Table XII B.1. SAMMY test cases

No.	Module tested	Main feature being tested	Data type	Nuclide
001	dat	Correlated data (DCV file)	Elastic	^{60}Ni
002	ipq, npv	Comparison of different solution methods for Bayes' equations	Trans-mission	dummy
003	par	R-external	Trans	^{60}Ni
004	fin, old	Simultaneous vs sequential solution of Bayes' equations	Trans	^{60}Ni
005	dat	Use ODF file as input	Fission	^{241}Am
006		Resonance parameters only	Trans	^{60}Ni
007	amr	Rearranging "active" data-reduction parameters	Trans	^{56}Fe
008	dat	Comparing alternative auxiliary grids	Trans	^{58}Ni
009		Simultaneous vs sequential solution of Bayes' Equations; explicit input of prior uncertainties	Fission	^{239}Pu
010	inp	New spin group format	Trans	^{93}Zr
011		R-external	Trans	^{54}Fe
012		Varying channel radius, normalization, and/or background	Trans	^{58}Ni
013	xct	Channel radius	Trans	^{58}Ni
014	avg	Averaging experimental and theoretical data	Fissi	^{239}Pu
015	new	"Relative uncertainties" vs "explicit uncertainties" in PARameter file	Trans	^{58}Ni
016		Radius	Trans	^{58}Ni
017		Long run	Fission	^{239}Pu
018		Different cross sections	(All)	^{235}U
019	old	Read and use "old" par covariance file	Trans	^{235}U
020	fgm, dbd, dop	Different versions of Doppler broadening	Fission	^{235}U
021	orr	Oak Ridge Resolution function; vary radius	Trans	^{58}Ni
022	rsl	Shift exponential tail on resolution function	Trans	^{56}Fe
023	ndf	Make ENDF File 2	Trans	^{204}P, ^{58}Ni
024		Vary radii	Trans	Natural Fe
025	mlb	MLBW vs RM	Trans	^{56}Fe

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
026	fgm	Compare different Doppler broadening methods	Fission	^{241}Am
027		Generate partial derivatives	Fission	^{235}U
028	dbd	No low-energy Doppler broadening	Total	^{241}Pu
029		Abundance as a variable	Trans	^{58}Ni
030		Remove resonances using negative group number in PARameter file	Trans	^{58}Ni
031	dop	Leal-Huang vs. no broadening vs. free-gas model at thermal energy	Fission	^{235}U
032	amr	Vary radii, convert "active" data-reduction parameters	Trans	^{56}Fe
033	ang	Differential elastic (no Coulomb)	diff el	~ ^{14}N
034	orr	ORR resolution function at thermal energies	Trans	^{65}Cu
035		Γ_γ as miscellaneous parameter	Capture	^{235}U
036	amr	Sequential data sets; converting data-reduction parameters	diff el, trans	~ ^{14}N
037	rec	Reconstruct point-wise cross sections from resonance parameters	All	lots
038	many	Broadening parameters as PUPs (Propagated Uncertainty Parameters); see tr007	Trans	^{56}Fe
039	ssm	Self-shielding and multiple-scattering corrections to capture yields	Capture	^{58}Ni
040	xct	External R-matrix parameters as PUPs (Propagated Uncertainty Parameters); see tr011	Trans	^{54}Fe
041	many	Normalization and background as PUPs (Propagated-Uncertainty Parameters); see tr012. Also see tr138 for non-PUP like tr041	Trans	^{58}Ni
042	mxw	Maxwellian (stellar) averages	Capture	^{58}Ni
043	ang	Differential elastic angular distributions	angular distribution	^{58}Ni,^{52}Cr,...
044	xct	Resonance parameters as PUPs; see tr009	Fission	^{239}Pu
045	ssm	Multiple-scattering corrections with more than one nuclide in sample	Capture	Natural Fe
046	ssm	Ditto, making plots with and without corrections	Capture	Natural Fe

