The United States Nuclear Regulatory Commission's Report to Congress on the Disposition of Highly Enriched Uranium Previously Exported from the United States

January 1993

This report has been prepared in response to Section 903(b) of the Energy Policy Act of 1992:

> (1) IN GENERAL. -- Not later than 90 days after the date of the enactment of this Act, the Chairman of the Nuclear Regulatory Commission, after consulting with other relevant agencies, shall submit to the Congress a report detailing the current disposition of previous United States exports of highly enriched uranium, including --
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> (A) their location;
>
> (B) whether they are irradiated;
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> (C) whether they have been used for the purpose stated in their export license; and
>
> (d) whether they have been used for an alternative purpose and, if so, whether such alternative purpose has been explicitly approved by the Commission.
>
> (2) EXPORTS TO EURATOM. -- To the maximum extent possible, the report required by paragraph (1) shall include --
>
> (A) exports of highly enriched uranium to EURATOM; and
>
> (B) subsequent retransfers of such material within EURATOM, without regard to the extent of United States control over such retransfers.

Introduction

This report covers highly enriched uranium (HEU) exported by the U.S. under the international peaceful nuclear cooperation agreements permitted by Section 123 of the Atomic Energy Act of 1954, as amended.

The information presented in this report has been compiled using U.S. sources of data, such as the U.S. Nuclear Materials Management and Safeguards System (NMMSS), and through the U.S. Reduced Enrichment for Research and Test Reactors (RERTR) program. It was not possible, in the 90-day period specified in the Energy Policy Act, to reconcile this information and associated calculations with all foreign HEU holders.

Information on inventories of unirradiated HEU is sensitive from a physical security perspective and is thus provided in a classified annex to this report.

Upon removal of classified attachments this document is unclassified

Definitions

End Use - The final, intended use of exported material or items after intermediate conversion and/or fabrication stages have been completed.

EURATOM - European Atomic Energy Community, established in 1957. Responsible for nuclear safety, safeguards, and the peaceful use of nuclear energy within the European Community. Currently includes the countries of Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom.

Equivalent HEU - The quantity of HEU contained in spent fuel plus the HEU that has been burned during irradiation.

High(ly) Enriched Uranium (HEU) - Uranium enriched to 20% or more in the isotope uranium-235. [1]

Low Enriched Uranium (LEU) - Uranium enriched to less than 20% in the isotope uranium-235. [1]

RERTR Program - Reduced Enrichment for Research and Test Reactors Program. A program established by the Department of Energy in 1978 to provide the technical means for research reactors to convert from HEU fuel to LEU fuel.

Retransfer - The re-export by a foreign country of U.S.-origin material or equipment.

Overview and Summary

The United States has exported 25,875 kilograms (kg) of HEU. A total of 17,489 kg of HEU and equivalent HEU is currently located in 51 countries. Table 1 below summarizes the distribution of the exported HEU between EURATOM and non-EURATOM countries. Figure 1 provides a history of U.S. HEU exports in graphic form.

	Exports kg U	Retransfers In	Total U In	Retransfers Out	Returns to US	Total U Out	Total In minus Total Out
EURATOM	21,238	4,985	26,223	6,144	6,402	12,546	13,677
Non-EURATOM	4,637	1,717	6,354	550	1,992	2,542	3,812
Total	25,875	6,702	32,577	6,694	8,394	15,088	17,489

Table 1. Summary of Distribution of U.S. HEU Exports
(HEU and equivalent HEU in kg)

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[1] For the purposes of this report some 300 kg of nominal 20% enriched material exported during the 1960s to early 1970s for use in 19.9% LEU-fueled research reactors is considered to be LEU.

