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SUBJECT: Foreign Research and Power Reactor Preliminary List

TO: F. L. Culler, Jr.

FROM: J. W. Ullmann

Abstract

Non-US reactors are tabulated. Nuclear power buildup goals are given for each nation where available.

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ARGENTINA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
RA-1	Buenos Aires	20% U-235 Argonaut	0.01	0	1959
(Power)	Buenos Aires	?	~600	150	?

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1980	2000

AUSTRALIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
HIFAR (10^{14} flux)	Lucas Heights	90% U-235 D ₂ O	10	0	1959

AUSTRIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹¹ flux Research)	Vienna	20% U-235 TRIGA	0.01	0	1959
(10 ¹³ flux Research)	Dollensheim	20% U-235 Pool	5	0	1959
(Testing)	?	?	?	0	1961
Power	?	?	?	?	~1966

BELGIUM

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
BR-1 (2×10^{12} flux)	Mol	Natural U-Graphite	4	0	1956
BR-2 ($\sim 5 \times 10^{14}$ flux)	Mol	90% U-235 Tank	50	0	1959
BR-3	Mol	4% U-235 SS Clad PWR	43	11.5	1959
Medical	Mol	20% U-235 Pool	1	0	1960
Industrial	?	?	~500	125	1962
Industrial	?	?	~500	~135	1962
Industrial	?	?	~500	~135	1965
Industrial	?	?	~500	~135	1967
Pu Breeder	?	?	<u>?</u>	<u>?</u>	1968
TOTAL			2098	542	

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1967	550
1970	950
1975	1800

900 912 215 006

BRAZIL

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(3 x 10 ¹³ flux Research)	Sao Paulo	20% U-235 Pool	5	0	1957
U. of Minas Gerais	Belo Horizonte	20% U-235 TRIGA	0.03	0	1959
(Power)	Sao Paulo	?	~500	125	?

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1965	500
1975	3000

BULGARIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw</u> _e	<u>On-Stream</u>
Academy of Science	Sofia	Natural U and 10% U-235 Pool	2	0	1959

CANADA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
ZEEP (10^8 flux)	Chalk River	Natural U-D ₂ O	0	0	1945
NRX (7×10^{13} flux)	Chalk River	Natural U-D ₂ O	40	0	1947
PTR (2×10^{11} flux)	Chalk River	90% U-235 Pool	0.1	0	1957
NRU (3×10^{14} flux)	Chalk River	Natural U-D ₂ O	200	0	1957
McMaster U.	Hamilton	Enriched U-235 Pool	1	0	1958
NPD-2	Des Joachims	Natural UO ₂ -D ₂ O	86	20	1962
(Power)	?	Natural UO ₂ -D ₂ O	~800	200	1965

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1966	200-1000
1971	600-1700
1976	2000-3000
1981	4000-7000

CHINA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	?	D ₂ O	10	0	1958
(10 ¹⁰ flux Research)	Tientsin	Homogeneous	0	0	1959

205 011

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CONGO

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹¹ flux Research)	Leopoldville	20% U-235 TRIGA	0.01	0	1959

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CUBA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Power)	Santa Lucia	Boiling H ₂ O	~80	21	1962

435 012

CZECHOSLOVAKIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Prague	10% U-235 Pool	2	0	1957
Power	Bohunice	Natural U-D ₂ O-CO ₂	~600	150	1963

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1970	3000

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DENMARK

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
DR-1 (10^{10} flux)	Risø	20% U-235 Homogeneous	0	0	1957
DR-2 (4×10^{13} flux)	Risø	20% U-235 Tank	5	0	1959
DR-3 (10^{14} flux)	Risø	90% U ²³⁵ -D ₂ O Tank	10	0	1959

014 923

EGYPT

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Cairo	10% U-235 Pool	2	0	1958

<u>FRANCE</u>					
<u>Power Reactors</u>					
<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
G-1	Marcoule	Air Cooled	40	5	1956
G-2	Marcoule	CO ₂ Cooled	150	30	1958
G-3	Marcoule	CO ₂ Cooled	150	30	1959
EDF-1	Chinon	CO ₂ Cooled	300	63	1959
EDF-2	Chinon	CO ₂ Cooled	~750	167	1961
EDF-3	Ardennes	CO ₂ Cooled	~650	150	1963
Euratom	?	BWR or PWR	~1000	250	1963
Total			3040	695	

Nuclear Power Buildup Goal
(Includes French Euratom Reactors)