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
047		Vary t_0 and L_0	Trans	^{56}Fe
048	rsl	Channel resolution varies with energy	Fission	^{239}Pu
049	rec, mxw	Reconstruct point-wise cross sections; use results to calculate stellar averages	Capture	^{54}Fe
050	mas	Use ENDF File2 for input to SAMMY	Trans	^{59}Co
051	mxw	Various ways to generate stellar averages	Capture	^{136}Ba
052	ssm	Self-shielding and multiple-scattering corrections	Capture	^{134}Ba
053	rpt	Generate RPI resolution function	none	none
054	rpi	Use RPI resolution function	Trans	W
055	xct	Paramagnetic cross section (including PUPs)	Total	Dummy
056		Background function	Dummy	Dummy
057	ssm	Self-indication data	Self-indication	Dummy
058	dop, fgm	Very-low-energy Doppler broadening	Capture	Dummy
059	xct	Channel radii as PUPs; see tr093	Reaction	^{16}O
060	ssm	Self-shielding and multiple-scattering corrections	Capture	^{136}Ba
061	ref	Convert REFIT input to SAMMY and vice versa		
062		Abundances as PUPs	Trans	^{58}Ni
063		Constant cross section		Dummy
064		Fission yields, polar coordinates	Fission	^{235}U
066	many	Miscellaneous parameters as PUPs	many	many
067	dat	Twenty significant digits for data		Dummy
068	orr	ORR parameters as PUPs. See tr117 for related unPUP case.	Trans	^{58}Ni
069	ntg	Integral quantities	All	^{235}U
070	idc, fdc	Implicit data covariances		^{235}U
071		Write covariance matrix in compact ASCII format		^{235}U
072	thn	Thinning data		
073	fff	Unresolved resonance region	many	^{235}U

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
074	idc	Various ways to use data covariance information		^{241}Am
075	avg	Generate group-average cross sections with and without covariances	fission	^{235}U
076		Uncorrected tr039; include direct capture	Capture	^{58}Ni
077	xct, ntg	Comparison with other codes	(All)	^{235}U
078	xct	Spin-group-dependent detector efficiencies	Capture	^{136}Ba
079	rsl	Energy-dependent exponential broadening	Capture	^{136}Ba
080	rsl	Exponential folding width	Total	^{235}U
081	rsl	Energy-dependent exponential folding width	Total	^{235}U
082	ywy, wyw	Retroactive covariance	many	^{235}U
083	old, grp	Compact covariance format; Bondarenko multi-group cross sections	many	^{235}U
084	old	Compact covariance format	Capture	^{235}U
085	grp	Bondarenko averaging	Capture, Total	^{235}U, ^{27}Al
086	ndf	Generate and/or read-and-use ENDF file 2	Trans, Capture	^{27}Al
087	amr	Background functions and RPI resolution function	Trans	^{183}W
088	fff, acs	Unresolved resonance region with many data sets, each with its own normalization	many	^{244}Cm
089	ywy, wyw	Retroactive covariance matrix; covariance for multigroup cross sections	Total	^{29}Si
090	rpi	RPI resolution function	Capture	nat Sm
091	xct	Coulomb	(n,α)	^{16}O
092	dis	Luiz Leal's samdis (samdist) program		
093	xct	Exit channels specified separately	Reaction	^{16}O
094	rpi, rpt	RPI resolution function	Trans	^{99}Tc
095	rpt	RPI resolution function		Tc
096	rpi	RPI resolution function parameters as PUPs; see tr054	Trans	^{183}W

