EUROPEAN ATOMIC ENERGY COMMUNITY

THE COMMISSION

NUCLEAR INSTALLATIONS IN THE COUNTRIES OF THE EUROPEAN ATOMIC ENERGY COMMUNITY

30 June 1961

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INTRODUCTORY NOTE

1. The following survey, drawn up on 30 June 1961, is designed to provide those circles interested in the development of nuclear industry with an overall picture of the installations which already exist or which are planned within the Community.

2. For the sake of brevity and uniformity, only the main characteristics of the installations listed are featured. For the same reason, it is not possible to include all the enterprises involved in various ways in the building of the installations mentioned. Data on capacities or performances are intended merely as a rough guide and are subject to any modifications which may be required by changes in market conditions, technology and research. Projects offering a reasonable certainty of being implemented have been included wherever they would seem to foreshadow possible lines of development in certain sectors.

3. This document has been drawn up on the basis of information published by the various enterprises and bodies within the Community and we should be glad to receive notice of any omissions from the parties concerned.

4. A new edition will be published once the picture given in the present inventory has been substantially modified by the emergence of new installations or the elaboration of new plans.

ABBREVIATIONS

The following conventional abbreviations have been employed :

1. Status of projects referred to ("STATUS" column) :

T	- Built
C	- Being built
D	- Construction decided on
P	- Seriously envisaged construction project

2. Euratom and non-Euratom countries referred to ("COUNTRY" column) :

B	- Belgium
D	- West Germany
F	- France
I	- Italy
N	- Netherlands
GB	- Great Britain
USA	- United States of America

3. Enterprises or organizations frequently mentioned :

BMAt	- Bundesministerium fuer Atomenergie und Wasserwirtschaft (Germany)
CEA	- Commissariat à l'Energie atomique (France)
CEN	- Centre d'Etudes de l'Energie nucléaire (Belgium)
CNRN	- Comitato Nazionale per le Ricerche Nucleari (Italy)
EDF	- Electricité de France
GKSS	- Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt (Germany)
RCN	- Reactor Centrum Nederland
UKAEA	- United Kingdom Atomic Energy Authority (Great Britain)

NOMENCLATURE OF NUCLEAR REACTORS

The expression used in the present document to describe the different types of nuclear reactors have the following meaning :

INDUSTRIAL REACTORS : are built and operated for the purpose of producing energy (mainly in the form of electricity) and/or fissile materials (in particular, plutonium). They are used only exceptionally for study purposes, but are central to intensive development programs in which the construction and operating industries necessarily play an extremely important role.

PROTOTYPE REACTORS : their conception, design and dimensions are such that their construction and operation enable the transition to be made quite safety to the industrial reactor of the same type.

REACTOR EXPERIMENTS : are intended for preliminary technical tests, or are remote variants of already-proven reactor types.

TEST REACTORS : (general or specialised) are used mainly for subjecting materials to irradiation tests.

EXPERIMENTAL REACTORS : extremely varied in type and power, are used essentially as neutron sources for various research purposes.

TABLE OF CONTENTS

BIBLIOGRAPHY OF MAIN SOURCES OF INFORMATION USED IN THE COMPILATION OF THE INVENTORY

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- Annales des Mines (Monthly review - France)
- Atomkernreaktoren (Pamphlet issued by BMat - Germany)
- Atom und Wasser Informationen (Press Bulletin of BMat - Germany)
- Atomenergie en haar toepassingen (Monthly review - RCN/Netherlands)
- Bulletins d'Informations scientifiques et techniques du CEA (Monthly review - France)
- Bulletins d'information de l'Association belge pour le développement pacifique de l'énergie atomique (Two monthly review - Belgium)
- Commissariat à l'Energie Atomique 1945-1960 (Information pamphlet)
- Annual company reports from firms in the member-countries
- Directory of Nuclear Reactors (Vols. I and II, Vienna Agency)
- Energia nucleare (Monthly review of the CISE - Italy)
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- Industries Atomiques (Two-monthly review - Switzerland)
- Kernforschung und Atomwirtschaft in Deutschland (Information pamphlet - Germany)
- Rapporto di attivita per gli anni 1958-1959 (CNRN - Italy)
- Rapports annuels 1957-1958-1959 du Commissariat à l'Energie Atomique (CEA - France)
- Reactor Centrum Nederland - Verslag over het jaar 1959 (1959 Annual Report)
- Taschenbuch fuer Atomfragen 1960/61 (BMAt Germany)

SECTION I - Uranium and Thorium Mines

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
ELLWEILER Kreis Birkenfeld (Rhine-Palatinate) Gewerkschaft Brunhilde Hanover	- Extraction capacity : 30 t/day ore - Reserves : 60-80 t uranium content - Ore content 0.1 to 0.12 % uranium oxide	Site owner and plant operator : Gewerkschaft Brunhilde, Hanover Constructors : Lurgi GmbH, Frankfurt Philipp Holzmann, Frankfurt	D	T
CEA mining outfits : LA CROUZILLE VENDEE FOREZ GRURY Commissariat à l'Energie atomique, DREM 69, rue de Varenne Paris 7e	1959 production in contained U : 120 t " " " " : 271 t " " " "): " " " "): 131 t Total reserves in tons of contained U : Estimated ore available / Total potential La Crouzille 3,492 / 6,594 Vendée 1,790 / 2,686 Forez-Grury 3,961 / 5,870	Owner-operator : Commissariat à l'Energie atomique	F	T
Works : SAINT-PIERRE (Cantal) SOURCES DE LA VIENNE ESCOUSSAC Société Centrale de l'Uranium et des Minerais et Métaux radioactifs (SCUMRA) 1, rue F. Bastian Paris 8e	In 1959, production equivalent to 96 t U metal	Owner and operator : SCUMRA	 F F F	 T T T
Works : INGUINIEL (Morbihan) PRAT-MERIEN (Morbihan) BONOTE-EN-BERNE (Morbihan) Société industrielle et minière de l'Uranium (SIMURA) 31, avenue de l'Opera Paris 8e		Owner and operator : SIMURA	 F F F	 T T T
Works : LE DRIOT (Haute-Loire) LIGONZAG Société pour la Recherche et l'Exploitation du Sous-Sol (RESS) 70, avenue Edison Paris 13e	26 t of U metal produced up to 31.12.59	Owner and operator : RESS	F	T

SECTION I - Uranium and Thorium Mines

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
Works : EGLETONS (Corrèze) LA BARRIERE VEDRENNE-SUD Saint-Gobain Company 106, Faubourg St Honoré Paris 8e		Owner and operator : Saint-Gobain	 F F F	 T T T
Works : ESPEYRAC (Aveyron) Société S.E.R.E.M.I.C. 27-29, rue St Ferdinand Paris 17e		Owner and operator : Société S.E.R.E.M.I.C.	F	T
Works : SAINT-JEAN LA FOUILLOUSE (Lozère) LES PIERRES PLANTEES (Lozère) LE MONTAGAUD (Creuse) LOMBARTEIX (Creuse) LA BREJADE (Corrèze) MARGABAL (Aveyron) CHAUDES-AIGUES (Cantal) BASSENEUILLE (Creuse) LE CELLIER (Lozère) Compagnie Française des Minerais d'Uranium 10, Place Vendôme Paris 1er	25 t contained Uranium produced up to 31 December 1959 in the course of prospecting Production of 190 t of U metal up to end of 1959 (Open-cast mining)	Owner and operator : CFMU	 F F F F F F F F F	 T T T T T T T T T
ELLWEILER Kreis Birkenfeld (Rhine-Palatinate) (Experimental plant) Gewerkschaft Brunhilde Hanover	Production capacity : 10-12 t/year uranium oxide	Site owner and plant operator : Gewerkschaft Brunhilde, Hanover Constructors : Lurgi GmbH Frankfurt and Philipp Holzmann Frankfurt	D	T
GUEUGNON (near the Grury - S et L mines) (Production of sodium uranate) Commissariat à l'Energie atomique 69, rue de Varenne Paris 7e	Processing capacity : 30,000 t/year Average ore content : 0,6 %	Owner and operator : CEA	F	T