<u>Year</u>	<u>Mw_e</u>
1965	2500
1967	4000
1975	8000

FRANCE

Research and Test Reactors

<u>Reactor</u>	<u>Location</u>	<u>Kw Heat</u>	<u>Flux</u>	<u>Type</u>	<u>On-Stream</u>
EL-1 (ZOE)	Fontenay*	150	10^{12}	Natural U-D ₂ O	1953
EL-2 (P-2)	Saclay	2,500	10^{13}	Natural U-D ₂ O-CO ₂	1952
EL-3	Saclay	15,000	10^{14}	1.3% U ²³⁵ -D ₂ O	1957
EL-4	?	?	?	D ₂ O-CO ₂	?
Aquilon	Saclay	0	10^6	Natural U-D ₂ O	1956
Prosperine	Saclay	0	5×10^7	Pu Sulfate-H ₂ O	1958
Minerve	Fontenay*	0.1	?	90% U ²³⁵ -H ₂ O Pool	1958
Mélusine	Grenoble	1,200	10^{13}	20% U-235 Pool	1958
Triton	Fontenay*	1,200	10^{13}	20% U-235 Pool	1959
Alizé	Saclay	0	?	1.5% U ²³⁵ -D ₂ O	1959
Pégase	Fontenay*	50,000	3×10^{14}	90% U-235 Tank	1960
Brenda	Fontenay*	Low	?	1300° F Gas Cooled	1962
Rapsodie	Fontenay*	1,000	?	U-Pu Alloy Na Cooled	1965
Marin	?	?	?	Naval Propulsion (Q-244 Prototype)	?

*Fontenay-aux-Roses is the new name for Châtillon.

GERMANY (EAST)

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(2 x 10 ¹³ flux Research)	Rosendorf	10% U-235 Pool	2	0	1958
(Power)	Neuglobsow	Enriched U-D ₂ O-CO ₂	~300	70	1961
(Power)	Lake Malchin	PWR	~400	~100	1961

GERMANY (WEST)

Power Reactors

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
RWE	Kahl	2.6% U-235 Zr-Clad - Boiling	60	15	1961
AVR	Jülich	20% U ²³⁵ -Th Carbide Pebble Bed	48	15	1961
AEG	?	1.5% U ²³⁵ -Zr-2 Clad PWR	~380	100	1963
Deutsche B & W	?	Natural U - Magnox Clad	~430	100	1964
S-S	Bavaria	Natural UO ₂ Zr-Clad D ₂ O	~380	100	1964
AVR	?	20% U ²³⁵ -Th Carbide Pebble Bed	~300	100	1964
Total			1598	430	

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1965	500
1967	1500*

*6000 Mw_e called for by Euratom
by 1967.

GERMANY (WEST)

Research and Test Reactors

<u>Reactor</u>	<u>Location</u>	<u>Kw Heat</u>	<u>Flux</u>	<u>Type</u>	<u>On-Stream</u>
FRM	Munich	1,000	10^{13}	20% U-235 Pool	1957
FRF	Frankfurt	50	10^{12}	20% U-235 Homogeneous	1958
FRB	Berlin	50	10^{12}	20% U-235 Homogeneous	1958
FRH	Hamburg	5,000	3.2×10^{13}	20% U-235 Pool	1958
Demag	Duisburg	0	10^9	20% U-235 Homogeneous	1959
AEG	Frankfurt	0	10^8	?	1959
Merlin	Jülich	5,000	5×10^{13}	90% U-235 Pool	1959
Siemens	Munich	10	10^{11}	Argonaut	1959
FR-2	Karlsruhe	12,000	3×10^{13}	Natural U-D ₂ O	1959
Ship Reactor	Hamburg	50,000	?	Organic Moderated	1963
DIDO	Jülich	10,000	10^{14}	90% U-235 Tank	1961