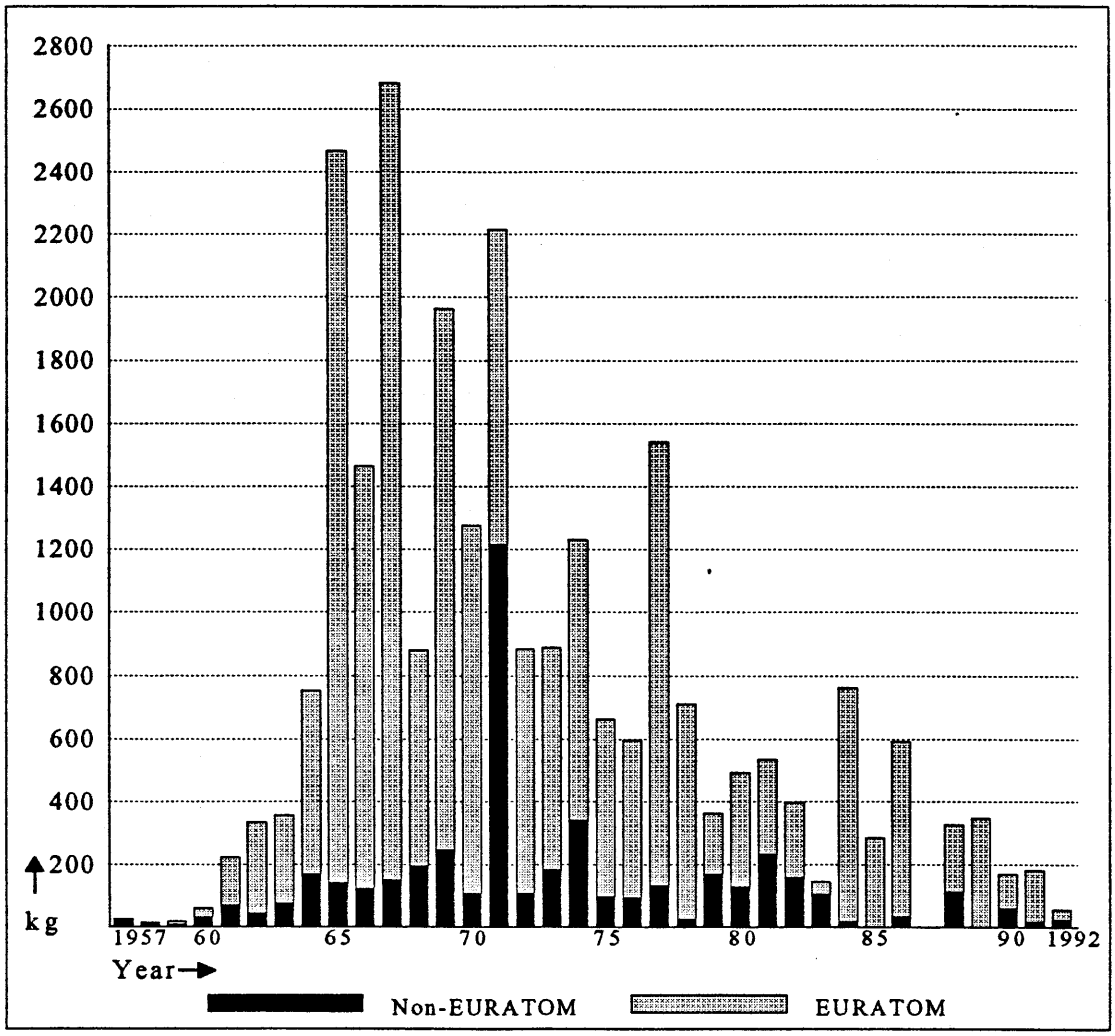

Figure 1. HEU Exports by Year

HEU Exports and Retransfers for Non-EURATOM Countries

Table 2 shows the present allocation of U.S.-origin HEU for the 39 non-EURATOM countries. Countries having at least one research reactor or similar facility are listed separately. Others, possessing only small quantities of HEU for purposes other than reactor fuel, are combined in a single entry. Retransfer information includes incoming and outgoing material to and from all countries, including EURATOM member states.

Irradiation- All Countries

This information is contained in classified Annex A to this report.