SECTION II - Ore Contrating Plants

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
L'ECARPIERE (Gétigne, L.A.) (Near the Mines d'Ecarpière et de la Chapelle-Largeau) Société industrielle des Minerais de l'Ouest (SIMO) 11, rue de la Baume Paris 8e	Processing capacity : 300,000 t/year Average ore content : 0.1 %	Owner and operator : Société industrielle des Minerais de l'Ouest (SIMO)	F	T
BESSINES (near the Mines de la Crouzille et Margnac, H.V.) Production of magnesium uranate Société industrielle des Minerais de l'Ouest (SIMO) 11, rue de la Baume Paris 8e	Processing capacity : 600,000 t/year Average ore content : 0.125 %	Owner and operator : Société industrielle des Minerais de l'Ouest (SIMO)	F	T
BOIS-NOIRS (near the Mines de St-Priest-La Pugne, Forez) Production of sodium uranate CEA 69, rue de Varenne Paris 7e	Construction completed in 1960 Processing capacity : 180,000 t/year Average ore content : 0.185 %	Owner and operator : C.E.A.	F	C
SAN DONATO MILANESE Pilot plant for processing uranium-bearing ores Società Minerali Radioattivi Energia Nucleare (SOMIREN) San Donato Milanese Milan	Processing capacity : 10 t/day Production 65 % U_3O_8	Owner and operator : Società Minerali Radioattivi Energia Nucleare (SOMIREN)	I	T

SECTION III - Plants for the Chemical Processing and Refining of Concentrates

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
OLEN (Refining plant) Sté Gle Métallurgique de Hoboken 14, rue Adolf Greiner Hoboken-lez-Anvers	Production capacity : 500 t/year UO_3	Owner and operator : Société Gle Métallurgique de Hoboken	B	T
WOLFGANG (Semi-industrial installation) Nukem-Wolfgang bei Hanau	Production capacity : 50 t/year of uranium in the form of metal, oxide or carbide and 5-10 t of thorium oxide and metal	Owner and operator : NUKEM (Nuklear-Chemie und Metallurgie GmbH)	D	T
LE BOUCHET Processing and refining of thorium and uranium concentrates Commissariat à l'Energie atomique 69, rue de Varenne Paris 7e	Production capacity : 500 t/year contained uranium Able to produce 250-300 t/year of contained thorium in the form of crystallized nitrate	Owner and operator : CEA	F	T
MALVESI (near Narbonne, Aude) Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	Production capacity : uranium metal : 1,000 t/year natural and depleted U	Owner : CEA Operator : SRU (Société de Raffinage d'Uranium) Industrial architect : SETU (Sté d'Etudes et de Travaux pour l'Uranium) Constructors : - Société Potasse et Engrais Chimiques (PEC) - Société Saint-Gobain	F	T

SECTION IV - Plants for the Preparation of all types of Nuclear Fuel

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
OLEN (pilot plant for the production of uranium metal) Société Générale Métallurgique de Hoboken 14, rue Adolf Greiner Hoboken-lez-Anvers	Production capacity : 50 t/year uranium metal	Owner and operator : Société Générale Métallurgique de Hoboken	B	T
WOLFGANG Nukem Wolfgang bei Hanau	UO_2 sintering and compression installation with capacity of 20 t/year Smelting and shaping installation for uranium metal with capacity of 50 t/year Thorium smelting and sintering installation with capacity of 5 to 10 t/year	Owner and operator : Nukem (Nuklear-Chemie und Metallurgie GmbH)	D	T
LE BOUCHET Metal ingot production Commissariat à l'Energie atomique 69, rue de Varenne Paris 7e	Production capacity : 500 t/year uranium metal	Owner and operator : CEA	F	T
LA ROCHELLE-LA PALLICE Fabrication of thorium metal and thorium compounds Compagnie "Péchiney-Groupe Terres rares" 67, rue de Prony Paris 17e	Processing capacity : 1,000 t/year monazite Thorium nitrate production : 75 t/year Production capacity : - nuclear-grade thorium oxide : 30 t/year - thorium metal billets : 25 t/year	Owner and operator : Société Péchiney	F	T
ORSAY (Domaine de Corbeville) Production of sintered UO_2 pellets Compagnie industrielle des Combustibles atomiques frittés (CICAF) 63, rue de Beaumarchais Montreuil-sous-Bois (Seine)	Production capacity : 25 t/year	Owner and operator : Compagnie industrielle des Combustibles atomiques frittés (CICAF) Constructor : Compagnie générale de Télégraphie sans Fil (CSF)	F	T
SALUGGIA Plant for production of natural and enriched uranium fuels ITALATOM s.p.a. 39, via Montebello Milan	Planned production capacity : 270 t/year uranium metal 50 t/year uranium oxide	Owner and operator : "Italatom", formed by Sorin, Engelhardt Industries of Canada, Anglo-American and Mallincrodt Nuclear C° (USA)	I	P

SECTION V - Fuel Element Fabrication Plants

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
OLEN Manufacture of fuel elements Société Générale Métallurgique de Hoboken (SGMH) 14, rue Adolf Greiner Hoboken-lez-Anvers	The OLEN and HERSTAL works will be replaced by the joint installation at MOL mentioned below	Owner and operator : SGMH	B	T
HERSTAL Fuel element cladding Fabrique Nationale d'Armes de guerre (FN) Rue Voie de Liège Herstal-Lez-Liège	The OLEN and HERSTAL works will be replaced by the joint installation at MOL mentioned below	Owner and operator : F.N.	B	T
MOL Manufacture and cladding of fuels Métallurgie et Mécanique Nucléaires S.A. (MMN) 25, rue des Colonies Brussels	Planned initial capacity : 200 t/year cladded fuels Scheduled to start operating early in 1961	Owner and operator : MMN (a subsidiary of FN and SGMH)	B	C
WOLFGANG Nukem Wolfgang (Hanau/Main)	Production capacity : 20 t/year	Owner and operator : Nukem (Nuklear - Chemie und Metallurgie GmbH)	D	T
BONNEUIL-sur-Marne Compagnie pour l'Etude et la Réalisation de Combustibles Atomiques S.A. (CERCA) 16, route de Stains Bonneuil-sur-Marne	Production capacity : 4 sets of fuel elements for EL 3 per year (for example)	Owner and operator : Compagnie pour l'Etude et la Réalisation des Combustibles Atomiques (CERCA)	F	T
ROMANS-SUR-ISERE (Drôme) Fabrication of fuel elements for power reactors Compagnie pour l'Etude et la Réalisation de Combustibles Atomiques S.A. (CERCA) 16, route de Stains Bonneuil-sur-Marne	It is planned that the installation will supply, from the beginning of 1962 onwards, the CEA reactors of Marcoule and the EDF reactors with natural uranium-based fuels	Owner and operator : CERCA	F	C

SECTION V - Fuel Element Fabrication Plants

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
ANNECY (Savoie) Société industrielle de Combustibles nucléaires (SICN) 98, avenue du Petit Brogny Annecy (Savoie)	Production capacity : 750 t/year uranium metal	Owners : SACM, UGINE, Tréfileries et Laminoirs du Havre, Compagnie Française des Métaux Operator : SICN (Société Industrielle des Combustibles Nucléaires) Constructors : SACM (Société Alsacienne de Constructions Mécaniques)	F	T
TURIN Fiat, s.p.a. Corso G. Marconi, 10 Turin	Laboratory and plant for fuel element fabrication	Future owner and operator : FIAT	I	P

SECTION VI - Uranium Hexafluoride Plants

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
PIERRE-BENITE Experimental plant for the production and distillation of uranium hexafluoride Ugine Service des produits fluorés 16, rue Monceau Paris 8e	Development of industrial scale manufacture of uranium hexafluoride with a view to isotope separation	Owner and operator : UGINE		

SECTION VII - Uranium Enrichment Plants

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
PIERRELATE (Drôme) (Isotope separation plant) Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e		Owner : CEA Firm commissioned for research work : Société de Recherches Techniques et Industrielles Responsible contractor : USSI (Company for the construction of an isotope separation plant) Le Plessis-Robinson (Seine)	F	C

