

Appendix II – Operational, Shut Down, and Converted HEU-fueled Research Reactors

Parts 1, 2 and 3 list relevant background information on the variety of HEU-fueled applications. The information is compiled from a range of sources, in particular different versions of the IAEA Research Reactor Database, as well as other open-source material. Various versions of the RRDB (1989, 1994, 1996, 1999) have been used to identify the core inventories. The list of facilities is an extract from the HEU Facility Database (HEU-FD) at the Norwegian Radiation Protection Authority (NRPA) covering facilities established after 1978. All civilian (research reactors) and all military reactors (except submarines) divide into groups reflecting the subchapters of the report.

Part 1: Operational HEU-fueled research reactors (2007)

Country	Name of facility	Type of facility	Type of reactor	Civilian/ military	Amount of HEU in the core/ reactor (kg)	First crit.	Conversion	Shutdown	Enrichment levels (%) - given	Power levels (steady)	Annual HEU consumption (kg)	Availability factor (days/ year)	Avg. burnup IAEA RRDB (%)
Belarus	YALINA-Booster	Critical assembly	Subcrit. ass.	Civ.					36-90	60			
Belgium	BR-2	Steady state	Tank	Civ.	10	1961		2016	74-93	100	29	105	50
Canada	Slowpoke Alberta	Steady state	Slowpoke-2	Civ.	0.88	1977			93	0.02	0	13	1.5
Canada	Slowpoke Saskatch	Steady state	Slowpoke-2	Civ.	0.89	1981			93	0.02	0.3	25	1.5
Canada	Slowpoke-2 Halifax	Steady state	Slowpoke-2	Civ.	0.89	1976			93	0.02	0.3	87	1.5
Chile	RECH-2	Steady state	Pool	Civ.	3.82	1989		2008	90		0	0	0
China	IAE	Steady state	MNSR	Civ.	0.99	1984	2014		90.2	0.027		25	1.1
China	SD	Steady state	MNSR	Civ.	0.92	1989			90	0.033	0		1
China	SZ	Steady state	MNSR	Civ.	0.92	1988			90	0.03	0	13	1
China	Zero Power Fast Re	Critical assembly	Fast	Civ.	40.65	1970				90	0		
Czech Republic	LVR-15 REZ	Steady state	Tank	Civ.	4.8	1957		2012	36-80	10	14	200	50
Dem. P.R. of Korea	IRT-DPRK	Steady state	Pool	Mil.	5.27	1965	2008		36	8	0.6	5	40
France	CALIBAN	Pulsed	Fast	Mil.									
France	MASURCA	Critical assembly	Fast	Civ.	0	1966			12.0-25	20	0		
France	MINERVE	Critical assembly		Civ.	8	1959			90-93	90	0		
France	ORPHEE	Steady state	Tank	Civ.	5.88	1980	2018		93	14	16	245	35
France	Pile Azur	Critical assembly		Mil.	0	1962				90	0		
France	PROSPERO	Steady state	Fast	Mil.									
