**DO NOT MICROFILM
COVER**

UPDATE

**NUCLEAR POWER PROGRAM
INFORMATION AND DATA**

JULY-SEPTEMBER 1981

**PREPARED BY
OFFICE OF COORDINATION AND SPECIAL PROJECTS
OFFICE OF NUCLEAR REACTOR PROGRAMS
U.S. DEPARTMENT OF ENERGY**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DOE/NBM--6011986

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

UPDATE

DOE/NBM--6011986

DE86 011986

**NUCLEAR POWER PROGRAM
INFORMATION AND DATA**

JULY-SEPTEMBER 1981

**PREPARED BY
OFFICE OF COORDINATION AND SPECIAL PROJECTS
OFFICE OF NUCLEAR REACTOR PROGRAMS
U.S. DEPARTMENT OF ENERGY**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

jsu

Preface

UPDATE is published by the Office of Coordination and Special Projects, Office of Nuclear Reactor Programs, to provide a quick reference source on the current status of nuclear powerplant construction and operation in the United States and for information on the fuel cycle, economics, and performance of nuclear generating units. Similar information on other means of electric generation as related to nuclear power is included when appropriate.

The subject matter of the reports and analyses presented in UPDATE will vary from issue to issue, reflecting changes in foci of interest and new developments in the field of commercial nuclear power generation.

UPDATE is intended to provide a timely source of current statistics, results of analyses, and programmatic information proceeding from the activities of the Office of Nuclear Reactor Programs and other components of the Department of Energy, as well as condensations of topical articles from other sources of interest to the nuclear community. It also facilitates quick responses to requests for data and information of the type often solicited from this office.

We trust you find UPDATE interesting and helpful.

R. G. Staker, Acting
Deputy Assistant Secretary
for Nuclear Reactor Programs
Office of Nuclear Energy

MASTER

UPDATE
July-September 1981

Table of Contents

	<u>Page</u>
I. Central Station Power Plants	
A. Status of U.S. Nuclear Electric Generating Capacity	1
B. Schedule Slippage in U.S. Nuclear Power Plant Projects - 1975 through Mid-1981	4
C. U.S. Electric Power Supply and Demand, 1981-1990	9
D. NERC's Electric Power Projections	18
II. Energy and Fuels	
A. U.S. Electric Utility Statistics	22
B. Peak Load Growth at 2.7 Percent Per Year to 2000	25
C. Survey of United States Uranium Marketing Activity	30
III. Economics	
A. The Financial Health of the Electric Utility Sector	42
B. TVA Study: Cost Comparison of Nuclear Versus Coal-Fired Power	51
IV. Operation	
A. Capacity Factors, Unit Availability and Forced Outage Rate	59
B. A Survey of Occupational Employment in the Nuclear Power Industry	62

Table of Contents
(Cont'd.)

	<u>Page</u>
C. Utility Briefs	71
1. General Public Utilities, "Reactor Safeguards Committee Supports Restart of TMI Unit #1"	
2. Alabama Power Company, "Farley Nuclear Plant Dedicated"	
3. Northeast Utilities, "Several Electric Systems Interested in Purchase of Millstone III"	
4. Omaha Public Power District, "Refueling of Fort Calhoun"	
5. Commonwealth Edison Company, "No Unusual Risk From Zion Station, Major New Study Concludes"	
D. Errata	78
V. Appendix	
o U.S. Central Station Nuclear Electric Generating Units: Significant Milestones (Publication DOE/NE-0030/3(81))	

I. CENTRAL STATION POWER PLANTS

A. Status of U.S. Nuclear Electric Generating Capacity

The status of central station nuclear electric generating units
in the U.S. as of 9/30/81:

	Units <u>9/30/81</u>	Capacity (MWe Net) <u>9/30/81</u>
Operable		
- Licensed by NRC ^{1/} , ^{2/}	76	58,674.0
- Authorized by DOE ^{3/}	2	910.0
Being Built		
- Construction Permit Issued	78	86,211.6
- Limited Work Authorization	2	2,300.0
Ordered	<u>12</u>	<u>13,924.0</u>
	170	162,019.6

1/ Includes the following units:

- o Humboldt Bay, 65 MWe, shut down 7/2/76 pending a decision on whether to make seismic and other modifications or to decommission.
- o Three Mile Island 1, 819 MWe, shut down in accordance with a Nuclear Regulatory Commission (NRC) restraining order pending completion of modifications and other actions related to the accident at Three Mile Island.
- o Three Mile Island 2, 906 MWe, shut down since the accident on 3/28/79.
- o Diablo 1, 1048 MWe, which was authorized on September 15, 1981 to load fuel and conduct low power testing up to five per-cent.
- o Dresden 1, 200 MWe, shut down 10/31/78 for upgrading of its emergency core cooling system and for chemical cleaning. Outage expected to last through mid-1986, according to the NRC.

2/ Does not include Indian Point 1, 265 MWe; the operating authority of this unit was revoked on 6/19/80 by the NRC and the owner has submitted a decommissioning plan to the NRC.

3/ Shippingport, 60 MWe, and N Reactor, 850 MWe.

Licensing

On September 15, 1981 the Nuclear Regulatory Commission (NRC) issued a full power operating license to the Tennessee Valley Authority for the 1148 MWe Sequoyah Unit 2. A provisional low power license had been issued on June 25, 1981.

The NRC issued a low power operating license to the Pacific Gas & Electric Company on September 22, 1981 for Diablo Unit 1 to load fuel and conduct low power testing up to 5% of full power. Diablo Unit 1 is rated at 1084 MWe.

The NRC on July 8, 1981, authorized full power operation of McGuire 1. Provisional licenses had been issued to Duke Power Company on January 1 and June 12, 1981.

Cancellation of Nuclear Units

On August 26, 1981, Northern Indiana Public Service Company (NIPSCO), announced the Company's decision to terminate the construction of Bailly nuclear unit rated at 643.8 MWe. Mr. Edmund A. Schroer, NIPSCO Chairman and Chief Executive Officer cited that continuing regulation and litigation delays, not lack of sound planning, have prevented the building of Bailly.

The Boston Edison Company announced on September 24, 1981 the cancellation of Pilgrim 2 rated at 1150 MWe. Mr. Thomas J. Galligan, Chairman and Chief Executive Officer of Boston Edison cited increased costs resulting from delays, additional regulatory requirements and the continuing uncertainty surrounding still other possible

requirements as forcing this decision. Cancellation will not become final until the other joint owners in the project have an opportunity to comment on the proposed course of action. Boston Edison has a 59 percent interest in Pilgrim 2 with 41 percent owned by 13 other utilities.

Rating Changes

The following rating changes are noted:

	<u>Old</u>	<u>New</u>
Sequoyah 1	1140	1148
Surry 1	822	788
Surry 2	822	788

Criticality Time

The cumulative criticality time of central station type civilian nuclear reactors in the U.S. totaled 425 years through May 1981. This statistic is based on the number of hours of criticality operation reported in NRC publication NUREG-0020 (Grey Book) for the reactors licensed by NRC to operate, plus the cumulative criticality time of the DOE-owned Shippingport and "N" reactors, plus an estimated total of 16 years criticality time for the eight central station units permanently shut down.

B. Schedule Slippage in U.S. Nuclear Power Plant Projects - 1975 through Mid-1981

Delays in the schedules for initial commercial operation of nuclear generating units starting up, under construction, or on order during the first six months of 1981 were about 44 percent less compared to those for the same period of the previous year. This finding comes from recent analysis by the Office of Nuclear Reactor Programs of slippage in domestic nuclear power plant project schedules. Results are presented in Table 1. The data are based on quarterly construction progress reports as of June 30, 1981, to the Department of Energy by the electric utilities concerned.

During the first six months of 1981, the schedules of 23 light water reactor (LWR) nuclear generating units were delayed a total of 370 months. The sum of the products of each unit's schedule change and its megawatt-electrical (MWe) rating amounted to a net slippage of 424,578 MWe-months for this period. This is a sharp decline when compared to the slippage of 857 months amounting to 944,758 MWe-months for the first half of 1980. Table 1 reflects schedule slippages for 1975 through the first half of 1981.

In Table 2, the 370 months of schedule slippage for the first six months of 1981 are separated into two groups: (1) delays in schedule of the units licensed for construction or starting up in that period, and (2) deferrals in the initial commercial operation dates of units ordered but not yet licensed for construction. The slippage in the first category totals 320 months and 367,078 MWe-months for 22 units (a total of 82 units were under construction as of June 30, 1981).

Table 1

Utility Changes in Scheduled Commercial Operating Dates^{1/}
for LWR Nuclear Power Plants Under Construction or on Order in the U.S.

Year	Delays		Advances		Net Slippage	
	Number of Units Delayed	Period Length (Months)	Number of Units	Period Length (Months)	Period Length (Months)	Capacity Weighted Slippage (MWe-months) ^{2/}
1975	70	1095	4	13	1082	1,177,600.0
1976	74	1161	6	61	1100	1,232,208.7
1977	75	1118	1	5	1113	1,208,993.0
1978	52	660	-	-	660	751,142.4
1979	77	1502	1	5	1497	1,746,298.0
1980 (first half)	48	862	1	5	857	944,758.0
1980 (whole year)	76	1551	-	-	1551	1,726,018.0
1981 (first half)	23	370	-	-	370	424,578.0

^{1/} Does not include units whose construction was in a stage of indefinite postponement.

^{2/} Megawatt-months is the sum of the products of the net electrical megawatt (MWe) rating and the number of months schedule change for each nuclear unit whose prospective commercial operation date was deferred or advanced during that period.

Table 2

Breakdown of Scheduled Commercial
Operating Date Slippages Shown in Table 1
(First Six Months of 1981)

<u>Delay Category (Months)</u>	<u>Number of Units Delayed</u>	<u>Total of Unit Delays (Months)</u>	<u>Capacity Weighted Slippage (MWe-Months)</u>
Units Licensed for Construction or Starting Up ^{1/}			
1-6 ^{2/}	9	46	52,012
7-12	7	79	91,176
13-24	4	65	74,390
25-36	0	0	0
37-48	0	0	0
Over 48	<u>2</u>	<u>130</u>	<u>149,500</u>
Subtotals	22	320	367,078
Units Ordered But Not Yet Licensed for Construction ^{3/}			
Over 48	<u>1</u>	<u>50</u>	<u>57,500</u>
Totals	23	370	424,578

^{1/} Includes units with NRC construction permits or limited work authorizations.

^{2/} Includes the McGuire 1 and Sequoyah 2 units, which received Nuclear Regulatory Commission (NRC) licenses to load fuel and do preliminary testing during this period.

^{3/} Does not include units cancelled during the first half of 1981.

These schedule slippages can be examined also in relation to progress in physical construction of the units. The results are shown in Table 3.

In this tabulation, the two units with 10 percent or less of construction completed averaged 19.5 months delay; the six units with 10-50 percent completion averaged 8.8 months delay and the 14 units delayed in the over 50 percent construction category averaged 16.3 months delay.

The total average delay for the 23 units reporting delays in the first six months of 1981 was 16.1 months compared to a delay of 18 months for 48 units delayed in the first six months of 1980.

Table 3

Breakdown of Commercial Operating
Date Schedule Slippages by Construction Status
(First Six Months of 1981)

<u>Percent Com- pletion of Physical Construction</u>	<u>Number of Units In</u>		<u>Total of Units Delays (Months)</u>	<u>Capacity Weighted Slippage (MWe-Months)</u>	<u>Average Length of Delay (Months)</u>
	<u>Category</u>	<u>Delayed</u>			
Units Licensed for Construction or Starting Up					
10 percent or less*	17	2	39	44,880	19.5
Over 10 per- cent to 50 percent	25	6	53	61,105	8.8
Over 50 per- cent**	<u>42</u>	<u>14</u>	<u>228</u>	<u>261,093</u>	<u>16.3</u>
Subtotals	84	22	320	367,078	14.5
Units Ordered But Not Yet Licensed for Construction					
0 percent	<u>13</u>	<u>1</u>	<u>50</u>	<u>57,500</u>	<u>50</u>
Totals	97	23	370	424,578	16.1

*Includes Bailly which was cancelled 8/26/81.

**Includes McGuire 1 and Sequoyah 2 which were licensed as of June 30, 1981 for low power operation.

C. U.S. Electric Power Supply and Demand, 1981-1990

In July of this year, the Department of Energy (DOE) released for distribution its report^{1/} on the outlook for electric power supply adequacy and reliability in the United States for the decade 1981-1990. The report is based on data submitted to DOE by the nine Regional Electric Reliability Councils. It includes a breakdown of said data for each of the 28 Electric Regions (sub-areas of the nine Council areas) in the contiguous U.S. (see the maps on following pages). In general, the report expects projected reserve margins within each Council area, as viewed in the context of historical data, to be adequate. However, margins in some Electric Regions may be insufficient over specific time intervals (summer - winter peak periods) to assure reliable service in those sub-areas. Tables 1 and 2^{2/} (page 15) identify those Electric Regions that may require assistance in meeting peak demands. Repeated below are the report's General Conclusions and Summary Highlights.

General Conclusions

- "The Reliability Councils project a contiguous U.S. average annual increase of 3.5% in annual energy (electric) requirements for the period 1981-1983, and an average annual increase of 3.6% for the period 1981-1990, over the actual 1980 total energy requirement of 2,293,964 gigawatt hours.
- "The Reliability Councils project an average annual increase of 2.7% in summer peak demand for the period 1981-1983, and an average annual

^{1/} "Electric Power Supply and Demand for the Contiguous United States 1981-1990," publication DOE/EP-0022, dated July 1981, U.S. Department of Energy, Office of Emergency Operations, Washington, DC 20461.

^{2/} For editorial purposes, these and succeeding table numbers in this article differ from those in publication DOE/EP-0022.

DEPARTMENT OF ENERGY - ENERGY INFORMATION ADMINISTRATION

Electric Regions in the United States

June 1, 1981 *

Electric Region	ECAR	Identification		MAAC			SERC
1		Allegheny Power System (APS)	5		Pennsylvania-New Jersey-Maryland Interconnection (PNJM)	7	Florida Coordinating Group (FCG)
2		American Electric Power System (AEP)		MAIN		9	Southern Company Group
13		Central Area Power Coordination Group (CAPCO)	17			11	Tennessee Valley Authority Group (TVA)
14		Cincinnati, Dayton Group (CD)	19			12	Virginia-Carolina Group (VACAR)
15		Kentucky Group			Commonwealth Edison Co. Illinois-Missouri Group (ILLMO)	8	Middle South Utilities/ Gulf States Utilities Group
16		Indiana Group - All Indiana Utilities except I&M Electric Co.	20	MARCA	Wisconsin-Upper Michigan Systems Group (WUMS)	21	Missouri-Kansas Group (MOKAN)
18		Michigan Electric Coordinated Systems (MECS)				22	Oklahoma Group
					Mid-Continent Area Power Pool (MAPP)	24	Rocky Mountain Power Pool (RMPP)
				NPCC		25	Northwest Power Pool (NWPP)
	ERCOT		3		New England Power Pool (NEPOOL)	26	Arizona-New Mexico Group
23		Texas Interconnected Systems Group (TIS)	4		New York Power Pool (NYPP)	27	Southern California-Nevada Group
						28	Northern California-Nevada Group

increase of 3.2% for the period 1981-1990, over the actual 1980 total (non-coincidental) peak summer demand of 429,804 megawatts.

- "Planned generating capacity reserve margins, computed from the peak demands and projected capacities reported by the Councils, are adequate for reliable service in most areas of the contiguous U.S. for the period 1981-1990. Margins in some Electric Regions (sub-areas of the Council areas) may, however, be insufficient over specific time intervals to assure reliable service in those Regions.
- "Projected capacity reserve margins, after allowance for scheduled transfers of power and capacity unavailable for various reasons, appear adequate. But if they are reduced from the projected values by failure of nuclear and coal-based unit construction to receive necessary permits or meet completion schedules, or by unforeseen increases in peak demand, reserves could be less than adequate in some Regions. The result would be deterioration of system reliability and adequacy.
- "To assure nation-wide reliable electric system operation, and reduction in the use of oil by electric utilities, current schedules for construction, licensing and commercial operation of the following nuclear units should be maintained:

Diablo Canyon 1 ^{3/}	Watts Bar 1
Diablo Canyon 2	Sequoyah ^{24/}
Comanche Peak	McGuire ^{15/}
San Onofre 2	Shoreham 1
Summer 1	

^{3/} As of September 22, 1981, this unit had a license to operate at 5% of full power.

^{4/} As of September 15, 1981, this unit had a license to operate at full power.

^{5/} As of July 8, 1981, this unit had a license to operate at full power.

- "Coal-fired generating units whose accelerated completion would be beneficial include:

Brandon Shores 1	Allen 1
Brandon Shores 2	Sears Island
Intermountain 1	Seward 7
Intermountain 2	Martin 4
Martin 3	

- "The data provided by the ERA-411 Reports show that planned reserves of generating capacity within each Reliability Council area are at or above levels that have in the past been adequate to assure reliable service. The Staff has assessed the planned reserves of the Electric Regions within each Council area by using as an indicator capability that may be unavailable during seasonal peak periods because of scheduled maintenance, forced outages or other reasons, from the reported unavailability data of the past four years. The Staff has further adjusted the capability of each Region by the net of its scheduled purchases and sales of capacity. This assessment indicates that within some of the Electric Regions there may be insufficient capacity available to satisfy projected seasonal peak demands. For these Regions, however, the generating capacity within their Council areas, in conjunction with the transmission system capacity and the usual diversity of occurrence of outages and peak demands, should be sufficient to remedy the potential deficiencies. However, since Regional reliability is a major concern, the Staff is indicating those Electric Regions that may require assistance

in meeting their peak demands. These Electric Regions are listed in Tables 1 and 2 on the following page.

Summary Highlights

- "Electric power supply reliability in most areas of the United States is expected to be adequate during the period 1981-1990. Some areas may experience less reliable service than others at some time during that period, but no area is expected to face long-term unreliable service.
- "The Reliability Council projections of annual energy and peak demand requirements are less than those projected by the Councils in their April 1980 ERA-411 reports.
- "Delay in bringing new nuclear and coal-fired units into commercial operation would result in the use of oil that would otherwise not be needed. It would also increase vulnerability of electric power supply to oil supply interruptions.
- "The timely completion and licensing of certain nuclear units would improve the reliability of electric power supply in several Electric Regions and Reliability Council areas.

Discussion

In their April 1, 1981 Coordinated Bulk Power Supply Program reports

Table 1 - Summer Peak Periods
Regions With Adjusted Reserve Less Than 5%*

<u>Council</u>	<u>Electric Region</u>	<u>Years</u>
ECAR	APS, CAPCO, CD	1982 through 1990
MAIN	CECO	1982 through 1990
	WUMS	1990
SERC	VACAR	1982 through 1990
SPP	MOKAN	1988 through 1990
WSCC	So. Cal-Nevada	1989, 1990

Table 2 - Winter Peak Periods
Regions With Adjusted Reserve Less Than 5%*

<u>Council</u>	<u>Electric Region</u>	<u>Years</u>
ECAR	APS, CAPCO	1982/83 through 1990/91
	AEP	1983/84; 1985/86 through 1990/91
	CD	1981/82; 1984/85 through 1990/91
MAIN	CECO	1990/91
	WUMS	1983/84; 1987/88 through 1990/91
SERC	FLORIDA	1981/82; 1982/83
	VACAR	1981/82 through 1990/91
WSCC	NWPP	1981/82 through 1986/87

* After adjustment of planned capability by net of scheduled purchases and sales, and for the purpose of evaluation considering generating capacity out of service based on 1977-1980 averages for scheduled maintenance, forced outages and other unavailable capacity.

- o For the Electric Regions not listed in Tables 1 and 2, the projected reserve margins appear adequate. However, unusual occurrences resulting in large scale damage to generation and transmission facilities, or delays in completion of scheduled facilities, could adversely affect the ability to supply power to loads.

(ERA-411), the Regional Electric Reliability Councils project lower growth rates for peak demand, energy requirements and generating capability than they projected a year earlier.

Table 3 below is a comparison of changes in power supply and demand as projected by the Reliability Councils in 1980 and 1981.

Table 3
Reliability Council Projections
Contiguous U.S.

