

Analyses of Criticality Benchmark Problems from ICSBEP handbook with a continuous-energy Monte Carlo Code MVP and JENDL-3.3

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In order to clarify problems of JENDL-3.3 and to prepare a database for integral testing of next JENDL, an enormous number of criticality benchmark analyses are now under way by using a continuous-energy Monte Carlo code MVP and its library based on JENDL-3.3. The benchmark problems are taken from the handbook of Criticality Safety Benchmark Evaluation Project (ICSBEP), which covers various fuel materials (enriched ^{233}U , ^{235}U , Pu, their mixtures), fuel forms (compound, metal, solution, and their mixed ones), neutron spectra (thermal, intermediate, fast).

Table 1 shows the benchmark cases selected from the ICSBEP handbook. The total number of benchmark cases is more than 900. For these cases, analyses with MVP and JENDL-3.3 will be finished by the end of FY2004. In this presentation, comparison of k_{eff} between calculations and experiments will be shown for the results obtained until now.

Table 1 Selected benchmark cases from ICSBEP Ver.2003

Fuel	Form	Spectrum	Selected	ICSBEP2003	%	
HEU	SOL	INTER	2	3	67	
		THERM	50	432	12	
	COMP	FAST	0	8	0	
		INTER	5	14	36	
		THERM	21	105	20	
		MIXED	0	45	0	
	MET	FAST	41	191	21	
		INTER	9	11	82	
		THERM	3	87	3	
	MISC	MIXED	8	29	28	
THERM		0	7	0		
IEU	SOL	THERM	0	4	0	
	COMP	FAST	1	1	100	
		INTER	2	2	100	
		THERM	1	38	3	
	MET	FAST	11	16	69	
LEU	SOL	THERM	77	90	86	
	COMP	THERM	191	923	21	
	MET	THERM	13	13	100	
MIX	SOL	THERM	12	48	25	
		COMP	THERM	63	184	34
		FAST	9	42	21	
	MET	INTER	0	2	0	
		MIXED	0	1	0	
		MISC	THERM	64	53	121
	U233	SOL	INTER	29	29	100
			THERM	44	140	31
			MIXED	3	8	38
		MET	FAST	10	10	100
PU	SOL	THERM	208	381	55	
		FAST	0	6	0	
		COMP	INTER	0	1	0
		THERM	0	21	0	
		MIXED	0	7	0	
	MET	FAST	41	87	47	
		INTER	4	4	100	
		THERM	2	2	100	
SPEC	MET	MIXED	1	1	100	
		FAST	0	18	0	
Total			925	3064	30	