France	RHF	Steady state	Tank	Civ.	8.57	1971	2015		93	58.3	55	225	41
France	SILENE	Pulsed	HOMOG (L)	Mil.	2.6	1974				93	0		
Germany	FRMII	Steady state	Tank	Civ.	8	2004	2018		93	20	37.3	245	18
Ghana	GHARR-1	Steady state	MNSR	Civ.	1	1994	2014		90.2	0.03	0.2	60	1.1
Hungary	BUDAPEST RES. RI	Steady state	Tank	Civ.	5	1959	2014		36	10	9.7	70	50
India	APSARA	Steady state		Civ.	4.1	1956	2008		93	1	0.5	85	23
Iran	ENTC MNSR	Steady state	MNSR	Civ.	1.1	1994			90	0.03	0	11	1
Israel	IRR-1	Steady state		Civ.	5	1960			90-93	5	0.3	20	50
Italy	RSV Tapiro	Steady state	Fast	Civ.	22.11	1971			93.5	0.005			
Jamaica	UWI CNS SLOWPOK	Steady state	Slowpoke-2	Civ.	0.82	1984			93	0.02	0.5	45	1
	FCA Tokai research establishm.	Critical assembly	Fast	Civ.	56	1967			20-93	60	0		
Japan	KUCA Kyoto University	Critical assembly		Civ.	2	1974			45-93	70	0		
Japan	KUR	Steady state	Tank	Civ.	4	1964		2008	93	5	4	250	40
Japan	UTR KINKI	Steady state	Argonaut	Civ.	3.07	1961			90	0	0	45	1
Japan	YAYOI	Steady state	Fast	Civ.	28	1971			93	0.002	0	40	1
Kazakhstan	EWG 1	Steady state	Tank	Civ.	4.6	1972		2010	90	60	50	250	40
Kazakhstan	IGR	Pulsed		Civ.	7	1963							
Kazakhstan	WWR-K Alatau	Steady state	Pool	Civ.	4.3	1967	2008		36	6	17.9	250	28
Kazakhstan	WWR-K CA	Critical assembly		Civ.		1972	2008	2008			0		
Mexico	TRIGA MARK III	Steady state	Triga	Civ.	5.86	1968	2008		20-70	1	0.3	17	10
Netherlands	LFRR	Steady state	Argonaut	Civ.	1.91	1960		2015	90	0.03	0.2	38	1
Nigeria	NIRR-0001	Steady state	MNSR	Civ.	1	2004	2014		90	0.03	0.5	17	1
Pakistan	PARR-2	Steady state	MNSR	Civ.	1	1989			90.2	0.03	0.4	10	1
Poland	MARIA	Steady state	Pool	Civ.	7	1974	2009		80 conv. to 36	30	22.2	200	45
Russia	659	Critical assembly		Mil.		1963					0		
Russia	1125	Critical assembly		Mil.		1975					0		
Russia	AKSAMIT	Critical assembly		Mil.									
Russia	ARGUS	Steady state	Homog.	Civ.	1.54	1981			90	0.02	0.2	80	1
Russia	Astra	Critical assembly		Civ.		1981			90	90	0		
Russia	BARS-4	Pulsed		Mil.	3.6				90	90			
Russia	BARS-5	Pulsed	Fast	Mil.	244	1986			90	90	0		
Russia	BARS-6	Pulsed		Mil.	3.6				90	90			
Russia	BFS-1	Critical assembly		Civ.		1961			36-90	65			
Russia	BFS-2	Critical assembly		Civ.		1969			90	90			
Russia	BIGR	Pulsed		Mil.	< 7 kg.	1977			90	90			
Russia	BIR-2M	Pulsed		Mil.	< 7 kg.	1965							
Russia	BR-1	Critical assembly		Civ.		1965			90-97	93	0		
Russia	BR-10	Steady state	Fast	Civ.	137.62	1958		2013	90	8	37.3	210	6
Russia	BR-K1	Pulsed		Mil.									
Russia	CA MIR.M1	Critical assembly		Civ.		1966			90	90	0		
Russia	CA-SM	Critical assembly		Civ.		1970			90	90	0		
Russia	Delta	Critical assembly		Mil.		1985			80 and 90	85	0		
Russia	Emphir-2M / EFIR-2	Critical assembly		Civ.		1973			90	90	0		
Russia	FBR_L	Pulsed	Fast	Mil.	78				90	90			

Ole Reistad and Styrkaar Hustveit, "HEU Fuel Cycle Inventories and Progress on Global Minimization," *The Nonproliferation Review*, July 2008, Vol. 15, No. 2, pp. 266-287

Country	Name of facility	Type of facility	Type of reactor	Civilian/ military	Amount of HEU in the core/ reactor (kg)	First crit.	Conversion	Shutdown	Enrichment levels (%) - given	Power levels (steady)	Annual HEU consumption (kg)	Availability factor (days/ year)	Avg. burnup IAEA RRDB (%)
Russia	FKBN-2M	Critical assembly		Mil.									
Russia	FM MR	Critical assembly		Civ.		1971			90	90	0		
Russia	FS-1M	Critical assembly		Civ.		1970			90	90	0		
Russia	GJR 2	Pulsed		Mil.		1993							
Russia	HYDRA (IIN-3M G	Pulsed	Homog.	Civ.	3.1	1972			90	90	0		
Russia	IBR-30	Pulsed	Fast	Civ.	10	1970			90	90	0		
Russia	Igrik	Pulsed	Homog.	Mil.	7				17,48-90	55	0		
Russia	Impuls 1			Mil.									