	<u>10-Year Average Annual Percentage Increase</u> <u>Projected in 1980</u> <u>For 1979-1989</u>	<u>Projected in 1981</u> <u>For 1980-1990</u>
Summer Peak Demand	4.3	3.2
Winter Peak Demand	4.6	3.4
Annual Net Energy	4.2	3.5
Capability at Summer Peak	3.6	3.1
Capability at Winter Peak	3.7	3.0

"The individual Council projections of annual net energy and summer peak demand are shown in Table 4 below.

Table 4

Projected Average Annual Percent Increase
Council Area Energy and Peak Demand

	<u>Annual Net Energy as Projected</u>		<u>Summer Peak Demand as Projected</u>	
	<u>April 1, 1980</u> <u>1979-1989</u>	<u>April 1, 1981</u> <u>1980-1990</u>	<u>April 1, 1980</u> <u>1979-1989</u>	<u>April 1, 1981</u> <u>1980-1990</u>
MAAC	3.2	2.8	2.9	1.9
NPCC	2.1	2.0	1.9	1.5
ECAR	3.8	3.6	4.0	3.3
MAIN	4.0	3.2	4.2	3.0
WSCC	4.5	4.0	4.5	3.6
SERC	4.6	3.5	4.5	3.2
MARCA	4.8	4.2	5.5	3.7
ERCOT	5.2	4.6	5.6	4.3
SPP	5.3	3.9	5.6	3.4

"No change is projected from the system peak demand occurring in the summer which has become characteristic of the U.S. as a whole, although some Council areas expect to continue in a winter peaking mode. For summer 1990, the total of Council area summer peak demands^{6/} is expected to be 585,932 Mw; this is 156,128 Mw more than the corresponding 1980 demand. To meet this demand, the Councils project a net dependable generating capability of 750,467 Mw. The planned reserve margins currently projected by the Councils are in general somewhat larger than those that were projected in April 1980."

6/ Non-coincident summation

D. NERC's Electric Power Projections

The National Electric Reliability Council (NERC)^{1/} recently released its projections "Electric Power Supply and Demand 1981-1990," dated July 1981. Selected excerpts from this report regarding net electrical requirements by principal energy source and regional net electric energy requirements are presented below.

- Net Electrical Energy Requirements by Principal Energy Source

"Even though the NERC Regions are projecting a substantially lower growth rate than in past years, based on this year's projections they will require 38% more electric energy ten years from now. (The following figures show, by principal energy sources, the growth of net generation required to provide this energy by 1990.)

^{1/} Regional Electric Reliability Council Areas are defined on page 10 of this issue.

Regional Electric Generation by Principal Energy Sources* (Contiguous U.S.)

*The difference between the sum of the parts and 100% represents the share of electric generation by sources not shown, including net pumped storage requirements

"The projected changes in the relative contributions of the principal energy sources to total net generation are as follows: Gas dropping from 14.0% in 1981 to 4.9% in 1990; Oil decreasing from 10.7% in 1981 to 8.1% in 1990; Nuclear about doubling from 13.2% in 1981 to 25.5% in 1990; Coal rising from 51.2% in 1981 to 52.8% in 1990; and Hydro declining from 10.2% in 1981 to 7.7% in 1990."

- Regional Net Electrical Energy Requirements Growth Rates

"The growth rates of net electrical energy requirements of the NERC Regions are expressed on a percent basis in the following figure.

"The growth rates for electrical energy of the NERC Regions range from an average 2.2% annually, as projected by NPCC, to the 4.7% projected by ERCOT.

"Subregional growth shows an even wider range, from the 1.7% of the New York Subregion (NY) of NPCC, to the 6.0% of the Rocky Mountain Power Area (RMPA) of WSCC."

II. ENERGY AND FUELS

A. U.S. Electric Utility Statistics

For the 52 week period ending August 29, 1981, the Edison Electric Institute (EEI) reported a total of 2,321,025 million net kilowatt-hours (kWh) distributed by the electric utility industry in the 48 contiguous states.

This represents an increase of 1.7 percent over the total net kWh for the corresponding period a year earlier. It compares with corresponding changes reported in past issues of UPDATE as follows:

Electrical Energy Output in United States (48 States)

<u>52 Weeks Ended</u>	<u>1980 (million kWh)</u>	<u>Change 80/79 (percent)</u>
October 4	2,291,999	+1.3
November 1	2,291,536	+1.1
November 29	2,294,776	+1.1
December 27	2,300,955	+1.5

<u>52 Weeks Ended</u>	<u>1981 (million kWh)</u>	<u>Change 81/80 (percent)</u>
January 31	2,309,188	+2.4
February 28	2,307,415	+2.4
March 28	2,306,117	+2.1
May 2	2,309,649	+2.3
May 30	2,313,336	+2.6
June 25	2,328,273	+2.6
August 1	2,326,511	+2.5
August 29	2,321,025	+1.7

For the first 35 weeks of 1981, the EEI reports a total output of 1,583,261 million net kilowatt-hours, which represents a 1.3 percent increase over the 1,563,191 million net kilowatt-hours produced in the corresponding period in 1980.

Recently published EEI statistics^{1/} relating to classifications of energy sales by all U.S. utilities (public, privately-owned and cooperative) in the 50 states, for the 12 months ended June 30, 1981, show the commercial and industrial sectors jointly consuming 1.0 percent more than for the previous 12 month period. Sales to the residential community increased by 5.2 percent. Overall during the period, total energy sales to ultimate customers averaged 2.4 percent higher for the twelve months ended June 30, 1981. A complete breakdown of these sales to ultimate consumers is presented as follows:

<u>ELECTRICITY SALES</u> (Kwhr in Thousands)	<u>Twelve Months Ended</u>		<u>% Change</u>
	<u>6/30/81</u>	<u>6/30/80</u>	
Residential	727,851,375	691,748,264	+5.2
Commercial and Industrial (Subtotal)	1,312,167,423	1,299,311,742	+1.0
Commercial	519,698,496	496,404,926	+4.7
Industrial	792,468,927	802,906,816	-1.3
Street and Highway Lighting	15,024,236	14,817,923	+1.4
Other Public Authorities	50,281,407	49,469,265	+1.6
Railroads and Railways	4,255,043	4,208,317	+1.1
Interdepartmental	6,860,969	6,682,298	+2.7
 TOTAL SALES TO ULTIMATE CUSTOMERS	 2,116,440,453	 2,066,237,809	 +2.4

Unit statistics for residential service for the period are:

<u>Average Customer Data</u>	<u>Twelve Months Ended</u>		<u>% Change</u>
	<u>6/30/81</u>	<u>6/30/80</u>	
Kilowatt-hours per Customer	8,959	8,716	+2.8
Average Annual Bill	\$469.29	\$400.64	+17.1
Revenue per Kilowatt-hour	5.24¢	4.60¢	+13.9

^{1/} Edison Electric Institute, Total Electric Utility Industry in the United States Including Alaska and Hawaii, Source and Disposition of Electricity, 12 months ended February, 1981, Volume 49, No. 6, September 15, 1981.

EEI financial data indicate that revenue from ultimate customers of the electric utility industry totaled \$98,913 million for the twelve months ending June 30, 1981, 19.4 percent above the figure for the corresponding period one year earlier.

B. Peak Load Growth at 2.7 Percent Per Year to 2000

In both a Department of Energy projection^{1/} and a Westinghouse forecast^{2/}, U.S. electricity demand is predicted to rise at an average rate of 2.7 percent per annum to the year 2000.

As indicated in Table 1,^{3/} the Department forecasts a midrange^{4/} growth in electricity demand of 2.7 percent per year for the period 1980 to 2000. This corresponds to roughly 3.6 trillion kWh in year 2000 of which 28 percent is estimated to be supplied by nuclear power. DOE's mid-range estimate of installed nuclear capacity by the year 2000 is 175 GWe as shown on Table 2.

In its July issue, Electric Light & Power reported on the Westinghouse annual industry forecast. The forecast indicates that, "1980 installed generating capacity of 613 GWe is expected to climb to 926 GWe by 2000" (see Figure 1). Reserve margins are predicted "to drop from the mid-30's to slightly under 20 percent by 1992 or 1993 and stay there for the rest of the decade."

^{1/} "Energy Projections to the Year 2000," U.S. Department of Energy, Office of Policy, Planning and Analysis, publication DOE/PE-0029, July 1981, Washington, DC 20585.

^{2/} "Westinghouse Forecasts Peak Load Growth at 2.7% Per Year to 2000," Electric Light & Power, July 1981, Technical Publishing Company, Barrington, IL 60010.

^{3/} Table numbers have been changed from those in the original text for editorial purposes.

^{4/} Projections try to account for uncertainties by providing ranges for all estimates based on alternative assumptions about key uncertainties affecting the energy market.

TABLE 1

KEY NUCLEAR ASSUMPTIONS

	ACTUAL 1980	PROJECTED					
		1985		1990		2000	
		Midrange	Range	Midrange	Range	Midrange	Range
GNP Growth Rate (1980-year, %/year)	--	3.0	2.3-3.7	2.8	2.1-3.6	2.5	2.0-3.0
Electricity Demand Growth Rate (1980-year, %/year)	--	3.0	1.8-4.2	3.0	1.7-4.1	2.7	1.9-3.3
Total Electricity Consumption (Trillion kWh)	2.1	2.4	2.3-2.6	2.8	2.5-3.2	3.6	3.0-4.1
(Quadrillion Btu's)	7.14	8.3	7.8-8.8	9.6	8.5-10.8	12.3	10.4-13.9
Electricity Produced by Nuclear Plants ^{1/} (Trillion kWh)	.25	.51	.45-.57	.7	.6-.8	1.0	.7-1.3
(Quadrillion Btu's)	.86	1.7	1.5-2.0	2.4	2.1-2.75	3.35	2.3-4.4
Primary Energy ^{2/} Displaced by Nuclear Power (Quadrillion Btu's)	2.75	5.5	4.9-6.2	7.6	6.7-8.7	10.6	7.4-14.0
Average Nuclear ^{3/} Capacity Factor	.53	.61	.61-.62	.63	.62-.64	.64	.63-.65
Assumed Adjustments to 1990 Nuclear Plant Completion Schedules ^{4/}	--	--		Per EIA Schedule	2 year delay to 1 year accelera- tion	--	--

^{1/} Electricity generated at the busbar.

^{2/} Ranges include "extra high" and "extra low" nuclear supply cases
Assumes heat rate of 10,800 Btu/kWh.

^{3/} Assumes average capacity factor of 0.65 for all plants operating at start of year.
Plants coming on-line during each projection year are assumed to operate at a
capacity factor of 0.3 during that year.

^{4/} EIA schedule for nuclear plant completions was developed by adding empirical data on
nuclear plant construction and licensing lead times to actual data on the current
state of completion of each plant.

TABLE 2
U.S. NUCLEAR POWER PROJECTIONS^{1/}
(Gigawatts-Electric--GWe)

	ACTUAL <u>1980</u>	PROJECTED			
		<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
High Nuclear Supply ^{2/}	55	109	144	188	230
Balanced High Supply ^{3/}	55	102	136	155	195
Midrange	55	96	128	145	175
Balanced Low Supply ^{3/}	55	86	123	135	155
Low Nuclear Supply ^{4/}	55	82	115	120	120

^{1/} End-of-year capacity.

^{2/} High Nuclear Supply case assumes an integrated scenario of high GNP and electricity demand growth and slow introduction of coal plants currently under construction and planned. Orders for new capacity are split equally between coal and nuclear plants.

^{3/} Balanced High and Low Supply cases assume high and low introduction of new coal, nuclear, and central-electric renewable plants, with slightly higher and lower electricity demand, respectively, than in the midrange case.

^{4/} Low Nuclear Supply case assumes only those plants currently on line, and about 90 percent of those with construction significantly completed will be operating. Assumes integrated scenario of low GNP and low electricity demand growth.

Figure 1

According to Westinghouse, "nuclear power's share (of electric generation) is expected to climb from 12 percent to 25 percent," by 2000 as indicated in Figure 2. This approximates DOE's projection given above. The report stated that, "Coal, which accounted for 52 percent of 1980's generation is predicted to produce 59 percent of kWh in 2000--which means that roughly twice as much coal will be consumed by electric utilities by the end of the century. The combined share of oil and gas will drop from 22 percent now to 5.4 percent; and the 'other' category--chiefly hydro at present--is expected to drop from 14 percent to 10.3 percent, indicating that Westinghouse sees no significant contribution from unconventional energy sources such as solar."

Figure 2

Figure 3 shows that, "Electrical energy consumption is expected to rise from 2097 billion kWh in 1980 to 3746 billion in 2000. Industrial consumers are predicted to account for half the increase. Commercial consumers will be responsible for 18 percent of the increase and residential consumers for 27 percent."

Figure 3

The company sees installed generating capacity in the year 2000 as being 20 percent nuclear, which equates to 182,000 MW. This prediction is similar to, but slightly higher than the 175,000 MW given as a midrange prediction by DOE.

C. Survey of United States Uranium Marketing Activity

Studies on U.S. uranium production capabilities and the effects of importation of foreign uranium on the domestic industry have been reported in previous issues of UPDATE.^{1/} Recently, DOE completed a survey^{2/}, ^{3/} of U.S. uranium marketing and procurement activity in 1980. Reproduced below are the report summary and parts of the **survey** dealing with uranium procurement and pricing.

Summary

"In 1980, U.S. Buyers contracted for 12,500 short tons U₃O₈ in new procurement. Nonetheless, there was a net decrease of 13,100 tons^{4/} in total commitments as of January 1, 1981, because of even larger changes to the delivery commitments as of January 1, 1980. The average contract price of domestic uranium was \$28.15 per pound of U₃O₈ for 1980 delivery and \$30.70 for 1981 delivery. Settlements of domestic market price contracts averaged \$36.75 for 1980 delivery and \$46.80 for 1981 delivery. Prices of foreign uranium averaged \$43.10 for 1980 delivery and \$40.00 for 1981 delivery. Producers expect to be able to offer 21,800 tons U₃O₈ for sale in the 1981-1985

^{1/} March/April 1980 UPDATE, page 24, "Foreign Uranium in the U.S. Market," and November/December 1980 UPDATE, page 46, "U.S. Uranium Production Capability".

^{2/} "Survey of United States Uranium Marketing Activity," by S. V. Krusiewski, D. C. Thomas and J. A. Patterson, U.S. Department of Energy, Office of Uranium Enrichment and Assessment, DOE/NE-0013, June 1981.

^{3/} Information for the survey was obtained from 60 utilities with nuclear reactor projects, 39 present or potential uranium producers, and five reactor manufacturers.

^{4/} Unless otherwise noted, uranium quantities are in short tons.

period, about 30 percent less than was estimated in the 1980 survey, although additional uranium could be available in that timeframe. U.S. producers also estimated that 30,600 tons U_3O_8 would be available for sale in the 1986-1990 period. Utilities made sales of 800 tons U_3O_8 for 1980-1981 delivery as well as loans of another 800 tons.

"New export commitments made in 1980 totalled 4,000 tons U_3O_8 ; however, 2,500 tons of these commitments are options or delivery is contingent on price developments. Import commitments made in 1980 totalled 2,300 tons U_3O_8 . Inventories of natural and enriched uranium held by U.S. buyers increased from 52,300 to 63,400 tons U_3O_8 during 1980. In addition, inventories of uranium held by U.S. producers increased from 2,400 to 2,700 tons U_3O_8 .

"Unfilled requirements for the 1981-1990 period decreased from 75,300 tons U_3O_8 , as reported in last year's survey, to 54,500 tons in this year's survey, a decrease of 20,800 tons. Responses to the 1981 survey suggest that there seems to be an adequate supply of uranium to meet U.S. demand at least through 1986, although the apparent buyer requirements reported as of January 1, 1981 for the 1987-1990 period are higher than the total domestic production or supply. However, some production potential for that period was not reported."

Purchase Commitments of Domestic Uranium by Domestic Buyers

"Table I summarizes U.S. uranium procurement activity during 1980. Domestic buyers contracted with U.S. primary producers for an additional 12,500 tons of domestic-origin U₃O₈. However, those new commitments were offset by a 25,600-ton reduction in January 1, 1980 delivery commitments under previous contracts, resulting in a net decrease of 13,100 tons for the year. This is the first year in which the reduction exceeded new procurement. The reductions resulted largely from revisions in reactor and enrichment service schedules, planned buyer captive production, and adjustments to commitments for material under litigation. Past delivery and delivery commitments total 315,200 tons U₃O₈, of which 157,500 tons were delivered through 1980 and 157,700 tons remain to be delivered. Delivery commitments through 1990 total 135,800 tons

Table I
Domestic Uranium Deliveries and Commitments*
as of January 1, 1980 and January 1, 1981

		<u>TONS U₃O₈</u>
PAST DELIVERIES PLUS FORWARD COMMITMENTS (1/1/80)		328,300
CHANGES DURING 1980:		
TOTAL NEW PURCHASES DURING 1980	12,500	
CHANGES TO 1/1/80 COMMITMENTS	<u>(25,600)</u>	
NET CHANGE		<u>(13,100)</u>
PAST DELIVERIES PLUS FORWARD COMMITMENTS (1/1/81)		315,200
DELIVERIES:		
PRIOR TO 1980		140,000
DURING 1980		17,500
FORWARD COMMITMENTS (1/1/81)		157,700

*DELIVERY COMMITMENTS BETWEEN DOMESTIC PRODUCERS AND BUYERS;
TRANSFERS BETWEEN PRODUCERS OR BETWEEN BUYERS ARE NOT INCLUDED.

U₃O₈, a reduction of 26,900 tons from the data reported in the July 1, 1980 price survey."^{5/}

"Table II lists reported annual delivery commitments of domestic-origin uranium from U.S. primary producers to domestic buyers as of January 1, 1979, January 1, 1980, and January 1, 1981. Actual deliveries reported in 1980 were 4,000 tons U₃O₈ less than was reported at the beginning of 1980. This downward revision continues the recent pattern in which actual deliveries in a year are less than scheduled. The annual delivery commitments reported to DOE in the January 1981 survey also are reduced for each year of the 1981-1990 period from the commitments reported to us in the January 1980 survey. Some of the deliveries in that period are now scheduled for the 1991-2000 period."

Table II
Uranium Delivery Commitments
Domestic Primary Producers to Domestic Buyers*
(Tons U₃O₈)

YEAR OF DELIVERY	AS OF 1/1/79		AS OF 1/1/80		AS OF 1/1/81	
	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE
1966-79		142,600		140,000		140,000
1980	20,000	162,600	21,500	161,500	17,500	157,500
1981	19,300	181,900	20,000	181,500	18,000	175,500
1982	19,400	201,300	19,400	200,900	17,500	193,000
1983	17,800	219,100	17,400	218,300	15,900	208,900
1984	14,100	233,200	16,000	234,300	13,900	222,800
1985	12,800	246,000	13,900	248,000	11,700	234,500
1986	10,900	256,900	11,200	259,400	10,100	244,600
1987	10,500	267,400	11,400	270,800	8,700	253,300
1988	9,500	276,900	10,500	281,300	8,000	261,300
1989	9,400	286,300	9,500	290,000	7,800	269,100
1990	7,300	293,600	7,300	298,100	6,700	275,800
1991-2000	19,300	312,900	30,200	328,300	39,400	315,200

*INCLUDES OPTIONAL QUANTITIES (SEE TABLE III).

^{5/} S.V. Krusiewski and J.A. Patterson, U.S. Uranium Market Developments, U.S. Department of Energy, GJO-108(80).

• Uranium Supply Under Litigation

"The data in Table II include about 8,200 tons U_3O_8 in contracts that were under litigation as of January 1, 1981. This material is included in the commitments until the litigation is resolved, or it becomes apparent that the uranium will not be delivered. Some commitments reported in the previous survey have been deleted from the January 1, 1981 data since the material will probably not be delivered.

"Prices and quantities of material under litigation are excluded from our data on prices because disputes generally involve prices to be paid rather than the quantities to be delivered. The data are adjusted as disputes on uranium deliveries and prices are resolved.