SECTION VIII - Plants for the Reprocessing of Irradiated Fuels

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MARCOULE Plutonium extraction and separation plant Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	In operation since 6 July 1958	Owner and operator : CEA Constructor : Saint-Gobain	F	T
MOL EUROCHEMIC : cf. Annex A : international installations with which Euratom or the member countries are associeted			OE EC	D
CAP DE LA HAGUE (Calvados) Plutonium chemical extraction plant Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	The plant will concentrate on the reprocessing of irradiated fuels from Chinon (EDF 1, 2 and 3) and Brennilis (EL 4) Construction work planned to begin in 1961 Probable duration of construction work : 3 years	Owner and operator : CEA Constructor : Saint-Gobain	F	D

SECTION IX - Plants for Manufacture of Moderator Materials

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
HEAVY WATER				
TOULOUSE Pilot plant for heavy water production Compagnie française de l'eau lourde c/o ONIA Toulouse (Haute-Garonne)	Heavy water production by fractional distillation of hydrogen obtained from synthetic mixture Capacity : 1.5 to 2 t/year	Studies : Liquid air General contractor : Office national Industriel de l'Azote Owner and operator : Compagnie française de l'eau lourde	F	T
HOECHST (Griesheim) Pilot plant for heavy water production Farbwerke Hoechst/Hoechst	Heavy water production by fractional distillation of pure hydrogen Capacity : 6 t/year	Owner and operator : Farbwerke Hoechst	D	T
GRAPHITE				
KROPFMÜHL Graphitwerke Kropfmühl AG Max-Joseph Strasse, 2 Munich	Work on the development of nuclear grade graphite from natural graphite	Owner and operator : Graphitwerke Kropfmühl	D	T
BAD-GODESBERG/MEHLEM Ringsdorff-Werke GmbH Bad Godesberg-Mehlem	Shaping and hardening natural nuclear-grade graphite	Owner : Kropfmühl-Ringsdorff Arbeitsgemeinschaft für Sondergraphite Operator : Ringsdorff-Werke GmbH	D	T
MEITINGEN Plant for the production of nuclear grade graphite from coke, oil and petroleum Siemens-Plania Chemische Fabrik Griesheim 13 b, Meitingen nr. Augsburg	Production capacity : 200 t/year	Owner and operator : Siemens-Plania	D	T
CHEDDE Péchiney - Compagnie de Produits Chimiques et Electrométallurgiques 23, rue Balzac Paris 8e	Production capacity 6,000 t/year	Owner and operator : Péchiney	F	T
MARCOULE Graphite-shaping plant Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e		Owner and operator : CEA	F	T

SECTION IX - Plants for Manufacture of Moderator Materials

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
BERYLLIUM				
SALINDRES (Beryllium oxide preparation)	Production capacity : 36 t/year	In collaboration with Ugine, Péchiney is studying the problems of beryllium oxide behaviour under irradiation resistance to corrosion in water under pressure, and in liquid sodium	F	T
LA PRAZ (Fabrication of beryllium oxide bricks)	Production capacity : 10 t/year		F	T
CALYPSO (St-Jean de Maurienne) (Beryllium metal fabrication)	Production capacity : 7-10 t/year		F	T
Péchiney - Compagnie de Produits Chimiques et Electrométallurgiques 23, rue Balzac Paris 8e				

SECTION X - Zirconium Plants

SITE pf installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
CUISE-LAMOTHE (Oise) Plant for zirconium hafnium separation and zirconium fabrication Société Nobel-Bozel 67, Bd Haussmann Paris 8e	10 t zirconium oxide produced per month	Owner : CEA State-appointed operator : Nobel-Bozel	F	T
CLAVAUX Fabrication of hafnium-free chlorinated zirconium and zirconium sponge Electro-Chimie Ugine 10, rue du Général Foy Paris 8e	Production : 5 t per month	Owner and operator : Ugine	F	T
CHAMBERY Fabrication of zirconium tubes Péchiney - Compagnie de Produits Chimiques et Electrométallurgiques 23, rue Balzac Paris 8e	Application of the Kroll process Production capacity : 12-20 t/year	Owner : Péchiney Operator : Péchiney, in association with Sobertiz and Ugine	F	T
LA ROCHE-DE-RAME Works for producing zirconium pellets Société Sobertiz 23, rue Balzac Paris 8e	Production capacity : 20 t/year	Owner and operator : Sobertiz	F	T
LA PRAZ Péchiney - Compagnie de Produits Chimiques et Electrométallurgiques 23, rue Balzac Paris 8e	Zirconium ingots and half-finished products	Owner and operator : Péchiney and Sobertiz	F	T
HANAU Production of zirconium sponge and half finished products in nuclear grade zirconium Production of zircaloy alloys W.C. Heraeus GmbH Postfach 369 Hanau (16)		Owner and operator : W.C. Heraeus	D	T

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
CONSTANCE Pilot-plant for production of hafnium-free zirconium tetrachloride Deutsche Gold und Silber-Scheideanstalt (Degussa) 9, Weissfrauenstrasse Frankfurt/Main		Owner and operator : Degussa	D	T
WOLFGANG (near Hanau/ Main) Production of zirconium (sponges, ingots, bars) Nukem, Wolfgang bei Hanau	An electronic smelting furnace is in operation	Owner and operator : Nukem (Nuklear-Chemie und Metallurgie GmbH)	D	T

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MOL BR 1 Research reactor CEN - Centre d'Etude de l'Energie Nucléaire 31, rue Belliard Brussels	- Type : natural uranium, graphite moderator, air-cooled - Power : 4 - 10 MW (th) - Fuel : natural uranium - Load : 23 to 25 t - Max. thermal neutron flux : 2.1×10^{12} n/cm^2 sec - Criticality : 11 May 1956	- Owner : Centre d'Etude de l'Energie Nucléaire (CEN) - Operator or user : CEN - Constructor(s) : CEN - Main Suppliers : Belgian industry	B	T
MOL BR 2 Materials' testing reactor CEN - Centre d'Etude de l'Energie Nucléaire 31, rue Belliard Brussels	- Type : uranium-beryllium, light water - Power : 50 MW(th) - Fuel : 90 % enriched uranium - Load : 4 to 5 kg U 235 - Max. thermal neutron flux : 6.2×10^{14} n/cm^2 sec fast neutrons : 2.1×10^{15} n/cm^2 sec - Criticality : scheduled for beginning of 1961	- Owner : CEN - Operator or user : CEN/EURATOM Association - Constructor(s) : CEN in collaboration with BEN, Belgonucléaire, Nuclear Development Corp. of America - Main suppliers : ACEC - MBLE Cockerill-Ougrée Metals and Controls Brush Beryllium Sylcor	B	C
MOL BR 02 Critical assembly Centre d'Etude de l'Energie Nucléaire (CEN) 31, rue Belliard Brussels	- Type : swimming-pool test reactor for BR 2 - Power : 50 kW(th) - Fuel 90 % enriched U - Load : 1.5 to 2 kg U 235 - Max. thermal neutron flux in the order of : 10^{11} n/cm^2 sec - Criticality : 14 January 1960	- Owner : CEN - Operator or user : CEN/EURATOM Association - Constructor(s) : cf. BR 2 - Main suppliers : cf. BR 2	B	T
GHENT R.R. - B.N. 1 Experimental reactor Institut interuniversitaire des Sciences Nucléaires 11, rue d'Egmont Brussels	- Type : swimming pool, graphite moderator - Power : 15 kW(th) - Fuel : 6 % enriched U - Load : - Max. thermal neutron flux : - Criticality : planned for 1962	- Owner : Institut interuniversitaire des Sciences Nucléaires - Operator or user : Ghent University - Constructor(s) Belgonucléaire - Main Suppliers :	B	D