Russia	Impuls 2			Mil.									
Russia	IR-8	Steady state	Pool	Civ.	4.35	1981			90	8	2	220	50
Russia	IRT, MEPHl	Steady state	Pool	Civ.	3.5	1967			90	2.5	1	250	25
Russia	IRT-T, Tomsk	Steady state	Pool	Civ.	5.2	1967			90	6	6	150	50
Russia	ISKRA	Critical assembly		Civ.		1996			90	90	0		
Russia	IVV-2M	Steady state	Pool	Civ.	7	1966			90	15	9	300	40
Russia	KV-1	Critical assembly		Civ.									
Russia	Kvant	Critical assembly		Mil.		1990			90	90	0		
Russia	MAKET	Critical assembly		Civ.									
Russia	MIR.M1	Steady state	Pool	Civ.	12.8	1966		2017	90	100	62	220	50
Russia	Nartsiss-M2	Critical assembly		Mil.		1983			36-90	96	0		
Russia	OR	Steady state		Civ.	3.8	1989			10.0-36	0.3	0.1	125	40
Russia	PhS-2 (FS-2)	Critical assembly		Civ.									
Russia	PhS-4 (FS-4)	Critical assembly		Civ.									
Russia	PhS-5 (FS-5)	Critical assembly		Civ.									
Russia	PIK FM	Critical assembly		Civ.		1983			90	90	0		
Russia	RBT-10/2, Minatom	Steady state	Pool	Civ.	50.7	1984		2012	63	7	7.1	220	41
Russia	RBT-6, Minatom	Steady state	Pool	Civ.	36	1975		2009	63	6	6.5	230	41
Russia	RF-GS	Critical assembly		Civ.		1962			90	90	0		
Russia	SF-1	Critical assembly		Mil.		1972			80	80	0		
Russia	SF-7	Critical assembly		Mil.		1975			90	90	0		
Russia	SGO	Critical assembly		Civ.		1968			90	90	0		
Russia	SM-3	Steady state	Tank	Civ.	19.3	1961		2017	90	100	81.1	225	37
Russia	SO-2M SubCA	Critical assembly		Civ.									
Russia	SO-2M SubCA	Critical assembly		Civ.									
Russia	STEND-2	Critical assembly		Civ.		1969					0		
Russia	STEND-3	Critical assembly		Civ.		1967					0		
Russia	STEND-4	Critical assembly		Civ.		1967					0		
Russia	STEND-5	Critical assembly		Civ.		1967					0		
Russia	Strela	Critical assembly		Civ.		1968			90	90	0		
Russia	T2	Critical assembly		Civ.		1965			90	90	0		
Russia	VIR-2M	Pulsed		Civ.	< 7 kg	1980			90	90	0		
Russia	WWR-M	Steady state	Tank	Civ.	8	1959		2014	90	18	14	130	40
Russia	WWR-TS	Steady state	Tank	Civ.	6.2	1964		2010	36	15	31.7	190	20
Russia	Yaguar (NHUAR)	Pulsed	Homog.	Mil.	15.64	1990					0		
Switzerland	AGN 211 P	Steady state	HOMOG (S)	Civ.	2	1959	2014		90	0.002		1	0
Syrian Arab Republi	SRR-1	Steady state	MNSR	Civ.	1.01	1996			89.87	0.03	0.1	25	1
UK	IMPERIAL COLLEC	Steady state	Pool	Civ.	3.6	1965		2008	80	0.1	0.1	20	7
UK	NEPTUNE	Critical assembly		Mil.		1963			90	90	0		
UK	VIPER	Pulsed	Fast	Mil.	257	1967			37.5	90	0		
Ukraine	WWR-M, Kiev	Steady state		Civ.	5	1960			36	10	16.7	15	50
