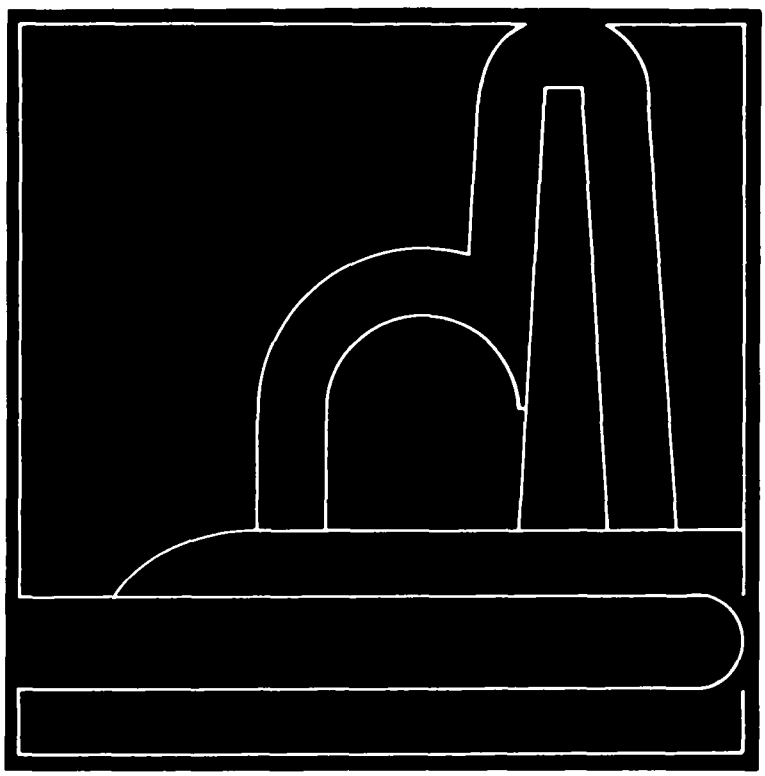
DOE / TIC-8200-R50
(DE87002262)

Nuclear Reactors Built, Being Built, or Planned: 1986



MARCH 1987

Prepared for

U.S. Department of Energy
Assistant Secretary for Nuclear Energy

Published by

Office of Scientific and Technical Information

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REVISION

Nuclear Reactors Built, Being Built, or Planned

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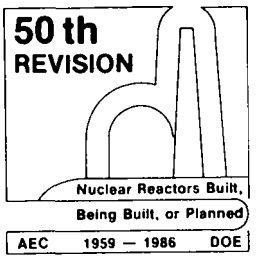

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Nuclear Reactors Built, Being Built, or Planned 1986

Prepared for

U.S. Department of Energy

Assistant Secretary for Nuclear Energy

Division of Plans and Evaluation

Washington, D.C. 20545

MARCH 1987

Published by

Office of Scientific and Technical Information

Preface

Nuclear Reactors Built, Being Built, or Planned contains unclassified information about facilities built, being built, or planned in the United States for domestic use or export as of December 31, 1986. The Office of Scientific and Technical Information, U. S. Department of Energy, gathers this information annually from Washington headquarters and field offices of DOE; from the U. S. Nuclear Regulatory Commission; from the U. S. reactor manufacturers who are the principal nuclear contractors for foreign reactor locations; from U. S. and foreign embassies; and from foreign governmental nuclear departments.

Information is presented in five parts, each of which is categorized by primary function or purpose: civilian, production, military, export, and critical assembly. Various classes of reactors within these categories are defined as follows:

CENTRAL-STATION ELECTRIC POWER PLANT: A nuclear power facility designed and constructed for operation on a utility system. (Part I, Sec. 1A).

DUAL-PURPOSE PLANT: A nuclear power facility designed, constructed, and operated for more than one primary purpose; for example, the production of nuclear materials and the generation of electricity or the use of reactor thermal energy for electrical generation and process-heat applications including desalting. (Part I, Sec. 1B)

EXPERIMENTAL POWER REACTOR: A facility designed, engineered, constructed, and operated to test the technical feasibility of a concept or to provide the technical basis for a similar type nuclear power plant in a larger size. Design flexibility permits changes to prove out various aspects of reactor technology including fuel and other components. Power-conversion equipment may or may not be included as part of the facility. (Part I, Sec. 2A)

GENERAL IRRADIATION TEST REACTOR: A reactor having (1) a thermal power level exceeding 10 MW; (2) test loops or experimental facilities within, or in proximity to, the core; and (3) the use of nuclear radiation for testing the life or performance of reactor components as its major function. (Part I, Sec. 3A, and Part IV, Sec. 2A)

HIGH-POWER RESEARCH AND TEST REACTOR: A reactor having a relatively high thermal power level but not classed as a general irradiation test reactor. (Part I, Sec. 3B)

SAFETY RESEARCH AND TEST REACTOR: A reactor associated with a nuclear safety research or engineering-scale test program conducted for the purpose of developing basic design information or demonstrating safety characteristics of terrestrial and aerospace nuclear reactor systems. (Part I, Sec. 3C)

RESEARCH REACTOR: A reactor—excluding that located at a university—whose nuclear radiations are used primarily as a research tool for basic or applied research and whose thermal power level is 10 MW or less. It may include facilities for testing reactor materials. (Part I, Sec. 3D; Part III, Sec. 3B; and Part IV, Sec. 2B)

UNIVERSITY RESEARCH AND TEACHING REACTOR: A reactor located at a university and usually operated for the primary purpose of training in the operation and utilization of reactors and for instruction in reactor theory and performance. (Part I, Sec. 3E, and Part IV, Sec. 2C)

EXPORT REACTOR: Reactor for which the principal nuclear contractor is an American company—working either independently or in cooperation with a foreign company. (Part IV)

CRITICAL ASSEMBLY: A configuration capable of being stacked and assembled to sustain a nuclear chain reaction operating at extremely low power (a few watts) and designed to determine a critical mass, neutron-flux distribution, and other characteristics of a flexible arrangement of nuclear fuel, construction materials, coolant, and other components. Fluid critical facilities are used to explore the critical masses of various concentrations of solutions in differing geometries. Metal critical assemblies are used to investigate the variations in heterogeneous cores. The tabulation of these assemblies is in Part V.

The initial commercial-operation dates for power reactors are given in Table 1. Initial criticality dates are given in Parts I through V.

Reactors are listed as being *operable* under the following circumstances:

1. Reactors regulated by the Nuclear Regulatory Commission (NRC)—when an operating license is issued by NRC.
2. Federal Government reactors—when criticality is achieved.
3. Reactors for export—when criticality is achieved.

Reactors are listed as *being built* under the following circumstances:

1. Reactors regulated by NRC—when a construction permit or limited work authorization is issued by NRC.
2. Federal Government reactors—when ground is broken, components are ordered, or construction contract is awarded.
3. Reactors for export—when an application for an export license is received by NRC or when reliable information is received relating to the fabrication of reactor components.

Reactors are listed as being *planned* under the following circumstances:

1. Reactors regulated by NRC—when a public announcement that includes the principal vendor supplier is made by the sponsoring organization or an application for a construction permit is received by NRC.
2. Federal Government reactors—when publicly announced by the agency involved or the project is otherwise appropriately authorized.
3. Reactors for export—when public announcement that includes principal contractor and reactor type is made or when NRC receives information that a U. S. reactor manufacturer is proceeding with preconstruction design and development on the basis of a letter of intent.

Reactors are listed as *shut down* or *dismantled* under the following circumstances:

1. Reactors regulated by NRC—when the licensee has applied to the Commission for authority to surrender a license voluntarily and to dismantle the facility and dispose of its component parts. A reactor *shut down/under review* due to technical problems, extensive modifications, or refueling, continues to be listed as operable. Canceled reactors are not listed.

2. Federal Government reactors—when the facility has ceased operation and the agency has declared officially that the agency does not intend to operate the reactor further. Within this category, a few reactors are identified as being in *standby* mode, the condition in which a reactor facility is neither operable nor declared excess, and documentary authorization exists to maintain the reactor for possible future operation. A reactor in *stand down* condition for extensive safety improvements continues to be listed as operable.
3. Reactors for export—when the plant is officially declared shut down by the owner and taken out of operation permanently.

The statistical summary (Table 2) shows the number of reactors in every category except critical facilities. Shutdown and dismantled reactors in these categories are included since such facilities have made significant contributions to reactor technology.

The abbreviated listings in the principal nuclear contractor column refer to the technical organization assigned primary responsibility for design and/or fabrication of the reactor system. The spelled-out forms for those abbreviations as well as those for designers, shipbuilders, and facility operators, are given in Table 3.

Nuclear Reactors Built, Being Built, or Planned (DOE/TIC-8200-R50) was prepared by the DOE Office of Scientific and Technical Information (OSTI) under the sponsorship of the DOE Office of Nuclear Energy, Edward F. Mastal, Program Official. Elizabeth Carter of DOE/OSTI served as the managing editor in charge of the development and publication of this document.

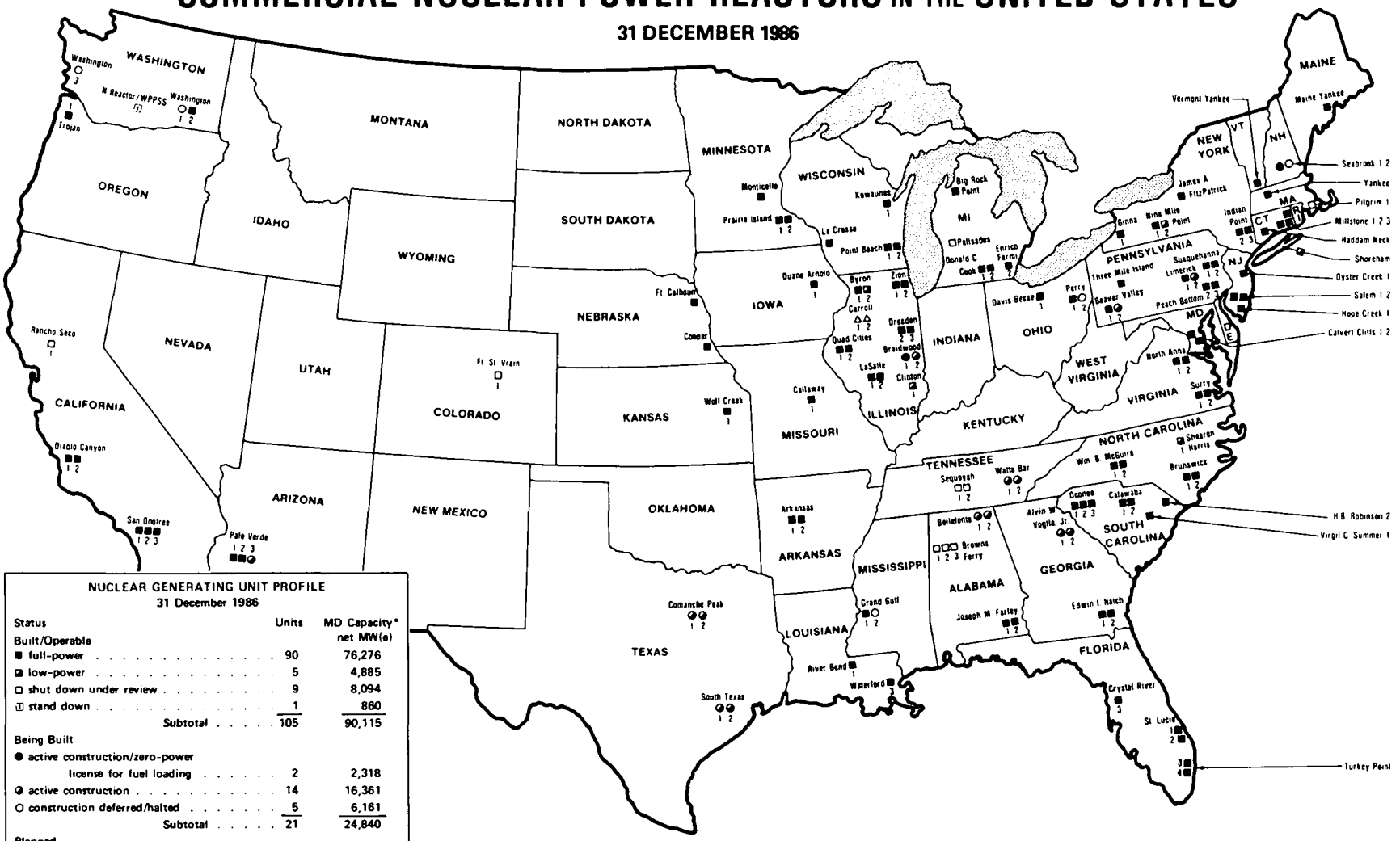
The participation and assistance of many individuals, agencies, laboratories, and companies in providing data and updating the entries in this revision are gratefully acknowledged. Comments and suggestions about this publication are welcome.

To ensure that the wide range of information included in this publication will continue to be timely and accurate, please direct any information related to updating the items to William F. Simpson, Jr., DOE/OSTI, P. O. Box 62, Oak Ridge, TN 37831; (615) 576-1228 (Commercial); 626-1228 (FTS); Fax 576-2865 (Commercial); 626-2865 (FTS).

CONTENTS

COMMERCIAL NUCLEAR POWER REACTORS IN THE UNITED STATES

31 DECEMBER 1986



Because of space limitations, symbols do not reflect precise locations.

NUCLEAR GENERATING UNIT PROFILE
31 December 1986

Status	Units	MD Capacity* net MW(e)
Built/Operable		
■ full-power	90	76,276
▣ low-power	5	4,885
□ shut down under review	9	8,094
◫ stand down	1	860
Subtotal	105	90,115
Being Built		
● active construction/zero-power license for fuel loading	2	2,318
◍ active construction	14	16,361
○ construction deferred/halted	5	6,161
Subtotal	21	24,840
Planned		
△ ordered construction/not started	2	2,240
TOTAL	128	117,195

*Maximum Dependable Capacity or Design Electrical Rating

COMMERCIAL NUCLEAR POWER

31 DECE

NUCLEAR GENERATING UNIT PROFILE
31 December 1986

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Subtotal	21	24,840
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TOTAL	128	117,195

*Maximum Dependable Capacity or Design Electrical Rating

Because of space limitations, symbols do not ref

DOE/TIF-0007 (3/87)

COMMERCIAL NUCLEAR POWER REACTOI

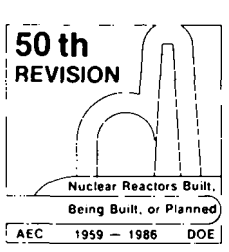
SITE	PLANT NAME	MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
ALABAMA				
Decatur	Browns Ferry Nuclear Power Station, Unit 1 □	1065	Tennessee Valley Authority	1974
Decatur	Browns Ferry Nuclear Power Station, Unit 2 [1]	1065	Tennessee Valley Authority	1975
Decatur	Browns Ferry Nuclear Power Station, Unit 3 □	1065	Tennessee Valley Authority	1977
Dothan	Joseph M. Farley Nuclear Plant, Unit 1 ■	827	Alabama Power Co.	1977
Dothan	Joseph M. Farley Nuclear Plant, Unit 2 ■	829	Alabama Power Co.	1981
Scottsboro	Bellefonte Nuclear Plant, Unit 1 ◪	1235†	Tennessee Valley Authority	Est. 1994
Scottsboro	Bellefonte Nuclear Plant, Unit 2 ◪	1235†	Tennessee Valley Authority	Est. 1996
ARIZONA				
Wintersburg	Palo Verde Nuclear Generating Station, Unit 1 ■	1221	Arizona Public Service Co.	1986
Wintersburg	Palo Verde Nuclear Generating Station, Unit 2 ■	1221	Arizona Public Service Co.	1986
Wintersburg	Palo Verde Nuclear Generating Station, Unit 3 ◪	1304†	Arizona Public Service Co.	Est. 1987
ARKANSAS				
Russellville	Arkansas Nuclear One, Unit 1 ■	836	Arkansas Power & Light Co.	1974
Russellville	Arkansas Nuclear One, Unit 2 ■	858	Arkansas Power & Light Co.	1980
CALIFORNIA				
San Clemente	San Onofre Nuclear Generating Station, Unit 1 ■	436	Southern California Edison Co.	1968
San Clemente	San Onofre Nuclear Generating Station, Unit 2 ■	1070	Southern California Edison Co.	1983
San Clemente	San Onofre Nuclear Generating Station, Unit 3 ■	1080	Southern California Edison Co.	1984
Diablo Canyon	Diablo Canyon Nuclear Power Plant, Unit 1 ■	1073	Pacific Gas & Electric Co.	1985
Diablo Canyon	Diablo Canyon Nuclear Power Plant, Unit 2 ■	1073	Pacific Gas & Electric Co.	1986
Clay Station	Rancho Seco Nuclear Generating Station, Unit 1 □	873	Sacramento Municipal Utility District	1975
COLORADO				
Platteville	Ft. St. Vrain Nuclear Generating Station □	330	Public Service Co. of Colorado	1979
CONNECTICUT				
Haddam Neck	Haddam Neck Plant ■	569	Connecticut Yankee Atomic Power Co.	1968
Waterford	Millstone Nuclear Power Station, Unit 1 ■	654	Northeast Nuclear Energy Co.	1971
Waterford	Millstone Nuclear Power Station, Unit 2 ■	857	Northeast Nuclear Energy Co.	1975
Waterford	Millstone Nuclear Power Station, Unit 3 ■	1149	Northeast Nuclear Energy Co.	1986
FLORIDA				
Florida City	Turkey Point Plant, Unit 3 ■	666	Florida Power & Light Co.	1972
Florida City	Turkey Point Plant, Unit 4 ■	666	Florida Power & Light Co.	1973
Red Level	Crystal River Nuclear Plant, Unit 3 ■	821	Florida Power Corp.	1977
Ft. Pierce	St. Lucie Plant, Unit 1 ■	827	Florida Power & Light Co.	1976
Ft. Pierce	St. Lucie Plant, Unit 2 ■	837	Florida Power & Light Co.	1983
GEORGIA				
Baxley	Edwin I. Hatch Nuclear Plant, Unit 1 ■	768	Georgia Power Co.	1975
Baxley	Edwin I. Hatch Nuclear Plant, Unit 2 ■	777	Georgia Power Co.	1979
Waynesboro	Alvin W. Vogtle, Jr. Nuclear Plant, Unit 1 ◪	1210†	Georgia Power Co.	Est. 1987
Waynesboro	Alvin W. Vogtle, Jr. Nuclear Plant, Unit 2 ◪	1210†	Georgia Power Co.	Est. 1988
ILLINOIS				
Morris	Dresden Nuclear Power Station, Unit 2 ■	772	Commonwealth Edison Co.	1970
Morris	Dresden Nuclear Power Station, Unit 3 ■	773	Commonwealth Edison Co.	1971
Zion	Zion Nuclear Plant, Unit 1 ■	1040	Commonwealth Edison Co.	1973
Zion	Zion Nuclear Plant, Unit 2 ■	1040	Commonwealth Edison Co.	1974
Cordova	Quad-Cities Station, Unit 1 ■	769	Commonwealth Edison Co.	1973
Cordova	Quad-Cities Station, Unit 2 ■	769	Commonwealth Edison Co.	1973
Seneca	LaSalle County Station, Unit 1 ■	1036	Commonwealth Edison Co.	1984
Seneca	LaSalle County Station, Unit 2 ■	1036	Commonwealth Edison Co.	1984
Byron	Byron Station, Unit 1 ■	1129	Commonwealth Edison Co.	1985
Byron	Byron Station, Unit 2 ◪	1120†	Commonwealth Edison Co.	Est. 1987
Braidwood	Braidwood Station, Unit 1 ●	1120†	Commonwealth Edison Co.	Est. 1987
Braidwood	Braidwood Station, Unit 2 ◪	1120†	Commonwealth Edison Co.	Est. 1988
Clinton	Clinton Power Station, Unit 1 ◪	950†	Illinois Power Co.	Est. 1987
Savanna	Carroll County Station, Unit 1 △	1120†	Commonwealth Edison Co.	Indef.
Savanna	Carroll County Station, Unit 2 △	1120†	Commonwealth Edison Co.	Indef.
IOWA				
Palo	Duane Arnold Energy Center, Unit 1 ■	515	Iowa Electric Light & Power Co.	1975

SITE	PLANT NAME
KANSAS	
Burlington	Wolf Creek Generating Station, Unit 1 ■
LOUISIANA	
Taft	Waterford Generating Station, Unit 3 ■
St. Francisville	River Bend Station, Unit 1 ■
MAINE	
Wiscasset	Maine Yankee Atomic Power Plant ■
MARYLAND	
Lusby	Calvert Cliffs Nuclear Power Plant, Unit 1
Lusby	Calvert Cliffs Nuclear Power Plant, Unit 2
MASSACHUSETTS	
Rowe	Yankee Nuclear Power Station ■
Plymouth	Pilgrim Nuclear Power Station, Unit 1 □
MICHIGAN	
Big Rock Point	Big Rock Point Nuclear Plant ■
South Haven	Palisades Nuclear Plant □
Newport	Enrico Fermi Atomic Power Plant, Unit 2 ■
Bridgman	Donald C. Cook Nuclear Power Plant, Unit 1
Bridgman	Donald C. Cook Nuclear Power Plant, Unit 2
MINNESOTA	
Monticello	Monticello Nuclear Generating Plant ■
Red Wing	Prairie Island Nuclear Generating Plant, Unit
Red Wing	Prairie Island Nuclear Generating Plant, Unit
MISSISSIPPI	
Port Gibson	Grand Gulf Nuclear Station, Unit 1 ■
Port Gibson	Grand Gulf Nuclear Station, Unit 2 ○
MISSOURI	
Fulton	Callaway Plant, Unit 1 ■
NEBRASKA	
Fort Calhoun	Fort Calhoun Station, Unit 1 ■
Brownville	Cooper Nuclear Station ■
NEW HAMPSHIRE	
Seabrook	Seabrook Nuclear Station, Unit 1 ●
Seabrook	Seabrook Nuclear Station, Unit 2** ○
NEW JERSEY	
Toms River	Oyster Creek Nuclear Power Plant, Unit 1 ■
Salem	Salem Nuclear Generating Station, Unit 1 ■
Salem	Salem Nuclear Generating Station, Unit 2 ■
Salem	Hope Creek Nuclear Generating Station, Unit
NEW YORK	
Buchanan	Indian Point Station, Unit 2 ■
Buchanan	Indian Point Station, Unit 3 ■
Scriba	Nine Mile Point Nuclear Station, Unit 1 ■
Scriba	Nine Mile Point Nuclear Station, Unit 2 ◪
Ontario	Robert Emmett Ginna Nuclear Power Plant, Unit 1 ■
Brookhaven	Shoreham Nuclear Power Station ◪
Scriba	James A. FitzPatrick Nuclear Power Plant ■
NORTH CAROLINA	
Southport	Brunswick Steam Electric Plant, Unit 1 ■
Southport	Brunswick Steam Electric Plant, Unit 2 ■
Cowans Ford Dam	Wm. B. McGuire Nuclear Station, Unit 1 ■
Cowans Ford Dam	Wm. B. McGuire Nuclear Station, Unit 2 ■
Bonsal	Shearon Harris Nuclear Power Plant, Unit 1 ◪

REACTORS IN THE UNITED STATES

:MBER 1986

recise locations.



