15	**1.00e-7**	-20.8	21.9	66.3	-0.1	-	-	67.3
Total		-47.6	36.3	100.0	38.0	2.4	0.1	129.3

Table 20. k_{eff} R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-0.2	-	-	-	-	-	-0.2
U235	-13.0	31.1	93.6	-	-	-	111.8
U236	-0.1	-	-	-	-	-	-0.1
U238	-28.0	4.2	6.4	-	1.7	0.1	-15.5
Zr90	-0.1	-	-	0.1	0.3	-	0.2
O16	-0.3	-	-	1.4	-	-	1.1
H	-5.8	-	-	37.6	-	-	31.8
Al27	-1.0	-	-	0.2	0.2	-	-0.7
Mn55	-0.1	-	-	-	-	-	-0.1
Total	-48.6	35.3	100.0	39.3	2.3	0.1	128.4

Table 21. k_{eff} R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-0.2	-	-	-	-	-	-0.1
U235	-12.5	32.4	94.0	-	-	-	114.0
U236	-0.1	-	-	-	-	-	-0.1
U238	-25.8	4.0	5.9	-	1.8	0.1	-14.0
Zr90	-0.1	-	-	0.1	0.3	-	0.3
O16	-0.3	-	-	1.4	-	-	1.1
H	-7.5	-	-	36.4	-	-	28.8
Al27	-1.0	-	-	0.2	0.2	-	-0.6
Mn55	-0.1	-	-	-	-	-	-0.1
Total	-47.6	36.3	100.0	38.0	2.4	0.1	129.3

Table 22. k_{eff} R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	0.5	0.8	-0.1	-	0.1	1.2
2	**6.07**	-0.3	3.2	4.9	0.3	0.3	-	8.4
3	**2.23**	-0.1	1.7	2.8	0.4	0.1	-	4.9
4	**1.35**	-0.5	0.7	1.0	2.6	0.2	-	3.9
5	**4.98e-1**	-0.4	0.3	0.4	1.4	-	-	1.7
6	**1.83e-1**	-0.4	0.2	0.3	0.9	-	-	1.0
7	**6.74e-2**	-0.5	0.1	0.2	0.9	-	-	0.7
8	**2.48e-2**	-0.7	0.1	0.2	0.9	-	-	0.6
9	**9.12e-3**	-1.4	0.3	0.5	1.7	-	-	1.0
10	**2.04e-3**	-2.1	0.6	1.0	2.0	-	-	1.5
11	**4.54e-4**	-8.5	3.4	5.7	6.0	-	-	6.7
12	**2.26e-5**	-8.8	3.4	6.2	5.8	-	-	6.7
13	**4.00e-6**	-11.3	1.8	3.5	10.0	-	-	4.0
14	**5.40e-7**	-15.8	14.8	34.5	1.2	-	-	34.7
15	**1.00e-7**	-15.3	15.5	38.1	-	-	-	38.3
Total		-66.3	46.5	100.0	34.2	0.6	0.1	115.0

Table 23. k_{eff} MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.2	0.7	1.0	-0.1	-0.1	0.1	1.5
2	**6.07**	-0.4	4.7	7.1	0.1	0.1	-	11.5
3	**2.23**	-0.2	2.7	4.1	0.1	0.1	-	6.7
4	**1.35**	-0.6	2.0	2.9	2.4	0.2	-	6.8
5	**4.98e-1**	-0.5	0.9	1.5	1.3	-	-	3.2
6	**1.83e-1**	-0.5	0.6	0.9	0.9	-	-	1.9
7	**6.74e-2**	-0.7	0.4	0.7	0.8	-	-	1.3
8	**2.48e-2**	-0.9	0.4	0.6	1.0	-	-	1.2
9	**9.12e-3**	-1.9	0.8	1.4	1.7	-	-	2.0
10	**2.04e-3**	-3.1	1.7	2.8	1.9	-	-	3.4
11	**4.54e-4**	-11.3	8.3	14.0	3.9	-	-	14.9
12	**2.26e-5**	-9.0	6.5	11.7	2.8	-	-	12.1
13	**4.00e-6**	-10.8	3.3	6.4	7.8	-	-	6.7
14	**5.40e-7**	-12.0	11.4	28.1	0.7	-	-	28.2
15	**1.00e-7**	-6.3	6.3	16.7	-	-	-	16.7
Total		-58.3	50.9	100.0	25.2	0.3	0.1	118.2

Table 24. k_{eff} R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-0.1	-	-	-	-	-	-0.1
U235	-1.5	3.6	9.5	-	-	-	11.7
U238	-21.2	4.6	7.2	-	0.5	0.1	-8.9
Np237	-0.1	-	-	-	-	-	-0.1
Pu239	-22.2	36.2	79.4	-	-	-	93.4
Pu240	-10.3	0.2	0.3	-	-	-	-9.8
Pu241	-0.6	1.6	3.3	-	-	-	4.3
Pu242	-0.6	-	-	-	-	-	-0.5
Am241	-6.5	0.2	0.2	-	-	-	-6.1
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-0.2	-	-	0.1	0.1	-	-0.1
O16	-0.4	-	-	0.5	-	-	0.1
H	-2.6	-	-	33.6	-	-	31.0
Total	-66.3	46.5	100.0	34.2	0.6	0.1	115.0

Table 25. k_{eff} MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-0.3	0.6	1.2	-	-	-	1.6
U238	-18.8	5.3	8.2	-	0.3	0.1	-4.9
Np237	-	-	-	-	-	-	-
Pu239	-23.0	42.8	86.8	-	-	-	106.6
Pu240	-11.5	0.8	1.1	-	-	-	-9.7
Pu241	-0.4	1.4	2.5	-	-	-	3.5
Pu242	-0.4	-	-	-	-	-	-0.3
Am241	-0.7	-	-	-	-	-	-0.6
Fe56	-1.4	-	-	-	-	-	-1.4
Cr52	-0.1	-	-	-	-	-	-0.1
Ni58	-0.4	-	-	-	-	-	-0.4
Zr90	-	-	-	-	-	-	-
O16	-0.4	-	-	0.3	-	-	-0.1
H	-0.8	-	-	24.9	-	-	24.1
Total	-58.3	50.9	100.0	25.2	0.3	0.1	118.2

Table 26. k_{eff} ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	0.9	1.4	-	-0.3	0.1	2.0
2	**6.07**	-0.1	7.2	11.4	0.8	-2.9	-	16.3
3	**2.23**	-0.3	6.3	9.9	0.6	-2.2	-	14.2
4	**1.35**	-2.4	12.1	17.6	3.9	-1.1	-	30.2
5	**4.98e-1**	-4.1	16.0	22.8	4.5	-0.2	-	39.1
6	**1.83e-1**	-4.4	12.5	17.4	2.2	-0.4	-	27.2
7	**6.74e-2**	-3.6	6.3	8.4	0.2	-	-	11.4
8	**2.48e-2**	-3.2	4.3	5.7	0.8	-	-	7.6
9	**9.12e-3**	-1.3	1.3	1.8	0.1	-	-	2.0
10	**2.04e-3**	-1.9	1.7	2.5	0.1	-	-	2.4
11	**4.54e-4**	-0.6	0.5	0.8	-0.4	-	-	0.4
12	**2.26e-5**	-0.1	0.1	0.1	-0.1	-	-	-
13	**4.00e-6**	-	-	-	-0.1	-	-	-
14	**5.40e-7**	-	-	-	-	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-22.0	69.4	100.0	12.5	-7.2	0.1	152.8

Table 27. k_{eff} SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	0.7	1.0	-	-0.2	-	1.5
2	**6.07**	-0.1	6.4	9.8	0.8	-2.1	-	14.7
3	**2.23**	-0.3	7.0	10.8	0.8	-2.4	-	15.8
4	**1.35**	-1.5	15.1	22.1	1.5	-3.1	-	34.1
5	**4.98e-1**	-3.1	13.7	19.0	2.4	-0.1	-	31.9
6	**1.83e-1**	-4.0	10.8	14.6	1.7	-0.1	-	23.1
7	**6.74e-2**	-3.3	5.8	7.8	0.1	-	-	10.5
8	**2.48e-2**	-3.3	5.0	6.6	0.7	-	-	9.0
9	**9.12e-3**	-1.5	1.9	2.6	-0.1	-	-	2.9
10	**2.04e-3**	-3.0	3.1	4.3	-	-	-	4.5
11	**4.54e-4**	-0.8	0.8	1.2	-0.4	-	-	0.7
12	**2.26e-5**	-0.1	0.1	0.2	-0.2	-	-	-
13	**4.00e-6**	-	-	-	-	-	-	-
14	**5.40e-7**	-	-	-	-	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-21.2	70.4	100.0	7.3	-8.0	-	148.6

Table 28. k_{eff} ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	0.4	0.6	-	-	-	0.9
U238	-14.5	7.4	12.3	3.0	-4.4	0.1	3.9
Np237	-0.1	0.1	0.1	-	-	-	0.1
Pu238	-	0.1	0.2	-	-	-	0.3
Pu239	-4.0	58.1	82.2	0.5	-0.3	-	136.5
Pu240	-0.6	2.0	2.9	0.1	-0.1	-	4.2
Pu241	-0.1	1.1	1.6	-	-	-	2.6
Pu242	-	0.1	0.1	-	-	-	0.1
Am241	-0.1	0.1	0.1	-	-	-	0.1
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm243	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Cm246	-	-	-	-	-	-	-
Fe56	-1.4	-	-	4.9	-1.6	-	1.9
Cr52	-0.2	-	-	1.2	-0.2	-	0.9
Ni58	-0.1	-	-	0.1	-	-	0.1
Zr90	-0.1	-	-	0.5	-0.2	-	0.2
Na23	-0.1	-	-	2.1	-0.5	-	1.5
C	-	-	-	-	-	-	-
B10	-0.5	-	-	-	-	-	-0.5
Mn55	-0.1	-	-	0.1	-	-	-
Total	-22.0	69.4	100.0	12.5	-7.2	0.1	152.8

Table 29. k_{eff} SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-0.1	0.1	0.2	-	-	-	0.2
U235	-	0.2	0.3	-	-	-	0.4
U238	-4.0	1.7	2.9	0.5	-1.5	-	-0.3
Np237	-0.9	0.7	1.2	-	-0.1	-	1.0
Pu238	-0.6	4.5	6.4	-	-	-	10.3
Pu239	-2.4	31.0	43.7	0.2	-0.2	-	72.3
Pu240	-3.1	9.8	14.6	0.3	-0.4	-	21.2
Pu241	-0.6	9.2	12.8	-	-0.1	-	21.5
Pu242	-0.9	2.3	3.4	0.1	-0.1	-	4.8
Am241	-1.4	1.0	1.5	-	-0.1	-	1.1
Am242m	-0.3	6.2	8.3	-	-0.1	-	14.2
Am243	-1.1	0.7	1.0	-	-0.1	-	0.5
Cm242	-	0.1	0.2	-	-	-	0.3
Cm243	-	0.1	0.1	-	-	-	0.1
Cm244	-0.4	1.0	1.4	-	-	-	2.0
Cm245	-0.1	1.4	1.9	-	-	-	3.2
Cm246	-	0.1	0.2	-	-	-	0.2
Fe56	-1.9	-	-	4.3	-3.4	-	-1.0
Cr52	-0.3	-	-	1.2	-0.3	-	0.6
Ni58	-0.1	-	-	0.1	-	-	-
Zr90	-0.1	-	-	0.3	-0.2	-	-
Na23	-0.2	-	-	0.3	-1.2	-	-1.1
C	-	-	-	-0.2	-	-	-0.2
B10	-2.5	-	-	-0.1	-	-	-2.6
Mn55	-0.2	-	-	0.2	-0.1	-	-
Total	-21.2	70.4	100.0	7.3	-8.0	-	148.6

Table 30. k_{eff} EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	0.8	1.3	-	-0.3	0.1	1.6
2	**6.07**	-0.7	7.2	11.9	0.5	-3.8	-	15.1
3	**2.23**	-0.4	6.1	9.9	-0.3	-2.8	-	12.5
4	**1.35**	-2.1	10.6	15.9	-0.6	-2.2	-	21.6
5	**4.98e-1**	-2.9	10.0	14.3	-1.8	-0.4	-	19.3
6	**1.83e-1**	-4.3	10.6	14.7	-1.7	-0.5	-	18.8
7	**6.74e-2**	-5.0	7.6	10.1	-0.6	-	-	12.1
8	**2.48e-2**	-5.0	5.8	7.6	0.3	-	-	8.6
9	**9.12e-3**	-4.1	4.1	5.4	0.4	-	-	5.7
10	**2.04e-3**	-5.8	5.4	7.4	0.5	-	-	7.5
11	**4.54e-4**	-1.1	1.0	1.4	-	-	-	1.3
12	**2.26e-5**	-	-	-	-	-	-	-
13	**4.00e-6**	-	-	-	-	-	-	-
14	**5.40e-7**	-	-	-	-	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-31.8	69.2	100.0	-3.3	-10.0	0.1	124.1

Table 31. k_{eff} GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.4	1.0	1.7	-	-0.4	-	2.0
2	**6.07**	-0.1	8.6	13.9	-0.3	-5.4	-	16.7
3	**2.23**	-0.4	7.7	12.0	-1.8	-3.5	-	14.1
4	**1.35**	-1.8	10.4	14.5	-3.6	-1.9	-	17.6
5	**4.98e-1**	-2.2	7.2	9.6	-2.8	-0.3	-	11.6
6	**1.83e-1**	-3.9	8.3	10.8	-2.0	-0.3	-	12.9
7	**6.74e-2**	-5.3	7.1	9.1	-0.4	-	-	10.5
8	**2.48e-2**	-6.0	6.2	7.9	0.8	-	-	8.9
9	**9.12e-3**	-8.4	8.0	10.4	1.4	-	-	11.4
10	**2.04e-3**	-5.8	5.5	7.3	0.6	-	-	7.6
11	**4.54e-4**	-2.0	1.9	2.6	0.2	-	-	2.7
12	**2.26e-5**	-	-	0.1	-	-	-	0.1
13	**4.00e-6**	0.2	-	-	-0.2	-	-	-
14	**5.40e-7**	0.4	-0.3	0.1	-0.2	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-35.5	71.8	100.0	-8.4	-11.6	-	116.2

Table 32. k_{eff} EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	0.1	0.1	-	-	-	0.1
U235	-	0.3	0.4	-	-	-	0.6
U238	-18.6	6.0	10.5	1.5	-5.7	0.1	-6.4
Np237	-0.1	0.1	0.1	-	-	-	-
Pu238	-0.2	1.2	1.7	-	-	-	2.8
Pu239	-5.0	49.2	69.2	0.1	-0.4	-	113.1
Pu240	-2.9	6.3	9.5	0.1	-0.3	-	12.6
Pu241	-0.3	4.2	5.8	-	-	-	9.8
Pu242	-0.3	0.5	0.8	-	-	-	0.9
Am241	-1.0	0.5	0.7	-	-	-	0.2
Am242m	-	0.3	0.4	-	-	-	0.6
Am243	-0.2	0.1	0.1	-	-	-	-
Cm243	-	-	0.1	-	-	-	0.1
Cm244	-0.1	0.2	0.2	-	-	-	0.3
Cm245	-	0.3	0.3	-	-	-	0.6
Fe56	-1.1	-	-	0.2	-1.9	-	-2.7
Cr52	-0.2	-	-	0.1	-0.3	-	-0.5
Ni58	-0.9	-	-	0.1	-0.2	-	-1.1
Zr90	-	-	-	-	-	-	-
Na23	-0.2	-	-	-0.9	-0.8	-	-1.9
O16	-0.3	-	-	-4.5	-	-	-4.9
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-	-	-	-0.1
Mn55	-0.1	-	-	0.1	-0.1	-	-0.1
Total	-31.8	69.2	100.0	-3.3	-10.0	0.1	124.1

Table 33. k_{eff} GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-0.3	2.4	3.4	-	-	-	5.5
U238	-19.5	7.8	13.1	0.5	-8.8	-	-6.9
Np237	-1.2	0.7	1.0	-	-0.1	-	0.4
Pu238	-0.3	2.0	2.8	-	-	-	4.5
Pu239	-4.2	38.1	51.4	0.1	-0.3	-	85.0
Pu240	-2.3	5.0	7.2	-	-0.3	-	9.7
Pu241	-0.6	10.0	13.2	-	-0.1	-	22.4
Pu242	-0.8	1.3	1.9	-	-0.1	-	2.3
Am241	-5.1	2.8	4.0	-	-0.2	-	1.5
Am242m	-	0.1	0.2	-	-	-	0.3
Am243	-1.1	0.5	0.7	-	-0.1	-	0.1
Cm243	-	-	-	-	-	-	0.1
Cm244	-0.2	0.3	0.5	-	-	-	0.6
Cm245	-	0.6	0.8	-	-	-	1.4
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	0.1	-	-	0.8	-	-	0.9
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	0.5	-	-	-8.0	-0.2	-	-7.7
He4	-	-	-	-0.3	-	-	-0.3
Si28	-0.4	-	-	-1.6	-1.3	-	-3.3
Mn55	-	-	-	-	-	-	-
Total	-35.5	71.8	100.0	-8.4	-11.6	-	116.2

Table 34. k_{eff} LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	0.6	0.8	-	-0.4	0.1	1.1
2	**6.07**	-0.2	5.5	8.5	0.5	-3.6	-	10.8
3	**2.23**	-0.4	6.3	10.0	0.4	-3.6	-	12.8
4	**1.35**	-3.6	15.5	22.7	2.0	-4.7	-	31.9
5	**4.98e-1**	-6.4	16.6	22.8	0.2	-1.1	-	32.2
6	**1.83e-1**	-6.4	12.5	16.3	-0.9	-0.8	-	20.6
7	**6.74e-2**	-5.1	7.5	9.3	-0.5	-0.1	-	11.0
8	**2.48e-2**	-4.0	4.9	5.9	0.1	-	-	6.8
9	**9.12e-3**	-1.8	2.0	2.5	-	-	-	2.6
10	**2.04e-3**	-0.7	0.6	0.8	-	-	-	0.7
11	**4.54e-4**	-0.3	0.2	0.3	-0.2	-	-	0.1
12	**2.26e-5**	-	-	0.1	-0.1	-	-	-
13	**4.00e-6**	-	-	-	-	-	-	-
14	**5.40e-7**	-	-	-	-	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-29.0	72.2	100.0	1.5	-14.2	0.1	130.6