US	ACRR	Steady state	Triga ACPR	Mil.	23.6	1967			35	4	2.9	85	40
US	ATR	Steady state	Tank	Civ.	38	1967	2016		93	250	107.5	250	30
US	ATRC	Critical assembly		Civ.	39	1964	2016	2016	93	93	0		
US	COMET	Critical assembly		Mil.		2007							
US	Fast Burst (FBR)	Pulsed	Fast	Mil.	0	1964			93	93	10		
US	FLATTOP	Critical assembly		Mil.	16.22	2007			93.2	93.2	0		
US	GODIVA	Critical assembly		Mil.	66	2007			93	93	0		
US	HFIR	Steady state	Tank	Civ.	9.4	1965	2016		93	85	94	250	67
US	MTR-II	Steady state	Tank	Civ.	9	1958	2015		93	4.9	8	280	40
US	MURR UNIV.	Steady state	Tank in pool	Civ.	5.4	1966	2015		93.15	10	24	310	23
US	NBSR	Steady state	Reactor	Civ.	7	1967	2015		93	20	13	250	70
US	NRAD	Steady state	Triga MII	Civ.	10.68	1977	2009		70	0.25	0	33	40
US	NTR General Elect	Steady state	Graphite	Civ.		1956				0.1	0	30	10
US	OSTR, STATE UNIV	Steady state	Triga	Civ.	11	1967	2008		70	1.1	0.2	75	40
US	PLANET	Critical assembly		Mil.		2007							
US	SPR-II	Pulsed	Fast	Mil.	106	1967			93	93	0		
US	SPR-III	Pulsed	Fast	Mil.	258.9	1975			93	93	0		
US	UWNR UNIV WIS	Steady state	Triga	Civ.	3.6	1961	2009		20-70	1	0.4	65	40
US	WSUR, ST.UNIV.	Steady state	Triga	Civ.	3.6	1961	2008		20-70	1	0.1	55	40
Uzbekistan	Photon	Pulsed	IIN (homoge-neous	Civ.		1975			90	90	1.5		

Part 2: Shut down HEU-fueled research reactors, 1978-2007

Country	Name of facility	Type of facility	Type of reactor	Civilian/ military	Amount of HEU in the core/ reactor (kg)	First crit.	Shut-down	Enrichment levels (%) Given	Power levels (steady)	Annual HEU consumption (kg)	availability factor (days/ year)	Avg. burnup from IAEA rrdB (%)
Australia	MOATA	Steady state	Argonaut	Civ.	3.09	1961	1998	90	0.1	0.2	12	1
Austria	SAR-GRAZ	Steady state	Argonaut	Civ.	3.3	1965	2004	20-70	0.01	0.2	80	1
Belarus	IRT-M Minsk	Steady state	Pool, IRT	Civ.	- / -	1962	1988	36	4	8.3	250	40
Belgium	BR-02 Power	Critical assembly	Pool	Civ.	- / -	1959	1993	90-93	0.0005			
Bulgaria	IRT-Sofia	Steady state	Pool, IRT	Civ.	6	1961	1989	36	2	6.7	250	25
Canada	NRX	Steady state	Heavy water	Civ.	23	1947	1993	21-93	42	1.7	20	74
Canada	PTR	Steady state	Pool	Civ.		1957	1990	90	0.0001	0	250	40
Canada	Slowpoke-2 Kanata (AECL)	Steady state	Slowpoke-2	Civ.	0.88	1984	1989	93.18	0.02	0.1	75	1.5
Canada	Slowpoke-2 Ottawa	Steady state	Slowpoke-2	Civ.	0.89	1971	1984	93.18	0.02	0.6	90	1.5
Canada	Slowpoke-2 Toronto	Steady state	Slowpoke-2	Civ.	0.83	1971	1998	93.18	0.02	0.1	80	1.5