	Exports kg U	Retransfers In	Total U In	Retransfers Out	Returns to US	Total U Out	Total In minus Total Out
Argentina	58	0	58	0	0	0	58
Australia	10	155	165	19	0	19	146
Austria	8	64	72	19	14	33	39
Brazil	8	1	9	0	0	0	9
Canada	2,169	162	2,331	52	1,095	1,147	1,184
Chile	0	12	12	0	0	0	12
Colombia	3	0	3	0	0	0	3
Iran	6	0	6	0	0	0	6
Israel	19	15	34	0	0	0	34
Jamaica	0	1	1	0	0	0	1
Japan	2,054	536	2,590	223	394	617	1,973
Mexico	13	0	13	0	1	1	12
Norway	0	5	5	1	0	1	4
Pakistan	6	10	16	0	0	0	16
Philippines	3	0	3	0	0	0	3
Romania	39	0	39	0	0	0	39
Slovenia	5	0	5	0	0	0	5
South Africa	33	72	105	43	52	95	10
South Korea	25	0	25	0	0	0	25
Sweden	148	571	719	173	419	592	127
Switzerland	9	105	114	20	12	32	82
Taiwan	10	0	10	0	0	0	10
Thailand	5	0	5	0	0	0	5
Turkey	5	8	13	0	5	5	8
15 Others	1	0	1	0	0	0	1
Total	4,637	1,717	6,354	550	1,992	2,542	3,812

Table 2. HEU Exports and Retransfers for Non-EURATOM Countries
(HEU and equivalent HEU in kg)

Stated Uses, Alternative Uses, NRC-Approved Alternative Uses - All Countries

Appendix I provides a list of the end uses stated on export licenses in NRC's files, some going back as far as 1968. No such list exists for additional licenses in the archives of the former Atomic Energy Commission. A thorough reconciliation of U.S. and foreign records in respect to end use could require several months of additional effort, assuming EURATOM would agree to participate in such an audit-like activity.

Nevertheless, to our knowledge, the HEU exported by the United States has been used only for peaceful purposes and, with one exception reported by Romania to the U.S. and the IAEA in 1992 (see Appendix II), has been under international safeguards, consistent with applicable bilateral and multilateral agreements. [1] In the Romanian case the material has been placed under international safeguards.

The U.S. Government has been consulted in respect to some changes of end use of HEU in Japan. Table 3 summarizes several changes approved by the U.S. Government, including the NRC.

Original End user	HEU in kg	New End user	Approved	Year
KUHFR	5	KUR	Yes	1984
KUHFR	2.6	KUR	Yes	1986
KUHFR	4.992	KUR	Yes	1987
JMTR	3.555	JRR-4	Yes	1988
KUHFR	4.992	KUR	Yes	1989
KUHFR	5	KUR	Yes	1992
KUHFR	17.002	KUR	Pending	
KUHFR	2.398	Samples	Pending	
Total	45.539			

Table 3. End Use Changes for HEU in Japan
(KUHFR = Kyoto University High Flux Reactor, KUR = Kyoto University Reactor, JMTR = Japan Material Test Reactor, JRR - 4 = Japan Research Reactor 4)

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[1] For additional information see classified Annex B

Exports and External Retransfers for EURATOM Countries

Table 4 shows exports to, and external retransfers to and from, the EURATOM bloc of countries. Retransfer information includes incoming and outgoing HEU to and from EURATOM, to and from non-EURATOM countries. This information is based on U.S. records and calculations which have not been reconciled with EURATOM records. EURATOM and several of its member states have been requested, through U.S. diplomatic channels, to volunteer such information. This table should not be compared with the following table 5, which shows only internal retransfers within EURATOM.

	Exports kg U	Retransfers In	Total U In	Retransfers Out	Returns to US	Total U Out	Total In minus Total Out
Belgium	187	1,338	1,525	328	692	1,020	505
Denmark	26	151	177	64	109	173	4
France	7,250	1,883	9,133	1,215	3,814	5,029	4,104
Germany	11,327	317	11,644	3,711	1,116	4,827	6,817
Greece	7	21	28	0	0	0	28
Ireland	0	0	0	0	0	0	0
Italy	354	81	435	25	95	120	315
Luxembourg	0	0	0	0	0	0	0
Netherlands	64	706	770	303	365	668	102
Portugal	8	0	8	0	0	0	8
Spain	9	36	45	36	8	44	1
UK	2,006	452	2,458	462	203	665	1,793
Total	21,238	4,985	26,223	6,144	6,402	12,546	13,677

Table 4. HEU Exports and External Retransfers for EURATOM Countries
(HEU and equivalent HEU in kg)

Retransfers Within EURATOM

The U.S. has no legal control over retransfers of HEU within the European Community under the U.S.-EURATOM Additional Agreement for Cooperation nor is there an obligation for EURATOM to report such transactions to the U.S., except Spain. The information presented in Table 5 is based on U.S. information and calculations which have not been reconciled with EURATOM records.