GREAT BRITAIN

Power Reactors

<u>Station</u>	<u>Reactors</u>	<u>Type</u>	<u>Total Mw Heat</u>	<u>Total Net Mw_e</u>	<u>On-Stream</u>
Calder Hall A (Cumberland)	2 (AEA)	U-CO ₂	364	70	1956
Calder Hall B (Cumberland)	2 (AEA)	U-CO ₂	364	70	1958
Chapel Cross A (Dumfriesshire)	2 (AEA)	U-CO ₂	364	70	1959
Chapel Cross B (Dumfriesshire)	2 (AEA)	U-CO ₂	364	70	1960
Dounreay (Caithness)	1 (AEA)	Fast	60	15	1959
Bradwell (Essex)	2 (CEA)	U-CO ₂	1,060	300	1960
Berkeley (Gloucestershire)	2 (CEA)	U-CO ₂	1,100	275	1960
AGR (Windscale)	1 (AEA)	UO ₂ -Be-CO ₂	100	28.5	1961
Hinkley Point (Somerset)	2 (CEA)	U-CO ₂	1,930	500	1961
Hunterston (Renfrew)	2 (CEA)	U-CO ₂	1,060	320	1962
Trawsfynydd (Merioneth)	2 (CEA)	U-CO ₂	~2,000	500	1963
Dungeness (Kent)	2 (CEA)	U-CO ₂	~2,000	550	1963
Sizewell (Suffolk)	2 (CEA)	U-CO ₂	~2,500	650	1964
			1,616 (AEA)	324 (AEA)	
			11,650 (CEA)	3,095 (CEA)	
			13,296	3,431	

Nuclear Power Buildup Goal (CEA Stations Only)

<u>Year</u>	<u>Mw_e</u>
1961	725
1962	1,475
1963	2,400
1964	4,150
1965	6,000
1970	12,000-16,000

GREAT BRITAIN

Research, Test and Shutdown Production Reactors

<u>Reactor</u>	<u>Location</u>	<u>Kw Heat</u>	<u>Flux</u>	<u>Type</u>	<u>On-Stream</u>
GLEEP	Harwell	10	10^9	Natural U - Graphite-Air	1947
BEPO	Harwell	6,000	10^{12}	Natural U - Graphite-Air	1948
Windscale #1	Windscale	Shutdown	10^{13}	Natural U - Graphite-Air	1950
Windscale #2	Windscale	Shutdown	10^{13}	Natural U - Graphite-Air	1951
DIMPLE	Harwell	0	10^8	D ₂ O	1954
ZEPHYR	Harwell	0	10^9	Pu Fast	1954
ZEUS	Harwell	0	2×10^9	U-235 Fast	1955
ZETR	Harwell	0	4×10^5	Solution	1955
DIDO	Harwell	10,000	10^{14}	90% U ²³⁵ -D ₂ O Tank	1956
LIDO	Harwell	100	10^{12}	46% U-235 Pool	1956
NERO	Harwell	0	10^8	Graphite	1957
PLUTO	Harwell	10,000	10^{14}	90% U ²³⁵ -D ₂ O Tank	1957
DMTR	Dounreay	10,000	10^{14}	90% U ²³⁵ -D ₂ O Tank	1958
LEO	Harwell	?	?	Slightly Enriched-H ₂ O	?
NEPTUNE	Harwell	0	10^8	Enriched U	1957
Horace	Aldermaston	0	?	Pool	1958
Hazel	Harwell	0	10^6	90% U-235 UO ₂ F ₂ in D ₂ O	1958
Herald	Aldermaston	5,000	5×10^{13}	90% U-235 Pool	1959
ZENITH	Winfrith Heath	0	?	Graphite-UO ₂ -ThO ₂	1959
HTGR	Winfrith Heath	10,000	?	Graphite-UO ₂ -ThO ₂ - N ₂	1961
HERO	Windscale	5	?	UO ₂ -Be	1961
JASON	?	?	?	Argonaut	?
Submarine Prototype	Dounreay	?	?	?	?

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GREECE

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Thessalonika	20% U-235 Pool	1	0	1958

215 023

HUNGARY

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Csilleberc	Natural U and 10% U-235 Pool	2	0	1958
(Small Research)	Debrecen	Enriched UO ₂ -Al Tank	?	0	1959
(Power)	?	?	~800	~200	1963

INDIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
APSARA	Trombay	90% U-235 Pool	1	0	1956
CIR (7×10^{13} flux)	Trombay	Natural U-D ₂ O	40	0	1959

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1966	250-1000

025 025

215
026

-24-

IRAN

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Amirabad	20% U-235 Pool	1	0	1959

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ISRAEL

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Tel-Aviv	20% U-235 Pool	1	0	1959

276 027

ITALY

Power Reactors

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
SIMEA (AGIP)	Latina	Natural U-CO ₂	705	200	1962
SENN	Punta Fiume	1.5% U-235 Boiling	500	150	1962
SELNI (Edisonvolta)	Milan	1.9% U-235 PWR	492	134	?
SORIN	?	2.6% U-235 PWR	540	150	1963
SORIN	?	Natural U-CO ₂	<u>770</u>	<u>200</u>	1964
Total			3,102	834	