China	SH	Steady state	MNSR	Civ.	0.92	1991	2007	90	0.03	0	28	1
Czech Republic	SR-O	Steady state	Pool	Civ.		1971	1992	80	0.001	0	250	40
Former Yugoslavia	RA	Steady state	Heavy water	Civ.	4.7	1959	1984	80	6.5	4.1	250	60
France	HARMONIE	Steady state	Tank	Civ.	22.9	1965	1996	93.19	0.001	0	250	40
France	MELUSINE	Steady state	Pool	Civ.	- / -	1958	1988		8	4.8	250	55
France	SCARABEE	Steady state	Pool	Civ.	10.4	1982	1996	90	100	83.3	250	40
France	SILOF	Steady state	Pool	Civ.	- / -	1963	1997	93	35	25.9	250	45
France	SILOETTE	Steady state	Pool	Civ.	4.7	1964	1985	93	0.1	0	60	40
France	STRASBOURG-CRONENBOURG	Steady state	Argonaut	Civ.	5	1966	1997	93	0.1	0.5	8	1
France	ULYSSE-Saclay	Steady state	Argonaut	Civ.	5.8	1961	2007	20-90	0.1	0.8	40	1
Georgia	IRT-M TBLISI	Steady state	Pool, IRT	Civ.	4	1959	1990	90	8	1.6	210	33
Germany	FMRB	Steady state	Pool	Civ.	4.5	1967	1995	89.85-93	1	0.7	125	23
Germany	FRG-2	Steady state	Pool	Civ.	9	1963	1993	90-93	15	12.2	250	36
Germany	FRJ-1 (MERLIN)	Steady state	Pool	Civ.	- / -	1962	1985		0.01	0	250	45
Germany	FRJ-2 (DIDO)	Steady state	Heavy water	Civ.	3.5	1962	2006	80-93	23	10.9	200	55
Germany	FRM	Steady state	Pool	Civ.	3.9	1957	2000	45-93	4	2.1	185	60
Germany	KATHER	Critical assembly		- / -	1973	1985		0.0001				
Germany	KEITER	Critical assembly		- / -	1971	1982		0.00001				
Germany	RFR	Steady state	Tank WWR	Civ.	5.3	1957	1991	36	10	17.1	180	35
Germany	ZLFR	Critical assembly	HOMOG (L)/Crit.	Civ.	3.75	1979	2005	36	0.00001			
India	PURNIMA II	Critical assembly	Ass	Mil.	0.5	1984	1986	98.18	0.0001			
India	PURNIMA-III	Steady state	SLOWPOKE	Civ.	- / -	1990	1993		0.02	0.2	80	1
Iraq	IRT-5000	Steady state	Pool, IRT	Civ.	5	1967	1991	80	5	1.8	100	40
Iraq	TAMMUZ-2	Steady state	Pool	Civ.	- / -	1987	1991	93	0.5	0.4	250	40
Italy	RANA	Steady state	Pool	Civ.		1965	1981		0.01	0	250	40
Italy	RB-2	Steady state	Argonaut	Civ.		1963	1980		0.01		250	40
Japan	JMTRC	Critical assembly		Civ.	6.4	1965	1995	45-90	0.0001			
Japan	JRR-2	Steady state		Civ.	4.68	1960	1996	93	10	11.6	180	20
Korea, Republic of	Seoul	Steady state	TRIGA Mark III	Civ.	12.73	1972	1995	20-70	2	1.2	150	40
Latvia	IRT-C Riga	Steady state	Pool	Civ.	5	1961	1998	90	5	1.7	200	45
Latvia	RKS25	Critical assembly		Civ.		1966	1993					
Poland	AGATA	Critical assembly		Civ.		1973	1995	80	0.0001			
Poland	EWA	Steady state	Tank WWR	Civ.	4.6	1958	1995	36	10	13.3	80	40
Poland	VVR-S	Steady state		Civ.								