Office of Scientific and Technical Information
U.S. Department of Energy
Revised December 31, 1986
from *Nuclear Reactors Built, Being Built, or Planned* (DOE/TIC-8200-R50)

HE UNITED STATES AS OF 31 DEC 1986

MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
1128	Kansas Gas & Electric Co.	1985
1104	Louisiana Power & Light Co.	1985
936	Gulf States Utilities Co.	1986
810	Maine Yankee Atomic Power Co.	1972
825	Baltimore Gas and Electric Co.	1975
825	Baltimore Gas and Electric Co.	1977
167	Yankee Atomic Electric Co.	1961
670	Boston Edison Co.	1972
69	Consumers Power Co.	1963
730	Consumers Power Co.	1971
1093†	Detroit Edison Co.	Est. 1987
1020	Indiana & Michigan Electric Co.	1975
1060	Indiana & Michigan Electric Co.	1978
536	Northern States Power Co.	1971
503	Northern States Power Co.	1973
500	Northern States Power Co.	1974
1108	Mississippi Power & Light Co.	1985
1250†	Mississippi Power & Light Co.	Indef.
1120	Union Electric Co.	1984
478	Omaha Public Power District	1974
764	Nebraska Public Power District	1974
1198†	Public Service Co. of New Hampshire	Est. 1987
1198†	Public Service Co. of New Hampshire	Indef.
620	GPU Nuclear Corp.	1969
1079	Public Service Electric and Gas, N.J.	1977
1106	Public Service Electric and Gas, N.J.	1981
1067†	Public Service Electric and Gas, N.J.	Est. 1987
849	Consolidated Edison Co. of New York, Inc.	1974
965	New York Power Authority	1976
610	Niagara Mohawk Power Corp.	1969
1080†	Niagara Mohawk Power Corp.	Est. 1987
470	Rochester Gas & Electric Corp.	1970
820†	Long Island Lighting Co.	Indef.
796	New York Power Authority	1975
790	Carolina Power and Light Co.	1977
790	Carolina Power and Light Co.	1975
1150	Duke Power Co.	1981
1150	Duke Power Co.	1984
915†	Carolina Power and Light Co.	Est. 1987

SITE	PLANT NAME	MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
OHIO				
Oak Harbor	Davis Besse Nuclear Power Station, Unit 1 ■	860	Toledo Edison Co.	1978
Perry	Perry Nuclear Power Plant, Unit 1 ■	1205†	Cleveland Electric Illuminating Co.	Est. 1987
Perry	Perry Nuclear Power Plant, Unit 2 ○	1205†	Cleveland Electric Illuminating Co.	Indef.
OREGON				
Prescott	Trojan Nuclear Plant, Unit 1 ■	1050	Portland General Electric Co.	1976
PENNSYLVANIA				
Peach Bottom	Peach Bottom Atomic Power Station, Unit 2 ■	1051	Philadelphia Electric Co.	1974
Peach Bottom	Peach Bottom Atomic Power Station, Unit 3 ■	1035	Philadelphia Electric Co.	1974
Pottstown	Limerick Generating Station, Unit 1 ■	1055	Philadelphia Electric Co.	1986
Pottstown	Limerick Generating Station, Unit 2 ◕	1065†	Philadelphia Electric Co.	Est. 1991
Shippingport	Beaver Valley Power Station, Unit 1 ■	810	Duquesne Light Co.	1976
Shippingport	Beaver Valley Power Station, Unit 2 ◕	852†	Duquesne Light Co.	Est. 1987
Middletown	Three Mile Island Nuclear Station, Unit 1‡ ■	776	GPU Nuclear Corp.	1974
Berwick	Susquehanna Steam Electric Station, Unit 1 ■	1032	Pennsylvania Power and Light Co.	1983
Berwick	Susquehanna Steam Electric Station, Unit 2 ■	1032	Pennsylvania Power and Light Co.	1985
SOUTH CAROLINA				
Hartsville	H.B. Robinson Plant, Unit 2 ■	665	Carolina Power and Light Co.	1971
Seneca	Oconee Nuclear Plant, Unit 1 ■	860	Duke Power Co.	1973
Seneca	Oconee Nuclear Plant, Unit 2 ■	860	Duke Power Co.	1974
Seneca	Oconee Nuclear Plant, Unit 3 ■	860	Duke Power Co.	1974
Jenkinsville	Virgil C. Summer Nuclear Station, Unit 1 ■	885	S. Carolina Elec. & Gas Co.	1984
Lake Wylie	Catawba Nuclear Station, Unit 1 ■	1145	Duke Power Co.	1985
Lake Wylie	Catawba Nuclear Station, Unit 2 ■	1145	Duke Power Co.	1986
TENNESSEE				
Daisy	Sequoyah Nuclear Plant, Unit 1 □	1148	Tennessee Valley Authority	1981
Daisy	Sequoyah Nuclear Plant, Unit 2 □	1148	Tennessee Valley Authority	1982
Spring City	Watts Bar Nuclear Plant, Unit 1 ◕	1165†	Tennessee Valley Authority	Indef.
Spring City	Watts Bar Nuclear Plant, Unit 2 ◕	1165†	Tennessee Valley Authority	Indef.
TEXAS				
Glen Rose	Comanche Peak Steam Electric Station, Unit 1 ◕	1150†	Texas Utilities Generating Co.	Indef.
Glen Rose	Comanche Peak Steam Electric Station, Unit 2 ◕	1150†	Texas Utilities Generating Co.	Indef.
Matagorda County	South Texas Project, Unit 1 ◕	1250†	Houston Lighting & Power Co.	Est. 1987
Matagorda County	South Texas Project, Unit 2 ◕	1250†	Houston Lighting & Power Co.	Est. 1989
VERMONT				
Vernon	Vermont Yankee Nuclear Power Station ■	504	Vermont Yankee Nuclear Power Corp.	1972
VIRGINIA				
Gravel Neck	Surry Power Station, Unit 1 ■	781	Virginia Electric & Power Co.	1972
Gravel Neck	Surry Power Station, Unit 2 ■	781	Virginia Electric & Power Co.	1973
Mineral	North Anna Power Station, Unit 1 ■	893	Virginia Electric & Power Co.	1978
Mineral	North Anna Power Station, Unit 2 ■	893	Virginia Electric & Power Co.	1980
WASHINGTON				
Richland	N-Reactor/WPPSS Steam [illegible]	860	Department of Energy	1966
Richland	Washington Nuclear Project No. 1§ ○	1266†	Wash. Pub. Power Supply System	Indef.
Richland	Washington Nuclear Project No. 2 ■	1095	Wash. Pub. Power Supply System	1984
Satsop	Washington Nuclear Project No. 3¶ ○	1242†	Wash. Pub. Power Supply System	Indef.
WISCONSIN				
La Crosse	La Crosse (Genoa) Nuclear Generating Station ■	48	Dairyland Power Cooperative	1969
Two Creeks	Point Beach Nuclear Plant, Unit 1 ■	485	Wisconsin Electric Power Co.	1970
Two Creeks	Point Beach Nuclear Plant, Unit 2 ■	485	Wisconsin Electric Power Co.	1972
Carlton	Kewaunee Nuclear Power Plant, Unit 1 ■	503	Wisconsin Public Service Corp.	1974

*Maximum dependable (MD) capacity (net electrical output for grid connection) is given for plants having an operating history.
†Design electrical power is given for plants when operating capacities have not been established.
‡Three Mile Island 1 was shut down 3-28-79 for modifications at the time of the accident at Three Mile Island 2, although it was not involved in the accident. Three Mile Island 1 resumed commercial operation 11-8-85.
§Utility approved in April 1982 an extended construction delay of up to 5 years.
¶Utility announced construction delay 7-83 until funding is assured.
**In December 1986 NRC received from the licensee a notification of their intent to surrender the Seabrook 2 construction permit.

TABLE 1

COMMERCIAL NUCLEAR POWER REACTORS IN THE UNITED STATES AS OF 31 DEC 1986

SITE	PLANT NAME	MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
ALABAMA				
Decatur	Browns Ferry Nuclear Power Station, Unit 1 □	1065	Tennessee Valley Authority	1974
Decatur	Browns Ferry Nuclear Power Station, Unit 2 □	1065	Tennessee Valley Authority	1975
Decatur	Browns Ferry Nuclear Power Station, Unit 3 □	1065	Tennessee Valley Authority	1977
Dothan	Joseph M. Farley Nuclear Plant, Unit 1 ■	827	Alabama Power Co.	1977
Dothan	Joseph M. Farley Nuclear Plant, Unit 2 ■	829	Alabama Power Co.	1981
Scottsboro	Bellefonte Nuclear Plant, Unit 1 ◕	1235†	Tennessee Valley Authority	Est. 1994
Scottsboro	Bellefonte Nuclear Plant, Unit 2 ◕	1235†	Tennessee Valley Authority	Est. 1996
ARIZONA				
Wintersburg	Palo Verde Nuclear Generating Station, Unit 1 ■	1221	Arizona Public Service Co.	1986
Wintersburg	Palo Verde Nuclear Generating Station, Unit 2 ■	1221	Arizona Public Service Co.	1986
Wintersburg	Palo Verde Nuclear Generating Station, Unit 3 ◕	1304†	Arizona Public Service Co.	Est. 1987
ARKANSAS				
Russellville	Arkansas Nuclear One, Unit 1 ■	836	Arkansas Power & Light Co.	1974
Russellville	Arkansas Nuclear One, Unit 2 ■	858	Arkansas Power & Light Co.	1980
CALIFORNIA				
San Clemente	San Onofre Nuclear Generating Station, Unit 1 ■	436	Southern California Edison Co.	1968
San Clemente	San Onofre Nuclear Generating Station, Unit 2 ■	1070	Southern California Edison Co.	1983
San Clemente	San Onofre Nuclear Generating Station, Unit 3 ■	1080	Southern California Edison Co.	1984
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Diablo Canyon	Diablo Canyon Nuclear Power Plant, Unit 2 ■	1073	Pacific Gas & Electric Co.	1986
Clay Station	Rancho Seco Nuclear Generating Station, Unit 1 □	873	Sacramento Municipal Utility District	1975
COLORADO				
Platteville	Ft. St. Vrain Nuclear Generating Station □	330	Public Service Co. of Colorado	1979
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Waterford	Millstone Nuclear Power Station, Unit 1 ■	654	Northeast Nuclear Energy Co.	1971
Waterford	Millstone Nuclear Power Station, Unit 2 ■	857	Northeast Nuclear Energy Co.	1975
Waterford	Millstone Nuclear Power Station, Unit 3 ■	1149	Northeast Nuclear Energy Co.	1986
FLORIDA				
Florida City	Turkey Point Plant, Unit 3 ■	666	Florida Power & Light Co.	1972
Florida City	Turkey Point Plant, Unit 4 ■	666	Florida Power & Light Co.	1973
Red Level	Crystal River Nuclear Plant, Unit 3 ■	821	Florida Power Corp.	1977
Ft. Pierce	St. Lucie Plant, Unit 1 ■	827	Florida Power & Light Co.	1976
Ft. Pierce	St. Lucie Plant, Unit 20 ■	837	Florida Power & Light Co.	1983
GEORGIA				
Baxley	Edwin I. Hatch Nuclear Plant, Unit 1 ■	768	Georgia Power Co.	1975
Baxley	Edwin I. Hatch Nuclear Plant, Unit 2 ■	777	Georgia Power Co.	1979
Waynesboro	Alvin W. Vogtle, Jr., Nuclear Plant, Unit 1 ◕	1210†	Georgia Power Co.	Est. 1987
Waynesboro	Alvin W. Vogtle, Jr., Nuclear Plant, Unit 2 ◕	1210†	Georgia Power Co.	Est. 1988
ILLINOIS				
Morris	Dresden Nuclear Power Station, Unit 2 ■	772	Commonwealth Edison Co.	1970
Morris	Dresden Nuclear Power Station, Unit 3 ■	773	Commonwealth Edison Co.	1971
Zion	Zion Nuclear Plant, Unit 1 ■	1040	Commonwealth Edison Co.	1973
Zion	Zion Nuclear Plant, Unit 2 ■	1040	Commonwealth Edison Co.	1974
Cordova	Quad-Cities Station, Unit 1 ■	769	Commonwealth Edison Co.	1973
Cordova	Quad-Cities Station, Unit 2 ■	769	Commonwealth Edison Co.	1973
Seneca	LaSalle County Station, Unit 1 ■	1036	Commonwealth Edison Co.	1984
Seneca	LaSalle County Station, Unit 2 ■	1036	Commonwealth Edison Co.	1984
Byron	Byron Station, Unit 1 ■	1129	Commonwealth Edison Co.	1985
Byron	Byron Station, Unit 2 ◪	1120†	Commonwealth Edison Co.	Est. 1987
Braidwood	Braidwood Station, Unit 1 ●	1120†	Commonwealth Edison Co.	Est. 1987
Braidwood	Braidwood Station, Unit 2 ◕	1120†	Commonwealth Edison Co.	Est. 1988
Clinton	Clinton Power Station, Unit 1 ◪	950†	Illinois Power Co.	Est. 1987
Savanna	Carroll County Station, Unit 1 △	1120†	Commonwealth Edison Co.	Indef.
Savanna	Carroll County Station, Unit 2 △	1120†	Commonwealth Edison Co.	Indef.

See footnotes at end of table.

TABLE 1 (Continued)

SITE	PLANT NAME	MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
IOWA				
Palo	Duane Arnold Energy Center, Unit 1 ■	515	Iowa Electric Light & Power Co.	1975
KANSAS				
Burlington	Wolf Creek Generating Station, Unit 1 ■	1128	Kansas Gas & Electric Co.	1985
LOUISIANA				
Taft	Waterford Generating Station, Unit 3 ■	1104	Louisiana Power & Light Co.	1985
St. Francisville	River Bend Station, Unit 1 ■	936	Gulf States Utilities Co.	1986
MAINE				
Wiscasset	Maine Yankee Atomic Power Plant ■	810	Maine Yankee Atomic Power Co.	1972
MARYLAND				
Lusby	Calvert Cliffs Nuclear Power Plant, Unit 1 ■	825	Baltimore Gas and Electric Co.	1975
Lusby	Calvert Cliffs Nuclear Power Plant, Unit 2 ■	825	Baltimore Gas and Electric Co.	1977
MASSACHUSETTS				
Rowe	Yankee Nuclear Power Station ■	167	Yankee Atomic Electric Co.	1961
Plymouth	Pilgrim Nuclear Power Station, Unit 1 □	670	Boston Edison Co.	1972
MICHIGAN				
Big Rock Point	Big Rock Point Nuclear Plant ■	69	Consumers Power Co.	1963
South Haven	Palisades Nuclear Plant □	730	Consumers Power Co.	1971
Newport	Enrico Fermi Atomic Power Plant, Unit 2 ■	1093†	Detroit Edison Co.	Est. 1987
Bridgman	Donald C. Cook Nuclear Power Plant, Unit 1 ■	1020	Indiana & Michigan Electric Co.	1975
Bridgman	Donald C. Cook Nuclear Power Plant, Unit 2 ■	1060	Indiana & Michigan Electric Co.	1978
MINNESOTA				
Monticello	Monticello Nuclear Generating Plant ■	536	Northern States Power Co.	1971
Red Wing	Prairie Island Nuclear Generating Plant, Unit 1 ■	503	Northern States Power Co.	1973
Red Wing	Prairie Island Nuclear Generating Plant, Unit 2 ■	500	Northern States Power Co.	1974
MISSISSIPPI				
Port Gibson	Grand Gulf Nuclear Station, Unit 1 ■	1108	Mississippi Power & Light Co.	1985
Port Gibson	Grand Gulf Nuclear Station, Unit 2 ○	1250†	Mississippi Power & Light Co.	Indef.
MISSOURI				
Fulton	Callaway Plant, Unit 1 ■	1120	Union Electric Co.	1984
NEBRASKA				
Fort Calhoun	Fort Calhoun Station, Unit 1 ■	478	Omaha Public Power District	1974
Brownville	Cooper Nuclear Station ■	764	Nebraska Public Power District	1974
NEW HAMPSHIRE				
Seabrook	Seabrook Nuclear Station, Unit 1 ●	1198†	Public Service Co. of New Hampshire	Est. 1987
Seabrook	Seabrook Nuclear Station, Unit 2** ○	1198†	Public Service Co. of New Hampshire	Indef.
NEW JERSEY				
Toms River	Oyster Creek Nuclear Power Plant, Unit 1 ■	620	GPU Nuclear Corp.	1969
Salem	Salem Nuclear Generating Station, Unit 1 ■	1079	Public Service Electric and Gas Co.	1977
Salem	Salem Nuclear Generating Station, Unit 2 ■	1106	Public Service Electric and Gas Co.	1981
Salem	Hope Creek Nuclear Generating Station, Unit 1 ■	1067†	Public Service Electric and Gas Co.	Est. 1987
NEW YORK				
Buchanan	Indian Point Station, Unit 2 ■	849	Consolidated Edison Co. of New York, Inc.	1974
Buchanan	Indian Point Station, Unit 3 ■	965	New York Power Authority	1976
Scriba	Nine Mile Point Nuclear Station, Unit 1 ■	610	Niagara Mohawk Power Corp.	1969
Scriba	Nine Mile Point Nuclear Station, Unit 2 ◪	1080†	Niagara Mohawk Power Corp.	Est. 1987
Ontario	Robert Emmett Ginna Nuclear Power Plant, Unit 1 ■	470	Rochester Gas & Electric Corp.	1970
Brookhaven	Shoreham Nuclear Power Station ◪	820†	Long Island Lighting Co.	Indef.
Scriba	James A. FitzPatrick Nuclear Power Plant ■	796	New York Power Authority	1975

See footnotes at end of table.

TABLE 1 (Continued)

SITE	PLANT NAME	MD CAPACITY, NET MW(e)*	LICENSEE	COMMERCIAL OPERATION
NORTH CAROLINA				
Southport	Brunswick Steam Electric Plant, Unit 1 ■	790	Carolina Power and Light Co.	1977
Southport	Brunswick Steam Electric Plant, Unit 2 ■	790	Carolina Power and Light Co.	1975
Cowans Ford Dam	Wm. B. McGuire Nuclear Station, Unit 1 ■	1150	Duke Power Co.	1981
Cowans Ford Dam	Wm. B. McGuire Nuclear Station, Unit 2 ■	1150	Duke Power Co.	1984
Bonsal	Shearon Harris Nuclear Power Plant, Unit 1 ◪	915†	Carolina Power and Light Co.	Est. 1987
OHIO				
Oak Harbor	Davis-Besse Nuclear Power Station, Unit 1 ■	860	Toledo Edison Co.	1978
Perry	Perry Nuclear Power Plant, Unit 1 ■	1205†	Cleveland Electric Illuminating Co.	Est. 1987
Perry	Perry Nuclear Power Plant, Unit 2 ○	1205†	Cleveland Electric Illuminating Co.	Indef.
OREGON				
Prescott	Trojan Nuclear Plant, Unit 1 ■	1050	Portland General Electric Co.	1976
PENNSYLVANIA				
Peach Bottom	Peach Bottom Atomic Power Station, Unit 2 ■	1051	Philadelphia Electric Co.	1974
Peach Bottom	Peach Bottom Atomic Power Station, Unit 3 ■	1035	Philadelphia Electric Co.	1974
Pottstown	Limerick Generating Station, Unit 1 ■	1055	Philadelphia Electric Co.	1986
Pottstown	Limerick Generating Station, Unit 2 ◕	1065†	Philadelphia Electric Co.	Est. 1991
Shippingport	Beaver Valley Power Station, Unit 1 ■	810	Duquesne Light Co.	1976
Shippingport	Beaver Valley Power Station, Unit 2 ◕	852†	Duquesne Light Co.	Est. 1987
Middletown	Three Mile Island Nuclear Station, Unit 1‡ ■	776	GPU Nuclear Corp.	1974
Berwick	Susquehanna Steam Electric Station, Unit 1 ■	1032	Pennsylvania Power and Light Co.	1983
Berwick	Susquehanna Steam Electric Station, Unit 2 ■	1032	Pennsylvania Power and Light Co.	1985
SOUTH CAROLINA				
Hartsville	H.B. Robinson Plant, Unit 2 ■	665	Carolina Power and Light Co.	1971
Seneca	Oconee Nuclear Plant, Unit 1 ■	860	Duke Power Co.	1973
Seneca	Oconee Nuclear Plant, Unit 2 ■	860	Duke Power Co.	1974
Seneca	Oconee Nuclear Plant, Unit 3 ■	860	Duke Power Co.	1974
Jenkinsville	Virgil C. Summer Nuclear Station, Unit 1 ■	885	S. Carolina Elec. & Gas Co.	1984
Lake Wylie	Catawba Nuclear Station, Unit 1 ■	1145	Duke Power Co.	1985
Lake Wylie	Catawba Nuclear Station, Unit 2 ■	1145	Duke Power Co.	1986
TENNESSEE				
Daisy	Sequoyah Nuclear Plant, Unit 1 □	1148	Tennessee Valley Authority	1981
Daisy	Sequoyah Nuclear Plant, Unit 2 □	1148	Tennessee Valley Authority	1982
Spring City	Watts Bar Nuclear Plant, Unit 1 ◕	1165†	Tennessee Valley Authority	Indef.
Spring City	Watts Bar Nuclear Plant, Unit 2 ◕	1165†	Tennessee Valley Authority	Indef.
TEXAS				
Glen Rose	Comanche Peak Steam Electric Station, Unit 1 ◕	1150†	Texas Utilities Generating Co.	Indef.
Glen Rose	Comanche Peak Steam Electric Station, Unit 2 ◕	1150†	Texas Utilities Generating Co.	Indef.
Matagorda County	South Texas Project, Unit 1 ◕	1250†	Houston Lighting & Power Co.	Est. 1987
Matagorda County	South Texas Project, Unit 2 ◕	1250†	Houston Lighting & Power Co.	Est. 1989
VERMONT				
Vernon	Vermont Yankee Nuclear Power Station ■	504	Vermont Yankee Nuclear Power Corp.	1972
VIRGINIA				
Gravel Neck	Surry Power Station, Unit 1 ■	781	Virginia Electric & Power Co.	1972
Gravel Neck	Surry Power Station, Unit 2 ■	781	Virginia Electric & Power Co.	1973
Mineral	North Anna Power Station, Unit 1 ■	893	Virginia Electric & Power Co.	1978
Mineral	North Anna Power Station, Unit 2 ■	893	Virginia Electric & Power Co.	1980
WASHINGTON				
Richland	N-Reactor/WPPSS Steam ◫	860	Department of Energy	1966
Richland	Washington Nuclear Project No. 1§ ○	1266†	Wash. Pub. Power Supply System	Indef.
Richland	Washington Nuclear Project No. 2 ■	1095	Wash. Pub. Power Supply System	1984
Satsop	Washington Nuclear Project No. 3¶ ○	1242†	Wash. Pub. Power Supply System	Indef.
WISCONSIN				
La Crosse	La Crosse (Genoa) Nuclear Generating Station ■	48	Dairyland Power Cooperative	1969
Two Creeks	Point Beach Nuclear Plant, Unit 1 ■	485	Wisconsin Electric Power Co.	1970
Two Creeks	Point Beach Nuclear Plant, Unit 2 ■	485	Wisconsin Electric Power Co.	1972
Carlton	Kewaunee Nuclear Power Plant, Unit 1 ■	503	Wisconsin Public Service Corp.	1974

See footnotes at end of table.

