Annex

Table A1. **SUMMARY OF ALLOCATION AND UTILIZATION OF REGULAR BUDGET RESOURCES IN 1999**

Programme	1999 budget GC(42)/7 (at AS 12.70) (1)	1999 adjusted budget (at AS 12.86) (2)	1999 total expenditure Amount (3)	1999 total expenditure % of adjusted budget (3) / (2)	Unused (over-expended) budget (2)–(3) (5)
Nuclear Power	4 453 000	4 409 000	4 468 025	101.34	(59 025)
Nuclear Fuel Cycle and Waste Technology	5 233 000	5 182 000	5 133 808	99.07	48 192
Comparative Assessment of Energy Sources	2 909 000	2 881 000	2 867 694	99.54	13 306
Subtotal	**12 595 000**	**12 472 000**	**12 469 527**	**99.98**	**2 473**
Food and Agriculture	10 566 000	10 474 000	10 474 114	100.00	(114)
Human Health	6 019 000	5 968 000	5 953 687	99.76	14 313
Marine Environment, Water Resources and Industry	6 516 000	6 452 000	6 422 342	99.54	29 658
Physical and Chemical Sciences	8 835 000	8 768 000	8 781 845	100.16	(13 845)
Subtotal	**31 936 000**	**31 662 000**	**31 631 988**	**99.91**	**30 012**
Nuclear Safety	5 593 000	5 533 000	5 603 006	101.27	(70 006)
Radiation Safety	3 382 000	3 346 000	3 397 856	101.55	(51 856)
Radioactive Waste Safety	2 130 000	2 107 000	2 183 749	103.64	(76 749)
Co-ordination of Safety Activities	3 062 000	3 029 000	2 824 610	93.25	204 390
Subtotal	**14 167 000**	**14 015 000**	**14 009 221**	**99.96**	**5 779**
Safeguards	79 752 000	78 876 000	78 984 983	100.14	(108 983)
Security of Material	1 060 000	1 049 000	926 227	88.30	122 773
Subtotal	**80 812 000**	**79 925 000**	**79 911 210**	**99.98**	**13 790**
Management of Technical Co-operation for Development					
Technical Co-operation Programme	7 845 000	7 753 000	7 965 819	102.74	(212 819)
Planning, Co-ordination and Evaluation	4 824 000	4 770 000	4 541 814	95.22	228 186
Subtotal	**12 669 000**	**12 523 000**	**12 507 633**	**99.88**	**15 367**
Management, Co-ordination and Support					
Executive Management	5 041 000	4 983 000	4 774 382	95.81	208 618
Policy making Organs	6 374 000	6 306 000	6 457 470	102.40	(151 470)
Legal Activities, External Relations and Public Information	7 036 000	6 964 000	6 355 036	91.26	608 964
Administration	12 585 000	12 440 000	12 480 472	100.33	(40 472)
General Services	22 322 000	22 044 000	22 339 865	101.34	(295 865)
Information Management and Support Services	13 752 000	13 597 000	13 613 958	100.12	(16 958)
Subtotal	**67 110 000**	**66 334 000**	**66 021 183**	**99.53**	**312 817**
Total – Agency Programmes	219 289 000	216 931 000	216 550 762	99.82	380 238
Reimbursable work for others	4 958 000	4 901 000	5 008 883	102.20	(107 883)
TOTAL	224 247 000	221 832 000	221 559 645	99.88	272 355

Table A2. **EXTRABUDGETARY PROGRAMME FUND, 1999 (*resources and expenditures*)**

Programme	Resources			Total expenditure	Unused balance as at 31 December 1999
	Unused balance as at 1 January 1999	Receipts	Adjusted budget		
	(1)	(2)	(1) + (2) (3)	(4)	(3)–(4) (5)
Projects funded by individual Member States					
Nuclear Power	233 546	117 200	350 746	104 782	245 964
Nuclear Fuel Cycle and Waste Technology	289 846	514 130	803 976	409 707	394 269
Comparative Assessment of Energy Sources	136 104	154 151	290 255	183 266	106 989
Food and Agriculture	729 422	66 856	796 278	548 835	247 443
Human Health	307 212	118 000	425 212	118 832	306 380
Marine Environment, Water Resources and Industry	1 151 823	865 536	2 017 359	801 430	1 215 929
Physical and Chemical Sciences	26 998	85 956	112 954	53 457	59 497
Nuclear Safety	1 609 601	2 461 128	4 070 729	1 656 247	2 414 482
Radiation Safety	85 401	406 000	491 401	204 289	287 112
Radioactive Waste Safety	53 211	44 936	98 147	31 923	66 224
Co-ordination of Safety Activities	181 152	146 332	327 484	137 042	190 442
Safeguards	9 945 387	10 321 412	20 266 799	13 538 686	6 728 113
Security of Material	424 782	897 240	1 322 022	287 710	1 034 312
Management of Technical Co-operation for Development	162 136	265 656	427 792	253 025	174 767
Executive Management	557 235	750 577	1 307 812	807 458	500 354
Services for Policy Making Organs	0	22 835	22 835	14 281	8 554
Legal Activities, External Relations and Public Information	623 592	625 718	1 249 310	700 172	549 138
Administration	38 219	22 000	60 219	55 859	4 360
Subtotal	**16 555 667**	**17 885 663**	**34 441 330**	**19 907 001**	**14 534 329**
Multi-funded projects					
Nuclear Power	105 928	0	105 928	41 570	64 358
Nuclear Fuel Cycle and Waste Technology	25 716	114 288	140 004	85 936	54 068
Food and Agriculture	167 877	124 776	292 653	92 491	200 162
Nuclear Safety	101 257	0	101 257	68 962	32 295
Co-ordination of Safety Activities	54 299	0	54 299	54 299	0
Subtotal	**455 077**	**239 064**	**694 141**	**343 258**	**350 883**
International organizations					
Food and Agriculture	99 602	1 731 061	1 830 663	1 697 645	133 018
Marine Environment, Water Resources and Industry	110 778	491 496	602 274	549 801	52 473
Executive Management	26 383	1 250 000	1 276 383	1 126 095	150 288
Subtotal	**236 763**	**3 472 557**	**3 709 320**	**3 373 541**	**335 779**
Agency's Programmes	17 247 507	21 597 284	38 844 791	23 623 800	15 220 991
FAO: AGRIS	0	465 259	465 259	410 549	54 710
TOTAL Extrabudgetary	17 247 507	22 062 543	39 310 050	24 034 349	15 275 701

Note: In addition to the above Extrabudgetary Programme Fund, Member States and UNDP provided $4.1 million in 1999 for technical co-operation projects under the Technical Co-operation Extrabudgetary Fund.

Table A3. **DISBURSEMENTS BY AGENCY PROGRAMME AND REGION IN 1999**
(summary of all areas, in thousands of dollars)

Programme	Africa	Latin America	East Asia and the Pacific	West Asia	Europe	Inter-regional	Total
Nuclear Power	186.1	319.8	328.0	264.7	846.2	687.8	2 632.6
Nuclear Fuel Cycle and Waste Technology	432.0	120.2	486.7	383.5	983.0	456.0	2 861.4
Comparative Assessment of Energy Sources	62.9	32.0	139.9	0.0	266.4	102.2	603.4
Food and Agriculture	4 966.7	1 684.6	1 679.4	1 113.7	447.8	523.0	10 415.2
Human Health	3 836.4	3 071.3	2 461.7	868.8	2 724.7	307.2	13 270.1
Marine Environment, Water Resources and Industry	1 698.2	1 520.9	2 467.6	1 065.0	3 018.5	0.9	9 771.1
Physical and Chemical Sciences	1 464.0	1 281.7	1 110.2	1 408.4	2 758.8	109.1	8 132.2
Nuclear Safety	127.8	199.5	860.8	156.9	1 977.9	129.1	3 452.0
Radiation Safety	1 100.6	1 626.3	1 550.6	1 134.4	1 894.1	31.0	7 337.0
Radioactive Waste Safety	290.8	112.5	74.0	34.5	506.9	0.0	1 018.7
Co-ordination of Safety Activities	185.1	184.8	91.8	79.2	90.9	56.6	688.4
Safeguards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Security of Material	0.0	0.0	0.0	0.0	309.7	0.0	309.7
Management of Technical Co-operation for Development	413.3	633.3	1,080.0	200.1	260.2	502.1	3 089.0
Management, Co-ordination and Support							
Legal Activities, External Relations and Public Information	0.0	4.9	0.0	0.0	186.0	0.0	190.9
General Services	0.0	0.0	5.7	0.0	0.0	0.0	5.7
Information Management and Support Services	26.2	89.2	31.9	12.5	45.5	39.2	244.5
TOTAL	14 790.1	10 881.0	12 368.3	6 721.7	16 316.6	2 944.2	64 021.9

Table A4. **INTERNATIONAL PEER REVIEW SERVICE (IPERS) ON PSA REVIEWS, 1999**

Review type	Location, Country	Nuclear Power Plant
Pre-IPERS Level 1 PSA	Karachi, Pakistan	KANUPP CANDU
Low power and shutdown PSA	Budapest/Paks, Hungary	Paks WWER 440/213
Low power and shutdown PSA	Piestany, Slovakia	Bohunice V2 WWER 440/213

Table A5. **ENGINEERING SAFETY REVIEW SERVICE (ESRS) MISSIONS RELATED TO SITE AND EXTERNAL HAZARDS, 1999**

Country	Site/plant	Service
Korea, Rep. of		AMAT
Romania	Cernavoda	CMRS and EIPSA
China	Lianyunggang	DSRS and W
Islamic Rep. of Iran	Bushehr	SSRS and DSRS
Bulgaria	Kozloduy	SSRS
China	CEFR	DSRS
China	Quinshan	3 SWSRS
Armenia	Medzamor	SSRS and DSRS
Turkey	Akkuyu	SSRS
Turkey	Istanbul	SSRS of an RR
Kazakhstan	Balkash	SSRS and W
Pakistan	Chashma	DSRS and FSRS
Pakistan	KANUPP	AMAT
Slovenia	Krško	DSRS
Slovakia	Bohunice	SSRS
Morocco	Mamoora	SSRS of an RR
Dem. Rep. of the Congo	Kinshasa	SSRS of an RR
Ukraine	South Ukraine	DSRS

CEFR: Chinese Experimental Fast Reactor; **DSRS**: Design Safety Review Service; **SSRS**: Seismic (or Site) Safety Review Service; **FSRS**: Fire Safety Review Service; **SWSRS**: Software Safety Review Service; **CMRS**: Configuration Management Review Service; **AMAT**: Ageing Management Advisory Team; **EIPSA**: External and internal event PSA; **W**: workshop; **RR**: research reactor

Table A6. **Y2K RELATED SAFETY MISSIONS TO NUCLEAR POWER PLANTS**

Plant	Country
Chernobyl	Ukraine
Chernobyl	Ukraine
Qinshan	China
Bohunice	Slovakia
Zaporozhe	Ukraine
Qinshan	China
Guangdong	China
Zaporozhe	Ukraine
South Ukraine	Ukraine
South Ukraine	Ukraine
Kozloduy	Bulgaria
Armenia	Armenia
Chernobyl	Ukraine
Balakovo	Russian Federation
Krško	Slovenia
Armenia	Armenia
Zaporozhe	Ukraine
Qinshan	China
Ignalina	Lithuania
Angra	Brazil

Table A7. **OPERATIONAL SAFETY REVIEW TEAM (OSART) MISSIONS, 1999**

Type	Location/plant	Plant type	Country
OSART	Kozloduy	WWER	Bulgaria
Follow-up OSART	Qinshan	PWR	China
Preparatory Visit	North Anna	PWR	USA
Pre-OSART	Chashma	PWR	Pakistan
Preparatory Visit	Temelin	WWER	Czech Republic
OSART	Bugey	PWR	France
Follow-up OSART	Embalse	PHWR	Argentina
Follow-up OSART	Palual	PWR	France
Preparatory Visit	Belleville	PWR	France
Follow-up OSART	Yonggwang	PWR	Rep. of Korea
Preparatory Visit	Mühleberg	BWR	Switzerland
OSART	Gösgen	PWR	Switzerland

Table A8. **SAFETY CULTURE SERVICE MISSIONS, 1999**

Type	Country	Location/ plant
Safety culture enhancement	Brazil	Angra
Peer review of self-assessment	Brazil	Angra
Management of safety culture workshop	Bulgaria	Ledenika

Table A9. **ASSESSMENT OF SAFETY SIGNIFICANT EVENTS TEAM (ASSET) SERVICES AND OPERATING EXPERIENCE REVIEW ACTIVITY, 1999**

Type	Country	Location/nuclear power plant
S_A	Slovakia	Bratislava
S	Armenia	Metsamor
Z	Ukraine	South Ukraine
S_A	India	Kakrapar

S: ASSET seminar to present guidance for plant self-assessment; **S_A**: workshop on analysis of the root causes of events; **Z**: peer review of self-assessment of plant operational events.

Table A10. **INTERNATIONAL REGULATORY REVIEW TEAM (IRRT) MISSIONS, 1999**

Type of mission	Country
Pre-IRRT	Indonesia
Pre-IRRT	Viet Nam
Full scope IRRT	Slovenia

Table A11. **INTEGRATED SAFETY ASSESSMENT OF RESEARCH REACTORS (INSARR) MISSIONS, 1999**

Type	Location/nuclear power plant	Country
Review of operational safety	BR-II	Belgium
Review of operational safety	Otaniemi	Finland

Table A12. **INTERNATIONAL NUCLEAR EVENT SCALE (INES) RATINGS REPORTED, 1999**

Level	Description	Number reported
Below scale	Deviation	2
1	Anomaly	4
2	Incident	14
3	Serious incident	3
4	Accident	1 (Tokaimura accident)

Table A13. **NUMBER OF STATES HAVING SIGNIFICANT NUCLEAR ACTIVITIES AT THE END OF 1997, 1998 AND 1999**

	Number of States		
	1997	**1998**	**1999**
States with safeguards applied under NPT or NPT/Tlatelolco agreements	56[a]	58[a]	60
States with safeguards applied under Tlatelolco agreements	2	1	1
States with safeguards applied pursuant to other comprehensive safeguards agreements	1	0	0
States with safeguards applied under INFCIRC/66/Rev.2-type agreements[b]	4	4	4
Nuclear weapon States with safeguards applied under voluntary offer agreements	5	5	5
States without any safeguards agreement in force	1	1	1
Total number of States with significant nuclear activities[c]	69	69	71

[a] This excludes Iraq, where safeguards activities continued to be subsumed under activities carried out pursuant to United Nations Security Council Resolution 687.

[b] Some States with INFCIRC/66/Rev.2-type agreements under which the application of safeguards has not yet been suspended, although NPT or other comprehensive safeguards agreements have entered into force, are listed under NPT agreements only. Nuclear weapon States with INFCIRC/66/Rev.2-type agreements in force are not included. Safeguards are also applied to nuclear installations in Taiwan, China.

[c] According to information available to the Agency for the year in question.