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
097	many	Background functions as PUPs; see tr066. Also see tr121 for non-PUP runs like tr097.	Total	nat Fe
098	clm	Crystal-lattice model for Doppler broadening	Trans	^{238}U
099	orr, fgm	General	Capture	^{192}Pt
100	xct	Coulomb	(α,n)	^{17}O(α,n)^{20}Ne
101	inp, xct	Two-channel interactions	Total	dummy
102	xct	Very small cross sections; numerical stability	many	^{28}Si, ^{60}Ni
103	rsl, orr	Combination of resolution functions	Trans	^{58}Ni
104	rpi	RPI Resolution function mod for Geel & nTOF	Trans	^{99}Tc
105	dex	Square resolution function	several	^{16}O, ^{17}F
106	mlb	Compare MLBW to SLBW	Elastic	^{56}Fe
107	rpi, clq	Dirac on RPI Res function		^{99}Tc
108	rpi, clq	Gunsing's values for Geel- and nTOF-RPI resolution function		dummy
109	ang	Differential elastic with charged particles; Rutherford scattering	Angular distrib	F + p
110	xct	Level-level interference in capture	Capture	dummy
111	xct	Like tr059 but channel radii not PUPed.		
112	ang	Angular distributions (artificial data)	Reactions	^{12}C(α,n)
113	par	Interchangeable channels	Artificial	^{16}O
114	udr	User-defined resolution function (not working well yet -- user beware!)	Total	^{235}U
115	clq, rpi	Constant, linear, quadratic, Dirac delta function, or 1/v for "cross section" RPI resolution function with and without shift		^{235}U
116	ang	Rutherford scattering, with non-elastic channels	Differential elastic	^{13}C
117	orr	Like tr068 but ORR parameters not PUPed	Trans	^{58}Ni
118	idc	Norm + background + RPI background	Capture	Tc
119	xct	*Many* channels	Reaction	^{18}O(α,n)^{21}Ne
121	many	Like tr097 but background functions not PUPed	Total	nat Fe
122	ftz	Fix t-zero	Trans	^{56}Fe

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
123	ang	Angle average	Diff elas	^{17}F+p
124	clm	Crystal lattice model for Doppler broadening (DOPUSH)	several	dummy ^{238}U
125	xct, ang	Running as pseudo R-matrix (no Reich-Moore approximation); Coulomb; many channels	many	^{16}O
126	ndf	Prepare compact covariance file in ENDF File 32 format	Fission, Total	^{235}U, ^{27}Al, ^{23}Na, ^{242}Pu, ^{240}Pu, ^{241}Am
127	lru	Create File 2 for unresolved resonance region	all	^{235}U, ^{244}Cm
128	fff	Use several energy regions in URR calculation	all	^{235}U
129	mas	Read all of ENDF file, not just File 2		^{242}Pu, ^{23}Na, ^{240}Pu, ^{241}Am
130	new	Read ENDF File 32 as generated in tr126		
131	ndf	Write compact covariance matrix in ENDF format		^{152}Gd
132	ndf, new	Create PAR & COV file, generate ENDF File 2 and File 32, read them back		dummy like ^{27}Al
133	lru	Write ENDF File 2 and File 32 for URR	all	^{235}U
134	lru	Write ENDF File 2 for URR; options for energies in ENDF file		^{238}U
135	inp, par	More than fifty spin groups	Total	dummy (Si)
136	rpi	Derivatives with respect to RPI resolution function parameters	Trans	Gd
137	ndf	Create File 32 original ENDF formats (LCOMP = 0 or 1)		^{242}Pu, ^{23}Na, ^{240}Pu, ^{241}Am
138	many	Like tr041 but normalization and background are not PUPs	Trans	^{58}Ni
139	xct, xxx	Calculate hard-sphere phase shift at high energy	Reaction	^{9}Be(α,n)^{12}C
140	idc	User-supplied implicit data covariance matrix	Trans	^{129}I
141	suggel	Estimate quantum numbers for resonances		
142	fit, fff	Sequential runs in URR	all	^{233}U