*Maximum dependable (MD) capacity (net electrical output for grid connection) is given for plants having an operating history.

†Design electrical power is given for plants when operating capacities have not been established.

‡Three Mile Island 1 was shut down 3-28-79 for modifications at the time of the accident at Three Mile Island 2, although it was not involved in the accident. Three Mile Island 1 resumed commercial operation 11-8-85.

§Utility approved in April 1982 an extended construction delay of up to 5 years.

¶Utility announced construction delay 7-83 until funding is assured.

**In December 1986 NRC received from the licensee a notification of their intent to surrender the Seabrook 2 construction permit.

Built/Operable
- ■ full power
- ◪ low-power
- □ shut down under review
- [1] stand down for extensive improvements for safety, scheduled for 1-7-87.

Being Built
- ● active construction/zero-power license for fuel loading
- ◕ active construction
- ○ construction deferred/halted

Planned
- △ ordered construction/not started

TABLE 2

STATISTICAL SUMMARY OF NUCLEAR REACTORS AS OF DECEMBER 1986

		Operable	Being built	Planned	Shut down or dismantled
I.	CIVILIAN REACTORS (DOMESTIC)				
	1. **Power Reactors**				
	A. Central-Station Electric Power Plants	104	21	2	13
	B. Dual-Purpose Plants	1			
	C. Propulsion (Maritime)				1
	2. **Experimental Power-Reactor Systems**				
	A. Electric-Power Systems	1		1	23
	B. Auxiliary Power (SNAP)			1	9
	C. Space Propulsion (Rover)				21
	3. **Test, Research, and University Reactors**				
	A. General Irradiation Test	2			5
	B. High-Power Research and Test	7			5
	C. Safety-Research and Test	2			10
	D. General Research	21			47
	E. University Research and Teaching	42			22
II.	PRODUCTION REACTORS				
	1. **Materials Production**	4			9
	2. **Process Development**				5
III.	MILITARY REACTORS				
	1. **Defense Power-Reactor Applications**				
	A. Remote Installations				6
	B. Propulsion (Naval)	147	24		21
	2. **Developmental Power**				
	A. Electric-Power Experiments and Prototypes				3
	B. Propulsion Experiments and Prototypes	8			7
	3. **Test and Research**				
	A. Test				3
	B. Research	3			6
IV.	REACTORS FOR EXPORT				
	1. **Power Reactors**				
	A. Central-Station Electric Power Plants	47	10	9	4
	B. Propulsion	1			
	2. **Test, Research, and Teaching**				
	A. General Irradiation Test	7			
	B. General Research	26	1		7
	C. University Research and Teaching	24			3

TABLE 3 ABBREVIATIONS OF CONTRACTORS, DESIGNERS, SHIPBUILDERS, AND FACILITY OPERATORS

AC	Allis-Chalmers Mfg. Co.
ACEC	Ateliers de Constructions Electriques de Charleroi S. A. (Belgium)
ACF	ACF Industries, Inc. (reactor activities absorbed by AC)
AG	Aerojet-General Corporation
AGN	Aerojet-General Nucleonics, formerly a subsidiary and now a division of Aerojet-General Corporation
AI	Atomics International, a division of Rockwell International
Alco	Alco Products, Inc. (reactor activities absorbed by AC)
AMF	AMF Atomics, Inc., a division of American Machine & Foundry Co.
ANL	Argonne National Laboratory, operated by the University of Chicago
ANPD	Aircraft Nuclear Propulsion Department, General Electric Company (name changed to Flight Propulsion Laboratory Department)
AS Inc.	American Standard Inc.
AU, Inc.	Associated Universities, Inc. (Brookhaven National Laboratory
BAC	Bendix Aviation Corp.
Bethlehem	Shipbuilding Division, Bethlehem Steel Co. (now Quincy Division, General Dynamics Corp.)
Bettis	Bettis Atomic Power Laboratory, operated by Westinghouse Electric Corporation
Blaw-Knox	Blaw-Knox Co.
B&R	Burns & Roe, Inc.
B&W	Babcock & Wilcox Co.
BNL	Brookhaven National Laboratory, operated by Associated Universities, Inc.
CL	Clinton Laboratory of the Manhattan Engineer District
Comb.	*Combustion Engineering, Inc.*
Convair	Convair Division, General Dynamics Corp.
Cook	Nucledyne Co., a division of Cook Electric Company
CW	Curtiss-Wright Corporation
Daystrom	Daystrom, Inc.
DOD	Department of Defense
DOE	Department of Energy
Du Pont	E. I. Du Pont de Nemours & Company, Inc.
Ebasco	Ebasco Services, Inc.
EG&G–ID	EG&G Idaho, Inc. (a division of EG&G, Inc.)
Electric Boat	Electric Boat Division, General Dynamics Corp.
Fluor	The Fluor Corporation, Ltd.
Fram.	Framatome
Fram./West.	Framatome/Westinghouse
FW	Foster Wheeler Corp.
GA	GA Technologies Inc., a subsidiary of Gulf Oil Corporation
GD (Quincy)	Quincy Division, General Dynamics Corp.
GE	General Electric Company
GENMPO	General Electric Nuclear Materials and Propulsion Operation
GNEC	General Nuclear Engineering Corp. (became a division of Combustion Engineering, Inc., in 1964)
HA	Hittman Associates
IC	Internuclear Co.
INC	Idaho Nuclear Corporation
INEL	Idaho National Engineering Laboratory
Ingalls	Ingalls Shipbuilding Corp.
Kaman	Kaman Nuclear, a division of Kaman Aircraft Corp.
KAPL	Knolls Atomic Power Laboratory, operated by General Electric Company
KE	Kaiser Engineers, a division of Henry J. Kaiser Co.
LANL	Los Alamos National Laboratory, operated by the University of California
LLNL	Lawrence Livermore National Laboratory, operated by the University of California
Lockheed	Lockheed Aircraft Corp.
Mare Island	Mare Island Naval Shipyard
Martin	Martin Marietta Corp.
Maxon	Maxon Construction Co.
Met. Lab	Metallurgical Laboratory of the Manhattan Engineer District
NASA	National Aeronautics and Space Administration
NBS	National Bureau of Standards
Newport News	Newport News Shipbuilding & Dry Dock Co.
NRDS	Nuclear Rocket Development Station
NRL	Naval Research Laboratory
NSA	Nuclear Systems Associates
NTS	Nevada Test Site
NYSC	New York Shipbuilding Corp.
ORNL	Oak Ridge National Laboratory
PNL	Pacific Northwest Laboratory, operated by Battelle Memorial Institute
Portsmouth	Portsmouth Naval Shipyard
PPC	Phillips Petroleum Co.
PRDC	Power Reactor Development Company
RI	Rockwell International
Sandia	Sandia National Laboratories, operated by Sandia Corp., a subsidiary of Western Electric Co.
San Francisco Bay	San Francisco Bay Naval Shipyard
UNC	United Nuclear Corporation, Development Division
UNCNI	UNC Nuclear Industries
Vitro	Vitro Corporation of America
West.	Westinghouse Electric Corporation
WHC	Westinghouse Hanford Co.

1. POWER REACTORS AS OF 31 DEC 1986

(All reactors are regulated by the Nuclear Regulatory Commission, except as noted by footnote 21.)

A. Central-Station Electric Power Plants

Name (licensee) [docket number]	Location	Principal nuclear contractor	Type	Power MD capacity net MW(e)[1]	Power Licensed MW(t)	Initial criticality (yr mo)	Shutdown permanently
OPERABLE							
Arkansas Nuclear One, Unit 1 (Arkansas Power & Light Co.) [50-313]	Russellville, Ark.	B&W	Pressurized water	836	2568	74 08	
Arkansas Nuclear One, Unit 2 (Arkansas Power & Light Co.) [50-368]	Russellville, Ark.	Comb.	Pressurized water	858	2815	78 12	
Beaver Valley Power Station, Unit 1 (Duquesne Light Co., Ohio Edison Co.) [50-334]	Shippingport, Pa.	West.	Pressurized water	810	2652	76 05	
Big Rock Point Nuclear Plant (Consumers Power Co.) [50-155][4]	Big Rock Point, Mich.	GE	Boiling water	69	240	62 09	
*Browns Ferry Nuclear Power Station, Unit 1 (Tennessee Valley Authority) [50-259]	Decatur, Ala.	GE	Boiling water	1065	3293	73	
*Browns Ferry Nuclear Power Station, Unit 2 (Tennessee Valley Authority) [50-260]	Decatur, Ala.	GE	Boiling water	1065	3293	74 07	
*Browns Ferry Nuclear Power Station, Unit 3 (Tennessee Valley Authority) [50-296]	Decatur, Ala.	GE	Boiling water	1065	3293	76 08	
Brunswick Steam Electric Plant, Unit 1 (Carolina Power & Light Co.) [50-325]	Southport, N. C.	GE	Boiling water	790	2436	76 10	
Brunswick Steam Electric Plant, Unit 2 (Carolina Power & Light Co.) [50-324]	Southport, N. C.	GE	Boiling water	790	2436	75 03	
Byron Station, Unit 1 (Commonwealth Edison Co.) [50-454]	Byron, Ill.	West.	Pressurized water	1129	3411	85 02	
Callaway Plant, Unit 1 (Union Electric Co.) [STN-50-483]	Fulton, Mo.	West.	Pressurized water	1120	3411	84 10	
Calvert Cliffs Nuclear Power Plant, Unit 1 (Baltimore Gas & Electric Co.) [50-317]	Lusby, Md.	Comb.	Pressurized water	825	2700	74 10	
Calvert Cliffs Nuclear Power Plant, Unit 2 (Baltimore Gas & Electric Co.) [50-318]	Lusby, Md.	Comb.	Pressurized water	825	2700	76 11	
Catawba Nuclear Station, Unit 1 (Duke Power Co.) [50-413]	Lake Wylie, S. C.	West.	Pressurized water	1145	3411	85 01	
†Catawba Nuclear Station, Unit 2 (Duke Power Co.) [50-414]	Lake Wylie, S. C.	West.	Pressurized water	1145	3582	86 05	
Cooper Nuclear Station (Nebraska Public Power District) [50-298]	Brownville, Nebr.	GE	Boiling water	764	2381	74 02	
Crystal River Nuclear Plant, Unit 3 (Florida Power Corp.) [50-302]	Red Level, Fla.	B&W	Pressurized water	821	2544	77 01	
Davis–Besse Nuclear Power Station, Unit 1 (Toledo Edison Co.) [50-346]	Oak Harbor, Ohio	B&W	Pressurized water	860	2772	77 08	
Diablo Canyon Nuclear Power Plant, Unit 1 (Pacific Gas & Electric Co.) [50-275]	Diablo Canyon, Calif.	West.	Pressurized water	1073	3338	84 04	
‡Diablo Canyon Nuclear Power Plant, Unit 2 (Pacific Gas & Electric Co.) [50-323]	Diablo Canyon, Calif.	West.	Pressurized water	1073	3411	85 08	
Donald C. Cook Nuclear Power Plant, Unit 1 (Indiana and Michigan Electric Co.) [50-315]	Bridgman, Mich.	West.	Pressurized water	1020	3250	75 01	
Donald C. Cook Nuclear Power Plant, Unit 2 (Indiana and Michigan Electric Co.) [50-316]	Bridgman, Mich.	West.	Pressurized water	1060	3411	78 03	
Dresden Nuclear Power Station, Unit 2 (Commonwealth Edison Co.) [50-237]	Morris, Ill.	GE	Boiling water	772	2527	70 01	
Dresden Nuclear Power Station, Unit 3 (Commonwealth Edison Co.) [50-249]	Morris, Ill.	GE	Boiling water	773	2527	71 01	
Duane Arnold Energy Center, Unit 1 (Iowa Electric Light & Power Co.) [50-331]	Palo, Iowa	GE	Boiling water	515	1658	74 03	
Edwin I. Hatch Nuclear Plant, Unit 1 (Georgia Power Co.) [50-321]	Baxley, Ga.	GE	Boiling water	768	2436	74 09	
Edwin I. Hatch Nuclear Plant, Unit 2 (Georgia Power Co.) [50-366]	Baxley, Ga.	GE	Boiling water	777	2436	78 07	
§Enrico Fermi Atomic Power Plant, Unit 2 (Detroit Edison Co.) [50-341]	Newport, Mich.	GE	Boiling water	1093	3292	85 06	
Fort Calhoun Station, Unit 1 (Omaha Public Power District) [50-285]	Fort Calhoun, Nebr.	Comb.	Pressurized water	478	1500	73 08	
¶Fort St. Vrain Nuclear Generating Station (Public Service Co. of Colorado) [50-267][4]	Platteville, Colo.	GA	High temperature, gas cooled	330	842	74 01	
Grand Gulf Nuclear Station, Unit 1 (Mississippi Power & Light Co.) [50-416]	Fort Gibson, Miss.	GE	Boiling water	1108	3833	82 08	
Haddam Neck Plant (Connecticut Yankee Atomic Power Co.) [50-213][4]	Haddam Neck, Conn.	West.	Pressurized water	569	1825	67 07	
**Hope Creek Nuclear Generating Station, Unit 1 (Public Service Electric & Gas Co.) [50-354]	Salem, N. J.	GE	Boiling water	1067	3440	86 06	
H. B. Robinson Plant, Unit 2 (Carolina Power & Light Co.) [50-261]	Hartsville, S. C.	West.	Pressurized water	665	2300	70 09	
Indian Point Station, Unit 2 (Consolidated Edison Co. of New York, Inc.) [50-247]	Buchanan, N. Y.	West.	Pressurized water	849	2758	73 05	
Indian Point Station, Unit 3 (New York Power Authority) [50-286]	Buchanan, N. Y.	West.	Pressurized water	965	3025	76 04	

James A. FitzPatrick Nuclear Power Plant (New York Power Authority [50-333]	Scriba, N. Y.	GE	Boiling water	796	2436	74 11
Joseph M. Farley Nuclear Plant, Unit 1 (Alabama Power Co.) [50-348]	Dothan, Ala.	West.	Pressurized water	827	2652	77 08
Joseph M. Farley Nuclear Plant, Unit 2 (Alabama Power Co.) [50-364]	Dothan, Ala.	West.	Pressurized water	829	2652	81 05
Kewaunee Nuclear Power Plant (Wisconsin Public Service Corp.) [50-305]	Carlton, Wis.	West.	Pressurized water	503	1650	74 03
La Crosse (Genoa) Nuclear Generating Station (Dairyland Power Cooperative) [50-409][4]	La Crosse, Wis.	AC	Boiling water	48	165	67 07
La Salle County Station, Unit 1 (Commonwealth Edison Co.) [50-373]	Seneca, Ill.	GE	Boiling water	1036	3223	82 06
La Salle County Station, Unit 2 (Commonwealth Edison Co.) [50-374]	Seneca, Ill.	GE	Boiling water	1036	3223	84 03
†† Limerick Generating Station, Unit 1 (Philadelphia Electric Co.) [50-352]	Pottstown, Pa.	GE	Boiling water	1055	3293	84 12
Maine Yankee Atomic Power Plant (Maine Yankee Atomic Power Co.) [50-309]	Wiscasset, Maine	Comb.	Pressurized water	810	2630	72 10
Millstone Nuclear Power Station, Unit 1 (Northeast Nuclear Energy Co.) [50-245]	Waterford, Conn.	GE	Boiling water	654	2011	70 10
Millstone Nuclear Power Station, Unit 2 (Northeast Nuclear Energy Co.) [50-336]	Waterford, Conn.	Comb.	Pressurized water	857	2700	75 10
‡‡ Millstone Nuclear Power Station, Unit 3 (Northeast Nuclear Energy Co.) [50-423]	Waterford, Conn.	West.	Pressurized water	1149	3411	86 01
Monticello Nuclear Generating Plant (Northern States Power Co.) [50-263]	Monticello, Minn.	GE	Boiling water	536	1670	70 12
Nine Mile Point Nuclear Station, Unit 1 (Niagara Mohawk Power Corp.) [50-220]	Scriba, N. Y.	GE	Boiling water	610	1850	69 09
North Anna Power Station, Unit 1 (Virginia Electric & Power Co.) [50-338]	Mineral, Va.	West.	Pressurized water	893	2775	78 04
North Anna Power Station, Unit 2 (Virginia Electric & Power Co.) [50-339]	Mineral, Va.	West.	Pressurized water	893	2775	80 06
Oconee Nuclear Station, Unit 1 (Duke Power Co.) [50-269]	Seneca, S. C.	B&W	Pressurized water	860	2568	73 04
Oconee Nuclear Station, Unit 2 (Duke Power Co.) [50-270]	Seneca, S. C.	B&W	Pressurized water	860	2568	73 11
Oconee Nuclear Station, Unit 3 (Duke Power Co.) [50-287]	Seneca, S. C.	B&W	Pressurized water	860	2568	74 09
Oyster Creek Nuclear Power Plant, Unit 1 (GPU Nuclear Corp.) [50-219]	Toms River, N. J.	GE	Boiling water	620	1930	69 05
§§ Palisades Nuclear Plant, Unit 1 (Consumers Power Co.) [50-255]	South Haven, Mich.	Comb.	Pressurized water	730	2530	71 05
¶¶ Palo Verde Nuclear Generating Station, Unit 1 (Arizona Public Service Co.) [STN-50-528]	Wintersburg, Ariz.	Comb.	Pressurized water	1221	3800†	85 05
¶¶ Palo Verde Nuclear Generating Station, Unit 2 (Arizona Public Service Co.) [STN-50-529]	Wintersburg, Ariz.	Comb.	Pressurized water	1221	3800	86 04
Peach Bottom Atomic Power Station, Unit 2 (Philadelphia Electric Co.) [50-277]	Lancaster, Pa.	GE	Boiling water	1051	3293	73 09
Peach Bottom Atomic Power Station, Unit 3 (Philadelphia Electric Co.) [50-278]	Lancaster, Pa.	GE	Boiling water	1035	3293	74 08
*** Perry Nuclear Power Plant, Unit 1 (Cleveland Electric Illuminating Co.) [50-440]	Perry, Ohio	GE	Boiling water	1205	3759	86 06
††† Pilgrim Nuclear Power Station, Unit 1 (Boston Edison Co.) [50-293]	Plymouth, Mass.	GE	Boiling water	670	1998	72 06
Point Beach Nuclear Plant, Unit 1 (Wisconsin Electric Power Co.) [50-266]	Two Creeks, Wis.	West.	Pressurized water	485	1518	70 12
Point Beach Nuclear Plant, Unit 2 (Wisconsin Electric Power Co.) [50-301]	Two Creeks, Wis.	West.	Pressurized water	485	1518	72 02
Prairie Island Nuclear Generating Plant, Unit 1 (Northern States Power Co.) [50-282]	Red Wing, Minn.	West.	Pressurized water	503	1650	73 12
Prairie Island Nuclear Generating Plant, Unit 2 (Northern States Power Co.) [50-306]	Red Wing, Minn.	West.	Pressurized water	500	1650	74 12
Quad-Cities Station, Unit 1 (Commonwealth Edison Co.) [50-254]	Cordova, Ill.	GE	Boiling water	769	2511	71 10
Quad-Cities Station, Unit 2 (Commonwealth Edison Co.) [50-265]	Cordova, Ill.	GE	Boiling water	769	2511	72 04
‡‡‡ Rancho Seco Nuclear Generating Station, Unit 1 (Sacramento Municipal Utility District) [50-312]	Clay Station, Calif.	B&W	Pressurized water	873	2772	74 09

*Shut down of Units 1, 2, 3 (6-1-85, 9-15-84, 12-1-85): administrative hold to resolve various TVA and NRC concerns. Estimated startups: No date, Late 1987, No date.

†Full-power license 5-15-86. Commercial operation 8-19-86.

‡Full-power license 8-26-85. Commercial operating license 3-13-86.

§Full-power license 7-10-85.

¶Shut down/under review, 5-30-86; environmental qualification modifications. Estimated startup: 3-87.

** Full-power license, 7-25-86.

†† Commercial operation, 2-1-86.

‡‡ Commercial operation, 4-23-86.

§§ Shut down/under review, 5-19-86: loss of power to turbine EHC control system. Estimated startup: 3-87.

¶¶ Commercial operation for Units 1 and 2: 2-13-86 and 9-22-86.

*** Full-power license, 11-13-86.

††† Shut down/under review, 4-12-86: various hardware and administrative items, including RHR pump wear ring inspections and local leak rate testing. Estimated startup: 6-87.

‡‡‡ Shut down, 12-26-85: reactor trip on high pressure preceded by total loss of ICS power. Corrective actions being implemented. Estimated startup: 5-87.

1. POWER REACTORS AS OF 31 DEC 1986

(All reactors are regulated by the Nuclear Regulatory Commission, except as noted by footnote 21.)