Table A14. **SITUATION ON 31 DECEMBER 1999 WITH RESPECT TO THE CONCLUSION OF SAFEGUARDS AGREEMENTS BETWEEN THE AGENCY AND NON-NUCLEAR-WEAPON STATES IN CONNECTION WITH NPT**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Afghanistan	4 February 1970	In force: 20 February 1978	257
Albania[b]	12 September 1990		
Algeria	12 January 1995	In force: 7 January 1997	531
Andorra	7 June 1996		
Angola	14 October 1996		
Antigua and Barbuda[c]	27 November 1968	In force: 9 September 1996	528
Argentina[d]	10 February 1995	In force: 18 March 1997	435/Mod.1
Armenia	15 July 1993	In force: 5 May 1994	455
Australia	23 January 1973	In force: 10 July 1974	217
Austria[e]	27 June 1969	Accession: 31 July 1996	193
Azerbaijan	22 September 1992	In force: 29 April 1999	580
Bahamas[c]	10 July 1973	In force: 12 September 1997	544
Bahrain	3 November 1988		
Bangladesh	31 August 1979	In force: 11 June 1982	301
Barbados[c]	21 February 1980	In force: 14 August 1996	527
Belarus	22 July 1993	In force: 2 August 1995	495
Belgium	2 May 1975	In force: 21 February 1977	193
Belize[f]	9 August 1985	In force: 21 January 1997	532
Benin	31 October 1972		
Bhutan	23 May 1985	In force: 24 October 1989	371
Bolivia[c]	26 May 1970	In force: 6 February 1995	465
Bosnia and Herzegovina[g]	15 August 1994	In force: 28 December 1973	204
Botswana	28 April 1969		
Brazil[d]	18 September 1998	In force: 20 September 1999	435/Mod.3
Brunei Darussalam	26 March 1985	In force: 4 November 1987	365
Bulgaria	5 September 1969	In force: 29 February 1972	178
Burkina Faso	3 March 1970		
Burundi	19 March 1971		
Cambodia	2 June 1972	In force: 17 December 1999	
Cameroon	8 January 1969	Signed: 21 May 1992	
Canada	8 January 1969	In force: 21 February 1972	164
Cape Verde	24 October 1979		
Central African Republic	25 October 1970		
Chad	10 March 1971		
Chile[h]	25 May 1995	In force: 9 September 1996	476/Mod.1
Colombia[i]	8 April 1986		
Comoros	4 October 1995		
Congo	23 October 1978		
Costa Rica[c]	3 March 1970	In force: 22 November 1979	278
Côte d'Ivoire	6 March 1973	In force: 8 September 1983	309
Croatia	29 June 1992	In force: 19 January 1995	463
Cyprus	10 February 1970	In force: 26 January 1973	189
Czech Republic[j]	1 January 1993	In force: 11 September 1997	541
Democratic People's Republic of Korea	12 December 1985	In force: 10 April 1992	403

Table A14. **SITUATION ON 31 DECEMBER 1999 (cont.)**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Democratic Republic of the Congo	4 August 1970	In force: 9 November 1972	183
Denmark[k]	3 January 1969	In force: 21 February 1977	193
Djibouti	16 October 1996		
Dominica[f]	10 August 1984	In force: 3 May 1996	513
Dominican Republic[c]	24 July 1971	In force: 11 October 1973	201
Ecuador[c]	7 March 1969	In force: 10 March 1975	231
Egypt	26 February 1981	In force: 30 June 1982	302
El Salvador[c]	11 July 1972	In force: 22 April 1975	232
Equatorial Guinea	1 November 1984	Approved: 13 June 1986	
Eritrea	16 March 1995		
Estonia	7 January 1992	In force: 24 November 1997	547
Ethiopia	5 February 1970	In force: 2 December 1977	261
Fiji	14 July 1972	In force: 22 March 1973	192
Finland[l]	5 February 1969	Accession: 1 October 1995	193
Gabon	19 February 1974	Signed: 3 December 1979	
Gambia	12 May 1975	In force: 8 August 1978	277
Georgia	7 March 1994	Signed: 29 September 1997	
Germany[m]	2 May 1975	In force: 21 February 1977	193
Ghana	4 May 1970	In force: 17 February 1975	226
Greece[n]	11 March 1970	Accession: 17 December 1981	193
Grenada[c]	19 August 1974	In force: 23 July 1996	525
Guatemala[c]	22 September 1970	In force: 1 February 1982	299
Guinea	29 April 1985		
Guinea-Bissau	20 August 1976		
Guyana[c]	19 October 1993	In force: 23 May 1997	543
Haiti[c]	2 June 1970	Signed: 6 January 1975	
Holy See	25 February 1971	In force: 1 August 1972	187
Honduras[c]	16 May 1973	In force: 18 April 1975	235
Hungary	27 May 1969	In force: 30 March 1972	174
Iceland	18 July 1969	In force: 16 October 1974	215
Indonesia	12 July 1979	In force: 14 July 1980	283
Iran, Islamic Republic of	2 February 1970	In force: 15 May 1974	214
Iraq	29 October 1969	In force: 29 February 1972	172
Ireland	1 July 1968	In force: 21 February 1977	193
Italy	2 May 1975	In force: 21 February 1977	193
Jamaica[c]	5 March 1970	In force: 6 November 1978	265
Japan	8 June 1976	In force: 2 December 1977	255
Jordan	11 February 1970	In force: 21 February 1978	258
Kazakhstan	14 February 1994	In force: 11 August 1995	504
Kenya	11 June 1970		
Kiribati	18 April 1985	In force: 19 December 1990	390
Korea, Republic of	23 April 1975	In force: 14 November 1975	236
Kuwait	17 November 1989	Signed: 10 May 1999	
Kyrgyzstan	5 July 1994	Signed: 18 March 1998	

Table A14. **SITUATION ON 31 DECEMBER 1999 (cont.)**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Lao People's Democratic Republic	20 February 1970	Signed: 22 November 1991	
Latvia	31 January 1992	In force: 21 December 1993	434
Lebanon	15 July 1970	In force: 5 March 1973	191
Lesotho	20 May 1970	In force: 12 June 1973	199
Liberia	5 March 1970		
Libyan Arab Jamahiriya	26 May 1975	In force: 8 July 1980	282
Liechtenstein	20 April 1978	In force: 4 October 1979	275
Lithuania	23 September 1991	In force: 15 October 1992	413
Luxembourg	2 May 1975	In force: 21 February 1977	193
Madagascar	8 October 1970	In force: 14 June 1973	200
Malawi	18 February 1986	In force: 3 August 1992	409
Malaysia	5 March 1970	In force: 29 February 1972	182
Maldives	7 April 1970	In force: 2 October 1977	253
Mali	10 February 1970		
Malta	6 February 1970	In force: 13 November 1990	387
Marshall Islands	30 January 1995		
Mauritania	26 October 1993		
Mauritius	8 April 1969	In force: 31 January 1973	190
Mexico[c]	21 January 1969	In force: 14 September 1973	197
Micronesia, Federated States of	14 April 1995		
Monaco	13 March 1995	In force: 13 June 1996	524
Mongolia	14 May 1969	In force: 5 September 1972	188
Morocco	27 November 1970	In force: 18 February 1975	228
Mozambique	4 September 1990		
Myanmar	2 December 1992	In force: 20 April 1995	477
Namibia	2 October 1992	In force: 15 April 1998	551
Nauru	7 June 1982	In force: 13 April 1984	317
Nepal	5 January 1970	In force: 22 June 1972	186
Netherlands[o]	2 May 1975	In force: 21 February 1977	193
New Zealand[p]	10 September 1969	In force: 29 February 1972	185
Nicaragua[c]	6 March 1973	In force: 29 December 1976	246
Niger	9 October 1992		
Nigeria	27 September 1968	In force: 29 February 1988	358
Norway	5 February 1969	In force: 1 March 1972	177
Oman	23 January 1997	Approved: 20 September 1999	
Palau, Republic of	14 April 1995		
Panama[c,q]	13 January 1977	Signed : 22 December 1988	
Papua New Guinea	13 January 1982	In force: 13 October 1983	312
Paraguay[c]	4 February 1970	In force: 20 March 1979	279
Peru[c]	3 March 1970	In force: 1 August 1979	273
Philippines	5 October 1972	In force: 16 October 1974	216
Poland	12 June 1969	In force: 11 October 1972	179
Portugal[r]	15 December 1977	Accession: 1 July 1986	193
Qatar	3 April 1989		

Table A14. **SITUATION ON 31 DECEMBER 1999 (cont.)**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Republic of Moldova	11 October 1994	Signed: 14 June 1996	
Romania	4 February 1970	In force: 27 October 1972	180
Rwanda	20 May 1975		
St. Kitts and Nevis[f]	22 March 1993	In force: 7 May 1996	514
St. Lucia[f]	28 December 1979	In force: 2 February 1990	379
St. Vincent and the Grenadines[f]	6 November 1984	In force: 8 January 1992	400
Samoa	17 March 1975	In force: 22 January 1979	268
San Marino	10 August 1970	In force: 21 September 1998	575
São Tome and Principe	20 July 1983		
Saudi Arabia	3 October 1988		
Senegal	17 December 1970	In force: 14 January 1980	276
Seychelles	12 March 1985		
Sierra Leone	26 February 1975	Signed: 10 November 1977	
Singapore	10 March 1976	In force: 18 October 1977	259
Slovakia[s]	1 January 1993	In force: 3 March 1972	173
Slovenia	7 April 1992	In force: 1 August 1997	538
Solomon Islands	17 June 1981	In force: 17 June 1993	420
Somalia	5 March 1970		
South Africa	10 July 1991	In force: 16 September 1991	394
Spain	5 November 1987	Accession: 5 April 1989	193
Sri Lanka	5 March 1979	In force: 6 August 1984	320
Sudan	31 October 1973	In force: 7 January 1977	245
Suriname[c]	30 June 1976	In force: 2 February 1979	269
Swaziland	11 December 1969	In force: 28 July 1975	227
Sweden[t]	9 January 1970	Accession: 1 June 1995	193
Switzerland	9 March 1977	In force: 6 September 1978	264
Syrian Arab Republic	24 September 1969	In force: 18 May 1992	407
Tajikistan	17 January 1997		
Thailand	7 December 1972	In force: 16 May 1974	241
The Former Yugoslav Republic of Macedonia	30 March 1995		
Togo	26 February 1970	Signed: 29 November 1990	
Tonga	7 July 1971	In force: 18 November 1993	426
Trinidad and Tobago[c]	30 October 1986	In force: 4 November 1992	414
Tunisia	26 February 1970	In force: 13 March 1990	381
Turkey	17 April 1980	In force: 1 September 1981	295
Turkmenistan	29 September 1994		
Tuvalu	19 January 1979	In force: 15 March 1991	391
Uganda	20 October 1982		
Ukraine	5 December 1994	In force: 22 January 1998	550
United Arab Emirates	26 September 1995		
United Republic of Tanzania	31 May 1991	Signed: 26 August 1992	
Uruguay[c]	31 August 1970	In force: 17 September 1976	157
Uzbekistan	7 May 1992	In force: 8 October 1994	508
Vanuatu	24 August 1995		
Venezuela[c]	25 September 1975	In force: 11 March 1982	300

Table A14. **SITUATION ON 31 DECEMBER 1999 (cont.)**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Viet Nam	14 June 1982	In force: 23 February 1990	376
Yemen, Republic of	1 June 1979		
Yugoslavia[u], Federal Republic of	4 March 1970	In force: 28 December 1973	204
Zambia	15 May 1991	In force: 22 September 1994	456
Zimbabwe	26 September 1991	In force: 26 June 1995	483

[a] The information in columns (1) and (2) was provided to the Agency by depositary governments of NPT, and an entry in column (1) does not imply the expression of any opinion on the part of the Secretariat concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers. The table does not contain information relating to the participation of Taiwan, China, in NPT.

[b] A sui generis comprehensive safeguards agreement with Albania entered into force on 25 March 1988 (INFCIRC/359).

[c] The relevant safeguards agreement refers to both NPT and the Treaty of Tlatelolco.

[d] An exchange of letters has taken place between this State and the Agency confirming that the safeguards agreement concluded between Argentina, Brazil, ABACC and the Agency for the application of safeguards which entered into force on 4 March 1994 (INFCIRC/435) satisfies the requirements of this State under Article III of the NPT to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

[e] The application of safeguards in Austria under the NPT safeguards agreement INFCIRC/156, in force since 23 July 1972, was suspended on 31 July 1996, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Austria had acceded, entered into force for Austria.

[f] An exchange of letters has taken place between this State and the Agency confirming that the NPT safeguards agreement concluded with the State satisfies the obligations of the State under Article 13 of the Treaty of Tlatelolco to conclude a safeguards agreement with the Agency.

[g] The NPT safeguards agreement concluded with the Socialist Federal Republic of Yugoslavia (INFCIRC/204), which entered into force on 28 December 1973, continues to be applied in Bosnia and Herzegovina to the extent relevant to the territory of Bosnia and Herzegovina.

[h] An exchange of letters has taken place between this State and the Agency confirming that the safeguards agreement concluded with the State pursuant to the Treaty of Tlatelolco satisfies the requirements of the obligations of the State under Article III of the NPT to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

[i] A comprehensive safeguards agreement with Colombia concluded pursuant to the Treaty of Tlatelolco entered into force on 22 December 1982 (INFCIRC/306).

[j] The NPT safeguards agreement concluded with the Czechoslovak Socialist Republic (INFCIRC/173), which entered into force on 3 March 1972, continued to be applied in the Czech Republic to the extent relevant to the territory of the Czech Republic until 11 September 1997, on which date the NPT safeguards agreement concluded with the Czech Republic entered into force.

[k] The NPT safeguards agreement with Denmark (INFCIRC/176), in force since 1 March 1972, has been replaced by the agreement of 5 April 1973 between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency (INFCIRC/193) but still applies to the Faroe Islands. Upon Greenland's secession from EURATOM as of 31 January 1985, the Agreement between the Agency and Denmark (INFCIRC/176) re-entered into force as to Greenland.

[l] The application of safeguards in Finland under the NPT safeguards agreement INFCIRC/155, in force since 9 February 1972, was suspended on 1 October 1995, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Finland had acceded, entered into force for Finland.

[m] The NPT safeguards agreement of 7 March 1972 concluded with the German Democratic Republic (INFCIRC/181) is no longer in force with effect from 3 October 1990, on which date the German Democratic Republic acceded to the Federal Republic of Germany.

[n] The application of safeguards in Greece under the NPT safeguards agreement INFCIRC/166, provisionally in force since 1 March 1972, was suspended on 17 December 1981, on which date Greece acceded to the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency.

[o] An agreement had also been concluded in respect of the Netherlands Antilles (INFCIRC/229). This agreement entered into force on 5 June 1975.

[p] The NPT safeguards agreement with New Zealand (INFCIRC/185) also applies to Cook Islands, Niue and Tokelau.

[q] A comprehensive safeguards agreement with Panama concluded pursuant to the Treaty of Tlatelolco entered into force on 23 March 1984 (INFCIRC/316).

[r] The application of safeguards in Portugal under the NPT safeguards agreement INFCIRC/272, in force since 14 June 1979, was suspended on 1 July 1986, on which date Portugal acceded to the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency.

[s] The NPT safeguards agreement concluded with the Czechoslovak Socialist Republic (INFCIRC/173), which entered into force on 3 March 1972, continues to be applied in Slovakia to the extent relevant to the territory of Slovakia. A new NPT safeguards agreement concluded with Slovakia was approved by the Board of Governors on 14 September 1998.

[t] The application of safeguards in Sweden under the NPT safeguards agreement INFCIRC/234, in force since 14 April 1975, was suspended on 1 June 1995, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Sweden had acceded, entered into force for Sweden.

[u] The NPT safeguards agreement concluded with the Socialist Federal Republic of Yugoslavia (INFCIRC/204), which entered into force on 28 December 1973, continues to be applied in the Federal Republic of Yugoslavia to the extent relevant to the territory of the Federal Republic of Yugoslavia.

Table A15. **SITUATION ON 31 DECEMBER 1999 WITH RESPECT TO THE CONCLUSION OF SAFEGUARDS AGREEMENTS BETWEEN THE AGENCY AND STATES PARTY TO THE TREATY OF TLATELOLCO[a]**

States party to the Treaty of Tlatelolco (1)	Date of becoming a party to the Treaty of Tlatelolco (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Antigua and Barbuda[b]	11 October 1983	In force: 9 September 1996	528
Argentina[c]	18 January 1994	In force: 18 March 1997	435/Mod.1
Bahamas[b]	26 April 1977	In force: 12 September 1997	544
Barbados[b]	25 April 1969	In force: 14 August 1996	527
Belize[d]	4 November 1994	In force: 18 March 1997	532/Mod.1
Bolivia[b]	18 February 1969	In force: 6 February 1995	465
Brazil[c]	30 May 1994	In force: 10 June 1997	435/Mod.2
Chile	18 January 1994	In force: 5 April 1995	476
Colombia	6 September 1972	In force: 22 December 1982	306
Costa Rica[b]	25 August 1969	In force: 22 November 1979	278
Dominica[d]	25 August 1993	In force: 10 June 1997	513/Mod.1
Dominican Republic[b]	14 June 1968	In force: 11 October 1973	201
Ecuador[b]	11 February 1969	In force: 10 March 1975	231
El Salvador[b]	22 April 1968	In force: 22 April 1975	232
Grenada[b]	20 June 1975	In force: 23 July 1996	525
Guatemala[b]	6 February 1970	In force: 1 February 1982	299
Guyana[b]	6 May 1996	In force: 23 May 1997	543
Haiti[b]	23 May 1969	Signed: 6 January 1975	
Honduras[b]	23 September 1968	In force: 18 April 1975	235
Jamaica[b]	26 June 1969	In force: 6 November 1978	265
Mexico[b,e]	20 September 1967	In force: 14 September 1973	197
Nicaragua[b]	24 October 1968	In force: 29 December 1976	246
Panama[f]	11 June 1971	In force: 23 March 1984	316
Paraguay[b]	19 March 1969	In force: 20 March 1979	279
Peru[b]	4 March 1969	In force: 1 August 1979	273
St. Kitts and Nevis[d]	14 February 1997	In force: 18 March 1997	514/Mod.1
St. Lucia[d]	2 June 1995	In force: 12 June 1996	379/Mod.1
St. Vincent and the Grenadines[d]	11 May 1992	In force: 18 March 1997	400/Mod.1
Suriname[b]	10 June 1977	In force: 2 February 1979	269
Trinidad and Tobago[b]	27 June 1975	In force: 4 November 1992	414
Uruguay[b]	20 August 1968	In force: 17 September 1976	157
Venezuela[b]	23 March 1970	In force: 11 March 1982	300

In addition, there are the following safeguards agreements with States party to Additional Protocol I to the Treaty[g]:

France	Approved by the Board, June 1998	
Netherlands[b]	In force: 5 June 1975	229
United Kingdom	Approved by the Board, Sep.1992	
United States of America	In force: 6 April 1989	366

[a] The information in columns (1) and (2) was provided by Mexico as depositary of the Treaty of Tlatelolco. In addition to the States listed in column (1), Cuba signed the Treaty on 25 March 1995.