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1965	900
1967	3,000

ITALY

Research and Test Reactors

<u>Reactor</u>	<u>Location</u>	<u>Kw Heat</u>	<u>Flux</u>	<u>Type</u>	<u>On-Stream</u>
SORIN	Saluggia	1000	$\sim 8 \times 10^{12}$	20% U-235 Pool	1958
CISE	Ispra	5000	$\sim 8 \times 10^{13}$	20% U-235 Tank	1958
Fermi Center	Milan	50	$\sim 10^{12}$	20% U-235 Homogeneous	1958
CNRN	Rome	30	$\sim 3 \times 10^{11}$	20% U-235 TRIGA	1959
U. of Pisa	San Pietro	5000	$\sim 4 \times 10^{13}$	20% U-235 Pool	1960
CAMEN	?	?	?	20% U-235 Pool	1961

JAPAN

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
JRR-1 (10^{12} flux)	Tokai-Mura	20% U-235 Homogeneous	0.05	0	1957
JRR-2 (10^{14} flux)	Tokai-Mura	20% U ²³⁵ -D ₂ O Tank	10	0	1959
JRR-3 (10^{13} flux)	Tokai-Mura	Natural U-D ₂ O	10	0	1960
Rikkyo University	Yokahama	20% U-235 TRIGA	0.03	0	1959
JMTR-4 (6×10^{14} flux)	Tokai-Mura	90% U-235 Tank	50	0	1963
JRR-5	Tokai-Mura	5% U-235 H ₂ O	~40	10	1962
Kyoto-Osaka	Kansai	20% U-235 Pool	1	0	?
(Power)	?	Natural U-CO ₂	~600	150	1964
(Thermal Breeder)	?	?	?	~5	1966
(Fast Breeder)	?	?	?	~5	1966
(Breeder)	?	?	?	100	1970

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1962	150
1967	1,200
1970	3,000
1975	7,000

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KOREA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹¹ flux Research)	Seoul	20% U-235 TRIGA	0.01	0	1959

276 031

NETHERLANDS

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
HOR (10^{12} flux)	Delft	20% U-235 Pool	0.1	0	1957
HFR (10^{14} flux)	Petten	90% U-235 Tank	20	0	1959
Babypop	Arnhem	20% U-235 UO_2-H_2O Suspension	0.25	0	?
Power	Geertruidenberg	?	~600	150	1962

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1965	400
1970	1,200
1975	3,000

NORWAY

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
JEEP (10 ¹² flux)	Kjeller	Natural U-D ₂ O	~0.5	0	1951
JENER-2	Halden	Boiling D ₂ O (First charge natural U later spiked with natural and 1.5% U-235 UO ₂)	20	0	1959

POLAND

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
EWA (10^{13} flux)	Swierk	10% U-235 Pool	2	0	1958
(5×10^{13} flux Research)	Cracow	?	?	0	1962
(Power)	?	Natural U-CO ₂	~800	200	1965

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1970	800
1975	1,800

PORTUGAL

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(2 x 10 ¹³ flux Research)	Savcavem	90% U-235 Pool	1	0	1959
(Power)	?	?	?	100	1964

PUERTO RICO

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	Mayaguez	20% U-235 Pool	1	0	1960

RUMANIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	?	10% U-235 Pool	2	0	1957

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1975	500

SPAIN

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(2 x 10 ¹³ flux Research)	Moncloa	20% U-235 Pool	3	0	1958
(1 watt Research)	Madrid	Pool	0	0	1958
Materials Testing	?	Natural U-D ₂ O with Enriched Spikes	~100	20	1963
Nuclenor	Sobron	?	~900	220	1964
Technatom	Cadiz	?	~600	132	?
CENUSA	Madrid	?	~800	200	1966

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1972	1,000
1977	2,200

SWEDEN

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
R-0	Studsvik	Natural U-D ₂ O	0	0	?
R-1 (2 x 10 ¹² flux)	Stockholm	Natural U-D ₂ O	0.6	0	1954
Zebra	Stockholm	Natural U-D ₂ O	0	0	1955
R-2 (10 ¹⁴ flux)	Studsvik	90% U-235 Tank	30	0	1959
R-3/ADAM	Agesta	Natural U-D ₂ O	100	10	1960
R-4/EVA	Finnevodja	Natural U-D ₂ O	~400	100	1963
AKK	Misterhult	?	~600	~150	1965