• Optional Uranium Deliveries

"Table III shows the scheduled optional deliveries of domestic-origin uranium to U.S. buyers as of January 1, 1979, January 1, 1980, and January 1, 1981. These options represent a portion of the quantities listed in Table II and total 7,000 tons U_3O_8 as of January 1, 1981, compared to 7,800 tons as of January 1, 1980."

"Figure 1 compares the components of domestic U_3O_8 sales commitments for the 1980-1990 period that U.S. producers and buyers reported to DOE as of January 1, 1981. These components are material under litigation, options, captive production and "firm" contracts. Although any contract can become subject to litigation, rescheduling, etc., we use the term "firm" to distinguish those commitments that are most likely to be delivered under contractual provisions."

Table III
Optional Uranium Deliveries
Domestic Primary Producers to Domestic Buyers
(Tons U₃O₈)

YEAR OF DELIVERY	AS OF 1/1/79		AS OF 1/1/80		AS OF 1/1/81	
	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE
1981	400	400	300	300	400	400
1982	500	900	300	600	400	800
1983	700	1,600	500	1,100	500	1,300
1984	1,000	2,600	600	1,700	600	1,900
1985	700	3,300	600	2,300	300	2,200
1986	700	4,000	600	2,900	300	2,500
1987	700	4,700	600	3,500	300	2,800
1988 & beyond	1,900	6,600	4,300	7,800	4,200	7,000

Figure 1
Components of Domestic Uranium Delivery Commitments
as of January 1, 1981

U.S. Uranium Prices

"In this survey, various types of uranium price data were gathered. 'Contract prices' relate to procurement when prices and their escalation factors are determined at the time the contract is signed. In 'market price' contracts, prices are determined at or sometime before time of delivery and are based on prevailing prices. Most market price contracts contain floor (or minimum) prices that provide a lower limit on the eventual settled price. These floor prices and the means of escalation are commonly determined when the contract is signed. All prices in this report are weighted averages.

● Contract Prices

"Table IV (Column 2) shows the average contract prices, including prices of settled market price contracts, that were reported as of January 1, 1981, for 1980-1989 delivery. These prices are stated in year-of-delivery dollars and, as such, reflect buyers' estimates of escalation in their contracts. Market price settlements for 1980 to 1982 are included with 'contract prices' since, as settled prices, they are similar to 'contract prices'. This procedure also provides a comprehensive average price for actual 1980 deliveries. The actual average price for 1980 deliveries was \$28.15 per pound U₃O₈ in contrast to \$26.00 reported as of July 1, 1980,^{6/} and \$25.40 reported as of January 1, 1980.^{7/}

^{6/} Grand Junction Office, Department of Energy, Release No. 80-155, "DOE Reports Results of Uranium Price Survey", October 1980.

^{7/} DOE/RA-0053, "Survey of United States Uranium Marketing Activity", July 1980.

Table IV
Average Contract Prices and Average Floor Prices
of Market Price Contracts
(Year-of-Delivery Dollars)

YEAR	AVERAGE CONTRACT PRICES		AVERAGE FLOOR PRICES	
	DOLLARS PER POUND U ₃ O ₈	PERCENT OF COMMITMENTS WITH REPORTED PRICES	DOLLARS PER POUND U ₃ O ₈	PERCENT OF COMMITMENTS WITH REPORTED FLOOR PRICES
1980	28.15*	81*	—	—
1981	30.70*	72*	46.45	76
1982	37.70*	65*	49.70	67
1983	47.25	66	52.85	79
1984	54.25	45	58.00	77
1985	59.95	50	62.35	76
1986	52.55	60	66.25	72
1987	53.90	62	67.60	66
1988	55.85	67	71.40	73
1989	60.45	68	76.05	81
1990	**	24	81.05	88

* INCLUDES MARKET PRICE SETTLEMENTS OF MARKET PRICE CONTRACTS

** NOT REPORTED BECAUSE OF LIMITED DATA

"Also shown in Table IV are the percentages of annual commitments or deliveries for which price data were reported. For 1981, prices were reported for 72 percent of the total of contract price and settled market price deliveries. It should be noted that the percentage coverage of prices in 1981-1990 contract price and settled market price deliveries is much lower than was reported in previous surveys. Some previously reported contract prices are now uncertain due to litigation; and hence, were not reported. However, since the data are a sampling of the price data, the coverages, particularly for the 1980-1983 period, can be considered representative.

"Figure 2 depicts, in \$5 increments, the distribution of contract prices for the 1980-1989 period. Those price increments covering 15 or more percent of any year's delivery commitments are shaded."

● Floor Prices of Market Price Contracts

"Floor prices of market price contracts are summarized in Table IV, Column 4. These prices are comparatively high, ranging from \$46.45 in 1981 to \$81.05 in 1990. Figure 3 shows the annual ranges and averages of floor prices for market price contracts during the 1981-1990 period. Ranges and average price settlements of market price contracts for 1980-1981 are also indicated. It should be noted that, as these prices are reported in year-of-delivery dollars, changes in the average prices reflect expectations of escalation rates as well as underlying contract trends."

Figure 2
Distribution of Contract Prices as of January 1, 1981

Figure 3

Range of Floor Prices of Market Price Contracts as of January 1, 1981

III. ECONOMICS

A. The Financial Health of the Electric Utility Sector

Booz, Allen and Hamilton, Inc. presented a briefing paper^{1/} to the Federal Energy Regulatory Commission (FERC) at its March 6th public hearings on the financial condition of electric utilities. The paper addressed national objectives to reduce oil consumption which are threatened due to a limited availability of capital to finance power plant expansion; this is a result of the utility industry's weak financial health caused in large part by adverse Public Utility Commission (PUC) decisions.

Based on a growth in electricity demand between three and four percent per year, the paper estimates (as shown in Figure 1) that the industry will need to install about 210 GW of new capacity to meet load growth. However, as Figure 2 indicates, if consumption of oil and gas is to be reduced, not only must existing consumption of these fuels be displaced, load growth must be supplied by installing new coal and nuclear units.

As the paper noted (see Figures 3 and 4), to meet even moderate load growth projections, tremendous amounts of capital will be required. However, bond deratings, deteriorating coverage ratios, and poor market-to-book value common stock ratios result in the industry's inability to raise the needed funds (see Figures 5, 6 and 7). Therefore, as depicted in Figure 8, capital intensive investments of coal and nuclear are likely to be deferred and the retirement or conversion of oil or gas units delayed or cancelled. This will result in an actual increase in the use of oil and gas rather than a reduction of such usage.

^{1/} "The Financial Health of the Electric Utility Sector, Implications to Utility Investment Decisions and National Energy Policy," A briefing paper prepared by Booz, Allen and Hamilton, Inc., March 1981.

^{2/} The numbering of the figures in the paper has been changed for editorial purposes.

FIGURE 1

WHILE DEMAND FOR ELECTRICITY IS EXPECTED TO INCREASE BETWEEN 3.0 AND 4.0 PERCENT PER YEAR THROUGH 1990,* THE INDUSTRY WILL STILL NEED TO INSTALL 210 GIGAWATTS OF NEW CAPACITY TO MEET LOAD GROWTH.

*DEPARTMENT OF ENERGY FORECASTS PRESENTLY PREDICT ELECTRICITY CONSUMPTION TO GROW AT A RATE OF APPROXIMATELY 3.5% PER YEAR. OFFICIAL INDUSTRY FORECASTS—EEI, NERC, ELECTRICAL WORLD—PREDICT A SIMILAR GROWTH RATE.

FIGURE 2

IF UTILITY CONSUMPTION OF OIL AND GAS IS TO BE REDUCED, NOT ONLY MUST EXISTING CONSUMPTION BE DISPLACED, LOAD GROWTH MUST BE SUPPLIED BY INSTALLING NEW COAL, NUCLEAR, AND RENEWABLE RESOURCE TECHNOLOGIES.

FIGURE 3

UTILITY CAPITAL EXPENDITURES TOTALED NEARLY \$37 BILLION IN 1980. INVESTOR-OWNED UTILITIES ALONE SPENT OVER \$24 BILLION, OVER 10 PERCENT OF ALL INDUSTRIAL EXPENDITURES, MAKING THE UTILITY SECTOR THE LARGEST CAPITAL-SPENDING INDUSTRY. INVESTMENT IN COAL AND NUCLEAR PLANTS TOTALED \$24 BILLION.

*INCLUDES COMPUTER AND DATA PROCESSING

FIGURE 4

TO MEET EVEN THE MODERATE LOAD GROWTH PROJECTIONS OF THE 1980'S, TREMENDOUS AMOUNTS OF CAPITAL WILL BE REQUIRED. CAPACITY ADDITIONS ASSOCIATED WITH OIL AND GAS DISPLACEMENT COULD SIGNIFICANTLY INCREASE THESE CAPITAL REQUIREMENTS.

1970-1979 CAPITAL EXPENDITURES
\$320 BILLION

1980-1990 PROJECTED CAPITAL
EXPENDITURES — \$350 BILLION

ALL FIGURES, HISTORICAL AND PROJECTED, ARE
IN 1980 DOLLARS

KEY:

DISPLACING PROJECTED OIL AND GAS CONSUMPTION
WILL REQUIRED 80 GW OF ADDITIONAL COAL AND
NUCLEAR CAPACITY — ASSUMING THIS CAPACITY COULD
BE OPERATED AT AN AVERAGE CAPACITY
FACTOR OF 70%.

FIGURE 5

UTILITY FINANCIAL CONDITIONS HAVE GENERALLY DETERIORATED, AS REFLECTED IN REDUCED COVERAGE RATIOS* AND LOWER RETURNS ON COMMON EQUITY.

*INTEREST COVERAGE IS THE RATIO OF INCOME AVAILABLE FOR DEBT INTEREST PAYMENTS TO THE DOLLAR LEVEL OF INTEREST CHARGES. IT PROVIDES A MEASURE OF LIQUIDITY AND SAFETY.

**ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION (AFC) IS AN ACCOUNTING ADJUSTMENT REFLECTING CAPITAL CHARGES INCURRED BEFORE PLANT IS PLACED IN SERVICE. IT PROVIDES NO CASH RETURN, HOWEVER.

FIGURE 6

WALL STREET HAS INTERPRETED THESE ADVERSE FINANCIAL DEVELOPMENTS AS REDUCING THE SAFETY OF UTILITY INVESTMENTS AND HAS DOWNGRADED ELECTRIC UTILITY BOND RATINGS* ACCORDINGLY.

*BOND RATINGS PROVIDE A MEASURE OF SECURITIES INVESTMENT QUALITY AND SAFETY—PROBABILITY OF PAYMENT OF INTEREST AND PRINCIPAL. RATINGS OF THE HIGHEST QUALITY ARE Aaa (MOODY'S) OR AAA (STANDARD AND POOR'S), WHILE Baa (MOODY'S) OR BBB (STANDARD AND POOR'S) IS AN INDICATION THAT THE COMPANY IS DEVELOPING POOR RISK AND SPECULATIVE CHARACTERISTICS.

FIGURE 7

THE EQUITY MARKETS HAVE ALSO VIEWED THESE FINANCIAL DEVELOPMENTS NEGATIVELY, AS MARKET PRICES HAVE FALLEN BELOW BOOK VALUE. INDEED, TO HELP ATTRACT EQUITY-HOLDERS, MANY UTILITIES ARE NOW PAYING COMMON DIVIDENDS THAT EXCEED CASH EARNINGS.

FIGURE 8

IF BOND DERATINGS, DETERIORATING COVERAGE RATIOS, AND POOR COMMON STOCK MARKET-TO-BOOK VALUE RATIOS RESULT IN THE INDUSTRY'S INABILITY TO RAISE NEEDED FUNDS, CAPITAL INTENSIVE COAL AND NUCLEAR UNITS ARE LIKELY TO BE DEFERRED FIRST; AND RETIREMENT OR CONVERSION OF OIL AND GAS-FIRED UNITS DELAYED OR CANCELLED.

B. TVA Study: Cost Comparison of Nuclear Versus Coal-Fired Power

In a recent speech, Tennessee Valley Authority (TVA) staff personnel made a comparison of the costs of nuclear and coal-fired electric generating stations. The comparison was generic in nature and represents a typical analysis of coal versus nuclear generation for operation in 1995, particularly taking into account the effect of today's high interest costs. According to TVA, the study was not intended to be a comprehensive decision-making tool and TVA has no plans to publish it as a formal Agency report. Presented below are excerpts from the text of the speech.

"In 1974, TVA evaluated the coal-fired and nuclear alternatives for additional generating capacity. The results of the analysis favored the nuclear option. Tables 1 and 2 present results of the economic comparison of alternatives updated in 1977 which was included in the Yellow Creek Nuclear Plant Environmental Report. Table 1 presents the assumptions used to make an economic comparison of base load alternative capacity additions such as Yellow Creek. Table 2 shows the resulting comparative investment costs, fuel costs, operating and maintenance costs for nuclear, low-sulfur coal, and high-sulfur facilities for the 1985-86 time period using the assumptions shown in Table 1. During the period the analysis was prepared, inflation was running at 4 to 6 percent per year and was projected to continue at this level for the long term.

TABLE 1
ASSUMPTIONS UNDERLYING 1977 ECONOMIC COMPARISON

	<u>NUCLEAR</u>	<u>LOW-SULFUR COAL</u>	<u>HIGH-SULFUR COAL</u>
CAPACITY FACTOR	70%	70%	70%
ESCALATION RATES			
SITE LABOR	8.0%	8.0%	8.0%
MATERIALS	8.0%	8.0%	8.0%
COMPOSITE RATE	8.0%	8.0%	8.0%
LIFE OF PLANT	35 YEARS	35 YEARS	35 YEARS
FUEL COSTS - 1984	65¢/MBTU	178¢/MBTU	143¢/MBTU
FUEL COST ESCALATION RATE/YEAR	4%	3%	3%
O&M ESCALATION RATE	5-1/2%	5-1/2%	5-1/2%
DISCOUNT RATE	8-1/2%	8-1/2%	8-1/2%

TABLE 2
ECONOMIC COMPARISON OF BASE LOAD ALTERNATIVE CAPACITY ADDITIONS
 10-YEAR EVALUATION
 (8-1/2 PERCENT DISCOUNT RATE)

	NUCLEAR	COAL-FIRED	
		LOW-SULFUR	HIGH-SULFUR ^{B/}
INSTALLED CAPACITY - NET MW	2,570	2,145	2,472
NPHR ^{E/}	10,100	9,074	9,108
FUEL COST - ¢/10 ⁶ BTU	79	206	165
INVESTMENT - \$/KW (NET) ^{A/}	837	665	676
ANNUAL USE - HOURS ^{C/}	6,132	6,132	6,132
GENERATING COST - MILLS/KWH ^{D/}			
INVESTMENT	12.3	9.8	9.9
FUEL	8.0	18.7	15.1
O&M (INCLUDING NUCLEAR INSURANCE AND LICENSING FEES AND DECOMMISSIONING)	<u>1.6</u>	<u>1.9</u>	<u>4.9</u>
TOTAL (MILLS/KWH)	21.9 ^{E/}	30.4	29.9
DIFFERENCE (MILLS/KWH)	BASE	8.5	8.0

^{A/} ALL CAPITAL COST ESTIMATES INCLUDE COOLING TOWERS.

^{B/} INCLUDES ESTIMATES OF SO₂ REMOVAL EQUIPMENT CAPITAL AND OPERATING COSTS.

^{C/} EQUIVALENT ANNUAL HOURS OPERATION AT FULL LOAD.

^{D/} TEN-YEAR EVALUATION.

^{E/} BASED ON A THROWAWAY FUEL CYCLE, THE NUCLEAR FUEL COST WOULD BE 90¢/MBTU AND THE TOTAL GENERATING COST WOULD BE 23 MILLS/KWH.

^{F/} NET PLANT HEAT RATE.

"The investment costs are in terms of cost expected in the 1985-86 time period. The investment cost for high-sulfur coal includes the cost of SO₂ removal equipment. The investment cost for low-sulfur coal reflects requirements for substantially larger furnace volume and more pulverizer capacity required to burn low-sulfur coal. The indicated fossil-fuel costs reflect mining costs plus a reasonable rate of return.

"The comparison in Table 2 shows that the base-load nuclear plant offers about an 8.0 mills per kWh economic advantage over the high-sulfur coal-fired plant, which is the next lowest cost alternative. This represents an annual generating cost advantage for the nuclear plant of about \$126 million.

"From the standpoint of the updated economics in 1977, it was concluded that nuclear capacity was the most attractive alternative type of feasible base-load capacity as it offered approximately 35-percent advantage over the high-sulfur coal alternative. This evaluation reaffirmed our (TVA's) decision to build the two-unit Yellow Creek Nuclear Plant.

"Table 3 presents recent economic assumptions used as a basis for making a comparison of new coal-fired and nuclear generation base-load capacity with a commercial operation date of 1995. Table 4 shows the resulting comparative investment costs, fuel costs, and operating and maintenance costs for the two alternatives based on commercial operation in 1995. Note the new assumptions include much

TABLE 3
ASSUMPTIONS UNDERLYING 1980 ECONOMIC COMPARISON

	<u>NUCLEAR</u>	<u>HIGH-SULFUR COAL</u>
CAPACITY FACTOR	68%	68%
ESCALATION RATE - CONSTRUCTION COMPOSITE RATE	8.5%	8.5%
LIFE OF PLANT	35 YEARS	35 YEARS
FUEL COSTS - 1995	187¢/MBTU	564¢/MBTU
FUEL COST ESCALATION RATE/YEAR	8.0%	8.5%
O&M ESCALATION RATE/YEAR	8.5%	8.5%
DISCOUNT RATE	15%	15%

TABLE 4
ENERGY COST COMPARISON OF ALTERNATIVE CAPACITY ADDITIONS
 35-YEAR EVALUATION
 (15 PERCENT DISCOUNT RATE)

	<u>NUCLEAR PLANT</u>	<u>COAL PLANT</u>
NET PLANT CAPACITY, MW	2,400	2,400
NET PLANT HEAT RATE, BTU/KWH	10,227	9,248
FUEL COST, LEVELIZED, ¢/MBTU	378	1,085
INVESTMENT - PRESENT WORTH 1995 DOLLARS - \$/KW NET	4,970	2,450
<u>ENERGY COST - LEVELIZED - MILLS/KWH</u>		
INTEREST AND DEPRECIATION PLANT INVESTMENT ^{1/}	122.5	60.4
FUEL COST	38.7	100.3
OPERATION & MAINTENANCE ^{2/}	<u>19.3</u>	<u>20.6</u>
TOTAL COST	180.5	181.3

^{1/} INCLUDES DECOMMISSIONING ALLOWANCE FOR NUCLEAR UNITS.

^{2/} INCLUDES INSURANCE ALLOWANCE FOR NUCLEAR UNITS.

higher long-term inflation rates than in Table 1, and therefore, a higher cost of money and a resulting higher discount rate.

"Based on our (TVA's) current estimates for capacity additions in 1995, these cost comparisons indicate that the generation cost for a new nuclear plant is approximately the same as the cost for a new coal-fired plant. The primary difference in assumptions from 1974 and 1977 to the recent assumptions which causes the loss of cost advantage by the nuclear option is the increased long-term outlook for the cost of debt and the resulting increase in the discount rate.

Uncertainty

"During the past decade, the external environment of all electric utilities has undergone several substantial changes. An environment which at one time was thought to be predictable and understood has now been replaced by an environment known to be characterized by a high degree of uncertainty.

"It is becoming more difficult to compare the relative costs of nuclear power and coal. One reason for the difficulty is that public policy now requires the internalizing of most, but not all, costs associated with energy production. Many of these costs had been uncounted in past economic assessments.

"TVA's analysis indicates that either the coal-fired or nuclear option can be built and operated to meet acceptable environmental standards. However, reliance on either of these options, coal or nuclear, alone probably would involve much greater risks and costs for society than using both options together.

Conclusion

"Based on this analysis, there is no clear-cut choice between coal and nuclear from an economic standpoint. In addition, both alternatives face a number of uncertainties that influence the evaluation. This situation of not having an obvious choice enhances the option of conservation. Lower capital cost, minimal regulatory requirements, and better public acceptance makes conservation very attractive; however, like both the coal and nuclear options, it is not without problems.

"There is no assurance that the amount of conservation planned will be in place and realized by the utility on a specific time schedule. The result could be a growing load where the necessary supply is not available which, in turn, could restrict the economic growth of the region."