[b] The relevant safeguards agreement refers to both the Treaty of Tlatelolco and the NPT.

[c] An exchange of letters has taken place between this State and the Agency confirming that the safeguards agreement concluded between Argentina, Brazil, ABACC and the Agency for the application of safeguards which entered into force on 4 March 1994 (INFCIRC/435) satisfies the requirements of this State under Article 13 of the Treaty of Tlatelolco to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

[d] An exchange of letters has taken place between this State and the Agency confirming that the NPT safeguards agreement concluded with the State satisfies the obligations of the State under Article 13 of the Treaty of Tlatelolco to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

[e] The application of safeguards under an agreement with Mexico in connection with the Treaty of Tlatelolco which entered into force on 6 September 1968 (INFCIRC/118) was suspended after the conclusion of an agreement with Mexico in connection with both the Treaty of Tlatelolco and NPT (INFCIRC/197).

[f] A safeguards agreement pursuant to both the Treaty of Tlatelolco and NPT has been concluded with Panama; the agreement has not yet entered into force.

[g] Additional Protocol I refers to States outside Latin America and the Caribbean which have de jure or de facto jurisdiction over territories which lie within the limits of the geographical zone established in the Treaty.

Table A16. **AGREEMENTS PROVIDING FOR SAFEGUARDS, OTHER THAN THOSE IN CONNECTION WITH NPT OR THE TREATY OF TLATELOLCO, APPROVED BY THE BOARD OF GOVERNORS AS OF 31 DECEMBER 1999[a]**

Party(ies)[b]	Subject	Entry into force	INFCIRC
(While the Agency is a party to each of the following agreements, only the State(s) party to them is (are) listed.)			
(i) Project agreements			
Argentina[c]	Siemens SUR-100	13 March 1970	143
	RAEP reactor	2 December 1964	62
Chile[d]	Herald reactor	19 December 1969	137
Colombia[d]	Fuel for research reactor	17 June 1994	460
Democratic Republic of the Congo[e]	TRICO reactor	27 June 1962	37
	Fuel for research reactor	20 September 1990	389
Finland[e]	FIR-1 reactor	30 December 1960	24
	FINN subcritical assembly	30 July 1963	53
Ghana[e]	Research reactor and fuel therefor	14 October 1994	468
Greece[e]	GRR-1 reactor	1 March 1972	163
Indonesia[e]	Additional core-load for TRIGA reactor	19 December 1969	136
	Supply of enriched uranium	15 January 1993	453
	Supply of enriched uranium	15 January 1993	454
Iran, Islamic Republic of[e]	UTRR reactor	10 May 1967	97
Jamaica[e]	Fuel for research reactor	25 January 1984	315
Japan[e]	JRR-3	24 March 1959	3
Malaysia[e]	TRIGA-II reactor	22 September 1980	287
Mexico[e]	TRIGA-III reactor	18 December 1963	52
	Siemens SUR-100	21 December 1971	162
	Laguna Verde Nuclear Power Plant	12 February 1974	203
Morocco[e]	Fuel for research reactor	2 December 1983	313
Nigeria[e]	Research reactor and fuel therefor	29 August 1996	526
Pakistan	PRR reactor	5 March 1962	34
	Booster rods for KANUPP	17 June 1968	116
Peru[e]	Research reactor and fuel therefor	9 May 1978	266
Philippines[e]	PRR-1 reactor	28 September 1966	88
Romania[e]	TRIGA reactor	30 March 1973	206
	Experimental fuel elements	1 July 1983	307
Slovenia[e]	TRIGA-II reactor	4 October 1961	32
	Krško Nuclear Power Plant	14 June 1974	213
Spain[e]	Coral-I reactor	23 June 1967	99
Syrian Arab Republic[e]	Miniature neutron source reactor and enriched uranium	18 May 1992	408
Thailand[e]	Fuel for research reactor	30 September 1986	342
Turkey[e]	Subcritical assembly	17 May 1974	212
Uruguay[e]	URR reactor	24 September 1965	67
Venezuela[e]	RV-1 reactor	7 November 1975	238
Viet Nam[e]	Fuel for research reactor	1 July 1983	308

Table A16. **AGREEMENTS PROVIDING FOR SAFEGUARDS (cont.)**

Party(ies)[b]	Subject	Entry into force	INFCIRC
(ii) Unilateral submissions			
Algeria	Nur research reactor[h]	9 April 1990	361
	Es Salam research reactor[h]	2 June 1992	401
Argentina	Atucha Power Reactor Facility [f]	3 October 1972	168
	Nuclear material [f]	23 October 1973	202
	Embalse Power Reactor Facility [f]	6 December 1974	224
	Equipment and nuclear material [f]	22 July 1977	250
	Nuclear material, material, equipment and facilities [f]	22 July 1977	251
	Atucha II Nuclear Power Plant [f]	15 July 1981	294
	Heavy water plant [f]	14 October 1981	296
	Heavy water [f]	14 October 1981	297
	Nuclear material [f]	8 July 1982	303
Chile	Nuclear material[g]	31 December 1974	256
	Nuclear material[g]	22 September 1982	304
	Nuclear material[g]	18 September 1987	350
Cuba	Nuclear power plant and nuclear material	5 May 1980	281
	Zero power nuclear reactor and fuel therefor	7 October 1983	311
Democratic People's Republic of Korea	Research reactor and nuclear material therefor[h]	20 July 1977	252
India	Nuclear material, material and facilities	17 November 1977	260
	Nuclear power station	27 September 1988	360
	Nuclear material	11 October 1989	374
	All nuclear material subject to safeguards under INFCIRC/154	1 March 1994	433*
Pakistan	Nuclear material	2 March 1977	248
	Miniature neutron source reactor	10 September 1991	393
	Nuclear power reactor	24 February 1993	418
Spain	Nuclear material[h]	18 June 1975	221
	Vandellos Nuclear Power Plant[h]	11 May 1981	292
	Specified nuclear facilities[h]	11 May 1981	291**
United Kingdom	Nuclear material	14 December 1972	175
Viet Nam	Research reactor and fuel therefor[h]	12 June 1981	293

* Amended in 1994 to cover nuclear material supplied for use in the Tarapur Atomic Power Station (TAPS) which material is required by the supplier to be subject to safeguards. The amendment entered into force on 12 September 1994 (INFCIRC/433/Mod.1).

** Amended in 1985 to cover specified nuclear facilities. The amendment entered into force on 8 November 1985 (INFCIRC/291/Mod.1/Corr.1).

Table A16. **AGREEMENTS PROVIDING FOR SAFEGUARDS (cont.)**

Party(ies)[b]	Subject	Entry into force	INFCIRC
(iii) Agreements concluded with nuclear weapon States on the basis of voluntary offers			
China	Nuclear material in facilities selected from list of facilities provided by China	18 September 1989	369
France	Nuclear material in facilities submitted to safeguards	12 September 1981	290
Russian Federation	Nuclear material in facilities selected from list of facilities provided by the Russian Federation	10 June 1985	327
United Kingdom	Nuclear material in facilities designated by the Agency	14 August 1978	263
United States of America	Nuclear material in facilities designated by the Agency	9 December 1980	288
(iv) Other comprehensive safeguards agreements			
Albania	All nuclear material and facilities	25 March 1988	359
Argentina/Brazil	All nuclear material in all nuclear activities	4 March 1994	435
(v) Other safeguards agreements			
Argentina[f]/United States of America[i]		25 July 1969	130
Austria[h]/United States of America		24 January 1970	152
Brazil[f]/Germany[h]		26 February 1976	237
Brazil[f]/United States of America[i]		31 October 1968	110
Colombia/United States of America		9 December 1970	144
India/Canada[h]		30 September 1971	211
Iran, Islamic Republic of [h]/United States of America		20 August 1969	127
Israel/United States of America		4 April 1975	249
Japan[h]/Canada[h]		20 June 1966	85
Japan[h]/France		22 September 1972	171
Korea, Republic of/United States of America		5 January 1968	111
Korea, Republic of [h]/France		22 September 1975	233
Pakistan/Canada		17 October 1969	135
Pakistan/France		18 March 1976	239
Philippines[h]/United States of America		19 July 1968	120
Portugal[h]/United States of America[i]		19 July 1969	131
South Africa/United States of America		26 July 1967	98
South Africa/France		5 January 1977	244
Spain/Germany[h]		29 September 1982	305
Spain[h]/United States of America[i]		9 December 1966	92
Spain/Canada[h]		10 February 1977	247
Sweden[h]/United States of America		1 March 1972	165
Switzerland[h]/United States of America[i]		28 February 1972	161
Turkey[h]/United States of America[i]		5 June 1969	123
Venezuela[h]/United States of America[i]		27 March 1968	122

(vi) The Agency also applies safeguards under two agreements (INFCIRC/133 and INFCIRC/158) to the nuclear facilities in Taiwan, China. Pursuant to the decision adopted by the Board of Governors on 9 December 1971 that the Government of the People's Republic of China is the only government which has the right to represent China in the Agency, the relations between the Agency and the authorities in Taiwan, China, are non-governmental. The agreements are implemented by the Agency on that basis.

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[a] Safeguards agreements pursuant to the South Pacific Nuclear Weapon Free Zone Treaty (Rarotonga Treaty) are not separately listed with this compilation since the Treaty requires that safeguards by the Agency will be applied pursuant to safeguards agreements equivalent in scope and effect to an agreement required in connection with the NPT on the basis of the material reproduced in INFCIRC/153 (Corrected). As of 31 December 1997, all 11 States Party to the Treaty (Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tuvalu and Samoa) were covered by safeguards agreements concluded pursuant to NPT.

[b] An entry in this column does not imply the expression of any opinion whatsoever on the part of the Agency concerning the legal status of any country or territory or of its authorities or concerning the delimitation of its frontiers.

[c] Agency safeguards required by this project agreement are implemented pursuant to the comprehensive safeguards agreement concluded between Argentina, Brazil, the ABACC and the Agency (INFCIRC/435).

[d] Agency safeguards required by this project agreement are implemented pursuant to a safeguards agreement in connection with the Treaty of Tlatelolco covering the State indicated.

[e] Agency safeguards required by this (these) project agreement(s) are implemented pursuant to an agreement in connection with NPT covering the State indicated.

[f] Application of Agency safeguards under this agreement has been suspended in the State indicated. Safeguards are applied pursuant to the comprehensive safeguards agreement concluded between Argentina, Brazil, the ABACC and the Agency (INFCIRC/435).

[g] Application of Agency safeguards under this agreement has been suspended in the State indicated as the State has concluded an agreement in connection with the Treaty of Tlatelolco.

[h] Application of Agency safeguards under this agreement has been suspended in the State indicated as the State has concluded an agreement in connection with NPT.

[i] Application of Agency safeguards under this agreement has been suspended in the USA in order to comply with a provision of INFCIRC/288.

Table A17. **SITUATION ON 31 DECEMBER 1999 WITH RESPECT TO THE CONCLUSION OF PROTOCOLS ADDITIONAL TO SAFEGUARDS AGREEMENTS**

State	Status of the Protocol	INFCIRC
Armenia	signed 29 September 1997	
Australia	in force 12 December 1997	217/Add.1
Austria	signed 22 September 1998	
Belgium	signed 22 September 1998	
Bulgaria	signed24 September 1998	
Canada	signed 24 September 1998	
China	signed 31 December 1998	
Croatia	signed 22 September 1998	
Cuba	signed 15 October 1999	
Cyprus	signed 29 July 1999	
Czech Republic	signed 28 September 1999	
Denmark	signed 22 September 1998	
Ecuador	signed 1 October 1999	
Finland	signed 22 September 1998	
France	signed 22 September 1998	
Georgia	signed 29 September 1997	
Germany	signed 22 September 1998	
Ghana*	signed 12 June 1998	226/Add.1
Greece	signed 22 September 1998	
Holy See	in force 24 September 1998	187/Add.1
Hungary	signed 26 November 1998	
Indonesia	in force 29 September 1999	283/Add.1
Ireland	signed 22 September 1998	
Italy	signed 22 September 1998	
Japan	in force 16 December 1999	255/Add. 1
Jordan	in force 28 July 1998	258/Add.1
Korea, Republic of	signed 21 June 1999	
Lithuania	signed 11 March 1998	
Luxembourg	signed 22 September 1998	
Monaco	in force 30 September 1999	524/Add.1
Netherlands	signed 22 September 1998	
New Zealand	in force 24 September 1998	185/Add.1
Norway	signed 29 September 1999	
Peru	approved 10 December 1999	
Philippines	signed 30 September 1997	
Poland	signed 30 September 1997	
Portugal	signed 22 September 1998	
Romania	signed 11 June 1999	
Slovakia	signed 27 September 1999	
Slovenia	signed 26 November 1998	
Spain	signed 22 September 1998	
Sweden	signed 22 September 1998	
United Kingdom	signed 22 September 1998	
United States of America	signed 12 June 1998	
Uruguay	signed 29 September 1997	
Uzbekistan	in force 21 December 1998	508/Add.2

* Pending entry into force of the Protocol, it is applied provisionally in this State with effect from date of signature.

Table A18. **APPROXIMATE QUANTITIES OF MATERIAL SUBJECT TO AGENCY SAFEGUARDS AT THE END OF 1999**

Type of material	Quantity of material (t)			
	Comprehensive safeguards agreements[a]	INFCIRC/66[b]	Nuclear weapon States	Quantity in SQs
Nuclear material				
Plutonium[c] contained in irradiated fuel	503.7	26.4	78.9	76 117
Separated plutonium outside reactor cores	13.6	0.1	53.3	8 375
Recycled plutonium in fuel elements in reactor cores	7.6	0.4	0	994
HEU (equal to or greater than 20% ^{235}U)	11.1	0.1	10.0	596
LEU (less than 20% ^{235}U)	42 220	2 707	4 481	13 576
Source material[d] (natural or depleted uranium and thorium)	78 418	1 568	11 661	6 940
Non-nuclear material[e]				
Heavy water	0	509	0	25
Total significant quantities				106 598

[a] Covering safeguards agreements pursuant to NPT and/or Treaty of Tlatelolco and other comprehensive safeguards agreements.

[b] Excluding installations in nuclear weapon States; including installations in Taiwan, China.

[c] The quantity includes an estimated 92 t (11 540 SQ) of plutonium in irradiated fuel, which is not yet reported to the Agency under the reporting procedures agreed to (the non-reported plutonium is contained in irradiated fuel assemblies to which item accountancy and C/S measures are applied).

[d] This table does not include material within the terms of subparagraphs 34(a) and (b) of INFCIRC/153 (Corrected).

[e] Non-nuclear material subject to Agency safeguards under INFCIRC/66/Rev.2-type agreements.

Table A19. **NUMBER OF FACILITIES UNDER SAFEGUARDS OR CONTAINING SAFEGUARDED MATERIAL ON 31 DECEMBER 1999**

Facility type	Number of facilities (number of installations)			
	Comprehensive safeguards agreementsa	INFCIRC/66[b]	Nuclear weapon States	Total
Power reactors	184 (221)	11 (14)	1 (1)	196 (236)
Research reactors and critical assemblies	148 (160)	8 (8)	0 (0)	156 (168)
Conversion plants	12 (12)	1 (1)	0 (0)	13 (13)
Fuel fabrication plants	39 (41)	4 (4)	0 (0)	43 (45)
Reprocessing plants	5 (5)	1 (1)	0 (0)	6 (6)
Enrichment plants	11 (11)	0 (0)	3 (3)	14 (14)
Separate storage facilities	58 (59)	4 (4)	7 (8)	69 (71)
Other facilities	83 (94)	1 (1)	2 (2)	86 (97)
Subtotals	**540 (603)**	**30 (33)**	**13 (14)**	**583 (650)**
Other locations	313 (411)	3 (31)	0 (0)	316 (442)
Non-nuclear installations	0 (0)	1 (1)	0 (0)	1 (1)
Totals	853 (1014)	34 (65)	13 (14)	900 (1093)

[a] Covering safeguards agreements pursuant to NPT and/or Treaty of Tlatelolco and other comprehensive safeguards agreements.