Table 35. k_{eff} ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	0.6	0.9	-	-0.2	-	1.3
2	**6.07**	-0.1	6.5	9.5	0.4	-2.7	-	13.7
3	**2.23**	-0.3	9.5	14.1	0.6	-3.9	-	19.9
4	**1.35**	-1.9	21.3	29.7	-	-5.2	-	43.9
5	**4.98e-1**	-3.8	11.9	14.9	0.2	-0.5	-	22.6
6	**1.83e-1**	-5.2	9.5	11.5	0.1	-0.1	-	15.8
7	**6.74e-2**	-4.5	6.2	7.5	-	-	-	9.2
8	**2.48e-2**	-4.0	4.9	5.9	0.1	-	-	6.9
9	**9.12e-3**	-3.0	3.5	4.2	-	-	-	4.6
10	**2.04e-3**	-1.4	1.4	1.6	-0.1	-	-	1.5
11	**4.54e-4**	-0.3	0.2	0.3	-0.1	-	-	0.1
12	**2.26e-5**	-	-	-	-	-	-	-
13	**4.00e-6**	-	-	-	-	-	-	-
14	**5.40e-7**	-	-	-	-	-	-	-
15	**1.00e-7**	-	-	-	-	-	-	-
Total		-24.4	75.7	100.0	1.2	-12.7	-	139.7

Table 36. k_{eff} LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	0.1	0.2	-	-	-	0.2
U235	-	0.4	0.6	-	-	-	1.0
U236	-0.1	0.1	0.1	-	-	-	0.1
U238	-13.0	5.2	8.7	-0.1	-6.6	-	-5.8
Np237	-0.4	0.5	0.7	-	-0.1	-	0.6
Pu238	-0.3	2.8	3.9	-	-	-	6.4
Pu239	-2.3	46.5	62.8	-	-0.4	-	106.5
Pu240	-2.0	7.8	11.2	-	-0.4	-	16.6
Pu241	-0.3	5.1	6.7	-	-	-	11.5
Pu242	-0.4	1.1	1.6	-	-0.1	-	2.2
Am241	-0.9	0.7	1.0	-	-0.1	-	0.7
Am242m	-	0.5	0.7	-	-	-	1.1
Am243	-0.4	0.2	0.4	-	-0.1	-	0.2
Cm242	-	0.1	0.1	-	-	-	0.1
Cm243	-	-	-	-	-	-	-
Cm244	-0.1	0.4	0.5	-	-	-	0.8
Cm245	-	0.7	0.8	-	-	-	1.5
Cm246	-	-	0.1	-	-	-	0.1
Fe56	-1.0	-	-	-1.2	-1.7	-	-3.9
Cr52	-0.1	-	-	-0.1	-0.1	-	-0.4
Zr90	-0.3	-	-	-0.4	-0.3	-	-1.0
C	-	-	-	-0.3	-	-	-0.3
Pb204	-0.2	-	-	0.1	-0.1	-	-0.2
Pb206	-0.7	-	-	0.9	-1.8	-	-1.6
Pb207	-0.4	-	-	0.8	-1.4	-	-1.0
Pb208	-0.1	-	-	2.4	-0.7	-	1.6
B10	-5.8	-	-	-0.5	-	-	-6.3
Mn55	-0.1	-	-	-	-	-	-0.1
Total	-29.0	72.2	100.0	1.5	-14.2	0.1	130.6

Table 37. k_{eff} ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	-3.8	5.1	7.5	-	-0.7	-	8.1
Pu238	-0.1	1.8	2.4	-	-	-	4.0
Pu239	-1.4	29.9	38.2	-	-0.4	-	66.4
Pu240	-0.7	3.4	4.7	-	-0.2	-	7.2
Pu241	-0.4	9.8	12.3	-	-0.1	-	21.7
Pu242	-0.3	1.0	1.4	-	-0.1	-	2.1
Am241	-9.0	9.8	13.7	0.1	-1.4	-	13.3
Am242m	-	1.2	1.5	-	-	-	2.7
Am243	-5.6	5.2	7.3	-	-1.2	-	5.6
Cm242	-	-	-	-	-	-	-
Cm243	-	0.4	0.5	-	-	-	0.9
Cm244	-1.2	4.7	6.3	-	-0.3	-	9.5
Cm245	-0.1	3.4	4.1	-	-	-	7.4
Cm246	-	-	-	-	-	-	-
Fe56	-1.0	-	-	-0.2	-4.9	-	-6.0
Cr52	-0.1	-	-	-	-0.4	-	-0.5
Zr90	-0.3	-	-	-0.2	-0.8	-	-1.3
C	-	-	-	-	-	-	-
Pb204	-	-	-	-	-0.1	-	-0.1
Pb206	-0.2	-	-	0.3	-1.0	-	-0.9
Pb207	-0.1	-	-	0.3	-0.7	-	-0.5
Pb208	-	-	-	0.7	-0.3	-	0.4
B10	-	-	-	-	-	-	-
Mn55	-	-	-	-	-	-	-0.1
Total	-24.4	75.7	100.0	1.2	-12.7	-	139.7

Table 38. k_{eff} PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.2	0.3	0.5	-0.1	-0.1	0.1	0.5
2	6.07	-0.3	1.6	3.5	-0.8	-0.4	-	3.6
3	2.23	-0.1	0.8	1.9	-0.5	-0.1	-	2.0
4	1.35	-0.5	0.3	0.8	0.2	-	-	0.8
5	4.98e-1	-0.4	0.2	0.5	0.2	-	-	0.5
6	1.83e-1	-0.4	0.1	0.4	0.2	-	-	0.4
7	6.74e-2	-0.5	0.1	0.4	0.4	-	-	0.4
8	2.48e-2	-0.7	0.2	0.4	0.5	-	-	0.4
9	9.12e-3	-1.4	0.3	0.9	1.1	-	-	1.0
10	2.04e-3	-2.2	0.7	1.8	1.6	-	-	1.9
11	4.54e-4	-8.4	3.1	8.8	5.5	-	-	8.9
12	2.26e-5	-8.5	1.5	4.9	7.0	-	-	4.9
13	4.00e-6	-2.4	1.5	6.8	0.9	-	-	6.8
14	5.40e-7	-5.3	5.1	23.2	0.3	-	-	23.3
15	1.00e-7	-9.5	9.7	45.2	-0.1	-	-	45.3
Total		-40.7	25.5	100.0	16.4	-0.6	0.1	100.7

Table 39. k_{eff} PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-17.3	23.2	95.0	-	-	-	100.9
U238	-19.9	2.2	5.0	-0.1	-0.5	0.1	-13.1
Zr90	-0.1	-	-	-	-0.1	-	-0.1
O16	-0.4	-	-	-	-	-	-0.5
H	-2.9	-	-	16.4	-	-	13.5
Total	-40.7	25.5	100.0	16.4	-0.6	0.1	100.7

Appendix E. η Sensitivity Coefficients

Th232 Sample

Table 40. η R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.4	-0.6	-	-2.3	-2.4	-0.6	-6.2
2	6.07	-0.3	-1.2	-	-23.7	-16.5	-	-41.7
3	2.23	-	-	-	-23.7	-5.7	-	-29.4
4	1.35	0.5	0.2	-	-10.8	-0.9	-	-11.0
5	4.98E-1	0.4	0.1	-	-4.3	-0.1	-	-4.0
6	1.83E-1	0.4	0.1	-	-2.3	-	-	-1.8
7	6.74E-2	0.5	0.1	-	-1.0	-	-	-0.4
8	2.48E-2	0.7	0.1	-	-0.3	-	-	0.4
9	9.12E-3	1.3	0.2	-	0.7	-	-	2.3
10	2.04E-3	1.9	0.4	-	2.0	-	-	4.2
11	4.54E-4	6.2	2.0	-	8.9	-	-	17.0
12	2.26E-5	6.1	1.0	-	-3.6	-	-	3.6
13	4.00E-6	1.3	1.5	-	-1.2	-	-	1.6
14	5.40E-7	3.5	7.4	-	-1.2	-	-	9.7
15	1.00E-7	12.1	27.6	-	-0.6	-	-	39.1
Total		34.0	38.9	-	-63.3	-25.6	-0.6	-16.5

Table 41. η R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.4	-0.5	-	-2.3	-2.1	-0.6	-5.8
2	6.07	-0.3	-1.1	-	-24.3	-15.3	-	-41.0
3	2.23	-	-	-	-24.1	-5.4	-	-29.4
4	1.35	0.4	0.2	-	-11.3	-0.9	-	-11.5
5	4.98E-1	0.3	0.1	-	-4.5	-0.1	-	-4.2
6	1.83E-1	0.3	0.1	-	-2.4	-	-	-2.0
7	6.74E-2	0.5	0.1	-	-1.1	-	-	-0.6
8	2.48E-2	0.6	0.1	-	-0.5	-	-	0.2
9	9.12E-3	1.2	0.2	-	0.4	-	-	1.7
10	2.04E-3	1.6	0.4	-	1.4	-	-	3.4
11	4.54E-4	5.6	1.8	-	7.2	-	-	14.6
12	2.26E-5	5.8	1.0	-	-3.9	-	-	2.8
13	4.00E-6	1.3	1.4	-	-1.5	-	-	1.2
14	5.40E-7	3.7	7.3	-	-1.7	-	-	9.3
15	1.00E-7	14.6	31.1	-	-0.8	-	-	44.9
Total		35.1	42.0	-	-69.1	-23.8	-0.6	-16.4

Table 42. η R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	8.7	40.5	-	-0.1	-0.4	-	48.7
U236	0.1	-	-	-	-	-	-
U238	21.3	-1.6	-	-2.2	-17.7	-0.6	-0.8
Zr90	0.1	-	-	-1.3	-4.1	-	-5.2
O16	-0.6	-	-	-10.6	-0.5	-	-11.7
H	3.7	-	-	-47.2	-	-	-43.5
Al27	0.6	-	-	-1.7	-2.9	-	-4.0
Mg24	-	-	-	-0.1	-0.1	-	-0.2
Mn55	0.1	-	-	-	-	-	-
Total	34.0	38.9	-	-63.3	-25.6	-0.6	-16.5

Table 43. η R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	9.0	43.4	-	-0.1	-0.3	-	52.0
U236	-	-	-	-	-	-	-
U238	20.4	-1.4	-	-2.1	-16.4	-0.5	-0.1
Zr90	0.1	-	-	-1.2	-3.7	-	-4.8
O16	-0.6	-	-	-10.5	-0.5	-	-11.6
H	5.3	-	-	-53.4	-	-	-48.1
Al27	0.6	-	-	-1.6	-2.6	-	-3.6
Mg24	-	-	-	-0.1	-0.1	-	-0.2
Mn55	0.1	-	-	-	-	-	-
Total	35.1	42.0	-	-69.1	-23.8	-0.6	-16.4

Table 44. η R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.5	-0.9	-	-3.5	-3.9	-0.9	-9.7
2	6.07	-0.3	-1.3	-	-25.6	-19.4	-	-46.7
3	2.23	-	0.1	-	-22.8	-5.1	-	-27.8
4	1.35	0.5	0.3	-	-5.6	-0.5	-	-5.2
5	4.98E-1	0.4	0.2	-	-1.5	-	-	-1.0
6	1.83E-1	0.4	0.1	-	-0.5	-	-	-0.1
7	6.74E-2	0.5	0.1	-	0.7	-	-	1.3
8	2.48E-2	0.7	0.1	-	1.5	-	-	2.3
9	9.12E-3	1.4	0.2	-	4.0	-	-	5.6
10	2.04E-3	1.9	0.3	-	6.2	-	-	8.4
11	4.54E-4	6.0	1.8	-	21.4	-	-	29.2
12	2.26E-5	4.6	1.1	-	0.9	-	-	6.6
13	4.00E-6	4.5	0.7	-	-1.8	-	-	3.4
14	5.40E-7	5.7	7.2	-	-6.0	-	-	6.9
15	1.00E-7	8.1	11.9	-	-0.1	-	-	19.9
Total		33.8	21.9	-	-32.7	-28.9	-0.9	-6.8

Table 45. η MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.7	-1.3	-	-3.8	-4.0	-1.1	-10.9
2	6.07	-0.5	-2.2	-	-25.9	-20.2	-	-48.7
3	2.23	-	0.2	-	-19.8	-6.9	-	-26.5
4	1.35	0.7	1.0	-	-3.6	-0.4	-	-2.3
5	4.98E-1	0.5	0.5	-	-0.6	-	-	0.4
6	1.83E-1	0.5	0.4	-	0.3	-	-	1.1
7	6.74E-2	0.7	0.3	-	1.7	-	-	2.6
8	2.48E-2	0.9	0.2	-	2.7	-	-	3.9
9	9.12E-3	1.8	0.5	-	6.3	-	-	8.7
10	2.04E-3	2.7	1.0	-	8.6	-	-	12.3
11	4.54E-4	7.4	3.9	-	25.5	-	-	36.8
12	2.26E-5	3.3	1.2	-	2.5	-	-	6.9
13	4.00E-6	2.3	0.7	-	0.3	-	-	3.2
14	5.40E-7	2.0	2.8	-	-1.8	-	-	3.0
15	1.00E-7	1.9	3.2	-	-0.1	-	-	5.0
Total		23.6	12.3	-	-7.7	-31.6	-1.1	-4.4

Table 46. η R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.8	3.1	-	-	-0.1	-	3.8
U238	14.4	-1.8	-	-1.0	-18.2	-0.8	-7.5
Pu239	9.9	19.8	-	-	-0.2	-	29.4
Pu240	4.6	-	-	-	-0.1	-	4.5
Pu241	0.3	0.8	-	-	-	-	1.1
Pu242	0.3	-	-	-	-	-	0.2
Am241	2.8	-	-	-	-	-	2.8
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	0.2	-	-	-1.6	-9.6	-	-11.0
O16	-0.8	-	-	-8.3	-0.7	-	-9.8
Si28	-	-	-	-	-	-	-
H	1.3	-	-	-21.7	-	-	-20.4
Total	33.8	21.9	-	-32.7	-28.9	-0.9	-6.8

Table 47. η MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.1	0.3	-	-	-	-	0.4
U238	12.5	-2.4	-	-	-22.0	-1.0	-13.0
Pu239	7.6	14.0	-	-	-0.8	-	20.6
Pu240	3.3	-	-	-	-0.2	-	3.1
Pu241	0.1	0.4	-	-	-	-	0.5
Pu242	0.1	-	-	-	-	-	0.1
Am241	0.2	-	-	-	-	-	0.2
Fe56	0.5	-	-	-0.3	-5.4	-	-5.2
Cr52	0.1	-	-	-0.2	-1.5	-	-1.6
Ni58	-0.1	-	-	-	-0.6	-	-0.7
Zr90	-	-	-	-	-	-	-
O16	-1.0	-	-	-7.0	-0.8	-	-8.8
Si28	-	-	-	-	-0.1	-	-0.1
H	0.3	-	-	-0.2	-	-	0.1
Total	23.6	12.3	-	-7.7	-31.6	-1.1	-4.4

Table 48. η ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.2	-1.2	0.1	-	-4.8	-1.2	-7.3
2	**6.07**	-0.1	-2.6	0.9	0.3	-33.0	-	-34.5
3	**2.23**	-	-0.1	0.6	-3.7	-23.7	-	-27.0
4	**1.35**	2.5	6.5	0.7	-6.2	-6.7	-	-3.3
5	**4.98E-1**	5.5	10.2	1.1	-16.2	-3.2	-	-2.5
6	**1.83E-1**	8.8	9.9	0.4	-15.3	-3.1	-	0.7
7	**6.74E-2**	9.7	5.6	-0.2	-5.5	-0.2	-	9.4
8	**2.48E-2**	9.1	3.2	-0.8	-2.5	-	-	9.0
9	**9.12E-3**	3.2	0.8	-0.4	0.1	-	-	3.7
10	**2.04E-3**	3.1	0.2	-1.1	0.3	-	-	2.5
11	**4.54E-4**	0.7	-0.5	-0.8	0.4	-	-	-0.2
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-0.1
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		42.4	31.9	0.2	-48.1	-74.7	-1.2	-49.4

Table 49. η SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	-0.8	-0.1	-0.2	-5.6	-0.4	-7.3
2	**6.07**	-0.1	-3.2	-1.2	-1.5	-31.3	-	-37.3
3	**2.23**	-	-0.9	-1.1	-8.1	-23.7	-	-33.8
4	**1.35**	1.7	5.2	-2.3	-8.4	-5.6	-	-9.4
5	**4.98E-1**	4.8	7.2	-0.3	-14.7	-1.1	-	-4.1
6	**1.83E-1**	8.2	8.1	1.0	-13.8	-0.9	-	2.6
7	**6.74E-2**	8.3	5.7	1.1	-3.2	-	-	11.9
8	**2.48E-2**	8.2	5.0	1.1	-0.8	-	-	13.6
9	**9.12E-3**	3.4	2.3	0.7	1.8	-	-	8.2
10	**2.04E-3**	5.5	3.9	1.6	1.8	-	-	12.8
11	**4.54E-4**	1.0	0.2	-0.3	0.6	-	-	1.6
12	**2.26E-5**	0.1	-0.1	-0.2	0.2	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		40.8	32.5	-	-46.2	-68.1	-0.4	-41.3

Table 50. η ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.1	0.3	-	-	-0.1	-	0.4
U236	-	-	-	-	-	-	-
U238	29.3	-2.1	1.4	-8.8	-44.7	-1.1	-26.0
Np237	0.1	-	-0.1	-	-	-	-
Pu238	-	-0.1	-0.1	-	-	-	-0.2
Pu239	8.1	33.9	0.4	-1.4	-3.3	-0.1	37.7
Pu240	1.1	0.2	-0.3	-0.2	-0.5	-	0.4
Pu241	0.1	-0.2	-0.8	-	-	-	-0.9
Pu242	-	-0.1	-0.1	-	-	-	-0.1
Am241	0.1	-0.1	-0.1	-	-	-	-
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm243	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Cm246	-	-	-	-	-	-	-
Fe56	1.9	-	-	-14.3	-17.1	-	-29.5
Cr52	0.3	-	-	-2.9	-2.0	-	-4.7
Ni58	-	-	-	-0.3	-0.1	-	-0.3
Zr90	0.2	-	-	-2.1	-2.2	-	-4.0
Na23	0.1	-	-	-17.8	-4.6	-	-22.4
C	-	-	-	-	-	-	-
B10	0.7	-	-	-	-	-	0.7
Mn55	0.1	-	-	-0.3	-0.2	-	-0.3
Total	42.4	31.9	0.2	-48.1	-74.7	-1.2	-49.4

Table 51. η SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-0.1	-	0.1
U235	-	0.3	0.1	-	-	-	0.4
U236	0.1	-	-	-	-0.1	-	-
U238	8.3	-0.3	0.6	-1.4	-11.4	-0.2	-4.4
Np237	1.7	-0.1	-0.3	-0.1	-0.2	-	1.0
Pu238	1.0	2.4	0.2	-0.1	-0.2	-	3.3
Pu239	4.5	14.5	-2.8	-0.4	-1.2	-	14.6
Pu240	5.9	1.9	-0.9	-0.6	-2.2	-	4.1
Pu241	1.1	6.6	1.0	-0.1	-0.3	-	8.2
Pu242	1.8	0.3	-0.2	-0.2	-0.9	-	0.8
Am241	2.6	-0.2	-0.3	-0.1	-0.3	-	1.7
Am242m	0.6	5.5	2.0	-	-0.3	-	7.8
Am243	2.2	-	-0.1	-0.1	-0.4	-	1.7
Cm242	-	0.1	0.1	-	-	-	0.2
Cm243	-	-	-	-	-	-	0.1
Cm244	0.9	0.3	0.1	-	-0.2	-	1.0
Cm245	0.1	1.2	0.5	-	-0.1	-	1.7
Cm246	0.1	-	-	-	-	-	0.1
Fe56	2.9	-	-	-15.9	-34.6	-	-47.6
Cr52	0.4	-	-	-3.6	-4.0	-	-7.1
Ni58	-	-	-	-0.2	-0.1	-	-0.3
Zr90	0.2	-	-	-1.4	-1.9	-	-3.0
Na23	0.1	-	-	-21.1	-9.2	-	-30.2
C	-	-	-	-0.2	-	-	-0.2
B10	5.7	-	-	-0.2	-	-	5.4
Mn55	0.2	-	-	-0.4	-0.5	-	-0.6
Total	40.8	32.5	-	-46.2	-68.1	-0.4	-41.3