Romania	BUCHAREST	Steady state	Tank WWR	Civ.		1957	1997	36	2	4.2	250	40
Russia	G-1	Critical assembly		Mil.			2006					
Russia	MER	Critical assembly		Mil.			2006					
Russia	MR	Steady state	Tank subcrit	Civ.		1963	1992	90	50	41.7	250	40
Russia	R-1	Critical assembly		Mil.			2006					
Russia	RBT-10/1	Steady state	Pool	Civ.	50.7	1983	1994	63	10	11.6	250	41
Russia	SF-3	Critical assembly		Civ.		1979	1993	21-90	0.0001			
Russia	SF-5	Critical assembly		Civ.		1972	1993	24-36	0.0001			
Russia	TVR	Steady state	Channel type	Civ.		1949	1986		2.5	2.1	250	40
Russia	U-3	Steady state	Pool	Mil.		1964	1992		0.05	0	250	40
Spain	CORAL-1	Critical assembly		Civ.		1968	1988		0.00005			
Spain	JEN-1 MOD	Steady state	Pool	Civ.		1958	1987		3	6.7	250	15
Switzerland	SAPHIR	Steady state	Pool	Civ.	6.5	1957	1994	19.90-93	10	8.6	330	65
Taiwan	ZPRL	Steady state	Pool	Civ.	3.42	1971	1995	20	0.03	0.1	250	40
UK	DIDO	Steady state	Heavy water	Civ.	4.4	1956	1990	70	26	30.3	310	45
UK	Herald	Steady state	Pool	Mil.	4.56	1960	1998	80	5	4.5	250	50
UK	JASON	Steady state	Argonaut	Mil.	1.98	1959	1996	90	0.01	0.1	65	1
UK	NESTOR	Steady state	Argonaut	Civ.	4.72	1961	1995	80	0.03	0.3	65	1
UK	Pluto	Steady state	Heavy water	Civ.	4	1957	1990	70	26	24.8	250	45
UK	QMC UTR-B	Steady state	Argonaut	Civ.		1964	1982		0.1	0.5	40	1

Ole Reistad and Styrkaar Hustveit, "HEU Fuel Cycle Inventories and Progress on Global Minimization," *The Nonproliferation Review*, July 2008, Vol. 15, No. 2, pp. 266-287

Country	Name of facility	Type of facility	Type of reactor	Civilian/ military	Amount of HEU in the core/ reactor (kg)	First crit.	Shut-down	Enrichment levels (% Given)	Power levels (steady)	Annual HEU consumption (kg)	availability factor (days/ year)	Avg. burnup from IAEA rrdB (%)
UK	THE UNIV RESEARCH REACTOR	Steady state	Argonaut	Civ.	3.7	1964	1991	90	0.3	1.1	65	1
UK	UTR-300	Steady state	Argonaut	Civ.	3.6	1963	1995	90	0.3	1.1	45	1
UK	VULCAN	Steady state		Mil.		1961	1997	90	0			
US	AFSR	Steady state	Fast	Civ.	21	1959	1997	93	0.001			
US	ARMF	Critical assembly		Civ.	-	1960	1991		0.1			
US	ATSR	Steady state	Pool	Civ.		1957	1988		0.01	0	250	40
US	BMRR	Steady state	Tank	Civ.	3.8	1959	2000	42-93,17	3	2.5	250	40
US	BTRR UNIV KANSAS	Steady state	Pool	Civ.		1961	1986		0.25	0.2	250	40
US	BSR Bulk Shielding Reactor	Steady state	Pool	Civ.		1950	1991		2	1.7	250	40
US	CAVALIER Univ Virginia	Steady state	Pool	Civ.		1974	1987		0.0001	0	250	40
US	CFRMF	Steady state	Pool	Civ.		1962	1991		0.1	0.1	250	40
US	CINTICHEM NUCL REACTOR	Steady state	Pool	Civ.		1961	1990		5	4.2	250	40
US	COMET	Critical assembly		Mil.		1952	2004					
US	CP-5, ARGONNE RESEARCH	Steady state	Heavy water	Civ.		1954	1979		5	4.2	250	40
US	ETRC	Critical assembly		Civ.		1957	1981		0.05			
US	FLATTOP	Critical assembly		Mil.	16.22	1957	2004	93.2	0.0001			
US	GODIVA	Critical assembly		Mil.	66	1967	2004	93	0.001			
US	GTRR	Steady state	Tank	Civ.		1964	1998		5	5.5	250	29.5