[b] Excluding installations in nuclear weapon States; including installations in Taiwan, China.

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS OR CONTAINING SAFEGUARDED MATERIAL ON 31 DECEMBER 1999**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Power reactors				
Argentina	Atucha NPP	1	Lima	—
	Embalse NPP	1	Embalse	—
Armenia	Armenia NPP	2	Medzamor	—
Belgium	BR3-Mol	1	Mol	x
	DOEL-1	2	Doel	x
	DOEL-3	1	Doel	x
	DOEL-4	1	Doel	x
	Tihange-1	1	Tihange	x
	Tihange-2	1	Tihange	x
	Tihange-3	1	Tihange	x
Brazil	Admiral Alvaro Alberto (Angra-1)	1	Angra dos Reis	x
	Admiral Alvaro Alberto (Angra-2)	1	Angra dos Reis	—
Bulgaria	Kozloduy-I	2	Kozloduy	x
	Kozloduy-II	2	Kozloduy	x
	Kozloduy-III	2	Kozloduy	x
Canada	Bruce A	4	Tiverton	x
	Bruce B	4	Tiverton	x
	Darlington N.G.S.	4	Bowmanville	x
	Gentilly-2	1	Gentilly	x
	Pickering G.S.	8	Pickering	x
	Point Lepreau G.S.	1	Point Lepreau	x
China	QSNPP	1	Hai Yan	x
Cuba	Juragua	2	Juragua	x
Czech Republic	EDU-1	2	Dukovany	x
	EDU-2	2	Dukovany	x
	Temelin	2	Temelin	—
Democratic People's Republic of Korea	Nyongbyon-1	1	Nyongbyon	—
Finland	Loviisa	2	Loviisa	—
	TVO I	1	Olkiluoto	—
	TVO II	1	Olkiluoto	—
Germany	AVR	1	Jülich	—
	KWG Grohnde	1	Grohnde	x
	GKN-2	1	Neckarwestheim	x
	RWE Biblis-A	1	Biblis	x
	RWE Biblis-B	1	Biblis	x
	KBR Brokdorf	1	Brokdorf	x
	KKB Brunsbüttel	1	Brunsbüttel	x
	KKE Emsland	1	Lingen	x
	KKG Grafenrheinfeld	1	Grafenrheinfeld	x
	KKI Isar-Ohu	1	Ohu bei Landshut	x
	KKI Isar-2	1	Essenbach	x
	KKK Krümmel	1	Geesthacht	x
	RWE Mühlheim-Kärlich	1	Mühlheim-Kärlich	x
	GKN Neckarwestheim	1	Neckarwestheim	x
	KWO Obrigheim	1	Obrigheim	x
	KKP Philippsburg-1	1	Philippsburg	x
	KKP Philippsburg-2	1	Philippsburg	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Germany (cont.)	KRB II Gundremmingen B	1	Gundremmingen	x
	KRB II Gundremmingen C	1	Gundremmingen	x
	KKS Stade	1	Stade	x
	KKU Unterweser	1	Unterweser	x
	HKG-THTR 300	1	Hamm	—
	KKW Greifswald 1	2	Lubmin	—
	KKW Greifswald 2	2	Lubmin	—
	KKW Greifswald 3	1	Lubmin	—
	KKW Rheinsberg	1	Rheinsberg	x
Hungary	PAKS-I	2	Paks	x
	PAKS-II	2	Paks	x
India	RAPS	2	Rajasthan	x
	TAPS	2	Tarapur	x
Italy	ENEL-Latina	1	Borgo-Sabotino	x
	ENEL-Caorso	1	Caorso	x
	ENEL-Trino	1	Trino-Vercellese	x
Japan	Fugen	1	Tsuruga-shi, Fukui-ken	x
	Fukushima Dai-Ichi-1	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ichi-2	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ichi-3	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ichi-4	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ichi-5	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ichi-6	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ni-1	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ni-2	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ni-3	1	Futaba-gun, Fukushima-ken	x
	Fukushima Dai-Ni-4	1	Futaba-gun, Fukushima-ken	x
	Genkai-1	1	Higashimatsura-gun, Saga-ken	x
	Genkai-2	1	Higashimatsura-gun, Saga-ken	x
	Genkai-3	1	Higashimatsura-gun, Saga-ken	x
	Genkai-4	1	Higashimatsura-gun, Saga-ken	x
	Hamaoka-1	1	Ogasa-gun, Shizuoka-ken	x
	Hamaoka-2	1	Ogasa-gun, Shizuoka-ken	x
	Hamaoka-3	1	Ogasa-gun, Shizuoka-ken	x
	Hamaoka-4	1	Ogasa-gun, Shizuoka-ken	x
	Ikata-1	1	Nishiuwa-gun, Ehime-ken	x
	Ikata-2	1	Nishiuwa-gun, Ehime-ken	x
	Ikata-3	1	Nishiuwa-gun, Ehime-ken	x
	Joyo	1	Higashi-gun, Ibaraki-ken	x
	Kashiwazaki-1	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-2	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-3	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-4	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-5	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-6	1	Kashiwazaki-shi, Niigata-ken	x
	Kashiwazaki-7	1	Kashiwazaki-shi, Niigata-ken	x
	Mihama-1	1	Mikata-gun, Fukui-ken	x
	Mihama-2	1	Mikata-gun, Fukui-ken	x
	Mihama-3	1	Mikata-gun, Fukui-ken	x
	Monju	1	Tsuruga-shi, Fukui-ken	x
	Ohi-1 and 2	2	Ohi-gun, Fukui-ken	x
	Ohi-3	1	Ohi-gun, Fukui-ken	x
	Ohi-4	1	Ohi-gun, Fukui-ken	x
	Onagawa-1	1	Oshika-gun, Miyaki-ken	x
	Onagawa-2	1	Oshika-gun, Miyaki-ken	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Japan (cont.)	Sendai-1	1	Sendai-shi, Kagoshima-ken	x
	Sendai-2	1	Sendai-shi, Kagoshima-ken	x
	Shika	1	Hakui-gun, Ishikawa-ken	x
	Shimane-1	1	Yatsuka-gun, Shimane-ken	x
	Shimane-2	1	Yatsuka-gun, Shimane-ken	x
	Takahama-1	1	Ohi-gun, Fukui-ken	x
	Takahama-2	1	Ohi-gun, Fukui-ken	x
	Takahama-3	1	Ohi-gun, Fukui-ken	x
	Takahama-4	1	Ohi-gun, Fukui-ken	x
	Tokai-1	1	Tokai-Mura, Ibaraki-ken	x
	Tokai-2	1	Tokai-Mura, Ibaraki-ken	x
	Tomari-1	1	Furuu-gun, Hokkaido	x
	Tomari-2	1	Furuu-gun, Hokkaido	x
	Tsuruga-1	1	Tsuruga-shi, Fukui-ken	x
	Tsuruga-2	1	Tsuruga-shi, Fukui-ken	x
Kazakhstan	BN-350	1	Aktau	—
Korea, Republic of	Kori-1	1	Pusan	x
	Kori-2	1	Pusan	x
	Kori-3	1	Pusan	x
	Kori-4	1	Pusan	x
	Ulchin-1	1	Ulchin	x
	Ulchin-2	1	Ulchin	x
	Ulchin-3	1	Ulchin	x
	Ulchin-4	1	Ulchin	x
	Wolsong-1	1	Kyongju	x
	Wolsong-2	1	Kyongju	x
	Wolsong-3	1	Kyongju	x
	Wolsong-4	1	Kyongju	x
	Younggwang-1	1	Younggwang	x
	Younggwang-2	1	Younggwang	x
	Younggwang-3	1	Younggwang	x
	Younggwang-4	1	Younggwang	x
Lithuania	Ignalina NPP	2	Visaginas	x
Mexico	Laguna Verde 1	1	Alto Lucero	x
	Laguna Verde 2	1	Alto Lucero	x
Netherlands	Borssele	1	Borssele	x
	Dodewaard NPP	1	Dodewaard	x
Pakistan	KANUPP	1	Karachi	x
	Chasnupp-1	1	Kundian	—
Philippines	Bataan NPP	1	Morong, Bataan	x
Romania	Cernavoda-1	1	Cernavoda	—
Slovakia	A1	1	Bohunice	x
	EMO-1	2	Mochovce	—
	V-1	2	Bohunice	x
	V-2	2	Bohunice	x
Slovenia	Krško	1	Krško	x
South Africa	Koeberg-1	1	Cape Town	x
	Koeberg-2	1	Cape Town	x
Spain	Almaraz-1	1	Almaraz	x
	Almaraz-2	1	Almaraz	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Spain (cont.)	Asco-1	1	Asco	x
	Asco-2	1	Asco	x
	Cofrentes	1	Cofrentes	x
	José Cabrera	1	Almonazid de Zorita	x
	Santa María de Garona	1	Santa María de Garona	x
	Trillo-1	1	Trillo	x
	Vandellos 1	1	Vandellos	—
	Vandellos 2	1	Vandellos	x
Sweden	Barsebäck 1	1	Malmö	—
	Barsebäck 2	1	Malmö	—
	Forsmark 1	1	Uppsala	—
	Forsmark 2	1	Uppsala	—
	Forsmark 3	1	Uppsala	—
	Oskarshamn 1	1	Oskarshamn	—
	Oskarshamn 2	1	Oskarshamn	—
	Oskarshamn 3	1	Oskarshamn	—
	Ringhals 1	1	Göteborg	—
	Ringhals 2	1	Göteborg	—
	Ringhals 3	1	Göteborg	—
	Ringhals 4	1	Göteborg	—
Switzerland	KKB Beznau I	1	Beznau	x
	KKB Beznau II	1	Beznau	x
	KKG Gösgen	1	Gösgen-Däniken	x
	KKL Leibstadt	1	Leibstadt	x
	KKM Mühleberg	1	Mühleberg	x
Ukraine	Chernobyl NPP	3	Chernobyl	—
	Khmelnitski 1	1	Neteshin	—
	Rovno 1 and 2	2	Kuznetsovsk	—
	Rovno 3	1	Kuznetsovsk	—
	South Ukraine 1	1	Yuzhnoukrainsk	—
	South Ukraine 2	1	Yuzhnoukrainsk	—
	South Ukraine 3	1	Yuzhnoukrainsk	—
	Zaporozhe 1	1	Energodar	—
	Zaporozhe 2	1	Energodar	—
	Zaporozhe 3	1	Energodar	—
	Zaporozhe 4	1	Energodar	—
	Zaporozhe 5	1	Energodar	—
	Zaporozhe 6	1	Energodar	—
Research reactors and critical assemblies				
Algeria	NUR Reactor	1	Algiers	—
	Es Salam research reactor	1	Ain Oussera	—
Argentina	Argentine reactor-1	1	Constituyentes	x
	Argentine reactor-3	1	Ezeiza	x
	Argentine reactor-4	1	Rosario	x
	Argentine reactor-6	1	Bariloche	x
	Argentine reactor-0	1	Córdoba	x
	Argentine reactor-8	1	Pilcaniyeu	x
Australia	HIFAR	1	Lucas Heights	x
	MOATA	1	Lucas Heights	x
Austria	ASTRA	1	Seibersdorf	—
	Siemens Argonaut Reactor	1	Graz	—
	Triga II	1	Vienna	—

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Bangladesh	At. Energy Res. Est.	1	Dhaka	x
Belarus	Sosny	1	Minsk	—
Belgium	BR1-CEN	1	Mol	x
	BR2-CEN-BRO2	2	Mol	x
	CEN-Venus	1	Mol	x
	Thetis	1	Gent	x
Brazil	IEA-R1	1	São Paulo	—
	RIEN-1 Argonaut RR	1	Rio de Janeiro	x
	IPR-RI-CDTN	1	Belo Horizonte	x
	IPEN Critical assembly	1	São Paulo	x
Bulgaria	IRT-2000	1	Sofia	x
Canada	Biology, Chemistry, Physics	2	Chalk River	x
	McMaster	1	Hamilton	x
	NRU	1	Chalk River	x
	NRX	1	Chalk River	x
	Slowpoke-AECL	1	Ottawa	x
	Slowpoke-Dalhousie Univ.	1	Halifax	x
	Slowpoke-Ecole Polytechnique	1	Montreal	x
	Slowpoke-Kingston	1	Kingston	x
	Slowpoke-Saskatchewan	1	Saskatoon	x
	Slowpoke-Univ. of Toronto	1	Toronto	x
	Slowpoke-Univ. of Alberta	1	Edmonton	x
Chile	La Reina	1	Santiago	x
	Lo Aguirre	1	Santiago	x
Colombia	IAN-R1	1	Bogotá	x
Czech Republic	LR-0	1	Řež	x
	Univ. Training Reactor VR-1P	1	Prague	x
	VVR-S	1	Řež	x
Democratic People's Republic of Korea	Critical Assembly	1	Bungang-Ri, Nyongbyon	x
	IRT	1	Bungang-Ri, Nyongbyon	x
Democratic Republic of the Congo	Triga II	1	Kinshasa	x
Denmark	DR-1	1	Roskilde	x
	DR-3	1	Roskilde	x
Egypt	RR-I	1	Inshas	x
	MPR	1	Inshas	—
Estonia	Paldiski reactor	1	Paldiski	—
Finland	FIR 1	1	Otaniemi	—
Germany	BER-2	1	Berlin	x
	FH-Furtwangen	1	Furtwangen	x
	FRF-2	1	Frankfurt	x
	FRM	1	Garching	x
	GKSS-FRG1&FRG2	2	Geesthacht	x
	KFA-FRJ2	1	Jülich	x
	SUR 100	1	Hannover	x
	SUR 100	1	Kiel	x
	SUR 100	1	Hamburg	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Germany (cont.)	SUR 100	1	Ulm	x
	SUR 100	1	Stuttgart	x
	SUR 100	1	Berlin	x
	SUR 100	1	Aachen	x
	Tech. Univ. AKR	1	Dresden	x
	Tech. Hochschule ZLR	1	Zittau	x
	Triga	1	Mainz	x
	MHH-Triga	1	Hannover	x
	DKFZ-Triga	1	Heidelberg	x
	VKT research reactor	1	Rossendorf	x
Ghana	GHARR-1	1	Legon-Accra	x
Greece	GRR-1	1	Attiki	x
Hungary	Training reactor	1	Budapest	x
	WWR-S M 10	1	Budapest	x
Indonesia	PPNY	1	Yogyakarta	x
	RSG-GAS	1	Serpong	x
	PPTN	1	Bandung	x
Iran, Islamic Republic of	TRR	1	Tehran	x
	HWZPR	1	Esfahan	x
	MNSR	1	Esfahan	x
Israel	IRR-1	1	Soreq	x
Italy	AGN-201	1	Palermo	x
	Poltec.	1	Milan	x
	RTS-1	1	San Piero a Grado	x
	TAPIRO	1	Santa Maria di Galeria	x
	Triga-RC1	1	Santa Maria di Galeria	x
	Triga-2	1	Pavia	x
Jamaica	Centre for Nucl. Sciences	1	Kingston	x
Japan	DCA	1	Oarai-machi, Ibaraki-ken	x
	FCA	1	Tokai-Mura, Ibaraki-ken	x
	HTR	1	Kawasaki-shi, Kanagawa-ken	x
	HTTR	1	Higashi-gun, Ibaraki-ken	x
	JMTR	1	Higashi-gun, Ibaraki-ken	x
	JMTRCA	1	Higashi-gun, Ibaraki-ken	x
	JRR-2	1	Tokai-Mura, Ibaraki-ken	x
	JRR-3	1	Tokai-Mura, Ibaraki-ken	x
	JRR-4	1	Tokai-Mura, Ibaraki-ken	x
	Kinki University reactor	1	Higashiosaka-shi, Osaka-fu	x
	KUCA	3	Osaka	x
	KUR	1	Sennan-gun, Osaka	x
	Musashi reactor	1	Kawasaki-shi, Kanagawa-ken	x
	NCA	1	Kawasaki-shi	x
	NSRR	1	Tokai-Mura, Ibaraki-ken	x
	Rikkyo University R.R.	1	Nagasaka, Kanagawa-ken	x
	TCA	1	Tokai-Mura, Ibaraki-ken	x
	TODAI	1	Tokai-Mura, Ibaraki-ken	x
	TTR	1	Kawasaki-shi, Kanagawa-ken	x
	VHTRC	1	Tokai-Mura, Ibaraki-ken	x
Kazakhstan	Kurchatov test reactor	3	Semipalatinsk	—
	WWR-K	1	Almaty	—