A. Central-Station Electric Power Plants (Continued)

Name (licensee) [docket number]	Location	Principal nuclear contractor	Type	Power		Initial criticality (yr mo)	Shutdown permanently
				MD capcity net MW(e)[1]	Licensed MW(t)		
OPERABLE (Continued)							
*River Bend Station, Unit 1 (Gulf States Utilities Co.) [50-458]	St. Francisville, La.	GE	Boiling water	934	3015	85 10	
Robert Emmett Ginna Nuclear Power Plant, Unit 1 (Rochester Gas & Electric Corp.) [50-244]	Ontario, N. Y.	West.	Pressurized water	470	1520	69 11	
Salem Nuclear Generating Station, Unit 1 (Public Service Electric & Gas Co.) [50-272]	Salem, N. J.	West.	Pressurized water	1079	3338	76 12	
Salem Nuclear Generating Station, Unit 2 (Public Service Electric & Gas Co.) [50-311]	Salem, N. J.	West.	Pressurized water	1106	3411	80 08	
San Onofre Nuclear Generating Station, Unit 1 (Southern California Edison) [50-206][4]	San Clemente, Calif.	West.	Pressurized water	436	1347	67 06	
San Onofre Nuclear Generating Station, Unit 2 (Southern California Edison) [50-361]	San Clemente, Calif.	Comb.	Pressurized water	1070	3410	82 07	
San Onofre Nuclear Generating Station, Unit 3 (Southern California Edison) [50-362]	San Clemente, Calif.	Comb.	Pressurized water	1080	3390	83 08	
† Sequoyah Nuclear Plant, Unit 1 (Tennessee Valley Authority) [50-327]	Daisy, Tenn.	West.	Pressurized water	1148	3411	80 07	
† Sequoyah Nuclear Plant, Unit 2 (Tennessee Valley Authority) [50-328]	Daisy, Tenn.	West.	Pressurized water	1148	3411	81 11	
‡ Shoreham Nuclear Power Station (Long Island Lighting Co.) [50-322]	Brookhaven, N. Y.	GE	Boiling water	820	2436	85 02	
St. Lucie Plant, Unit 1 (Florida Power & Light Co.) [50-335]	Fort Pierce, Fla.	Comb.	Pressurized water	827	2700	76 04	
St. Lucie Plant, Unit 2 (Florida Power & Light Co.) [50-389]	Fort Pierce, Fla.	Comb.	Pressurized water	837	2700	83 06	
Surry Power Station, Unit 1 (Virginia Electric & Power Co.) [50-280]	Gravel Neck, Va.	West.	Pressurized water	781	2441	72 07	
Surry Power Station, Unit 2 (Virginia Electric & Power Co.) [50-281]	Gravel Neck, Va.	West.	Pressurized water	781	2441	73 03	
Susquehanna Steam Electric Station, Unit 1 (Pennsylvania Power & Light Co.) [50-387]	Berwick, Pa.	GE	Boiling water	1032	3293	82 09	
Susquehanna Steam Electric Station, Unit 2 (Pennsylvania Power & Light Co.) [50-388]	Berwick, Pa.	GE	Boiling water	1032	3293	84 05	
§ Three Mile Island Nuclear Station, Unit 1 (GPU Nuclear Corp.) [50-289]	Middletown, Pa.	B&W	Pressurized water	776	2535	74 06	
Trojan Nuclear Plant, Unit 1 (Portland General Electric Co.) [50-344]	Prescott, Oreg.	West.	Pressurized water	1050	3411	75 12	
Turkey Point Plant, Unit 3 (Florida Power & Light Co.) [50-250]	Florida City, Fla.	West.	Pressurized water	666	2200	72 10	
Turkey Point Plant, Unit 4 (Florida Power & Light Co.) [50-251]	Florida City, Fla.	West.	Pressurized water	666	2200	73 06	
Vermont Yankee Nuclear Power Station (Vermont Yankee Nuclear Power Corp.) [50-271]	Vernon, Vt.	GE	Boiling water	504	1593	72 03	
Virgil C. Summer Nuclear Station, Unit 1 (South Carolina Electric & Gas Co.) [50-395]	Jenkinsville, S. C.	West.	Pressurized water	885	2775	82 10	
Washington Nuclear Project, Unit 2 (Washington Public Power Supply System) [50-397]	Richland, Wash.	GE	Boiling water	1095	3323	84 01	
¶ Waterford Generating Station, Unit 3 (Louisiana Power & Light Co.) [50-382]	Taft, La.	Comb.	Pressurized water	1104	3390	85 03	
William B. McGuire Nuclear Station, Unit 1 (Duke Power Co.) [50-369]	Cowans Ford Dam, N. C.	West.	Pressurized water	1150	3411	81 08	
William B. McGuire Nuclear Station, Unit 2 (Duke Power Co.) [50-370]	Cowans Ford Dam, N. C.	West.	Pressurized water	1150	3411	83 05	
** Wolf Creek Generating Station (Kansas Gas & Electric Co.) [STN-50-482]	Burlington, Kans.	West.	Pressurized water	1128	3411	85 05	
Yankee Nuclear Power Station (Yankee Atomic Electric Co.) [50-29][4]	Rowe, Mass.	West.	Pressurized water	167	600	60 08	

Zion Nuclear Plant, Unit 1 (Commonwealth Edison Co.) [50-295]	Zion, Ill.	West.	Pressurized water	1040	3250	73 06
Zion Nuclear Plant, Unit 2 (Commonwealth Edison Co.) [50-304]	Zion, Ill.	West.	Pressurized water	1040	3250	73 12

				Power		
				Design, electrical power net MW(e)	Design, thermal power net MW(t)	Estimated initial criticality (yr mo)
BEING BUILT						
Alvin W. Vogtle Nuclear Plant, Unit 1 (Georgia Power Co.) [50-424]	Waynesboro, Ga.	West.	Pressurized water	1210	3565	87 06
Alvin W. Vogtle Nuclear Plant, Unit 2 (Georgia Power Co.) [50-425]	Waynesboro, Ga.	West.	Pressurized water	1210	3565	88 09
Beaver Valley Power Station, Unit 2 (Duquesne Light Co.) [50-412]	Shippingport, Pa.	West.	Pressurized water	852	2774	87 12
Bellefonte Nuclear Plant, Unit 1 (Tennessee Valley Authority) [50-438]	Scottsboro, Ala.	B&W	Pressurized water	1235	3760	94 01
Bellefonte Nuclear Plant, Unit 2 (Tennessee Valley Authority) [50-438]	Scottsboro, Ala.	B&W	Pressurized water	1235	3760	96 01
†† Braidwood Station, Unit 1 (Commonwealth Edison Co.) [50-456]	Braidwood, Ill.	West.	Pressurized water	1120	3411	88 09
Braidwood Station, Unit 2 (Commonwealth Edison Co.) [50-457]	Braidwood, Ill.	West.	Pressurized water	1120	3411	88 04
‡‡ Byron Station, Unit 2 (Commonwealth Edison Co.) [50-455]	Byron, Ill.	West.	Pressurized water	1129	3411	86 11
§§ Clinton Power Station, Unit 1 (Illinois Power Co.) [50-461]	Clinton, Ill.	GE	Boiling water	950	2894	86 12
Comanche Peak Steam Electric Station, Unit 1 (Texas Utilities Generating Co.) [50-445]	Glen Rose, Tex.	West.	Pressurized water	1150	3411	89 00
Comanche Peak Steam Electric Station, Unit 2 (Texas Utilities Generating Co.) [50-446]	Glen Rose, Tex.	West.	Pressurized water	1150	3411	89 00
¶¶ Grand Gulf Nuclear Station, Unit 2 (Mississippi Power & Light Co.) [50-417]	Port Gibson, Miss.	GE	Boiling water	1250	3833	Indef.
Limerick Generating Station, Unit 2 (Philadelphia Electric Co.) [50-353]	Pottstown, Pa.	GE	Boiling water	1065	3440	91 06
*** Nine Mile Point Nuclear Station, Unit 2 (Niagara Mohawk Power Corp.) [50-410]	Scriba, N. Y.	GE	Boiling water	1080	3489	86 10
Palo Verde Nuclear Generating Station, Unit 3 (Arizona Public Service Co.) [STN-50-530]	Wintersburg, Ariz.	Comb.	Pressurized water	1304	3817	87 09
¶¶ Perry Nuclear Power Plant, Unit 2 (Cleveland Electric Illuminating Co.) [50-441]	Perry, Ohio	GE	Boiling water	1205	3759	Indef.
††† Seabrook Nuclear Station, Unit 1 (Public Service Co. of New Hampshire) [50-443]	Seabrook, N. H.	West.	Pressurized water	1198	3411	87 00
‡‡‡ Seabrook Nuclear Station, Unit 2 (Public Service Co. of New Hampshire) [50-444]	Seabrook, N. H.	West.	Pressurized water	1198	3411	87 01
§§§ Shearon Harris Nuclear Power Plant, Unit 1 (Carolina Power & Light Co.) [50-400]	Bonsal, N. C.	West.	Pressurized water	915	2775	86 10
South Texas Project, Unit 1 (Houston Lighting & Power Co.) [STN-50-498]	Bay City, Tex.	West.	Pressurized water	1250	3800	87 12
South Texas Project, Unit 2 (Houston Lighting & Power Co.) [STN-50-499]	Bay City, Tex.	West.	Pressurized water	1250	3800	89 06
¶¶¶ Washington Nuclear Project, Unit 1 (Washington Public Power Supply System) [50-460]	Richland, Wash.	B&W	Pressurized water	1266	3760	Indef.
**** Washington Nuclear Project, Unit 3 (Washington Public Power Supply System) [STN-50-508]	Satsop, Wash.	Comb.	Pressurized water	1242	3800	Indef.
Watts Bar Nuclear Plant, Unit 1 (Tennessee Valley Authority) [50-390]	Spring City, Tenn.	West.	Pressurized water	1165	3411	Indef.

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* Commercial operation, 6-16-86.

† Shut down of Units 1 and 2 (12-20-85 and 8-21-85): design control, configuration updating, and employee concerns. Estimated startups: No date and Spring 1987.

‡ Low-power license, 7-3-85.

§ Three Mile Island 1 was shut down on 3-28-79 for modifications at the time of the accident at Three Mile Island 2, although not involved in the accident. Three Mile Island 1 resumed commercial operation 11-8-85.

¶ Commercial operation, 8-24-85.

** Commercial operation, 9-3-85.

†† Zero-power license for fuel loading, 11-17-86.

‡‡ Low-power license, 11-6-86.

§§ Low-power license, 9-29-86.

¶¶ Construction deferred/halted.

*** Low-power license, 10-31-86.

††† Zero-power license, 11-17-86.

‡‡‡ In December 1986 NRC received from the licensee a notification of their intent to surrender the Seabrook 2 construction permit.

§§§ Low-power license, 10-24-86.

¶¶¶ Utility approved in April 1982 an extended construction delay of up to five years.

**** Utility announced construction delay until funding is assured.

1. POWER REACTORS AS OF 31 DEC 1986

(All reactors are regulated by the Nuclear Regulatory Commission, except as noted by footnote 21.)

A. Central-Station Electric Power Plants (Continued)

Name (licensee) [docket number]	Location	Principal nuclear contractor	Type	Power: Design, electrical power net MW(e)	Power: Design, thermal power net MW(t)	Estimated initial criticality (yr mo)	Shutdown permanently
BEING BUILT (Continued)							
Watts Bar Nuclear Plant, Unit 2 (Tennessee Valley Authority) [50-391]	Spring City, Tenn.	West.	Pressurized water	1165	3411	Indef.	
PLANNED							
*Carroll County Station, Unit 1 (Commonwealth Edison Co.)	Savanna, Ill.	West.	Pressurized water	1120		Indef.	
*Carroll County Station, Unit 2 (Commonwealth Edison Co.)	Savanna, Ill.	West.	Pressurized water	1120		Indef.	

Name (licensee) [docket number]	Location	Principal nuclear contractor	Type	Power: MD capacity net MW(e)[1]	Power: Licensed MW(t)	Initial criticality	Shutdown permanently
SHUT DOWN OR DISMANTLED							
Boiling Nuclear Superheater Power Station (AEC and Puerto Rico Water Resources Authority)[4]	Punta Higuera, P. R.	Comb.	Boiling water, integral nuclear superheat	16.5	50	1964	1968
Carolinas–Virginia Tube Reactor (Carolinas–Virginia Nuclear Power Associates, Inc.)[4,7]	Parr, S. C.	West.	Pressure tube, heavy water	17	64	1963	1967
Dresden Nuclear Power Station, Unit 1 (Commonwealth Edison Co.) [50-010]	Morris, Ill.	GE	Boiling water	200	700	1959	1984
Elk River Reactor (AEC and Rural Cooperative Power Association)[4,10]	Elk River, Minn.	AC	Boiling water	22	58.2	1962	1968
Enrico Fermi Atomic Power Plant, Unit 1 (Power Reactor Development Co.) [50-16][4]	Lagoona Beach, Mich.	PRDC	Sodium cooled, fast	60.9	200	1963	1973
Hallam Nuclear Power Facility, Sheldon Station (AEC and Consumers Public Power District)[4,6,21]	Hallam, Nebr.	AI	Sodium graphite	75	240	1962	1964
Humboldt Bay Power Plant, Unit 3 (Pacific Gas & Electric Co.) [50-133]	Eureka, Calif.	GE	Boiling water	65	242	1963	1983
Indian Point Station, Unit 1 (Consolidated Edison Co. of New York, Inc.) [50-3][5]	Buchanan, N.Y.	B&W	Pressurized water	265	615	1962	1980
Pathfinder Atomic Plant (Northern States Power Co.)[9]	Sioux Falls, S. Dak.	AC	Boiling water	58.5	190	1964	1967
Peach Bottom Atomic Power Station, Unit 1 (Philadelphia Electric Co.) [50-171][4]	Peach Bottom, Pa.	GA	High temperature gas cooled	40	115	1966	1974
Piqua Nuclear Power Facility (AEC and City of Piqua)[4,8,21]	Piqua, Ohio	AI	Organic cooled and moderated	11.4	45.5	1963	1966
Shippingport Atomic Power Station (DOE and Duquesne Light Co.)[2,21]	Shippingport, Pa.	West.	Pressurized water	60	236	1957	1982
†Three Mile Island Nuclear Station, Unit 2 (GPU Nuclear Corp.) [50-320]	Middletown, Pa.	B&W	Pressurized water	906	2772	1978	1979

*Ordered/construction not started.

†Shut down since 3-28-79 accident. Core removal in progress.

B. Dual-Purpose Plants

Name and/or owner	Location	Principal nuclear contractor	Type	Power: Capacity net MW(e)	Power: Licensed MW(t)	Initial criticality (yr mo)
OPERABLE						
*N Reactor (DOE and Washington Public Power Supply System)[11,21]	Richland, Wash.	UNCNI	Graphite	860	4000	63 12

C. Propulsion (Maritime)

Name and/or owner	Nuclear designer	Shipbuilder	Type	Maximum shaft horsepower	Licensed power, kW(t)	Start-up	Shut-down
SHUT DOWN OR DISMANTLED							
Nuclear Ship SAVANNAH (Maritime Administration)	B&W	NYSC	Pressurized water	22,000	80,000	1961	1971

2. EXPERIMENTAL POWER-REACTOR SYSTEMS

(All reactors are regulated by the Department of Energy, except as noted by footnote 3.)

A. Electric-Power Systems

Name (all owned by DOE except as noted)	Designation	Location	Principal nuclear contractor	Type	Power: Capacity net kW(e)	Power: Licensed kW(t)	Initial criticality	
OPERABLE								
Experimental Breeder Reactor II[79]	EBR-II	INEL Site, Idaho	ANL	Sodium cooled, fast	20,000	62,500	1961	
PLANNED								
Small Nuclear Power Source Demonstration Reactor[82]		AECL-Whiteshell	LANL	Heat pipe cooled, thermal	15†	~135†	Indef.	
SHUT DOWN OR DISMANTLED								
Boiling Reactor Experiment No. 1	BORAX-1	INEL Site, Idaho	ANL	Boiling water	No elec.	1,400	1953	1954
Boiling Reactor Experiment No. 5	BORAX-5	INEL Site, Idaho	ANL	Boiling water, integral nuclear superheat	2,600	20,000	1962	1964
Boiling Reactor Experiments[13]	BORAX-2, -3, -4	INEL Site, Idaho	ANL	Boiling water	2,400	15,500	1954	1958
ESADA Vallecitos Experimental Superheat Reactor (Empire States Atomic Development Associates and General Electric Company)[3]	EVESR	Pleasanton, Calif.	GE	Light-water moderated, superheater	No elec.	17,000	1963	1967
Experimental Beryllium Oxide Reactor[15]	EBOR	INEL Site, Idaho	GA	Gas cooled, BeO moderated	No elec.	10,000	Terminated	

*Stand down for extensive improvements for safety, scheduled for 1-7-87.
†Design levels.

2. EXPERIMENTAL POWER-REACTOR SYSTEMS AS OF 31 DEC 1986

(All reactors are regulated by the Department of Energy, as noted by footnote 21.)

A. Electric-Power Systems (Continued)

Name (all owned by DOE except as noted)	Designation	Location	Principal nuclear contractor	Type	Power: Capacity net kW(e)	Power: Licensed kW(t)	Initial criticality	Shut-down
SHUT DOWN OR DISMANTLED (Continued)								
Experimental Boiling Water Reactor[20]	EBWR	Argonne, Ill.	ANL	Boiling water	4,000	100,000	1956	1967
Experimental Breeder Reactor No. 1[16]	EBR-1	INEL Site, Idaho	ANL	NaK cooled, fast	150	1,400	1951	1964
Experimental Gas Cooled Reactor[18]	EGCR	Oak Ridge, Tenn.	KE-AC	Gas cooled, graphite moderated	21,900	84,300	Termi-nated	
Experimental Organic Cooled Reactor[19]	EOCR	INEL Site, Idaho	Fluor-AI	Organic cooled and moderated	No elec.	40,000	Termi-nated	
Heavy Water Components Test Reactor	HWCTR	Savannah River Laboratory, Aiken, S. C.	Du Pont	Pressurized heavy water	No elec.	61,100	1962	1964
Homogeneous Reactor Experiment No. 1	HRE-1	Oak Ridge, Tenn.	ORNL	Aqueous homogeneous solution (UO_2SO_4)	140	1,000	1952	1954
Homogeneous Reactor Experiment No. 2	HRE-2	Oak Ridge, Tenn.	ORNL	Aqueous homogeneous solution (UO_2SO_4)	300	5,200	1957	1961
Los Alamos Molten Plutonium Reactor Experiment	LAMPRE-1	Los Alamos, N. Mex.	LANL	Fast molten plutonium fueled, sodium cooled	No elec.	1,000	1961	1963
Los Alamos Power Reactor Experiment No. 1	LAPRE-1	Los Alamos, N. Mex.	LANL	Aqueous homogeneous (phosphoric acid)	No elec.	2,000	1956	1957
Los Alamos Power Reactor Experiment No. 2	LAPRE-2	Los Alamos, N. Mex.	LANL	Aqueous homogeneous (phosphoric acid)	No elec.	1,000	1959	1959
Molten Salt Reactor Experiment	MSRE	Oak Ridge, Tenn.	ORNL	Single region, graphite moderated	No elec.	8,000	1965	1969
Organic Moderated Reactor Experiment[14]	OMRE	INEL Site, Idaho	AI	Organic cooled and moderated	No elec.	12,000	1957	1963
Plutonium Recycle Test Reactor	PRTR	Richland, Wash.	PNL	Pressure tube, heavy-water moderated and cooled	No elec.	70,000	1960	1969
Saxton Nuclear Experimental Reactor Project (Saxton Nuclear Experimental Corp.)[3]		Saxton, Pa.	West.	Pressurized water	3,000	23,500	1962	1972
Sodium Reactor Experiment (DOE and Southern California Edison Co.)[17]	SRE	Santa Susana, Calif.	AI	Sodium graphite	5,700	20,000	1957	1964
Southwest Experimental Fast Oxide Reactor (Southwest Atomic Energy Associates)[3]	SEFOR	Strickler, Ark.	GE	Sodium cooled, fast		20,000	1969	1972
Ultra High Temperature Reactor Experiment	UHTREX	Los Alamos, N. Mex.	LANL	Helium cooled	No elec.	3,000	1968	1970
Vallecitos Boiling Water Reactor (General Electric Company and Pacific Gas & Electric Co.)[3]	VBWR	Pleasanton, Calif.	GE	Boiling water	5,000	33,000	1957	1963

B. Auxiliary Power (SNAP)

					Power			
					Capacity net kW(e)	Authorized kW(t)		
PLANNED								
SP-100 Ground Engineering System Reactor	SP-100GES	Hanford	To be decided	Thermoelectric	To be decided	To be decided	1989-90	Indef.
SHUT DOWN OR DISMANTLED								
SNAP-2 Developmental System	S2DS	Santa Susana, Calif.	AI	NaK cooled	No elec.	50	1961	1963
SNAP-2 Experimental Reactor	SER	Santa Susana, Calif.	AI	NaK cooled	No elec.	50	1959	1960
SNAP-2/10A TSF Shielding Experiment	SNAP-TSF	Oak Ridge, Tenn.	AI-ORNL	NaK cooled		10	1967	1973
SNAP-8 Developmental Reactor	S8DR	Santa Susana, Calif.	AI	NaK cooled		600	1968	1969
SNAP-8 Experimental Reactor	S8ER	Santa Susana, Calif.	AI	NaK cooled	No elec.	600	1962	1965
SNAP-10A Flight System Ground Test No. 1	S10FS-1	Los Alamos, N. Mex.	AI	NaK cooled	0.5	39	1964	1964
SNAP-10A Flight System Ground Test No. 3[22]	S10FS-3	Santa Susana, Calif.	AI	NaK cooled	0.5	39	1964	1966
SNAP-10A Flight System[22]	S10FS-4	In orbit	AI	NaK cooled	0.5	39	1965	1965
SNAP-10A Flight System	S10FS-5	Oak Ridge, Tenn.	AI	NaK cooled	0.5	39	(Spare)	

C. Space Propulsion (Rover)

				Type	Authorized power, kW(t)	Year of operation	Dismantled
SHUT DOWN OR DISMANTLED							
Fuel Element Test Bed	NF-1	NRDS, Nev.	LANL	Open cycle, gaseous hydrogen	44,000	1972	1972
Fuel Element Test Reactor	Pewee-1	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	514,000	1968	1968
Fuel Element Test Reactor	Pewee-2	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	514,000	Indef.	1973
Ground Experimental Engine Experiment	XE-Prime	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,100,000	1968	1969
Ground Experimental Engine Experiment	XE-Backup	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,100,000	Indef.	1973
Nuclear Rocket Engine Reactor Experiment (NERVA)	NRX-A2	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,096,000	1964	1964
Nuclear Rocket Engine Reactor Experiment (NERVA)	NRX-A3	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,100,000	1965	1965
Nuclear Rocket Engine Reactor Experiment (NERVA)	NRX-A5	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,120,000	1966	1966
Nuclear Rocket Engine Reactor Experiment (NERVA)	NRX-A6	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,199,000	1967	1967
Nuclear Rocket Reactor Engine System Test (NERVA)	NRX-A4/EST	NRDS, Nev.	AG-West.	Open cycle, liquid hydrogen	1,155,000	1966	1966
Nuclear Rocket Reactor Experiment	Kiwi-A	NRDS, Nev.	LANL	Open cycle, gaseous hydrogen	70,000	1959	1959
Nuclear Rocket Reactor Experiment	Kiwi-A Prime	NRDS, Nev.	LANL	Open cycle, gaseous hydrogen	85,000	1960	1960
Nuclear Rocket Reactor Experiment	Kiwi-A3	NRDS, Nev.	LANL	Open cycle, gaseous hydrogen	100,000	1960	1960
Nuclear Rocket Reactor Experiment	Kiwi-B1A	NRDS, Nev.	LANL	Open cycle, gaseous hydrogen	300,000	1961	1961
Nuclear Rocket Reactor Experiment	Kiwi-B1B	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	900,000	1962	1962
Nuclear Rocket Reactor Experiment	Kiwi-B4A	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	500,000	1962	1962
Nuclear Rocket Reactor Experiment	Kiwi-B4D	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	1,000,000	1964	1964
Nuclear Rocket Reactor Experiment	Kiwi-B4E	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	950,000	1964	1964
Nuclear Rocket Reactor Experiment	Phoebus 1A	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	1,070,000	1965	1965

2. EXPERIMENTAL POWER-REACTOR SYSTEMS AS OF 31 DEC 1986

(All reactors are regulated by the Department of Energy, as noted by footnote 21.)

C. Space Propulsion (Rover) (Continued)

Name (all owned by DOE except as noted)	Designation	Location	Principal nuclear contractor	Type	Authorized power kW(t)	Year of operation	Dismantled
SHUT DOWN OR DISMANTLED (Continued)							
Nuclear Rocket Reactor Experiment	Phoebus 1B	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	1,400,000	1967	1967
Nuclear Rocket Reactor Experiment	Phoebus 2A	NRDS, Nev.	LANL	Open cycle, liquid hydrogen	4,200,000	1968	1968
Nuclear Rocket Reactor Engine System Test	NRX-A4/EST	NRDS, Nev.	AG-West.	Open cycle, gaseous hydrogen	4,200,000	Indef.	1968

3. TEST, RESEARCH, AND UNIVERSITY REACTORS

(All reactors are regulated by the Department of Energy, except as noted by footnote 3.)