Table 52. η EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.7	-1.3	-	-0.6	-5.2	-1.0	-8.8
2	**6.07**	-0.6	-3.9	0.1	-2.2	-37.4	-	-44.1
3	**2.23**	-	-0.2	-0.1	-10.1	-21.2	-	-31.5
4	**1.35**	2.5	5.9	-0.2	-6.9	-3.8	-	-2.5
5	**4.98E-1**	4.4	6.3	-	-8.5	-0.8	-	1.4
6	**1.83E-1**	8.0	7.4	0.2	-8.6	-0.8	-	6.2
7	**6.74E-2**	11.1	5.6	0.2	-2.5	-	-	14.4
8	**2.48E-2**	11.3	4.2	0.2	0.8	-	-	16.6
9	**9.12E-3**	8.3	2.8	0.2	1.9	-	-	13.3
10	**2.04E-3**	8.5	2.5	-0.4	1.5	-	-	12.2
11	**4.54E-4**	1.2	0.1	-0.3	0.1	-	-	1.1
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		54.0	29.6	-0.1	-35.0	-69.3	-1.0	-21.7

Table 53. η GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-1.1	-1.7	0.1	-1.0	-4.5	-1.3	-9.5
2	**6.07**	-0.1	-4.1	0.5	-8.4	-33.3	-	-45.5
3	**2.23**	-	0.3	0.3	-18.0	-15.5	-	-32.8
4	**1.35**	2.3	5.0	-	-6.5	-2.3	-	-1.5
5	**4.98E-1**	3.5	3.8	-0.1	-4.5	-0.3	-	2.4
6	**1.83E-1**	7.2	4.4	-0.1	-5.5	-0.4	-	5.6
7	**6.74E-2**	11.1	4.0	-	-2.0	-	-	13.0
8	**2.48E-2**	12.6	3.5	-	0.5	-	-	16.5
9	**9.12E-3**	15.7	4.3	-	2.5	-	-	22.4
10	**2.04E-3**	7.9	2.3	-0.1	1.7	-	-	11.8
11	**4.54E-4**	1.9	0.5	-0.3	0.1	-	-	2.2
12	**2.26E-5**	-	-	-0.1	-	-	-	-0.1
13	**4.00E-6**	-0.2	-	-	-	-	-	-0.3
14	**5.40E-7**	-0.3	0.2	-0.1	0.1	-	-	-0.1
15	**1.00E-7**	-	-	-	-	-	-	-
Total		60.5	22.3	-	-41.0	-56.3	-1.3	-15.7

Table 54. η EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	0.1	0.2	-	-	-	-	0.2
U238	33.7	-2.5	0.6	-3.4	-36.7	-0.9	-9.3
Np237	0.2	-	-	-	-	-	0.3
Pu238	0.3	0.6	-	-	-0.1	-	0.8
Pu239	8.7	26.9	-0.6	-0.4	-2.1	-	32.6
Pu240	5.1	1.4	-0.3	-0.2	-1.6	-	4.4
Pu241	0.5	2.4	-	-	-0.1	-	2.7
Pu242	0.6	0.1	-	-	-0.2	-	0.3
Am241	1.9	0.1	0.1	-	-0.2	-	1.8
Am242m	-	0.2	0.1	-	-	-	0.3
Am243	0.5	-	-	-	-0.1	-	0.4
Cm244	0.2	0.1	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	1.6	-	-	-4.2	-16.9	-	-19.5
Cr52	0.3	-	-	-1.3	-3.4	-	-4.3
Ni58	0.4	-	-	-1.1	-2.2	-	-3.0
Zr90	-	-	-	-	-	-	-
Na23	0.1	-	-	-5.5	-4.3	-	-9.7
O16	-0.6	-	-	-18.5	-0.5	-	-19.6
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-0.2	-0.2	-	-0.4
Mn55	0.2	-	-	-0.1	-0.5	-	-0.4
Ti48	-	-	-	-	-0.1	-	-0.1
Total	54.0	29.6	-0.1	-35.0	-69.3	-1.0	-21.7

Table 55. η GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.5	1.7	0.2	-	-0.2	-	2.2
U238	34.6	-2.9	0.8	-1.8	-40.3	-1.2	-10.7
Np237	2.1	0.2	0.1	-	-0.2	-	2.1
Pu238	0.5	0.8	-	-	-0.1	-	1.1
Pu239	6.7	16.4	-1.0	-0.2	-1.4	-	20.5
Pu240	3.8	0.9	-0.1	-0.1	-1.1	-	3.2
Pu241	1.0	4.4	-0.3	-	-0.3	-	4.9
Pu242	1.3	0.1	-	-	-0.5	-	0.9
Am241	9.0	0.3	0.2	-0.1	-0.8	-	8.6
Am242m	-	0.1	-	-	-	-	0.1
Am243	2.0	-	-	-	-0.3	-	1.8
Cm244	0.3	0.1	-	-	-0.1	-	0.4
Cm245	0.1	0.3	-	-	-	-	0.4
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-1.2	-	-	-1.2
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	-0.6	-	-	-27.9	-1.7	-	-30.2
He4	-	-	-	-1.1	-	-	-1.1
Si28	-0.7	-	-	-8.6	-9.3	-	-18.6
Mn55	-	-	-	-	-	-	-
Ti48	-	-	-	-	-	-	-
Total	60.5	22.3	-	-41.0	-56.3	-1.3	-15.7

Table 56. η LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.6	-	-0.1	-5.2	-1.1	-7.0
2	**6.07**	-0.4	-2.2	0.1	-0.3	-35.1	-	-37.8
3	**2.23**	-0.4	-0.9	0.3	-4.8	-30.5	-	-36.2
4	**1.35**	3.8	8.5	1.1	-6.6	-6.1	-	0.6
5	**4.98E-1**	9.8	9.9	1.1	-9.3	-1.6	-	10.0
6	**1.83E-1**	15.3	8.4	0.9	-6.1	-1.3	-	17.2
7	**6.74E-2**	16.3	4.5	-0.1	-1.0	-	-	19.8
8	**2.48E-2**	12.9	1.6	-1.1	0.7	-	-	14.1
9	**9.12E-3**	4.5	-0.3	-1.2	0.3	-	-	3.4
10	**2.04E-3**	1.0	-0.5	-0.7	-	-	-	-0.3
11	**4.54E-4**	0.3	-0.3	-0.4	0.2	-	-	-0.1
12	**2.26E-5**	0.1	-	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		63.1	28.2	-	-26.9	-79.8	-1.1	-16.4

Table 57. η ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.5	-	-	-3.2	-0.3	-4.0
2	**6.07**	-0.1	-2.1	-	0.4	-19.9	-	-21.7
3	**2.23**	-0.1	-0.8	0.1	-3.2	-18.9	-	-22.8
4	**1.35**	2.3	9.3	0.5	-4.6	-4.4	-	3.2
5	**4.98E-1**	7.1	5.8	0.2	-4.9	-1.2	-	7.1
6	**1.83E-1**	12.8	5.1	0.1	-4.7	-0.6	-	12.8
7	**6.74E-2**	13.8	3.8	-	-2.0	-	-	15.6
8	**2.48E-2**	12.7	2.7	-0.2	-0.2	-	-	15.0
9	**9.12E-3**	8.9	1.8	-0.1	0.5	-	-	11.0
10	**2.04E-3**	2.8	0.2	-0.3	0.3	-	-	3.0
11	**4.54E-4**	0.3	-0.2	-0.3	0.2	-	-	-
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		60.7	25.2	-	-18.2	-48.1	-0.3	19.2

Table 58. η LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	0.1	-	-	-	-	0.1
U235	0.1	0.2	-	-	-	-	0.2
U236	0.2	-	-	-	-0.1	-	-
U238	24.3	-1.6	0.3	-1.7	-29.8	-0.4	-8.9
Np237	0.9	0.1	-	-	-0.2	-	0.9
Pu238	0.5	1.2	-0.1	-	-0.1	-	1.4
Pu239	4.5	22.2	-0.5	-0.2	-1.6	-	24.5
Pu240	3.8	2.6	0.4	-0.1	-1.5	-	5.1
Pu241	0.4	2.3	-0.2	-	-0.1	-	2.4
Pu242	0.7	0.3	0.1	-	-0.4	-	0.7
Am241	1.8	0.1	-	-	-0.2	-	1.7
Am242m	-	0.2	-	-	-	-	0.2
Am243	0.8	-	-	-	-0.2	-	0.7
Cm243	-	-	-	-	-	-	-
Cm244	0.3	0.1	-	-	-0.1	-	0.3
Cm245	0.1	0.3	-	-	-	-	0.3
Fe56	1.5	-	-	-4.9	-11.9	-	-15.3
Cr52	0.2	-	-	-0.9	-1.3	-	-2.0
Ni58	-	-	-	-	-	-	-
Zr90	0.5	-	-	-1.7	-2.8	-	-4.0
C	-	-	-	-1.1	-	-	-1.1
Pb204	0.3	-	-	-0.2	-0.8	-	-0.7
Pb206	1.1	-	-	-3.0	-12.8	-0.1	-14.7
Pb207	0.6	-	-	-2.9	-8.1	-0.2	-10.6
Pb208	0.2	-	-	-7.3	-7.5	-0.3	-15.0
B10	20.2	-	-	-2.6	-0.1	-	17.6
Mn55	0.1	-	-	-0.1	-0.2	-	-0.2
Total	63.1	28.2	-	-26.9	-79.8	-1.1	-16.4

Table 59. η ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	10.0	1.3	0.1	-0.2	-1.7	-	9.5
Pu238	0.3	0.7	-	-	-0.1	-	0.9
Pu239	3.4	13.4	-0.2	-0.2	-1.1	-	15.3
Pu240	1.7	0.8	-	-0.1	-0.7	-	1.8
Pu241	0.9	4.6	-0.1	-	-0.3	-	4.9
Pu242	0.6	0.2	-	-	-0.3	-	0.5
Am241	22.6	1.0	0.1	-0.3	-3.0	-	20.3
Am242m	0.1	0.5	-	-	-	-	0.5
Am243	14.3	0.3	0.1	-0.2	-2.8	-	11.6
Cm243	-	0.2	-	-	-	-	0.2
Cm244	3.1	1.0	0.1	-0.1	-0.7	-	3.3
Cm245	0.3	1.2	-0.1	-	-0.1	-	1.3
Fe56	1.7	-	-	-7.7	-19.5	-	-25.5
Cr52	0.2	-	-	-1.6	-2.2	-	-3.5
Ni58	-	-	-	-0.1	-0.1	-	-0.1
Zr90	0.7	-	-	-3.0	-4.5	-	-6.8
C	-	-	-	-	-	-	-
Pb204	0.1	-	-	-0.1	-0.3	-	-0.3
Pb206	0.4	-	-	-1.0	-4.7	-	-5.4
Pb207	0.2	-	-	-1.0	-3.0	-0.1	-3.9
Pb208	0.1	-	-	-2.5	-2.6	-0.1	-5.1
B10	-	-	-	-	-	-	-
Mn55	0.1	-	-	-	-0.2	-	-0.1
Total	60.7	25.2	-	-18.2	-48.1	-0.3	19.2

Table 60. η PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.8	-1.2	-	-5.5	-3.6	-1.1	-12.2
2	**6.07**	-0.4	-1.8	-	-33.0	-16.5	-	-51.8
3	**2.23**	-	0.1	-	-21.8	-4.6	-	-26.2
4	**1.35**	0.5	0.5	-	-0.4	-0.1	-	0.5
5	**4.98E-1**	0.4	0.3	-	0.7	-	-	1.4
6	**1.83E-1**	0.4	0.2	-	0.8	-	-	1.4
7	**6.74E-2**	0.5	0.2	-	1.4	-	-	2.1
8	**2.48E-2**	0.7	0.2	-	1.9	-	-	2.8
9	**9.12E-3**	1.3	0.5	-	4.2	-	-	6.0
10	**2.04E-3**	1.9	1.0	-	5.5	-	-	8.5
11	**4.54E-4**	6.4	4.4	-	16.2	-	-	26.9
12	**2.26E-5**	5.2	1.6	-	0.5	-	-	7.3
13	**4.00E-6**	1.2	2.5	-	0.2	-	-	3.9
14	**5.40E-7**	2.5	8.7	-	-1.2	-	-	10.0
15	**1.00E-7**	4.8	18.1	-	-0.3	-	-	22.6
Total		24.6	35.6	-	-30.9	-24.8	-1.1	3.3

Table 61. η PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	9.9	37.9	-	-	-1.2	-0.1	46.6
U238	14.3	-2.4	-	-	-19.5	-1.0	-8.7
Zr90	0.1	-	-	-0.2	-3.0	-	-3.2
O16	-1.2	-	-	-7.7	-1.0	-	-9.9
H	1.5	-	-	-23.0	-	-	-21.5
Total	24.6	35.6	-	-30.9	-24.8	-1.1	3.3

UO_2 Sample

Table 62. η R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-0.1	-	-0.2	-0.2	-0.1	-0.6
2	6.07	-	-0.2	-	-3.4	-2.4	-	-6.1
3	2.23	-	-	-	-3.5	-0.8	-	-4.3
4	1.35	0.1	-	-	-0.9	-0.1	-	-0.9
5	4.98E-1	-	-	-	-0.1	-	-	-
6	1.83E-1	-	-	-	0.2	-	-	0.3
7	6.74E-2	0.1	-	-	0.7	-	-	0.7
8	2.48E-2	0.1	-	-	1.0	-	-	1.1
9	9.12E-3	0.1	-	-	2.1	-	-	2.3
10	2.04E-3	0.2	-	-	3.1	-	-	3.3
11	4.54E-4	0.7	0.1	-	10.8	-	-	11.6
12	2.26E-5	1.8	-0.2	-	16.0	-	-	17.6
13	4.00E-6	-0.6	-0.7	-	2.2	-	-	0.9
14	5.40E-7	-1.8	-3.7	-	1.4	-	-	-4.1
15	1.00E-7	-6.4	-14.7	-	0.4	-	-	-20.8
Total		-5.8	-19.4	-	29.9	-3.6	-0.1	1.1

Table 63. η R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-0.2	-0.2	-0.1	-0.5
2	6.07	-	-0.1	-	-3.0	-1.9	-	-5.1
3	2.23	-	-	-	-3.0	-0.7	-	-3.7
4	1.35	0.1	-	-	-0.8	-0.1	-	-0.8
5	4.98E-1	-	-	-	-0.1	-	-	-
6	1.83E-1	-	-	-	0.2	-	-	0.2
7	6.74E-2	-	-	-	0.6	-	-	0.6
8	2.48E-2	0.1	-	-	0.9	-	-	1.0
9	9.12E-3	0.1	-	-	1.9	-	-	2.1
10	2.04E-3	0.1	-	-	3.0	-	-	3.1
11	4.54E-4	0.5	-	-	10.9	-	-	11.4
12	2.26E-5	1.5	-0.2	-	16.3	-	-	17.6
13	4.00E-6	-0.6	-0.6	-	2.1	-	-	0.9
14	5.40E-7	-1.7	-3.4	-	1.6	-	-	-3.5
15	1.00E-7	-7.1	-15.2	-	0.4	-	-	-21.9
Total		-7.0	-19.4	-	30.7	-2.8	-0.1	1.5

Table 64. η R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.4	-19.2	-	-	-0.1	-	-22.6
U238	-	-0.2	-	-0.3	-2.5	-0.1	-3.1
Zr90	-	-	-	-0.1	-0.6	-	-0.6
O16	-0.1	-	-	-0.8	-	-	-0.9
H	-1.9	-	-	31.3	-	-	29.4
Al27	-0.3	-	-	-0.2	-0.4	-	-0.9
Total	-5.8	-19.4	-	29.9	-3.6	-0.1	1.1

Table 65. η R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.4	-19.2	-	-	-	-	-22.7
U238	-0.6	-0.2	-	-0.2	-2.0	-0.1	-3.0
Zr90	-	-	-	-0.1	-0.4	-	-0.5
O16	-0.1	-	-	-0.6	-	-	-0.7
H	-2.5	-	-	31.7	-	-	29.2
Al27	-0.3	-	-	-0.1	-0.3	-	-0.8
Total	-7.0	-19.4	-	30.7	-2.8	-0.1	1.5

Table 66. η R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.1	-0.2	-	-0.6	-0.8	-0.2	-2.0
2	6.07	-0.1	-0.5	-	-7.9	-6.0	-	-14.4
3	2.23	-	-	-	-7.2	-1.6	-	-8.7
4	1.35	0.2	0.1	-	-1.3	-0.1	-	-1.2
5	4.98E-1	0.1	-	-	-0.1	-	-	-
6	1.83E-1	0.1	-	-	0.2	-	-	0.4
7	6.74E-2	0.2	-	-	0.9	-	-	1.0
8	2.48E-2	0.2	-	-	1.4	-	-	1.6
9	9.12E-3	0.4	-	-	2.7	-	-	3.1
10	2.04E-3	0.5	0.1	-	3.8	-	-	4.3
11	4.54E-4	2.0	0.3	-	12.3	-	-	14.7
12	2.26E-5	3.6	-0.1	-	19.3	-	-	22.9
13	4.00E-6	-3.6	-0.5	-	3.8	-	-	-0.3
14	5.40E-7	-4.8	-6.0	-	5.7	-	-	-5.1
15	1.00E-7	-7.1	-10.5	-	0.2	-	-	-17.4
Total		-8.5	-17.0	-	33.3	-8.6	-0.2	-1.0

Table 67. η MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.3	-0.5	-	-1.2	-1.5	-0.4	-3.8
2	6.07	-0.2	-1.2	-	-13.8	-11.0	-	-26.2
3	2.23	-	-	-	-11.0	-3.8	-	-14.7
4	1.35	0.3	0.5	-	-2.3	-0.3	-	-1.7
5	4.98E-1	0.3	0.3	-	-0.5	-	-	-
6	1.83E-1	0.3	0.2	-	-	-	-	0.5
7	6.74E-2	0.4	0.1	-	0.9	-	-	1.4
8	2.48E-2	0.5	0.1	-	1.5	-	-	2.1
9	9.12E-3	1.0	0.3	-	3.0	-	-	4.2
10	2.04E-3	1.5	0.5	-	3.9	-	-	5.9
11	4.54E-4	5.4	2.1	-	9.7	-	-	17.2
12	2.26E-5	6.6	0.9	-	15.3	-	-	22.8
13	4.00E-6	-2.3	-0.6	-	2.0	-	-	-0.9
14	5.40E-7	-2.3	-3.2	-	2.3	-	-	-3.1
15	1.00E-7	-2.3	-3.8	-	0.1	-	-	-5.9
Total		8.8	-4.2	-	10.0	-16.5	-0.4	-2.2