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Korea, Republic of	Triga II and III	2	Seoul	x
	Kyunghee Univ.	1	Suwoon	x
	Hanaro	1	Taejon	x
Latvia	IRT	1	Riga	x
Libyan Arab Jamahiriya	IRT reactor	1	Tajura	x
Malaysia	Puspati	1	Bangi, Selangor	x
Mexico	Triga Mark III	1	Ocoyoacac	x
Netherlands	HOR	1	Delft	x
	HFR	1	Petten	x
	LFR	1	Petten	x
Norway	HBWR-Halden	1	Halden	x
	JEEP-II	1	Kjeller	x
Pakistan	PARR-1	1	Rawalpindi	x
	PARR-2	1	Rawalpindi	x
Peru	RP-0	1	Lima	x
	RP-10	1	Lima	x
Philippines	PRR-1	1	Quezon City, Diliman	x
Poland	Agata and Anna	2	Świerk	x
	Ewa	1	Świerk	x
	Maria	1	Świerk	x
Portugal	RPI	1	Sacavem	x
Romania	Triga II	1	Piteşti Colibaşi	x
	VVR-S	2	Magurele	x
Slovenia	Triga II	1	Ljubljana	x
South Africa	SAFARI-1	1	Pelindaba	x
Sweden	Studsvik RR	2	Studsvik	—
Switzerland	AGN 211P	1	Basel	x
	Crocus	1	Lausanne	x
	Proteus	1	Würenlingen	x
	Saphir	1	Würenlingen	x
Syrian Arab Republic	MNSR	1	Damascus	x
Thailand	TRR-1	1	Bangkok	x
Turkey	Çekmece Nuclear Research and Training Centre	1	Istanbul	x
	ITU-TRR Triga Mark II	1	Istanbul	x
Ukraine	Kiev RR	1	Kiev	—
	IR-100 RR	1	Sevastopol	—
Uruguay	Centro Investigaciones Nucleares	1	Montevideo	x
Uzbekistan	Photon	1	Tashkent	—
	WWR-SM	1	Tashkent	—
Venezuela	RV-I	1	Altos de Pipe	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number of reactor units	Location	Subsidiary arrangements in force
Viet Nam	Da Lat Research Reactor	1	Da Lat, Lam Dong	x
Yugoslavia Fed. Rep. of	RA-RB	2	Vinèa	x
Conversion plants, including pilot plants				
Argentina	UF_6 production facility		Pilcaniyeu	—
	UO_2 conversion plant		Córdoba	—
Canada	CAMECO		Port Hope	x
Chile	Lab. exper. de conversión		Santiago	x
Japan	JCO conv. plant		Tokai-Mura, Ibaraki-ken	x
	Ningyo R&D		Tomata-gun, Okayama-ken	x
	PCDF		Tokai-Mura, Ibaraki-ken	x
Mexico	Fuel fabrication pilot plant		Salazar	x
Romania	UO_2 powder fabrication plant		Feldioara	—
South Africa	Conversion plant		Pelindaba	x
	HEU-UF_6 production plant		Pelindaba	x
Sweden	Ranstad Mineral		Ranstad	—
Fuel fabrication plants, including pilot plants				
Argentina	Experimental plant		Constituyentes	—
	Fuel fabrication plant		Ezeiza	—
	Fuel fabrication plant		Constituyentes	—
Belgium	BN-MOX		Dessel	x
	FBFC		Dessel	x
	FBFC MOX		Dessel	—
Brazil	Fuel fabrication plant		Resende	x
Canada	CRNL fuel fabrication		Chalk River	x
	Fuel fabrication facility		Chalk River	x
	GEC, Inc.		Toronto	x
	GEC, Inc.		Peterborough	x
	Zircatec		Port Hope	x
Chile	UMF		Santiago	x
Democratic People's Republic of Korea	Nuclear fuel fabrication plant		Nyongbyon	—
Denmark	Metallurgy		Roskilde	x
Egypt	FMPP		Inshas	—
Germany	Adv. Nuclear Fuels		Lingen	x
	NUKEM		Wolfgang	x
	Siemens Uran (two units)		Hanau	x
	Siemens MOX		Hanau	x
India	Ceramic fuel fab. assembly area		Hyderabad	x
	EFFP-NFC		Hyderabad	x
Indonesia	Experimental fuel element installation (IEBE)		Serpong	x
	Research reactor fuel element production installation (IPEBRR)		Serpong	x
Iran, Islamic Rep. of	Fuel fabrication lab.		Esfahan	—

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Location	Subsidiary arrangements in force
Italy	Fabnuc	Bosco Marengo	x
Japan	JNF	Yokosuka-shi, Kanagawa-ken	x
	MNF	Tokai-Mura, Ibaraki-ken	x
	NFI (Kumatori-1)	Sennan-gun, Osaka	x
	NFI (Kumatori-2)	Sennan-gun, Osaka	x
	NFI Tokai	Tokai-Mura, Ibaraki-ken	x
	PFPF	Tokai-Mura, Ibaraki-ken	x
	PPFF	Tokai-Mura, Ibaraki-ken	x
Kazakhstan	Ulbinski Metallurgical Works	Kamenogorsk	—
Korea, Republic of	CANDU fuel fabrication plant	Taejon	x
	KNFFP	Taejon	x
Romania	Romfuel	Pitești Colibasi	x
South Africa	MTR fuel fabrication	Pelindaba	x
	LEU fuel fabrication	Pelindaba	x
Spain	ENUSA fuel fabrication plant	Juzbado	—
Sweden	ABB	Västeras	—
Chemical reprocessing plants, including pilot plants			
Democratic People's Republic of Korea	Radiochemical Laboratory	Bungang-Ri, Nyongbyon	—
Germany	WAK	Eggenstein-Leopoldshafen	x
India	PREFRE	Tarapur	x
Italy	EURE	Saluggia	x
	ITREC-Trisaia	Rotondella	x
Japan	Tokai reprocessing plant	Tokai-Mura, Ibaraki-ken	x
In addition, the following R&D facilities and locations are associated with reprocessing technology:			
Argentina	*Lapep*	*Buenos Aires*	—
	Fission products div.	*Ezeira*	—
Brazil	*Reprocessing project*	*São Paulo*	—
Indonesia	*RMI*	*Serpong*	—
Japan	*SCF*	*Tokai-Mura, Ibaraki-ken*	*x*
	JAERI Tokai R&D	*Tokai-Mura, Ibaraki-ken*	*x*
	PNC Tokai R&D	*Tokai-Mura, Ibaraki-ken*	*x*
	Sumitomi Met. Mining	*Tokai-Mura, Ibaraki-ken*	*x*
Enrichment plants, including pilot plants			
Argentina	Pilcaniyeu enrichment plant	Pilcaniyeu	—
Brazil	Enrichment plant (first cascade)	Resende	—
	Enrichment laboratory	Ipero	—
	Uranium enrichment pilot plant	São Paulo	—
	Laser spectroscopy lab.	San jose dos Campos	—
China	Shaanxi	Han Zhang	—
Germany	UTA-1	Gronau	x
Japan	Uranium Enrichment Plant	Tomata-gun, Okayama-ken	x
	Rokkasho Enrichment Plant	Kamikita-gun, Aomori-ken	x
Netherlands	URENCO	Almelo	x
South Africa	Semi-commercial enrichment plant	Pelindaba	x
	MLIS enrichment plant	Valindaba	—

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Location	Subsidiary arrangements in force
United Kingdom	URENCO E22	Capenhurst	x
	URENCO A3 plant	Capenhurst	—
In addition, the following R&D facilities and locations are associated with enrichment technology:			
Brazil	*UF_6 laboratory*	*Belo Horizonte*	—
Germany	*Urenco*	*Jülich*	—
Japan	*Asahi Chemical Industry*	*Hyuga-shi, Miyazaki-ken*	*x*
	Hitachi laboratory	*Hitachi-shi, Ibaraki-ken*	*x*
	JAERI Tokai R&D	*Tokai-Mura, Ibaraki-ken*	*x*
	NDC U-Lab.	*Tokai-Mura, Ibaraki-ken*	*x*
	PNC Tokai R&D	*Tokai-Mura, Ibaraki-ken*	*x*
	Toshiba R&D Centre	*Kawasaki-shi, Kanagawa-ken*	*x*
Netherlands	*Urenco*	*Almelo*	*x*
Separate storage facilities			
Argentina	Central store	Ezeiza	x
	Central store	Constituyentes	—
	Nuclear material store	Constituyentes	—
Australia	Vault storage	Lucas Heights	x
Belgium	Belgoprocess	Dessel	x
	Elbel	Beveren	—
	Wet Store	Tihange	—
Brazil	Aramar stores (2 units)	Ipero	—
	UF_6 production facility	São Paulo	—
Bulgaria	Long term storage	Kozloduy	x
Canada	Nuclear material	Chalk River	x
	Spent fuel canister store	Chalk River	x
	Douglas Point dry storage	Tiverton	x
	Gentilly-1	Gentilly	x
	Spent fuel storage	Chalk River	x
	AECL Research	Pinawa	x
	PUFDSF	Pickering	x
Czech Republic	Storage Skoda	Bolevec	x
	HLW store	Reż	—
	ISFS Dukovany	Dukovany	—
Democratic People's Republic of Korea	Nuclear fuel storage	Bungang-Ri, Nyongbyon	—
Denmark	Risø Store	Roskilde	x
	Risø Waste	Roskilde	—
Finland	TVO-KPA store	Olkiluoto	—
France	Cogéma UP2 and UP3	La Hague	x
Germany	Bundeslager	Wolfgang	—
	ANF UF_6 Lager	Lingen	x
	KFA AVR BL	Jülich	—
	KFA AVR	Jülich	x
	BZA-Ahaus	Ahaus	—
	NCS-Lagerhalle	Hanau	—
	Energiewerke Nord GmbH	Lubmin	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Location	Subsidiary arrangements in force
Germany (cont.)	Energiewerke Nord-ZLN	Lubmin	—
	Transportbehälterlager	Gorleben	—
	TR Halle 87	Rossendorf	—
	Kernmateriallager	Rossendorf	—
Hungary	Central radionuclide store	Budapest	x
	MVDS	Paks	—
India	AFR	Tarapur	x
Indonesia	TC and ISFSF	Serpong	—
Iraq	Tuwaitha Location C	Tuwaitha	—
Italy	Compes. deposito	Saluggia	x
	Essor nuclear plant	Ispra	—
	Essor storage	Ispra	x
	Research centre	Ispra	—
Japan	KUFFS	Kyoto	x
	Fukushima Dai-Ichi SFS	Futaba-gun, Fukushima-ken	x
	N. S. Mutsu	Mutsu-shi, Aomori-ken	x
	RSFS	Kamikita-gun, Aomori-ken	x
Kazakhstan	Ulbinski Thorium Storage	Kamenogorsk	—
Lithuania	Spent Fuel Dry Storage	Visaginas	—
Netherlands	Covra Store	Vlissingen	—
Pakistan	Hawks Bay depot	Karachi	x
Portugal	Inst. de Armazenagem	Sacavem	x
Russian Federation	Mashinostroitel'nyi Zavod	Ehlektrostal	—
Slovakia	AFRS	Bohunice	x
South Africa	Waste storage	Pelindaba	—
	Bulk storage facility	Pelindaba	x
	HEU storage vault	Pelindaba	x
	Thabana pipe store	Pelindaba	x
Sweden	Central long term storage	Oskarshamn	—
Ukraine	Chernobyl storage	Chernobyl	—
United Kingdom	Special nuclear material store 9	Sellafield	x
	Thorp Plutonium Store	Sellafield	—
United States of America	Pu storage vault	Hanford, WA	—
	Y-12 plant	Oak Ridge, TN	x
	Vault	Golden, CO	—
Other facilities			
Algeria	UDEC	Draria	—
	Es Salam reactor	Ain Oussera	—
Argentina	Alpha facility	Constituyentes	—
	Experimental UO_2 plant	Cordoba	—
	Enriched uranium lab.	Ezeiza	—
	Fission products div.	Ezeiza	—
	Fuel fabrication plant	Ezeiza	—
	LFR	Buenos Aires	—
	Uranium powder fab. plant	Constituyentes	—
	Triple Altura Lab.	Ezeiza	—

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Location	Subsidiary arrangements in force
Australia	Research Lab.	Lucas Heights	x
Belgium	IRMM-Geel	Geel	x
	CEN-Labo	Mol	x
	CEN-Waste	Dessel	—
	I.R.E.	Fleurus	x
	CEN-lab. Pu	Mol	x
Brazil	Fuel tech. co-ord. unit	São Paulo	—
	Isotope laboratory	São Paulo	—
	Metal. uran. project	São Paulo	—
	Nuclear material lab.	Ipero	—
	Nuclear fuel & instr. dev. lab.	São Paulo	—
	Reconversion project	São Paulo	—
	Reprocessing project	São Paulo	—
	Safeguards store	São Paulo	x
Czech Republic	Nuclear Fuel Inst. (UJP)	Zbraslav	x
	Research Laboratories	Řež	x
Democratic People's Republic of Korea	Subcritical assembly	Pyongyang	x
Estonia	Balti ES	Narva	—
Germany	KFA-heisse Zellen	Jülich	x
	KFK-heisse Zellen	Eggenstein-Leopoldshafen	x
	KFK-IHCH	Eggenstein-Leopoldshafen	x
	Siemens heisse Zellen	Karlstein	x
	KFA Lab.	Jülich	x
	Transuran	Eggenstein-Leopoldshafen	x
	VKT. Tec. ZTR	Rossendorf	x
Hungary	Institute of Isotopes	Budapest	x
Indonesia	RMI	Serpong	—
Iran, Islamic Republic of	LWSCR	Esfahan	x
	GSCR	Esfahan	—
Italy	CNEN-LAB. PU.	Santa Maria di Galeria	x
Japan	JAERI-Oarai R&D	Higashi-gun, Ibaraki-ken	x
	JAERI-Tokai R&D	Tokai-Mura, Ibaraki-ken	x
	Kumatori R&D	Sennan-gun, Osaka	x
	Mitsui Iwakuni-Ohtake	Kuga-gun, Yamaguchi	x
	Mitsui Toatsu	Takai-shi, Osaka-fu	x
	NDC Fuel Hot Lab.	Tokai-Mura, Ibaraki-ken	x
	NDC fuel laboratories	Tokai-Mura, Ibaraki-ken	x
	NERL, University of Tokyo	Tokai-Mura, Ibaraki-ken	x
	NFD	Higashi-gun, Ibaraki-ken	x
	NFI Tokai-2	Tokai-Mura, Ibaraki-ken	x
	NRF Neutron Radiation Facility	Tsukuba-shi, Ibaraki-ken	x
	PNC FMF	Higashi-gun, Ibaraki-ken	x
	PNC IRAF	Higashi-gun, Ibaraki-ken	x
	PNC-Oarai R&D	Higashi-gun, Ibaraki-ken	x
	PNC-Tokai R&D	Tokai-Mura, Ibaraki-ken	x
	SCF	Tokai-Mura, Ibaraki-ken	x
	Showa-Kawasaki	Kawasaki-shi, Kanagawa-ken	x
	Sumitomo-Chiba	Sodegaura-shi, Chiba-ken	x
	Uranium Material Laboratory	Higashi-gun, Ibaraki-ken	x

Table A20. **FACILITIES UNDER AGENCY SAFEGUARDS (cont.)**

State[a]	Abbreviated name of facility	Number	Location	Subsidiary arrangements in force
Korea, Republic of	PIEF		Taejon	x
	Acrylonitrile plant		Ulsan	x
	DFDF		Taejon	x
	DUF 4		Taejon	—
	HFFL		Taejon	x
	IMEF		Taejon	x
	KAERI R&D		Taejon	—
Netherlands	ECN and JRC		Petten	x
Norway	Research laboratories		Kjeller	x
Poland	Institute for Nuclear Chemistry and Engineering		Warsaw	—
	Institute of Nuclear Research		Świerk	x
South Africa	Decommissioned pilot enrichment plant		Pelindaba	x
	Decontamination and waste recovery		Pelindaba	x
	Hot Cell Complex		Pelindaba	x
	NU and DU metals plant		Pelindaba	x
Switzerland	EIR		Würenlingen	x
	CERN		Geneva	x
Turkey	Nuclear fuel pilot plant		Istanbul	x
Ukraine	Chernobyl unit 4		Chernobyl	—
	Khmelnitski FF Storage		Neteshin	—
	KHFTI		Kharkov	—
	Rovno FF Storage		Kuznetsovsk	—
	South Ukraine Storage		Yuzhnoukrainsk	—
	Zaporozhe FF Storage		Energodar	—
	Sevastopol subcritical assembly		Sevastopol	—
United States of America	B&W NNFD		Lynchburg, VA	—
	BWXT Facility 179		Lynchburg, VA	—
Non-nuclear installations				
Cuba	Storage of equipment		Prov. Havana	—

[a] An entry in this column does not imply the expression of any opinion whatsoever on the part of the Agency concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

Note: The Agency was also applying safeguards in Taiwan, China, at six power reactors, five research reactors/critical assemblies, one uranium pilot conversion plant, two fuel fabrication plants, two storage facilities and one R&D facility.