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
JÜLICH MERLIN Experimental Reactor Kernforschungsanlage Jülich des Landes Nordrhein-Westfalen e.v. (K. F. A.) Cecilienstrasse, 41 Dusseldorf	- Type : swimming-pool, enriched U, light water - Power : 2 to 5 MW(th) - Fuels : 80 % enriched U - Load : 4,5 kg U 235 - Max. thermal neutron flux : 5×10^{13} n/cm^2 sec - Criticality : scheduled for autumn of 1961	- Owner : Land Nordrhein-Westfalen - Operator or user : Universities of Bonn, Cologne and Aachen, - Constructor(s) : AEG - Main suppliers : AEI John Thompson Nuclear Energy Co (G. B.)	D	C
JÜLICH M. P. R. DIDO Materials' testing reactor Kernforschungsanlage Jülich des Landes Nordrhein-Westfalen e.v. (K. F. A.) Cecilienstrasse, 41 Dusseldorf	- Type : Dido, enriched U, heavy water cooled and moderated - Power : 10 MW(th) - Fuel : 90 % enriched U - Load : 2.5 kg U 235 - Max. thermal neutron flux : 10^{14} n/cm^2 sec - Criticality : planned for spring of 1962	- Owner : Land Nordrhein-Westfalen - Operator or user : Universities of Bonn, Cologne and Aachen - Constructor(s) : AEG and Ruhrstahl AG - Main suppliers : Head Wrightson Processes Ltd (G. B.)	D	C
BERLIN-WANNSEE BER Experimental reactor Institut für Kernforschung der Techn. Universität und der Universität Berlin, Forschungsreaktor Berlin Glienickerstrasse Berlin - Wannsee	- Type : homogeneous - Power : 50 kW(th) - Fuel : 20 % enriched U (UO_2 SO_4 solution) - Load : 1.4 kg U 235 - Max. thermal neutron flux 10^{12} n/cm^2 sec - Criticality : 24 July 1958	- Owner : Hahn-Meitner Institut für Kernforschung, Berlin - Operator or user : Technical University and Free University, Berlin - Constructor(s) : Arbeitsgemeinschaft AEG, BORSIG, Pintsch-Bamag und SSW - Main suppliers : North American Aviation (Atomics International)	D	T
FRANKFURT FRF Experimental reactor Institut für Kernphysik der Universität Frankfurt, Am Römerhof, 31 Frankfurt/Main	- Type : homogeneous - Power : 50 kW(th) - Fuel : 20 % enriched U (UO^2 SO^4 solution) - Load : 1.4 kg U 235 - Max. thermal neutron flux : 10^{12} n/cm^2 sec - Criticality : 10 January 1958	- Owner : Land Hessen - Operator or user : Frankfurt University - Constructor(s) : AEG, BBC, SSW, Mannesmann - Main suppliers : North American Aviation (Atomics International)	D	T

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
GROSSWELZHEIM AEG P.R. 10 Testing reactor Allgemeine Elektrizitäts Gesellschaft (AEG) AEG Hochhaus Frankfurt/Main-Süd-10	- Type : Argonaut, light water moderated and cooled, graphite reflector - Power : 10 Watt - Fuel : 20 % enriched U (U_3O_8) - Load : 2 to 5.7 kg U 235 - Max. thermal neutron flux : - Criticality : 27 January 1961	- Owner : AEG - Operator or user : AEG - Constructor(s) : AEG - Main suppliers : AEG Fuel elements : Nukem, Wolfgang Reflector graphite : Siemens-Plania, Griesheim	D	C
HAMBURG-GEESTHACHT FRG Experimental reactor Gesellschaft für Kernenergieverwertung in Schiffbau und Schiffahrt GmbH 10, Normannenweg Hamburg 26	- Type : swimming-pool, enriched U - Power : 5 MW(th) - Fuel : 20 % enriched U - Load : 5.4 kg U 235 - Max. thermal neutron flux : 3×10^{13} n/cm^2 sec - Criticality : 23 October 1958	- Owner : Gesellschaft fur Kernenergieverwertung in Schiffbau und Schiffahrt (GKSS) - Operator or user : GKSS - Constructor(s) : German Babcock and Wilcox American Babcock and Wilcox - Main Suppliers :	D	T
MAINZ Experimental reactor Inorganic Chemistry Institute Mainz-University	- Type : Triga II - Power : 30 kW(th) - Fuel : - Load : - Max. thermal neutron flux : about 10^{16} n/cm^2 sec - Criticality : scheduled for 1962	- Owner : Mainz University - Operator or user : Inorganic Chemistry Institute Mainz University - Constructor(s) : General Atomics - Main suppliers : Gute Hoffnungshütte Sterkrade AG	D	D
MUNICH - GARCHING FRM Experimental reactor Laboratorium für Technische Physik der TH München, Arcisstrasse 21 Munich 2	- Type : swimming-pool, light water cooled and moderated - Power : 1 MW(th) - Fuel : 20 % enriched U - Load : 4 kg 869 U 235 - Max. thermal neutron flux 1.9×10^{13} n/cm^2 sec - Criticality : 31 October 1957	- Owner : Bavaria - Operator or user : Technische Hochschule, Munich, and Munich University - Constructor(s) : - Main suppliers : American Machine and Foundry Co (AMF)	D	T
MUNICH - GARCHING SAR (Siemens Argonaut Reaktor) Experimental reactor Siemens - Schuckertwerke AG. Werner von Siemenstr. 50 Erlangen	- Type : Argonaut, heterogeneous, enriched U, graphite, light water - Power : 1 to 10 kW(th) - Fuel : 20 % enriched U - Load : 2 to 5.7 kg U 235 - Max. thermal neutron flux 10^{11} n/cm^2 sec (at 10 kW(th)) - Criticality : 23 June 1959	- Owner : Siemens-Schuckertwerke AG. (SSW) - Operator or user : SSW and Munich University - Constructor : SSW - Main suppliers : SSW	D	T

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
KARLSRUHE FR2 Testing reactor Kernreaktor Bau-und-Betriebsgesellschaft m.b.h. (K I) Weberstrasse, 5 Karlsruhe	- Type : natural uranium, heavy water cooled and moderated - Power : 12 MW(th) - Fuel : natural U - Load : 5 t natural U and 1 t thorium - Max. thermal neutron flux : 3.5×10^{13} n/cm^2 sec - Criticality : 7 March 1961	- Owner : Kernreaktor-Bau u. Betriebsgesellschaft m.b.H. (KI) Weberstrasse 5 Karlsruhe - Operator or user : as above - Constructor(s) : - Main suppliers : Heat exchanger : German Babcock-Wilcox Steel vessel and thermal shield : Gute Hoffnungshütte Oberhausen Circuit pumps D20 Klein-Schanzlin u. Becker Fuel elements : Nukem Control and safety rods : Siemens	D	T
KARLSRUHE (Siemens Argonaut Reaktor) Experimental Reactor Gesellschaft für Kernforschung m.b.h. (K II) Friedrichplatz, 4 Karlsruhe	- Type : Argonaut, heterogeneous enriched uranium, graphite, light water - Power : 10 W - Fuel : 20 % enriched U_3O_8 aluminium caning - Load : - Max. thermal neutron flux : - Criticality scheduled for Autumn 1961	- Owner : Gesellschaft für Kernforschung m.b.h. (K II) Friedrichplatz, 4 Karlsruhe - Operator or user : - Constructor(s) : Arbeitsgemeinschaft Siemens-Schukkertwerke AG. Erlangen-Berlin Lurgi G.m.b.H., Frankfurt Pintsch Bamag AG., Butzbach	D	C
KARLSRUHE Subcritical assembly Reactor physics study Kernreaktor Bau u. Betriebsgesellschaft m.b.H. Weberstrasse 5 Karlsruhe	- Type : natural uranium, heavy water moderated - Power : 0 - Fuel : natural U - Max. thermal neutron flux 10^4 n/cm^2 sec	- Owner : Kernreaktor-Bau u. Betriebsgesellschaft m.b.H (KI) - Operator : as above - Constructor(s) : - Suppliers : Fuel elements : Nukem	D	T
FONTENAY-AUX-ROSES MINERVE Testing reactor CEN de Fontenay-aux-Roses Boîte postale n° 6 Fontenay-aux-Roses (Seine)	- Type : swimming-pool, enriched U, light water moderated and cooled - Power : 100 W - Fuel : 20 % enriched U - Load : critical mass of 3 to 5 kg U 235 - Max. thermal neutron fux : 5×10^9 n/cm^2 sec - Criticality : 29 September 1959	- Owner : CEA - Operator or user : CEN Fontenay-aux-Roses - Constructor(s) : Industrial architect : Indatom - Main suppliers : Seratom	F	T

SECTION XI A - Research. Training and Materials' Testing Reactors, etc.