	From Belgium	From Denmark	From France	From Germany	From Greece	From Ireland	From Italy	From Luxembg.	From Netherl.	From Portugal	From Spain	From UK	Total To
To Belgium		0	225	695	0	0	17	0	273	0	0	2	1,212
To Denmark	0		0	58	0	0	0	0	0	0	0	91	149
To France	323	0		1,306	0	0	2	0	0	0	33	30	1,694
To Germany	1	2	122		0	0	0	0	29	0	0	105	259
To Greece	0	0	14	7		0	0	0	0	0	0	0	21
To Ireland	0	0	0	0	0		0	0	0	0	0	0	0
To Italy	0	0	0	80	0	0		0	0	0	0	1	81
To Luxembg.	0	0	0	0	0	0	0		0	0	0	0	0
To Netherl.	0	0	160	544	0	0	0	0		0	0	2	706
To Portugal	0	0	0	0	0	0	0	0	0		0	0	0
To Spain	0	0	5	27	0	0	0	0	0	0		5	37
To UK	5	60	138	67	0	0	3	0	0	0	4		277
Total From	329	62	664	2,784	0	0	22	0	302	0	37	236	4,436

Table 5. HEU Retransfers within EURATOM
(HEU and equivalent HEU in kg)

Appendix I
to
The United States Nuclear Regulatory Commission's Report to Congress on the Disposition of Highly Enriched Uranium Previously Exported from the United States

January 1993

List of AEC/NRC HEU export licenses for quantities above 1 kg.
The list reflects only materials authorized for export,
not the actual amount of material that was exported as some
of the licenses may not have been fully consumed.
The list includes only those records held by the NRC;
some AEC archive records are not in NRC's data base.

License	kg	Country	End use
XSNM2139	27.5	Australia	HIFAR
XSNM0968	2.43	Austria	ASTRA
XSNM1428	3.81	Austria	ASTRA
XSNM1725	4.37	Austria	ASTRA
XSNM1727	3.74	Austria	ASTRA
XSNM2305	2.16	Austria	IAEA Safeguards, Seibersdorf
XSNM2582	30.15	Belgium	BR-2
XSNM0158	55.49	Belgium	BR-2
XSNM0277	167.4	Belgium	BR-2, Mol
XSNM0646	97.71	Belgium	BR-2, Mol
XSNM0969	76.39	Belgium	BR-2, Mol
XSNM1391	113.18	Belgium	BR-2, Mol
XSNM2144	55	Belgium	BR-2, Mol
XSNM2144/03	43.12	Belgium	BR-2, Mol
XSNM2444	51.05	Belgium	BR-2, Mol
XSNM2495	25.23	Belgium	BR-2, Mol
XSNM0071	2.5	Belgium	BR-2, Rapsodie
XSNM0218	45	Canada	AECL
XSNM0381	32.7	Canada	Booster Rods, Bruce
XSNM0430	21.2	Canada	Booster Rods, Bruce
XSNM0586	25.06	Canada	Booster Rods, Bruce
XSNM0688	25.07	Canada	Booster Rods, Bruce
XSNM0956	4.65	Canada	Booster Rods, Bruce
XSNM1035	24.21	Canada	Booster Rods, Bruce
XSNM1054	19.35	Canada	Booster Rods, Bruce
XSNM1064	2.31	Canada	Booster Rods, Bruce
XSNM1345	4.23	Canada	Booster Rods, Bruce
XSNM0527	1.54	Canada	Experimental Fuel, CRNL
XSNM0793	4.5	Canada	MOX Fab at Whiteshell
XSNM0548	5.71	Canada	McMaster
XSNM1339	5.3	Canada	McMaster
XSNM1948	4.91	Canada	McMaster
XSNM2229	4.1	Canada	McMaster
XSNM2400	4.05	Canada	McMaster