Table A21. **MAIN EQUIPMENT AND ACTIVITIES IN SUPPORT OF SAFEGUARDS**

	1998	1999
	Total in inventory	
Gamma ray measurement systems		
Low resolution systems (assay probes)	78	75
High resolution systems (analysers)	42	39
Portable multichannel analysers	304	280
Detectors	759	908
Neutron measurement systems		
Detection heads for active neutron measurements	30	32
Detection heads for passive neutron measurements	34	35
Neutron coincidence counting electronics	102	92
Spent fuel measurement systems		
Cerenkov glow viewing devices	97	96
Spent fuel radiation measuring systems	165	175
Irradiated fuel measuring electronics	77	75
Other measurement systems		
Physical properties devices	147	150
Optical surveillance systems		
Photo cameras	891	715
Video single camera systems	456	505
Video multiple camera systems	65	134
Video review stations	86	142
Seals		
In situ verifiable seals	1 327	1 328
Radiation monitoring systems	74	81
Activities		
Metal cap seals issued	18 600	21 300
Metal cap seals verified	19 301	19 718
Shipment of equipment and supplies	554	534
Hand carried transport of equipment and supplies	656	514
Shipment of reference material and chemicals to facilities	170	289
Shipment of inspection samples, radioactive material standards and contaminated items to the Safeguards Analytical Laboratory	202	232
Procurement actions	1 707	1 423

Table A22. **ADDITIONAL SAFEGUARDS SUPPORT PROVIDED BY STATES**

States and organizations representing groups of States having formal support programmes	States having R&D contracts and test programmes
Argentina	Austria
Australia	Czech Republic
Belgium	Israel
Canada	Latvia
EURATOM	Pakistan
Finland	Russian Federation
France	
Germany	
Hungary	
Japan	
Republic of Korea	
Netherlands	
Russian Federation	
Sweden	
United Kingdom	
United States of America	

Table A23. **STANDING ADVISORY GROUPS**

- Advisory Commission on Safety Standards
- International Consultative Group on Food Irradiation
- International Fusion Research Council
- International Nuclear Data Committee
- International Nuclear Desalination Advisory Group
- International Nuclear Safety Advisory Group
- International Radioactive Waste Technology Advisory Committee
- Nuclear Safety Standards Advisory Committee
- Radiation Safety Standards Advisory Committee
- Scientific Committee of IAEA/WHO Network of Secondary Standard Dosimetry Laboratories
- Standing Advisory Group on Safeguards Implementation
- Standing Advisory Group on Technical Assistance and Co-operation
- Transport Safety Standards Advisory Committee
- Waste Safety Standards Advisory Committee

Table A24. **CONVENTIONS NEGOTIATED AND ADOPTED UNDER THE AUSPICES OF THE AGENCY AND FOR WHICH THE DIRECTOR GENERAL IS THE DEPOSITARY (STATUS AND RELEVANT DEVELOPMENTS)**

Agreement on the Privileges and Immunities of the IAEA (reproduced in INFCIRC/9/Rev. 1). Status remained unchanged during 1999, with 67 Parties.

Vienna Convention on Civil Liability for Nuclear Damage (reproduced in INFCIRC/500). Entered into force on 12 November 1977. In 1999, 1 State adhered to the Convention. By the end of the year, there were 32 Parties.

Optional Protocol Concerning the Compulsory Settlement of Disputes (reproduced in INFCIRC/500/Add.3). Entered into force on 13 May 1999. By the end of the year, there were 2 Parties.

Convention on the Physical Protection of Nuclear Material (reproduced in INFCIRC/274/Rev.1). Entered into force on 8 February 1987. In 1999, 1 State adhered to the Convention. By the end of the year, there were 64 Parties.

Convention on Early Notification of a Nuclear Accident (reproduced in INFCIRC/335). Entered into force on 27 October 1986. In 1999, 2 States adhered to the Convention. By the end of the year, there were 84 Parties.

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (reproduced in INFCIRC/336). Entered into force on 26 February 1987. In 1999, 2 States adhered to the Convention. By the end of the year, there were 79 Parties.

Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (reproduced in INFCIRC/402). Entered into force on 27 April 1992. Its status remained unchanged during 1999, with 20 Parties.

Convention on Nuclear Safety (reproduced in INFCIRC/449). Entered into force on 24 October 1996. In 1999, 3 States adhered to the Convention. By the end of the year, there were 52 Parties.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (reproduced in INFCIRC/546). Opened for signature on 29 September 1997. In 1999, 8 States adhered to the Convention. By the end of the year, there were 13 Contracting States and 40 Signatories.

Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (reproduced in INFCIRC/566). Opened for signature on 29 September 1997. In 1999, 1 State adhered to the Protocol. By the end of the year, there were 2 Contracting States and 14 Signatories.

Convention on Supplementary Compensation for Nuclear Damage (reproduced in INFCIRC/567). Opened for signature on 29 September 1997. In 1999, 2 States adhered to the Convention. By the end of the year, there were 2 Contracting States and 13 Signatories.

Extension of the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA) (reproduced in INFCIRC/377). Entered into force on 4 April 1995. In 1999, 2 States adhered to the Extension of the Agreement. By the end of the year, there were 26 Parties.

Second Agreement to Extend the 1987 Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA) (reproduced in INFCIRC/167/Add. 18). Entered into force on 12 June 1997. Status remained unchanged during 1999, with 17 Parties.

Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA). In 1999, 1 State concluded the Agreement. By the end of the year, there were 89 States that concluded RSA Agreement.

Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) (reproduced in INFCIRC/582) Opened for signature on 25 September 1998. In 1999, two States signed the Agreement. By the end of the year, there were 14 Signatories.

Table A25. **CO-ORDINATED RESEARCH PROJECTS**
(with start and finish)

Nuclear Fuel Cycle and Waste Technology	
Evaluation of the safety, environmental and non-proliferation aspects of the partitioning and transmutation of actinides and fission products	1994–2000
Site characterization techniques used in environmental restoration activities	1995–1999
Corrosion of research reactor aluminium clad spent fuel in water	1995–2000
High temperature on-line monitoring of water chemistry and corrosion (WACOL)	1995–2000
Extrapolation of short term observations to time periods for the isolation of long lived radioactive waste	1995–1999
Modelling of transport of radioactive substances in primary circuits of water cooled reactors	1996–2001
Treatment of liquid effluent from mines and mills during and after operation (post-decommissioning/rehabilitation)	1996–2001
Decommissioning techniques for research reactors	1997–2001
Combined methods of liquid radioactive waste treatment	1997–2001
Long term behaviour of low and intermediate level waste packages under repository conditions	1997–2002
Spent fuel performance and research	1997–2002
Chemical durability and performance assessment of spent fuel and high level waste forms under simulated repository conditions	1998–2002
Hydrogen and hydride induced degradation of the mechanical and physical properties of zirconium based alloys	1998–2003
Ageing of materials in spent fuel storage facilities	1999–2003
Anthropogenic analogues for geological disposal of high level and long lived radioactive waste	1999–2003
Comparative Assessment of Energy Sources	
Role of nuclear power and other energy options in meeting international goals on greenhouse gas emission reductions	1999–2001
Estimating external costs associated with electricity generation in developing countries using a simplified approach	1999–2001
Case studies to assess and compare different energy sources in sustainable energy and electricity supply strategies	1997–2000
Impact of infrastructural requirements on the competitiveness of nuclear power	1999–2002
Food and Agriculture	
Use of nuclear techniques for developing integrated nutrient and water management practices for agroforestry systems	1998–2005
Use of isotope techniques in studies on the management of organic matter and nutrient turnover for increased, sustainable agricultural production and environmental preservation	1995–2000
Use of nuclear and related techniques for evaluating the agronomic effectiveness of phosphate fertilizers, in particular rock phosphates	1993–1999
Assessment of soil erosion through the use of caesium-137 and related techniques as a basis for soil conservation, sustainable production and environmental protection	1995–2001
Use of nuclear and related techniques in the management of nutrients and water in rainfed arid and semi-arid areas for increasing crop production	1997–2002
Use of irradiated sewage sludge to increase soil fertility and crop yields and to preserve the environment	1995–1999
Development of management practices for sustainable crop production systems on tropical acid soils through the use of nuclear and related techniques	1999–2004
Radioactively labelled DNA probes for crop improvement	1994–1999
Improvement of new and traditional industrial crops by induced mutations and related biotechnology	1994–1999
Cellular biology and biotechnology including mutation techniques for creation of new useful banana genotypes	1994–1999

Table A25. **CO-ORDINATED RESEARCH PROJECTS (cont.)**

Genetic improvement of under-utilized and neglected crops in low income food deficit countries through irradiation and related techniques	1998–2003
Molecular characterization of mutated genes controlling important traits for seed crop improvement	1999–2004
Mutational analysis of root characters in annual food plants related to plant performance	1999–2004
Improving the effectiveness of monitoring trypanosomosis and tsetse control programmes in Africa using immunoassay and parasitological techniques	1993–1999
Use of radioimmunoassay and related techniques to identify ways of improving artificial insemination programmes for cattle reared under tropical and subtropical conditions	1994–1999
Use of immunoassay technologies for the diagnosis and control of foot and mouth disease in South East Asia	1994–1999
Use of nuclear and colorimetric techniques for measuring microbial protein supply from local feed resources in ruminant animals	1996–2001
Rinderpest seromonitoring and surveillance in Africa using immunoassay technologies	1997–1999
Development and validation of standardized methods for using polymerase chain reaction and related molecular technologies for rapid and improved animal disease diagnosis	1997–2001
Monitoring of contagious bovine pleuropneumonia in Africa using enzyme immunoassays	1997–2002
Use of nuclear and related techniques to develop simple tannin assays for predicting and improving the safety and efficiency of feeding ruminants on tanniniferous tree foliage	1998–2003
Assessment of the effectiveness of vaccination strategies against Newcastle Disease and Gumboro Disease using immunoassay based technologies for increasing farmyard poultry production in Africa	1998–2002
Use of non-structural protein of foot and mouth disease virus to differentiate between vaccinated and infected animals	1999–2004
Medfly mating behaviour studies under field cage conditions	1993–1999
Improved attractants for enhancing the efficiency of tsetse fly suppression operations and barriers systems used in tsetse control/eradication campaigns	1994–2002
Enhancement of the sterile insect technique through genetic transformation of arthropods using nuclear techniques	1994–2002
A molecular and genetic approach to develop sexing strains for field application in fruit fly sterile insect technique programmes	1994–2001
Automation in tsetse mass rearing for use in sterile insect technique programmes	1994–2001
Genetics application to improve the SIT for tsetse control/eradication	1997–2002
Quality assurance of mass produced and released fruit flies	1999–2004
Evaluating the use of nuclear techniques for the colonization and production of natural enemies of agricultural insect pests	1999–2004
Impact of long term pesticide usage on soil properties using radiotracer techniques	1994–1999
Validation of thin layer chromatographic screening methods for pesticide residue analysis	1996–2002
Alternative methods to gas and high performance liquid chromatography for pesticide residue analysis in grain	1997–2002
Development of safe, shelf-stable and ready to eat food through radiation processing	1996–2000
Determination of profiles of bacterial pathogens in food for export by the introduction of quality assured microbial assays	1998–2002
Irradiation as a phytosanitary treatment of food and agricultural commodities	1998–2002
Evaluation of methods of analysis for determining mycotoxin contamination of food and feed	1999–2003
Classification of soil systems on the basis of transfer factors of radionuclides from soil to reference plants	1999–2003
Human Health	
Local production and evaluation of primary reagents for the radioimmunoassay of alpha feto protein	1997–2000

Table A25. **CO-ORDINATED RESEARCH PROJECTS (cont.)**

Molecular typing in the management of multi-drug resistant tuberculosis	1997–2000
Genotype/phenotype correlation in thalassemia and muscular dystrophy	1998–2000
Bone SPECT in the management of patients with unexplained back pain	1997–2000
Relationship between vesico-ureteral reflux, pyelonephritis and renal scarring in children with recurrent urinary tract infection	1997–1999
Evaluation of technetium-99m based radiopharmaceuticals in the diagnosis and management of breast cancer patients	1997–2000
In vivo imaging for infection and inflammation	1996–1999
Diagnosis of subtypes of hepatitis B and C by in vitro nuclear techniques	1999–2002
Diagnosis of Chagas disease using a combination of antigens and radiolabelled probes	1999–2001
Standardization of iodine-131 treatment for hyperthyroidism with an intent to optimize radiation dose and treatment response	1994–1999
Efficacy and toxicity of samarium-153 EDTMP in the treatment of painful skeletal metastases	1996–1999
Relationship between recurrent lower respiratory tract infection, gastroesophageal reflux and bronchial asthma in children	1999–2003
Comparison of clinical applications software in nuclear medicine laboratories by software phantoms developed by COST-B	1999–2003
Development and validation of an Internet based clinical and technical study communication system for nuclear medicine	1998–2001
Clinical application of radiosensitizers in cancer radiotherapy	1994–2001
Randomized clinical trial of radiotherapy combined with mitomycin C in the treatment of advanced head and neck tumours	1994–2003
Use of radiotherapy in advanced cancer	1995–2000
Regional hyperthermia combined with radiotherapy for locally advanced cancers	1997–2002
Aspects of radiobiology applicable in clinical radiotherapy: Increase of the number of fractions per week	1998–2005
Human immunodeficiency virus markers in patients treated with radiotherapy for cervical cancer	1999–2000
Characterization and evaluation of high dose dosimetry techniques for quality assurance in radiation processing	1995–1999
Development of a quality assurance programme for radiation therapy dosimetry in developing countries	1995–2000
Development of a quality assurance programme for Secondary Standard Dosimetry Laboratories	1996–1999
Dose determination with plane parallel ionization chambers in therapeutic electron and photon beams	1996–1999
Development of a Code of Practice for dose determination in photon, electron and proton beams based on measurement standards of absorbed dose to water	1997–2000
Electron paramagnetic resonance biodosimetry	1998–2000
Comparative international studies of osteoporosis using isotope techniques	1994–2000
Development and application of isotopic techniques in studies of vitamin A nutrition	1995–1999
Reference Asian Man Project (Phase 2): Ingestion and organ content of trace elements of importance in radiological protection (RCA)	1995–2000
Isotopic evaluations of maternal and child nutrition to help prevent stunting	1996–1999
Isotopic evaluations in infant growth monitoring — in collaboration with WHO (partly RCA)	1999–2002
Application of nuclear techniques in the prevention of degenerative diseases (obesity and non-insulin dependent diabetes) in ageing	1998–2002
Use of isotopic techniques to examine the significance of infection and other insults in early childhood to diarrhoea morbidity, mal-assimilation and failure to thrive	1999–2003