Table 68. η R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-0.3	-1.8	-	-	-	-	-2.2
U238	5.1	-0.5	-	-0.5	-5.5	-0.2	-1.7
Pu239	-6.6	-14.1	-	-	-0.1	-	-20.7
Pu240	-3.2	-	-	-	-	-	-3.2
Pu241	-0.2	-0.5	-	-	-	-	-0.8
Pu242	-0.2	-	-	-	-	-	-0.2
Am241	-1.9	-	-	-	-	-	-2.0
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.4	-2.7	-	-3.1
O16	-0.2	-	-	-2.2	-0.2	-	-2.5
H	-1.0	-	-	36.3	-	-	35.3
Total	-8.5	-17.0	-	33.3	-8.6	-0.2	-1.0

Table 69. η MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	-	-	-	-	-	0.1
U238	12.1	-1.2	-	-0.3	-11.8	-0.4	-1.7
Pu239	-0.9	-3.0	-	-	-0.4	-	-4.4
Pu240	-1.5	-	-	-	-0.1	-	-1.6
Pu241	-	-	-	-	-	-	-
Pu242	-0.1	-	-	-	-	-	-0.1
Am241	-0.1	-	-	-	-	-	-0.1
Fe56	-0.1	-	-	-0.1	-2.7	-	-3.0
Cr52	-	-	-	-0.1	-0.7	-	-0.8
Ni58	-0.1	-	-	-	-0.3	-	-0.4
Zr90	-	-	-	-	-	-	-
O16	-0.4	-	-	-4.1	-0.3	-	-4.8
H	-0.2	-	-	14.7	-	-	14.5
Total	8.8	-4.2	-	10.0	-16.5	-0.4	-2.2

Table 70. η ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.5	0.1	-	-2.1	-0.6	-3.2
2	**6.07**	-0.1	-1.9	0.6	0.4	-22.8	-	-23.9
3	**2.23**	-	-0.2	0.4	-2.8	-16.4	-	-19.0
4	**1.35**	1.7	4.3	0.4	-4.2	-4.9	-	-2.7
5	**4.98E-1**	3.7	6.9	0.7	-11.2	-2.2	-	-2.1
6	**1.83E-1**	6.0	6.8	0.3	-10.5	-2.1	-	0.5
7	**6.74E-2**	6.6	3.8	-0.1	-3.1	-	-	7.1
8	**2.48E-2**	5.8	2.0	-0.5	-0.8	-	-	6.5
9	**9.12E-3**	1.7	0.4	-0.3	0.5	-	-	2.3
10	**2.04E-3**	1.6	-0.1	-0.8	0.1	-	-	0.9
11	**4.54E-4**	0.4	-0.3	-0.6	0.3	-	-	-0.2
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		27.4	21.1	0.1	-31.2	-50.6	-0.6	-33.8

Table 71. η SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.4	-0.1	-0.1	-2.5	-0.2	-3.3
2	**6.07**	-0.1	-2.3	-0.8	-0.8	-21.7	-	-25.7
3	**2.23**	-	-0.6	-0.7	-5.9	-16.2	-	-23.5
4	**1.35**	1.1	3.4	-1.6	-5.8	-4.3	-	-7.1
5	**4.98E-1**	3.3	4.9	-0.2	-10.5	-0.8	-	-3.4
6	**1.83E-1**	5.7	5.6	0.7	-9.8	-0.6	-	1.5
7	**6.74E-2**	5.7	3.9	0.8	-1.5	-	-	8.9
8	**2.48E-2**	5.4	3.4	0.7	0.7	-	-	10.3
9	**9.12E-3**	1.9	1.4	0.5	1.7	-	-	5.5
10	**2.04E-3**	2.9	2.3	1.1	1.3	-	-	7.5
11	**4.54E-4**	0.5	-	-0.2	0.5	-	-	0.8
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		26.3	21.5	-	-30.0	-46.1	-0.2	-28.6

Table 72. η ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.1	0.2	-	-	-	-	0.2
U238	19.0	-1.4	0.9	-5.9	-30.7	-0.6	-18.6
Np237	0.1	-	-0.1	-	-	-	-
Pu238	-	-0.1	-0.1	-	-	-	-0.1
Pu239	5.1	22.4	0.3	-0.9	-2.2	-	24.7
Pu240	0.7	0.1	-0.2	-0.1	-0.3	-	0.2
Pu241	0.1	-0.1	-0.5	-	-	-	-0.6
Pu242	-	-	-0.1	-	-	-	-0.1
Am241	0.1	-	-0.1	-	-	-	-
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Fe56	1.3	-	-	-9.2	-11.2	-	-19.1
Cr52	0.2	-	-	-2.0	-1.3	-	-3.1
Ni58	-	-	-	-0.2	-	-	-0.2
Zr90	0.2	-	-	-1.4	-1.4	-	-2.6
Na23	-	-	-	-11.4	-3.2	-	-14.5
C	-	-	-	-	-	-	-
B10	0.5	-	-	-	-	-	0.5
Mn55	0.1	-	-	-0.2	-0.1	-	-0.2
Total	27.4	21.1	0.1	-31.2	-50.6	-0.6	-33.8

Table 73. η SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	0.1	-	-	-	0.3
U238	5.3	-0.2	0.4	-0.9	-7.9	-0.1	-3.4
Np237	1.1	-0.1	-0.2	-	-0.2	-	0.6
Pu238	0.7	1.6	0.1	-0.1	-0.2	-	2.1
Pu239	2.8	9.6	-1.9	-0.3	-0.8	-	9.4
Pu240	3.8	1.2	-0.6	-0.4	-1.5	-	2.5
Pu241	0.7	4.4	0.7	-0.1	-0.2	-	5.4
Pu242	1.2	0.2	-0.1	-0.1	-0.6	-	0.5
Am241	1.7	-0.1	-0.2	-	-0.2	-	1.1
Am242m	0.4	3.6	1.4	-	-0.2	-	5.2
Am243	1.5	-	-	-	-0.3	-	1.1
Cm242	-	0.1	-	-	-	-	0.1
Cm244	0.6	0.2	0.1	-	-0.1	-	0.6
Cm245	0.1	0.8	0.3	-	-	-	1.1
Fe56	2.0	-	-	-10.2	-23.0	-	-31.3
Cr52	0.3	-	-	-2.4	-2.7	-	-4.8
Ni58	-	-	-	-0.1	-0.1	-	-0.2
Zr90	0.2	-	-	-0.9	-1.2	-	-2.0
Na23	0.1	-	-	-13.7	-6.3	-	-20.0
C	-	-	-	-0.1	-	-	-0.1
B10	3.7	-	-	-0.2	-	-	3.6
Mn55	0.1	-	-	-0.2	-0.3	-	-0.4
Total	26.3	21.5	-	-30.0	-46.1	-0.2	-28.6

Table 74. η EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	-0.6	-	-0.2	-2.3	-0.5	-3.9
2	**6.07**	-0.4	-2.9	0.1	-1.1	-26.2	-	-30.5
3	**2.23**	-	-0.2	-	-7.2	-14.5	-	-21.9
4	**1.35**	1.6	3.9	-0.1	-4.9	-2.8	-	-2.3
5	**4.98E-1**	3.0	4.3	-	-6.0	-0.6	-	0.6
6	**1.83E-1**	5.5	5.1	0.1	-5.8	-0.5	-	4.4
7	**6.74E-2**	7.4	3.8	0.1	-0.2	0.1	-	11.2
8	**2.48E-2**	7.1	2.6	0.1	2.6	0.1	-	12.5
9	**9.12E-3**	4.3	1.5	0.1	2.6	-	-	8.7
10	**2.04E-3**	3.9	1.1	-0.2	0.9	-	-	5.7
11	**4.54E-4**	0.5	-	-0.2	0.1	-	-	0.4
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		32.6	18.6	-	-19.0	-46.8	-0.5	-15.2

Table 75. η GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.5	-0.8	-	-0.3	-2.0	-0.7	-4.2
2	**6.07**	-0.1	-3.1	0.3	-5.3	-23.3	-	-31.4
3	**2.23**	-	0.1	0.2	-12.9	-10.6	-	-23.2
4	**1.35**	1.5	3.3	-	-4.6	-1.6	-	-1.3
5	**4.98E-1**	2.4	2.5	-	-3.0	-0.2	-	1.6
6	**1.83E-1**	4.9	3.0	-0.1	-3.2	-0.2	-	4.4
7	**6.74E-2**	7.3	2.6	-	0.9	0.1	-	10.8
8	**2.48E-2**	7.6	2.1	-	3.6	-	-	13.3
9	**9.12E-3**	7.9	2.2	-	4.3	-	-	14.3
10	**2.04E-3**	3.1	0.9	-0.1	1.3	-	-	5.3
11	**4.54E-4**	0.7	0.1	-0.2	-	-	-	0.6
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-0.1	-	-	-	-	-	-0.2
14	**5.40E-7**	-0.2	0.1	-	-	-	-	-0.1
15	**1.00E-7**	-	-	-	-	-	-	-
Total		34.5	13.1	-	-19.1	-37.8	-0.7	-10.1

Table 76. η EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	0.1	-	-	-	-	0.1
U238	20.5	-1.7	0.4	-2.1	-25.2	-0.5	-8.6
Np237	0.1	-	-	-	-	-	0.1
Pu238	0.2	0.4	-	-	-	-	0.5
Pu239	5.0	17.0	-0.4	-0.2	-1.4	-	20.0
Pu240	3.1	0.9	-0.2	-0.1	-1.1	-	2.6
Pu241	0.3	1.5	-	-	-0.1	-	1.7
Pu242	0.3	-	-	-	-0.2	-	0.2
Am241	1.1	0.1	0.1	-	-0.1	-	1.1
Am242m	-	0.1	-	-	-	-	0.2
Am243	0.3	-	-	-	-	-	0.2
Cm244	0.1	-	-	-	-	-	0.1
Cm245	-	0.1	-	-	-	-	0.1
Fe56	1.0	-	-	-2.2	-11.2	-	-12.4
Cr52	0.2	-	-	-0.8	-2.2	-	-2.9
Ni58	0.3	-	-	-0.3	-1.5	-	-1.6
Zr90	-	-	-	-	-	-	-
Na23	0.1	-	-	-2.7	-2.9	-	-5.5
O16	-0.3	-	-	-10.3	-0.2	-	-10.8
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-0.2	-0.1	-	-0.3
Mn55	0.1	-	-	-	-0.3	-	-0.2
Ti48	-	-	-	-	-0.1	-	-
Total	32.6	18.6	-	-19.0	-46.8	-0.5	-15.2

Table 77. η GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.3	1.0	0.1	-	-0.1	-	1.2
U238	20.0	-1.9	0.5	-0.9	-27.5	-0.6	-10.5
Np237	1.2	0.1	-	-	-0.2	-	1.2
Pu238	0.3	0.4	-	-	-0.1	-	0.6
Pu239	3.6	9.8	-0.6	-0.1	-1.0	-	11.7
Pu240	2.1	0.5	-0.1	-0.1	-0.8	-	1.7
Pu241	0.6	2.6	-0.2	-	-0.2	-	2.8
Pu242	0.7	0.1	-	-	-0.3	-	0.4
Am241	5.1	0.2	0.1	-	-0.5	-	4.8
Am242m	-	-	-	-	-	-	-
Am243	1.1	-	-	-	-0.2	-	1.0
Cm244	0.2	-	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.7	-	-	-0.8
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	-0.3	-	-	-11.5	-0.9	-	-12.7
He4	-	-	-	-0.7	-	-	-0.7
Si28	-0.3	-	-	-5.1	-6.0	-	-11.4
Mn55	-	-	-	-	-	-	-
Ti48	-	-	-	-	-	-	-
Total	34.5	13.1	-	-19.1	-37.8	-0.7	-10.1

Table 78. η LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-2.2	-0.6	-3.0
2	**6.07**	-0.3	-1.6	0.1	-0.1	-23.7	-	-25.5
3	**2.23**	-0.3	-0.6	0.2	-3.5	-20.2	-	-24.3
4	**1.35**	2.4	5.5	0.7	-4.5	-5.0	-	-0.9
5	**4.98E-1**	6.6	6.6	0.7	-7.0	-1.3	-	5.6
6	**1.83E-1**	10.7	5.8	0.6	-4.7	-1.0	-	11.3
7	**6.74E-2**	11.6	3.2	-0.1	-0.6	-	-	14.2
8	**2.48E-2**	8.9	1.1	-0.7	0.8	-	-	10.1
9	**9.12E-3**	2.7	-0.2	-0.8	0.3	-	-	2.0
10	**2.04E-3**	0.6	-0.4	-0.5	-	-	-	-0.2
11	**4.54E-4**	0.2	-0.2	-0.3	0.1	-	-	-0.1
12	**2.26E-5**	-	-	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		43.1	19.0	-	-19.1	-53.4	-0.6	-10.9

Table 79. η ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-1.4	-0.2	-1.8
2	**6.07**	-0.1	-1.6	-	0.4	-14.0	-	-15.3
3	**2.23**	-	-0.5	0.1	-2.4	-12.9	-	-15.8
4	**1.35**	1.5	6.2	0.3	-3.1	-3.6	-	1.4
5	**4.98E-1**	4.9	4.0	0.1	-3.7	-1.0	-	4.5
6	**1.83E-1**	9.1	3.6	0.1	-3.5	-0.5	-	8.8
7	**6.74E-2**	10.0	2.7	-	-1.4	-	-	11.3
8	**2.48E-2**	9.0	2.0	-0.1	-	-	-	10.9
9	**9.12E-3**	6.0	1.2	-0.1	0.4	-	-	7.5
10	**2.04E-3**	2.0	0.2	-0.2	0.1	-	-	2.1
11	**4.54E-4**	0.2	-0.1	-0.2	0.1	-	-	-
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		42.7	17.4	-	-13.0	-33.3	-0.2	13.7

Table 80. η LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	-	-	-	-	0.1
U236	0.1	-	-	-	-0.1	-	-
U238	16.6	-1.1	0.2	-1.2	-20.6	-0.2	-6.4
Np237	0.6	0.1	-	-	-0.1	-	0.6
Pu238	0.3	0.8	-	-	-0.1	-	1.0
Pu239	3.1	15.1	-0.3	-0.1	-1.1	-	16.5
Pu240	2.6	1.7	0.2	-0.1	-1.1	-	3.4
Pu241	0.3	1.6	-0.1	-	-0.1	-	1.7
Pu242	0.5	0.2	-	-	-0.3	-	0.4
Am241	1.2	0.1	-	-	-0.2	-	1.1
Am242m	-	0.1	-	-	-	-	0.1
Am243	0.5	-	-	-	-0.1	-	0.4
Cm243	-	-	-	-	-	-	-
Cm244	0.2	0.1	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	1.0	-	-	-3.4	-7.8	-	-10.2
Cr52	0.1	-	-	-0.6	-0.8	-	-1.4
Ni58	-	-	-	-	-	-	-
Zr90	0.3	-	-	-1.3	-1.8	-	-2.7
C	-	-	-	-0.8	-	-	-0.8
Pb204	0.2	-	-	-0.1	-0.6	-	-0.5
Pb206	0.8	-	-	-2.1	-8.5	-0.1	-9.9
Pb207	0.4	-	-	-2.0	-5.4	-0.1	-7.1
Pb208	0.1	-	-	-5.2	-4.4	-0.2	-9.6
B10	13.9	-	-	-1.9	-	-	12.0
Mn55	0.1	-	-	-	-0.1	-	-0.1
Total	43.1	19.0	-	-19.1	-53.4	-0.6	-10.9

Table 81. η ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	7.0	0.9	0.1	-0.1	-1.3	-	6.6
Pu238	0.2	0.5	-	-	-0.1	-	0.6
Pu239	2.4	9.3	-0.1	-0.1	-0.8	-	10.6
Pu240	1.2	0.6	-	-0.1	-0.5	-	1.2
Pu241	0.6	3.2	-0.1	-	-0.2	-	3.5
Pu242	0.5	0.1	-	-	-0.2	-	0.3
Am241	15.9	0.6	0.1	-0.2	-2.3	-	14.1
Am242m	0.1	0.4	-	-	-	-	0.4
Am243	10.0	0.2	-	-0.2	-2.1	-	8.1
Cm243	-	0.1	-	-	-	-	0.1
Cm244	2.2	0.7	-	-0.1	-0.5	-	2.2
Cm245	0.2	0.9	-	-	-0.1	-	0.9
Fe56	1.3	-	-	-5.5	-13.3	-	-17.6
Cr52	0.2	-	-	-1.1	-1.5	-	-2.5
Ni58	-	-	-	-	-	-	-0.1
Zr90	0.5	-	-	-2.2	-3.1	-	-4.8
C	-	-	-	-	-	-	-
Pb204	0.1	-	-	-0.1	-0.2	-	-0.2
Pb206	0.2	-	-	-0.7	-3.3	-	-3.8
Pb207	0.1	-	-	-0.7	-2.1	-	-2.7
Pb208	-	-	-	-1.8	-1.6	-0.1	-3.4
B10	-	-	-	-	-	-	-
Mn55	-	-	-	-	-0.1	-	-0.1
Total	42.7	17.4	-	-13.0	-33.3	-0.2	13.7

Table 82. η PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.2	-	-0.9	-0.6	-0.2	-2.1
2	**6.07**	-0.1	-0.5	-	-8.5	-4.3	-	-13.4
3	**2.23**	-	-	-	-5.7	-1.2	-	-6.8
4	**1.35**	0.1	0.1	-	0.6	-	-	0.9
5	**4.98E-1**	0.1	0.1	-	0.7	-	-	0.9
6	**1.83E-1**	0.1	0.1	-	0.8	-	-	0.9
7	**6.74E-2**	0.1	0.1	-	1.3	-	-	1.4
8	**2.48E-2**	0.1	0.1	-	1.7	-	-	1.9
9	**9.12E-3**	0.3	0.1	-	3.2	-	-	3.6
10	**2.04E-3**	0.3	0.2	-	3.8	-	-	4.3
11	**4.54E-4**	1.3	0.6	-	11.1	-	-	13.0
12	**2.26E-5**	2.0	-0.2	-	15.8	-	-	17.6
13	**4.00E-6**	-0.7	-1.5	-	2.1	-	-	-0.1
14	**5.40E-7**	-1.6	-5.6	-	1.5	-	-	-5.7
15	**1.00E-7**	-3.3	-12.4	-	0.3	-	-	-15.5
Total		-1.3	-19.3	-	27.8	-6.1	-0.2	0.9