IV. OPERATION

A. Capacity Factors, Unit Availability and Forced Outage Rate

Based on data presented in the Nuclear Regulatory Commission (NRC) publication NUREG-0020 (Grey Book), Figure 1 presents the variation of year end average capacity factor, unit availability, and forced outage rate for U.S. commercial nuclear plants from 1975 through 1980. Data are also shown for the average through June 1981.

As noted in the March/April 1980 issue of UPDATE, the decrease in unit availability and capacity factor between 1978 and 1979 reflected the effects of the Three Mile Island accident and the seismic adequacy checks required by NRC of the piping systems of five nuclear units.

The decreases in unit availability and capacity factors continued during 1980, when they dropped to their lowest levels since 1975. Since 1980 was the first full year of the TMI impact, this trend was not unexpected. There was, however, about a 3 percent decrease in average forced outage rate from 1979 to 1980.

For the first six months of 1981, the average capacity factor increased indicating that recovery is now taking place. An analysis for the first six months of this year shows that 16 plants had average capacity factors (based on maximum dependable capacity) of over 80 percent. Of these 16, eight had capacity factors which exceeded 90 percent. In comparison, for 1979 only 12 plants had an average capacity factor over 80 percent.

Basis: NRC "Grey Book"

NOTE: Year End Averages are shown for each year and for the first six months of 1981. No attempt has been made to show monthly variations during any particular year.

FIGURE 1
NUCLEAR PLANT PERFORMANCE
(1975 THROUGH JUNE 1981)

The following "definitions" of the performance parameters discussed above appear in the NRC's instructions to the utilities for completing the operating data report for NRC publication NUREG-0020 (Grey Book):

Unit Availability Factor. Compute by dividing the unit available hours (hours generator on line plus unit reserve shutdown hours) by the gross hours in the reporting period. Express as percent to the nearest tenth of a percent.

Unit Capacity Factor (Using MDC). Compute by dividing net electrical energy generated by the product of maximum dependable capacity (MDC) times the gross hours in the reporting period. Express as percent to the nearest tenth of a percent.

Unit Capacity Factor (Using DER). Compute as in the case of Unit Capacity Factor (Using MDC), substituting design electrical rating (DER) for maximum dependable capacity.

Unit Forced Outage Rate. Compute by dividing the total forced outage hours by the sum of hours generator on line plus total forced outage hours. Express as percent to the nearest tenth of a percent.

B. A Survey of Occupational Employment in the Nuclear Power Industry

A survey^{1/} of present and projected occupational employment in the nuclear power industry indicates that there are approximately 54,700 positions in the nuclear power industry presently, and that, over the next decade, the industry will have to locate approximately 57,000 new employees. This survey was sponsored by the Department of Energy's Office of Light Water Reactors and was conducted by the Training and Education Division of the Institute of Nuclear Power Operations (INPO). It stemmed from a White House response to the Kemeny Commission^{2/} recommendations. The President's directive suggested that the project go beyond the assessment level to provide data which would assist the industry in developing and implementing more effective staffing and training procedures.

The survey universe consisted of all public and investor-owned utilities with nuclear power plants in operation or under construction in the United States who are INPO members. Reported data were tabulated from questionnaires to determine: 1) actual on- and off-site nuclear occupational employment levels as of March 1, 1981, 2) projected employment levels over the coming decade, 3) preferred staffing levels, and 4) turnover data for the year 1980. Excerpted here are portions of the report dealing with present and projected staffing levels.

"Table 1 identifies the characteristics of respondents included in this preliminary report. Analysis of that table reveals the fact that 73 percent of INPO member organizations surveyed have responded to date and suggests no systematic bias in the reported data.

^{1/} "A Survey of Occupational Employment in the Nuclear Power Industry," by the Institute of Nuclear Power Operations, Progress Report #1, July 1, 1981.

^{2/} J. G. Kemeny, et al., "The Report of the President's Commission on the Accident at Three Mile Island," October 1979.

TABLE 1. CHARACTERISTICS OF RESPONDENTS
INCLUDED IN PRELIMINARY REPORT

	<u>Survey Universe</u>	<u>Preliminary Report</u>	
		<u>Number</u>	<u>Percent</u>
INPO Members	60 ^a	44 ^b	73
Nuclear power plant sites	99	76 ^c	77
Nuclear power reactor units			
Operating			
BWR	27	22	77
PWR	41	28	68
GR	1	1	100
HTGR	1	0	0
Under Construction			
BWR	29	23	79
PWR	58	47	81
Planned			
BWR	4	3	75
PWR	13	6	46
Shutdown ^d	1		
Decommissioning ^e	1		

^a This number includes two holding companies having two utilities in each.

^b Usable forms for data tabulations: 70 on-site employment, 39 off-site employment, 33 staff turnover, and 37 training.

^c In addition to the 70 sites reporting employment, 6 sites (no employees on site or decommissioning status) are accounted for in the responses.

^d Three Mile Island No. 2 (not included in report).

^e Shippingport (not included in report).

"Results will be reported in terms of each of the four issues--which the three questionnaires employed in Survey #1 were designed to answer.

Actual Nuclear Employment on March 1, 1981

"Table 2 summarizes occupational employment levels reported by INPO member organizations surveyed (on- and off-site combined). Analysis of those data reveals that the vacancy rate for these 44 respondents is 14.2% (4,961 positions) of 34,933 positions. An approximation of industry totals may be obtained by mathematical extrapolation. Such an effort produces an approximate total of 54,700 authorized positions in the nuclear industry. These data also indicate that "engineers" and "technicians" positions comprise the largest occupational groups in the industry while "scientists" and "other professionals" comprise the smallest.

Projected Employment 1981-1991

"Table 3 contains estimates of projected on-site occupational positions for the decade 1981-1991. Examination of that table reveals a 34.7% (8,678 positions) growth rate projected by the 38 respondents (64%). Again, an approximation of the industry growth rate was projected statistically and suggests 13,600 new positions will be created as a result of growth, regulatory requirements, etc., by 1991. Occupational groups predicted to realize the greatest expansion are "all other skilled craft workers" (140.7%), "electricians" (77%), and "clerical workers" (76.1%); while the "all other workers" (usually containing a high proportion of security personnel) category contains the only projected decrease in the industry (-2.6%).

TABLE 2. TOTAL EMPLOYMENT IN NUCLEAR POWER ACTIVITIES,
BY OCCUPATION, 1981 (73 PERCENT RESPONSE)

<u>Occupation</u>	<u>Status as of March 1, 1981</u>			<u>Percent of Total Positions</u>
	<u>Employment</u>	<u>Vacancies</u>	<u>Total Positions^a</u>	
Managers	2,665	219	2,884	7.2
Engineers	6,205	1,361	7,566	19.0
Scientists	755	134	889	2.2
Other professional workers	1,513	280	1,793	4.5
Technicians	6,463	1,216	7,679	19.2
Operators	3,524	842	4,366	10.9
Skilled craft workers	4,909	569	5,478	13.7
Clerical workers	2,958	130	3,088	7.7
All other workers	<u>5,941</u>	<u>210</u>	<u>6,151</u>	<u>15.4</u>
TOTAL	34,933	4,961*	39,894 (54,700) ^b	**

^a This includes persons employed by INPO member utilities, vacant positions, contractor positions used in normal operations, and holding company positions allocated to the utilities.

^b Numbers in parenthesis () represent estimates for industry inflated by multiplying reported positions (73 percent response) time 1.37; numbers rounded to nearest 100.

* 14.2% vacancy rate

** Total does not add to 100 percent because of rounding.

TABLE 3. ON-SITE POSITIONS: ESTIMATES OF 1981 STAFFING AND PROJECTIONS FOR 1991 BASED ON 64 PERCENT RESPONSE FROM THE UTILITIES

	<u>Total Positions^a</u>		<u>Change</u>	
	<u>Estimated^b</u>	<u>Projected^b</u>	<u>Number</u>	<u>Percent</u>
	<u>1981</u>	<u>1991</u>		
Managers	1,464 (2,300)	2,056 (3,200)	592 (900)	40.4
Engineers	2,223 (3,500)	2,551 (4,000)	328 (500)	14.6
Health Physicists	145 (200)	245 (400)	100 (200)	69.0
All other scientists	202 (300)	261 (400)	59 (600)	29.0
All other professional workers	767 (1,200)	1,128 (1,800)	361 (600)	47.1
TECHNICIANS				
Electrical & elec. technicians	1,528 (2,400)	2,355 (3,700)	827 (1,300)	54.1
All other engineering tech.	724 (1,100)	1,155 (1,800)	431 (700)	59.5
Health physics technicians and radiation monitors	1,558 (2,400)	2,209 (3,400)	651 (1,000)	41.8
All other technicians	900 (1,500)	1,070 (1,700)	80 (200)	8.1
OPERATORS				
Senior licensed operators	518 (800)	831 (1,300)	313 (500)	60.4
Shift supervisor	567 (900)	922 (1,400)	355 (500)	62.6
Licensed operators	1,025 (1,600)	1,483 (2,300)	458 (700)	44.7
Non-licensed operators	1,971 (3,100)	2,367 (3,700)	396 (600)	20.1
SKILLED CRAFT WORKERS				
Electricians	1,039 (1,600)	1,869 (2,900)	800 (1,300)	77.0
Mechanics	1,995 (3,100)	2,490 (3,900)	495 (800)	24.8
Welders with nuclear cert.	302 (500)	468 (700)	166 (200)	55.0
All other skilled craft workers	869 (1,400)	2,092 (3,300)	1,223 (1,900)	140.7
Clerical workers	1,561 (2,400)	2,749 (4,300)	1,188 (1,900)	76.1
All other workers	5,554 (8,700)	5,409 (8,400)	-145 (-300)	-2.6
TOTAL	25,002 (39,000)	33,680 (52,600)	8,678 (13,600)	34.7

^a This includes utility, contractor, and holding company positions.

^b Numbers in parenthesis () represent estimates for industry inflated by multiplying reported and projected positions (64 percent response) times 1.56; numbers rounded to nearest 100. Current regulations are assumed in the projections.

"Table 4 reports the same information for off-site positions. These data suggest a 13.1% increase in such occupational positions resulting from projected growth (3,000 projected positions for the entire industry). The highest increase is projected for "health physicists" (105.4%), while the only decline is predicted for the "technician" group (-3.3%).

"Combining projected increases from Tables 3 and 4 suggests that a total of 16,600 growth positions (13,600 on-site and 3,000 off-site) will be created industry-wide by 1991. The reader is reminded that these projections were based upon respondent's understanding of scheduled growth plans (e.g., new units coming on line), current regulatory requirements, and their own company's operating policies and procedures.

Preferred Staffing Levels for 1981

"Since there was some evidence to suggest that member organization's staffing levels might be based upon requirements mandated (or about to be mandated) by regulatory agencies rather than their own best judgements, the survey was also designed to collect preferred levels (irrespective of regulations). Since this was an optional part of both the on- and off-site questionnaires, the response rates dropped to 23% and 18%, respectively.

(There is)"...an overall preference for decreasing staffing levels (-17.9% on-site and -7.6% off-site). The greatest level of preferred decrease on-site was "welders with nuclear certification" (36.9%),

TABLE 4. OFF-SITE POSITIONS: ESTIMATES OF 1981 STAFFING
AND PROJECTIONS FOR 1991 BASED ON 55 PERCENT RESPONSE
FROM THE UTILITIES

<u>Occupations</u>	<u>Total Positions^a</u>		<u>Change</u>	
	<u>Estimated 1981^b</u>	<u>Projected 1991^b</u>	<u>Number</u>	<u>Percent</u>
Managers	1,052 (1,900)	1,233 (2,200)	181 (300)	17.2
Engineers	4,682 (8,500)	4,893 (8,900)	211 (400)	4.5
Health physicists	111 (200)	228 (400)	117 (200)	105.4
All other				
scientists	403 (700)	567 (1,000)	164 (300)	40.7
All other profes-				
sional workers	937 (1,700)	1,346 (2,400)	409 (700)	43.6
Technicians	2,359 (4,300)	2,280 (4,100)	-79 (-200)	-3.3
Skilled craft				
workers	1,173 (2,100)	1,576 (2,900)	403 (800)	34.4
Clerical workers	1,307 (2,400)	1,478 ^c (2,700)	171 (300)	13.1
All other workers	619 (1,100)	700 ^c (1,300)	81 (200)	13.1
TOTAL	12,643 (22,900)	14,301 (25,900)	1,658 (3,000)	13.1

^a This includes utility, contractor, and holding company positions.

^b Inflated by multiplying reported and projected positions (55 percent response) times 1.82; numbers rounded to nearest 100. Current regulations are assumed in the projections.

^c Estimated increase based upon overall increase in other positions.

while "total engineers" were the off-site group with the greatest preferred decrease (-16.1%). Increases were preferred for "senior licensed operators" (3.3%) on-site, and "total technicians" (4.5%) off-site.

"The critical issue is the number of additional people which must be brought into the industry by 1991. Table 5^{3/} provides an estimate of that number by combining data collected by the three (INPO) questionnaires.... This analysis suggests that the industry will have to locate approximately 57,000 new employees over the next decade.

^{3/} This table number has been changed for editorial purposes.

TABLE 5 ESTIMATES OF ADDITIONAL MANPOWER REQUIREMENTS
FOR THE NUCLEAR POWER INDUSTRY 1981-1991

	Number of Employees		
	<u>Growth^a</u>	<u>Replacement^b</u>	<u>Total</u>
Managers	1,200	1,900	3,100
Engineers	900	6,000	6,900
Scientists	800	800	1,600
Other professional workers	1,300	2,000	3,300
Technicians	3,000	4,800	7,800
Operators	2,300	5,700	8,000
Skilled craft workers	5,000	10,000	15,500
Clerical workers	2,200	3,300	5,500
All other workers	<u>- 100</u>	<u>5,400</u>	<u>5,300</u>
TOTAL	16,600	40,400	57,000

^a Estimated from projections by utilities inflated to industry level.

^b Estimated from turnover rates, assuming constant annual turnover rates and linear trend in growth.

C. Utility Briefs

1. General Public Utilities, "Reactor Safeguards Committee Supports Restart of TMI Unit #1"

From a July 17 GPU news release--"Officials at Three Mile Island expressed optimism over a report by the Advisory Committee on Reactor Safeguards that Three Mile Island Unit #1 'can be restarted and operated without undue risk to the health and safety of the public' upon completion of efforts currently underway.

"The reactor safeguards committee submitted its report on TMI Unit #1 to Nunzio J. Palladino, chairman of the U.S. Nuclear Regulatory Commission, earlier this week (week of July 13). The committee was created by Congress in 1957 to advise the members of first, the Atomic Energy Commission, and now the Nuclear Regulatory Commission on issues relating to the safety of nuclear reactors.

"Robert C. Arnold, chief operating executive of GPU Nuclear, the operator of Three Mile Island, said, 'he is enthusiastic and optimistic that the requirements of the Advisory Committee and the NRC can successfully be met. We are extremely gratified that the great amount of engineering and scientific development that has gone into Unit #1 has helped result in this opinion.'

"TMI Unit #1 was in the final stages of a refueling shutdown when the accident at TMI Unit #2 occurred on March 28, 1979. The NRC ordered Unit #1 to stay shut down pending an exhaustive safety

review and modifications from the lessons learned in the Unit #2 accident. Unit #1 and #2 have now been completely separated from each other for operational purposes.

"Before addressing the restart of TMI Unit #1 directly, the Nuclear Regulatory Commission is awaiting the recommendation of the Atomic Safety and Licensing Board that held nine months of hearings on the restart. Their report is expected in September. The NRC is expected to rule on the restart within 35 days after receiving the hearing board's report."

2. Alabama Power Company, "Farley Nuclear Plant Dedicated"

A July report indicated that an Alabama Power Company nuclear generating plant was dedicated Friday morning, July 10 at ceremonies in honor of President Joseph M. Farley.

"The plant consists of two Westinghouse pressurized water reactors, each with a generating capacity of 860,000 kilowatts. During its first eight months of operation, Unit 1 generated more electricity than all but four of the 69 nuclear plants operating in the United States at that time.

"With the second unit in commercial operation later this month, we anticipate that both units could supply about 30 percent annually of Alabama Power's total generation. This is important to our customers who will benefit from the lower costs of nuclear fuel. This savings affirms the company's decision a decade ago

to include nuclear energy as an important part of our generation mix', said W. O. Whitt, Executive Vice President."

3. Northeast Utilities, "Several Electric Systems Interested in Purchase of Millstone III"

"Northeast Utilities (NU) reported on July 17 that it has received expressions of interest in 63 megawatts (MW) of its ownership offering in Millstone III. The expressions of interest come in response to NU's announcement on January 5, 1981, that it was making a firm offer to sell 100 MW of its 748 MW ownership in the unit. The proposed sale is subject to the approval of state and federal regulatory agencies, which is expected to be completed in about 12 months.

"Under the Millstone III Joint Ownership Agreement, the 12 other New England utilities that currently own part of the unit have a first option preference to purchase. July 6, 1981 was the deadline for which the present owners were contractually entitled to receive preferential treatment for the sale.

"To date, 24 municipal electric systems and two cooperative electric systems have expressed an interest to participate in the purchase of a share of the unit. However, as of July 6, only one investor-owned utility has responded, which reflects the weakened financial condition common to most investor-owned utilities.

"While recognizing the enormous benefits of maintaining its current 748 MW ownership in Millstone III--both in terms of lower rates for consumers and achieving the company's goals of reducing dependence on uncertain foreign oil supplies--NU's offering was dictated by the company's weakened financial condition. The proposed sell-down represents a significant effort to reduce the company's need for new capital and to minimize the impact of sales of common equity at prices below book value.

"Each 100 MW share of the unit displaces generation requiring about 800,000 barrels of oil annually, or about 6 million barrels in the period from 1986 through 1993. The cost of the replacement oil alone through 1993 would be about \$840 million, or more than three and one-half times as expensive as the total \$226 million investment required for 100 MW of the unit."

4. Omaha Public Power District, "Refueling of Fort Calhoun"

In a release dated September 18, 1981 the Omaha Public Power District announced that its 478,000-kilowatt nuclear plant near Fort Calhoun will be taken out of service (that same night) for scheduled refueling and routine maintenance.

"'Fort Calhoun Station will remain off-line for approximately eight weeks,' according to William C. Jones, Division Manager, Production Operations. 'We'll also take advantage of this refueling period to make some additional safety modifications required by the Nuclear Regulatory Commission,' Mr. Jones said.

"This will be the sixth refueling at Fort Calhoun Station since it began generating electricity for District customers September 26, 1973.

"In the past eight years, Fort Calhoun Station has generated more than 20 billion kilowatt-hours of electricity, about 44 percent of the District's total generation for the same period,' OPPD General Manager Bernard W. Reznicek said today. 'It has done this safely and efficiently and has saved our customers more than \$114,000,000 in the process,' Mr. Reznicek added. He attributed the \$114,000,000 savings to the difference in fuel and other production costs between the District's nuclear and coal-fired generating plants.

"Mr. Jones said several plant modifications will be made during the refueling period, including the following: an upgrading of the system which provides an automatic back-up flow of water to the steam generators in the event the normal water flow is interrupted; the installation of a remote-controlled venting system for the reactor vessel to replace the present manual system; the installation of additional radiation shielding in the plant's auxiliary building; and an upgrading of radiation monitoring systems."

5. Commonwealth Edison Company, "No Unusual Risk From Zion Station, Major New Study Concludes"

A September 17 news bulletin from Commonwealth Edison contained the following comments concerning the Zion Station Probabilistic

Safety Study. "Commonwealth Edison's Zion Station poses no unique public risk and operates well below the risk level determined by the Nuclear Regulatory Commission, a massive new study coordinated by the utility concludes. Covering 6,000 pages and 10 volumes, the study today (September 17) was made public and presented to the NRC in Washington by Edison officials.

"Eighteen months in preparation, the Zion Station Probabilistic Safety Study is the most extensive and technologically advanced study of nuclear reactor safety undertaken to date. A team of Edison scientists and engineers as well as outside consultants considered tens of thousands of accident scenarios, including events initiated by pipe breaks, equipment malfunctions, tornadoes and earthquakes.