A. General Irradiation Test

Name and/or owner	Designation	Location	Principal nuclear contractor	Operator	Type	Authorized power kW(t)	Initial criticality	Shutdown
OPERABLE								
Advanced Test Reactor (DOE)	ATR	INEL, Idaho	Ebasco–B&W	EG&G–ID	Tank	250,000	1968	
Fast Flux Test Facility (DOE)	FFTF	Richland, Wash.	WHC	WHC	Sodium cooled	400,000	1982	
SHUT DOWN OR DISMANTLED								
Engineering Test Reactor (DOE)[23]	ETR	INEL, Idaho	KE–GE	EG&G–ID	Tank	175,000	1957	1981
General Electric Testing Reactor[3]	GETR	Pleasanton, Calif.	Owner	Owner	Tank	50,000	1958	1977
Materials Testing Reactor (DOE)[24]	MTR	INEL, Idaho	ORNL–ANL–Blaw-Knox	INC	Tank	40,000	1952	1970
Plum Brook Reactor Facility (NASA)[3]	NASA-TR	Sandusky, Ohio	NASA	NASA	Tank	60,000	1961	1974
Westinghouse Testing Reactor[3]	WTR	Waltz Mill, Pa.	Owner	Owner	Tank	60,000	1959	1962

B. High-Power Research and Test

Name and/or owner	Designation	Location	Principal nuclear contractor	Type	Authorized power kW(t)	Initial criticality	Shutdown
OPERABLE							
Brookhaven High Flux Beam Research Reactor (DOE)	HFBR	Upton, N. Y.	BNL	Heavy water	60,000	1965	
Brookhaven Medical Research Reactor (DOE)	BMRR	Upton, N. Y.	Daystrom	Tank	5,000	1959	
High Flux Isotope Reactor (DOE)	HFIR	Oak Ridge, Tenn.	ORNL	Tank flux trap	100,000	1965	
National Bureau of Standards Reactor[3]	NBSR	Gaithersburg, Md.	NBS–B&R	Heavy water	20,000	1967	
Oak Ridge Research Reactor (DOE)[89]	ORR	Oak Ridge, Tenn.	ORNL	Tank	30,000	1958	
Omega West Reactor (DOE)	OWR	Los Alamos, N. Mex.	LANL	Tank	8,000	1956	
Cintichem, Inc. Reactor[3]	CINR	Sterling Forest, N. Y.	AMF	Pool	5,000	1961	

	Designation	Location	Principal nuclear contractor	Type			
SHUT DOWN OR DISMANTLED							
Ames Laboratory Research Reactor (DOE)	ALRR	Ames, Iowa	AMF	Heavy water	5,000	1965	1977
Argonne Research Reactor (DOE)	CP-5	Argonne, Ill.	ANL	Heavy water	5,000	1954	1979
Babcock & Wilcox Nuclear Development Center Test Reactor[3]	BAWTR	Lynchburg, Va.	Owner	Pool	6,000	1964	1971
Industrial Reactor Laboratories, Inc.[3]	IRL	Plainsboro, N. J.	AMF	Pool	5,000	1958	1975
Sandia Engineering Reactor (DOE)	SER	Kirtland AFB, East, N. Mex.	Sandia	Tank	5,000	1961	1970

C. Safety-Research and Test

OPERABLE							
*Power-Burst Facility (DOE)	PBF	INEL, Idaho	EG&G-ID	Open tank	Transient 28,000	1973	
Transient Reactor Test (DOE)	TREAT	INEL Site, Idaho	ANL	Graphite	Transient	1959	
SHUT DOWN OR DISMANTLED							
Intrinsic Subcriticality Experiment (DOE)[27]	SNAPTRAN-1	Los Alamos, N. Mex.	AI	Be-reflected SNAP-10A	Transient	1968	1971
King Intense Neutron Generator (DOE)	Kinglet	Los Alamos, N. Mex.	LANL	Homogeneous	Transient	1972	1977
Kiwi-Transient Test Reactor (DOE)	Kiwi-TTR	NRDS, Nev.	LANL	Kiwi/NERVA	Transient	1965	1965
Loss of Fluid Test (DOE)[85]	LOFT	INEL, Idaho	EG&G-ID	Pressurized water	55,000	1978	1985
SNAP-10A Transient Test No. 2 (DOE)[25]	SNAPTRAN-2	INEL, Idaho	AI-PPC	Be-reflected SNAP-10A	Transient	1965	1966
SNAP-10A Transient Test No. 3 (DOE)[25]	SNAPTRAN-3	INEL, Idaho	PPC-AI	H_2O-reflected SNAP-10A	Transient	1964	1964
Special Power Excursion Reactor Test No. 1 (DOE)	SPERT-1	INEL, Idaho	PPC	Open tank	Transient	1955	1964
Special Power Excursion Reactor Test No. 2 (DOE)	SPERT-2	INEL, Idaho	PPC	Pressurized water	Transient	1960	1965
Special Power Excursion Reactor Test No. 3 (DOE)	SPERT-3	INEL, Idaho	PPC	Pressurized water	Transient	1958	1968
Special Power Excursion Reactor Test No. 4 (DOE)	SPERT-4	INEL, Idaho	INC	Pool	Transient	1962	1970

D. General Research

OPERABLE							
Aerotest Operations, Inc.[3]	AGNIR	San Ramon, Calif.	GA	Pool-TRIGA core	250	1965	
Annular Core Research Reactor (DOE)[80]	ACRR	Kirtland AFB, East, N. Mex.	Sandia	UO_2 BeO	2000 and transient	1978	
Argonne Thermal Source Reactor (DOE)	ATSR	Argonne, Ill.	ANL	Thermal	10	1957	
Biological Research Reactor (DOE)	JANUS	Argonne, Ill.	ANL	Tank	200	1964	
Bulk Shielding Reactor (DOE)[28]	BSR	Oak Ridge, Tenn.	ORNL	Pool	2,000	1950	
Dow Chemical Co.[3]	TRIGA-Mk I	Midland, Mich.	GA	U-Zr hydride	100	1967	
Fast Source Reactor (DOE)	AFSR	INEL Site, Idaho	ANL	Fast	1	1959	
GA Technologies, Inc., Advanced TRIGA-Mk F Prototype Reactor[3]	TRIGA-Mk F	La Jolla, Calif.	Owner	U-Zr hydride	1,500	1960	
GA Technologies, Inc., TRIGA-Mk I Prototype Reactor[3,30]	TRIGA-Mk I	La Jolla, Calif.	Owner	U-Zr hydride	250	1958	
General Electric Nuclear Test Reactor[3]	NTR	Pleasanton, Calif.	GE	Light water	100	1957	

*Standby.

3. TEST, RESEARCH, AND UNIVERSITY REACTORS AS OF 31 DEC 1986 (Continued)

(All reactors are regulated by the Department of Energy, except as noted by footnote 3.)

D. General Research (Continued)

Name and/or owner	Designation	Location	Principal nuclear contractor	Type	Authorized power, kW(t)	Initial criticality	Shut down
OPERABLE (Continued)							
Health Physics Research Reactor (DOE)[31]	HPRR	Oak Ridge, Tenn.	ORNL	Fast burst	10	1962	
Low Temperature Neutron Irradiation Facility (DOE)[90]	LTNIF	Oak Ridge, Tenn.	ORNL	Pool	Neglig.	1986	
Neutron Radiography Facility (DOE)	NRF	Richland, Wash.	WHC	U–Zr hydride	250	1977	
Neutron Radiography Facility (DOE)	NRAD	INEL, Idaho	ANL	Pool–TRIGA core	250	1977	
Omaha Veterans Administration Hospital[3]	TRIGA-Mk I	Omaha, Nebr.	GA	U–Zr hydride	18	1959	
Rhode Island Nuclear Science Center[3]	RINSC	Fort Kearney, R. I.	GE	Pool	2,000	1964	
Sandia Pulsed Reactor II (DOE)	SPR-II	Kirtland AFB, East, N. Mex.	Sandia	Prompt burst	Transient	1967	
Sandia Pulsed Reactor III (DOE)	SPR-III	Kirtland AFB, East, N. Mex.	Sandia	Prompt burst	Transient	1975	
*Tower Shielding Reactor No. II (DOE)[86]	TSR-2	Oak Ridge, Tenn.	ORNL	Light water	1,000	1960	
U. S. Geological Survey Laboratory (Department of the Interior)[3,30]	TRIGA-Mk I	Denver, Colo.	GA	U–Zr hydride	1,000	1969	
Westinghouse Nuclear Training Center[3]	WNTR	Zion, Ill.	West.	Tank	10	1972	
SHUT DOWN OR DISMANTLED							
Accelerator Pulsed Fast Critical Assembly (DOE)[42]	APFA-III	La Jolla, Calif.	GA	Fast	1	1967	1973
American Standard Inc.[35]	UTR-1	Mountain View, Calif.	AS Inc.	Graphite/water	Neglig.	1958	1960
Annular Core Pulsed Reactor (DOE)[80]	ACPR	Kirtland AFB, East, N. Mex.	GA	U–Zr hydride	Transient	1967	1977
Argonne CP-3, rebuilt as CP-3′ (Manhattan Engineer District—DOE)	CP-3′	Palos Park, Ill.	Met. Lab.	Heavy water	300	1944	1963
Argonne Low Power Research Reactor (DOE)[39]	Juggernaut	Argonne, Ill.	ANL	Graphite/water	250	1962	1970
Argonne National Laboratory (DOE)	AGN-201-108	Argonne, Ill.	AGN	Homog. solid	Neglig.	1957	1972
Argonne Nuclear Assembly for University Training (DOE)	Argonaut (CP-11)	Argonne, Ill.	ANL	Graphite/water	10	1957	1972
Atomics International[3]	L-47	Canoga Park, Calif.	AI	Homogeneous	Neglig.	1957	1958
Babcock & Wilcox Lynchburg Pool Reactor[3]	LPR	Lynchburg, Va.	Owner	Pool	1,000	1958	1981
Battelle Memorial Institute[3]	BRR	West Jefferson, Ohio	AMF	Pool	2,000	1956	1974
Brookhaven Graphite Research Reactor	BGRR	Upton, N. Y.	AU, Inc.	Air cooled, graphite moderated	20,000	1950	1969
Brookhaven Neutron Source Reactor No. 1 (DOE)	SCHIZO	Upton, N. Y.	AU, Inc.	Tank	100	1958	1970
Brookhaven Neutron Source Reactor No. 2 (DOE)	PHRENIC	Upton, N. Y.	AU, Inc.	Tank	100	1965	1970
Chicago Pile 1, rebuilt as CP-2 (Manhattan Engineer District—DOE)[34]	CP-2	Chicago, Ill.	Met. Lab.	Graphite	0.2–2	1942	1954
Curtiss-Wright Nuclear Research Laboratory of the Commonwealth of Pennsylvania	CWRR	Quehanna, Pa.	Owner	Pool	1,000	1958	1966
DOE Demonstration Reactor[43]	Demo Reac	Oak Ridge, Tenn.	Lockheed	Pool	10	1969	1969
European–Asian Exhibit Program (DOE)[33]	EAEP	Oak Ridge, Tenn.	Lockheed	Pool	10	1963	1969
Fast Neutron Source Reactor (DOE)	BNL/FS-1	Upton, N. Y.	BNL	Fast		1967	1970

G. A. Technologies, Inc. (World Agricultural Fair—U. S. Exhibit Reactor)[36]	TRIGA-Mk I	San Diego, Calif.	Owner	U–Zr hydride	50	1960	1960
High Temperature Lattice Test Reactor (DOE)	HTLTR	Richland, Wash.	PNL	Graphite	2	1967	1971
Illinois Institute of Technology Research Institute (Armour Research Foundation)[3]	ARR (L-54)	Chicago, Ill.	AI	Homogeneous	75	1956	1967
Kinetic Experiment on Water Boilers (Rockwell International)[3,32]	KEWB	Santa Susana, Calif.	AI	Homogeneous	Transient	1956	1967
Livermore Pool Type Reactor (DOE)	LPTR	Livermore, Calif.	FW	Tank	3,000	1957	1980
Livermore Water Boiler (DOE)	LIWB	Livermore, Calif.	AI	Homogeneous	0.5	1953	1961
Lockheed Aircraft Corp.		Dawsonville, Ga.	Lockheed	Pool	Neglig.	1960	1960
Los Alamos Fast Reactor (DOE)	Clementine	Los Alamos, N. Mex.	LANL	Fast, plutonium fuel, mercury cooled	25	1946	1953
Los Alamos LOPO Reactor (DOE)	LOPO	Los Alamos, N. Mex.	LANL	Homogeneous	Neglig.	1944	1944
Los Alamos Water Boiler (DOE)	HYPO	Los Alamos, N. Mex.	LANL	Homogeneous	5.5	1944	1950
Los Alamos Water Boiler (DOE)	SUPO	Los Alamos, N. Mex.	LANL	Homogeneous	25	1950	1974
Louisiana State University Nuclear Science Center (Phillips Petroleum Co.)[37]	SNARE	Baton Rouge, La.	Sandia	Pool	2	1965	1966
Low Intensity Test Reactor (DOE)	LITR	Oak Ridge, Tenn.	ORNL	Tank	3,000	1950	1968
NASA Mock-Up Reactor[3]	MUR	Sandusky, Ohio	Lockheed	Light water, pool	100	1963	1973
Northrop Corporate Laboratories (Space Radiation Laboratory)[3,30]	TRIGA-Mk F	Hawthorne, Calif.	GA	U–Zr hydride	100	1963	1986
Nuclear Effects Reactor (DOE)[38]	FRAN	NTS, Nev.	LLNL/PPC	Prompt burst	Transient	1962	1970
Nuclear Effects Reactor (DOE)	KUKLA	San Diego, Calif.	LLNL	Prompt burst	Transient	1959	1964
Nuclear Examination Reactor (Rockwell International)[3,29]	L-85 (AE-6)	Santa Susana, Calif.	AI	Homogeneous	3	1952	1980
Oak Ridge Graphite Reactor (DOE)	ORG	Oak Ridge, Tenn.	CL	Graphite	3,500	1943	1963
Pawling Research Reactor (United Nuclear Corp.)[3]	PRR	Pawling, N. Y.	UNC	Light water	Neglig.	1958	1971
Physical Constants Test Reactor (DOE)	PCTR	Richland, Wash.	PNL	Graphite	0.1	1955	1972
Radiation Effects Reactor (Lockheed Aircraft Corp.)[3,40]	RER	Dawsonville, Ga.	Lockheed	Pool	3,000	1958	1970
Rockwell International[3]	L-77	Canoga Park, Calif.	AI	Homogeneous	Neglig.	1958	1974
Sandia Pulsed Reactor (DOE)	SPR	Kirtland AFB, East, N. Mex.	Sandia	Prompt burst	Transient	1961	1967
Shield Test and Irradiation Reactor (DOE)[41]	STIR	Santa Susana, Calif.	AI	Pool	1,000	1961	1972
Thermal Test Reactor No. 2 (DOE)	TTR-2	Richland, Wash.	PNL	Graphite	0.1	1955	1972
Torrey Pines, TRIGA-Mk III Reactor (General Atomic)[3]	TRIGA-Mk III	La Jolla, Calif.	Owner	U–Zr hydride	1,500	1966	1973
*Tower Shielding Reactor	TSR	Oak Ridge, Tenn.	ORNL	BSR-type in tank	500	1954	1958
UTR Test Reactor (American Radiator & Standard Sanitary Corp.)[3]		Mountain View, Calif.	Owner	Graphite/water	Neglig.	1961	1963

E. University Research and Teaching

(All reactors listed in this section are regulated by the Nuclear Regulatory Commission, except as noted by footnote 21.)

Name and/or owner	Designation	Location	Principal nuclear contractor	Type	Authorized power, kW(t)	Initial criticality
OPERABLE						
Arizona, University of	TRIGA-Mk I	Tucson, Ariz.	GA	U–Zr hydride	100	1958
Brigham Young University	L-77	Provo, Utah	AI	Homogeneous	Neglig.	1967
California, Berkeley, University of[30]	TRIGA-Mk III	Berkeley, Calif.	GA	U–Zr hydride	1,000	1966
California, Irvine, University of[30]	TRIGA-Mk I	Irvine, Calif.	GA	U–Zr hydride	250	1969
Cornell University[30]	TRIGA-Mk II	Ithaca, N. Y.	GA	U–Zr hydride	500	1962

*The first TSR, which was shut down before the second TSR was started up, was not named TSR-1.

3. TEST, RESEARCH, AND UNIVERSITY REACTORS AS OF 31 DEC 1986

(All reactors are regulated by the Department of Energy, except as noted by footnote 3.)

E. University Research and Teaching (Continued)

Name and/or owner	Designation	Location	Principal nuclear contractor	Type	Authorized power, kW(t)	Initial criticality	Shut-down
OPERABLE (Continued)							
Cornell University Zero Power Reactor	ZPR	Ithaca, N. Y.	Vitro	Tank	Neglig.	1962	
Florida, University of	UFTR	Gainesville, Fla.	GNEC	Graphite/water	100	1959	
Georgia Institute of Technology	GTRR	Atlanta, Ga.	GNEC	Heavy water	5,000	1964	
Idaho State University[52]	AGN-201P-103	Pocatello, Idaho	AGN	Homog. solid	Neglig.	1967	
Illinois, University of	LOPRA	Urbana, Ill.	GA	U–Zr hydride	10	1971	
Illinois, University of	TRIGA-Mk II	Urbana–Champaign, Ill.	GA	U–Zr hydride	1,500	1960	
Iowa State University	UTR-10	Ames, Iowa	AS Inc.	Graphite/water	10	1959	
Kansas State University[30]	TRIGA-Mk II	Manhattan, Kans.	GA	U–Zr hydride	250	1962	
Kansas, University of	Model 4180	Lawrence, Kans.	BAC	Pool	10	1961	
Lowell, University of	ULR	Lowell, Mass.	GE	Pool	1,000	1974	
Manhattan College	MCZPR	New York, N. Y.	AMF	Tank	Neglig.	1964	
Maryland, University of	TRIGA	College Park, Md.	GA	Tank–TRIGA core	250	1974	
Massachusetts Institute of Technology	MITR-II	Cambridge, Mass.	ACF	Heavy-water reflected	5,000	1958	
Michigan State University[30,53]	TRIGA-Mk I	East Lansing, Mich.	GA	U–Zr hydride	250	1969	
Michigan, University of (Ford Nuclear Reactor)	FNR	Ann Arbor, Mich.	B&W	Pool	2,000	1957	
Missouri, University of	MURR	Columbia, Mo.	Owner–IC	Tank	10,000	1966	
Missouri at Rolla, University of	UMR-R	Rolla, Mo.	CW	Pool	200	1961	
New Mexico, University of[46]	AGN-201M-112	Albuquerque, N. Mex.	AGN	Homog. solid	Neglig.	1966	
North Carolina State University	PULSTAR	Raleigh, N. C.	AMF	Pool	1,000	1972	
Ohio State University	OSURR	Columbus, Ohio	Lockheed	Pool	10	1961	
Oklahoma, University of	AGN-211-102	Norman, Okla.	AGN	Homog. solid, pool	Neglig.	1958	
Oregon State University[30]	OSTR	Corvallis, Oreg.	GA	U–Zr hydride	1,000	1967	
Penn State TRIGA Reactor (Pennsylvania State University)[30,51]	PSTR	University Park, Pa.	GA	Pool–TRIGA core	1,000	1965	
Purdue University	PUR-1	West Lafayette, Ind.	Lockheed	Pool	1.0	1962	
Reed College	TRIGA-Mk I	Portland, Oreg.	GA	U–Zr hydride	250	1968	
State University of New York (Western New York Nuclear Research Center, Inc.)	PULSTAR	Buffalo, N. Y.	AMF	Pool	2,000	1961	
Texas A&M University[30,49]	TRIGA	College Station, Tex.	GA	U–Zr hydride	1,000	1961	
Texas A&M University	AGN-201M-106	College Station, Tex.	AGN	Homog. solid	Neglig.	1957	
Texas at Austin, University of[30]	TRIGA-Mk I	Austin, Tex.	GA	U–Zr hydride	250	1963	
Utah, University of	TRIGA-Mk I	Salt Lake City, Utah	GA	U–Zr hydride	250	1975	
Utah, University of	AGN-201-107	Salt Lake City, Utah	AGN	Homog. solid	Neglig.	1957	
Virginia, University of	CAVALIER	Charlottesville, Va.	Owner		Neglig.	1974	
Virginia, University of	UVAR	Charlottesville, Va.	Owner–B&W	Pool	2,000	1960	
Washington State University[30,50]	WSTR	Pullman, Wash.	GA	Pool–TRIGA core	1,000	1967	

Washington, University of	Educator	Seattle, Wash	AMF	Graphite/water	100	1961	
Wisconsin, University of[30,48]	TRIGA	Madison, Wis.	GA	Pool–TRIGA core	1,000	1967	
Worcester Polytechnic Institute		Worcester, Mass.	GE	Pool	10	1959	
SHUT DOWN OR DISMANTLED							
California State Polytechnic University[54]	AGN-201-100	San Luis Obispo, Calif.	AGN	Homog. solid	Neglig.	1973	1980
California, Los Angeles, University of, School of Engineering and Applied Science	Educator	Los Angeles, Calif.	AMF	Graphite/water	100	1960 1984	1984 1986
California, Santa Barbara, University of[30]	L-77	Santa Barbara, Calif.	AI	Homogeneous	Neglig.	1974	1986
Catholic University of America	AGN-201-101	Washington, D. C.	AGN	Homog. solid	Neglig.	1957	1986
Colorado State University	AGN-201-109	Fort Collins, Colo.	AGN	Homog. solid	Neglig.	1957	1974
Columbia University[30,83]	TRIGA-Mk II	New York, N. Y.	GA	U–Zr hydride	250	Licensed	1985
Delaware, University of	AGN-201-113	Newark, Del.	AGN	Homog. solid	Neglig.	1958	1978
Georgia Institute of Technology[45]	AGN-201-104	Atlanta, Ga.	AGN	Homog. solid	Neglig.	1968	1985
Leland Stanford University		Palo Alto, Calif.	GE	Pool	10	1959	1974
Memphis State University	AGN-201-108	Memphis, Tenn.	AGN	Homog. solid	Neglig.	1977	1985
Mississippi State University[55]	RRR	State College, Miss.	Owner–NSA	Homogeneous	Neglig.		
Nevada, University of	L-77	Reno, Nev.	AI	Homogeneous	Neglig.	1963	1974
North Carolina State University		Raleigh, N. C.	Cook	Graphite/water	10	1960	1973
Oregon State University	AGN-201-114	Corvallis, Oreg.	AGN	Homog. solid	Neglig.	1958	1974
Polytechnic Institute of New York[56]	AGN-201M-105	New York, N. Y.	AGN	Homog. solid	Neglig.	1967	1974
Puerto Rico Nuclear Center (DOE)[21,47]	L-77	Mayagüez, P. R.	AI	Homogeneous	Neglig.	1959	1979
Puerto Rico Nuclear Center (DOE)[21,78]	TRIGA-FLIP	Mayagüez, P. R.	GA	Pool–TRIGA core	2,000	1972	1976
Tuskegee Institute[44]	AGN-201-102	Tuskegee, Ala.	AGN	Homog. solid	Neglig.	1974	1984
Virginia Polytechnic Institute	UTR-10	Blacksburg, Va.	AS Inc.	Graphite/water	100	1959	1984
West Virginia University	AGN-211-103	Morgantown, W. Va.	AGN	Homog. solid, pool	Neglig.	1959	1972
William Marsh Rice University	AGN-211-101	Houston, Tex.	AGN	Homog. solid, pool	Neglig.	1959	1965
Wyoming, University of	L-77	Laramie, Wyo.	AI	Homogeneous	Neglig.	1959	1974

PART II PRODUCTION REACTORS

1. MATERIALS PRODUCTION AS OF 31 DEC 1986

(All owned by DOE)

Designation	Nuclear designer	Location	Type	Start-up	Shut-down
OPERABLE*					
‡C Reactor	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1955	
K Reactor	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1954	
†L Reactor	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1954	1968
P Reactor	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1954	
SHUT DOWN OR DISMANTLED					
B Reactor	Du Pont	Richland, Wash.	Graphite	1944	1968
C Reactor	GE	Richland, Wash.	Graphite	1952	1969
D Reactor	Du Pont	Richland, Wash.	Graphite	1944	1967
DR Reactor	GE	Richland, Wash.	Graphite	1950	1964
F Reactor	Du Pont	Richland, Wash.	Graphite	1945	1965
H Reactor	GE	Richland, Wash.	Graphite	1949	1965
KE Reactor	GE	Richland, Wash.	Graphite	1955	1971
KW Reactor	GE	Richland, Wash.	Graphite	1955	1970
‡R Reactor	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1953	1964

2. PROCESS DEVELOPMENT

Name (all owned by DOE)	Designation	Nuclear designer	Location	Type	Authorized power, kW(t)	Initial criticality	Shut-down
SHUT DOWN OR DISMANTLED							
Hanford 305 Test Reactor	HTR	Du Pont	Richland, Wash.	Graphite	Neglig.	1944	1976
‡Lattice Test Reactor	LTR	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1	1967	1979
‡Process Development Pile	PDP	Du Pont	Savannah River Plant, Aiken, S. C.	Heavy water	1	1953	1979
§SR 305-M Test Pile[87]	Test Pile	Du Pont	Savannah River Plant, Aiken, S. C.	Graphite	1	1953	1983
‡Standard Pile/Subcritical Experimental Complex[88]	SP/SE	Du Pont	Savannah River Laboratory, Aiken, S. C.	Graphite	2–10	1953	1979

*The N Reactor, Richland, Wash., is listed on page 13; see also footnote 11.
†Shut down 1968; restarted 10-85.
‡Standby.
§Dismantled.