License	kg	Country	End use
XSNM2448	58.69	Canada	NRU
XSNM0427	27.1	Canada	NRX
XSNM0617	1.56	Canada	NRX,NRU
XSNM0704	88	Canada	NRX,NRU
XSNM0704/02	55	Canada	NRX,NRU
XSNM1627	191	Canada	NRX,NRU
XSNM1899	98	Canada	NRX,NRU
XSNM1899/01	3.3	Canada	NRX,NRU
XSNM1900	108.5	Canada	NRX,NRU
XSNM1022	114.5	Canada	NRX,NRU,Slowpoke
XSNM2667	68.3	Canada	NRX/NRU
XSNM1292	198	Canada	NRX,NRU,Slowpoke
XSNM1355	101	Canada	NRX,NRU,Slowpoke
XSNM2553	16.08	Canada	Target Material, medical isotopes
XSNM0007	6.04	Canada	Test Irradiation, CRNL
XSNM1805	4.4	Canada	Test Irradiation, Rtn
XSNM0962	3	Canada	WR-1, Pinawa
XSNM1027	3	Canada	WR-1, Pinawa
XSNM0579	11.03	Denmark	DR-3, Riso
XSNM0741	23.76	Denmark	DR-3, Riso
XSNM1168	18.05	Denmark	DR-3, Riso
XSNM1500	15.04	Denmark	DR-3, Riso
XSNM1988	15.04	Denmark	DR-3, Riso
XSNM1680	3	EURATOM	Irradiation Test Samples
XSNM1390	50.13	EURATOM	KNK-II
XSNM2142	10.77	EURATOM	MO-99 Production
XSNM1390	15.04	EURATOM	Petten,BR-2
XSNM2655	3.83	EURATOM	Sensing equipment
XSNM0038	60	France	CEA Research Reactors
XSNM0077	120	France	CEA Research Reactors
XSNM0157	73	France	CEA Research Reactors
XSNM0161	232	France	CEA Research Reactors
XSNM0166	213	France	CEA Research Reactors

License	kg	Country	End use
XSNM0247	210.26	France	CEA Research Reactors
XSNM0355	42.2	France	CEA Research Reactors
XSNM0399	86.22	France	CEA Research Reactors
XSNM0435	45.11	France	CEA Research Reactors
XSNM0439	167.42	France	CEA Research Reactors
XSNM0541	59	France	CEA Research Reactors
XSNM0555	31.62	France	CEA Research Reactors
XSNM0660	76.2	France	CEA Research Reactors
XSNM0746	148.37	France	CEA Research Reactors
XSNM1537	28.5	France	CERCA (RERTR)
XSNM1616	5	France	CERCA (Test Fab, RERTR)
XSNM1354	7.33	France	Fab by CERCA, returned to US
XSNM1193	7.85	France	Fab by CERCA, returned to US
XSNM1595	10.59	France	Fab by CERCA, returned to US
XSNM1787	10.8	France	Fab, Return to US
XSNM0254	30.15	France	HFR Grenoble
XSNM0275	35.1	France	HFR Grenoble
XSNM0556	35	France	HFR Grenoble
XSNM0695	33.1	France	HFR Grenoble
XSNM0957	16.04	France	HFR Grenoble
XSNM0987	93.2	France	HFR Grenoble
XSNM1232	23.06	France	HFR Grenoble
XSNM1362	72.6	France	HFR Grenoble
XSNM1521	33	France	HFR Grenoble
XSNM1536	26	France	HFR Grenoble
XSNM1764	26	France	HFR Grenoble
XSNM1924	28.07	France	HFR Grenoble
XSNM2012	25	France	HFR Grenoble
XSNM2143	53.7	France	HFR Grenoble
XSNM2241	26.9	France	HFR Grenoble
XSNM2241/01	52.5	France	HFR Grenoble
XSNM2315	25.07	France	HFR Grenoble
XSNM2315/02	76	France	HFR Grenoble