Table 83. η PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.1	-18.7	-	-	-0.3	-	-22.1
U238	2.9	-0.6	-	-0.1	-4.9	-0.2	-2.9
Zr90	-	-	-	-	-0.7	-	-0.7
O16	-0.2	-	-	-1.4	-0.2	-	-1.9
H	-0.9	-	-	29.4	-	-	28.5
Total	-1.3	-19.3	-	27.8	-6.1	-0.2	0.9

Np237_1 Sample

Table 84. η R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-0.1	-	-0.2	-0.2	-0.1	-0.6
2	6.07	-	-0.2	-	-3.5	-2.5	-	-6.2
3	2.23	-	-	-	-3.6	-0.9	-	-4.4
4	1.35	0.1	-	-	-1.1	-0.1	-	-1.1
5	4.98E-1	-	-	-	-0.2	-	-	-0.1
6	1.83E-1	-	-	-	0.2	-	-	0.2
7	6.74E-2	0.1	-	-	0.6	-	-	0.7
8	2.48E-2	0.1	-	-	1.0	-	-	1.1
9	9.12E-3	0.2	-	-	2.0	-	-	2.2
10	2.04E-3	0.2	-	-	2.9	-	-	3.1
11	4.54E-4	0.8	0.1	-	10.5	-	-	11.4
12	2.26E-5	1.8	-0.2	-	15.5	-	-	17.1
13	4.00E-6	-0.6	-0.7	-	2.9	-	-	1.6
14	5.40E-7	-1.8	-3.7	-	2.4	-	-	-3.1
15	1.00E-7	-6.5	-14.8	-	0.4	-	-	-20.9
Total		-5.7	-19.4	-	29.7	-3.7	-0.1	0.9

Table 85. η R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-0.2	-0.2	-0.1	-0.5
2	6.07	-	-0.2	-	-3.1	-2.0	-	-5.3
3	2.23	-	-	-	-3.1	-0.7	-	-3.8
4	1.35	0.1	-	-	-0.9	-0.1	-	-0.9
5	4.98E-1	-	-	-	-0.1	-	-	-0.1
6	1.83E-1	-	-	-	0.1	-	-	0.2
7	6.74E-2	0.1	-	-	0.5	-	-	0.6
8	2.48E-2	0.1	-	-	0.9	-	-	0.9
9	9.12E-3	0.1	-	-	1.8	-	-	2.0
10	2.04E-3	0.1	-	-	2.9	-	-	3.0
11	4.54E-4	0.6	0.1	-	10.5	-	-	11.2
12	2.26E-5	1.5	-0.1	-	15.7	-	-	17.1
13	4.00E-6	-0.5	-0.6	-	2.7	-	-	1.5
14	5.40E-7	-1.7	-3.4	-	2.5	-	-	-2.6
15	1.00E-7	-7.1	-15.2	-	0.4	-	-	-21.9
Total		-6.9	-19.4	-	30.5	-2.9	-0.1	1.3

Table 86. η R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.4	-19.2	-	-	-0.1	-	-22.6
U238	-	-0.2	-	-0.3	-2.6	-0.1	-3.1
Zr90	-	-	-	-0.1	-0.6	-	-0.7
O16	-0.1	-	-	-0.9	-0.1	-	-1.0
H	-1.9	-	-	31.1	-	-	29.2
Al27	-0.3	-	-	-0.2	-0.4	-	-0.9
Total	-5.7	-19.4	-	29.7	-3.7	-0.1	0.9

Table 87. η R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.4	-19.2	-	-	-	-	-22.6
U238	-0.6	-0.2	-	-0.2	-2.1	-0.1	-3.1
Zr90	-	-	-	-0.1	-0.5	-	-0.5
O16	-0.1	-	-	-0.6	-	-	-0.7
H	-2.5	-	-	31.6	-	-	29.1
Al27	-0.3	-	-	-0.1	-0.3	-	-0.8
Total	-6.9	-19.4	-	30.5	-2.9	-0.1	1.3

Table 88. η R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.1	-0.2	-	-0.7	-0.8	-0.2	-2.0
2	6.07	-0.1	-0.5	-	-8.0	-6.1	-	-14.7
3	2.23	-	-	-	-7.3	-1.6	-	-8.9
4	1.35	0.2	0.1	-	-1.5	-0.1	-	-1.4
5	4.98E-1	0.1	-	-	-0.2	-	-	-
6	1.83E-1	0.1	-	-	0.2	-	-	0.3
7	6.74E-2	0.2	-	-	0.8	-	-	1.0
8	2.48E-2	0.2	-	-	1.3	-	-	1.5
9	9.12E-3	0.4	-	-	2.6	-	-	3.0
10	2.04E-3	0.5	0.1	-	3.6	-	-	4.2
11	4.54E-4	2.1	0.4	-	11.9	-	-	14.4
12	2.26E-5	3.6	-	-	18.6	-	-	22.2
13	4.00E-6	-3.3	-0.5	-	4.5	-	-	0.7
14	5.40E-7	-4.7	-5.9	-	6.6	-	-	-4.0
15	1.00E-7	-7.1	-10.4	-	0.2	-	-	-17.3
Total		-8.0	-16.7	-	32.5	-8.8	-0.2	-1.1

Table 89. η MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.3	-0.5	-	-1.2	-1.5	-0.4	-3.9
2	6.07	-0.2	-1.3	-	-13.9	-11.0	-	-26.5
3	2.23	-	-	-	-11.1	-3.9	-	-14.9
4	1.35	0.3	0.5	-	-2.5	-0.3	-	-2.0
5	4.98E-1	0.3	0.3	-	-0.6	-	-	-0.1
6	1.83E-1	0.3	0.2	-	-	-	-	0.4
7	6.74E-2	0.4	0.1	-	0.8	-	-	1.3
8	2.48E-2	0.5	0.1	-	1.4	-	-	2.0
9	9.12E-3	1.0	0.3	-	2.8	-	-	4.1
10	2.04E-3	1.5	0.5	-	3.7	-	-	5.7
11	4.54E-4	5.5	2.2	-	9.4	-	-	17.1
12	2.26E-5	6.7	1.0	-	14.7	-	-	22.4
13	4.00E-6	-2.0	-0.5	-	2.6	-	-	0.1
14	5.40E-7	-2.1	-3.0	-	2.7	-	-	-2.4
15	1.00E-7	-2.2	-3.7	-	0.1	-	-	-5.9
Total		9.6	-3.6	-	8.8	-16.7	-0.4	-2.3

Table 90. η R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-0.3	-1.8	-	-	-	-	-2.1
U238	5.1	-0.5	-	-0.5	-5.7	-0.2	-1.7
Pu239	-6.5	-13.8	-	-	-0.1	-	-20.3
Pu240	-3.0	-	-	-	-	-	-3.1
Pu241	-0.2	-0.5	-	-	-	-	-0.7
Pu242	-0.1	-	-	-	-	-	-0.1
Am241	-1.8	-	-	-	-	-	-1.9
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.4	-2.8	-	-3.1
O16	-0.2	-	-	-2.2	-0.2	-	-2.6
H	-1.0	-	-	35.6	-	-	34.6
Total	-8.0	-16.7	-	32.5	-8.8	-0.2	-1.1

Table 91. η MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.1	-	-	-	-	-	0.1
U238	12.2	-1.2	-	-0.3	-11.9	-0.4	-1.7
Pu239	-0.6	-2.5	-	-	-0.5	-	-3.5
Pu240	-1.2	-	-	-	-0.1	-	-1.3
Pu241	-	-	-	-	-	-	-
Pu242	-	-	-	-	-	-	-
Am241	-	-	-	-	-	-	-0.1
Fe56	-0.1	-	-	-0.1	-2.7	-	-3.0
Cr52	-	-	-	-0.1	-0.7	-	-0.8
Ni58	-0.1	-	-	-	-0.3	-	-0.4
Zr90	-	-	-	-	-	-	-
O16	-0.4	-	-	-4.1	-0.3	-	-4.8
H	-0.2	-	-	13.5	-	-	13.4
Total	9.6	-3.6	-	8.8	-16.7	-0.4	-2.3

Table 92. η ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.5	0.1	-	-2.1	-0.6	-3.2
2	**6.07**	-0.1	-1.9	0.6	0.4	-22.6	-	-23.6
3	**2.23**	-	-0.2	0.4	-2.7	-16.3	-	-18.9
4	**1.35**	1.7	4.2	0.4	-4.3	-5.2	-	-3.1
5	**4.98E-1**	3.7	6.9	0.7	-11.3	-2.3	-	-2.2
6	**1.83E-1**	6.0	6.8	0.3	-10.5	-2.1	-	0.6
7	**6.74E-2**	6.6	3.8	-0.1	-3.1	-	-	7.1
8	**2.48E-2**	5.8	2.0	-0.5	-0.8	-	-	6.5
9	**9.12E-3**	1.7	0.4	-0.3	0.5	-	-	2.3
10	**2.04E-3**	1.7	-0.1	-0.8	0.1	-	-	0.9
11	**4.54E-4**	0.4	-0.3	-0.6	0.3	-	-	-0.2
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		27.6	21.1	0.1	-31.5	-50.5	-0.6	-33.8

Table 93. η SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.4	-0.1	-0.1	-2.5	-0.2	-3.3
2	**6.07**	-0.1	-2.3	-0.8	-0.8	-21.5	-	-25.5
3	**2.23**	-	-0.6	-0.7	-5.9	-16.1	-	-23.3
4	**1.35**	1.1	3.4	-1.6	-6.0	-4.5	-	-7.6
5	**4.98E-1**	3.3	4.9	-0.2	-10.6	-0.8	-	-3.5
6	**1.83E-1**	5.7	5.6	0.7	-9.8	-0.6	-	1.6
7	**6.74E-2**	5.7	3.9	0.8	-1.5	-	-	8.9
8	**2.48E-2**	5.4	3.4	0.7	0.7	-	-	10.2
9	**9.12E-3**	2.0	1.4	0.5	1.7	-	-	5.5
10	**2.04E-3**	3.0	2.3	1.1	1.2	-	-	7.6
11	**4.54E-4**	0.5	-	-0.2	0.5	-	-	0.8
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		26.5	21.5	-	-30.5	-46.1	-0.2	-28.6

Table 94. η ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.1	0.2	-	-	-	-	0.2
U238	19.1	-1.4	0.9	-5.9	-30.7	-0.6	-18.6
Np237	0.1	-	-0.1	-	-	-	-
Pu238	-	-0.1	-0.1	-	-	-	-0.1
Pu239	5.1	22.5	0.3	-0.9	-2.2	-	24.7
Pu240	0.7	0.1	-0.2	-0.1	-0.3	-	0.2
Pu241	0.1	-0.1	-0.5	-	-	-	-0.6
Pu242	-	-	-0.1	-	-	-	-0.1
Am241	0.1	-	-0.1	-	-	-	-
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Fe56	1.3	-	-	-9.3	-11.1	-	-19.1
Cr52	0.2	-	-	-2.0	-1.3	-	-3.1
Ni58	-	-	-	-0.2	-	-	-0.2
Zr90	0.2	-	-	-1.4	-1.4	-	-2.6
Na23	-	-	-	-11.5	-3.2	-	-14.7
C	-	-	-	-	-	-	-
B10	0.5	-	-	-	-	-	0.5
Mn55	0.1	-	-	-0.2	-0.1	-	-0.2
Total	27.6	21.1	0.1	-31.5	-50.5	-0.6	-33.8

Table 95. η SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	0.1	-	-	-	0.3
U238	5.4	-0.2	0.4	-1.0	-7.9	-0.1	-3.4
Np237	1.1	-0.1	-0.2	-	-0.2	-	0.6
Pu238	0.7	1.6	0.1	-0.1	-0.2	-	2.1
Pu239	2.9	9.7	-1.9	-0.3	-0.8	-	9.4
Pu240	3.8	1.2	-0.6	-0.4	-1.5	-	2.5
Pu241	0.7	4.4	0.7	-0.1	-0.2	-	5.4
Pu242	1.2	0.2	-0.1	-0.1	-0.6	-	0.5
Am241	1.7	-0.1	-0.2	-	-0.2	-	1.1
Am242m	0.4	3.6	1.4	-	-0.2	-	5.2
Am243	1.5	-	-	-	-0.3	-	1.1
Cm242	-	0.1	-	-	-	-	0.1
Cm244	0.6	0.2	0.1	-	-0.1	-	0.6
Cm245	0.1	0.8	0.3	-	-	-	1.1
Fe56	2.0	-	-	-10.3	-22.9	-	-31.3
Cr52	0.3	-	-	-2.4	-2.7	-	-4.8
Ni58	-	-	-	-0.1	-0.1	-	-0.2
Zr90	0.2	-	-	-0.9	-1.2	-	-2.0
Na23	0.1	-	-	-14.0	-6.3	-	-20.2
C	-	-	-	-0.1	-	-	-0.1
B10	3.7	-	-	-0.2	-	-	3.6
Mn55	0.2	-	-	-0.3	-0.3	-	-0.4
Total	26.5	21.5	-	-30.5	-46.1	-0.2	-28.6

Table 96. η EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	-0.6	-	-0.2	-2.3	-0.5	-3.9
2	**6.07**	-0.4	-2.9	0.1	-1.1	-26.0	-	-30.3
3	**2.23**	-	-0.2	-	-7.1	-14.5	-	-21.8
4	**1.35**	1.6	3.9	-0.1	-5.1	-3.0	-	-2.7
5	**4.98E-1**	3.0	4.3	-	-6.1	-0.6	-	0.5
6	**1.83E-1**	5.5	5.1	0.1	-5.8	-0.5	-	4.4
7	**6.74E-2**	7.5	3.8	0.1	-0.3	0.1	-	11.2
8	**2.48E-2**	7.1	2.7	0.1	2.5	0.1	-	12.5
9	**9.12E-3**	4.4	1.6	0.1	2.6	-	-	8.7
10	**2.04E-3**	4.0	1.1	-0.2	0.9	-	-	5.8
11	**4.54E-4**	0.5	-	-0.2	0.1	-	-	0.4
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		32.9	18.7	-	-19.5	-46.8	-0.5	-15.2

Table 97. η GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.5	-0.8	-	-0.3	-2.0	-0.7	-4.2
2	**6.07**	-0.1	-3.1	0.3	-5.2	-23.2	-	-31.3
3	**2.23**	-	0.1	0.2	-12.8	-10.7	-	-23.1
4	**1.35**	1.5	3.3	-	-4.9	-1.7	-	-1.8
5	**4.98E-1**	2.4	2.5	-	-3.1	-0.2	-	1.6
6	**1.83E-1**	4.9	3.0	-0.1	-3.2	-0.2	-	4.4
7	**6.74E-2**	7.3	2.6	-	0.8	0.1	-	10.8
8	**2.48E-2**	7.7	2.1	-	3.5	-	-	13.3
9	**9.12E-3**	8.0	2.2	-	4.2	-	-	14.4
10	**2.04E-3**	3.2	0.9	-0.1	1.3	-	-	5.4
11	**4.54E-4**	0.7	0.1	-0.2	-	-	-	0.6
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-0.1	-	-	-	-	-	-0.2
14	**5.40E-7**	-0.2	0.1	-	-	-	-	-0.1
15	**1.00E-7**	-	-	-	-	-	-	-
Total		34.9	13.2	-	-19.7	-37.9	-0.7	-10.2

Table 98. η EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.1	-	-	-	-	0.1
U238	20.7	-1.7	0.4	-2.1	-25.3	-0.5	-8.5
Np237	0.1	-	-	-	-	-	0.2
Pu238	0.2	0.4	-	-	-	-	0.5
Pu239	5.1	17.1	-0.4	-0.2	-1.4	-	20.2
Pu240	3.1	0.9	-0.2	-0.1	-1.1	-	2.6
Pu241	0.3	1.5	-	-	-0.1	-	1.7
Pu242	0.3	-	-	-	-0.2	-	0.2
Am241	1.1	0.1	0.1	-	-0.1	-	1.1
Am242m	-	0.1	-	-	-	-	0.2
Am243	0.3	-	-	-	-	-	0.2
Cm244	0.1	-	-	-	-	-	0.1
Cm245	-	0.1	-	-	-	-	0.1
Fe56	1.0	-	-	-2.2	-11.1	-	-12.3
Cr52	0.2	-	-	-0.8	-2.2	-	-2.9
Ni58	0.3	-	-	-0.3	-1.5	-	-1.6
Zr90	-	-	-	-	-	-	-
Na23	0.1	-	-	-2.8	-2.9	-	-5.6
O16	-0.3	-	-	-10.6	-0.2	-	-11.1
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-0.2	-0.1	-	-0.3
Mn55	0.1	-	-	-	-0.3	-	-0.2
Ti48	-	-	-	-	-0.1	-	-
Total	32.9	18.7	-	-19.5	-46.8	-0.5	-15.2

Table 99. η GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.3	1.0	0.1	-	-0.1	-	1.2
U238	20.2	-1.9	0.5	-0.9	-27.6	-0.6	-10.3
Np237	1.2	0.1	-	-	-0.2	-	1.2
Pu238	0.3	0.5	-	-	-0.1	-	0.6
Pu239	3.6	9.9	-0.6	-0.1	-1.0	-	11.9
Pu240	2.1	0.5	-0.1	-0.1	-0.8	-	1.8
Pu241	0.6	2.6	-0.2	-	-0.2	-	2.8
Pu242	0.7	0.1	-	-	-0.3	-	0.5
Am241	5.2	0.2	0.1	-	-0.6	-	4.9
Am242m	-	-	-	-	-	-	-
Am243	1.1	-	-	-	-0.2	-	1.0
Cm244	0.2	-	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.8	-	-	-0.8
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	-0.3	-	-	-12.0	-0.9	-	-13.2
He4	-	-	-	-0.7	-	-	-0.7
Si28	-0.3	-	-	-5.2	-6.0	-	-11.5
Mn55	-	-	-	-	-	-	-
Ti48	-	-	-	-	-	-	-
Total	34.9	13.2	-	-19.7	-37.9	-0.7	-10.2

Table 100. η LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-2.2	-0.5	-3.0
2	**6.07**	-0.3	-1.6	0.1	-0.1	-23.4	-	-25.2
3	**2.23**	-0.3	-0.6	0.2	-3.4	-20.0	-	-24.1
4	**1.35**	2.4	5.4	0.7	-4.7	-5.4	-	-1.7
5	**4.98E-1**	6.6	6.7	0.7	-7.1	-1.3	-	5.5
6	**1.83E-1**	10.7	5.8	0.6	-4.7	-1.0	-	11.4
7	**6.74E-2**	11.7	3.2	-0.1	-0.6	-	-	14.3
8	**2.48E-2**	8.9	1.1	-0.7	0.8	-	-	10.1
9	**9.12E-3**	2.8	-0.2	-0.8	0.3	-	-	2.1
10	**2.04E-3**	0.6	-0.4	-0.5	-	-	-	-0.2
11	**4.54E-4**	0.2	-0.2	-0.3	0.1	-	-	-0.1
12	**2.26E-5**	-	-	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		43.3	19.0	-	-19.3	-53.2	-0.6	-10.8