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
FONTENAY-AUX-ROSES TRITON Experimental reactor CEN de Fontenay-aux-Roses Boîte postale n° 6 Fontenay-aux-Roses (Seine)	- Type : as above - Power : 1 MW - Fuel : 20 % enriched U - Load : 3 kg U 235 - Max. thermal neutron flux : 10^{13} n/cm^2 sec - Criticality : 30 June 1959	- Owner : CEA Operator or user : CEN Fontenay-aux-Roses - Constructor(s) : Indatom - Main suppliers : French industry	F	T
FONTENAY-AUX-ROSES ELI - ZOE Experimental reactor Centre d'Etudes Nucléaires de Fontenay-aux-Roses Boîte postale n° 6 Fontenay-aux-Roses (Seine)	- Type : natural U, heavy water cooled and moderated - Power : 150 kW(th) - Fuel : natural U - Load : 1,940 kg natural U - Max. thermal neutron flux : 10^{12} n/cm^2 sec - Criticality : 15 December 1948	- Owner : CEA	F	T
SACLAY EL 2 Experimental reactor Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : natural U, heavy water moderated - Coolant : CO_2 - Power : 2,500 kW(th) - Fuel : natural U - Load : 2,950 kg natural U - Max. thermal neutron flux : 10^{12} n/cm^2 sec - Criticality : 21 October 1952	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : CEA - Main suppliers : French industry	F	T
SACLAY E.L. 3 Testing reactor Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : enriched U, heavy water moderated and cooled - Power : 15 MW(th) - Fuel : 1.35 % to 1.60 % enriched U - Load : 673 kg - Max. thermal neutron flux : 10^{14} n/cm^2 sec - Criticality : 4 July 1957	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : Chantiers de l'Atlantique et France Atome - Main suppliers : French industry	F	T
SACLAY Rubéole Critical assembly Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : enriched U, beryllium oxide moderated and cooled - Power : 0 - Fuel : 35 % enriched U in molybdenum alloy - Load : - Max. thermal neutron flux : 10^{14} n/cm^2 sec - Criticality : 1 December 1957	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : CEA - Main suppliers : French industry	F	T

SECTION XI A - Research, Training and Materials' Testing Reactors, etc.

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
SACLAY Peg Mobile demonstration pile Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : Swimming pool, enriched U - Power : 0.1 W - Fuel : 20 % enriched U - Load : 3.2 kg U 235 - Max. thermal neutron flux : 3×10^6 n/cm^2 sec - Criticality : 1959	- Owner : CEA - Operator or user : CEA - Constructor(s) : Chantiers de l'Atlantique - Main suppliers :	F	T
SACLAY Aquilon Experimental reactor Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : Naturel U, heavy water moderated graphite reflector - Power : 100 Watt - Fuel : Natural U - Load : - Max. thermal neutron flux : 10^7 n/cm^2 sec - Criticality : 11 August 1956	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : CEA - Main suppliers : French industry	F	T
SACLAY Alize Experimental reactor Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : Enriched U, light water moderated - Power : very low - Fuel : 1.5 % enriched U - Load : about 2,000 kg enriched U - Max. thermal neutron flux : 5×10^7 n/cm^2 sec - Criticality : 18 June 1959	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : Caratom - Main suppliers : Caratom	F	T
SACLAY Proserpine Experimental reactor Centre d'Etudes Nucléaires de Saclay Boîte postale n° 2 Gif-sur-Yvette (Seine-et-Oise)	- Type : homogeneous, plutonium sulphate, beryllium oxide and graphite - Power : 1 Watt - Fuel : plutonium - Load : critical mass : 260 gr - Max. thermal neutron flux : 7×10^8 n/cm^2 sec - Criticality : 17 March 1958	- Owner : CEA - Operator or user : CEN Saclay - Constructor(s) : CEA - Main suppliers : French industry	F	T
SACLAY Ulysse Institut National des Sciences et Techniques Nucléaires (INSTN) Boîte postale n° 6 Gif-sur-Yvette	- Type : Argonaut - Power : 100 kW - Fuel : enriched U - Load : - Max. thermal neutron flux : - Criticality : 1961	- Owner : INSTN - Operator : INSTN - Constructor : - Main suppliers :	F	C

SECTION XI A - Research, Training and Materials' Testing Reactors, etc.

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MARCOULE Marius Critical assembly Materials' and fuel elements' testing Centre de Production de Plutonium de Marcoule Chusclan (Gard)	- Type : natural U, graphite - Power : 30 Watt - Fuel : natural U G. 2 fuel elements - Load : variable - Max. thermal neutron flux : 10^7 n/cm^2 sec - Criticality : 8 January 1960	- Owner : Electricité de France - Operator or user : Centre de Marcoule in collaboration with EDF - Constructor(s) : EDF - CEA - Main suppliers : French industry	F	T
CADARACHE Pegase Testing reactor Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	- Type : swimming-pool, enriched U, light water cooled and moderated - Power : 20 - 30 MW(th) - Fuel : 20 % enriched U - Load : - Max. thermal neutron flux : 3.10^{13} to 10^{14} n/cm^2 sec - Criticality : scheduled for end of 1962	- Owner : CEA - Operator or user : CEA - Constructor(s) : Group "Propeg" Design : Penhoët Chantiers de la Pallice - Main suppliers : French industry	F	C
CADARACHE Peggy Full-scale model of the nuclear part of the "Pegase" project Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	- Type : swimming-pool, light water cooled and moderated, enriched U - Power : 1 kW(th) - Fuel : 20 % enriched U - Load : 7,5 kg of U235 - Max. thermal neutron flux : - Criticality : 2 February 1961	- Owner : CEA - Operator or user : CEA - Constructor(s) : - Design : CEA, Chantiers de l'Atlantique, Hispano-Suiza	F	T
CADARACHE Rapsodie Reactor experiment Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	- Type : Plutonium and enriched U, sodium-cooled fast neutron breeder reactor - Power : 10 MW(th) with possibility of extension until 20 MW(th) - Fuel : plutonium and enriched U - Load : - Max. thermal neutron flux : 10^{15} n/cm^2 sec - Criticality : scheduled for 1964	- Owner : CEA - Operator or user : CEA - Constructor(s) Design : CEA, Chantiers de l'Atlantique, Hispano-Suiza - Industrial Architect : Groupement Atomique Alsacienne-Atlantique (G 3A)	F	C
GRENOBLE Melusine Experimental reactor Centre d'Etudes Nucléaires de Grenoble Grenoble (Isère)	- Type : swimming-pool, enriched U, light water cooled and moderated - Power : 1,000 kW(th) - Fuel : 20 % enriched U - Load : 4,094 kg U 235 - Max. thermal neutron flux : 10^{13} n/cm^2 sec - Criticality : 1 July 1958	- Owner : CEA - Operator or user : CENG - Constructor(s) : Indatom - Main suppliers : French industry	F	T

SECTION XI A - Research, Training and Materials' Testing Reactors, etc.