License	kg	Country	End use
XSNM2454	32.08	France	HFR Grenoble
XSNM2534	56.7	France	HFR Grenoble
XSNM2580	69.35	France	HFR Grenoble
XSNM0879	127.32	France	HFR Grenoble & Others
XSNM0084	120	France	Masurca
XSNM1080	16.08	France	Melusine
XSNM1543	15	France	ORPHEE
XSNM2204	32.68	France	ORPHEE
XSNM2360	32.6	France	ORPHEE
XSNM0987/01	27.61	France	ORPHEE, EL-3
XSNM0819	66.77	France	OSIRIS,SILOE
XSNM1020	74.76	France	OSIRIS,Triton
XSNM2492	47.36	France	Orphee
XSNM0084	125	France	Pegase, Siloe
XSNM0036	120	France	Rapsodie
XSNM0036	10	France	Rapsodie
XSNM0084	10	France	Rapsodie
XSNM0894	2.01	France	Rapsodie
XSNM1081	74.76	France	Rapsodie
XSNM1545	26	France	SILOE
XSNM2205	59.25	France	SILOE,Melusine(8.822 Kg)
XSNM0477	6.77	Greece	Democritus
XSNM1234	7	Greece	Democritus
XSNM1848	7.02	Greece	Democritus
XSNM0689	46	Italy	ESSOR Reactor, ISPRA
XSNM0066	4.2	Japan	Fab for Rapsodie & Fermi
XSNM0400	17.5	Japan	JMTR
XSNM0401	15	Japan	JMTR
XSNM0578	15.55	Japan	JMTR
XSNM0594	17.13	Japan	JMTR
XSNM0649	16.43	Japan	JMTR
XSNM0937	35.42	Japan	JMTR
XSNM0972	4.5	Japan	JMTR

License	kg	Country	End use
XSNM1668	22.14	Japan	JMTR
XSNM1778	21.47	Japan	JMTR
XSNM1778/01	33.7	Japan	JMTR
XSNM1778/02	84.25	Japan	JMTR
XSNM1778/03	50.93	Japan	JMTR
XSNM1778/04	50.93	Japan	JMTR
XSNM1778/05	85.56	Japan	JMTR
XSNM1778/06	85.56	Japan	JMTR
XSNM2467	85.56	Japan	JMTR
XSNM0448	37.25	Japan	JMTR,JRR-2
XSNM0942	46.14	Japan	JMTR,JRR-2
XSNM1667	40.48	Japan	JMTR,JRR-2
XSNM1340	39.08	Japan	JMTR,JRR-2,JRR-4
XSNM1408	47.16	Japan	JMTR,JRR-2,JRR-4
XSNM1909	33	Japan	JMTR,JRR-4
XSNM0357	25.4	Japan	JMTR,KUR
XSNM0208	972.3	Japan	JOYO
XSNM0522	317.8	Japan	JOYO
XSNM1779	14.71	Japan	JRR-2
XSNM1779/01	12.31	Japan	JRR-2
XSNM1779/02	24.63	Japan	JRR-2
XSNM1779/04	24.63	Japan	JRR-2
XSNM1962	3.22	Japan	JRR-2
XSNM2468	25.07	Japan	JRR-2
XSNM1190	4.9	Japan	KUCA, Kyoto Univ.
XSNM1271	42	Japan	KUHFR
XSNM0447	7.4	Japan	KURR
XSNM1435	14	Japan	Kyoto U Critical Assemb.
XSNM0826	1.84	Japan	MITI, Standard Pile
XSNM0135	13.31	Japan	PNC Breeder Reactor Proj
XSNM0703	3.49	Mexico	Salazar TRIGA Mk-III
XSNM1150	3.5	Mexico	Salazar TRIGA Mk-III
XSNM1259	7.38	Mexico	Salazar TRIGA-Mk III