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
143	qua	Prepare spin group quantum number information in SAMMY input format		^{58}Ni, ^{99}Tc, ^{26}Fe, ^{241}Am, ^{235}U, ^{16}O, ^{17}O, ^{13}C
144	inp, par	Treat channels properly: 10 spin groups vs. 18; 2 or 3 channels vs. 1	Trans	^{27}Al
145	fff, acs	Covariances, normalizations in URR	Total, Fission	^{235}U
146	avg, grp, fin	"Compact" format for ENDF	Capture	^{235}U
147	rml	Read and use LRF=7 ENDF format; test SAMRML program (see tr147a for SAMRML runs with no SAMMY runs)	Elastic, Absorp-tion, Fission	^{27}Al, ^{16}O, ^{235}U
148	rml	Test SAMRML program, including derivatives and angular distributions (see tr148a for only SAMRML runs, no SAMMY runs)	many	^{52}Cr
149	many	Create retroactive covariance matrix for ENDF File 32	many	^{233}U
150	rml	Extension of tr147 with fewer resonances and parameters but more features (see tr150a for SAMRML without SAMMY)	Angular distribs, derivatvs	^{16}O
151	par	Additional possibilities for input of prior uncertainty on resonance parameters	input	^{58}Ni
152	par, xct	Exclude channels from entire calculation	Trans	^{19}F
153	inp, par	Input data-related parameters via the INPut file rather than PARameter file	Trans	^{19}F
154	ndf	Prepare covariance file in ENDF File 32 format. Like tr126 but use default uncertainty option ("def = value" in *.ndf file; see Section VI.F.2 for details). All resonances appear in File 32.		^{235}U, ^{27}Al, ^{23}Na, ^{242}Pu, ^{240}Pu, ^{241}Am
155	ang	Angular distribution of reaction cross sections	Differential reaction	^{9}Be
156	grp	Bondarenko averaging with Doppler broadening and resolution broadening	Capture	^{238}U
157	inp, par	Broadening parameters in INPut file	Trans	^{238}U

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
158	ndf	Write ENDF File 2 in LRF = 7 format		^{19}F
159	inp	Use particle-pair input format to define reaction channels	Reaction	^{16}O
160		Varying resonance energy might require modifications to auxiliary grid	Capture	^{232}Th
161	ndf, new, avg	Reading ENDF File 2 and File 32, creating multigroup averages and covariances	Total	Several
162	many	Derivatives with respect to t_0 and L_0	Total	Dummy
163	many	Least squares and other extensions	(n,t) and total	^{6}Li
164	inp, par	Broadening parameters with uncertainties in the INPut file or PARameter file	Trans	Dummy
165	ndf	Prepare compact covariance file in ENDF File 32 format		Pseudo ^{27}Al
166	ndf	Creating ENDF File 32 with LCOMP=2 and Ndigit > 2	Trans	^{27}Al
167	ndf	Prepare covariance file in ENDF File 32 format. Like tr154 but only resonances with flagged parameters are listed in File 32 (except for LCOMP = 2, which must include all resonance parameters)		^{27}Al, ^{23}Na, ^{242}Pu, ^{240}Pu
168	several	Creating and then using PUP covariance file	Trans	^{56}Fe
169	ndf	Short-range sections in LCOMP=1 for ENDF File 32	Fission	^{235}U
170	mlb	Artificial energy grid with multilevel Breit Wigner	Fission	^{241}Am
171	ssm	Neutron sensitivities	Capture	^{55}Mn
172	ang	Elastic angular distributions with charged particles	Elastic	^{7}Be+p
173	old, ndf	Read a COVariance file created by version M6, create ENDF File 2 and 32 when there are two or more nuclides in the PARameter file		Natural LiCl
174	ndf, avg	Read ENDF File 2 and 32 as generated in tr167; calculate average cross sections		^{27}Al, ^{23}Na, ^{242}Pu, ^{240}Pu

Table XII B.1 (continued)

No.	Module tested	Main feature being tested	Data type	Nuclide
175	rec, mxw	Calculating Maxwellian averages with and without using the RECONSTRUCT command		^{19}Fl
176	xct	Energy-dependent nu	Eta	^{235}U
177	xct	Including both the Reich-Moore eliminated capture channel and an explicit capture channel	Many	^{16}O
178	Several	Non-uniform sample for transmission data	Trans	^{204}P
179	ndf, mas	Creating and reading ENDF File 2 and 32 with LRF = 3, LCOMP = 1, when different spin groups have different number of fission channels and/or different number of flags		^{240}Pu
180	ndf, mas	Creating and reading ENDF File 2 and 32 with LRF = 7, LCOMP = 1, when some resonances are below inelastic threshold		^{19}Fl