1. DEFENSE POWER-REACTOR APPLICATIONS AS OF 31 DEC 1986

A. Remote Installations

Name (all owned by DOD)	Designation[57]	Location	Principal nuclear contractor	Type	Power: Capacity net kW(e)	Power: Authorized kW(t)	Initial criticality	Shut-down
SHUT DOWN OR DISMANTLED								
Portable Medium Power Plant No. 1	PM-1	Sundance, Wyo.	Martin	Pressurized water	1,000	9,370	1962	1968
Portable Medium Power Plant No. 2A[59]	PM-2A	Camp Century, Greenland	Alco	Pressurized water	1,560	10,000	1960	1963
Portable Medium Power Plant No. 3A	PM-3A	McMurdo Sound, Antarctica	Martin	Pressurized water	1,500	9,510	1962	1973
Stationary Medium Power Plant No. 1	SM-1	Fort Belvoir, Va.	Alco	Pressurized water	1,855	10,000	1957	1973
Stationary Medium Power Plant No. 1A[60]	SM-1A	Fort Greely, Alaska	Alco	Pressurized water	1,650	20,200	1962	1972
STURGIS Floating Nuclear Power Plant[58]	MH-1A	Gatun Lake, Canal Zone	Martin	Pressurized water	10,000	45,000	1967	1976

B. Propulsion (Naval)

Name (all owned by U. S. Navy)	Designation[61]	Shipbuilder	Start-up
OPERABLE			
USS SWORDFISH	SSN579	Portsmouth	1958
USS SKIPJACK	SSN585	Electric Boat (Groton)	1958
USS SCAMP	SSN588	San Francisco Bay	1961
USS SCULPIN	SSN590	Ingalls	1961
USS SHARK	SSN591	Newport News	1960
USS PERMIT	SSN594	San Francisco Bay	1962
USS PLUNGER	SSN595	San Francisco Bay	1962
USS BARB	SSN596	Ingalls	1963
USS TULLIBEE	SSN597	Electric Boat (Groton)	1960
USS POLLACK	SSN603	NYSC	1963
USS HADDO	SSN604	NYSC	1964
USS JACK	SSN605	Portsmouth	1965
USS TINOSA	SSN606	Portsmouth	1963
USS DACE	SSN607	Ingalls	1963
USS SAM HOUSTON	SSN609	Electric Boat (Groton)	1961
USS JOHN MARSHALL	SSN611	Ingalls	1962
USS GUARDFISH	SSN612	NYSC	1966
USS FLASHER	SSN613	Electric Boat (Groton)	1966
USS GREENLING	SSN614	GD (Quincy)	1967
USS GATO	SSN615	GD (Quincy)	1967
USS HADDOCK	SSN621	Ingalls	1967
USS STURGEON	SSN637	Electric Boat (Groton)	1966
USS WHALE	SSN638	GD (Quincy)	1968
USS TAUTOG	SSN639	Ingalls	1968
USS GRAYLING	SSN646	Portsmouth	1969
USS POGY	SSN647	NYSC/Ingalls	1970
OPERABLE (Continued)			
USS ASPRO	SSN648	Ingalls	1968
USS SUNFISH	SSN649	GD (Quincy)	1968
USS PARGO	SSN650	Electric Boat (Groton)	1967
USS QUEENFISH	SSN651	Newport News	1966
USS PUFFER	SSN652	Ingalls	1969
USS RAY	SSN653	Newport News	1967
USS SAND LANCE	SSN660	Portsmouth	1971
USS LAPON	SSN661	Newport News	1967
USS GURNARD	SSN662	San Francisco Bay	1968
USS HAMMERHEAD	SSN663	Newport News	1967
USS SEA DEVIL	SSN664	Newport News	1968
USS GUITARRO	SSN665	Mare Island	1972
USS HAWKBILL	SSN666	Mare Island	1970
USS BERGALL	SSN667	Electric Boat (Groton)	1969
USS SPADEFISH	SSN668	Newport News	1969
USS SEA HORSE	SSN669	Electric Boat (Groton)	1969
USS FINBACK	SSN670	Newport News	1969
USS NARWHAL	SSN671	Electric Boat (Groton)	1969
USS PINTADO	SSN672	Mare Island	1970
USS FLYING FISH	SSN673	Electric Boat (Groton)	1969
USS TREPANG	SSN674	Newport News	1970
USS BLUEFISH	SSN675	Newport News	1970
USS BILLFISH	SSN676	Newport News	1970
USS DRUM	SSN677	Newport News	1971
USS ARCHERFISH	SSN678	Electric Boat (Groton)	1971
USS SILVERSIDES	SSN679	Newport News	1971

1. DEFENSE POWER-REACTOR APPLICATIONS AS OF 31 DEC 1986

B. Propulsion (Naval) (Continued)

Name (all owned by U. S. Navy)	Designation[61]	Shipbuilder	Start-up
OPERABLE (Continued)			
USS WILLIAM H. BATES	SSN680	Electric Boat (Groton)	1972
USS BATFISH	SSN681	Newport News	1972
USS TUNNY	SSN682	Electric Boat (Groton)	1973
USS PARCHE	SSN683	Electric Boat (Groton)	1974
USS CAVALLA	SSN684	Electric Boat (Groton)	1972
USS GLENARD P. LIPSCOMB	SSN685	San Francisco Bay	1974
USS L. MENDELL RIVERS	SSN686	Newport News	1974
USS RICHARD B. RUSSELL	SSN687	Portsmouth	1974
USS LOS ANGELES	SSN688	Electric Boat (Groton)	1976
USS BATON ROUGE	SSN689	Newport News	1977
USS PHILADELPHIA	SSN690	Electric Boat (Groton)	1976
USS MEMPHIS	SSN691	Newport News	1977
USS OMAHA	SSN692	Electric Boat (Groton)	1977
USS CINCINNATI	SSN693	Electric Boat (Groton)	1977
USS GROTON	SSN694	Electric Boat (Groton)	1977
USS BIRMINGHAM	SSN695	Newport News	1978
USS NEW YORK CITY	SSN696	Electric Boat (Groton)	1978
USS INDIANAPOLIS	SSN697	Electric Boat (Groton)	1979
USS BREMERTON	SSN698	Electric Boat (Groton)	1979
USS JACKSONVILLE	SSN699	Electric Boat (Groton)	1979
USS DALLAS	SSN700	Electric Boat (Groton)	1980
USS LA JOLLA	SSN701	Electric Boat (Groton)	1981
USS PHOENIX	SSN702	Electric Boat (Groton)	1981
USS BOSTON	SSN703	Electric Boat (Groton)	1981
USS BALTIMORE	SSN704	Electric Boat (Groton)	1982
USS CITY OF CORPUS CHRISTI	SSN705	Electric Boat (Groton)	1982
USS ALBUQUERQUE	SSN706	Electric Boat (Groton)	1982
USS PORTSMOUTH	SSN707	Electric Boat (Groton)	1983
USS MINNEAPOLIS-SAINT PAUL	SSN708	Electric Boat (Groton)	1983
USS HYMAN G. RICKOVER	SSN709	Electric Boat (Groton)	1984
USS AUGUSTA	SSN710	Electric Boat (Groton)	1984
USS SAN FRANCISCO	SSN711	Newport News	1980
USS ATLANTA	SSN712	Newport News	1981
USS HOUSTON	SSN713	Newport News	1982
USS NORFOLK	SSN714	Newport News	1983
USS BUFFALO	SSN715	Newport News	1983
USS SALT LAKE CITY	SSN716	Newport News	1983
USS OLYMPIA	SSN717	Newport News	1984
USS HONOLULU	SSN718	Newport News	1985
USS PROVIDENCE	SSN719	Electric Boat (Groton)	1985
USS PITTSBURGH	SSN720	Electric Boat (Groton)	1985
USS CHICAGO	SSN721	Newport News	1986

Name (all owned by U. S. Navy)	Designation[61]	Shipbuilder	Start-up
OPERABLE (Continued)			
USS GEORGIA	SSBN729	Electric Boat (Groton)	1983
USS HENRY M. JACKSON	SSBN730	Electric Boat (Groton)	1984
USS ALABAMA	SSBN731	Electric Boat (Groton)	1984
USS ALASKA	SSBN732	Electric Boat (Groton)	1985
USS NEVADA	SSBN733	Electric Boat (Groton)	1986
USS LONG BEACH (2 reactors)	CGN9	Bethlehem	1961
USS BAINBRIDGE (2 reactors)	CGN25	Bethlehem	1962
USS TRUXTUN (2 reactors)	CGN35	NYSC	1967
USS CALIFORNIA (2 reactors)	CGN36	Newport News	1973
USS SOUTH CAROLINA (2 reactors)	CGN37	Newport News	1974
USS VIRGINIA (2 reactors)	CGN38	Newport News	1976
USS TEXAS (2 reactors)	CGN39	Newport News	1977
USS MISSISSIPPI (2 reactors)	CGN40	Newport News	1978
USS ARKANSAS (2 reactors)	CGN41	Newport News	1980
USS ENTERPRISE (8 reactors)	CVN65	Newport News	1960
USS NIMITZ (2 reactors)	CVN68	Newport News	1974
USS DWIGHT D. EISENHOWER (2 reactors)	CVN69	Newport News	1977
USS CARL VINSON (2 reactors)	CVN70	Newport News	1981
USS THEODORE ROOSEVELT (2 reactors)	CVN71	Newport News	1986
Deep Submergence Research Vehicle	NR-1	Electric Boat (Groton)	1969
BEING BUILT			
KEY WEST	SSN722	Newport News	
OKLAHOMA CITY	SSN723	Newport News	
HELENA	SSN725	Electric Boat (Groton)	
NEWPORT NEWS	SSN750	Newport News	
SAN JUAN	SSN751	Electric Boat (Groton)	
PASADENA	SSN752	Electric Boat (Groton)	
ALBANY	SSN753	Newport News	
Submarine	SSN754	Electric Boat (Groton)	
MIAMI	SSN755	Electric Boat (Groton)	
SCRANTON	SSN756	Newport News	
ASHEVILLE	SSN757	Electric Boat (Groton)	
Submarine	SSN758	Newport News	
Submarine	SSN759	Newport News	
TENNESSEE	SSBN734	Electric Boat (Groton)	
Submarine	SSBN735	Electric Boat (Groton)	
Submarine	SSBN736	Electric Boat (Groton)	
Submarine	SSBN737	Electric Boat (Groton)	

USS LOUISVILLE	SSN724	Electric Boat (Groton)	1986
USS LAFAYETTE	SSBN616	Electric Boat (Groton)	1963
USS ALEXANDER HAMILTON	SSBN617	Electric Boat (Groton)	1963
USS ANDREW JACKSON	SSBN619	San Francisco Bay	1963
USS JOHN ADAMS	SSBN620	Portsmouth	1964
USS JAMES MONROE	SSBN622	Newport News	1963
USS WOODROW WILSON	SSBN624	San Francisco Bay	1963
USS HENRY CLAY	SSBN625	Newport News	1963
USS DANIEL WEBSTER	SSBN626	Electric Boat (Groton)	1964
USS JAMES MADISON	SSBN627	Newport News	1964
USS TECUMSEH	SSBN628	Electric Boat (Groton)	1964
USS DANIEL BOONE	SSBN629	San Francisco Bay	1963
USS JOHN C. CALHOUN	SSBN630	Newport News	1964
USS ULYSSES S. GRANT	SSBN631	Electric Boat (Groton)	1964
USS VON STEUBEN	SSBN632	Newport News	1964
USS CASIMIR PULASKI	SSBN633	Electric Boat (Groton)	1964
USS STONEWALL JACKSON	SSBN634	San Francisco Bay	1964
USS SAM RAYBURN	SSBN635	Newport News	1964
USS BENJAMIN FRANKLIN	SSBN640	Electric Boat (Groton)	1965
USS SIMON BOLIVAR	SSBN641	Newport News	1965
USS KAMEHAMEHA	SSBN642	San Francisco Bay	1965
USS GEORGE BANCROFT	SSBN643	Electric Boat (Groton)	1965
USS LEWIS AND CLARK	SSBN644	Newport News	1965
USS JAMES K. POLK	SSBN645	Electric Boat (Groton)	1966
USS GEORGE C. MARSHALL	SSBN654	Newport News	1966
USS HENRY L. STIMSON	SSBN655	Electric Boat (Groton)	1966
USS GEORGE WASHINGTON CARVER	SSBN656	Newport News	1966
USS FRANCIS SCOTT KEY	SSBN657	Electric Boat (Groton)	1966
USS MARIANO G. VALLEJO	SSBN658	San Francisco Bay	1966
USS WILL ROGERS	SSBN659	Electric Boat (Groton)	1967
USS OHIO	SSBN726	Electric Boat (Groton)	1980
USS MICHIGAN	SSBN727	Electric Boat (Groton)	1982
USS FLORIDA	SSBN728	Electric Boat (Groton)	1982
Submarine	SSBN738	Electric Boat (Groton)	
Submarine	SSBN760	Electric Boat (Groton)	
Submarine	SSBN761	Electric Boat (Groton)	
Submarine	SSBN762	Electric Boat (Groton)	
Submarine	SSBN763	Electric Boat (Groton)	
ABRAHAM LINCOLN	CVN72	Newport News	
GEORGE WASHINGTON	CVN73	Newport News	

Name (all owned by U. S. Navy)	Designation[61]	Shipbuilder	Start-up	Shut-down
SHUT DOWN OR DISMANTLED				
USS NAUTILUS	SSN571	Electric Boat (Groton)	1954	1980
USS SEAWOLF PWR[62]	SSN575	Electric Boat (Groton)	1960	1986
USS SEAWOLF Sodium Reactor[62]	SSN575	Electric Boat (Groton)	1957	1959
USS SKATE	SSN578	Electric Boat (Groton)	1957	1985
USS SARGO	SSN583	San Francisco Bay	1958	1986
USS SEADRAGON	SSN584	Portsmouth	1959	1983
USS TRITON (2 reactors)	SSN586	Electric Boat (Groton)	1959	1968
USS HALIBUT	SSN587	San Francisco Bay	1959	1976
USS SCORPION[63]	SSN589	Electric Boat (Groton)	1960	1968
USS SNOOK	SSN592	Ingalls	1961	1986
USS THRESHER[63]	SSN593	Portsmouth	1961	1963
USS GEORGE WASHINGTON	SSN598	Electric Boat (Groton)	1959	1984
USS PATRICK HENRY[77]	SSN599	Electric Boat (Groton)	1960	1983
USS ROBERT E. LEE	SSN601	Electric Boat (Groton)	1960	1983
USS ETHAN ALLEN	SSN608	Ingalls	1961	1982
USS THOMAS A. EDISON	SSN610	Ingalls	1961	1983
USS THOMAS JEFFERSON	SSN618	Newport News	1962	1984
USS THEODORE ROOSEVELT	SSBN600	Mare Island	1960	1981
USS ABRAHAM LINCOLN	SSBN602	Electric Boat (Groton)	1960	1981
USS NATHAN HALE	SSBN623	Electric Boat (Groton)	1963	1986
USS NATHANAEL GREENE	SSBN636	Portsmouth	1964	1986

2. DEVELOPMENTAL POWER

A. Electric-Power Experiments and Prototypes

Name (all owned by DOE)	Designation[57]	Location	Principal nuclear contractor	Type	Power			
					Capacity, net kW(e)	Authorized, kW(t)	Initial criticality	Shut-down
SHUT DOWN OR DISMANTLED								
Gas Cooled Reactor Experiment	GCRE	INEL Site, Idaho	AGN	Gas cooled, light water moderated	No elec.	2,200	1960	1962
Mobile Low Power Plant No. 1	ML-1	INEL Site, Idaho	AGN	Gas cooled, light water moderated	300	3,300	1961	1965
Stationary Low Power Plant No. 1	SL-1	INEL Site, Idaho	ANL	Boiling water	300	2,200	1958	1961

B. Propulsion Experiments and Prototypes

OPERABLE								
Destroyer Reactor Prototype	D1G	West Milton, N. Y.	GE	Pressurized water			1962	
Large Ship Reactor Prototype (2 reactors)	A1W	INEL Site, Idaho	West.	Pressurized water			1958	
Modifications and Additions to Reactor Facility	MARF	West Milton, N. Y.	GE	Pressurized water			1976	
Natural Circulation Test Plant	S5G	INEL Site, Idaho	West.	Pressurized water			1965	
Small Submarine Reactor Prototype	S1C	Windsor, Conn.	GE	Pressurized water			1959	
S1W Reactor Facility	S1W	INEL Site, Idaho	West.	Pressurized water			1953	
Submarine Advanced Reactor Prototype	S3G	West Milton, N. Y.	GE	Pressurized water			1958	
Trident Prototype	S8G	West Milton, N.Y.	GE	Pressurized water			1978	
SHUT DOWN OR DISMANTLED								
Aircraft Reactor Experiment	ARE	Oak Ridge, Tenn.	ORNL	Molten salt		1,500	1954	1954
Experimental Propulsion Test Reactor	TORY IIA	NTS, Nev.	LLNL	Air cooled		150,000	1960	1961
Experimental Propulsion Test Reactor[64]	TORY IIC	NTS, Nev.	LLNL	Air cooled		600,000	1964	1964
Heat Transfer Reactor Experiment No. 1	HTRE-1	INEL Site, Idaho	ANPD	Air cooled		20,000	1956	1957
Heat Transfer Reactor Experiment No. 2	HTRE-2	INEL Site, Idaho	ANPD	Air cooled		14,000	1957	1961
Heat Transfer Reactor Experiment No. 3	HTRE-3	INEL Site, Idaho	ANPD	Air cooled		32,000	1958	1961
Submarine Intermediate Reactor Mark A	S1G	West Milton, N.Y.	GE	Sodium			1955	1957

3. TEST AND RESEARCH

A. Test

Name (all owned by DOE)	Designation[57]	Location	Principal nuclear contractor	Type	Power Authorized, kW(t)	Initial criticality	Shut-down
SHUT DOWN OR DISMANTLED							
*Aerospace Systems Test Reactor (USAF)	ASTR	Fort Worth, Tex.	Convair	Light water	10,000	1954	1971
†Ground Test Reactor (USAF)	GTR	Fort Worth, Tex.	Convair	Pool	10,000	1953	1973
Nuclear Engineering Test Reactor (USAF)	NETR	Dayton, Ohio	Maxon-AC	Tank	10,000	1965	1970

B. Research

OPERABLE							
Aberdeen Pulsed Reactor Facility (Ballistic Research Laboratories, USA)	APRF	Aberdeen, Md.	UNC	Bare, fast, prompt burst	10	1968	
Armed Forces Radiobiology Research Institute (DNA, DOD)[3,30]	AFRRI	Bethesda, Md.	GA	TRIGA-Mk F	1,000	1962	
Fast Burst Reactor Facility (Army Missile Test and Evaluation Directorate, USA)	FBRF	White Sands, N. Mex.	Kaman	Bare, fast, prompt burst	10	1964	
SHUT DOWN OR DISMANTLED							
Army Materials Research Reactor (Army Materials and Mechanics Research Center, USA)[3]	AMRR	Watertown, Mass.	BAC	Pool	5,000	1960	1970
Diamond Ordnance Radiation Facility (Harry Diamond Laboratories, USA)[30]	DORF	Forest Glen, Md.	GA	TRIGA-Mk F	250	1961	1977
Naval Research Reactor (USN)[3]	NRR	Washington, D. C.	NRL	Pool	1,000	1956	1970
‡Nuclear Effects Reactor (DOE)	Super KUKLA	NTS, Nev.	LLNL	Prompt burst	Transient	1964	1979
Thermal Test Reactor No. 1 (DOE)	TTR-1	Schenectady, N. Y.	KAPL	Graphite	10	1951	1983
Walter Reed Research Reactor (Walter Reed Army Institute of Research, USA)[3]	WRRR	Washington, D. C.	AI	Homogeneous	50	1962	1970

*Defueled in 1971; decommissioning began in 1973 and completed in 1974.

†Decommissioning began in 1973 and completed in 1974.

‡Standby; fuel is in storage at ORNL.