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
GRENOBLE Siloe Experimental reactor Centre d'Etudes Nucléaires de Grenoble Grenoble (Isère)	- Type : Swimming-pool, enriched U light water - Power : 10 MW(th) - Fuel : 90 % enriched U - Load : 25 elements of 196 g say 4 Kg 9 of U 235 - Max. thermal neutron flux : 5.10^{14} n/cm^2 sec - Criticality : Scheduled for 1963 (work begins in 1961)	- Owner : CEA - Operator or user : CENG - Constructor(s) : Industrial Architect : Indatom - Main suppliers :	F	C
ISPRA Ispra 1 Experimental reactor CNRN Comitato Nazionale per le Ricerche Nucleari 15, via Belisario Rome	- Type : CP 5 Enriched U, heavy water cooled and moderated - Power : 5 MW(th) - Fuel : 20 % enriched U - Load : 14 kg U - Max. thermal neutron flux : 8×10^{13} n/cm^2 sec - Criticality : 24 March 1959	- Owner : CNRN - Operator or user : CNRN - Constructor(s) : - Main suppliers : American Car and Foundry (ACF Industries)	I	T
MILAN L 54 Experimental reactor Centro Enrico Fermi Milan Polytechnical Institute Milan	- Type : L 54, homogeneous uranyl sulphate solution - Power : 50 kW(th) - Fuel : 20 % enriched U - Load : 6.5 kg U - Max. thermal neutron flux : 10^{12} n/cm^2 sec - Criticality : 27 November 1959	- Owner : Milan Polytechnical Institute - Operator or user : Centro Enrico Fermi - Constructor(s) : - Main suppliers : North American Aviation Atomics International	I	T
SALUGGIA (Prov. Vercelli) Avogadro - RS 1 Experimental reactor Sorin 39, via Montebello Milan	- Type : swimming-pool, enriched U, heavy water moderated and cooled - Power : 1-5 MW(th) - Fuel : 20 % enriched U - Load : 25 kg U - Max. thermal neutron flux : 8×10^{12} n/cm^2 sec - Criticality : 9 September 1959	- Owner : SORIN - Operator or user : SORIN - Constructor(s) : - Main suppliers : American Machine and Foundry (AMF Atomics)	I	T
SAN PIERO A GRADO (Leghorn - Pisa) Experimental reactor Camen Leghorn	- Type : swimming-pool, enriched U, light water moderated and cooled - Power : 1 - 5 MW(th) - Fuel : 20 % enriched U - Max. thermal neutron flux : 10^{12} n/cm^2 sec - Criticality : scheduled for beginning of 1961	- Owner : Camen - Operator or user : Pisa University and Leghorn Naval Academy - Constructor(s) : Vitro International Company - Main suppliers : Babcock and Wilcox (USA)	I	C

SECTION XI A - Research, Training and Materials' Testing Reactors, etc.

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
PAVIA Subcritical assembly for research and training Laboratorio di Radiochimica Viale Taramelli, 12 Pavia	- Type : Heterogeneous subcritical assembly, natural U, light water moderated - Power : O - Fuel : natural U - Load : 2 t - Max. thermal neutron flux : 6×10^4 n/cm^2 sec - Criticality : 14 July 1958	- Owner : Società Incremento Technologia Energia Nucleare (SITEN) - Operator or user : Pavia University General Chemistry Institute - Constructor(s) : - Main suppliers :	I	T
CASACCIA (25 km N. of Rome) RC 1 Experimental reactor CNRN - Comitato Nazionale per le Ricerche Nucleari 15, via Belisario Rome	- Type : Triga Mark II, enriched U, light water moderated and cooled - Power : 100 kW(th) - Fuel : 20 % enriched U - Load : 2.2 kg U 235 - Max. thermal neutron flux : 3×10^{12} n/cm^2 sec - Criticality : 11 June 1960	- Owner : CNRN - Operator or user : CNRN - Constructor(s) : - Main suppliers : General Dynamics Corporation (General Atomics) U.S.A.	I	T
PADUA Experimental reactor Padua University (Padua)	- Type : - Power : - Fuel : - Load : - Max. thermal neutron flux : - Criticality	- Owner : Padua University - Operator or user : Padua University - Constructor(s) : - Main suppliers : acquisition decided on in January 1960	I	P
PALERMO AGN 201 Experimental reactor Palermo University Via Maqueda, 175 Palermo	- Type : AGN 201 - enriched U, polyethylene moderated - Power O.1 to 5 Watts - Fuel : 20 % enriched U - Load : 3.3 kg U - Max. thermal neutron flux : 4.5×10^6 n/cm^2 sec - Criticality : 12 February 1960	- Owner : Palermo University - Operator or user : Istituto di Fisica Tecnica Palermo University - Constructor(s) : - Main Suppliers : Aerojet General Nucleonics U.S.A.	I	T
PETTEN LFR (Jason) Experimental reactor RCN - Reactor Centrum Nederland Scheveningseweg, 112 The Hague	- Type : Argonaut - Power : 10 kW(th) - Fuel : 90 % enriched U - Load : 4,725 kg U 235 - Max. thermal neutron flux : 1.5×10^{11} n/cm^2 sec - Criticality : 27 September 1960	- Owner : Reactor Centrum Nederland - Operator or user : Reactor Centrum Nederland - Constructor(s) : Dutch industry - Main suppliers : Hawker Siddeley (G.B.)	N	T

REACTOR - Site description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
PETTEN HFR Testing reactor RCN - Reactor Centrum Nederland Scheveningseweg, 112 The Hague	- Type : High flux MTR enriched U, light water cooled and moderated - Power : 20 MW(th) - Fuel : 90 % enriched U - Load : 4.2 kg U 235 - Max. thermal neutron flux 1.5×10^{14} n/cm^2 sec - Criticality : scheduled for autumn 1961	- Owner : RCN - Operator or user : RCN - Constructor(s) : - Main suppliers : Allis-Chalmers	N	C
DELFT HOR Experimental reactor Reactor Instituut Delft Nieuwlaan, 76 Delft	- Type : swimming-pool, enriched U light water cooled and moderated - Power : 100 kW(th) - Fuel : 90 % enriched U - Load : 3.5 kg enriched U - Max. thermal neutron flux : 11×10^{12} n/cm^2 sec - Criticality : scheduled for 1961 (went critical for first time in Amsterdam 1957 and was reassembled in Delft	- Owner : Dutch Government - Operator or user : Joint University Institute, Reactor Instituut Delft - Constructor(s) : - Main suppliers : American Machine and Foundry (AMF Atomics)	N	C
EINDHOVEN Experimental reactor Technische Hogeschool (Technical University) Eindhoven	- Type : Argonaut - Power : 10 kW(th) - Fuel : enriched U - Load : - Max. thermal neutron flux : 10^{11} n/cm^2 sec - Criticality	- Owner : Technische Hogeschool Eindhoven - Operator or user : Technische Hogeschool Eindhoven - Constructor(s) : - Main suppliers :	N	P
ARNHEM Suspop Reactor experiment N.V. tot Keuring van Elektrotechnische Materialen (KEMA) Utrechtseweg, 310 Arnhem	- Type : UO_2 and ThO_2 suspension in heavy water - Power : 250 kW(th) - Fuel : 90 % enriched U - Load : 2 kg U 235 - Max. thermal neutron flux : - Criticality	- Owner : Kema and Euratom - Operator or user : Kema and Euratom (agreement of 1 July 1959) - Constructor(s) : - Main suppliers :	N	D

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
WAGENINGEN Ital Experimental reactor Agricultural applications, food conservation, biological mutation Instituut voor de Toepassing van Atoomenergie in de Landbouw Wageningen	- Type : swimming-pool, enriched U - Power : 100 kW(th) - Fuel : 90 % enriched U - Load : 4 kg U 235 - Max. thermal neutron flux : 5×10^{11} n/cm^2 sec - Criticality : scheduled for spring of 1962	- Owner : ITAL Institute for the use of Nuclear Energy in Agriculture - Operator or user : Institute for the use of Nuclear Energy in Agriculture - Constructor(s) : Dutch industry - Main suppliers :	N	D