Table 101. η ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-1.4	-0.2	-1.7
2	**6.07**	-0.1	-1.6	-	0.4	-13.9	-	-15.1
3	**2.23**	-	-0.5	0.1	-2.4	-12.8	-	-15.6
4	**1.35**	1.5	6.1	0.3	-3.2	-3.8	-	1.1
5	**4.98E-1**	4.9	4.0	0.1	-3.7	-1.0	-	4.5
6	**1.83E-1**	9.2	3.7	0.1	-3.6	-0.5	-	8.8
7	**6.74E-2**	10.0	2.7	-	-1.4	-	-	11.3
8	**2.48E-2**	9.0	2.0	-0.1	-	-	-	10.9
9	**9.12E-3**	6.0	1.2	-0.1	0.4	-	-	7.6
10	**2.04E-3**	2.0	0.2	-0.2	0.1	-	-	2.1
11	**4.54E-4**	0.2	-0.1	-0.2	0.1	-	-	-
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		42.9	17.4	-	-13.1	-33.2	-0.2	13.8

Table 102. η LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	-	-	-	-	0.1
U236	0.1	-	-	-	-0.1	-	-
U238	16.6	-1.1	0.2	-1.2	-20.6	-0.2	-6.4
Np237	0.6	0.1	-	-	-0.1	-	0.6
Pu238	0.3	0.8	-	-	-0.1	-	1.0
Pu239	3.1	15.0	-0.3	-0.1	-1.1	-	16.5
Pu240	2.6	1.7	0.2	-0.1	-1.1	-	3.3
Pu241	0.3	1.6	-0.1	-	-0.1	-	1.7
Pu242	0.5	0.2	-	-	-0.3	-	0.4
Am241	1.3	0.1	-	-	-0.2	-	1.1
Am242m	-	0.1	-	-	-	-	0.1
Am243	0.5	-	-	-	-0.1	-	0.4
Cm243	-	-	-	-	-	-	-
Cm244	0.2	0.1	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	1.0	-	-	-3.5	-7.8	-	-10.2
Cr52	0.1	-	-	-0.6	-0.8	-	-1.4
Ni58	-	-	-	-	-	-	-
Zr90	0.3	-	-	-1.3	-1.8	-	-2.7
C	-	-	-	-0.8	-	-	-0.8
Pb204	0.2	-	-	-0.1	-0.5	-	-0.5
Pb206	0.8	-	-	-2.1	-8.5	-0.1	-9.9
Pb207	0.4	-	-	-2.0	-5.4	-0.1	-7.1
Pb208	0.1	-	-	-5.2	-4.4	-0.2	-9.6
B10	14.0	-	-	-2.0	-	-	12.0
Mn55	0.1	-	-	-	-0.1	-	-0.1
Total	43.3	19.0	-	-19.3	-53.2	-0.6	-10.8

Table 103. η ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	7.1	0.9	0.1	-0.1	-1.3	-	6.6
Pu238	0.2	0.5	-	-	-0.1	-	0.6
Pu239	2.4	9.3	-0.1	-0.1	-0.8	-	10.7
Pu240	1.2	0.6	-	-0.1	-0.5	-	1.2
Pu241	0.6	3.2	-0.1	-	-0.2	-	3.5
Pu242	0.5	0.1	-	-	-0.2	-	0.3
Am241	15.9	0.6	0.1	-0.2	-2.3	-	14.1
Am242m	0.1	0.4	-	-	-	-	0.4
Am243	10.1	0.2	-	-0.2	-2.1	-	8.1
Cm243	-	0.1	-	-	-	-	0.1
Cm244	2.2	0.6	-	-0.1	-0.5	-	2.2
Cm245	0.2	0.9	-	-	-0.1	-	0.9
Fe56	1.3	-	-	-5.5	-13.3	-	-17.5
Cr52	0.2	-	-	-1.1	-1.5	-	-2.4
Ni58	-	-	-	-	-	-	-0.1
Zr90	0.5	-	-	-2.2	-3.0	-	-4.8
C	-	-	-	-	-	-	-
Pb204	0.1	-	-	-0.1	-0.2	-	-0.2
Pb206	0.2	-	-	-0.7	-3.2	-	-3.8
Pb207	0.1	-	-	-0.7	-2.1	-	-2.7
Pb208	-	-	-	-1.8	-1.6	-0.1	-3.4
B10	-	-	-	-	-	-	-
Mn55	-	-	-	-	-0.1	-	-0.1
Total	42.9	17.4	-	-13.1	-33.2	-0.2	13.8

Table 104. η PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.2	-	-0.9	-0.6	-0.2	-2.1
2	**6.07**	-0.1	-0.5	-	-8.7	-4.4	-	-13.7
3	**2.23**	-	-	-	-5.9	-1.2	-	-7.0
4	**1.35**	0.1	0.1	-	0.4	-	-	0.7
5	**4.98E-1**	0.1	0.1	-	0.7	-	-	0.8
6	**1.83E-1**	0.1	0.1	-	0.7	-	-	0.9
7	**6.74E-2**	0.1	0.1	-	1.2	-	-	1.4
8	**2.48E-2**	0.2	0.1	-	1.6	-	-	1.8
9	**9.12E-3**	0.3	0.1	-	3.0	-	-	3.4
10	**2.04E-3**	0.4	0.2	-	3.6	-	-	4.1
11	**4.54E-4**	1.4	0.7	-	10.6	-	-	12.7
12	**2.26E-5**	2.1	-0.1	-	15.2	-	-	17.1
13	**4.00E-6**	-0.6	-1.4	-	3.0	-	-	1.0
14	**5.40E-7**	-1.6	-5.6	-	2.7	-	-	-4.5
15	**1.00E-7**	-3.3	-12.5	-	0.3	-	-	-15.6
Total		-1.0	-18.9	-	27.4	-6.3	-0.2	0.9

Table 105. η PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.0	-18.4	-	-	-0.3	-	-21.7
U238	3.0	-0.6	-	-0.1	-5.0	-0.2	-2.9
Zr90	-	-	-	-	-0.7	-	-0.8
O16	-0.2	-	-	-1.5	-0.2	-	-1.9
H	-0.9	-	-	29.1	-	-	28.2
Total	-1.0	-18.9	-	27.4	-6.3	-0.2	0.9

Pu239 Sample

Table 106. η R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-	-	-	-0.1
2	6.07	-	-	-	-0.5	-0.4	-	-0.9
3	2.23	-	-	-	-0.5	-0.1	-	-0.6
4	1.35	-	-	-	-	-	-	-
5	4.98E-1	-	-	-	0.1	-	-	0.1
6	1.83E-1	-	-	-	0.2	-	-	0.2
7	6.74E-2	-	-	-	0.3	-	-	0.4
8	2.48E-2	-	-	-	0.5	-	-	0.5
9	9.12E-3	-	-	-	1.0	-	-	1.0
10	2.04E-3	-	-	-	1.4	-	-	1.4
11	4.54E-4	-	-0.1	-	5.3	-	-	5.2
12	2.26E-5	0.3	-0.1	-	6.9	-	-	7.1
13	4.00E-6	-0.3	-0.4	-	2.8	-	-	2.1
14	5.40E-7	-1.0	-2.1	-	-2.3	-	-	-5.4
15	1.00E-7	-3.0	-7.0	-	0.2	-	-	-9.8
Total		-4.0	-9.7	-	15.5	-0.5	-	1.2

Table 107. η R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-	-	-	-0.1
2	6.07	-	-	-	-0.5	-0.3	-	-0.8
3	2.23	-	-	-	-0.4	-0.1	-	-0.5
4	1.35	-	-	-	-	-	-	-
5	4.98E-1	-	-	-	0.1	-	-	0.1
6	1.83E-1	-	-	-	0.2	-	-	0.2
7	6.74E-2	-	-	-	0.3	-	-	0.3
8	2.48E-2	-	-	-	0.4	-	-	0.4
9	9.12E-3	-	-	-	0.9	-	-	0.9
10	2.04E-3	-	-	-	1.4	-	-	1.4
11	4.54E-4	-	-	-	5.1	-	-	5.1
12	2.26E-5	0.3	-0.1	-	6.9	-	-	7.1
13	4.00E-6	-0.3	-0.3	-	2.5	-	-	1.9
14	5.40E-7	-0.9	-1.9	-	-1.7	-	-	-4.5
15	1.00E-7	-3.4	-7.2	-	0.3	-	-	-10.3
Total		-4.2	-9.5	-	15.4	-0.4	-	1.2

Table 108. η R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-1.8	-9.7	-	-	-	-	-11.5
U238	-1.1	-	-	-	-0.4	-	-1.5
Zr90	-	-	-	-	-0.1	-	-0.1
O16	-	-	-	0.1	-	-	0.1
H	-0.9	-	-	15.4	-	-	14.4
Al27	-0.2	-	-	-	-0.1	-	-0.2
Total	-4.0	-9.7	-	15.5	-0.5	-	1.2

Table 109. η R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-1.7	-9.5	-	-	-	-	-11.2
U238	-1.1	-	-	-	-0.3	-	-1.4
Zr90	-	-	-	-	-0.1	-	-0.1
O16	-	-	-	0.1	-	-	0.1
H	-1.2	-	-	15.3	-	-	14.1
Al27	-0.2	-	-	-	-	-	-0.2
Total	-4.2	-9.5	-	15.4	-0.4	-	1.2

Table 110. η R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-0.1	-0.2	-	-0.4
2	6.07	-	-0.1	-	-1.6	-1.2	-	-3.0
3	2.23	-	-	-	-1.4	-0.3	-	-1.8
4	1.35	-	-	-	-	-	-	-
5	4.98E-1	-	-	-	0.2	-	-	0.2
6	1.83E-1	-	-	-	0.3	-	-	0.3
7	6.74E-2	-	-	-	0.6	-	-	0.6
8	2.48E-2	-	-	-	0.9	-	-	0.9
9	9.12E-3	0.1	-	-	1.8	-	-	1.8
10	2.04E-3	-	-	-	2.5	-	-	2.6
11	4.54E-4	0.2	-0.1	-	8.7	-	-	8.8
12	2.26E-5	0.8	-0.4	-	11.6	-	-	12.1
13	4.00E-6	-3.0	-0.5	-	4.7	-	-	1.3
14	5.40E-7	-5.1	-6.3	-	0.9	-	-	-10.5
15	1.00E-7	-5.1	-7.6	-	0.2	-	-	-12.5
Total		-11.9	-14.9	-	29.1	-1.7	-	0.4

Table 111. η MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.1	-0.2	-	-0.4	-0.5	-0.2	-1.3
2	6.07	-0.1	-0.4	-	-4.8	-3.8	-	-9.1
3	2.23	-	-	-	-3.8	-1.3	-	-5.1
4	1.35	0.1	0.2	-	-0.7	-0.1	-	-0.5
5	4.98E-1	0.1	0.1	-	-0.1	-	-	0.1
6	1.83E-1	0.1	0.1	-	0.3	-	-	0.4
7	6.74E-2	0.1	-	-	0.9	-	-	1.0
8	2.48E-2	0.2	-	-	1.3	-	-	1.5
9	9.12E-3	0.3	0.1	-	2.7	-	-	3.1
10	2.04E-3	0.4	0.1	-	3.8	-	-	4.3
11	4.54E-4	1.4	0.2	-	10.5	-	-	12.1
12	2.26E-5	2.4	-0.8	-	12.9	-	-	14.5
13	4.00E-6	-4.2	-1.3	-	5.5	-	-	-0.1
14	5.40E-7	-5.8	-8.1	-	0.5	-	-	-13.4
15	1.00E-7	-3.1	-5.1	-	0.1	-	-	-8.1
Total		-8.3	-15.0	-	28.7	-5.7	-0.2	-0.5

Table 112. η R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-0.3	-1.6	-	-	-	-	-1.9
U238	0.4	-0.1	-	-0.1	-1.1	-	-1.0
Pu239	-6.4	-12.7	-	-	-	-	-19.1
Pu240	-2.5	-	-	-	-	-	-2.5
Pu241	-0.2	-0.5	-	-	-	-	-0.7
Pu242	-0.2	-	-	-	-	-	-0.2
Am241	-1.9	-	-	-	-	-	-1.9
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-	-0.6	-	-0.6
O16	-	-	-	-0.2	-	-	-0.3
H	-0.8	-	-	29.4	-	-	28.6
Total	-11.9	-14.9	-	29.1	-1.7	-	0.4

Table 113. η MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	-0.1	-	-	-	-	-0.2
U238	4.3	-0.4	-	-0.2	-4.1	-0.1	-0.6
Pu239	-7.2	-14.2	-	-	-0.2	-	-21.6
Pu240	-3.7	-	-	-	-	-	-3.8
Pu241	-0.1	-0.3	-	-	-	-	-0.4
Pu242	-0.1	-	-	-	-	-	-0.1
Am241	-0.2	-	-	-	-	-	-0.2
Fe56	-0.5	-	-	-	-0.9	-	-1.4
Cr52	-	-	-	-	-0.3	-	-0.3
Ni58	-0.1	-	-	-	-0.1	-	-0.2
Zr90	-	-	-	-	-	-	-
O16	-0.1	-	-	-1.3	-0.1	-	-1.5
H	-0.3	-	-	30.2	-	-	29.9
Total	-8.3	-15.0	-	28.7	-5.7	-0.2	-0.5

Table 114. η ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.3	0.1	-	-1.4	-0.4	-2.1
2	**6.07**	-	-1.3	0.4	0.3	-15.5	-	-16.1
3	**2.23**	-	-0.2	0.3	-1.8	-11.2	-	-12.9
4	**1.35**	1.1	2.8	0.3	-2.8	-4.4	-	-3.0
5	**4.98E-1**	2.6	4.9	0.5	-9.4	-2.1	-	-3.5
6	**1.83E-1**	4.7	5.3	0.2	-9.3	-2.0	-	-1.1
7	**6.74E-2**	5.5	3.2	-0.1	-2.9	-0.1	-	5.6
8	**2.48E-2**	4.9	1.8	-0.4	-0.7	-	-	5.6
9	**9.12E-3**	1.4	0.3	-0.2	0.4	-	-	2.0
10	**2.04E-3**	1.3	-	-0.6	0.1	-	-	0.8
11	**4.54E-4**	0.3	-0.2	-0.4	0.2	-	-	-0.1
12	**2.26E-5**	0.1	-	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		21.7	16.2	0.1	-25.9	-36.7	-0.4	-25.0

Table 115. η SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.2	-0.1	-	-1.6	-0.1	-2.2
2	**6.07**	-0.1	-1.6	-0.6	-0.5	-14.4	-	-17.1
3	**2.23**	-	-0.5	-0.5	-3.9	-10.8	-	-15.7
4	**1.35**	0.7	2.1	-1.1	-4.4	-4.1	-	-6.7
5	**4.98E-1**	2.3	3.4	-0.2	-9.6	-0.8	-	-4.8
6	**1.83E-1**	4.5	4.3	0.5	-9.3	-0.7	-	-0.7
7	**6.74E-2**	4.7	3.1	0.6	-1.7	-	-	6.6
8	**2.48E-2**	4.5	2.7	0.5	0.6	-	-	8.3
9	**9.12E-3**	1.6	1.1	0.3	1.6	-	-	4.6
10	**2.04E-3**	2.3	1.7	0.8	1.2	-	-	5.9
11	**4.54E-4**	0.3	-	-0.1	0.4	-	-	0.5
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		20.8	16.1	-	-25.6	-32.4	-0.1	-21.3

Table 116. η ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	0.2	-	-	-	-	0.2
U238	15.1	-0.9	0.7	-4.7	-22.7	-0.4	-13.0
Np237	0.1	-	-	-	-	-	-
Pu238	-	-	-0.1	-	-	-	-0.1
Pu239	4.1	17.1	0.2	-0.7	-1.7	-	18.9
Pu240	0.6	0.1	-0.2	-0.1	-0.2	-	0.2
Pu241	0.1	-0.1	-0.4	-	-	-	-0.4
Pu242	-	-	-	-	-	-	-0.1
Am241	0.1	-	-	-	-	-	-
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Fe56	1.0	-	-	-7.6	-7.7	-	-14.3
Cr52	0.1	-	-	-1.6	-0.9	-	-2.3
Ni58	-	-	-	-0.1	-	-	-0.1
Zr90	0.1	-	-	-1.1	-1.0	-	-2.0
Na23	-	-	-	-9.7	-2.3	-	-12.0
C	-	-	-	-	-	-	-
B10	0.4	-	-	-	-	-	0.4
Mn55	0.1	-	-	-0.1	-0.1	-	-0.2
Total	21.7	16.2	0.1	-25.9	-36.7	-0.4	-25.0

Table 117. η SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.1	0.1	-	-	-	0.2
U238	4.2	-0.1	0.3	-0.8	-5.8	-0.1	-2.2
Np237	0.8	-0.1	-0.2	-	-0.1	-	0.5
Pu238	0.5	1.2	0.1	-0.1	-0.1	-	1.6
Pu239	2.2	7.3	-1.4	-0.2	-0.6	-	7.2
Pu240	3.0	0.8	-0.4	-0.3	-1.1	-	1.9
Pu241	0.5	3.3	0.5	-0.1	-0.2	-	4.1
Pu242	0.9	0.1	-0.1	-0.1	-0.5	-	0.4
Am241	1.3	-0.1	-0.2	-	-0.2	-	0.9
Am242m	0.3	2.7	1.0	-	-0.2	-	3.8
Am243	1.1	-	-	-	-0.2	-	0.8
Cm242	-	-	-	-	-	-	0.1
Cm244	0.4	0.1	-	-	-0.1	-	0.5
Cm245	0.1	0.6	0.2	-	-	-	0.9
Fe56	1.5	-	-	-8.5	-15.7	-	-22.6
Cr52	0.2	-	-	-1.9	-1.8	-	-3.5
Ni58	-	-	-	-0.1	-	-	-0.1
Zr90	0.1	-	-	-0.8	-0.8	-	-1.5
Na23	0.1	-	-	-12.0	-4.5	-	-16.5
C	-	-	-	-0.2	-	-	-0.2
B10	3.0	-	-	-0.2	-	-	2.9
Mn55	0.1	-	-	-0.2	-0.2	-	-0.3
Total	20.8	16.1	-	-25.6	-32.4	-0.1	-21.3

Table 118. η EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.2	-0.4	-	-0.1	-1.5	-0.4	-2.6
2	**6.07**	-0.3	-1.9	0.1	-0.7	-17.6	-	-20.5
3	**2.23**	-	-0.2	-	-4.7	-10.0	-	-14.9
4	**1.35**	1.1	2.6	-0.1	-4.1	-2.9	-	-3.4
5	**4.98E-1**	2.1	3.0	-	-6.3	-0.7	-	-1.9
6	**1.83E-1**	4.2	3.9	0.1	-6.2	-0.6	-	1.3
7	**6.74E-2**	6.0	3.0	0.1	-0.7	0.1	-	8.4
8	**2.48E-2**	5.7	2.1	0.1	2.2	-	-	10.2
9	**9.12E-3**	3.4	1.2	0.1	2.5	-	-	7.2
10	**2.04E-3**	2.8	0.7	-0.2	1.0	-	-	4.4
11	**4.54E-4**	0.3	-0.1	-0.2	0.1	-	-	0.2
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		25.1	14.0	-	-17.0	-33.1	-0.4	-11.4