License	kg	Country	End use
XSNM0712	3.26	Netherlands	HOR, Delft
XSNM1104/	3.27	Netherlands	HOR, Delft
XSNM1539	3.01	Netherlands	HOR, Delft
XSNM1626	3.01	Netherlands	HOR, Delft
XSNM0593	15.04	Netherlands	Petten
XSNM0680	38.1	Netherlands	Petten
XSNM0791	16.04	Netherlands	Petten
XSNM0792	2.56	Netherlands	Petten
XSNM0856	38.1	Netherlands	Petten
XSNM0935	19.05	Netherlands	Petten
XSNM1064	19.25	Netherlands	Petten
XSNM1129	21.05	Netherlands	Petten
XSNM1149	22.56	Netherlands	Petten
XSNM1212	19.8	Netherlands	Petten
XSNM1238	20.05	Netherlands	Petten
XSNM1333	20.05	Netherlands	Petten
XSNM1412	19.4	Netherlands	Petten
XSNM1495	20.05	Netherlands	Petten
XSNM1632	16.04	Netherlands	Petten
XSNM1699	20.05	Netherlands	Petten
XSNM1824	38.1	Netherlands	Petten
XSNM1975	20	Netherlands	Petten
XSNM2133	38.1	Netherlands	Petten
XSNM2353	38.19	Netherlands	Petten
XSNM2445	38.29	Netherlands	Petten
XSNM2491	38.29	Netherlands	Petten, HFR
XSNM0243	6.4	Pakistan	Fab in Japan for PARR
XSNM0575	7.85	Portugal	JEN Reactor, Sacavem
XSNM0885	38.7	Romania	Pitesti TRIGA
XSNM2384	16.48	Romania	Pitesti TRIGA
XSNM0690	20.76	South Africa	SAFARI(Replace XSNM-508)
XSNM0508	12.53	South Africa	SAFARI-1
XSNM0508/01	12.53	South Africa	SAFARI-1

License	kg	Country	End use
XSNM0609	1.36	South Korea	KORR-2 TRIGA Mk-III
XSNM0623	1.91	South Korea	KORR-2 TRIGA Mk-III
XSNM0996	2.86	South Korea	KORR-2 TRIGA Mk-III
XSNM1173	3.28	South Korea	KORR-2 TRIGA Mk-III
XSNM1207	15.6	South Korea	Seoul TRIGA Mk-III
XSNM0588	13.34	Sweden	R-2, Studsvik
XSNM0718	15.04	Sweden	R-2, Studsvik
XSNM0881	20.05	Sweden	R-2, Studsvik
XSNM1247	22.06	Sweden	R-2, Studsvik
XSNM1248	17.04	Sweden	R-2, Studsvik
XSNM1494	35.09	Sweden	R-2, Studsvik
XSNM1679	35.09	Sweden	R-2, Studsvik
XSNM1825	35.09	Sweden	R-2, Studsvik
XSNM2140	26.07	Sweden	R-2, Studsvik
XSNM1724	4.42	Switzerland	SAPHIR
XSNM1840	15.21	Switzerland	SAPHIR
XSNM1840	21.21	Switzerland	SAPHIR
XSNM2082	10.75	Switzerland	SAPHIR
XSNM0349	5.48	Taiwan	ZPRL, INER
XSNM0587	19.4	United Kingdom	Dragon Reactor
XSNM0232	87.37	United Kingdom	UKAEA Research Reactors
XSNM0289	53.94	United Kingdom	UKAEA Research Reactors
XSNM0325	66.17	United Kingdom	UKAEA Research Reactors
XSNM0402	90.22	United Kingdom	UKAEA Research Reactors
XSNM0488	30	United Kingdom	UKAEA Research Reactors
XSNM0178	15.04	West Germany	AVR Juelich
XSNM0557	5.72	West Germany	AVR Juelich
XSNM0564	24	West Germany	AVR Juelich
XSNM0717	45.11	West Germany	AVR Juelich
XSNM1104	4.9	West Germany	AVR Juelich
XSNM1138	10.03	West Germany	AVR Juelich
XSNM1294	23.06	West Germany	AVR Juelich
XSNM0103	56.14	West Germany	AVR,DIDO,PTB