SECTION XI B - Power Reactors and Prototype Reactors

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MOL BR 3 Prototype reactor CEN - Centre d'Etudes Nucléaires 31, rue Belliard Brussels	- Type : PWR, enriched U, light water cooled and moderated - Power : 40 MW(th) - 10.5 MW(e) - Fuel : Two zones enriched U : 4.5 % and 3.7 %, in the form of UO_2 - Load : 2,006 kg (1,003 at 3,7 % 1,003 at 4,5 %) - Max. thermal neutron flux : $5,143 \times 10^{13}$ n/cm^2 sec - Criticality : scheduled for 1961	- Owner : CEN - Operator or user : CEN - Constructor(s) : Bureau d'Etudes Nucléaires, Belgonucléaires, Société de Traction et d'Electricité - Main suppliers : Westinghouse Electric C° (USA)	B	C
KAHL/Main Vak Prototype reactor Versuchsatomkraftwerk Kahl GmbH Kahl/Main	- Type : BWR, enriched U - Power : 60.4 MW(th) 15 MW(e) with possibility of extension to 30 MW(e) - Fuel : 2.6 % enriched UO^2 - Load : about 6 t - Max. thermal neutron flux : 3.5×10^{13} n/cm^2 sec - Criticality : 13 November 1960	- Owners : RWE 80 % and Bayernwerk 20 % - Operator or user : Versuchsatomkraftwerk Kahl GmbH - Constructor(s) : International General Electric and AEG - Main suppliers : Civil Engineering : Hochtief AG., Essen Heat exchangers : Gute Hoffnungshütte Sterkrade AG. Water decontamination : Pintsch Bamag	D	T
JÜLICH Prototype reactor Arbeitsgemeinschaft Versuchsreaktor Gmbh Düsseldorf	- Type : quasi-homogeneous, high temperature reactor, graphite-moderated, cooled by air, Ne and He - Power : 49 MW(th) - 15 MW(e) - Fuel : 20 % enriched U and Th - Load : 23.5 kg enriched U and 340 kg Th - Max. thermal neutron flux : - Criticality : scheduled for 1963	- Owner : Arbeitsgemeinschaft Versuchsreaktor GmbH (AVR) Düsseldorf - Operator or user : AVR - Constructor(s) : BBC and Krupp - Main suppliers : BBC and Krupp	D	C
BERLIN Bewag Industrial reactor Berliner Kraft und Licht (Bewag) Aktiengesellschaft Stauttenbergstrasse, 26 Berlin W 35	- Type : not yet decided - Power : 150 MW(e) - Fuel : - Load : - Max. thermal neutron flux : - Criticality : scheduled for 1965	- Owner : BEWAG und Lichtwerke AG - Operator or user : Berliner Kraft und Lichtwerke AG. (BEWAG) - Constructor(s) : - Main suppliers :	D	P
MUNICH Industrial reactor Gesellschaft für die Entwicklung der Atomkraft in Bayern m.b.H. Blutenburgstrasse, 6 München	- Type : Natural U heavy water moderated - Power : 400 MW(th) - 100 MW(e) - Fuel : - Load : - Max. thermal neutron flux : - Criticality :	- Owner : Gesellschaft fur die Entwicklung der Atomkraft in Bayern m.b.H. - Munich - Operator or user : - Constructor(s) : Design : Siemens-Schuckertwerke, Erlangen - Main suppliers :	D	P

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
STUTTGART (Obrigheim/Mosbach) K.B.W.P. Industrial reactor Kernkraftwerk Baden-Wurttemberg Planungsgesellschaft m.b.H. Goethestrasse, 12 Stuttgart-N	- Type : OMR - Power : 150 MW(e) - Fuel : - Load : - Max. thermal neutron flux : - Criticality	- Owner : KBWP - Operator or user : Company yet to be constituted - Constructor(s) : North American Aviation (Atomics International) Interatom, Brown and Boveri - Main suppliers :	D	P
HANOVER S.K.W. Prototype reactor Studiengesellschaft für Kernkraftwerke mbH (SKW) Papenstieg 10-12 Hanover	- Type : AGR or BWR - Power : 100 MW(e) - Fuel : - Load - Max. thermal neutron flux : - Criticality	- Owner Studiengesellschaft für Kernkraftwerke m.b.H. Hanover - Operator or user : - Constructor(s) Responsible for design : 1st project : AEG and IGE 2nd project : Babcock and Wilcox - Main suppliers :	D	P
MARCOULE G. 1 Industrial reactor Centre de production de plutonium de Marcoule Chusclan (Gard)	- Type : natural U, graphite-moderated, air-cooled - Power : 43 MW(th) - 5 MW(e) - Fuel : Naturel U - Load : 95 to 105 t - Max. thermal neutron flux : 5×10^{12} n/cm^2 sec - Criticality : 7 January 1956	- Owner : Reactor : CEA Connected power plant : EDF - Operator or user : Plutonium : CEA Electricity : EDF - Constructor(s) : Industrial architect : SFAC - Main suppliers : French industry	F	T
MARCOULE G 2 Industrial reactor Centre de Production de Plutonium de Marcoule Chusclan (Gard)	- Type : natural U, graphite, gas - Power : 200 MW(th) - 30 MW(e) - Fuel : natural U - Load : 105 t - Max. thermal neutron flux : 2.5×10^{13} n/cm^2 sec - Criticality : 21 June 1958	- Owner : Reactor : CEA Connected power plant : EDF - Operator or user : Plutonium : CEA Electricity : EDF - Constructor(s) : CEA and EDF Industrial architect : SACM (Alsacienne) - Main suppliers : French industry	F	T
MARCOULE G 3 Industrial reactor Centre de Production de Plutonium de Marcoule Chusclan (Gard)	- Type : natural U, graphite, gas - Power : 200 MW(th) - 30 MW(e) - Fuel : natural U - Load : 105 t - Max. thermal neutron flux : 2.5×10^{13} n/cm^2 sec - Criticality : 11 June 1959	- Owner : - Reactor : CEA Connected power plant : EDF - Operator or user : Plutonium : CEA Electricity : EDF - Constructor(s) : CEA and EDF Industrial architect : SACM (Alsacienne) - Main suppliers : French industry	F	T

SECTION XI B - Power Reactors and Prototype Reactors

REACTOR - Site, Description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
CHINON EDF 1 Industrial reactor Electricité de France 68, Faubourg St Honoré Paris 8e	- Type : Natural U, graphite-moderated, CO_2 cooled - Power : 300 MW(th) - 700 MW(e) - Fuel : natural U - Load : 150 t - Max. thermal neutron flux : 4.5×10^{13} n/cm^2 sec - Criticality schedules for 1961	- Owner : EDF - Operator or user : EDF - Constructor(s) : EDF Région d'Equipement Thermique Nucléaire n° 1 Clamart - Main suppliers : Pressure vessels : Ets Levivier Heat exchangers : Babcock-Wilcox Cie des Echangeurs Chantier de l'Atlantique Fives-Lille-Cail CO_2 circuits and condensers : SFAC Turbo-blowers : SNECMA	F	C
CHINON EDF 2 Industrial reactor Electricité de France 68, Faubourg St Honoré Paris 8e	- Type : Natural U, graphite-moderated CO_2-cooled - Power : 700 MW(th) 170/200 MW(e) - Fuel : Natural U - Load : 250 t - Max. thermal neutron flux : 3×10^{13} n/cm^2 sec - Criticality scheduled for 1961-1962	- Owner : EDF - Operator or user : EDF - Constructor(s) : EDF, Retn 1 - Main suppliers : French industry	F	C
CHINON EDF 3 Industrial reactor Electricité de France 68, Faubourg St-Honoré Paris 8e	- Type : Natural U, graphite-moderated CO_2-cooled - Power : 375-500 MW(e) - Fuel : Natural U - Load : - Max. thermal neutron flux : - Criticality : Scheduled for 1964-1965	- Owner : EDF - Operator or user : EDF - Constructor(s) : EDF, Retn 1 - Main suppliers : French industry	F	D
CHOOZ (near Givet, Meuse) Centrale Nucléaire des Ardennes Industrial reactor Société d'Energie Nucléaire Franco-Belge des Ardennes (SENA) c/o EDF 68, Faubourg St Honoré Paris 8e	- Type : PWR - Power : about 210 MW(e) - Fuel : 3 % enriched U - Load : - Max. thermal neutron flux : - Criticality : Scheduled for 1965	- Owner : Société d'Energie Nucléaire Franco-Belge des Ardennes (SENA) - Operator or user : EDF and SA Centre et Sud - Constructor(s) : - Main suppliers : ACEC - Framatone - Westinghouse (US)	F. B	D