Table 119. η GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	-0.5	-	-0.2	-1.4	-0.5	-2.9
2	**6.07**	-0.1	-2.1	0.2	-3.6	-16.1	-	-21.7
3	**2.23**	-	-	0.2	-8.7	-7.7	-	-16.2
4	**1.35**	1.1	2.3	-	-4.3	-1.7	-	-2.7
5	**4.98E-1**	1.7	1.8	-	-3.8	-0.3	-	-0.6
6	**1.83E-1**	3.7	2.3	-0.1	-3.9	-0.3	-	1.7
7	**6.74E-2**	5.7	2.1	-	0.3	0.1	-	8.1
8	**2.48E-2**	6.0	1.7	-	3.2	-	-	10.9
9	**9.12E-3**	6.0	1.6	-	4.1	-	-	11.7
10	**2.04E-3**	2.0	0.6	-0.1	1.4	-	-	3.9
11	**4.54E-4**	0.3	-	-0.1	0.1	-	-	0.2
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-0.1	-	-	-	-	-	-0.1
14	**5.40E-7**	-0.2	0.1	-	-	-	-	-0.1
15	**1.00E-7**	-	-	-	-	-	-	-
Total		26.0	9.8	-	-15.5	-27.4	-0.5	-7.7

Table 120. η EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	0.1	-	-	-	-	0.1
U238	15.8	-1.2	0.3	-1.7	-18.2	-0.3	-5.3
Np237	0.1	-	-	-	-	-	0.1
Pu238	0.1	0.3	-	-	-	-	0.4
Pu239	3.8	12.8	-0.3	-0.2	-1.0	-	15.1
Pu240	2.4	0.6	-0.1	-0.1	-0.8	-	1.9
Pu241	0.2	1.1	-	-	-0.1	-	1.3
Pu242	0.3	-	-	-	-0.1	-	0.1
Am241	0.9	-	-	-	-0.1	-	0.8
Am242m	-	0.1	-	-	-	-	0.1
Am243	0.2	-	-	-	-	-	0.2
Cm244	0.1	-	-	-	-	-	0.1
Cm245	-	0.1	-	-	-	-	0.1
Fe56	0.7	-	-	-1.9	-7.6	-	-8.7
Cr52	0.1	-	-	-0.7	-1.5	-	-2.0
Ni58	0.2	-	-	-0.3	-1.0	-	-1.1
Zr90	-	-	-	-	-	-	-
Na23	0.1	-	-	-2.4	-2.1	-	-4.4
O16	-0.2	-	-	-9.7	-0.1	-	-10.0
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-0.1	-0.1	-	-0.2
Mn55	0.1	-	-	-	-0.2	-	-0.1
Total	25.1	14.0	-	-17.0	-33.1	-0.4	-11.4

Table 121. η GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.2	0.7	0.1	-	-0.1	-	0.9
U238	15.1	-1.3	0.4	-0.7	-20.1	-0.4	-7.0
Np237	0.9	0.1	-	-	-0.1	-	0.8
Pu238	0.2	0.3	-	-	-	-	0.5
Pu239	2.6	7.3	-0.5	-0.1	-0.7	-	8.7
Pu240	1.6	0.4	-0.1	-	-0.6	-	1.3
Pu241	0.4	1.9	-0.1	-	-0.1	-	2.1
Pu242	0.6	0.1	-	-	-0.2	-	0.3
Am241	3.8	0.1	0.1	-	-0.4	-	3.6
Am242m	-	-	-	-	-	-	-
Am243	0.8	-	-	-	-0.1	-	0.7
Cm244	0.1	-	-	-	-	-	0.2
Cm245	-	0.1	-	-	-	-	0.2
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.6	-	-	-0.6
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	-0.3	-	-	-9.4	-0.6	-	-10.3
He4	-	-	-	-0.5	-	-	-0.5
Si28	-0.2	-	-	-4.1	-4.2	-	-8.5
Mn55	-	-	-	-	-	-	-
Total	26.0	9.8	-	-15.5	-27.4	-0.5	-7.7

Table 122. η LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.1	-	-	-1.3	-0.3	-1.8
2	**6.07**	-0.2	-1.0	0.1	-0.1	-14.6	-	-15.8
3	**2.23**	-0.2	-0.4	0.1	-2.1	-12.6	-	-15.2
4	**1.35**	1.3	3.3	0.5	-3.3	-4.8	-	-3.0
5	**4.98E-1**	4.3	4.4	0.5	-6.8	-1.6	-	0.8
6	**1.83E-1**	8.2	4.3	0.4	-4.9	-1.2	-	6.8
7	**6.74E-2**	9.6	2.6	-	-0.8	-	-	11.3
8	**2.48E-2**	7.4	1.0	-0.5	0.7	-	-	8.7
9	**9.12E-3**	2.2	-0.1	-0.5	0.3	-	-	1.9
10	**2.04E-3**	0.4	-0.2	-0.3	-	-	-	-0.1
11	**4.54E-4**	0.1	-0.1	-0.2	0.1	-	-	-0.1
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		33.2	13.5	-	-16.9	-36.1	-0.3	-6.7

Table 123. η ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.1	-	-	-0.9	-0.1	-1.2
2	**6.07**	-	-1.1	-	0.3	-9.4	-	-10.2
3	**2.23**	-	-0.4	0.1	-1.6	-8.7	-	-10.7
4	**1.35**	1.0	4.0	0.3	-2.3	-3.5	-	-0.5
5	**4.98E-1**	3.6	2.9	0.1	-3.4	-1.1	-	2.0
6	**1.83E-1**	7.2	2.9	-	-3.4	-0.5	-	6.1
7	**6.74E-2**	8.3	2.2	-	-1.4	-	-	9.1
8	**2.48E-2**	7.6	1.7	-0.1	-	-	-	9.1
9	**9.12E-3**	5.1	1.0	-0.1	0.3	-	-	6.4
10	**2.04E-3**	1.6	0.1	-0.2	0.1	-	-	1.7
11	**4.54E-4**	0.2	-0.1	-0.1	0.1	-	-	-
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		34.5	13.2	-	-11.3	-24.2	-0.1	12.0

Table 124. η LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	0.1	-	-	-	-	0.1
U236	0.1	-	-	-	-0.1	-	-
U238	12.5	-0.7	0.1	-1.2	-14.7	-0.1	-4.1
Np237	0.5	0.1	-	-	-0.1	-	0.4
Pu238	0.2	0.5	-	-	-0.1	-	0.7
Pu239	2.3	10.8	-0.2	-0.1	-0.8	-	11.9
Pu240	1.9	1.1	0.2	-0.1	-0.8	-	2.3
Pu241	0.2	1.2	-0.1	-	-0.1	-	1.2
Pu242	0.4	0.1	-	-	-0.2	-	0.3
Am241	0.9	-	-	-	-0.2	-	0.8
Am242m	-	0.1	-	-	-	-	0.1
Am243	0.4	-	-	-	-0.1	-	0.3
Cm243	-	-	-	-	-	-	-
Cm244	0.1	-	-	-	-	-	0.2
Cm245	-	0.1	-	-	-	-	0.1
Fe56	0.7	-	-	-3.3	-5.0	-	-7.6
Cr52	0.1	-	-	-0.6	-0.5	-	-1.0
Ni58	-	-	-	-	-	-	-
Zr90	0.2	-	-	-1.2	-1.1	-	-2.1
C	-	-	-	-0.8	-	-	-0.8
Pb204	0.2	-	-	-0.1	-0.4	-	-0.3
Pb206	0.6	-	-	-1.7	-5.4	-	-6.7
Pb207	0.3	-	-	-1.7	-3.6	-0.1	-5.0
Pb208	0.1	-	-	-4.2	-2.7	-0.1	-7.0
B10	11.3	-	-	-1.8	-	-	9.5
Mn55	-	-	-	-	-0.1	-	-0.1
Total	33.2	13.5	-	-16.9	-36.1	-0.3	-6.7

Table 125. η ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	5.7	0.6	-	-0.1	-1.1	-	5.1
Pu238	0.2	0.4	-	-	-	-	0.5
Pu239	2.0	7.2	-0.1	-0.1	-0.6	-	8.3
Pu240	0.9	0.4	-	-0.1	-0.4	-	0.9
Pu241	0.5	2.5	-0.1	-	-0.2	-	2.7
Pu242	0.4	0.1	-	-	-0.2	-	0.3
Am241	12.8	0.4	0.1	-0.2	-1.9	-	11.1
Am242m	-	0.3	-	-	-	-	0.3
Am243	8.1	0.1	-	-0.1	-1.8	-	6.4
Cm243	-	0.1	-	-	-	-	0.1
Cm244	1.7	0.4	-	-0.1	-0.4	-	1.7
Cm245	0.1	0.7	-	-	-0.1	-	0.7
Fe56	1.0	-	-	-4.8	-9.3	-	-13.1
Cr52	0.1	-	-	-0.9	-1.0	-	-1.8
Ni58	-	-	-	-	-	-	-0.1
Zr90	0.4	-	-	-1.9	-2.1	-	-3.6
C	-	-	-	-	-	-	-
Pb204	0.1	-	-	-	-0.1	-	-0.1
Pb206	0.2	-	-	-0.6	-2.3	-	-2.7
Pb207	0.1	-	-	-0.6	-1.5	-	-2.0
Pb208	-	-	-	-1.5	-1.1	-	-2.6
B10	-	-	-	-	-	-	-
Mn55	-	-	-	-	-0.1	-	-0.1
Total	34.5	13.2	-	-11.3	-24.2	-0.1	12.0

Table 126. η PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-	-	-0.1	-0.1	-	-0.3
2	**6.07**	-	-0.1	-	-1.4	-0.7	-	-2.2
3	**2.23**	-	-	-	-0.9	-0.2	-	-1.1
4	**1.35**	-	-	-	0.3	-	-	0.4
5	**4.98E-1**	-	-	-	0.3	-	-	0.3
6	**1.83E-1**	-	-	-	0.3	-	-	0.4
7	**6.74E-2**	-	-	-	0.6	-	-	0.6
8	**2.48E-2**	-	-	-	0.8	-	-	0.8
9	**9.12E-3**	-	-	-	1.5	-	-	1.5
10	**2.04E-3**	-	-	-	1.9	-	-	1.9
11	**4.54E-4**	-	-0.2	-	6.3	-	-	6.1
12	**2.26E-5**	0.1	-0.3	-	7.4	-	-	7.2
13	**4.00E-6**	-0.5	-1.0	-	3.7	-	-	2.2
14	**5.40E-7**	-1.3	-4.4	-	-3.5	-	-	-9.2
15	**1.00E-7**	-1.8	-6.8	-	0.2	-	-	-8.4
Total		-3.4	-12.7	-	17.3	-1.0	-	0.2

Table 127. η PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-2.5	-12.6	-	-	-	-	-15.2
U238	-0.2	-0.1	-	-0.1	-0.8	-	-1.2
Zr90	-	-	-	-	-0.1	-	-0.1
O16	-	-	-	-0.1	-	-	-0.1
H	-0.6	-	-	17.4	-	-	16.9
Total	-3.4	-12.7	-	17.3	-1.0	-	0.2

Am241_1

Table 128. η R1-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-0.1	-	-0.2	-0.2	-0.1	-0.6
2	6.07	-	-0.2	-	-3.6	-2.5	-	-6.4
3	2.23	-	-	-	-3.7	-0.9	-	-4.5
4	1.35	0.1	-	-	-1.1	-0.1	-	-1.1
5	4.98E-1	0.1	-	-	-0.2	-	-	-0.2
6	1.83E-1	-	-	-	0.1	-	-	0.2
7	6.74E-2	0.1	-	-	0.5	-	-	0.6
8	2.48E-2	0.1	-	-	0.9	-	-	1.0
9	9.12E-3	0.2	-	-	1.8	-	-	2.0
10	2.04E-3	0.2	-	-	2.6	-	-	2.8
11	4.54E-4	0.8	0.1	-	9.3	-	-	10.2
12	2.26E-5	1.8	-0.1	-	14.1	-	-	15.8
13	4.00E-6	-0.5	-0.6	-	3.7	-	-	2.6
14	5.40E-7	-1.7	-3.5	-	4.0	-	-	-1.1
15	1.00E-7	-6.4	-14.7	-	0.3	-	-	-20.7
Total		-5.3	-18.8	-	28.5	-3.8	-0.1	0.6

Table 129. η R2-UO_2 Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-	-	-	-0.2	-0.2	-0.1	-0.5
2	6.07	-	-0.2	-	-3.2	-2.0	-	-5.4
3	2.23	-	-	-	-3.2	-0.7	-	-3.9
4	1.35	0.1	-	-	-1.0	-0.1	-	-1.0
5	4.98E-1	-	-	-	-0.2	-	-	-0.2
6	1.83E-1	-	-	-	0.1	-	-	0.1
7	6.74E-2	0.1	-	-	0.5	-	-	0.5
8	2.48E-2	0.1	-	-	0.8	-	-	0.8
9	9.12E-3	0.1	-	-	1.7	-	-	1.8
10	2.04E-3	0.1	-	-	2.6	-	-	2.8
11	4.54E-4	0.6	0.1	-	9.4	-	-	10.1
12	2.26E-5	1.5	-0.1	-	14.4	-	-	15.8
13	4.00E-6	-0.5	-0.5	-	3.4	-	-	2.4
14	5.40E-7	-1.6	-3.2	-	4.0	-	-	-0.8
15	1.00E-7	-7.0	-15.0	-	0.3	-	-	-21.7
Total		-6.5	-18.8	-	29.4	-3.0	-0.1	1.0

Table 130. η R1-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.2	-18.6	-	-	-0.1	-	-21.8
U238	0.2	-0.2	-	-0.3	-2.6	-0.1	-3.0
Zr90	-	-	-	-0.1	-0.6	-	-0.7
O16	-0.1	-	-	-0.9	-0.1	-	-1.0
H	-1.8	-	-	30.0	-	-	28.1
Al27	-0.3	-	-	-0.2	-0.4	-	-0.9
Total	-5.3	-18.8	-	28.5	-3.8	-0.1	0.6

Table 131. η R2-UO_2 Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-3.2	-18.6	-	-	-	-	-21.9
U238	-0.4	-0.2	-	-0.2	-2.1	-0.1	-3.0
Zr90	-	-	-	-0.1	-0.5	-	-0.5
O16	-0.1	-	-	-0.7	-	-	-0.8
H	-2.4	-	-	30.5	-	-	28.1
Al27	-0.3	-	-	-0.2	-0.3	-	-0.8
Total	-6.5	-18.8	-	29.4	-3.0	-0.1	1.0

Table 132. η R1-MOX Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.1	-0.2	-	-0.7	-0.9	-0.2	-2.0
2	6.07	-0.1	-0.5	-	-8.1	-6.2	-	-14.8
3	2.23	-	-	-	-7.4	-1.6	-	-9.0
4	1.35	0.2	0.1	-	-1.5	-0.1	-	-1.4
5	4.98E-1	0.1	-	-	-0.2	-	-	-0.1
6	1.83E-1	0.1	-	-	0.1	-	-	0.3
7	6.74E-2	0.2	-	-	0.7	-	-	0.9
8	2.48E-2	0.2	-	-	1.2	-	-	1.4
9	9.12E-3	0.4	-	-	2.4	-	-	2.9
10	2.04E-3	0.5	0.1	-	3.4	-	-	4.0
11	4.54E-4	2.1	0.4	-	10.9	-	-	13.4
12	2.26E-5	3.7	0.1	-	17.5	-	-	21.2
13	4.00E-6	-2.7	-0.4	-	5.0	-	-	1.9
14	5.40E-7	-4.2	-5.3	-	6.5	-	-	-3.1
15	1.00E-7	-6.8	-10.1	-	0.1	-	-	-16.8
Total		-6.6	-15.7	-	30.0	-8.8	-0.2	-1.2

Table 133. η MR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	19.6	-0.3	-0.5	-	-1.2	-1.5	-0.4	-3.9
2	6.07	-0.2	-1.3	-	-13.9	-11.1	-	-26.5
3	2.23	-	-	-	-11.1	-3.9	-	-14.9
4	1.35	0.3	0.5	-	-2.5	-0.3	-	-1.9
5	4.98E-1	0.3	0.3	-	-0.6	-	-	-0.1
6	1.83E-1	0.3	0.2	-	-	-	-	0.4
7	6.74E-2	0.4	0.1	-	0.8	-	-	1.3
8	2.48E-2	0.5	0.1	-	1.4	-	-	2.0
9	9.12E-3	1.0	0.3	-	2.7	-	-	4.0
10	2.04E-3	1.5	0.5	-	3.6	-	-	5.6
11	4.54E-4	5.6	2.2	-	8.6	-	-	16.4
12	2.26E-5	6.7	1.1	-	14.0	-	-	21.9
13	4.00E-6	-1.5	-0.3	-	2.9	-	-	1.0
14	5.40E-7	-1.9	-2.7	-	2.5	-	-	-2.0
15	1.00E-7	-2.2	-3.6	-	0.1	-	-	-5.7
Total		10.5	-2.9	-	7.2	-16.7	-0.4	-2.3

Table 134. η R1-MOX Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-0.2	-1.7	-	-	-	-	-2.0
U238	5.3	-0.6	-	-0.5	-5.7	-0.2	-1.6
Pu239	-6.0	-12.9	-	-	-0.1	-	-18.9
Pu240	-2.7	-	-	-	-	-	-2.7
Pu241	-0.2	-0.5	-	-	-	-	-0.7
Pu242	-0.1	-	-	-	-	-	-0.1
Am241	-1.6	-	-	-	-	-	-1.6
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.4	-2.8	-	-3.2
O16	-0.2	-	-	-2.3	-0.2	-	-2.6
H	-0.9	-	-	33.2	-	-	32.3
Total	-6.6	-15.7	-	30.0	-8.8	-0.2	-1.2

Table 135. η MR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	0.1	-	-	-	-	-	0.1
U238	12.3	-1.2	-	-0.3	-12.0	-0.4	-1.6
Pu239	-0.2	-1.8	-	-	-0.5	-	-2.5
Pu240	-0.8	-	-	-	-0.1	-	-0.9
Pu241	-	-	-	-	-	-	-
Pu242	-	-	-	-	-	-	-
Am241	-	-	-	-	-	-	-
Fe56	-0.1	-	-	-0.1	-2.7	-	-3.0
Cr52	-	-	-	-0.1	-0.7	-	-0.8
Ni58	-0.1	-	-	-	-0.3	-	-0.4
Zr90	-	-	-	-	-	-	-
O16	-0.4	-	-	-4.2	-0.3	-	-4.9
H	-0.1	-	-	12.0	-	-	11.8
Total	10.5	-2.9	-	7.2	-16.7	-0.4	-2.3