US	HFBR	Steady state	Heavy water	Civ.		1965	1996	93	60	51.8	250	37.4
US	Honeycomb	Critical assembly		Mil.		1956	1990	0-93				
US	HST Rocky Flats	Critical assembly		Mil.		1965	1989		0			
US	JANUS	Steady state	Tank	Civ.		1964	1992		0.2	0.2	250	40
US	L-85 NUCLEAR EXAMINATION	Steady state	HOMOG (L)	Civ.		1952	1980		0.003		80	1
US	LPR	Steady state	Pool	Civ.		1958	1981		1	0.8	250	40
US	NTG (Nuclear Test Gage)	Critical assembly	Subcrit	Civ.		1958	1987		0			
US	ORR, Oak Ridge Research	Steady state	Tank in Pool	Civ.		1958	1987		30	20	250	50
US	OWR, OMEGA WEST REACTOR	Steady state	Tank	Civ.		1956	1992		8	7.4	250	36
US	PARKA Crit. ass.	Critical assembly		Mil.		1963	1987		0			
US	PCA	Critical assembly	Pool	Civ.		1958	1991	93	0.001			
US	PLANET Plasma Core	Critical assembly		Mil.		1950	2004					
US	Assembly (PCA)	Critical assembly		Mil.		1974	1987		0.0001			
US	PNL-CML	Critical assembly	HOMOG (L)	Civ.		1961	1988		0			
US	SS (Solution System)	Critical assembly		Mil.		1965	1989		0			
US	TR (Tank Reservoir)	Critical assembly		Mil.		1965	1989		0			
US	TSR-II	Steady state	Tank	Civ.		1960	1992		1	0.8	250	40
US	UCLA R1	Steady state	Argonaut	Civ.		1960	1984		0.1		80	1
US	UCSB L-77											
US	SANTA BARBARA UWNR UNIV	Steady state	HOMOG (L)	Civ.		1975	1986		0.0001	0	80	1
US	WASHINGTON VPI VIRGINIA	Steady state	Argonaut	Civ.		1961	1988		0.1		80	1
US	POLYTECHNIC WNTR	Steady state	Argonaut	Civ.		1959	1985		0.1	1.1	80	1
US	WESTINGHOUSE	Steady state	Tank	Civ.		1972	1987		0.001	0	250	40
US	ZPPR	Critical assembly	Fast	Mil.		1969	1997					

Part 3: Converted operational HEU-fueled research reactors, 1978-2007

Country	Name of facility	Type of facility	Type of reactor	Civilian/ military	Amount of HEU in the core/ reactor (kg)	First crit.	Conversion	Shut-down after conversion	Enrichment levels (% Given)	Power levels (steady)	Annual HEU consumption	availability factor (days/ year)	Avg. burnup from IAEA rrdB (%)
Argentina	RA-3	Steady state	Pool	Civ.	4.1	1968	1990		90	5	5	210	28
Argentina	RA-6	Steady state	Pool	Civ.	3.5	1982	2007		90	0.5	0.4	250	40
Australia	HIFAR	Steady state	Tank	Civ.	3	1958	2006	2007	60	10	10.4	336	64
Austria	ASTRA	Steady state	Pool	Civ.	2.1	1960	1990	1999	20-90	10	14	250	39
Austria	TRIGA II Vienna	Steady state	TRIGA MARK II	Civ.	5.2	1962	2006		20-70	0.25	1.1	250	15
Brazil	IEA-R1	Steady state	Pool	Civ.	4.5	1957	1997		20-93	5	3.5	125	30
Canada	MNR, McMaster U	Steady state	Pool	Civ.	5.3	1959	2005		93	5	1	170	37.5
Canada	NRU	Steady state	Heavy water	Civ.	45	1957	1993		93	135	52.1	275	80
Canada	Slowpoke-2 Montr	Steady state	Slowpoke-2	Civ.	0.88	1976	1997		93.18	0.02	0.1	62.5	1.3
Chile	RECH-1	Steady state	Pool	Civ.	4.5	1974	2006		45-80	5	0.8	50	48
China	HFETR	Steady state	Tank	Civ.	13	1979	2007		90	125	11	84	40
China	HFETR Critical	Critical assembly		Civ.	- / -	1979	2007		90	0			
China	MJTR	Steady state	Tank	Civ.		1991	2007			5	1.3	100	45