"An extremely violent earthquake would present the most significant risk to the plant, the study points out. To present a threat, however, an earthquake would have to be many times more severe than the worst on record in northern Illinois, rivaling those that struck San Francisco in 1906 and Alaska in 1968. The study maintains there is only slight likelihood of a core melt coupled with such an improbable event.

"Even if the plant were to incur the most serious of accidents, a core meltdown, the study shows there is a better than 99 percent probability that there would be no significant release of radioactive material. According to the study, the Zion reactor

containment building would be able to retain radioactive materials even under core melt conditions.

"Edison undertook the Zion safety study after the NRC expressed concern in late 1979 that the plant might have represented an undue risk to the public compared to the operation of other commercial nuclear power stations. Part of the agency's concern was that the plant is located in a comparatively high population area. However, the NRC staff did not consider Zion's unique design features in making its rather generalized probability calculations, the study notes.

"At the request of the NRC, the study also evaluated two costly new modifications aimed at further reducing the risk from core melts, namely, a core ladle of ceramic blocks to catch the molten core and prevent it from attacking the concrete floor of the containment building, and a filtered vented containment system to filter and release material after a meltdown, reducing the pressure inside the containment. The results clearly showed that these features would result in only marginal decreases in the already low level of risk associated with Zion Station."

D. Errata

May/June 1981 issue of UPDATE, page 21. The date mentioned on line 3 should be February 28, 1981 rather than December 31, 1980.

On page 32 of the same issue, change the fuel on the line indicating average generating costs for the U.S.A. from Oil^{5/} to Coal^{5/}.

U.S. Central Station Nuclear Electric Generating Units:

Significant Milestones

(Status as of July 1, 1981)

September 1981

U.S. Department of Energy
Assistant Secretary for Nuclear Energy
Office of Nuclear Reactor Programs
Washington, D.C. 20545

CONTENTS

	Page
Map	1
List of Nuclear Power Units	2-19
Notes	20
State Listing of Nuclear Power Units	21-22
Regional Listing of Nuclear Power Units	23-24
Utility Listing of Nuclear Power Units	25-34
Tabulations of Status, Schedules and Orders	35-37
Index	38

NUCLEAR POWER REACTORS IN THE UNITED STATES

INDEX

149 ALLEN'S CREEK #1	91 FITZPATRICK	29 PALISADES	90 TROJAN #1
57 ARKANSAS ONE #1	43 FORT CALHOUN	160 PALO VERDE #1	27 TURKEY POINT #3
102 ARKANSAS ONE #2	22 FORT ST. VRAIN	161 PALO VERDE #2	60 TURKEY POINT #4
80 ARNOLD #1		162 PALO VERDE #3	
	23 GINNA #1	6 PATHFINDER	179 VANDALIA
48 BAILLY	124 GRAND GULF #1	10 PEACH BOTTOM #1	42 VERMONT YANKEE
71 BEAVER VALLEY #1	125 GRAND GULF #2	39 PEACH BOTTOM #2	120 VOGTLE #1
122 BEAVER VALLEY #2		40 PEACH BOTTOM #3	121 VOGTLE #2
105 BELLEFONTE #1	16 HADDAM	148 PEBBLE SPRINGS #1	109 WATERFORD #3
106 BELLEFONTE #2	7 HALLAM	169 PEBBLE SPRINGS #2	107 WATTS BAR #1
13 BIG ROCK PT.	113 HARRIS #1	150 PERKINS 1	108 WATTS BAR #2
163 BLACK FOX #1	114 HARRIS #2	151 PERKINS 2	167 WOLF CREEK
164 BLACK FOX #2	115 HARRIS #3	152 PERKINS 3	140 WPPSS PROJECT #1
14 BONUS	116 HARRIS #4	127 PERRY #1	112 WPPSS PROJECT #2
134 BRAIDWOOD #1	141 HARTSVILLE A-1	128 PERRY #2	158 WPPSS PROJECT #3
135 BRAIDWOOD #2	142 HARTSVILLE A-2	177 PHIP BEND 1	170 WPPSS PROJECT #4
34 BROWNS FERRY #1	143 HARTSVILLE B-1	178 PHIP BEND 2	171 WPPSS PROJECT #5
35 BROWNS FERRY #2	144 HARTSVILLE B-2	24 PILGRIM #1	
65 BROWNS FERRY #3	75 HATCH #1	126 PILGRIM #2	4 YANKEE
78 BRUNSWICK #1	101 HATCH #2	12 PIQUA	175 YELLOW CRK #1
79 BRUNSWICK #2	93 HOPE CREEK #1	31 POINT BEACH #1	176 YELLOW CRK #2
117 BYRON #1	94 HOPE CREEK #2	52 POINT BEACH #2	
118 BYRON #2	8 HUMBOLDT BAY	53 PRAIRIE ISLAND #1	95 ZIMMER #1
		66 PRAIRIE ISLAND #2	56 ZION #1
166 CALLAWAY #1	2 INDIAN POINT #1	33 QUAD CITIES #1	69 ZION #2
168 CALLAWAY #2	26 INDIAN POINT #2	38 QUAD CITIES #2	
61 CALVERT CLIFFS #1	59 INDIAN POINT #3		
62 CALVERT CLIFFS #2		70 RANCHO SECO	
180 CARROLL COUNTY #1	50 KEWAUNEE #1	131 RIVER BEND #1	
181 CARROLL COUNTY #2		159 RIVER BEND #2	
132 CATAWBA #1	15 LACROSSE	30 ROBINSON #2	
133 CATAWBA #2	103 LASALLE #1		
153 CHEROKEE 1	104 LASALLE #2	41 SALEM #1	
154 CHEROKEE 2	72 LIMERICK #1	64 SALEM #2	
155 CHEROKEE 3	73 LIMERICK #2	17 SAN ONOFRE #1	
138 CLINCH RIVER		99 SAN ONOFRE #2	
145 CLINTON #1	51 MAINE YANKEE	100 SAN ONOFRE #3	
146 CLINTON #2	172 MARBLE HILL #1	129 SEABROOK #1	
136 COMANCHE #1	173 MARBLE HILL #2	130 SEABROOK #2	
137 COMANCHE #2	96 MCGUIRE #1	81 SEQUOYAH #1	
67 COOK #1	97 MCGUIRE #2	82 SEQUOYAH #2	
68 COOK #2	83 MIDLAND #1	1 SHIPPINGPORT	
58 COOPER	84 MIDLAND #2	54 SHOREHAM	
49 CRYSTAL RIVER #3	25 MILLSTONE #1	165 SKAGIT #1	
11 CVTR	77 MILLSTONE #2	174 SKAGIT #2	
	147 MILLSTONE #3	156 SOUTH TEXAS #1	
89 DAVIS-BESSE #1	32 MONTICELLO	157 SOUTH TEXAS #2	
46 DIABLO #1		76 ST. LUCIE #1	
87 DIABLO #2	18 N REACTOR	139 ST. LUCIE #2	
3 DRESDEN #1	19 NINE MILE #1	111 SUMNER	
21 DRESDEN #2	123 NINE MILE #2	44 SURRY #1	
28 DRESDEN #3	74 NORTH ANNA #1	45 SURRY #2	
	98 NORTH ANNA #2	85 SUSQUEHANNA #1	
9 ELK RIVER	119 NORTH ANNA #3	86 SUSQUEHANNA #2	
92 FARLEY #1	36 OCONEE #1	47 THREE MILE #1	
110 FARLEY #2	37 OCONEE #2	55 THREE MILE #2	
5 FERMI #1	63 OCONEE #3		
88 FERMI #2	20 OYSTER CREEK		

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP * NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNOC'D	NSSS ORDER	CP/ ** OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER***	COM-*** MERCIAL OPER.
1 SHIPPINGPORT ATOMIC POWER STATION (PA/REGION-2 MA)	DUQUESNE LIGHT CO & DOE	60.0	PWR	WEST S&W	10/53	07/53	N/A N/A	N/A N/A	12/57	12/57	12/57	N/A
2 INDIAN POINT STATION UNIT 1 (NY/REGION-1 NE)	CONSOLIDATED EDISON CO	265.0	PWR	B&W O/VIT	02/55	02/55	03/55 01/60	05/56 03/62	08/62	09/62	01/63	10/62 ⁱ
3 DRESDEN NUCLEAR POWER STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	200.0	BWR	GE BECH	04/55	07/55	03/55 06/58	05/56 09/59	10/59	04/60	06/60	07/60
4 YANKEE NUCLEAR POWER STATION (MA/REGION-1 NE)	YANKEE ATOMIC ELECTRIC CO	175.0	PWR	WEST S&W	04/55	06/56	07/56 09/59	11/57 07/60	08/60	11/60	01/61	07/61
5 ENRICO FERMI ATOMIC POWER PLANT UNIT 1 (MI/REGION-4 ENC)	POWER REACTOR DEVELOPMENT CO	60.9	FBR	PRDC CA	04/55	03/57	01/56 07/61	08/56 05/63	08/63	08/66	10/70	a
6 PATHFINDER ATOMIC POWER PLANT (SD/REGION-5 WNC)	NORTHERN STATES POWER CO	58.5	BWR	AC PSE	02/57	05/57	03/59 06/62	05/60 03/64	03/64	07/66	09/67	b
7 HALLAM NUCLEAR POWER FACILITY (NB/REGION-5 WNC)	CONSUMER PUBLIC POWER DISTRICT & DOE	75.0	SGR	AI BECH	04/55	09/57	02/59 04/61	07/60 08/62	08/62	05/63	07/63	11/63 ^c
8 HUMBOLDT BAY POWER PLANT (CA/REGION-9 FAC)	PACIFIC GAS & ELECTRIC CO	65.0	BWR	GE BECH	02/58	02/58	04/59 09/61	11/60 08/62	02/63	04/63	05/63	08/63 ^j
9 ELK RIVER NUCLEAR PLANT (MN/REGION-5 WNC)	RURAL COOP POWER ASSOC & DOE	22.0	BWR	AC S&L	02/56	06/58	03/59 07/60	12/59 11/62	11/62	08/63	02/64	07/64 ^d
10 PEACH BOTTOM ATOMIC POWER STATION UNIT 1 (PA/REGION-2 MA)	PHILADELPHIA ELECTRIC CO	40.0	HTGR	GAC BECH	11/58	11/58	07/60 02/64	02/62 01/66	03/66	01/67	05/67	06/67 ^e
11 CAROLINAS-VIRGINIA TUBE REACTOR (SC/REGION-3 SA)	CAROLINAS-VIRGINIA NUCLEAR POWER ASSOC,	17.0	HWR	WEST S&W	08/57	01/59	07/59 01/62	05/60 11/62	03/63	12/63	09/65	03/64 ^f
12 PIQUA NUCLEAR POWER FACILITY (OH/REGION-4 ENC)	CITY OF PIQUA & DOE	11.4	OMR	AI H&N	02/56	06/59	09/58 02/61	01/60 08/62	06/63	11/63	01/64	02/64 ^g

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNC'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
13 BIG ROCK POINT NUCLEAR PLANT (MI/REGION-4 ENC)	CONSUMERS POWER CO	72.0	BWR	GE BECH	12/59	12/59	01/60 12/61	05/60 03/62	09/62	12/62	03/63	03/63
14 BOILING NUCLEAR SUPERHEAT POWER STATION (PR/REGION-3 SA)	PUERTO RICO WATER RES AUTH & DOE	16.5	BWR	J&M	06/58	01/60	12/59 02/62	07/60 04/64	04/64	08/64	09/65	h
15 LACROSSE (GENOA) NUCLEAR GENERATING STATION (WI/REGION-4 ENC)	DAIRYLAND POWER COOPERATIVE	50.0	BWR	AC S&L	04/61	06/62	10/62 08/65	03/63 07/67	07/67	04/68	08/69	11/69*
16 HADDAM NECK (CONNECTICUT YANKEE) (CT/REGION-1 NE)	CONNECTICUT YANKEE ATOMIC POWER CO	580.0	PWR	WEST S&W	12/62	12/62	09/63 07/66	05/64 06/67	07/67	08/67	12/67	01/68
17 SAN ONOFRE NUCLEAR GENERATING STATION UNIT 1 (CA/REGION-9 PAC)	SO CALIFORNIA EDISON CO; SAN DIEGO GAS & ELECTRIC CO	436.0	PWR	WEST BECH	04/60	01/63	02/63 11/65	03/64 03/67	06/67	07/67	09/67	01/68
18 N REACTOR/WPPSS (WA/REGION-9 PAC)	WA PUBLIC POWER SUPPLY SYSTEM & DOE	850.0	GR	UNI B&R	04/62	04/63	N/A N/A	N/A N/A	12/63	04/66	07/66	11/66
19 NINE MILE POINT NUCLEAR STATION UNIT 1 (NY/REGION-1 NE)	NIAGARA MOHAWK POWER CORP	620.0	BWR	GE O	07/63	10/63	03/64 06/67	04/65 08/69	09/69	11/69	01/70	12/69
20 OYSTER CREEK NUCLEAR POWER PLANT (NJ/REGION-2 MA)	JERSEY CENTRAL POWER & LIGHT CO	650.0	BWR	GE B&R	05/63	12/63	03/64 11/67	12/64 04/69	05/69	09/69	12/69	12/69
21 DRESDEN NUCLEAR POWER STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	794.0	BWR	GE S&L	02/65	02/65	04/65 11/67	01/66 12/69	01/70	04/70	10/70	06/70*
22 FT ST VRAIN NUCLEAR GENERATING STATION (CO/REGION-8 RM)	PUBLIC SERVICE CO OF COLORADO	330.0	HTGR	GAC S&L	03/65	03/65	10/66 11/69	09/68 12/73	01/74	12/76	00/78	07/79
23 R. E. GINNA NUCLEAR POWER PLANT UNIT 1 (NY/REGION-1 NE)	ROCHESTER GAS & ELECTRIC CORP	470.0	PWR	WEST GIL	03/65	03/65	11/65 01/68	04/66 09/69	11/69	12/69	03/70	06/70*

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
24 PILGRIM STATION UNIT 1 (MA/REGION-1 NE)	BOSTON EDISON CO	655.0	BWR	GE BECH	08/65	08/65	06/67 01/70	08/68 06/72	06/72	07/72	10/72	12/72
25 MILLSTONE NUCLEAR POWER STATION UNIT 1 (CT/REGION-1 NE)	CONNECTICUT LIGHT & POWER CO; HARTFORD ELECTRIC LIGHT CO; WESTERN MASSACHUSETTS ELECTRIC CO	660.0	BWR	GE EBAS	04/65	09/65	11/65 03/68	05/66 10/70	10/70	11/70	12/70	03/71
26 INDIAN POINT STATION UNIT 2 (NY/REGION-1 NE)	CONSOLIDATED EDISON CO	873.0	PWR	WEST UEC	11/65	11/65	12/65 10/68	10/66 10/71	05/73	06/73	04/74	08/73
27 TURKEY POINT STATION UNIT 3 (FL/REGION-3 SA)	FLORIDA POWER & LIGHT CO	693.0	PWR	WEST BECH	11/65	11/65	03/66 05/69	04/67 07/72	10/72	11/72	04/74	12/72
28 DRESDEN NUCLEAR POWER STATION UNIT 3 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	794.0	BWR	GE S&L	01/66	01/66	02/66 11/67	10/66 01/71	01/71	07/71	10/71	11/71
29 PALISADES (MI/REGION-4 ENC)	CONSUMERS POWER CO	805.0	PWR	COMB BECH	01/66	01/66	06/66 11/68	03/67 03/71	05/71	12/71		12/71
30 H B ROBINSON SE PLANT UNIT 2 (SC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	700.0	PWR	WEST EBAS	01/66	01/66	07/66 11/68	04/67 07/70	09/70	09/70	02/71	03/71
31 POINT BEACH NUCLEAR PLANT UNIT 1 (WI/REGION-4 ENC)	WISCONSIN ELECTRIC POWER CO; WISCONSIN-MICHIGAN POWER CO	497.0	PWR	WEST BECH	02/66	02/66	08/66 03/69	07/67 10/70	11/70	11/70	04/71	12/70
32 MONTICELLO NUCLEAR GENERATING PLANT (MN/REGION-5 WNC)	NORTHERN STATES POWER CO	545.0	BWR	GE BECH	04/66	04/66	08/66 11/68	06/67 09/70	12/70	03/71	06/71	06/71
33 QUAD-CITIES STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO; IOWA-ILLINOIS GAS & ELECTRIC CO	789.0	BWR	GE S&L	04/66	04/66	05/66 09/68	02/67 10/71	10/71	04/72	12/72	02/73 *
34 BROWNS FERRY NUCLEAR POWER PLANT UNIT 1 (AL/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1065.0	BWR	GE TVA	05/66	06/66	07/66 09/70	05/67 06/73	08/73	10/73	05/74	08/74

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
5 BROWNS FERRY NUCLEAR POWER PLANT UNIT 2 (AL/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1065.0	BWR	GE TVA	06/66	06/66	07/66 09/70	05/67 05/74	07/74	08/74	4Q/74	03/75
6 OCONEE NUCLEAR STATION UNIT 1 (SC/REGION-3 SA)	DUKE POWER CO	887.0	PWR	B&W O/BEC	07/66	07/66	11/66 06/69	11/67 02/73	04/73	05/73	11/73	07/73
7 OCONEE NUCLEAR STATION UNIT 2 (SC/REGION-3 SA)	DUKE POWER CO	887.0	PWR	B&W O/BEC	07/66	07/66	11/66 06/69	11/67 10/73	11/73	12/73	06/74	09/74
8 QUAD-CITIES STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO; IOWA-ILLINOIS GAS & ELECTRIC CO	789.0	BWR	GE S&L	07/66	07/66	08/66 09/68	02/67 03/72	04/72	05/72	12/72	03/73 *
9 PEACH BOTTOM ATOMIC POWER STATION UNIT 2 (PA/REGION-2 MA)	PHILADELPHIA ELECTRIC CO; PUBLIC SERVICE ELECTRIC & GAS CO; DELMARVA POWER & LIGHT CO; ATLANTIC CITY ELECTRIC CO	1065.0	BWR	GE BECH	05/66	08/66	02/67 08/70	01/68 03/73	09/73	02/74	05/74	07/74
0 PEACH BOTTOM ATOMIC POWER STATION UNIT 3 (PA/REGION-2 MA)	PHILADELPHIA ELECTRIC CO; PUBLIC SERVICE ELECTRIC & GAS CO; DELMARVA POWER & LIGHT CO; ATLANTIC CITY ELECTRIC CO	1065.0	BWR	GE BECH	05/66	08/66	02/67 08/70	01/68 07/74	08/74	09/74	12/74	12/74
1 SALEM NUCLEAR GENERATING STATION UNIT 1 (NJ/REGION-2 MA)	PUBLIC SERVICE ELECTRIC & GAS CO; PHILADELPHIA ELECTRIC CO; DELMARVA POWER & LIGHT CO; ATLANTIC CITY ELECTRIC CO	1090.0	PWR	WEST PS&G	05/66	08/66	12/66 08/71	09/68 03/76	12/76	12/76	05/77	06/77
2 VERMONT YANKEE GENERATING STATION (VT/REGION-1 NE)	VERMONT YANKEE NUCLEAR POWER CORP	514.0	BWR	GE EDAS	12/65	08/66	11/66 01/70	12/67 03/72	03/72	09/72	11/72	11/72
3 FORT CALHOUN STATION (NB/REGION-5 WNC)	OMAHA PUBLIC POWER DISTRICT	490.0	PWR	COMB G&H	06/66	10/66	04/67 11/69	05/68 05/73	03/73	08/73	05/74	06/74 *