Table 136. η ABTR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.5	0.1	-	-2.1	-0.6	-3.2
2	**6.07**	-0.1	-1.9	0.6	0.4	-22.8	-	-23.8
3	**2.23**	-	-0.2	0.4	-2.8	-16.4	-	-19.0
4	**1.35**	1.7	4.3	0.4	-4.3	-5.1	-	-2.9
5	**4.98E-1**	3.7	6.9	0.7	-11.3	-2.3	-	-2.1
6	**1.83E-1**	6.0	6.8	0.3	-10.5	-2.1	-	0.6
7	**6.74E-2**	6.6	3.8	-0.1	-3.1	-	-	7.1
8	**2.48E-2**	5.8	2.0	-0.5	-0.8	-	-	6.5
9	**9.12E-3**	1.7	0.4	-0.3	0.5	-	-	2.3
10	**2.04E-3**	1.6	-0.1	-0.8	0.1	-	-	0.9
11	**4.54E-4**	0.4	-0.3	-0.6	0.3	-	-	-0.2
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		27.5	21.1	0.1	-31.3	-50.7	-0.6	-33.8

Table 137. η SFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.4	-0.1	-0.1	-2.5	-0.2	-3.3
2	**6.07**	-0.1	-2.3	-0.8	-0.8	-21.7	-	-25.7
3	**2.23**	-	-0.6	-0.7	-5.9	-16.2	-	-23.5
4	**1.35**	1.1	3.4	-1.6	-5.9	-4.4	-	-7.3
5	**4.98E-1**	3.3	4.9	-0.2	-10.6	-0.8	-	-3.4
6	**1.83E-1**	5.7	5.6	0.7	-9.8	-0.6	-	1.6
7	**6.74E-2**	5.7	3.9	0.8	-1.5	-	-	8.9
8	**2.48E-2**	5.4	3.4	0.7	0.7	-	-	10.2
9	**9.12E-3**	1.9	1.4	0.5	1.7	-	-	5.5
10	**2.04E-3**	2.9	2.3	1.1	1.2	-	-	7.6
11	**4.54E-4**	0.5	-	-0.2	0.5	-	-	0.8
12	**2.26E-5**	0.1	-0.1	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		26.4	21.5	-	-30.2	-46.1	-0.2	-28.6

Table 138. η ABTR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.1	0.2	-	-	-	-	0.2
U238	19.1	-1.4	0.9	-5.9	-30.8	-0.6	-18.7
Np237	0.1	-	-0.1	-	-	-	-
Pu238	-	-0.1	-0.1	-	-	-	-0.1
Pu239	5.1	22.5	0.3	-0.9	-2.2	-	24.7
Pu240	0.7	0.1	-0.2	-0.1	-0.3	-	0.2
Pu241	0.1	-0.1	-0.5	-	-	-	-0.6
Pu242	-	-	-0.1	-	-	-	-0.1
Am241	0.1	-	-0.1	-	-	-	-
Am242m	-	-	-	-	-	-	-
Am243	-	-	-	-	-	-	-
Cm242	-	-	-	-	-	-	-
Cm244	-	-	-	-	-	-	-
Cm245	-	-	-	-	-	-	-
Fe56	1.3	-	-	-9.2	-11.2	-	-19.1
Cr52	0.2	-	-	-2.0	-1.3	-	-3.1
Ni58	-	-	-	-0.2	-	-	-0.2
Zr90	0.2	-	-	-1.4	-1.4	-	-2.6
Na23	-	-	-	-11.5	-3.2	-	-14.6
C	-	-	-	-	-	-	-
B10	0.5	-	-	-	-	-	0.5
Mn55	0.1	-	-	-0.2	-0.1	-	-0.2
Total	27.5	21.1	0.1	-31.3	-50.7	-0.6	-33.8

Table 139. η SFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	0.1	-	-	-	0.3
U238	5.4	-0.2	0.4	-0.9	-7.9	-0.1	-3.4
Np237	1.1	-0.1	-0.2	-	-0.2	-	0.6
Pu238	0.7	1.6	0.1	-0.1	-0.2	-	2.1
Pu239	2.9	9.6	-1.9	-0.3	-0.8	-	9.4
Pu240	3.8	1.2	-0.6	-0.4	-1.5	-	2.5
Pu241	0.7	4.4	0.7	-0.1	-0.2	-	5.4
Pu242	1.2	0.2	-0.1	-0.1	-0.6	-	0.5
Am241	1.7	-0.1	-0.2	-	-0.2	-	1.1
Am242m	0.4	3.6	1.4	-	-0.2	-	5.2
Am243	1.5	-	-	-	-0.3	-	1.1
Cm242	-	0.1	-	-	-	-	0.1
Cm244	0.6	0.2	0.1	-	-0.1	-	0.6
Cm245	0.1	0.8	0.3	-	-	-	1.1
Fe56	2.0	-	-	-10.2	-23.0	-	-31.3
Cr52	0.3	-	-	-2.4	-2.7	-	-4.8
Ni58	-	-	-	-0.1	-0.1	-	-0.2
Zr90	0.2	-	-	-0.9	-1.2	-	-2.0
Na23	0.1	-	-	-13.9	-6.3	-	-20.1
C	-	-	-	-0.1	-	-	-0.1
B10	3.7	-	-	-0.2	-	-	3.6
Mn55	0.1	-	-	-0.3	-0.3	-	-0.4
Total	26.4	21.5	-	-30.2	-46.1	-0.2	-28.6

Table 140. η EFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.3	-0.6	-	-0.2	-2.3	-0.5	-3.9
2	**6.07**	-0.4	-2.9	0.1	-1.1	-26.1	-	-30.5
3	**2.23**	-	-0.2	-	-7.1	-14.6	-	-21.9
4	**1.35**	1.6	3.9	-0.1	-5.0	-2.9	-	-2.5
5	**4.98E-1**	3.0	4.3	-	-6.1	-0.6	-	0.6
6	**1.83E-1**	5.5	5.1	0.1	-5.8	-0.5	-	4.4
7	**6.74E-2**	7.5	3.8	0.1	-0.2	0.1	-	11.2
8	**2.48E-2**	7.1	2.7	0.1	2.6	0.1	-	12.5
9	**9.12E-3**	4.4	1.5	0.1	2.6	-	-	8.7
10	**2.04E-3**	4.0	1.1	-0.2	0.9	-	-	5.8
11	**4.54E-4**	0.5	-	-0.2	0.1	-	-	0.4
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		32.8	18.7	-	-19.2	-46.9	-0.5	-15.2

Table 141. η GFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.5	-0.8	-	-0.3	-2.0	-0.7	-4.2
2	**6.07**	-0.1	-3.1	0.3	-5.2	-23.2	-	-31.4
3	**2.23**	-	0.1	0.2	-12.8	-10.7	-	-23.2
4	**1.35**	1.5	3.3	-	-4.8	-1.7	-	-1.6
5	**4.98E-1**	2.4	2.5	-	-3.0	-0.2	-	1.6
6	**1.83E-1**	4.9	3.0	-0.1	-3.2	-0.2	-	4.4
7	**6.74E-2**	7.3	2.6	-	0.9	0.1	-	10.8
8	**2.48E-2**	7.6	2.1	-	3.5	-	-	13.3
9	**9.12E-3**	8.0	2.2	-	4.2	-	-	14.3
10	**2.04E-3**	3.2	0.9	-0.1	1.3	-	-	5.3
11	**4.54E-4**	0.7	0.1	-0.2	-	-	-	0.6
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-0.1	-	-	-	-	-	-0.2
14	**5.40E-7**	-0.2	0.1	-	-	-	-	-0.1
15	**1.00E-7**	-	-	-	-	-	-	-
Total		34.7	13.1	-	-19.4	-37.9	-0.7	-10.2

Table 142. η EFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	-
U235	-	0.1	-	-	-	-	0.1
U238	20.6	-1.7	0.4	-2.1	-25.3	-0.5	-8.6
Np237	0.1	-	-	-	-	-	0.2
Pu238	0.2	0.4	-	-	-	-	0.5
Pu239	5.1	17.1	-0.4	-0.2	-1.4	-	20.1
Pu240	3.1	0.9	-0.2	-0.1	-1.1	-	2.6
Pu241	0.3	1.5	-	-	-0.1	-	1.7
Pu242	0.3	-	-	-	-0.2	-	0.2
Am241	1.1	0.1	0.1	-	-0.1	-	1.1
Am242m	-	0.1	-	-	-	-	0.2
Am243	0.3	-	-	-	-	-	0.2
Cm244	0.1	-	-	-	-	-	0.1
Cm245	-	0.1	-	-	-	-	0.1
Fe56	1.0	-	-	-2.2	-11.2	-	-12.4
Cr52	0.2	-	-	-0.8	-2.2	-	-2.9
Ni58	0.3	-	-	-0.3	-1.5	-	-1.6
Zr90	-	-	-	-	-	-	-
Na23	0.1	-	-	-2.8	-2.9	-	-5.6
O16	-0.3	-	-	-10.4	-0.2	-	-11.0
C	-	-	-	-	-	-	-
He4	-	-	-	-	-	-	-
Si28	-	-	-	-0.2	-0.1	-	-0.3
Mn55	0.1	-	-	-	-0.3	-	-0.2
Ti48	-	-	-	-	-0.1	-	-
Total	32.8	18.7	-	-19.2	-46.9	-0.5	-15.2

Table 143. η GFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	0.3	1.0	0.1	-	-0.1	-	1.2
U238	20.1	-1.9	0.5	-0.9	-27.6	-0.6	-10.4
Np237	1.2	0.1	-	-	-0.2	-	1.2
Pu238	0.3	0.4	-	-	-0.1	-	0.6
Pu239	3.6	9.9	-0.6	-0.1	-1.0	-	11.8
Pu240	2.1	0.5	-0.1	-0.1	-0.8	-	1.7
Pu241	0.6	2.6	-0.2	-	-0.2	-	2.8
Pu242	0.7	0.1	-	-	-0.3	-	0.4
Am241	5.1	0.2	0.1	-	-0.5	-	4.9
Am242m	-	-	-	-	-	-	-
Am243	1.1	-	-	-	-0.2	-	1.0
Cm244	0.2	-	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	-	-	-	-	-	-	-
Cr52	-	-	-	-	-	-	-
Ni58	-	-	-	-	-	-	-
Zr90	-	-	-	-0.8	-	-	-0.8
Na23	-	-	-	-	-	-	-
O16	-	-	-	-	-	-	-
C	-0.3	-	-	-11.7	-0.9	-	-12.9
He4	-	-	-	-0.7	-	-	-0.7
Si28	-0.3	-	-	-5.1	-6.0	-	-11.5
Mn55	-	-	-	-	-	-	-
Ti48	-	-	-	-	-	-	-
Total	34.7	13.1	-	-19.4	-37.9	-0.7	-10.2

Table 144. η LFR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-2.2	-0.6	-3.0
2	**6.07**	-0.3	-1.6	0.1	-0.1	-23.6	-	-25.4
3	**2.23**	-0.3	-0.6	0.2	-3.4	-20.2	-	-24.3
4	**1.35**	2.4	5.5	0.7	-4.6	-5.2	-	-1.3
5	**4.98E-1**	6.6	6.7	0.7	-7.0	-1.3	-	5.6
6	**1.83E-1**	10.7	5.8	0.6	-4.7	-1.0	-	11.4
7	**6.74E-2**	11.6	3.2	-0.1	-0.6	-	-	14.3
8	**2.48E-2**	8.9	1.1	-0.7	0.8	-	-	10.1
9	**9.12E-3**	2.7	-0.2	-0.8	0.3	-	-	2.0
10	**2.04E-3**	0.6	-0.4	-0.5	-	-	-	-0.2
11	**4.54E-4**	0.2	-0.2	-0.3	0.1	-	-	-0.1
12	**2.26E-5**	-	-	-0.1	0.1	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		43.2	19.0	-	-19.1	-53.4	-0.6	-10.9

Table 145. η ADS Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-	-0.2	-	-	-1.4	-0.2	-1.7
2	**6.07**	-0.1	-1.6	-	0.4	-14.0	-	-15.2
3	**2.23**	-	-0.5	0.1	-2.4	-12.9	-	-15.7
4	**1.35**	1.5	6.2	0.3	-3.1	-3.7	-	1.3
5	**4.98E-1**	4.9	4.0	0.1	-3.7	-1.0	-	4.5
6	**1.83E-1**	9.2	3.7	0.1	-3.5	-0.5	-	8.8
7	**6.74E-2**	10.0	2.7	-	-1.4	-	-	11.3
8	**2.48E-2**	9.0	2.0	-0.1	-	-	-	10.9
9	**9.12E-3**	6.0	1.2	-0.1	0.4	-	-	7.5
10	**2.04E-3**	2.0	0.2	-0.2	0.1	-	-	2.1
11	**4.54E-4**	0.2	-0.1	-0.2	0.1	-	-	-
12	**2.26E-5**	-	-	-	-	-	-	-
13	**4.00E-6**	-	-	-	-	-	-	-
14	**5.40E-7**	-	-	-	-	-	-	-
15	**1.00E-7**	-	-	-	-	-	-	-
Total		42.8	17.4	-	-13.1	-33.3	-0.2	13.7

Table 146. η LFR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	0.1	-	-	-	-	-	0.1
U235	-	0.2	-	-	-	-	0.1
U236	0.1	-	-	-	-0.1	-	-
U238	16.6	-1.1	0.2	-1.2	-20.7	-0.2	-6.4
Np237	0.6	0.1	-	-	-0.1	-	0.6
Pu238	0.3	0.8	-	-	-0.1	-	1.0
Pu239	3.1	15.1	-0.3	-0.1	-1.1	-	16.6
Pu240	2.6	1.7	0.2	-0.1	-1.1	-	3.3
Pu241	0.3	1.6	-0.1	-	-0.1	-	1.7
Pu242	0.5	0.2	-	-	-0.3	-	0.4
Am241	1.3	0.1	-	-	-0.2	-	1.1
Am242m	-	0.1	-	-	-	-	0.1
Am243	0.5	-	-	-	-0.1	-	0.4
Cm243	-	-	-	-	-	-	-
Cm244	0.2	0.1	-	-	-	-	0.2
Cm245	-	0.2	-	-	-	-	0.2
Fe56	1.0	-	-	-3.4	-7.8	-	-10.2
Cr52	0.1	-	-	-0.6	-0.8	-	-1.4
Ni58	-	-	-	-	-	-	-
Zr90	0.3	-	-	-1.3	-1.8	-	-2.7
C	-	-	-	-0.8	-	-	-0.8
Pb204	0.2	-	-	-0.1	-0.6	-	-0.5
Pb206	0.8	-	-	-2.1	-8.5	-0.1	-9.9
Pb207	0.4	-	-	-2.0	-5.4	-0.1	-7.1
Pb208	0.1	-	-	-5.2	-4.4	-0.2	-9.6
B10	14.0	-	-	-1.9	-	-	12.0
Mn55	0.1	-	-	-	-0.1	-	-0.1
Total	43.2	19.0	-	-19.1	-53.4	-0.6	-10.9

Table 147. η ADS Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U234	-	-	-	-	-	-	-
U235	-	-	-	-	-	-	-
U236	-	-	-	-	-	-	-
U238	-	-	-	-	-	-	-
Np237	7.1	0.9	0.1	-0.1	-1.3	-	6.6
Pu238	0.2	0.5	-	-	-0.1	-	0.6
Pu239	2.4	9.4	-0.1	-0.1	-0.8	-	10.7
Pu240	1.2	0.6	-	-0.1	-0.5	-	1.2
Pu241	0.6	3.2	-0.1	-	-0.2	-	3.5
Pu242	0.5	0.1	-	-	-0.2	-	0.3
Am241	15.9	0.6	0.1	-0.2	-2.3	-	14.1
Am242m	0.1	0.4	-	-	-	-	0.4
Am243	10.1	0.2	-	-0.2	-2.1	-	8.1
Cm243	-	0.1	-	-	-	-	0.1
Cm244	2.2	0.6	-	-0.1	-0.5	-	2.2
Cm245	0.2	0.9	-	-	-0.1	-	0.9
Fe56	1.3	-	-	-5.5	-13.3	-	-17.6
Cr52	0.2	-	-	-1.1	-1.5	-	-2.5
Ni58	-	-	-	-	-	-	-0.1
Zr90	0.5	-	-	-2.2	-3.1	-	-4.8
C	-	-	-	-	-	-	-
Pb204	0.1	-	-	-0.1	-0.2	-	-0.2
Pb206	0.2	-	-	-0.7	-3.3	-	-3.8
Pb207	0.1	-	-	-0.7	-2.1	-	-2.7
Pb208	-	-	-	-1.8	-1.6	-0.1	-3.4
B10	-	-	-	-	-	-	-
Mn55	-	-	-	-	-0.1	-	-0.1
Total	42.8	17.4	-	-13.1	-33.3	-0.2	13.7

Table 148. η PWR Sensitivity Coefficients (%) by Group

Gr.	[MeV]	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
1	**19.6**	-0.1	-0.2	-	-0.9	-0.7	-0.2	-2.1
2	**6.07**	-0.1	-0.5	-	-8.9	-4.5	-	-14.0
3	**2.23**	-	-	-	-6.0	-1.2	-	-7.2
4	**1.35**	0.1	0.1	-	0.4	-	-	0.6
5	**4.98E-1**	0.1	0.1	-	0.6	-	-	0.8
6	**1.83E-1**	0.1	0.1	-	0.6	-	-	0.8
7	**6.74E-2**	0.1	0.1	-	1.1	-	-	1.3
8	**2.48E-2**	0.2	0.1	-	1.5	-	-	1.7
9	**9.12E-3**	0.3	0.1	-	2.7	-	-	3.2
10	**2.04E-3**	0.4	0.2	-	3.2	-	-	3.8
11	**4.54E-4**	1.5	0.7	-	9.1	-	-	11.4
12	**2.26E-5**	2.2	-	-	13.6	-	-	15.8
13	**4.00E-6**	-0.5	-1.1	-	3.9	-	-	2.4
14	**5.40E-7**	-1.4	-4.9	-	4.1	-	-	-2.2
15	**1.00E-7**	-3.3	-12.3	-	0.2	-	-	-15.4
Total		-0.4	-17.6	-	25.5	-6.4	-0.2	0.9

Table 149. η PWR Sensitivity Coefficients (%) by Isotope

Isotope	σ_{capt}	σ_{fiss}	ν	σ_{el}	σ_{inel}	$\sigma_{n.2n}$	Total
U235	-2.6	-17.0	-	-	-0.3	-	-19.9
U238	3.3	-0.6	-	-0.1	-5.1	-0.2	-2.8
Zr90	-	-	-	-	-0.7	-	-0.8
O16	-0.2	-	-	-1.5	-0.2	-	-2.0
H	-0.8	-	-	27.2	-	-	26.3
Total	-0.4	-17.6	-	25.5	-6.4	-0.2	0.9

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