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1975	2,000

SWITZERLAND

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
Saphire (5×10^{13} flux)	Würenlingen	20% U-235 Pool	1	0	1955
Zürich U. (10^{10} flux)	Zürich	AGN	0	0	1959
Diorit (4×10^{13} flux)	Würenlingen	Natural U-D ₂ O	20	0	1959
ETH	Zürich	Natural U - Zr-2 clad - D ₂ O	35	5	1961
Energies Nucléaire	Lausanne	Boiling Enriched UO ₂	20	5	1964

TAIWAN

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Taipei	20% U-235 Pool	1	0	1959

276 041
170

THAILAND

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(10 ¹³ flux Research)	Bangkok	20% U-235 Pool	1	0	1960

TURKEY

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	Ankara	?	?	0	?

870 923
276 043

UNITED ARAB REPUBLIC

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	?	Pool	2	0	?

U.S.S.R.

Power Reactors and Power Experiments

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
APS-1	Obninsk	5% U-235 Graphite-H ₂ O	30	5	1954
6-Reactor Station	Troitsk	Natural U-Graphite-H ₂ O	~3,000	560	1958
3-Reactor Icebreaker	"Lenin	5% U-235 Zr-Nb Clad PWR	270	-	1959
4-Reactor Station	Beloyarsk	1.3% U-235 Graphite-H ₂ O	1,150	375	?
2-Reactor Station	Voronezh	1.5% U-235 Zr-Clad PWR	1,520	390	1960
2-Reactor Station	Leningrad	1.5% U-235 Zr-Clad PWR	1,520	390	1961
(Experimental Boiling)	Ulyanovsk	1.5% U-235 Zr-Clad H ₂ O	~180	40	1961
(Homogeneous)	Ulyanovsk	UO ₂ in D ₂ O	35	-	?
(Sodium)	Ulyanovsk	Na-Graphite	~125	40	?
BN-50	Ulyanovsk	Na-Pu Alloy Fast	~125	40	?
BN-250	?	Pu Fast	~700	~230	?
(Intermediate)	?	? (2 x 10 ¹⁵ flux)	50	-	?
(Mobile)	Obninsk	PWR	~20	2	1959

Nuclear Power Buildup Goal

<u>Year</u>	<u>Mw_e</u>
1960	2,000

U.S.S.R.Research and Testing Reactors

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Kw Heat</u>	<u>Flux</u>	<u>On-Stream</u>
TR-1	Moscow	2% U-235 D ₂ O	2,500	10 ¹³	1949
RPT	Moscow	90% U-235 Tank	20,000	10 ¹⁴	1952
BR-1	?	12 Kg Pu Fast	0	?	1955
WWR-2	Moscow	10% U-235 H ₂ O	3,000	2 x 10 ¹³	1956
BR-3	?	Pu Fast	0	?	?
IRT	Moscow	10% U-235 Pool	2,000	10 ¹³	1957
BR-5 (Rebuilt BR-2)	Obninsk	57 Kg PuO ₂ Fast Na	5,000	?	1958
WWR-C	?	?	2,000	10 ¹³	?
WWR-M	Leningrad	20% U-235 Tank	10,000	5 x 10 ¹³	1959
WWR-Z	?	20% U-235 Tank	10,000	5 x 10 ¹³	?
?	Kiev	20% U-235 Pool	2,000	10 ¹³	?
?	Sverdlovsk	20% U-235 Pool	2,000	10 ¹³	?
?	Minsk	20% U-235 Pool	2,000	10 ¹³	?
?	Tomsk	20% U-235 Pool	2,000	10 ¹³	?
?	Tiblisi	20% U-235 Pool	2,000	10 ¹³	?

VENEZUELA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	Caracas	20% U-235 Tank	3	0	1958

285 047

VIETNAM

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Research)	Dalat	20% U-235 TRIGA	0.01	0	1959

YUGOSLAVIA

<u>Reactor</u>	<u>Location</u>	<u>Type</u>	<u>Mw Heat</u>	<u>Net Mw_e</u>	<u>On-Stream</u>
(Critical Assembly)	Vinca	Natural U-D ₂ O	0	0	1958
(10 ¹² flux Research)	Vinca	D ₂ O	~10	0	1959

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