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNOC'D	NSSS ORDER	CP/ OL APPLIED	CF/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
44 SURRY POWER STATION UNIT 1 (VA/REGION-3 SA)	VIRGINIA ELECTRIC & POWER CO	788.0	PWR	WEST S&W	06/66	10/66	03/67 01/70	06/68 05/72	07/72	07/72	11/72	12/72
45 SURRY POWER STATION UNIT 2 (VA/REGION-3 SA)	VIRGINIA ELECTRIC & POWER CO	788.0	PWR	WEST S&W	10/66	10/66	03/67 01/70	06/68 01/73	03/73	03/73	04/73	05/73
46 DIABLO CANYON NUCLEAR POWER PLANT UNIT 1 (CA/REGION-9 PAC)	PACIFIC GAS & ELECTRIC CO	1084.0	PWR	WEST PG&E	09/66	11/66	01/67 10/73	04/68	00/81		00/81	00/81
47 THREE MILE ISLAND NUCLEAR STATION UNIT 1 (PA/REGION-2 MA)	METROPOLITAN EDISON CO; JERSEY CENTRAL POWER & LIGHT CO; PA ELECTRIC CO	819.0	PWR	B&W GIL	11/66	11/66	05/67 03/70	05/68 04/74	06/74	06/74	08/74	09/74
48 BAILLY GENERATING STATION (IN/REGION-4 ENC)	NO INDIANA PUBLIC SERVICE CO	643.8	BWR	GE S&L	01/67	01/67	08/70	05/74	(00/89)		(00/89)	(06/89)*
49 CRYSTAL RIVER PLANT UNIT 3 (FL/REGION-3 SA)	FLORIDA POWER CORP & OTHERS	825.0	PWR	B&W GIL	02/67	02/67	08/67 02/71	09/68 12/76	01/77	01/77	04/77	03/77
50 KEWAUNEE NUCLEAR POWER PLANT UNIT 1 (WI/REGION-4 ENC)	WISCONSIN PUBLIC SERVICE CORP; WI POWER & LIGHT CO; MADISON GAS & ELECTRIC CO	535.0	PWR	WEST PSE	02/67	02/67	08/67 01/71	08/68 12/73	03/74	04/74	05/74	06/74
51 MAINE YANKEE ATOMIC POWER PLANT (ME/REGION-1 NE)	MAINE YANKEE ATOMIC POWER CO	825.0	PWR	COMB S&W	01/66	02/67	09/67 08/70	10/68 09/72	10/72	11/72	12/72	12/72
52 POINT BEACH NUCLEAR PLANT UNIT 2 (WI/REGION-4 ENC)	WISCONSIN ELECTRIC POWER CO; WISCONSIN-MICHIGAN POWER CO	497.0	PWR	WEST BECH	02/67	02/67	07/67 03/69	07/68 11/71	05/72	08/72	04/73	10/72**
53 PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT 1 (MN/REGION-5 WNC)	NORTHERN STATES POWER CO	530.0	PWR	WEST PSE	02/67	02/67	03/67 02/71	06/68 08/73	12/73	12/73	04/74	12/73
54 SHOREHAM NUCLEAR POWER STATION (NY/REGION-1 NF)	LONG ISLAND LIGHTING CO	819.0	BWR	GE S&W	04/65	02/67	05/68 01/76	04/73	(06/82)		(12/82)	(02/83)

*Utility announced cancellation 8-26-81

**As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNC'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
55 THREE MILE ISLAND NUCLEAR STATION UNIT 2 (PA/REGION-2 MA)	METROPOLITAN EDISON CO; JERSEY CENTRAL POWER & LIGHT CO; PA ELECTRIC CO	906.0	PWR	B&W B&R	02/67	02/67	04/68 04/74	11/69 02/78	03/78	04/78	10/78	12/78 ¹
56 ZION STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1040.0	PWR	WEST S&L	02/67	02/67	07/67 11/70	12/68 04/73	06/73	06/73	11/73	12/73
57 ARKANSAS NUCLEAR ONE UNIT 1 (AR/REGION-7 WSC)	ARKANSAS POWER & LIGHT CO.	850.0	PWR	B&W BECH	04/67	04/67	11/67 04/71	12/68 05/74	08/74	08/74	12/74	12/74
58 COOPER NUCLEAR STATION (NB/REGION-5 WNC)	NEBRASKA PUBLIC POWER DISTRICT	778.0	BWR	GE B&R	06/66	04/67	07/67 03/71	06/68 01/74	02/74	05/74	10/74	07/74
59 INDIAN POINT STATION UNIT 3 (NY/REGION-1 NE)	POWER AUTHORITY OF STATE OF NEW YORK	965.0	PWR	WEST UEC	04/67	04/67	04/67 12/70	08/69 12/75	04/76	04/76	06/76	08/76
60 TURKEY POINT STATION UNIT 4 (FL/REGION-3 SA)	FLORIDA POWER & LIGHT CO	693.0	PWR	WEST BECH	11/65	04/67	03/66 05/69	04/67 04/73	06/73	06/73	04/74	12/73*
61 CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 1 (MD/REGION-2 MA)	BALTIMORE GAS & ELECTRIC CO	845.0	PWR	COMB BECH	05/67	05/67	01/68 01/71	07/69 07/74	10/74	01/75*	04/75	05/75
62 CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2 (MD/REGION-2 MA)	BALTIMORE GAS & ELECTRIC CO	845.0	PWR	COMB BECH	05/67	05/67	01/68 01/71	07/69 08/76	11/76	12/76	01/77	04/77
63 OCONEE NUCLEAR STATION UNIT 3 (SC/REGION-3 SA)	DUKE POWER CO	887.0	PWR	B&W O/BECH	05/67	05/67	04/67 06/69	11/67 07/74	09/74	09/74	12/74	12/74
64 SALEM NUCLEAR GENERATING STATION UNIT 2 (NJ/REGION-2 MA)	PUBLIC SERVICE ELECTRIC & GAS CO; PHILADELPHIA ELECTRIC CO; DELMARVA POWER & LIGHT CO; ATLANTIC CITY ELECTRIC CO	1115.0	PWR	WEST PS&G	05/66	05/67	10/67 08/71	09/68 04/80	08/80	06/81	(3Q/81)	3Q/81
65 BROWNS FERRY NUCLEAR POWER PLANT UNIT 3 (AL/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1065.0	BWR	GE TVA	06/67	06/67	07/67 09/70	07/68 07/76	08/76	09/76	12/76	03/77

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'C'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
66 PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT 2 (MN/REGION-5 WNC)	NORTHERN STATES POWER CO	530.0	PWR	WEST PSE	06/67	06/67	03/67 02/71	06/68 10/74	12/74	12/74		12/74
67 DONALD C COOK PLANT UNIT 1 (MI/REGION-4 ENC)	INDIANA & MICHIGAN POWER CO	1054.0	PWR	WEST AEP	12/66	07/67	12/67 02/71	03/69 10/74	01/75	02/75	04/76	08/75
68 DONALD C COOK PLANT UNIT 2 (MI/REGION-4 ENC)	INDIANA & MICHIGAN POWER CO	1100.0	PWR	WEST AEP	07/67	07/67	12/67 02/71	03/69 12/77	03/78	03/78	05/78	07/78
69 ZION STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1040.0	PWR	WEST S&L	07/67	07/67	08/67 11/70	12/68 11/73	12/73	12/73	04/74	09/74
70 RANCHO SECO NUCLEAR GENERATING STATION (CA/REGION-9 PAC)	SACRAMENTO MUNICIPAL UTILITY DISTRICT	918.0	PWR	B&W BECH	04/66	08/67	11/67 04/71	10/68 08/74	09/74*	10/74*	01/76	04/75
71 BEAVER VALLEY POWER STATION UNIT 1 (PA/REGION-2 MA)	DUQUESNE LIGHT CO; OHIO EDISON CO; PA POWER CO	852.0	PWR	WEST O/S&W	09/67	09/67	01/69 10/72	05/70 01/76	05/76	06/76*	10/76	04/77*
72 LIMERICK GENERATING STATION UNIT 1 (PA/REGION-2 MA)	PHILADELPHIA ELECTRIC CO	1055.0	BWR	GE BECH	10/67	10/67	03/70	06/74	(01/85)		(02/85)	(04/85)
73 LIMERICK GENERATING STATION UNIT 2 (PA/REGION-2 MA)	PHILADELPHIA ELECTRIC CO	1055.0	BWR	GE BECH	10/67	10/67	03/70	06/74	(07/87)		(08/87)	(10/87)
74 NORTH ANNA POWER STATION UNIT 1 (VA/REGION-3 SA)	VIRGINIA ELECTRIC & POWER CO	907.0	PWR	WEST S&W	10/67	10/67	03/69 05/73	02/71 11/77	04/78	04/78	05/78	06/78
75 EDWIN I HATCH NUCLEAR PLANT UNIT 1 (GA/REGION-3 SA)	GEORGIA POWER CO; OGLETHORPE ELECTRIC MEMBERSHIP COOP; MUNICIPAL ELECTRIC AUTH OF GA; DALTON WATER & LIGHT COMMISSION	777.0	BWR	GE SSI	12/67	10/67	05/68 03/71	09/69 03/74	09/74	11/74	10/77	12/75
76 ST. LUCIE UNIT 1 (FL/REGION-3 SA)	FLORIDA POWER & LIGHT CO	802.0	PWR	COMB ERAS	02/68	12/67	01/69 03/73	07/70 03/76	04/76	05/76	09/76	12/76

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
77 MILLSTONE NUCLEAR POWER STATION UNIT 2 (CT/REGION-1 NE)	CONNECTICUT LIGHT & POWER CO; HARTFORD ELECTRIC LIGHT CO; WESTERN MASSACHUSETTS ELECTRIC CO	870.0	PWR	COMB BECH	06/67	12/67	02/69 08/72	12/70 08/75	10/75	11/75	03/76	12/75
78 BRUNSWICK STEAM ELECTRIC PLANT UNIT 1 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	821.0	BWR	GE UEC	01/68	01/68	07/68 10/72	02/70 09/76	10/76	12/76	03/77	03/77
79 BRUNSWICK STEAM ELECTRIC PLANT UNIT 2 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	821.0	BWR	GE UEC	01/68	01/68	07/68 10/72	02/70 12/74	03/75	04/75	09/75	11/75
80 DUANE ARNOLD ENERGY CENTER UNIT 1 (IA/REGION-5 WNC)	IOWA ELECTRIC LIGHT & POWER CO; CENTRAL IOWA POWER COOPERATIVE; CORNBELT POWER COOPERATIVE	538.0	BWR	GE BECH	02/68	02/68	11/68 05/72	05/70 02/74	03/74	05/74	08/74	02/75
81 SEQUOYAH NUCLEAR POWER PLANT UNIT 1 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1148.0	PWR	WEST TVA	04/68	04/68	10/68 01/74	05/70 02/80	07/80	07/80	06/81	(3Q/81)
82 SEQUOYAH NUCLEAR POWER PLANT UNIT 2 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1148.0	PWR	WEST TVA	04/68	04/68	10/68 01/74	05/70 06/81	(1Q/82)		(2Q/82)	(07/82)
83 MIDLAND NUCLEAR POWER PLANT UNIT 1 (MI/REGION-4 ENC)	CONSUMERS POWER CO	460.0	PWR	B&W BECH	12/67	05/68	01/69 11/77	12/72	(00/85)		(00/85)	(03/85)
84 MIDLAND NUCLEAR POWER PLANT UNIT 2 (MI/REGION-4 ENC)	CONSUMERS POWER CO	811.0	PWR	B&W BECH	12/67	05/68	01/69 11/77	12/72	(00/84)		(00/84)	(09/84)
85 SUSQUEHANNA STEAM ELECTRIC STATION UNIT 1 (PA/REGION-2 MA)	PENNSYLVANIA POWER & LIGHT CO; ALLEGHENY ELECTRIC COOPERATIVE	1050.0	BWR	GE BECH	05/67	05/68	03/71 06/78	11/73	(00/82)		(00/82)	(2Q/83)
86 SUSQUEHANNA STEAM ELECTRIC STATION UNIT 2 (PA/REGION-2 MA)	PENNSYLVANIA POWER & LIGHT CO; ALLEGHENY ELECTRIC COOPERATIVE	1050.0	BWR	GE BECH	05/68	05/68	03/71 06/78	11/73	(00/83)		(00/83)	(2Q/84)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
87 DIABLO CANYON NUCLEAR POWER PLANT UNIT 2 (CA/REGION-9 PAC)	PACIFIC GAS & ELECTRIC CO	1106.0	PWR	WEST PG&E	02/68	07/68	06/68 10/73	12/70	(00/82)		(00/82)	(00/82)
88 ENRICO FERMI ATOMIC POWER PLANT UNIT 2 (MI/REGION-4 ENC)	DETROIT EDISON CO; NO MI ELECTRIC COOP; WOLVERINE ELECTRIC COOP	1093.0	BWR	GE S&L	07/68	08/68	04/69 04/75	09/72	(01/83)		(10/83)	(11/83)
89 DAVIS BESSE NUCLEAR POWER STATION UNIT 1 (OH/REGION-4 ENC)	TOLEDO EDISON CO; CLEVELAND ELECTRIC ILLUMINATING CO	906.0	PWR	B&W BECH	02/68	10/68	07/69 03/73	03/71 04/77	08/77	08/77	12/77	07/78*
90 TROJAN NUCLEAR PLANT (OR/REGION-9 PAC)	PORTLAND GENERAL ELECTRIC CO; EUGENE WATER AND ELECTRIC BOARD; PACIFIC POWER & LIGHT CO	1130.0	PWR	WEST BECH	02/67	11/68	06/69 02/73	02/71 11/75	12/75	12/75*	05/76	05/76
91 JAMES A FITZPATRICK NUCLEAR POWER PLANT (NY/REGION-1 NE)	POWER AUTHORITY OF STATE OF NEW YORK	821.0	BWR	GE S&W	08/68	12/68	12/68 06/71	05/70 10/74	11/74	02/75	10/75	07/75
92 JOSEPH M FARLEY NUCLEAR PLANT UNIT 1 (AL/REGION-6 ESC)	ALABAMA POWER CO.	829.0	PWR	WEST B/SSI	05/69	05/69	10/69 08/73	08/72 06/77	08/77	08/77	10/77	12/77
93 HOPE CREEK GENERATING STATION UNIT 1 (NJ/REGION-2 MA)	PUBLIC SERVICE ELECTRIC & GAS CO; ATLANTIC CITY ELECTRIC CO	1067.0	BWR	GE BECH	08/69	08/69	02/70	11/74	(07/86)		(11/86)	(12/86)
94 HOPE CREEK GENERATING STATION UNIT 2 (NJ/REGION-2 MA)	PUBLIC SERVICE ELECTRIC & GAS CO; ATLANTIC CITY ELECTRIC CO	1067.0	BWR	GE BECH	08/69	08/69	02/70	11/74	(07/89)		(11/89)	(12/89)
95 WM H ZIMMER NUCLEAR POWER STATION UNIT 1 (OH/REGION-4 ENC)	CINCINNATI GAS & ELECTRIC CO; COLUMBUS & SOUTHERN OHIO ELECTRIC CO; DAYTON POWER & LIGHT CO	810.0	BWR	GE S&L	03/68	09/69	04/70 09/75	10/72	(10/81)		(02/82)	(04/82)
96 WILLIAM B MCGUIRE NUCLEAR STATION UNIT 1 (NC/REGION-3 SA)	DUKE POWER CO	1180.0	PWR	WEST DUKE	11/69	11/69	09/70 05/74	02/73 01/81	01/81		(3Q/81)	(10/81)

*As reported in NUREG-0020 July 1981

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'C'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
97 WILLIAM B MCGUIRE NUCLEAR STATION UNIT 2 (NC/REGION-3 SA)	DUKE POWER CO	1180.0	PWR	WEST DUKE	11/69	11/69	09/70 05/74	02/73	(12/82)		(06/83)	(06/83)
98 NORTH ANNA POWER STATION UNIT 2 (VA/REGION-3 SA)	VIRGINIA ELECTRIC & POWER CO	907.0	PWR	WEST SRW	10/67	01/70	03/69 05/73	02/71 04/80	06/80	08/80	10/80	12/80
99 SAN ONOFRE NUCLEAR GENERATING STATION UNIT 2 (CA/REGION-9 PAC)	SO CALIFORNIA EDISON CO; SAN DIEGO GAS & ELECTRIC CO	1100.0	PWR	COMB BECH	01/70	01/70	05/70 03/77	10/73	(12/81)		(06/82)	(06/82)
100 SAN ONOFRE NUCLEAR GENERATING STATION UNIT 3 (CA/REGION-9 PAC)	SO CALIFORNIA EDISON CO; SAN DIEGO GAS & ELECTRIC CO	1100.0	PWR	COMB BECH	01/70	01/70	05/70 03/77	10/73	(12/82)		(07/83)	(07/83)
101 EDWIN I HATCH NUCLEAR PLANT UNIT 2 (GA/REGION-3 SA)	GEORGIA POWER CO; OGLETHORPE ELECTRIC MEMBERSHIP COOP; MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA; DALTON WATER & LIGHT COMMISSION	784.0	BWR	GE SSI/B	02/70	01/70	07/70 10/75	12/72 06/78	07/78	09/78	05/79	09/79
102 ARKANSAS NUCLEAR ONE UNIT 2 (AR/REGION-7 WSC)	ARKANSAS POWER & LIGHT CO.	912.0	PWR	COMB BECH	05/70	05/70	09/70 04/74	12/72 09/78	12/78	12/78	09/79	03/80
103 LASALLE COUNTY NUCLEAR STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1078.0	BWR	GE S&L	03/70	05/70	11/70 05/77	09/73	(12/81)		(04/82)	(04/82)
104 LASALLE COUNTY NUCLEAR STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1078.0	BWR	GE S&L	03/70	05/70	11/70 05/77	09/73	(02/83)		(06/83)	(06/83)
105 BELLEFONTE NUCLEAR PLANT UNIT 1 (AL/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1213.0	PWR	B&W TVA	08/70	08/70	06/73 06/78	12/74	(2Q/85)		(3Q/85)	(12/85)
106 BELLEFONTE NUCLEAR PLANT UNIT 2 (AL/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1213.0	PWR	B&W TVA	08/70	08/70	06/73 06/78	12/74	(1Q/86)		(2Q/86)	(09/86)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNC'D	NSSS ORDER	CP/ OL APPLIED	CF/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
107 WATTS BAR NUCLEAR PLANT UNIT 1 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1177.0	PWR	WEST TVA	08/70	08/70	05/71 10/76	01/73	(3Q/83)		(4Q/83)	(01/84)
108 WATTS BAR NUCLEAR PLANT UNIT 2 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1177.0	PWR	WEST TVA	08/70	08/70	05/71 10/76	01/73	(2Q/84)		(3Q/84)	(10/84)
109 WATERFORD STEAM ELECTRIC STATION UNIT 3 (LA/REGION-7 WSC)	LOUISIANA POWER & LIGHT CO	1113.0	PWR	COMB EBAS	09/70	09/70	12/70 12/78	11/74	(11/82)		(03/83)	(03/83)
110 JOSEPH M FARLEY NUCLEAR PLANT UNIT 2 (AL/REGION-6 ESC)	ALABAMA POWER CO.	829.0	PWR	WEST B/SSI	06/70	12/70	06/70 08/73	08/72 10/80	05/81	05/81	06/81	(07/81)
111 VIRGIL C SUMMER NUCLEAR STATION UNIT 1 (SC/REGION-3 SA)	SC CAROLINA ELECTRIC & GAS CO; SC PUBLIC SERVICE AUTHORITY	900.0	PWR	WEST G/CA	02/71	02/71	06/71 02/77	03/73	(12/81)		(04/82)	(06/82)
112 WPPSS NUCLEAR PROJECT NO 2 (WA/REGION-9 PAC)	WASHINGTON PUBLIC POWER SUPPLY SYSTEM	1093.0	BWR	GE B&R	02/67	03/71	08/71 04/77	03/73	(09/83)		(12/83)	(02/84)
113 SHEARON HARRIS PLANT UNIT 1 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	900.0	PWR	WEST EBAS	04/71	04/71	09/71	01/78	(12/84)		(06/85)	(09/85)
114 SHEARON HARRIS PLANT UNIT 2 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	900.0	PWR	WEST EBAS	04/71	04/71	09/71	01/78	(06/87)		(12/87)	(03/88)
115 SHEARON HARRIS PLANT UNIT 3 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	900.0	PWR	WEST EBAS	04/71	04/71	09/71	01/78	(06/92)		(12/92)	(03/93)
116 SHEARON HARRIS PLANT UNIT 4 (NC/REGION-3 SA)	CAROLINA POWER & LIGHT CO	900.0	PWR	WEST EBAS	04/71	04/71	09/71	01/78	(05/91)		(12/91)	(03/92)
117 BYRON STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1120.0	PWR	WEST S&L	04/71	04/71	09/73 11/78	12/75	(05/83)		(10/83)	(10/83)
118 BYRON STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1120.0	PWR	WEST S&L	04/71	04/71	09/73 11/78	12/75	(06/84)		(10/84)	(10/84)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'C'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
119 NORTH ANNA POWER STATION UNIT 3 (VA/REGION-3 SA)	VIRGINIA ELECTRIC & POWER CO	907.0	PWR	B&W S&W	04/71	04/71	09/71	07/74	(07/89)		(10/89)	(10/89)
120 ALVIN W VOGTLE NUCLEAR PLANT UNIT 1 (GA/REGION-3 SA)	GEORGIA POWER CO; OGLETHORPE ELECTRIC MEMBERSHIP COOP; MUNICIPAL ELECTRIC AUTH OF GA; DALTON WATER & LIGHT COMMISSION	1110.0	PWR	WEST SSI/B	09/71	09/71	02/73	06/74	(12/84)		(04/85)	(05/85)
121 ALVIN W VOGTLE NUCLEAR PLANT UNIT 2 (GA/REGION-3 SA)	GEORGIA POWER CO; OGLETHORPE ELECTRIC MEMBERSHIP COOP; MUNICIPAL ELECTRIC AUTH OF GA; DALTON WATER & LIGHT COMMISSION	1110.0	PWR	WEST SSI/B	09/71	09/71	02/73	06/74	(06/87)		(10/87)	(11/87)
122 BEAVER VALLEY POWER STATION UNIT 2 (PA/REGION-2 MA)	OHIO EDISON CO; CLEVELAND ELECTRIC ILLUMINATING CO; TOLEDO EDISON CO; DUQUESNE LIGHT CO	833.0	PWR	WEST O/S&W	09/71	09/71	11/72	05/74	(12/85)		(04/86)	(05/86)
123 NINE MILE POINT NUCLEAR STATION UNIT 2 (NY/REGION-1 NE)	NIAGARA MOHAWK POWER CORP; ROCHESTER GAS & ELECTRIC CO; CENTRAL HUDSON GAS & ELECTRIC CORP; NY STATE ELECTRIC & GAS CORP; LONG ISLAND LIGHTING CO	1099.8	BWR	GE S&W	06/71	09/71	06/72	06/74	(04/86)		(09/86)	(10/86)
124 GRAND GULF NUCLEAR STATION UNIT 1 (MS/REGION-6 ESC)	MISSISSIPPI POWER & LIGHT CO	1250.0	BWR	GE TECH	03/71	01/72	11/72 06/78	09/74	(12/81)		(02/82)	(08/82)
125 GRAND GULF NUCLEAR STATION UNIT 2 (MS/REGION-6 ESC)	MISSISSIPPI POWER & LIGHT CO	1250.0	BWR	GE TECH	08/71	01/72	11/72 06/78	09/74	(12/85)		(02/86)	(04/86)
126 PILGRIM STATION * UNIT 2 (MA/REGION-1 NE)	BOSTON EDISON CO; MA MUNICIPAL WHOLESALE ELECTRIC CO; NEW ENGLAND POWER CO & OTHERS	1150.0	PWR	COMB TECH	03/72	03/72	12/74		(10/86)		(12/86)	(1Q/87)