1. POWER REACTORS[65] AS OF 31 DEC 1986

A. Central-Station Electric Power Plants

Name and/or owner	Location	Principal nuclear contractor	Type	Power		Initial criticality	Shut-down
				Design, net MW(e)	MW(t)		
OPERABLE							
Belgium, Doel, Unit 1	Antwerp	West.	Pressurized water	392	1192	1975	
Belgium, Doel, Unit 2	Antwerp	West.	Pressurized water	392	1192	1975	
Belgium, Doel, Unit 4	Antwerp	West.	Pressurized water	1006	3000	1985	
Belgium, Tihange, Unit 1	Huy, Liege	Fram/West., ACEC	Pressurized water	870	2660	1975	
Belgium, Tihange, Unit 3	Huy, Liege	West.	Pressurized water	1006	3000	1985	
Brazil, Central Electricia de Furnas, Unit 1	Angra dos Reis	West	Pressurized water	626	1882	1985	
France, Franco-Belgian Society for Nuclear Energy of Ardennes, SENA	Givet (near Chooz)	Fram/West., ACEC	Pressurized water	305	1040	1967	
India, Tarapur Nuclear Power Station, Unit 1	Tarapur (near Bombay)	GE	Boiling water	200	707	1969	
India, Tarapur Nuclear Power Station, Unit 2	Tarapur (near Bombay)	GE	Boiling water	200	707	1969	
Italy, Caorso Nuclear Station (ENEL)	Piacenza/Cremona	GE	Boiling water	840	2651	1979	
Italy, Project Enrico Fermi of SELNI, Edisonvolta (ENEL)	Trino Vercellese	West.	Pressurized water	260	825	1965	
Japan, Fukushima Dai-ichi Power Station, Unit 1 (Tokyo Electric Power Co.)	Okuma, Fukushima Pref.	GE	Boiling water	439	1380	1971	
Japan, Fukushima Dai-ichi Power Station, Unit 2 (Tokyo Electric Power Co.)	Okuma, Fukushima Pref.	GE, Toshiba	Boiling water	760	2381	1974	
Japan, Fukushima Dai-ichi Power Station, Unit 6 (Tokyo Electric Power Co.)	Futaba, Fukushima Pref.	GE, Toshiba	Boiling water	1067	3293	1979	
Japan, Mihama Power Station, Unit 1 (Kansai Electric Power Co.)	Mihama, Fukui Pref.	West., Mitsubishi	Pressurized water	320	1031	1970	
Japan, Ohi Power Station, Unit 1 (Kansai Electric Power Co.)	Ohi, Fukui Pref.	West., Mitsubishi	Pressurized water	1120	3423	1979	
Japan, Ohi Power Station, Unit 2 (Kansai Electric Power Co.)	Ohi, Fukui Pref.	West., Mitsubishi	Pressurized water	1120	3423	1979	
Japan, Takahama Power Station, Unit 1 (Kansai Electric Power Co.)	Takahama, Fukui Pref.	West., Mitsubishi	Pressurized water	780	2440	1974	
Japan, Tokai No. 2 Power Station (Japan Atomic Power Co.)	Tokai-Mura, Ibaraki Pref.	GE, Hitachi, Shimizu	Boiling water	1080	3293	1978	
Japan, Tsuruga Power Station (Japan Atomic Power Co.)	Tsuruga, Fukui Pref.	GE	Boiling water	341	1064	1970	
Korea, Unit 1 (Korea Electric Power Co.)	Ko-Ri (near Pusan)	West.	Pressurized water	587	1723	1977	
Korea, Unit 2 (Korea Electric Co.)	Ko-Ri (near Pusan)	West.	Pressurized water	650	1876	1983	
Korea, Unit 5 (Korea Electric Co.)	Ko-Ri (near Pusan)	West.	Pressurized water	950	2775	1985	
Korea, Unit 6 (Korea Electric Co.)	Ko-Ri (near Pusan)	West.	Pressurized water	950	2775	1985	
Korea, Unit 7 (Korea Electric Co.)	Gyema (near Kwang Ju)	West.	Pressurized water	950	2775	1986	
Netherlands, Dodewaard (GKN)[26]	Dodewaard, Betuwe	GE	Boiling water	55	183	1968	
Spain, Almaraz, Unit 1 (Union Electrica, S. A.)	Almaraz	West.	Pressurized water	930	2696	1981	
Spain, Almaraz, Unit 2 (Union Electrica, S. A.)	Almaraz	West.	Pressurized water	930	2696	1983	
Spain, Asco, Unit 1 (FECSA)	Asco	West.	Pressurized water	930	2696	1983	
Spain, Asco, Unit 2 (FECSA)	Asco	West.	Pressurized water	930	2696	1985	
Spain, Cofrentes, Unit 1 (Hidroelectrica Española, S. A.)	Cofrentes	GE	Boiling water	975	2900	1984	
Spain, José Cabrera (Union Electrica, S. A.)	Zorita de los Canes	West.	Pressurized water	160	510	1969	
Spain, Santa Maria de Garona (Centrales Nucleares del Norte, S. A., Nuclenor)	S.M. Goroña, Burgos	GE	Boiling water	440	1381	1970	
Sweden, Ringhals, Unit 2 (Swedish State Power Board)	Värö (near Göteborg)	West.	Pressurized water	822	2440	1975	
Sweden, Ringhals, Unit 3 (Swedish State Power Board)	Värö (near Göteborg)	West.	Pressurized water	915	2783	1981	
Sweden, Ringhals, Unit 4 (Swedish State Power Board)	Värö (near Göteborg)	West.	Pressurized water	915	2783	1983	
Switzerland, Beznau, Unit 1 (Nordostschweizerische Kraftwerke AG)	Döttingen	West.	Pressurized water	350	1130	1969	
Switzerland, Beznau, Unit 2 (Nordostschweizerische Kraftwerke AG)	Döttingen	West.	Pressurized water	350	1130	1972	
Switzerland, Leibstadt (Kernkraftwerk Leibstadt)	Leibstadt	GE	Boiling water	942	3012	1984	
Switzerland, Mühleberg (Bernische Kraftwerke AG)	Mühleberg (near Bern)	GE	Boiling water	320	997	1971	

Taiwan, Chin-shan, Unit 1 (Taiwan Power Co.)	Chin-shan	GE	Boiling water	604	1775	1978	
Taiwan, Chin-shan, Unit 2 (Taiwan Power Co.)	Chin-shan	GE	Boiling water	604	1775	1979	
Taiwan, Kuosheng, Unit 1 (Taiwan Power Co.)	Wanli Hsiang	GE	Boiling water	951	2894	1981	
Taiwan, Kuosheng, Unit 2 (Taiwan Power Co.)	Wanli Hsiang	GE	Boiling water	951	2894	1982	
Taiwan, Maanshan, Unit 1 (Taiwan Power Co.)	Heng-chun	West.	Pressurized water	907	2785	1984	
Taiwan, Maanshan, Unit 2 (Taiwan Power Co.)	Heng-chun	West.	Pressurized water	907	2785	1985	
Yugoslavia (Savske Electrane)	Krsko	West.	Pressurized water	615	1882	1983	
BEING BUILT							
Italy, ALTO LAZIO, ENEL-1 [Ente Nazionale per l'Energia Electtrica (ENEL)]	Montalto di Castro	GE	Boiling water	982	2894	1991	
Italy, ALTO LAZIO, ENEL-2 [Ente Nazionale per l'Energia Electtrica (ENEL)]	Montalto di Castro	GE	Boiling water	982	2894	1992	
Korea, Unit 8 (Korea Electric Co.)	Gyema (near Kwang Ju)	West.	Pressurized water	900	2775	1987	
Mexico, Laguna Verde Station, Unit 1	Laguna Verde	GE	Boiling water	654	1931	1988	
Mexico, Laguna Verde Station, Unit 2	Laguna Verde	GE	Boiling water	654	1931	1990	
Philippines, Republic of the Philippine Nuclear Power Plant, Unit 1 (National Power Corp.)	Napot Point Morong, Bataan, Luzon	West.	Pressurized water	620	1876	Indef.	
Spain, Lemoniz, Unit 2 (Iberduero, S. A.)	Lemoniz	West.	Pressurized water	930	2696	Indef.	
Spain, Valdecaballeros, Unit 1 (HE: Sevillana de Electricidad)	Valdecaballeros, Badajos	GE	Boiling water	975	2894	Indef.	
Spain, Valdecaballeros, Unit 2 (HE: Sevillana de Electricidad)	Valdecaballeros, Badajos	GE	Boiling water	975	2894	Indef.	
Spain, Vandellos, Unit 2 (ENHER)	Tarragona	West.	Pressurized water	950	2785	1988	
PLANNED							
Egypt, El Dabaa, Unit 1 (Nuclear Power Plants Authority)	El Dabaa (near Alexandria)	West.	Pressurized water	950	1300	Indef.	
Korea, Unit 11 (Korea Electric Co.)			Pressurized water	900		1995	
Korea, Unit 12 (Korea Electric Co.)			Pressurized water	900		1996	
Spain, Lemoniz, Unit 1 (Iberduero, S. A.)	Lemoniz	West.	Pressurized water	930	2696	Indef.	
Spain, Sayago (Iberduero, S. A.)	Sayago Zomora	West.	Pressurized water	1075	2785	Indef.	
Switzerland, Graben (Bernische Kraftwerke AG)	Graben	GE	Boiling water	1140	3579	Indef.	
Switzerland, Kaiseraugst (Kernkraftwerke Kaiseraugst AG)	Kaiseraugst (near Basel)	GE	Boiling water	942	3012	Indef.	
Taiwan, Unit 7 (Taiwan Power Co.)	Yenliao			900–1200		1992	
Taiwan, Unit 8 (Taiwan Power Co.)	Yenliao			900–1200		1993	
SHUT DOWN OR DISMANTLED							
Germany, Kahl Nuclear Power Station (Rhine-Westphalia Power Co., RWE)	Kahl-am-Main	GE	Boiling water	15.6	60	1961	1985
Germany, Kernkraftwerk-RWE-Bayernwerk, KRB1	Gundremmingen (near Gunzburg)	GE	Boiling water	237	801	1967	1980
Italy, Garigliano Nuclear Power Station (Project ENEL of SENN)	Punta Fiume (on Garigliano River)	GE	Boiling water	150	506	1964	1978
Japan, Japan Power Demonstration Reactor (JAERI)	Tokai-Mura, Ibaraki Pref.	GE	Boiling water	12	90	1963	1983

1. POWER REACTORS AS OF 31 DEC 1986

B. Propulsion

Name	Owner	Designer	Designation	Type	Start-up	Shut-down
OPERABLE						
S5W for HMS DREADNOUGHT	Great Britain	West.	S5W	Pressurized water	1962	

2. TEST, RESEARCH, AND TEACHING

A. General Irradiation Test

Owner	Location	Principal nuclear contractor	Type	Authorized power kW(t)	Initial criticality	Shut-down
OPERABLE						
Japan, Japan Atomic Energy Research Institute	Tokai-Mura, Ibaraki Pref.	AMF	Heavy water, CP-5	10,000	1960	
Japan, Japan Atomic Energy Research Institute[30]	Tokai-Mura, Ibaraki Pref.	GA	TRIGA-ACPR	300	1975	
Netherlands, Energy Center[66]	Petten	AC	Tank (MTR)	45,000	1961	
Romania, Institute for Nuclear Technologies	Bucharest	GA	TRIGA-ACPR	500	1979	
Romania, Institute for Nuclear Technologies	Bucharest	GA	TRIGA (MPR 16)	14,000	1979	
South Africa, Atomic Energy Board	Pelindaba (near Pretoria)	AC	Tank	20,000	1965	
Sweden, Studsvik Energiteknik	Studsvik	AC	Tank (MTR)	50,000	1960	

B. General Research

OPERABLE						
Australia, Atomic Energy Commission	Lucas Heights, New South Wales	AS Inc.	UTR-10	15	1961	
Austria, Seibersdorf Research Center	Seibersdorf	AMF	Pool	5,000	1960	
Bangladesh, Institute of Nuclear Technology	Dacca	GA	TRIGA-Mk II	3,000	1986	
Colombia, Colombian Institute of Nuclear Affairs	Bogotá	Lockheed	Pool	20	1965	
Denmark, Risö National Laboratory (DR-1)	Risö	AI	L-55	2.0	1957	
England (Imperial Chemical Industries)	Billingham, Teesside	GA	TRIGA-Mk I	250	1971	
Greece, Atomic Energy Commission	Athens	AMF	Pool	1,000	1961	
Indonesia, National Atomic Energy Agency	Bandung	GA	TRIGA-Mk II	1,000	1964	
Indonesia, National Atomic Energy Agency[84]	Yogyakarta	GA	TRIGA-Mk II	250	1979	
Israel, Atomic Energy Commission	Nahal Soreq	AMF	Pool	5,000	1960	
Italy, European Community Commission	Ispra	AC	Heavy water, tank	5,000	1959	
Italy, National Committee for Nuclear Energy	Rome	GA	TRIGA-Mk II	1,000	1960	

Korea, Advanced Energy Research Institute	Seoul	GA	TRIGA-Mk II	250	1962	
Korea, Advanced Energy Research Institute	Seoul	GA	TRIGA-Mk III	2,000	1972	
Malaysia, Tun Ismail Atomic Research Centre	Kuala Lumpur	GA	TRIGA-Mk II	1,000	1982	
Mexico, National Commission for Nuclear Energy[30]	Salazar	GA	TRIGA-Mk III	1,000	1968	
Pakistan, Atomic Energy Commission	Islamabad	AMF	Pool	5,000	1965	
Philippines, Republic of the, Philippine Atomic Energy Commission (PRR-1)[91]	Quezon City	GA	TRIGA Conversion	3,000	1976	
Portugal, National Laboratory of Engineering and Industrial Technology	Sacavém	AMF	Pool	1,000	1961	
Spain, Nuclear Energy Board-JEN	Madrid	GE	Pool	3,000	1958	
Switzerland, Institute for Reactor Research[68]	Wuerenlingen	ORNL	Pool	10,000	1957	
Thailand, Office of Atomic Energy for Peace[30,69]	Bangkok	GA	TRIGA-Mk III Conversion	1,000	1977	
Turkey, Atomic Energy Commission	Istanbul	AMF	Pool	1,000	1962	
Turkey, Technical University of Istanbul	Istanbul	GA	TRIGA-Mk II	250	1979	
Venezuela Institute for Scientific Research	Caracas	GE	Pool	3,000	1960	
Yugoslavia, Josef Stefan Nuclear Institute[30]	Ljubljana	GA	TRIGA-Mk II	250	1966	
Zaire (Regional Center for Nuclear Studies)[70]	Kinshasa	GA	TRIGA-Mk II	1,000	1959	
BEING BUILT						
Morocco, Mohammed V University	Rabat	GA	TRIGA-Mk I	100		
SHUT DOWN OR DISMANTLED						
Denmark, Risö National Laboratory (DR-2)	Risö	FW	Tank	5,000	1958	1975
Italy, Center for Military Application of Nuclear Energy	Near Pisa	B&W	Pool	Pulsing	1963	1980
Italy, National Committee for Nuclear Energy	Padua	AMF	Pool	Neglig.	1971	1979
Italy, Fiat TTG	Saluggia	AMF	Pool	7,000	1959	1973
Japan, Japan Atomic Energy Research Institute	Tokai-Mura, Ibaraki Pref.	AI	L-54	50	1957	1969
Vietnam, Vietnam Institute of Nuclear Research	Dalat	GA	TRIGA-Mk II	250	1963	1973
West Berlin, City of (Institute for Nuclear Research)	West Berlin	AI	L-54	50	1958	1970

C. University Research and Teaching

OPERABLE						
Austria, Vienna Polytechnic Institute[30]	Vienna	GA	TRIGA-Mk II	250	1962	
Brazil, University of Minas Gerais	Belo Horizonte	GA	TRIGA-Mk I	100	1960	
Brazil, University of São Paulo	São Paulo	B&W	Pool	5,000	1957	
Canada, McMaster University	Hamilton, Ont.	AMF	Pool	5,000	1959	
China, Republic of (National Tsing-Hua University)	Hsinchu	GA	TRIGA Conversion	1,000	1977	
Finland, Institute of Technology[30]	Helsinki	GA	TRIGA-Mk II	250	1962	
Germany, Institute for Nuclear Medicine[81]	Heidelberg	GA	TRIGA-MK I	250	1966	
Germany, Johannes Gutenberg University of Mainz[30]	Mainz	GA	TRIGA-Mk II	100	1965	
Germany, Medical College of Hanover[71]	Hanover	GA	TRIGA-Mk I	250	1973	
Germany, Technical University of Munich	Munich	AMF	Pool	4,000	1957	
Iran, University of Tehran	Tehran	AMF	Pool	5,000	1967	
Italy, University of Milan	Milan	AI	L-54	50	1959	
Italy, University of Palermo	Palermo	AGN	201-110	Neglig.	1960	
Italy, University of Pavia[30]	Pavia	GA	TRIGA-Mk II	250	1965	
Japan, Kinki University	Higashi-Osaka	AS Inc.	UTR-10	Neglig.	1961	
Japan, Musashi College of Technology	Kawasaki	GA	TRIGA-Mk II	100	1963	
Japan, Rikkyo University	Yokosuka	GA	TRIGA-Mk II	100	1961	
Korea, University of Kyang Hee	Seoul	AGN	201	Neglig.	1982	

PART IV EXPORT REACTORS

2. TEST, RESEARCH, AND TEACHING AS OF 31 DEC 1986

C. University Research and Teaching (Continued)

Owner	Location	Principal nuclear contractor	Type	Power, kW(t)	Start-up	Shut-down
OPERABLE (Continued)						
Netherlands, Delft Technical University[72]	Delft	AMF	Pool (MTR)	2,000	1963	
Switzerland, University of Basel[73]	Basel	AGN	211-100	Neglig.	1958	
Switzerland, University of Geneva[74]	Geneva	AGN	201-111	Neglig.	1958	
United Kingdom, Queen Mary College, London University	London	AS Inc.	UTR-B	100	1965	
United Kingdom, Scottish Research Reactor Center	East Kilbride	AS Inc.	UTR-100	300	1963	
Uruguay, University of Montevideo[75]	Montevideo	Lockheed	Pool	1,000	1973	
SHUT DOWN OR DISMANTLED						
Germany, Association for Radiation Research[30,71]	Munich	GA	TRIGA-Mk III	1,000	1972	1982
Germany, Brown Boveri/Krupp[67]	Jülich	AI	L-77A	0.01	1964	1977
Germany, Universities of Frankfurt and Darmstadt	Frankfurt	AI	L-54	50	1958	1968

PART V CRITICAL ASSEMBLIES

1. CIVILIAN AS OF 31 DEC 1986

Facility	Abbreviation	Location	Equipment: No. of cells	Equipment: No. of control panels/room	Subject of Experiment/Study	Designation	Start-up	Shut-down
OPERABLE								
Argonne National Laboratory, Idaho Division (DOE)	ANL-IDAHO	INEL Site, ID	1	1	Basic fast reactor studies and mock-up for LMFBR	ZPPR	1969	
Advanced Reactivity Measurement Facility (DOE)	ARMF-1	INEL Site, ID	1	1	Reactor-physics constants and reactivity changes caused by test-reactor irradiation	ARMF-I	1960	
Advanced Test Reactor Critical Facility (DOE)	ATRC	INEL Site, ID	1	1	ATR physics, core-loading and core-design measurements	ATRC	1964	
Coupled Fast Reactor Measurement Facility (DOE)	CFRMF	INEL Site, ID	1	1	Studies of differential cross sections to test calculational methods	CFRMF	1968	
Critical Facility-10, Lynchburg Research Center[3]	CX-10	Lynchburg, VA	2	1	Close storage of spent reactor fuel	SSRF	1977	

Los Alamos National Laboratory (DOE)	LANL, Kiva I	Los Alamos, NM	1	1	Solution high energy burst assembly	SHEBA	1980	
Los Alamos National Laboratory (DOE)	LANL, Kiva I	Los Alamos, NM			Vertical table assembly machine	Mars	1974	
Los Alamos National Laboratory (DOE)	LANL, Kiva I	Los Alamos, NM			Flexible split table assembly	Honeycomb	1956	
Los Alamos National Laboratory (DOE)	LANL, Kiva I	Los Alamos, NM			Vertical table assembly machine	Venus	1976	
Los Alamos National Laboratory (DOE)	LANL, Kiva II	Los Alamos, NM	1	1	Critical-configuration safety and neutronic tests	Comet	1952	
Los Alamos National Laboratory (DOE)	LANL, Kiva II	Los Alamos, NM			Vertical table assembly	Planet	1984	
Los Alamos National Laboratory (DOE)	LANL, Kiva II	Los Alamos, NM			Spherical metal cores in thick metal reflector	Flattop	1957	
Los Alamos National Laboratory (DOE)	LANL, Kiva II	Los Alamos, NM			U(10)-metal cylinder in thick metal reflector	Big Ten	1972	
Los Alamos National Laboratory (DOE)	LANL, Kiva III	Los Alamos, NM	1	1	Fast neutron irradiation, pulse capability	Godiva-IV	1967	
Los Alamos National Laboratory (DOE)	LANL, Kiva III	Los Alamos, NM			Fast neutron irradiation, pulse capability	SKUA	1978	
Oak Ridge Critical Experiment Facility (DOE) Cell W	OR-CEF	Oak Ridge, TN	1	1	HFIR core reactivity measurements	CEF	1950	
*ORNL Pool Critical Assembly, BSF Pool (DOE)[28]	ORNL-PCA	Oak Ridge, TN	1	1	Physics research on reactivity effects and training	PCA	1958	
PNL Critical Mass Laboratory (DOE)	PNL-CML	Richland, WA	1	1	Plutonium criticals	Horizontal	1961	
PNL Critical Mass Laboratory (DOE)	PNL-CML	Richland, WA	1	1	Fuel element array system	FEAS	1976	
PNL Critical Mass Laboratory (DOE)	PNL-CML	Richland, WA	1	1	Remote split table machine	RSTM	1963	
Rensselaer Polytechnic Institute, Troy, N. Y.[3]	Rensselaer	Troy, NY	1	1	Critical experiment assembly		1966	
SHUTDOWN OR DISMANTLED								
Argonne National Laboraory (DOE)	ANL	Argonne, IL	2	2	Basic fast reactor studies and mock-up for LMFBR	ZPR-6	1963	1982
Argonne National Laboraory (DOE)	ANL	Argonne, IL	2	2	Basic fast reactor studies and mock-up for LMFBR[76]	ZPR-9	1967	1982
Bettis Atomic Power Laboratory (DOE)	Bettis	Pittsburg, PA	3	3	LWB physics	LWBCC	1963	1980
†Los Alamos National Laboratory (DOE)	LANL, Kiva III	Los Alamos, NM	3	3	Cold critical for instrumentation testing	Parka	1963	1985
‡United Nuclear Corporation, Development Division[3]	UNC	Pawling, NY	4	3	Proff test facility	PTF	1967	1972

2. MILITARY

OPERABLE								
Knolls Atomic Power Laboratory (DOE)	KAPL	Schenectady, NY	2	1	Full core physics expriment	FCPE	1970	
Lockheed Aircraft Co., Critical Facility for RER[3]	Lockheed	Dawsonville, GA	1	1	RER core configurations	CERF	1958	
Nuclear Safety Facility, Rocky Flats Plant (DOE)	RFP-NSF	Golden, CO	1	1	Critical-configuration safety tests	Horizontal	1965	
Nuclear Safety Facility, Rocky Flats Plant (DOE)	RFP-NSF	Golden, CO			Critical-configuration safety tests	Vertical	1965	
Nuclear Safety Facility, Rocky Flats Plant (DOE)	RFP-NSF	Golden, CO			Critical-configuration safety tests	Solution	1965	
Nuclear Safety Facility, Rocky Flats Plant (DOE)	RFP-NSF	Golden, CO			Critical-configuration safety tests	Tank	1965	
SHUTDOWN OR DISMANTLED								
Bettis Atomic Power Laboratory (DOE)	Bettis	Pittsburgh, PA			Surface-ship physics	SS-CF	1957	1976
Bettis Atomic Power Laboratory (DOE)	Bettis	Pittsburgh, PA			Surface-ship physics	HHTG	1959	1984
Knolls Atomic Power Laboratory (DOE)	KAPL	Schenectady, NY			Flexible critical experiments	FPR	1956	1975
Knolls Atomic Power Laboratory (DOE)	KAPL	Schenectady, NY			High-temperature high-pressure physics and mock-up	PTR	1958	1976

*Instrumentation is being upgraded.