License	kg	Country	End use
XSNM0194	31.58	West Germany	AVR,FR-2,MZFR,BR-2,DFR
XSNM1026	17.16	West Germany	AVR,FRM,KNK-II
XSNM0876	5.85	West Germany	BER-II
XSNM1104	7.81	West Germany	BER-II
XSNM1459	6.82	West Germany	BER-II
XSNM2388	12.6	West Germany	BER-II
XSNM1236	2.36	West Germany	FMRB,Braunschweig
XSNM0013	60	West Germany	FR-2
XSNM0021	143	West Germany	FR-2
XSNM0814	22.36	West Germany	FRG-1,FRG-2
XSNM1109	23.06	West Germany	FRG-1,FRG-2
XSNM1425	35.07	West Germany	FRG-1,FRG-2
XSNM1718	6.5	West Germany	FRG-1,FRG-2
XSNM2189	14.57	West Germany	FRG-1,FRG-2
XSNM0169	17.54	West Germany	FRJ-1
XSNM1661	11.3	West Germany	FRJ-1
XSNM1241	22	West Germany	FRJ-1 & HTR Fuel Tests
XSNM1808	31.3	West Germany	FRJ-1,FRJ-2
XSNM1808	64.7	West Germany	FRJ-1,FRJ-2
XSNM0756	35.82	West Germany	FRJ-1,FRJ-2,KFA Fuel Dev
XSNM0842	15.04	West Germany	FRJ-2
XSNM1139	30.08	West Germany	FRJ-2
XSNM1429	21.55	West Germany	FRJ-2
XSNM1905	11.7	West Germany	FRJ-2
XSNM1444	2.37	West Germany	FRM Garching
XSNM1721	7.51	West Germany	FRM Garching
XSNM0825	83	West Germany	Returned to U.S.
XSNM1076	100	West Germany	Returned to U.S.
XSNM0076	32.08	West Germany	ITR Juelich
XSNM0056	222.55	West Germany	KNK-II
XSNM0056	158.4	West Germany	KNK-II
XSNM0056	315.79	West Germany	KNK-II
XSNM0078	220.98	West Germany	KNK-II

License	kg	Country	End use
XSNM0087	31.22	West Germany	KNK-II
XSNM0835	634.6	West Germany	KNK-II
XSNM0835	34.09	West Germany	KNK-II
XSNM0835	68.17	West Germany	KNK-II
XSNM0835	70.18	West Germany	KNK-II
XSNM1195	36.8	West Germany	KNK-II
XSNM1195	82.5	West Germany	KNK-II
XSNM1389	802	West Germany	KNK-II
XSNM0346	15.64	West Germany	Kahl
XSNM1482	2.21	West Germany	Loss Makeup, THTR
XSNM0176	9.52	West Germany	Merlin Reactor, Juelich
XSNM1615	5	West Germany	NUKEM (Test Fab, RERTR)
XSNM1483	15.04	West Germany	RERTR Fuel Fab by NUKEM
XSNM1483	30.08	West Germany	RERTR Fuel Fab by NUKEM
XSNM1072	4.36	West Germany	Repair,NUKEM;Rtn to GETR
XSNM0303	449.1	West Germany	THTR-300
XSNM0303/02	16.04	West Germany	THTR-300
XSNM0720	48.12	West Germany	THTR-300
XSNM0995	103.3	West Germany	THTR-300
XSNM1184	121.3	West Germany	THTR-300
XSNM1685	51.99	West Germany	THTR-300
XSNM2216	218.55	West Germany	THTR-300
XSNM2285	220.55	West Germany	THTR-300
XSNM0428	1.5	West Germany	Tests by KFA,HOBEG
XSNM0592	1	West Germany	Working Stock, HOBEG
XSNM0893	3.01	West Germany	Working Stock, NUKEM
XSNM0625	2.72	Yugoslavia	Josef Stefan TRIGA Mk-II
XSNM1230	1.37	Yugoslavia	Josef Stefan TRIGA Mk-II

Appendix II
to
The United States Nuclear Regulatory Commission's Report to Congress on the Disposition of Highly Enriched Uranium Previously Exported from the United States

January 1993

The Romanian Safeguards Violation

Appendix II

The Romanian IAEA Safeguards Violation

At the end of April 1992, the Government of Romania informed the U.S. and the IAEA that an inventory taken earlier that month at the former Institute for Nuclear Power Reactors (INPR) at Pitesti, Romania, had disclosed two (2) milligrams of plutonium stored outside the facility area safeguarded by the IAEA, thus violating the Romanian - IAEA safeguards agreement in connection with the Nuclear Non-Proliferation Treaty (NPT).

A Romanian Government investigation revealed that, in 1985, INPR personnel had carried out laboratory-scale reprocessing of nuclear material from a single fuel rod irradiated in Romania's U.S.-supplied TRIGA research reactor, which led to unauthorized separation of two milligrams of plutonium. The fuel rod was manufactured by Romania and contained LEU that had been blended down from U.S.-origin HEU.

These activities took place during the previous Communist regime. Since then the Romanian Government has repeatedly affirmed its commitment to the NPT and its safeguards obligations.