Table A25. **CO-ORDINATED RESEARCH PROJECTS (cont.)**

Applied research on air pollution using nuclear related analytical techniques in the Asia and Pacific region (RCA)	1995–1999
Assessment of levels and health effects of airborne particulate matter in the mining, metal refining and metal working industries using nuclear and related analytical techniques	1996–2000
Validation and application of plants as biomonitors of trace element atmospheric pollution, analysed by nuclear and related techniques	1997–2002
Health impacts of mercury cycling in contaminated environments studied by nuclear techniques	1999–2004
Marine Environment, Water Resources and Industry	
Worldwide marine radioactivity studies	1998–2001
Use of radiation processing to prepare biomaterials for applications in medicine	1995–1999
Improvement of physical properties of radiation vulcanized natural rubber latex (RVNRL) (RCA)	1997–2000
Radiation processing of indigenous natural polymers (RCA)	1997–2002
Sedimentation assessment studies by environmental radionuclides and their application to soil conservation measures	1995–2000
The use of tracers and stable isotopes in surface water pollution studies	1997–2000
Isotope based assessment of groundwater renewal and related anthropogenic effects in water scarce areas	1995–1999
The use of isotope techniques in investigating acidic fluids in geothermal exploitation	1997–2000
The application of isotope techniques to the assessment of aquifer systems in major urban areas	1997–2000
Isotope response to dynamic changes in groundwater systems due to long term exploitation	1999–2003
Isotope techniques for the assessment of slow moving deep groundwater and their potential application for the assessment of waste disposal sites	1997–2000
Radionuclide transport dynamics in freshwater resources	1997–2001
Radiotracer technology for engineering unit operation studies and unit process optimization	1997–2000
The use of radiation processing for sterilization or decontamination of pharmaceuticals and pharmaceutical raw materials	1998–2001
Validation of protocols for corrosion and deposit evaluation in pipes by radiography	1997–2000
Physical and Chemical Sciences	
Development of computer based troubleshooting tools and instruments	1996–2000
Specialized software utilities for gamma ray spectrometry	1997–2000
Application of nuclear techniques to anti-personnel land mine identification	1999–2002
Bulk hydrogen analysis using neutrons	1997–2000
WIMS Library update	1998–2002
Analysis of research reactor transients	1995–2000
Application of MeV ion beams for development and characterization of semiconductor materials	1997–2000
Development of agents for imaging central neural system receptors based on technetium-99m	1995–2000
Technetium-99m labelled peptide for imaging of peripheral receptors	1995–2000
Optimization of synthesis and quality control procedures for the preparation of fluorine-18 and iodine-123 labelled peptides	1997–2000
Development of kits for radioimmunometric assay of tumour markers	1997–2000
Validation of nuclear techniques for analysis of precious and rare metals in mineral concentrates	1997–2000
Development of radioactively labelled cancer seeking biomolecules for targeted radiotherapy	1997–2000
Engineering, industrial and environmental applications of plasma physics and fusion technologies	1996–1999

Table A25. **CO-ORDINATED RESEARCH PROJECTS (cont.)**

Power plant design for inertial fusion energy	2000–2004
Dense magnetized plasma	2001–2004
Comparison of compact toroid configurations	1998–2002
Nuclear Safety	
Management of ageing of in-containment instrumentation and control cables	1992–1999
Development of methodologies for optimization of surveillance testing and maintenance of safety related equipment at nuclear power plants	1996–1999
Round robin exercise on WWER-440 reactor pressure vessel weld metal irradiation embrittlement and annealing	1996–2000
Investigation of methodologies for incident analysis	1997–2000
Safety of RBMK type nuclear power plant in relation to external events	1997–2000
Development and application of indicators to monitor nuclear power plant operational safety performance	1999–2003
Radiation Safety	
Development of relevant accident data for quantifying risks associated with transport of radioactive material	1994–1999
Limitations of radioepidemiological assessments for stochastic radiation effects, in relation of radiation protection	1994–2000
Intercomparison of in vivo counting systems using a reference Asian phantom	1996–1999
Regional personal dosimetry intercomparison	1996–1999
Intercomparison for individual monitoring of external exposure from photon radiation	1996–2000
Intercomparison and biokinetic model validation of radionuclide intake assessment	1997–2000
Development of radiological basis for the transport safety requirements for low specific activity materials and surface contaminated objects	1997–2001
Accident severity during air transport of radioactive material	1998–2001
Cytogenetic biodosimetry	1998–2002
Image quality and patient dose optimization in mammography in eastern European countries	1999–2003
Radioactive Waste Safety	
Formulation of approaches to compare the potential impacts of wastes from electricity generation technologies	1997–2000
Improvement of safety assessment methodologies for near surface disposal facilities for radioactive waste (ISAM)	1997–2000
Biosphere modelling and assessment methods (BIOMASS)	1998–2002

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999**

Nuclear Power

National workshop on nuclear power project planning — Bangladesh

Regional workshops on Y2K issues: Interface between electricity grid performance and nuclear power plant operation — Bulgaria

Regional workshop on experience in delayed nuclear power projects — Brazil

Regional workshop on human resources management — Slovenia

Regional workshop on commissioning and project management — China

Regional workshop on steam generator degradation and inspection — France

Regional workshop on quality performance in niclear power plants: The role of management — Hungary

Interregional training course on instrumentation and control of nuclear power plants — Germany

Workshop on cost and process management for Latin America — Argentina

Regional workshop on human resources management with special focus on training and licensing — Rep. of Korea

Regional workshop on qualification of non-destructive testing systems — Croatia

Regional workshop on qualification of in-service inspection systems — Cuba

Regional workshop on optimization of in-service inspection programmes of primary circuit components — Slovakia

Nuclear Fuel Cycle and Waste Technology

Workshop on regulatory aspects of decommissioning — Italy

Seminar on nuclear graphite disposal — United Kingdom

Regional course on WWER fuel design, fabrication, performance and the back end — Slovakia

Workshop for the users of the TRANSURANUS code — Bulgaria

Interregional course on technical and administrative preparations required for the shipment of research reactor spent fuel to its country of origin — USA

Comparative Assessment of Energy Sources

Interregional course on energy and nuclear power planning using the Energy and Power Evaluation Program (ENPEP) — USA

Regional (Europe) course on the comparative assessment of nuclear power and other options and strategies for electricity generation in support of sustainable energy development — Italy

Regional (RCA) course on use of the Agency's DECADES computer tools and FINPLAN model to analyse the role of nuclear power in light of increased privatization in the electricity sector — Pakistan

Regional (RCA) seminar to exchange information and experience on national efforts in developing country specific databases to support comparative assessment — Thailand

National course on use of the Agency's MAED model for electricity demand forecasting — Sudan

Workshop on estimating external costs associated with electricity generation in developing countries, using a simplified approach — Italy

Workshop on exchange of experience in enhanced electricity planning incorporating comparative assessment into decision support studies — Brazil

Food and Agriculture

Regional group training on fertigation and the use of nuclear techniques in water and nutrient management — Jordan

FAO/IAEA regional seminar on extension aspects of agroforestry practices — Sri Lanka

Regional workshop on evaluation of the dynamics of nutrients and water in cropping systems — Chile

FAO/IAEA seminar on mutation techniques and molecular genetics for tropical and subtropical plant improvement in the Asia and Pacific region — Philippines

FAO/IAEA regional workshop on hands-on experience in molecular and mutation techniques — Austria

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Review and planning workshop for the Asia and Pacific region on feed supplementation strategies and reproductive management of cattle — Myanmar

First project co-ordination meeting of the IAEA/AFRA project on increasing and improving milk and meat production — Morocco

Project co-ordination meeting and mid-term review of AFRA project II–17 development and field evaluation of animal feed supplementation packages — Madagascar

Regional workshop on African swine fever — Senegal

IAEA/RCA regional training workshop on self-coating solid phase radioimmunoassay for measuring progesterone in milk of ruminant livestock — Indonesia

IAEA/AFRA training workshop on the production of iodinated tracers for self-coating radioimmunoassay of progesterone — Egypt

Fifth co-ordination meeting on support for rinderpest surveillance — Syrian Arab Republic

Regional FAO/IAEA workshop on internal quality control of the rinderpest enzyme linked immunosorbent assay (ELISA) and ELISA troubleshooting — Senegal

FAO/IAEA regional course on the diagnosis and control of foot and mouth disease — Thailand

Task force meeting on training of artificial insemination technicians, field assessment of fertility and database management — South Africa

Second workshop on quarantine procedures needed for the creation of a fruit fly free zone in Tacna and Moquegua — Peru

FAO/IAEA interregional course on the use of the sterile insect and related techniques for the area-wide management of insect pests — USA

FAO/IAEA regional course on techniques used for area-wide control/eradication of the Old World Screwworm fly — Malaysia

Third meeting of the working group on fruit flies of the Western Hemisphere — Guatemala

Second national course on integrated fruit fly control — Peru

FAO/IAEA course for Asia and the Pacific on the development of quality assurance for mycotoxin analysis of food and feed — Philippines

FAO/IAEA workshop on the introduction of quality assurance/quality control measures in pesticide residue analytical laboratories — Austria

Human Health

Regional course for diagnosis of diabetic nephropathy using radioimmunoassay techniques — India

Regional course on cardiac SPECT for nuclear medicine technologists — Thailand

Regional course on myocardial perfusion scintigraphy for nuclear medicine physicians — Philippines

Regional course on nuclear cardiology — India

Regional course on radionuclide techniques in the management of diabetic nephropathy — Republic of Korea

Regional course on myocardial perfusion studies using SPECT — China

Regional workshop on recent serological and tissue markers for breast cancer — China

Regional course on application of radionuclide techniques in oncology — Slovenia

Regional course on nuclear cardiology — Islamic Republic of Iran; Hungary

Regional course on quality control and SPECT systems — Egypt

Regional workshop on effective use of portable image processing software — Kenya; Morocco

Regional course on use and production of genotyping diagnostic reagents — Republic of Korea

Regional workshop on screening for neonatal hypothyroidism — Thailand

Regional workshop on national screening programme for neonatal hypothyroidism — Republic of Korea

Regional workshop on methodological aspects of tumour markers to ferritin and CEA — Ghana

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Regional workshop on the radioimmunoassay of tumour markers for diagnosis and management of cancer — Islamic Republic of Iran

Regional workshop on training and evaluation of methodologies for screening and confirmation of hepatitis C using radioimmunoassay— Costa Rica

Regional course on isotopes and molecular techniques for diagnosis and control of communicable diseases — South Africa

Regional workshop on quality control of single and multi-head SPECT systems — Saudi Arabia

Regional course on maintenance of gamma cameras — Syrian Arab Republic

Regional course on quality control of medical linear accelerators — Islamic Republic of Iran

Regional course on quality assurance of SPECT systems — Costa Rica

International seminar on therapeutic application of radiopharmaceuticals — India

National workshop on intraluminal and interstitial brachytherapy — Islamic Republic of Iran

Evidence based radiation oncology — South Africa

Regional workshop on health planners and harmonization of education — South Africa

Course on modern brachytherapy techniques — Norway

Teaching course on methodology of clinical research — Italy

Course on imaging for target volume determination in radiotherapy — United Kingdom

Project co-ordinators' meeting on quality assurance in radiation therapy — Australia

Regional course on public and professional awareness — Sri Lanka

Interregional course on clinical treatment planning for teletherapy and brachytherapy — Lithuania

Regional course on the basis for clinical quality assurance radiation oncology — Philippines

Regional course on breast conservation techniques for breast cancer — Morocco

Teaching course on evidence based radiation oncology: Principles and methods (in Russian) — Slovakia

Regional course on the basis for clinical quality assurance in radiation oncology — Philippines

Regional course on modern techniques and dosimetry in brachytherapy — Egypt

Regional workshop on the IAEA and ESTRO networks for external quality audits in radiotherapy — Greece

Interregional course on treatment planning in radiotherapy using ROCS^{TM} systems — Lithuania

Interregional course on calibration procedures and quality assurance in Secondary Standard Dosimetry Laboratories — Cuba

Regional workshop on harmonized methods of beam calibrations in external radiotherapy (AFRA) — Morocco

Regional course on application of chemometrics and statistics for the evaluation of airborne particulate matter data and black carbon analysis of aerosol samples — Indonesia

Regional course for East Asia and the Pacific on isotopic technique applications in human nutrition with emphasis on micronutrient intervention programmes — Thailand

Course on quality assurance — Austria

Regional workshop on sampling and sample preparation — Brazil

National course on the use of isotopes in human nutrition — Egypt

Workshop on efficient methodology for the evaluation of uncertainty in analytical chemistry — Finland

Determination of radionuclides in food and environmental samples — Japan

Workshop on standards, intercomparison and performance evaluations for low level and environmental mass spectrometry — USA

Workshop on mobile radiological laboratories — Ukraine

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Marine Environment, Water Resources and Industry

Assessment workshop on the development of hydrological conceptual models — Viet Nam

Regional workshop on isotope data interpretation and integration in site conceptual models — South Africa

Regional course on techniques for reservoir management — Philippines

Workshop on assessment of technology transfer in geothermal energy development —Indonesia

Regional course on cross-correlation techniques for flow rate measurement in multiphase systems — Malaysia

Regional course on radiotracer and sealed source applications in the petroleum industry — India

Regional workshop on industrial applications of tracer technology and nucleonic control systems — Venezuela

Regional course on level 3 examinations in surface methods (penetrant testing and magnetic particle testing) — Pakistan

Regional course and examination on radiographic testing: Level 2 — Islamic Republic of Iran

Regional course on non-destructive testing of concrete structures —Malaysia

Regional course on non destructive testing in-service inspection for industry —Saudi Arabia

Regional course and examination on ultrasonic testing: Level 2 — Syrian Arab Republic

Regional course on radiation synthesis of biomaterials — Australia

Regional course on radiation upgrading of agro wastes — Malaysia

Regional course on production and sterilization of biological tissues — Algeria

Regional course on radiation treatment of industrial and municipal wastewater — Austria

Regional course on production and control of radiopharmaceuticals — Saudi Arabia

Regional workshop on quality assurance in the production and control of iodine-131 therapeutic capsules — Viet Nam

Regional workshop on quality assurance in the production and control of therapeutic radiopharmaceuticals — Republic of Korea

Regional workshop on good manufacturing practices in the production of technetium-99m generators — China

Course on antibody coated tubes production and evaluation for use in radioimmunoassay/immunoradiometric assay — Greece

Regional expert workshop on quality assurance in cobalt-60 brachytherapy source production — India

Regional course on the training of auditors of nuclear analytical laboratories — Bolivia

Regional course on calibration and metrology in nuclear analytical techniques — Chile

Working group meetings on preparation of a programme for the harmonization of quality assurance procedures in radiopharmacy — Cuba; Argentina

Regional course on the preparation and quality control of iodine-131–MIBG for diagnoses and therapy — Brazil

Regional workshop on training in quality analysis/quality control of nuclear analytical techniques — Austria

Physical and Chemical Sciences

Regional course on the maintenance, repair and calibration of electrometers and ionization chambers in Latin America — Brazil

Regional course on power supplies — Malaysia

Regional course on troubleshooting of nuclear instruments — Indonesia

Group fellowship training in the maintenance of nuclear spectroscopy instruments — Agency's Laboratories, Seibersdorf

National workshop for environmental officers — Ghana

National course on power conditioning and earthing — Zambia

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Regional workshop on the management of research reactor facilities — Egypt

Nuclear Safety

Interregional course on environmental qualification of equipment important to safety in nuclear power plants — Spain

Regional course on regulatory control of nuclear power plants — United Kingdom

Regional course: Basic professional course on nuclear safety — France

Regional course on train the trainers in nuclear safety, including the use of basic simulators for training of nuclear power plant technical personnel — Slovenia

Advanced course on probabilistic safety assessment (PSA) modelling techniques, including human reliability analysis, common cause failure, Level 2 shutdown PSA and an overview of PSA applications — Spain

Joint utility/regulatory benefits of periodic safety reviews — Hungary

Safety assessment of plant modifications with emphasis on instrumentation and control modernization and human–machine interface issues — Slovenia

Development and validation of emergency operating procedures for effective prevention/mitigation of severe core damage — Slovakia

Nuclear power plant operating cycle extension (on-line maintenance, maintenance optimization, in-service inspection, technical specification applicability) — Slovenia

Safety issues for RBMK reactors — Lithuania

Application of selected event analysis methodologies to actual events from nuclear power plants — Slovakia

Utility–regulatory interface for nuclear power plant safety — Germany

Management of safety and safety culture — Bulgaria

Enhancement of operational safety — Slovenia

Regulatory experience in introducing advanced computer based technology into safety systems at nuclear power plants — Slovenia

Forum on safety analysis for WWER and RBMK reactors — Russian Federation

Workshop on regulatory review of licensee safety performance — Spain

Course on simulator training — Republic of Korea

Course on mechanical equipment — Republic of Korea

Course on steam generators — Republic of Korea

Workshop on the licensing of modifications — Slovenia

Workshop on co-operation issues between the regulatory body and other authorities involved in the licensing process — Czech Republic

Course on human resources management with special focus on training and licensing — Republic of Korea

Course on commissioning and project management — China

Course on application of the technical co-operation regional Asia reference book in cascade training with special focus on maintenance — Republic of Korea

Course on plant specific safety indicators for monitoring operational safety performance — China; India; Pakistan

