Benchmark Comparisons with ENDF/A Cr-52, -53 in Fast and Intermediate Systems

2010 Mini-CSEWG Meeting

June 22, 2010

Port Jefferson, NY

Richard M. Lell and Richard D. McKnight

Nuclear Engineering Division

Argonne National Laboratory

Benchmark Comparisons with ENDF/A Cr in Fast and Intermediate Systems

		Exp (BM or AB)			ENDF/B-V				ENDF/B-VI.8			
		k-eff	±	σ	k-eff	±	σ	C/E	k-eff	±	σ	C/E
PMI-002	ZPR-6/10 AB	1.00160	±	0.00130	0.9862	±	0.0005	0.985	1.0222	±	0.0006	1.021
HCI-005	CR - KBR-15	1.06400	±	0.01800	0.9020	±	0.0004	0.848	1.1636	±	0.0004	1.094
HCI-005	SS - KBR-9	1.05000	±	0.00800	1.0344	±	0.0004	0.985	1.1121	±	0.0004	1.059
MCF-001	ZPR-6/7 AB	1.00050	±	0.00090	0.9792	±	0.0004	0.979	0.9891	±	0.0005	0.989
ZPPR-10A	L07 - AB	1.00096	±	0.00038					1.0069	±	0.0001	1.006

		Exp (BM or AB)			ENDF/B-VII.0				Cr-52,-53 ENDF/A			
		k-eff	±	σ	k-eff	±	σ	C/E	k-eff	±	σ	C/E
PMI-002	ZPR-6/10 AB	1.00160	±	0.00130	1.03971	±	0.00022	1.03805	1.03378	±	0.00023	1.03213
HCI-005	CR - KBR-15	1.06400	±	0.01800	1.14605	±	0.00012	1.07711	1.17023	±	0.00013	1.09984
HCI-005	SS - KBR-9	1.05000	±	0.00800	1.09779	±	0.00012	1.04551	1.10490	±	0.00012	1.05229
MCF-001	ZPR-6/7 AB	1.00050	±	0.00090	1.00187	±	0.00016	1.00137	1.00141	±	0.00017	1.00091
ZPPR-10A	L07 - AB	1.00096	±	0.00038	1.00117	±	0.00015	1.00021	1.00137	±	0.00015	1.00041

What to conclude from these results?

- These systems have a very high sensitivity to Cr.
- For the “k-infinity” assemblies, results degrade.
- For the “reactor” critical assemblies, results are improved.
- The new data is an improvement, but we have more to learn from these experiments.