*Utility announced cancellation 9-24-81

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'C'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
127 PERRY NUCLEAR POWER PLANT UNIT 1 (OH/REGION-4 ENC)	CLEVELAND ELECTRIC ILLUMINATING CO; OHIO EDISON CO; TOLEDO EDISON CO; DUQUESNE LIGHT CO; TOLEDO EDISON CO	1205.0	BWR	GE G/CA	10/71	06/72	06/73 01/81	05/77	(06/83)		(05/84)	(05/84)
128 PERRY NUCLEAR POWER PLANT UNIT 2 (OH/REGION-4 ENC)	CLEVELAND ELECTRIC ILLUMINATING CO; OHIO EDISON CO; TOLEDO EDISON CO; DUQUESNE LIGHT CO; TOLEDO EDISON CO	1205.0	BWR	GE G/CA	10/71	06/72	06/73 01/81	05/77	(06/87)		(05/88)	(05/88)
129 SEABROOK NUCLEAR STATION UNIT 1 (NH/REGION-1 NE)	PUBLIC SERVICE CO OF NEW HAMPSHIRE; UNITED ILLUMINATING CO; MASSACHUSETTS MUNICIPAL WHOLESALE ELECTR; NEW ENGLAND POWER CO & OTHERS; & OTHERS	1200.0	PWR	WEST UEC	03/67	06/72	07/73	07/76	(11/83)		(01/84)	(02/84)
130 SEABROOK NUCLEAR STATION UNIT 2 (NH/REGION-1 NE)	PUBLIC SERVICE CO OF NEW HAMPSHIRE; UNITED ILLUMINATING CO; MASSACHUSETTS MUNICIPAL WHOLESALE ELECTR; NEW ENGLAND POWER CO & OTHERS; & OTHERS	1200.0	PWR	WEST UEC	02/72	06/72	07/73	07/76	(02/85)		(04/86)	(05/86)
131 RIVER BEND STATION UNIT 1 (LA/REGION-7 WSC)	GULF STATES UTILITIES CO	934.0	BWR	GE S&W	11/71	06/72	09/73	03/77	(10/83)		(04/84)	(04/84)
132 CATAWBA NUCLEAR STATION UNIT 1 (SC/REGION-3 SA)	DUKE POWER CO	1145.0	PWR	WEST DUKE	07/72	07/72	10/72 06/81	08/75	(10/83)		(03/84)	(03/84)
133 CATAWBA NUCLEAR STATION UNIT 2 (SC/REGION-3 SA)	DUKE POWER CO; NC MUNICIPAL POWER AGENCY NO. 1	1145.0	PWR	WEST DUKE	07/72	07/72	10/72 06/81	08/75	(06/85)		(09/85)	(09/85)
134 BRAIDWOOD STATION UNIT 1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1120.0	PWR	WEST S&L	09/72	09/72	09/73 12/78	12/75	(06/85)		(10/85)	(10/85)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
135 BRAIDWOOD STATION UNIT 2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO	1120.0	PWR	WEST S&L	09/72	09/72	09/73 12/78	12/75	(06/86)		(10/86)	(10/86)
136 COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1 (TX/REGION-7 WSC)	DALLAS POWER & LIGHT CO; TEXAS ELECTRIC SERVICE CO; TEXAS POWER & LIGHT CO	1111.0	PWR	WEST G&H	07/72	10/72	07/73 04/78	12/74	(00/82)		(00/82)	(00/82)
137 COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2 (TX/REGION-7 WSC)	DALLAS POWER & LIGHT CO; TEXAS ELECTRIC SERVICE CO; TEXAS POWER AND LIGHT CO	1111.0	PWR	WEST G&H	07/72	10/72	07/73 04/78	12/74	(00/84)		(00/84)	(00/84)
138 CLINCH RIVER BREEDER REACTOR PLANT (TN/REGION-6 ESC)	UNITED STATES GOVERNMENT	350.0	LMFB	WEST B&R	08/72	11/72	04/75					
139 ST. LUCIE UNIT 2 (FL/REGION-3 SA)	FLORIDA POWER & LIGHT CO	810.0	PWR	COMB EBAS	11/72	11/72	09/73 02/81	05/77	(12/82)		(05/83)	(05/83)
140 WPPSS NUCLEAR PROJECT NO 1 (WA/REGION-9 PAC)	WASHINGTON PUBLIC POWER SUPPLY SYSTEM	1218.0	PWR	B&W UEC	11/72	11/72	10/73	12/75	(12/85)		(04/86)	(06/86)
141 HARTSVILLE PLANT A, UNIT 1 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	05/72	12/72	09/74	05/77	(4Q/87)		(1Q/88)	(07/88)
142 HARTSVILLE PLANT A, UNIT 2 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	05/72	12/72	09/74	05/77	(3Q/88)		(1Q/89)	(04/89)
143 HARTSVILLE PLANT B, UNIT 1 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	05/72	12/72	09/74	05/77				
144 HARTSVILLE PLANT B, UNIT 2 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	05/72	12/72	09/74	05/77				
145 CLINTON NUCLEAR POWER STATION UNIT 1 (IL/REGION-4 ENC)	ILLINOIS POWER COMPANY	933.4	BWR	GE S&L	02/72	01/73	10/73 07/80	02/76	(01/83)		(09/83)	(09/83)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANNC'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OFER.
146 CLINTON NUCLEAR POWER STATION UNIT 2 (IL/REGION-4 ENC)	ILLINOIS POWER COMPANY	933.4	BWR	GE S&L	02/72	01/73	10/73 07/80	02/76	(10/87)		(06/88)	(06/88)
147 MILLSTONE NUCLEAR POWER STATION UNIT 3 (CT/REGION-1 NE)	CONNECTICUT LIGHT & POWER CO; HARTFORD ELECTRIC LIGHT CO; WESTERN MA ELECTRIC CO; NEW ENGLAND POWER CO & OTHERS	1156.0	PWR	WEST S&W	01/72	02/73	02/73	03/74	(02/86)		(04/86)	(05/86)
148 PEBBLE SPRINGS UNIT 1 (OR/REGION-9 PAC)	PORTLAND GENERAL ELECTRIC CO; PUGET SOUND POWER & LIGHT CO; PACIFIC POWER & LIGHT CO	1260.0	PWR	B&W BECH	02/73	02/73	08/74		(07/90)		(09/90)	(01/91)
149 ALLENS CREEK NUCLEAR GENERATING STATION UNIT 1 (TX/REGION-7 WSC)	HOUSTON LIGHTING & POWER CO	1150.0	BWR	GE EBAS	08/72	03/73	12/73		(09/90)		(12/90)	(03/91)
150 PERKINS NUCLEAR STATION UNIT 1 (NC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74					
151 PERKINS NUCLEAR STATION UNIT 2 (NC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74					
152 PERKINS NUCLEAR STATION UNIT 3 (NC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74					
153 CHEROKEE NUCLEAR STATION UNIT 1 (SC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74	12/77				
154 CHEROKEE NUCLEAR STATION UNIT 2 (SC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74	12/77				
155 CHEROKEE NUCLEAR STATION UNIT 3 (SC/REGION-3 SA)	DUKE POWER CO	1280.0	PWR	COMB DUKE	04/73	04/73	05/74	12/77				

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ CL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
156 SOUTH TEXAS NUCLEAR PROJECT UNIT 1 (TX/REGION-7 WSC)	HOUSTON LIGHTING & POWER CO; SAN ANTONIO PUBLIC SERVICE BOARD; CENTRAL POWER & LIGHT CO; CITY OF AUSTIN ELECTRIC DEPT	1250.0	PWR	WEST BART	06/73	07/73	07/74 07/78	12/75	(09/83)		(01/84)	(02/84)
157 SOUTH TEXAS NUCLEAR PROJECT UNIT 2 (TX/REGION-7 WSC)	HOUSTON LIGHTING & POWER CO; SAN ANTONIO PUBLIC SERVICE BOARD; CENTRAL POWER & LIGHT CO; CITY OF AUSTIN ELECTRIC DEPT	1250.0	PWR	WEST BART	06/73	07/73	07/74 07/78	12/75	(09/85)		(01/86)	(02/86)
158 WPPSS NUCLEAR PROJECT NO 3 (WA/REGION-9 PAC)	WASHINGTON PUBLIC POWER SUPPLY SYSTEM; PAC P&L & PORTLAND GE; PUGET SOUND P&L; WA WATER POWER CO	1240.0	PWR	COMB EBAS	01/73	07/73	08/74	04/78	(06/86)		(10/86)	(12/86)
159 RIVER BEND STATION UNIT 2 (LA/REGION-7 WSC)	GULF STATES UTILITIES CO	934.0	BWR	GE S&W	09/73	09/73	09/73	03/77				
160 PALO VERDE NUCLEAR GENERATING STATION UNIT 1 (AZ/REGION-8 RM)	ARIZONA PUBLIC SERVICE CO; SALT RIVER PROJECT; EL PASO ELECTRIC CO; PUBLIC SERVICE CO OF NM; SO CA EDISON	1270.0	PWR	COMB BECH	08/73	10/73	10/74 06/80	05/76	(12/82)		(02/83)	(05/83)
161 PALO VERDE NUCLEAR GENERATING STATION UNIT 2 (AZ/REGION-8 RM)	ARIZONA PUBLIC SERVICE CO; SALT RIVER PROJECT; EL PASO ELECTRIC CO; PUBLIC SERVICE CO OF NM; SO CA EDISON	1270.0	PWR	COMB BECH	08/73	10/73	10/74 06/80	05/76	(11/83)		(02/84)	(05/84)
162 PALO VERDE NUCLEAR GENERATING STATION UNIT 3 (AZ/REGION-8 RM)	ARIZONA PUBLIC SERVICE CO; SALT RIVER PROJECT; EL PASO ELECTRIC CO; PUBLIC SERVICE CO OF NM; SO CA EDISON	1270.0	PWR	COMB BECH	08/73	10/73	10/74 06/80	05/76	(12/85)		(02/86)	(06/86)

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
163 BLACK FOX STATION UNIT 1 (OK/REGION-7 WSC)	PUBLIC SERVICE CO OF OKLAHOMA; ASSOC EL COOP; WESTERN FARM EL COOP	1150.0	BWR	GE B&V	01/73	12/73	12/75					(00/91)
164 BLACK FOX STATION UNIT 2 (OK/REGION-7 WSC)	PUBLIC SERVICE CO OF OKLAHOMA; ASSOC EL COOP; WESTERN FARM EL COOP	1150.0	BWR	GE B&V	01/73	12/73	12/75					(00/92)
165 SKAGIT PROJECT UNIT #1 (WA/REGION-9 PAC)	PUGET SOUND POWER & LIGHT CO; PORTLAND GE; PACIFIC POWER & LIGHT CO; WA WATER POWER CO	1277.0	BWR	GE BECH	01/73	12/73			(08/90)		(12/90)	(01/91)
166 CALLAWAY PLANT #1 (MO/REGION-5 WNC)	UNION ELECTRIC CO	1120.0	PWR	WEST BECH	12/71	07/73	06/74 08/80	04/76	(10/82)		(03/83)	(04/83)
167 WOLF CREEK (KS/REGION-5 WNC)	KANSAS GAS & ELECTRIC CO; KANSAS CITY POWER & LIGHT	1150.0	PWR	WEST BECH	02/73	07/73	05/74 08/80	05/77	(04/83)		(02/84)	(04/84)
168 CALLAWAY PLANT #2* (MO/REGION-5 WNC)	UNION ELECTRIC CO	1120.0	PWR	WEST BECH	07/73	07/73	06/74 08/80	04/76	(10/89)		(03/90)	(04/90)
169 PEBBLE SPRINGS UNIT 2 (OR/REGION-9 PAC)	PORTLAND GENERAL ELECTRIC CO; PUGET SOUND POWER & LIGHT CO; PACIFIC POWER & LIGHT CO	1260.0	PWR	B&W BECH	05/74	05/74	08/74		(07/92)		(09/92)	(01/93)
170 WPPSS NUCLEAR PROJECT NO. 4 (WA/REGION-9 PAC)	WASHINGTON PUBLIC POWER SUPPLY SYSTEM	1218.0	PWR	B&W UEC	07/74	07/74	08/74	02/78	(12/86)		(04/87)	(06/87)
171 WPPSS NUCLEAR PROJECT NO. 5 (WA/REGION-9 PAC)	WASHINGTON PUBLIC POWER SUPPLY SYSTEM; PACIFIC POWER & LIGHT	1240.0	PWR	COMB EBAS	07/74	07/74	08/74	04/78	(06/87)		(10/87)	(12/87)
172 MARBLE HILL NUCLEAR POWER STATION UNIT 1 (IN/REGION-4 ENC)	PUBLIC SERVICE CO OF INDIANA; WABASH VALLEY POWER ASSOCIATION	1130.0	PWR	WEST S&L	11/73	8/74	09/75	04/78	(07/86)		(00/86)	(12/86)
173 MARBLE HILL NUCLEAR POWER STATION UNIT 2 (IN/REGION-4 ENC)	PUBLIC SERVICE CO OF INDIANA; WABASH VALLEY POWER ASSOCIATION	1130.0	PWR	WEST S&L	02/74	8/74	09/75	04/78	(07/87)		(00/87)	(12/87)

*Utility announced cancellation 10-9-81.

STATUS OF U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
SIGNIFICANT MILESTONES

PLANT (STATE/REGION)	OWNER(S)	CAP NET (MWE)	TYPE	NSSS/ AE CONTR	PUBLIC ANN'D	NSSS ORDER	CP/ OL APPLIED	CP/ OL ISSUED	INITIAL CRIT.	FIRST ELEC.	INITIAL DESIGN POWER	COM- MERCIAL OPER.
174 SKAGIT PROJECT UNIT #2 (WA/REGION-9 PAC)	PUGET SOUND POWER & LIGHT CO; PORTLAND GE CO; PACIFIC POWER & LIGHT CO; WA WATER POWER CO	1277.0	BWR	GE BECH	7/74	7/74			(08/92)		(12/92)	(01/93)
175 YELLOW CREEK NO. 1 (MS/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1285.0	PWR	COMB TVA	8/74	8/74	07/76	11/78	(4Q/87)		(1Q/88)	(04/88)
176 YELLOW CREEK NO. 2 (MS/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1285.0	PWR	COMB TVA	8/74	8/74	07/76	11/78				
177 PHIPPS BEND NO. 1 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	8/74	8/74	11/75	01/78	(2Q/88)		(4Q/88)	(02/89)
178 PHIPPS BEND NO. 2 (TN/REGION-6 ESC)	TENNESSEE VALLEY AUTHORITY	1233.0	BWR	GE TVA	8/74	8/74	11/75	01/78				
179 VANDALIA NUCLEAR PROJECT (IA/REGION-5 WNC)	IOWA POWER & LIGHT CO.; ASSOC EL COOP; CENTRAL IOWA POWER COOPERATIVE; IOWA POWER	1270.0	PWR	B&W BECH	06/74	06/76						
180 CARROLL COUNTY STATION UNIT #1 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO; INTERSTATE POWER CO; IOWA-ILLINOIS GAS & ELECTRIC	1120.0	PWR	WEST	01/74	12/78			(06/93)		(10/93)	(10/93)
181 CARROLL COUNTY STATION UNIT #2 (IL/REGION-4 ENC)	COMMONWEALTH EDISON CO; INTERSTATE POWER CO; IOWA-ILLINOIS GAS & ELECTRIC	1120.0	PWR	WEST	01/74	12/78			(06/94)		(10/94)	(10/94)

NOTES

KEY TO AE's (Architect-Engineer)

AEC American Electric Power
Service Corporation
BECH Bechtel
B&R Burns & Roe
B&V Black & Veatch
BRRT Brown & Root, Inc.
EBAS Ebasco
G/CA Gilbert/Commonwealth Assoc.
G&H Gibbs & Hill, Inc.
GIL Gilbert Associates

GHD&R Gibbs, Hill, Durham & Richardson
H&N Holmes & Narver
J&M Jackson & Moreland
O Owner
PSE Pioneer Service & Engineering
S&L Sargent & Lundy
SSI Southern Services, Inc.
S&W Stone & Webster
UEC United Engineers & Constructors
VIT Vitro

KEY TO NSSS's (Nuclear Steam System Supplier)

AC Allis-Chalmers
AI Atomics International
B&W Babcock & Wilcox
COMB Combustion Engineering
GE General Electric
GAC General Atomic Corporation
PRDC Power Reactor Development Co.
WEST Westinghouse

Project schedules in this report are in accordance with utility reporting for the second quarter 1981.
except for newly ordered and announced units.

Footnotes for tabulation on pages 1 through 21.