Course on self-assessments and peer reviews — China

Course on methods to detect, correct and prevent human errors — India

Course on education and training for safety — Republic of Korea

Course on ageing and plant life extension — Republic of Korea

Radiation Safety

Basic regional professional course on radiation protection — Syrian Arab Republic

Regional workshop on notification, authorization, inspection and enforcement — France

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Regional workshop on the development of national external individual monitoring services with emphasis on thermoluminescence dosimetry, operation and management — Côte d'Ivoire

Regional workshop on radiation protection and quality assurance in diagnostic radiology — Ghana

Regional post-graduate educational course on radiation protection — South Africa

Research reactor emergency response exercise — Australia

Regional (RCA) workshop on radiation protection and quality assurance, including optimization of collective dose from diagnostic radiology — Malaysia

Regional (RCA) workshop on occupational radiation protection — Australia

Regional (RCA) course on radiation safety in industrial radiography — Indonesia

Regional (RCA) workshop on current ICRP recommendations and IAEA standards — India

Group training on design, implementation and management of radiation protection and safety programme in industrial radiography — Malaysia

National workshop on radiation protection in radiodiagnostic, radiotherapy and nuclear medicine — Myanmar

National workshop on radiation protection and quality assurance in radiodiagnostics — Austria

Group training on operation and maintenance of the Harshaw thermoluminescent dosimeter reader — Germany

Group training on radiation protection and quality assurance in diagnostic radiology — United Kingdom

Group training on radiation protection and quality assurance in radiotherapy — Belgium

Group course on the safe transport of radioactive waste material — Syrian Arab Republic

Basic regional professional course on radiation protection — Syrian Arab Republic

Regional course on optimization of radiological protection in the design and operation of nuclear power plants — Russian Federation

Regional train the trainers course on medical preparedness and assistance for radiological accidents — Czech Republic

Regional course on medical preparedness and emergency medical assistance to nuclear and radiological accidents: Echo 1 — Hungary

Regional course on biodosimetry and diagnosis of health effects of exposure to ionizing radiation — Turkey

Regional train the trainers course on monitoring strategies, procedures, reporting and transmission of data (in English) — Ukraine

Regional train the trainers course on monitoring strategies, procedures, reporting and transmission of data (in Russian) — Ukraine

Regional train the trainers course on radiological emergency preparedness (in English) — Slovenia

Regional train-the-trainers course on radiological emergency preparedness (in Russian) — Russian Federation

Regional course on safety assessment and inspection in medical, industrial and research facilities — Lithuania

Regional course on radiation protection and safety in medicine — Belarus

Regional course on design, implementation and management of individual monitoring programmes — Czech Republic

Regional basic course on radiation protection — Russian Federation

National course on radiation protection for radiation protection officers — The Former Yugoslav Republic of Macedonia

National course on radiation protection in medical practices — Republic of Moldova

National course on radiation and quality assurance in medicine — Latvia

Regional course for regulatory staff on the control of medical practice in radiotherapy — Mexico

Table A26. **TRAINING COURSES, SEMINARS AND WORKSHOPS IN 1999 (cont.)**

Regional workshop on radiation protection and regulatory control in industrial applications of radiation sources — Chile

Second intercomparison of personal monitoring and workshop on external personal dosimetry — Guatemala

National course on emergency response and preparedness for national organizations — Panama

National course on medical aspects of radiological accidents — Argentina

Regional course on radiological protection in X ray diagnosis — Brazil

Regional course on radiation protection and nuclear safety — Argentina

Regional course on safe transport of radioactive materials — Argentina

Radioactive Waste Safety

Regional (RCA) workshop on environmental radiation monitoring and regional database — Republic of Korea

Regional basic course on radioactive waste safety — Republic of Moldova

Regional train the trainers workshop on decontamination of contaminated villages — Belarus

Regional course on physical protection of nuclear facilities and materials — Czech Republic

Safeguards

International course on state systems of accounting and control of nuclear materials — USA

Seminar on IAEA safeguards for the 21st century — Republic of Korea

Workshop on familiarization of IAEA activities and non-destructive analysis measurement techniques — Belarus; Uzbekistan

Workshop on containment and surveillance equipment and procedures for ABACC inspectors — Brazil; Argentina

Security of Material

LANL/IAEA joint international workshop on radiation monitoring — USA

Interagency co-ordination committee working group on training — Austria

Workshop on IAEA safeguards implementation — Austria

Joint IAEA–WCO–INTERPOL awareness training course for customs and police investigators on combating smuggling of nuclear and other radioactive materials — Austria

Nuclear Non-Proliferation Experts Group evaluation of exercise — Austria; Malta

Regional workshop on the illicit trafficking database — Kazakhstan

Workshop on design basis threat — Czech Republic

Workshop on nuclear materials accountancy and control — Austria

Regional workshop on physical protection of nuclear facilities and materials — Cyprus

International course on physical protection — USA

Table A27. **PUBLICATIONS ISSUED IN 1999**

Nuclear Power

Nuclear power reactors in the world — Reference Data Series No. 2

Operating experience with nuclear power stations in Member States in 1998 (13th edition) — Annual Publication

Verification and validation of software related to nuclear power plant instrumentation and control — Technical Reports Series No. 384

Modern instrumentation and control for nuclear power plants: A Guidebook — Technical Reports Series No. 387

World survey on nuclear power plant personnel training — IAEA-TECDOC-1063

Specification of requirements for upgrades using digital instrument and control systems — IAEA-TECDOC-1066

Technical support for nuclear power operations — IAEA-TECDOC-1078

Quality assurance within regulatory bodies — IAEA-TECDOC-1090

The impact of the year 2000 issue on electricity grid performance and nuclear power plant operation in Bulgaria, the Russian Federation and Slovakia — IAEA-TECDOC-1095

Evaluating and improving nuclear power plant performance — IAEA-TECDOC-1098

Management of delayed nuclear power projects — IAEA-TECDOC-1110

Strategies for competitive nuclear power plants — IAEA-TECDOC-1123

Nuclear Fuel Cycle and Waste Technology

Hydrogeological investigation of sites for the geological disposal of radioactive waste — Technical Reports Series No. 391

State of the art technology for decontamination and dismantling of nuclear facilities — Technical Reports Series No. 395

Hydrogeological investigations of sites for geological disposal of radioactive waste — IAEA-TECDOC-931

Remote technology in spent fuel management — IAEA-TECDOC-1061

Procedures and techniques for the management of experimental fuels from research and test reactors — IAEA-TECDOC-1080

Spent fuel storage and transport cask decontamination and modification — IAEA-TECDOC-1081

Potential vulnerabilities of nuclear fuel cycle facilities to the year 2000 (Y2K) issue and measures to address them — IAEA-TECDOC-1087

Technologies for the remediation of radioactively contaminated sites — IAEA-TECDOC-1086

Technical options for the remediation of contaminated groundwaters — IAEA-TECDOC-1088

Storage of spent fuel from power reactors: Proceedings of a symposium — IAEA-TECDOC-1089

Maintenance of records for radioactive waste disposal — IAEA-TECDOC-1097

Review of the factors affecting the selection and implementation of waste management technologies — IAEA-TECDOC-1096

Survey of wet and dry spent fuel storage — IAEA-TECDOC-1100

Status and trends in spent fuel reprocessing — IAEA-TECDOC-1103

Minimization of waste from uranium purification, enrichment and fuel fabrication — IAEA-TECDOC-1115

Use of natural analogues to support radionuclide transport models for deep geological repositories for long lived radioactive wastes — IAEA-TECDOC-1109

Compliance monitoring for remediated sites — IAEA-TECDOC-1118

On-site disposal as a decommissioning strategy — IAEA-TECDOC-1124

Water chemistry and corrosion control of cladding and primary circuit components — IAEA-TECDOC-1128

Nuclear decommissioning: A proposed standardized list of items for costing purposes

Table A27. **PUBLICATIONS ISSUED IN 1999 (cont.)**

Comparative Assessment of Energy Sources

Strategies for competitive nuclear power plants — IAEA-TECDOC-1123

Energy, electricity and nuclear power estimates for the period up to 2020, July 1999 Edition — Reference Data Series No. 1

Food and Agriculture

Soils newsletter, Vol. 22, Nos 1 and 2

Mutation breeding newsletter No. 44

Mutation breeding review No. 11

Animal production and health newsletter Nos 30 and 31.

Insect and pest control newsletter Nos 53 and 54

Plant breeding and genetics newsletter Nos 3 and 4

Nuclear based technologies for estimating microbial protein supply in ruminant livestock — IAEA-TECDOC-1093

Development of feed supplementation strategies for improving the productivity of dairy cattle on smallholder farms in Africa — IAEA-TECDOC-1102

The South American fruit fly *Anastrepha fraterculus* (Wied.): Advances in artificial rearing, taxonomic status and biological studies — IAEA-TECDOC-1064

Development of a female medfly attractant system for trapping and sterility assessment — IAEA-TECDOC-1099

Product quality control, irradiation and shipping procedures for mass-reared tephritid fruit flies for sterile insect release programmes

Irradiation as a quarantine treatment of arthropod pests — IAEA-TECDOC-1082

Use of nuclear and related techniques in studies of agroecological effects resulting from the use of persistent pesticides in Central America — IAEA-TECDOC-1116

Facts about food irradiation (2nd edition), ICGFI

Safeguarding our harvest, ICGFI

Irradiation and trade in food and agricultural commodities, ICGFI

Enhancing food safety through irradiation, ICGFI

Consumer attitudes and marketing response to irradiated food, ICGFI

The safety of poultry meat: from farm to table, ICGFI

Human Health

Handbook for mould room for teletherapy — IAEA-PRTM-4

Techniques for high dose dosimetry in industry, agriculture and medicine. Proceedings of an international symposium — IAEA-TECDOC-1070

Calibration of brachytherapy sources: guidelines on standardized procedures for the calibration of brachytherapy sources at Secondary Standard Dosimetry Laboratories (SSDLs) and hospitals — IAEA-TECDOC-1079

SSDL network charter: IAEA/WHO network of Secondary Standard Dosimetry Laboratories — IAEA/WHO/SSDL/99

SSDL newsletter Nos 40, 41

Marine Environment, Water Resources and Industry

Nuclear geophysics and its applications — Technical Report Series No. 393

Stability and stabilization of polymers under irradiation — IAEA-TECDOC-1062

Production technologies for molybdenum-99 and technetium-99m — IAEA-TECDOC-1065

Characterization of ceramics and semiconductors using nuclear techniques — IAEA-TECDOC-1069

Table A27. **PUBLICATIONS ISSUED IN 1999 (cont.)**

Optimization of production and quality control of therapeutic radionuclides and radiopharmaceuticals — IAEA- TECDOC-1114

NDT: A guidebook for industrial management and quality control personnel — Training Course Series No. 9

Ultrasonic testing of materials at Level 2 — Training Course Series No. 10

Physical and Chemical Sciences

17th IAEA Fusion Energy Conference — Proceedings Series

Nuclear Fusion, Vol.39, Yokohama Special Issues 1 and 2 (selected papers from the 17th IAEA Fusion Energy Conference)

Nuclear Fusion Vol. 39, No. 12, "ITER Physics Basis

Environmental and industrial applications of nuclear analytical techniques — IAEA-TECDOC-1121

Intercomparison of alpha particle spectrometry software packages (with the companion diskette containing the set of test spectra and programs used for analysis) — IAEA-TECDOC-1104

ITER Newsletter

ITER Final Design Report, Cost Review and Safety Analysis (FDR) and Relevant Documents — ITER EDA Documentation Series No. 14

ITER Council Proceedings 1998 — ITER EDA Documentation Series No. 15

Nuclear Safety

Topical issues in nuclear, radiation and radioactive waste safety — Proceedings Series

Implementation and review of a nuclear power plant ageing management programme — Safety Reports Series No. 15

Health and environmental impacts of electricity generation systems: Procedures for comparative assessment — Technical Reports Series No. 394

Light water reactor generic safety issues database (LWRGSIDB). User's manual — IAEA-CMS-13

RBMK fuel channel integrity — IAEA-EBP-RBMK-05

Anticipated transients without scram for WWER reactors — IAEA-EBP-WWER-12

Final report of the programme on the safety of WWER and RBMK nuclear power plants — IAEA-EBP-WWER-15

AMAT guidelines. Reference document for the IAEA Ageing Management Assessment Teams (AMATs) — IAEA-SVS-04

DSRS guidelines. Reference document for the IAEA Design Safety Review Services — IAEA-SVS-05

Achieving year 2000 readiness: Basic processes — IAEA-TECDOC-1072

A framework for a quality assurance programme for PSA — IAEA-TECDOC-1101

Living probabilistic safety assessment (LPSA) — IAEA-TECDOC-1106

Root cause analysis for fire events at nuclear power plants — IAEA-TECDOC-1112

Assessment and management of ageing of major nuclear power plant components important to safety: PWR vessel internals — IAEA-TECDOC-1119

Assessment and management of ageing of major nuclear power plant components important to safety: PWR pressure vessels — IAEA-TECDOC-1120

Self-assessment of operational safety for nuclear power plants — IAEA-TECDOC-1125

A simplified approach to estimating reference source terms for LWR designs — IAEA-TECDOC-1127

Radiation Safety

Safety of radiation sources and security of radioactive materials — Proceedings Series

Radiation protection and safety in industrial radiography — Safety Reports Series No. 13

Assessment of doses to the public from ingested radionuclides — Safety Reports Series No. 14

Occupational radiation protection — Safety Standards Series RS-G-1.1

Table A27. **PUBLICATIONS ISSUED IN 1999 (cont.)**

Assessment of occupational exposure due to intakes of radionuclides — Safety Standards Series RS-G-1.2

Assessment of occupational exposure due to external sources of radiation — Safety Standards Series RS-G-1.3

National competent authorities responsible for approvals and authorizations in respect of the transport of radioactive material - List No. 30 (1999 edition) — IAEA-NCAL-30

Organization and implementation of a national regulatory infrastructure governing protection against ionizing radiation and the safety of radiation sources — IAEA-TECDOC-1067

Intercomparison and biokinetic model validation of radionuclide intake assessment — IAEA-TECDOC-1071

Safety measures to address the year 2000 issue at medical facilities which use radiation generators and radioactive materials — IAEA-TECDOC-1074

Generic procedures for monitoring in a nuclear or radiological emergency — IAEA-TECDOC-1092

Directory of national competent authorities' approval certificates for package design, special form material and shipment of radioactive material. 1999 Edition — IAEA-TECDOC-1107

Report of the international workshop on safety measures to address the year 2000 issue at medical facilities which use radiation generators and radioactive materials — IAEA-TECDOC-1108

Safety assessment plans for authorization and inspection of radiation sources — IAEA-TECDOC-1113

Intercomparison for individual monitoring of external exposure from photon radiation — IAEA-TECDOC-1126

Report on the preliminary fact finding mission following the accident at the nuclear fuel processing facility in Tokaimura, Japan — IAEA-TOAC

Radioactive Waste Safety

Safety assessment for near surface disposal of radioactive waste — Safety Standards Series WS-G-1.1

Decommissioning of nuclear power plants and research reactors — Safety Standards Series WS-G-2.1

Decommissioning of medical, industrial and research facilities — Safety Standards Series WS-G-2.2

Near surface disposal of radioactive waste — Safety Standards Series WS- R-1

Application of radiological exclusion and exemption principles to sea disposal — IAEA-TECDOC-1068

Safety measures to address the year 2000 issue at radioactive waste management facilities — IAEA-TECDOC-1073

Critical groups and biospheres in the context of radioactive waste disposal — IAEA-TECDOC-1077

Protection of the environment from the effects of ionizing radiation — IAEA-TECDOC-1091

Inventory of radioactive waste disposals at sea — IAEA-TECDOC-1105

Report of the international workshop on safety measures to address the year 2000 issue at radioactive waste management and nuclear fuel cycle facilities — IAEA-TECDOC-1111

Co-ordination of Safety Activities

The safe management of sources of radiation: Principles and strategies — INSAG Series No. 11

Basic safety principles for nuclear power plants 75-INSAG-3 Rev. 1 — INSAG Series No. 12

Management of operational safety in nuclear power plants — INSAG Series No. 13

Safe management of the operating lifetimes of nuclear power plants — INSAG Series No. 14

Nuclear safety review for the year 1998 — IAEA/NSR/1998

Regulation of the life cycle of nuclear installations — IAEA-PDRP-3

Assessment of regulatory effectiveness — IAEA-PDRP-4

Communications on nuclear, radiation, transport and waste safety: A practical handbook — IAEA-TECDOC-1076