Colombia	IAN-R1	Steady state	Pool	Civ.	2.16	1965	1997		90	0.1	0.1	250	40
Czech Republic	VR-1 Sparrow	Steady state	Pool	Civ.		1982	2006			0.005	0	75	40
Denmark	DR-3	Steady state	Heavy water	Civ.	- / -	1960	1990	2000	93	10	6.1	250	55
Former Yugoslavia	RB	Critical assembly		Civ.	3.1	1959	2002		Feb-80				
France	OSIRIS	Steady state	Pool	Civ.	- / -	1966	1979			70	33.3	250	60
Germany	BER-II	Steady state	Pool	Civ.	5	1973	2000		19,55-93	10	5.1	365	65
Germany	FRG-1	Steady state	Pool	Civ.	7	1958	1991		90-93	5	3.6	250	39
Greece	DEMOKRITOS (GR)	Steady state	Pool	Civ.	5	1961	2006		20-93	5	0.8	18	15
Iran	TRR	Steady state	Pool	Civ.	4.7	1967	1993		93	5	1	105	40
Japan	JMTR	Steady state	Tank	Civ.	6.6	1968	1994		93	50	23.2	180	50
Japan	JRR-4	Steady state	Pool	Civ.	3	1965	1998		90-93	3.5	0.3	42	35
Libyan Arab Jamah	IRT-1	Steady state	Pool, IRT	Civ.	2.5	1981	2007		80	10	0.5	12	35
Netherlands	HFR Petten	Steady state	Pool	Civ.	12	1961	2006		93	45	37.8	315	50
Netherlands	HOR	Steady state	Pool	Civ.	3.4	1963	2004		19,75-93	2	0.9	225	48
Pakistan	PARR-1	Steady state	Pool	Civ.	6.58	1965	1991		90-93	10	0.6	12	35
Philippines	PRR-1	Steady state	Triga Conv	Civ.		1963	1987	1988		3	4	250	25
Portugal	RPI	Steady state	Pool	Civ.	3.6	1961	2007			1	0.2	145	25
Romania	TRIGA II PITESTI -	Steady state	Triga	Civ.	32	1974	2006		20-70	14	3.8	85	45
Russia	IBR-2	Pulsed	Fast	Civ.	82.5	1977	2003		0-98	2			
Slovenia	TRIGA-II Ljubljana	Steady state	TRIGA MARK II	Civ.	3.3	1966	1999		20-70	0.25	0.3	50	10
South Africa	SAFARI-1	Steady state	Tank in pool	Civ.	5.5	1965	2006		87-93	20	15.5	310	50
Sweden	R-2	Steady state	Tank	Civ.	9	1960	1993	2005	93	50	24.8	265	62.5
Sweden	R2-0	Steady state	Pool	Civ.	4.9	1960	2000	2005	93	1	0.1	15	62.5
Taiwan	THOR	Steady state	Triga Conv	Civ.	10	1961	1987			2	4.3	55	40
Turkey	TR-2	Steady state	Pool	Civ.		1981	2006		93	5	4.5	250	36
US	FNR Ford Nuclear	Steady state	Pool	Civ.		1957	1983			2	1.9	250	35
US	MCZPR	Steady state	Pool	Civ.		1964	1992	1997		0.0001	0	250	40
US	NSCR A&M UNIV.	Steady state	Triga	Civ.		1962	2007			1	0.3	115	40
US	OSURR	Steady state	Pool	Civ.		1961	1988			0.5	0	45	40
US	PUR-1 PURDUE U	Steady state	Pool	Civ.		1962	2007		93	0.001	0	3	40
US	RINSC	Steady state	Pool	Civ.		1964	1993			2	0.2	20	21
US	RPI RENSSLAER	Critical assembly		Civ.	- / -	1964	1987			0.0001			
US	UFTR University	Steady state		Civ.	3.35	1959	2007		93	0.1	0	85	7
US	UMLR UMass-Low	Steady state	Pool	Civ.		1975	2000		93	1	0.3	35	15
US	UMRR	Steady state	Pool, MTR	Civ.		1961	1992			0.2	0.3	40	5
US	UTR-10 IOWA ST.	Steady state	Argonaut	Civ.		1960	1991	1998		0.01		80	1
US	UVAR	Steady state	Pool	Civ.		1960	1993	1998		2	2.6	250	25
US	WPI	Steady state	Pool	Civ.		1959	1988			0.01	0	7.5	40
Uzbekistan	WWVR-CM, Tashke	Steady state	Tank	Civ.	5.5	1959	2007			10	13.9	245	60
Vietnam	Dalat Research Res	Steady state	Pool	Civ.	4.01	1963	2007		36	0.5	0.5	50	16.7