†Defueled.

‡Material License (SNM-871) terminated 7-14-75.

FOOTNOTES

1. MD Capacity [MW(e)] is the maximum dependable capacity (net electrical output for grid connection) for plants having an operating history.
2. The first core for the Shippingport station began power operation in 1957, with a capacity rating of 60 MW(e). The second core began power operation in 1965, with a capacity rating of 90 MW(e). The third core, a light water breeder reactor (LWBR), began power operation in 1977, with a capacity rating of 60 MW(e). Owned by the Department of Energy, the reactor plant was shut down on Oct. 1, 1982. All spent fuel was removed in 1984, and the reactor plant was turned over to the remedial action program within DOE/NE for decommissioning.
3. This reactor is regulated by the Nuclear Regulatory Commission and has been issued an operating license (or authorization) or a construction permit, or an application for same has been submitted.
4. This project is under the Power Demonstration Program.
5. In the Consolidated Edison Indian Point Station, the 615 MW(t) was increased by an oil-fired superheater to produce 265 MW(e) net.
6. The Hallam Nuclear Power Facility was shut down in September 1964 due to moderator-can failures. Entombment of the reactor was completed in 1968.
7. The last CVTR shutdown occurred Jan. 24, 1967. A license amendment issued June 14, 1967, authorizes CVNPA to possess but not operate the CVTR.
8. The dismantlement program for the Piqua Nuclear Power Facility was completed in February 1969.
9. The Pathfinder Plant has been shut down since November 1967. On Sept. 9, 1968, Northern States Power Company announced plans to install gas-fired boilers for operation the summer of 1969.
10. The Elk River Reactor was shut down due to technical problems in February 1968; in 1974, dismantling and removal of this facility was completed.
11. N Reactor, a DOE-owned reactor for production of special nuclear materials, also produces steam that is supplied to the adjacent electric generating plant, owned and operated by Washington Public Power Supply System (WPPSS). Initial electric-power generation began Apr. 8, 1966. Gross power output of 800 MW(e) utilizing N Reactor steam was achieved on Dec. 9, 1966, and gross generation of 860 MW(e) was achieved in 1972.
12. Footnote deleted.
13. This facility was originally built and operated in 1954 as the Boiling Reactor Experiment No. 2 (BORAX-2). With the addition of a turbogenerator, it operated during 1955 as BORAX-3 and on July 17, 1955, produced sufficient electricity to light and power Arco, Idaho—a U. S. first. BORAX-4, a further modification, operated from December 1956 to June 1958 when the experiment was shut down.
14. OMRE demonstrated the technical and economic feasibility of using liquid hydrocarbon terphenyls as coolant and/or moderator.
15. The EBOR reactor experiment was terminated in December 1966 prior to the completion of construction.
16. In a trial run on Dec. 21 and 22, 1951, EBR-I generated the world's first electric power from nuclear energy and was the first to demonstrate, in July 1953, the feasibility of breeding and the compatibility with breeding economy of sodium–potassium alloy as a liquid-metal coolant. It operated with a plutonium-bearing core (Mark IV) from November 1962 to December 1963. The reactor was decommissioned and dismantled early in 1964. The facility was dedicated as
32. The KEWB reactor was operated by AI from 1956 to 1967 as the Kinetic Experiment on Water Boilers.
33. This reactor was operated in the USAEC Atoms for Peace Exhibit in Vienna, Austria, in June 1963; in Belgrade, Yugoslavia, in September 1963; in Madrid, Spain, in April 1964; in Lisbon, Portugal, in April 1965; in Utrecht, Netherlands, in March 1966; in Dublin, Ireland, in September–October 1966; Ankara, Turkey, in April–May 1967; Tehran, Iran, in November–December 1967; Taipei, Taiwan, in April–May 1968; Seoul, Korea, in September–October 1968; Manila, Philippines, in February–March 1969; and Bucharest, Romania, in October 1969. The reactor instrumentation has been shipped to Howard University, Washington, D. C., and the fuel is currently in storage at Oak Ridge pending shipment to Howard University.
34. In 1943 the Manhattan Engineer District disassembled Chicago Pile 1 and rebuilt it at Palos Park, Ill., as Chicago Pile 2. CP-2 had a thermal-power level of 10 kW.
35. This reactor was shipped abroad for exhibition purposes in the USAEC Atoms for Peace Exhibit in the Tokyo International Trade Fair in 1959, and in Cairo, Egypt, and Lahore, Pakistan, in 1960.
36. This TRIGA-Mk II was operated at the New Delhi World Agricultural Fair in 1960. It has been dismantled for storage in California by Gulf Oil Corporation.
37. In 1965 and 1966 this reactor was operated at Sandia, N. Mex., as SNARE. Prior to that time it operated at INEL as the Shield Test Pool Reactor (Susie) in the Aircraft Nuclear Propulsion Program from 1959 to 1962. It was shut down in 1966 and transferred to Louisiana State University in June 1966, where it was never assembled.
38. Until mid-1967 FRAN was operated by LLNL at the Nevada Test Site, and until 1970 it was operated in the former ML-1 reactor area at INEL. In mid-1970 it was transferred back to LLNL. Fuel has been removed for processing.
39. After the assembly and operation of this reactor in the government exhibit at Geneva in September 1958, it was dismantled and returned to ANL, where it was rebuilt as a 250-kW(t) Juggernaut.
40. The RER was previously used in the terminated Aircraft Nuclear Propulsion Program. A license authorizing Lockheed to operate the reactor as a commercial facility was issued in July 1962, and in August 1962 the USAF transferred the facility to the General Services Administration. Lockheed acquired title to the facility in March 1965.
41. This reactor was previously designated STF for SNAP Shield Test Facility.
42. The APFA-III was previously operated as the KUKLA Prompt Critical Assembly at Lawrence Livermore National Laboratory at Livermore, Calif.
43. This reactor was formerly called the Latin American Demonstration Reactor and was operated initially in São Paulo, Brazil, in October 1969. It is currently in storage at Oak Ridge.
44. AGN-201-102 was operated at Oklahoma State University, Stillwater, Okla., from 1957 until transferred to Tuskegee Institute in 1972; there it was licensed to operate but was never started up. Tuskegee Institute returned the fuel to the Department of Energy, and the operating license was terminated on Oct. 12, 1984.
45. AGN-201-104 operated at the University of Akron (Ohio) from 1957 until

a historic landmark Aug. 26, 1966. It is open to the public June 14 to September 15 annually, beginning in 1975.

17. SRE operated at 20 MW(t) until shut down in February 1964 for modification to permit an increase in power level to 30 MW(t). On Dec. 2, 1966, deactivation of SRE was announced.
18. The EGCR project was terminated in January 1966 prior to the completion of construction.
19. EOCR construction was terminated in December 1962. The facility was mothballed prior to operation.
20. The EBWR achieved 100,000 kW(t) on Nov. 11, 1962. Operation of EBWR in the Boiling Water Program was closed out in December 1962. The reactor was used in support of the Plutonium Recycle Program and attained criticality using plutonium as its principal fuel on Sept. 22, 1965. In support of that program, it operated at power levels as high as 70,000 kW(t). Operation in that program was completed in June 1967.
21. This reactor is owned and regulated by the Department of Energy.
22. S10FS-4 operated in orbit during April–May 1965. Operation terminated unexpectedly after 43 days at power, probably owing to a sequence of failures of electrical components of the spacecraft with resulting spurious commands shutting down the reactor. An identical ground-test unit, S10FS-3, operated successfully for more than a year before being shut down in 1966.
23. Reactor was shut down in 1973 for modifications and insertion of Sodium Loop Safety Facility (SLSF) loop. Operation resumed in 1975. Deactivated in 1981 and no longer operable.
24. In August 1958 the MTR was operated with an experimental plutonium core at power levels up to 30,000 kW(t). It demonstrated the ability of plutonium fuel elements to perform satisfactorily in a high-flux research or test reactor. Operation as a test reactor was terminated on June 30, 1969, and a ^{240}Pu (Phoenix) core was run in FY 1970. Reactor decommissioned in 1974.
25. The SNAPTRAN series of experiments was designed to develop, in a land-based environment, safety information on space auxiliary power reactors through excursion testing at various temperatures and rates of reactivity insertion. The destructive experiments approach the maximum credible accidents postulated for SNAP reactor systems.
26. In 1984 the reactor's nominal power was raised from 163.4 MW(t) to 183 MW(t). The reactor's cooling is by natural circulation only.
27. This reactor is basically the same as the SNAP-10A Transient Test Reactor No. 1 (SNAPTRAN-1) that operated at Idaho National Engineering Laboratory (INEL) from 1963–1965. It was moved from INEL to its present location in the SNAP Environmental Test Facility. It was used there to evaluate the effects of separated ^{155}Gd as a burnable poison and as a shutdown agent in the event of water immersion. It was defueled in 1971 and placed on standby. The reactor was transferred to Los Alamos, N. Mex., in 1973.
28. BSR is light-water-cooled and moderated with a partially BeO-reflected core, which is suspended from a movable bridge and can be positioned to locations within a 12 by 25-foot matrix. The BSR may be operated simultaneously with the non-movable PCA Reactor (zero-power), which is located in the same pool.
29. Ownership of this reactor was transferred to North American Rockwell in December 1971 and was redesignated the Nuclear Examination Reactor or L-85 rather than AE-6. The AE-6, also designated WBNS, was built and first operated at Downey, Calif. It was moved to Santa Susana in 1956.
30. This TRIGA reactor is capable of being pulsed and of steady-state operation.
31. The HPRR, installed in the Dosimetry Applications Research Facility, is a small, unmoderated fast reactor that can be operated in the steady-state or pulse mode.

transferred to the Georgia Institute of Technology in 1967. Operations at that facility began in 1968. Decommissioning of AGN-201-104 was achieved in 1986.

46. AGN-201-112 was operated at the University of California, Berkeley, beginning in 1957. The University of New Mexico filed an application in April 1966 for transfer and reconstruction of the reactor at a site on its campus. The reactor achieved criticality at the University of New Mexico on Oct. 7, 1966.
47. The Center for Environmental and Energy Research (formerly Puerto Rico Nuclear Center).
48. The University of Wisconsin reactor has been modified for 1000-kW steady-state operation with a TRIGA-type core. Power level was 250 kW prior to modification in 1967.
49. The Nuclear Science Center Reactor at Texas A&M University has been modified for 1000-kW steady-state operation with a TRIGA-type core. Power level was 100 kW prior to modification in 1968.
50. In 1967 the original MTR-type core of the Washington State University reactor was replaced by a modified TRIGA-type core and control system, and the steady-state power level was increased from 100 to 1000 kW(t).
51. From 1955 to 1965 the Penn State reactor was operated as a 200-kW(t) pool-type reactor fueled with MTR-type elements.
52. The AGN-201P-103 was operated at San Ramon, Calif., by Aerojet-General Corporation from 1957 to 1966. In April 1967 Idaho State University applied for a license to operate the reactor at Pocatello, Idaho.
53. The core of the Michigan State University reactor operated in the University of Illinois TRIGA facility from 1960 until transferred in 1968.
54. California State Polytechnic College, San Luis Obispo, Calif., in December 1971 received a permit to relocate AGN-201-100 and operate it on CSPC's campus. The unit previously was operated starting in 1956 at the Naval Postgraduate School, Monterey, Calif. In 1980, AGN-201-100 was shut down and decommissioned.
55. This reactor was originally operated by North Carolina State University as the Raleigh Research Reactor (RRR). It was transferred in March 1966 to Mississippi State University for reactivation. The RRR was dismantled by N. C. State in 1963. Owing to funding problems, this reactor was never activated. Late in 1981 it was shipped to Barnwell, S. C., for disposal.
56. In 1957–1962, AGN-201M-105 was owned and operated by the National Naval Medical Center, Bethesda, Md. Title to the reactor was transferred to New York University early in 1964. A license to operate was issued in April 1967.
57. Reactors in the Army Power Program are identified by symbolic nomenclature to reflect mobility characteristics, power range, development sequence, and field sequence. The first capital letter indicates mobility characteristics: S (stationary operation), not designed for subsequent relocation; P (portable), semimobile, stationary operation, capable of being dismantled and reassembled for use in successive locations; and M (mobile), capable of being moved intact, or virtually intact, for use in successive locations. The second capital letter indicates the power range as measured by design capacity for continuous operation: L (low), 100 to 1000 kW(e); M (medium), 1000 to 10,000 kW(e); and H (high), 10,000 kW(e) or more. Arabic numerals indicate order in which plants having the same mobility and power characteristics are initiated. If not followed by an additional letter, the designation indicates a prototype or pilot plant. The last capital letter (when present) indicates the alphabetical order in which field plants of a specific type are initiated.
58. The MH-1A was installed in the STURGIS (formerly the Liberty Ship CHARLES H. CUGLE) at Mobile, Ala. Acceptance testing was performed at Fort Belvoir, Va., from April 1967 to June 27, 1967, when the Army accepted the plant from the Contractor. In late July 1968 the plant was deployed to Gatun

Lake, Panama Canal Zone, and began producing power to the Panama Canal power grid on Oct. 5, 1968.

59. The PM-2A was shut down on July 9, 1963, and dismantled during April–June 1964. The reactor vessel was then used at INEL for NDT (nil ductility transition temperature) investigations of materials that had been subjected to long-term irradiation. Defects were sequentially introduced into the vessel wall during a series of tests involving pressure and temperature conditions which exceeded the range permitted in operating nuclear power plants. The final test on Nov. 18, 1966, resulted in a brittle fracture under conditions even more severe than those which had been previously predicted to cause failure. The test program confirmed laboratory data on the adequacy of reactor-operating limitations to prevent brittle fracture of a pressure vessel.
60. The Army made the determination to shut down the SM-1A because the plant's demonstration and R&D missions had been successfully completed and because of the ready availability of cheaper conventional power at the site.
61. The abbreviations used here are defined as follows: SSN, Submarine (Nuclear Propulsion); SSBN, Fleet Ballistic Missile Submarine (Nuclear Propulsion); DLGN, Guided Missile Frigate (Nuclear Propulsion) (all DLGNs were redesignated CGN on July 1, 1975); CGN, Guided Missile Cruiser (Nuclear Propulsion); CVAN/CVN, Aircraft Carrier (Nuclear Propulsion).
62. The USS SEAWOLF, originally commissioned with a sodium-cooled reactor in March 1957, was recommissioned with a pressurized-water reactor on Sept. 30, 1960.
63. The USS THRESHER (SSN593) was lost in the Atlantic on Apr. 10, 1963. The USS SCORPION (SSN589) was lost in the Atlantic on May 21, 1968.
64. The TORY IIC was successfully tested at full design power during May 1964. Subsequent to cancellation of the Pluto program on July 1, 1964, the reactor was placed in the Pluto disassembly building at NTS for storage. In 1974 the reactor was transferred to the NERVA disassembly area for disassembly.
65. In addition to the export power reactors listed, Westinghouse provided the design and furnished nuclear components, including fuel elements, control rods, and instrumentation for the 11.5-MW(e) Belgium BR-3 pressurized-water reactor at Mol.
66. In 1985 the reactor vessel was replaced. It is now refurbished. Manufacturer of the vessel: Royal Schelde of Flushing (Vlissingen, Holland).
67. This L-77 reactor was operated in the commercial exhibit of the 1958 International Conference in Geneva and in the USAEC Atoms for Peace Exhibits in Beirut, Lebanon, in October 1961; in Athens, Greece, in May 1962; and in Bangkok, Thailand, in November 1962.
68. This is the 1955 Geneva Conference reactor rebuilt with increased power and now operating at Wuerenlingen, Switzerland.
69. The Thai research reactor (TRR-1), built by Curtiss-Wright and started up in 1962, originally operated at 1000 kW(t). In June 1975 the TRR-1 was shut down for conversion to TRR-1/M1, a TRIGA-Mark III system adapted for pool installation. The TRR-1/M1, with a power level of 2000 kW(t)/2000 MW pulsing, was commissioned in November 1977.
70. This TRIGA reactor was operated at the 1958 International Conference in Geneva prior to shipment to the University of Lovanium. It began operating at
77. The defueled reactor compartment has been removed and disposed of at a Government Burial Ground.
78. This reactor was operated at the Puerto Rico Nuclear Center from 1960 to October 1976; it was converted to the TRIGA-FLIP in 1972. It has been moved to the Neutron Radiography Facility at the National Engineering Laboratory in Idaho.
79. The EBR-II reactor is a major irradiation facility for the LMFBR program; it continues to generate electric power, and to date (12-86) has produced over 1.5 billion kW-hours for the Idaho National Engineering Laboratory grid. Recent tests (1986) at EBR-II have simulated LOCA flow; these tests demonstrate that the pool-type design, using metallic fuel, will safely shut itself down without automatic protection-system action or operation action on LOCA (primary/secondary flow).
80. In 1977 the Annular Core Pulsed Reactor (ACPR) was shut down. After replacement of fuel and other modifications, the unit was renamed the Annular Core Research Reactor.
81. This TRIGA Mk I reactor was installed in 1966. In 1977, the reactor was shut down, dismantled, and moved to another building. After the move, it was started up again in 1978. This operation was referred to as "TRIGA I" and "TRIGA II."
82. The Small Nuclear Power Source Demonstration Reactor will be jointly operated by DOE and the Atomic Energy of Canada, Ltd. (AECL).
83. The Columbia University TRIGA-Mk II was licensed to operate by NRC: however, the City of New York has not authorized operation. Therefore Columbia University has not procured fuel. The license was terminated in 1985.
84. This reactor was designed and built by BATAN (National Atomic Energy Agency of Indonesia). The design was based on the design of TRIGA Mark II reactor, with maximum power level of 250 kW. In 1979 this reactor reached initial criticality at 50 kW. After the upgrading and the replacing of some components, it reached a power level of 100 kW in 1984.
85. LOFT covered most of the concerns related to light-water safety. The first tests were done for NRC, and the last eight were done for a consortium of OECD countries and the U.S. The last two fission-product-release tests measured release and transport of fission products. There was an intentional core damage causing a partial meltdown. Inactivation, which started after the last test in July 1985, is scheduled to be completed by March 1987.
86. TSR-II is a light-water cooled and moderated reactor, utilizing enriched uranium, aluminum-clad fuel plates in a spherical core to provide a spherically-symmetrical source of radiation for conducting shielding experiments. It is operated in a cylindrical tank that can be positioned in a ground-based shield or elevated to study the transport of radiation through air. The TSR-II is currently (1986) being used in a shielding program that is jointly sponsored by DOE and a Japanese consortium, headed by PNC.
87. SR-305M Test Pile was used to measure the reactivity effects of components (fuel tubes, target tubes, control rods, etc.) prior to use in Savannah River (SR) reactors. In addition, the Test Pile was used to measure the neutron absorption of miscellaneous materials used at SR.
88. The SP—an enriched uranium-fueled, graphite-moderated, water-cooled

the University of Lovanium in June 1959. It is the first reactor to be operated on the African continent.

71. This reactor was sold through Gulf Oil licensee, Gutehoffnungshuette Sterkrade A.E.
72. The Netherlands research reactor was originally operated at the Amsterdam International Exhibition in June 1957; major portions of the exhibition reactor system were used to fabricate the present reactor.
73. This reactor was operated in the International Science Section of the Brussels Informational Exhibition, Apr. 15 to Oct. 1, 1958, prior to transfer to the University of Basel.
74. The AGN-201-111 was operated first in the USAEC Atoms for Peace Exhibit in Rome, Italy, in July 1958 and later in the commercial exhibit of the 1958 International Conference in Geneva prior to transfer to the University of Geneva.
75. Prior to its sale to the University of Montevideo in 1966, this reactor was part of the USAEC Exhibit Program. It was in Buenos Aires, Argentina, in the fall of 1960; in Rio de Janeiro, Brazil, in the spring of 1961; in Lima, Peru, in the fall of 1961; in Mexico City in the spring of 1962; in Santiago, Chile, in the fall of 1962; in Bogotá, Colombia, in the spring of 1963; and in Montevideo, Uruguay, in the fall of 1963. The unit became operational in 1973.
76. Zero-power experiments of historical interest previously conducted in ANL facility cells include the NAUTILUS core design (ZPR-1), the Savannah River reactor design (ZPR-2), and a series of fast-neutron studies (ZPR-4) and interactions between two basic systems (ZPR-5). The following experiments were performed in the ZPR-7 facility: thorium, uranium, deuterium criticals (THUD), and a series of flux-trap criticals for the Argonne High Flux Research Reactor.

reactor—supplies neutrons for reactor-component-reactivity testing in the SE, which is a graphite chamber on top of the SP.

89. A new servo system for the ORR, completed in August 1986, consists of a programmable controller and associated auxiliary equipment for signal conditioning and input/output functions. The functions of the programmable controller are: (1) demand control; (2) primary and pool flow and differential temperature calculations; (3) reactor heat power calculations; (4) neutron flux calibration; and (5) demand-flux comparison and rod positioning. A new ORR safety system. completed in December 1986, provides the same parameters as the original safety system but in a considerably more reliable arrangement. Three channels of neutron flux information will employ modern reliable electronics. The three channels of information are arranged in two-out-of-three coincidence to permit on-line testing and repair and to prevent an unnecessary shutdown, should a single channel fail.
90. A Low Temperature Neutron Irradiation Facility (LTNIF) has been constructed at the BSF for qualified experiments at no cost to users. The LTNIF, opened December 1986, provides a combination of high-radiation intensities and special environmental and testing conditions that have not been previously available in the U.S.
91. GA Technologies, Inc., is under contract with the Philippine Atomic Energy Commission to convert the existing PRR-1 Reactor to use of TRIGA-LEU fuel. The reactor was shutdown in early 1985 to increase the capacity of the cooling system and change the control system. The TRIGA core was shipped to the Philippines in late 1986, and initial use of the TRIGA fuel is expected in mid-1987. The reactor power level will be 3 MW.

REACTOR INDEX

Reactors for Export are not included in the index (see pages 28 to 32).