SECTION XI B - Power Reactors and Prototype Reactors

REACTOR - Site, description, use and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MONTS D'ARREE (Finistère) E.L. 4 Centrale Nucléaire des Monts d'Arrée Prototype reactor Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e	- Type : natural U, heavy water moderated, CO_2 cooled - Power : 100 MW(e) - Fuel : natural U - Load : - Max. thermal neutron flux : 1.6×10^{14} n/cm^2 sec - Criticality : scheduled for 1964	- Owner : CEA/EDF - Operator or user : CEA/EDF - Constructor(s) : Responsible contractor CEA - Electromechanical section : EDF - Main suppliers :	F	D
TRINO VERCELLESE (between Milan and Turin) Nuclear Power Plant Enrico Fermi Industrial Reactor Società Elettronucleare Italiana S.p.a. - Fora Buonaparto, 31 Milan	- Type : PWR, enriched U, light water moderated and cooled - Power : 615 MW(th) - 165 MW(e) - Fuel : 2.6 - 2.8 % enriched U - Load : 39 t U - Max. thermal neutron flux : - Criticality :	- Owner : SELNI - Operator or user : SELNI - Constructor(s) : Westinghouse Electric C° (USA) - Main suppliers :	I	C
GARIGLIANO Centrale Elettronucleare Del Garigliano Industrial reactor Società Elettronucleare Nazionale (SENN) Via Torino, 6 Rome	- Type : BWR, enriched U, light water moderated and cooled - Power : 508 MW(th) - 150 MW(e) - Fuel : 2 % enriched U - Load : 41.4 t U - Max. thermal neutron flux : - Criticality : scheduled for 1963	- Owner : SENN - Operator or user : SENN - Constructor(s) : International General Electric Operations S.A. (Geneva) - Main suppliers : Heat Exchanger : Stork en C° (Holland) Pressure vessels : Terni Shell : SIA (Genoa) Turboalternator : Ansaldo (Genoa)	I	C
LATINA (Foce Verde) Industrial reactor Società Italiana Meridionale Energia Atomica (SIMEA) Via San Teresa, 35 Rome	- Type : GCR, natural U, graphite moderated, CO_2 cooled - Power : 705 MW(th) - 200 MW(e) - Fuel : natural U - Load : 270 t - Max. thermal neutron flux : - Criticality : scheduled for 1962	- Owner : SIMEA - Operator or user : SIMEA - Constructor(s) Nuclear Power Plant and Co (NPPC) - (G.B.) - Main suppliers :	I	C
SITE NOT DECIDED UPON (Probably in Bologna region) PRO Prototype reactor Comitato Nazionale Ricerche Nucleari (CNRN) Via Belisario, 15 Rome	- Type : O.M.R. - Power : 30 MWt - Fuel : U - Mo Alloy, SS cladding - Load : - Max. thermal neutron flux : - Criticality :	- Owner : Construction agreement concluded between CNRN, SORIN and AGIP NUCLEARE (January 1960) - Operator or user : - Constructor(s) : SORIN, AGIP and CNEN - Main suppliers : Italian industry	I	D

REACTORS	BODIES concerned	REMARKS	STATUS
BELGIUM			
P W R Spectral shift type (Variable quantity of heavy water moderator)	Cockerill-Ougrée Company in collaboration with the Centre d'Etudes nucléaires, BELGONUCLEAIRE and the COMPAGNIE MARITIME BELGE		P
GERMANY			
O M R Reactor producing 10,000 shaft horsepower	GKSS and INTERATOM (DEMAG + ATOMICS INTERNATIONAL)	Euratom is making a 40 % contribution to the cost of the experiments and is also participating in the constructional design work on the basis of which the decision to build the reactor will be made.	P
P W R Reactor producing 20,000 shaft horsepower	SIEMENS-SCHUCKERTWERKE A.G. and HOWALDTWERKE A.G. Hamburg	Subsidy of 1.5 million DM granted by the Federal Government. Total cost of the studies : 3 million DM	P
B W R Reactor producing 20,000 shaft horsepower	Allgegemeine Elektrizitäts-Gesellschaft (AEG) and Deutsche Werft, Hamburg	Subsidy of 1.5 million DM to be provided by the Federal Government Total costs of studies : 3 million DM	P
A G C R Advanced gas-cooled reactor producing 20,000 shaft horsepower	German Babcock and Wilcox AG and Blohm und Voss, Hamburg	Federal Government subsidy in negotiation stage	P
H T R High-temperature reactor	BBC - KRUPP and AG WESER, Bremen	Federal Government subsidy in negotiation stage	P
FRANCE			
Land-based advanced gas-cooled reactor with a power of 25 MW(th)	Commissariat à l'Energie Atomique and Secrétariat d'Etat à la Marine Marchande		P

SECTION XI C - Marine Propulsion Reactors (Preliminary Designs)

REACTORS	BODIES concerned	REMARKS	STATUS
ITALY			
P.W.R. Pressurized water reactor with a power of 70 MW(th)	FIAT Company (Licensed by Westinghouse and ANSALDO	Draft design for a 52,000 ton tanker	P
NETHERLANDS			
P.W.R. Pressurized water reactor with a power of 60 MW(th)	Reactor Centrum Nederland and S.B.B. Group (Scheepsbouwbelangen)	Program envisaged - drafting of a priliminary design - research and development - building of a prototype reactor	P

SECTION XII - Industrial Installations for the Processing of Radioactives Wastes

SITE of installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
MARCOULE Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e		Owner and operator : CEA	F	T
FONTENAY-AUX-ROSES Commissariat à l'Energie Atomique 69, rue de Varenne Paris 7e		Owner and operator : C.E.A.	F	P
MOL CEN Centre d'Etudes Nucléaires 31, rue Belliard Brussels		Owner and operator : CEN	B	T

ANNEX

International Installations with which Euratom or the Member Countries are Associated

SITE of the installation and address of managing body	CHARACTERISTICS	ENTERPRISES concerned	COUNTRY	STATUS
WINFRITH HEATH (Great Britain) DRAGON Experimental reactor	- High-temperature graphite-moderated reactor - Fuel : 90 % enriched U and Th - Coolant : gas - Power : 20 MW(th) - Termination of construction work scheduled for spring 1963	- Owner : UKAEA on termination of the agreement for co-operation concluded under the auspices of the European Nuclear Energy Agency (OEEC) - Operators : Dragon project group - Constructors : UKAEA industrial group British and Continental firms	OEEC U.K. Austria Denmark Norway Switzerland Sweden and EURATOM	C
HALDEN (Norway) Power plant prototype supplying steam to paper and pulp-producing firm Institut Før Atomenergi Kjeller (Norway)	- Boiling heavy water reactor - Fuel : natural U - Power : 10 MW(eh) - Criticality : 29 June 1959 - Put into operation on 10 October 1959	- Owner : Institut Før Atomenergi, Kjeller - Operators : 5 member countries of OEEC and EURATOM Associated countries : USA and Finland - Constructors : - Design : Institut Før Atomenergi, Kjeller - Civil Engineering : Høyer Ellesfen - Suppliers : Mechanical installations : Kvaerner-Myrhen, Thune Combine Operating and control instrumentation : Ch. Michelsens Institut - Fuels : UKAEA - Heavy water : USAEC	Various	T
MOL (Belgium) EUROCHEMIC Plant for chemical reprocessing of irradiated fuels "Société européenne pour le Traitement chimique des Combustibles irradiés" (EUROCHEMIC) 35, rue Belliard Brussels	- Plant for reprocessing of natural uranium based or 5 % enriched irradiated fuels - Capacity 38 to 50 t/year - Cold tests scheduled for beginning of 1963 - Hot tests scheduled for end of 1963	- Owner and operator : EUROCHEMIC, company instituted under international public law by 12 governments : Germany, Austria, Belgium, Denmark, France, Italy, Norway, Netherlands, Portugal, Sweden, Switzerland, Turkey, and subsequently Spain - Constructor : A group of enterprises headed by Saint Gobain	OEEC	C