- * Initial or current capacity; may differ from that authorized by license.
- ** Date docketed by Nuclear Regulatory Commission.
- *** Future schedular dates are shown in parenthesis.
- CP Construction Permit.
- OL Operating License.
- N/A Not applicable.
- a Fermi 1 - Decision to decommission announced 11/29/72.
- b Pathfinder - Nuclear plant was shut down 10/67.
- c Hallam - Shut down 9/64.
- d Elk River - Shut down 2/68.
- e Peach Bottom 1 - Shut down 11/74.
- f CVTR - Shut down 1/67.
- g Piqua - Shut down for repairs 1/66; operating contract terminated 12/67.
- h BONUS - Decision to decommission announced 6/68. Order to dismantle issued 8/11/69.
- i Indian Point 1 - Shut down since 10/31/74; the operating authority of this unit was revoked on 6/19/80 by the Nuclear Regulatory Commission. The owner is to submit a decommissioning plan within 120 days from said date.
- j Humboldt Bay - Shut down since 7/2/76 for major modification; PG&E announced on 12/19/80 it will withdraw application that would permit it to restart the nuclear unit.
- k Midland Unit 1 will also produce up to 4 million pounds per hour of process steam.
- l Three Mile Island 2 - Shut down since 3/28/79; cleanup operations underway; no decision on future operation.

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

State Listing

ALABAMA	# OF UNITS	CAP (NET MWE)	CONNECTICUT	# OF UNITS	CAP (NET MWE)	ILLINOIS	# OF UNITS	CAP (NET MWE)	MARYLAND	# OF UNITS	CAP (NET MWE)
BELLEFONTE #1		1213.0	HADDAM		580.0	DRESDEN #3		794.0	CALVERT CLIFFS #1		845.0
BELLEFONTE #2		1213.0	MILLSTONE #1		660.0	LASALLE #1		1078.0	CALVERT CLIFFS #2		845.0
BROWNS FERRY #1		1065.0	MILLSTONE #2		870.0	LASALLE #2		1078.0	STATE TOTAL	2	1690.0
BROWNS FERRY #2		1065.0	MILLSTONE #3		1156.0	QUAD CITIES #1		789.0			
BROWNS FERRY #3		1065.0	STATE TOTAL	4	3266.0	QUAD CITIES #2		789.0			
FARLEY #1		829.0				ZION #1		1040.0	MAINE	# OF UNITS	CAP (NET MWE)
FARLEY #2		829.0				ZION #2		1040.0			
STATE TOTAL	7	7279.0	FLORIDA	# OF UNITS	CAP (NET MWE)	STATE TOTAL	17	16188.8	MAINE YANKEE		825.0
ARKANSAS	# OF UNITS	CAP (NET MWE)	CRYSTAL RIVER #3		825.0	INDIANA	# OF UNITS	CAP (NET MWE)	STATE TOTAL	1	825.0
ARKANSAS ONE #1		850.0	ST. LUCIE #1		802.0	BAILLY		643.8	MICHIGAN	# OF UNITS	CAP (NET MWE)
ARKANSAS ONE #2		912.0	ST. LUCIE #2		810.0	MARBLE HILL #1		1130.0			
STATE TOTAL	2	1762.0	TURKEY POINT #3		693.0	MARBLE HILL #2		1130.0	BIG ROCK PT.		72.0
ARIZONA	# OF UNITS	CAP (NET MWE)	TURKEY POINT #4		693.0	STATE TOTAL	3	2903.8	COOK #1		1054.0
PALO VERDE #1		1270.0	STATE TOTAL	5	3823.0				COOK #2		1100.0
PALO VERDE #2		1270.0				KANSAS	# OF UNITS	CAP (NET MWE)	FERMI #2		1093.0
PALO VERDE #3		1270.0	HATCH #1		777.0	WOLF CREEK		1150.0	MIDLAND #1		460.0
STATE TOTAL	3	3810.0	HATCH #2		784.0	STATE TOTAL	1	1150.0	MIDLAND #2		811.0
CALIFORNIA	# OF UNITS	CAP (NET MWE)	VOGTLE #1		1110.0	LOUISIANA	# OF UNITS	CAP (NET MWE)	PALISADES		805.0
DIABLO #1		1084.0	VOGTLE #2		1110.0				STATE TOTAL	7	5395.0
DIABLO #2		1106.0	STATE TOTAL	4	3781.0				MINNESOTA	# OF UNITS	CAP (NET MWE)
HUMBOLDT BAY		65.0				RIVER BEND #1		934.0	MONTICELLO		545.0
RANCHO SECO		918.0	ARNOLD #1		538.0	RIVER BEND #2		934.0	PRAIRIE ISLAND #1		530.0
SAN ONOFRE #1		436.0	VANDALIA		1270.0	STATE TOTAL	3	2981.0	PRAIRIE ISLAND #2		530.0
SAN ONOFRE #2		1100.0	STATE TOTAL	2	1808.0	MASSACHUSETTS	# OF UNITS	CAP (NET MWE)	STATE TOTAL	3	1605.0
SAN ONOFRE #3		1100.0							MISSOURI	# OF UNITS	CAP (NET MWE)
STATE TOTAL	7	5809.0	ILLINOIS	# OF UNITS	CAP (NET MWE)	PILGRIM #1		655.0	CALLAWAY #1		1120.0
COLORADO	# OF UNITS	CAP (NET MWE)	BRAIDWOOD #1		1120.0	PILGRIM #2		1150.0	CALLAWAY #2		1120.0
FORT ST. VRAIN		330.0	BYRON #1		1120.0	YANKEE		175.0	STATE TOTAL	2	2240.0
STATE TOTAL	1	330.0	BYRON #2		1120.0	STATE TOTAL	3	1980.0	MISSISSIPPI	# OF UNITS	CAP (NET MWE)
			CARROLL COUNTY #1		1120.0				GRAND GULF #1		1250.0
			CARROLL COUNTY #2		1120.0				GRAND GULF #2		1250.0
			CLINTON #1		933.4				YELLOW CRK #1		1285.0
			CLINTON #2		933.4						
			DRESDEN #1		200.0						
			DRESDEN #2		794.0						

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

State Listing

MISSISSIPPI	# OF UNITS	CAP (NET MWE)	NEW YORK	# OF UNITS	CAP (NET MWE)	PENNSYLVANIA	# OF UNITS	CAP (NET MWE)	VIRGINIA	# OF UNITS	CAP (NET MWE)
YELLOW CRK #2		1285.0	FITZPATRICK		821.0	THREE MILE #1		819.0	NORTH ANNA #1		907.0
STATE TOTAL	4	5070.0	GINNA #1		470.0	THREE MILE #2		906.0	NORTH ANNA #2		907.0
			INDIAN POINT #2		873.0	STATE TOTAL	11	9810.0	NORTH ANNA #3		907.0
			INDIAN POINT #3		965.0				SURRY #1		777.0
			NINE MILE #1		620.0				SURRY #2		777.0
NEBRASKA	# OF UNITS	CAP (NET MWE)	NINE MILE #2		1099.8	SOUTH CAROLINA	# OF UNITS	CAP (NET MWE)	STATE TOTAL	5	4275.0
			SHOREHAM		819.0						
COOPER		778.0	STATE TOTAL	7	5667.8	CATAWBA #1		1145.0	VERMONT	# OF UNITS	CAP (NET MWE)
FORT CALHOUN		490.0				CATAWBA #2		1145.0			
STATE TOTAL	2	1268.0	OHIO	# OF UNITS	CAP (NET MWE)	CHEROKEE 1		1280.0	VERMONT YANKEE		514.0
						CHEROKEE 2		1280.0			
						CHEROKEE 3		1280.0	STATE TOTAL	1	514.0
NORTH CAROLINA	# OF UNITS	CAP (NET MWE)	DAVIS-BESSE #1		906.0	OCONEE #1		887.0			
			PERRY #1		1205.0	OCONEE #2		887.0			
			PERRY #2		1205.0	OCONEE #3		887.0			
BRUNSWICK #1		821.0	ZIMMER #1		810.0	ROBINSON #2		700.0	WASHINGTON	# OF UNITS	CAP (NET MWE)
BRUNSWICK #2		821.0	STATE TOTAL	4	4126.0	SUMMER		900.0			
HARRIS #1		900.0				STATE TOTAL	10	10391.0	N REACTOR		850.0
HARRIS #2		900.0	OKLAHOMA	# OF UNITS	CAP (NET MWE)				SKAGIT #1		1277.0
HARRIS #3		900.0				TENNESSEE	# OF UNITS	CAP (NET MWE)	SKAGIT #2		1277.0
HARRIS #4		900.0							WPPSS PROJECT #1		1218.0
MCGUIRE #1		1180.0	BLACK FOX #1		1150.0	CLINCH RIVER		350.0	WPPSS PROJECT #2		1093.0
MCGUIRE #2		1180.0	BLACK FOX #2		1150.0	HARTSVILLE A-1		1233.0	WPPSS PROJECT #3		1240.0
PERKINS 1		1280.0	STATE TOTAL	2	2300.0	HARTSVILLE A-2		1233.0	WPPSS PROJECT #4		1218.0
PERKINS 2		1280.0				HARTSVILLE B-1		1233.0	WPPSS PROJECT #5		1240.0
PERKINS 3		1280.0				HARTSVILLE B-2		1233.0	STATE TOTAL	8	9413.0
STATE TOTAL	11	11442.0	OREGON	# OF UNITS	CAP (NET MWE)	PHIP BEND 1		1233.0			
						PHIP BEND 2		1233.0	WISCONSIN	# OF UNITS	CAP (NET MWE)
NEW HAMPSHIRE	# OF UNITS	CAP (NET MWE)	PEBBLE SPRINGS #1		1260.0	SEQUOYAH #1		1148.0			
			PEBBLE SPRINGS #2		1260.0	SEQUOYAH #2		1148.0	KEWAUNEE #1		535.0
SEABROOK #1		1200.0	TROJAN #1		1130.0	WATTS BAR #1		1177.0	LACROSSE		50.0
SEABROOK #2		1200.0				WATTS BAR #2		1177.0	POINT BEACH #1		497.0
STATE TOTAL	2	2400.0	STATE TOTAL	3	3650.0	STATE TOTAL	11	12398.0	POINT BEACH #2		497.0
									STATE TOTAL	4	1579.0
NEW JERSEY	# OF UNITS	CAP (NET MWE)	PENNSYLVANIA	# OF UNITS	CAP (NET MWE)	TEXAS	# OF UNITS	CAP (NET MWE)			
HOPE CREEK #1		1067.0	BEAVER VALLEY #1		852.0	ALLEN'S CREEK #1		1150.0			
HOPE CREEK #2		1067.0	BEAVER VALLEY #2		833.0	COMANCHE #1		1111.0			
OYSTER CREEK		650.0	LIMERICK #1		1055.0	COMANCHE #2		1111.0			
SALEM #1		1090.0	LIMERICK #2		1055.0	SOUTH TEXAS #1		1250.0			
SALEM #2		1115.0	PEACH BOTTOM #2		1065.0	SOUTH TEXAS #2		1250.0			
STATE TOTAL	5	4989.0	PEACH BOTTOM #3		1065.0	STATE TOTAL	5	5872.0			
			SHIPPINGPORT		60.0						
			SUSQUEHANNA #1		1050.0						
			SUSQUEHANNA #2		1050.0						

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Regional Listing

REGION 1 (NE)	# OF UNITS	CAP (NET MWE)	REGION 2 (MA)	# OF UNITS	CAP (NET MWE)	REGION 3 (SA)	# OF UNITS	CAP (NET MWE)	REGION 4 (ENC)	# OF UNITS	CAP (NET MWE)
OPERABLE			OPERABLE			OPERABLE			OPERABLE		
FITZPATRICK		821.0	BEAVER VALLEY #1		852.0	BRUNSWICK #1		821.0	BIG ROCK PT.		72.0
GINNA #1		470.0	CALVERT CLIFFS #1		845.0	BRUNSWICK #2		821.0	COOK #1		1054.0
HADDAM		580.0	CALVERT CLIFFS #2		845.0	CRYSTAL RIVER #3		825.0	COOK #2		1100.0
INDIAN POINT #2		873.0	OYSTER CREEK		650.0	HATCH #1		777.0	DAVIS-BESSE #1		906.0
INDIAN POINT #3		965.0	PEACH BOTTOM #2		1065.0	HATCH #2		784.0	DRESDEN #1		200.0
MAINE YANKEE		825.0	PEACH BOTTOM #3		1065.0	MCGUIRE #1		1180.0	DRESDEN #2		794.0
MILLSTONE #1		660.0	SALEM #1		1090.0	NORTH ANNA #1		907.0	DRESDEN #3		794.0
MILLSTONE #2		870.0	SALEM #2		1115.0	NORTH ANNA #2		907.0	KEWAUNEE #1		535.0
NINE MILE #1		620.0	SHIPPINGPORT		60.0	OCONEE #1		887.0	LACROSSE		50.0
PILGRIM #1		655.0	THREE MILE #1		819.0	OCONEE #2		887.0	PALISADES		805.0
VERMONT YANKEE		514.0	THREE MILE #2		906.0	OCONEE #3		887.0	POINT BEACH #1		497.0
YANKEE		175.0	STATUS TOTAL	11	9312.0	ROBINSON #2		700.0	POINT BEACH #2		497.0
STATUS TOTAL	12	8028.0				ST. LUCIE #1		802.0	QUAD CITIES #1		789.0
BEING BUILT			BEING BUILT			SURRY #1		777.0	QUAD CITIES #2		789.0
MILLSTONE #3		1156.0	BEAVER VALLEY #2		833.0	SURRY #2		777.0	ZION #1		1040.0
NINE MILE #2		1099.8	HOPE CREEK #1		1067.0	TURKEY POINT #3		693.0	ZION #2		1040.0
SEABROOK #1		1200.0	HOPE CREEK #2		1067.0	TURKEY POINT #4		693.0	STATUS TOTAL	16	10962.0
SEABROOK #2		1200.0	LIMERICK #1		1055.0	STATUS TOTAL	17	14125.0	BEING BUILT		
SHOREHAM		819.0	LIMERICK #2		1055.0	BEING BUILT			BAILLY		643.8
STATUS TOTAL	5	5474.8	SUSQUEHANNA #1		1050.0	CATAWBA #1		1145.0	BRAIDWOOD #1		1120.0
ORDERED			SUSQUEHANNA #2		1050.0	CATAWBA #2		1145.0	BRAIDWOOD #2		1120.0
PILGRIM #2		1150.0	STATUS TOTAL	7	7177.0	CHEROKEE 1		1280.0	BYRON #1		1120.0
STATUS TOTAL	1	1150.0	REGIONAL TOTAL	18	16489.0	CHEROKEE 2		1280.0	BYRON #2		1120.0
REGIONAL TOTAL	18	14652.8				CHEROKEE 3		1280.0	CLINTON #1		933.4
						HARRIS #1		900.0	CLINTON #2		933.4
						HARRIS #2		900.0	FERMI #2		1093.0
						HARRIS #3		900.0	LASALLE #1		1078.0
						HARRIS #4		900.0	LASALLE #2		1078.0
						MCGUIRE #2		1180.0	MARBLE HILL #1		1130.0
						NORTH ANNA #3		907.0	MARBLE HILL #2		1130.0
						ST. LUCIE #2		810.0	MIDLAND #1		460.0
						SUMMER		900.0	MIDLAND #2		811.0
						VOGTLE #1		1110.0	PERRY #1		1205.0
						VOGTLE #2		1110.0	PERRY #2		1205.0
						STATUS TOTAL	15	15747.0	ZIMMER #1		810.0
						ORDERED			STATUS TOTAL	17	16990.6
						PERKINS 1		1280.0	ORDERED		
						PERKINS 2		1280.0	CARROLL COUNTY #1		1120.0
						PERKINS 3		1280.0	CARROLL COUNTY #2		1120.0
						STATUS TOTAL	3	3840.0	STATUS TOTAL	2	2240.0
						REGIONAL TOTAL	35	33712.0	REGIONAL TOTAL	35	30192.6

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS
Regional Listing

REGION 5 (WNC)	# OF UNITS	CAP (NET MWE)	REGION 6 (ESC)	# OF UNITS	CAP (NET MWE)	REGION 7 (WSC)	# OF UNITS	CAP (NET MWE)	REGION 8 (RM)	# OF UNITS	CAP (NET MWE)
OPERABLE			OPERABLE			OPERABLE			OPERABLE		
ARNOLD #1		538.0	BROWNS FERRY #1		1065.0	ARKANSAS ONE #1		850.0	FORT ST. VRAIN		330.0
COOPER		778.0	BROWNS FERRY #2		1065.0	ARKANSAS ONE #2		912.0	STATUS TOTAL	1	330.0
FORT CALHOUN		490.0	BROWNS FERRY #3		1065.0	STATUS TOTAL	2	1762.0	BEING BUILT		
MONTICELLO		545.0	FARLEY #1		829.0	BEING BUILT			PALO VERDE #1		1270.0
PRAIRIE ISLAND #1		530.0	FARLEY #2		829.0	BLACK FOX #1		1150.0	PALO VERDE #2		1270.0
PRAIRIE ISLAND #2		530.0	SEQUOYAH #1		1148.0	BLACK FOX #2		1150.0	PALO VERDE #3		1270.0
STATUS TOTAL	6	3411.0	SEQUOYAH #2		1148.0	COMANCHE #1		1111.0	STATUS TOTAL	3	3810.0
BEING BUILT			STATUS TOTAL	7	7149.0	COMANCHE #2		1111.0	REGIONAL TOTAL	4	4140.0
CALLAWAY #1		1120.0	BEING BUILT			RIVER BEND #1		934.0	REGION 9 (PAC)		
CALLAWAY #2		1120.0	BELLEFONTE #1		1213.0	RIVER BEND #2		934.0	# OF		CAP
WOLF CREEK		1150.0	BELLEFONTE #2		1213.0	SOUTH TEXAS #1		1250.0	UNITS		(NET MWE)
STATUS TOTAL	3	3390.0	GRAND GULF #1		1250.0	SOUTH TEXAS #2		1250.0	OPERABLE		
ORDERED			GRAND GULF #2		1250.0	WATERFORD #3		1113.0	HUMBOLDT BAY		65.0
VANDALIA		1270.0	HARTSVILLE A-1		1233.0	STATUS TOTAL	9	10003.0	N REACTOR		850.0
STATUS TOTAL	1	1270.0	HARTSVILLE A-2		1233.0	ORDERED			RANCHO SECO		918.0
REGIONAL TOTAL	10	8071.0	HARTSVILLE B-1		1233.0	ALLEN'S CREEK #1		1150.0	SAN ONOFRE #1		436.0
			HARTSVILLE B-2		1233.0	STATUS TOTAL	1	1150.0	TROJAN #1		1130.0
			PHIP BEND 1		1233.0	REGIONAL TOTAL	12	12915.0	STATUS TOTAL	5	3399.0
			PHIP BEND 2		1233.0				BEING BUILT		
			WATTS BAR #1		1177.0				DIABLO #1		1084.0
			WATTS BAR #2		1177.0				DIABLO #2		1106.0
			YELLOW CRK #1		1285.0				SAN ONOFRE #2		1100.0
			YELLOW CRK #2		1285.0				SAN ONOFRE #3		1100.0
			STATUS TOTAL	14	17248.0				WPPSS PROJECT #1		1218.0
			ORDERED						WPPSS PROJECT #2		1093.0
			CLINCH RIVER		350.0				WPPSS PROJECT #3		1240.0
			STATUS TOTAL	1	350.0				WPPSS PROJECT #4		1218.0
			REGIONAL TOTAL	22	24747.0				WPPSS PROJECT #5		1240.0
									STATUS TOTAL	9	10399.0
									ORDERED		
									PEBBLE SPRINGS #1		1260.0
									PEBBLE SPRINGS #2		1260.0
									SKAGIT #1		1277.0
									SKAGIT #2		1277.0
									STATUS TOTAL	4	5074.0
									REGIONAL TOTAL	18	18872.0

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing*

OF
UNITS

CAP(NET)
MWE

CONSTR %
COMPLETE

OF
UNITS

CAP(NET)
MWE

CONSTR %
COMPLETE

ALABAMA POWER CO. OPERABLE

FARLEY #1 829.0
FARLEY #2 829.0

STATUS TOTAL 2 1658.0

UTILITY TOTAL 2 1658.0

ARIZONA PUBLIC SERVICE CO BEING BUILT

PALO VERDE #1 1270.0 89.6
PALO VERDE #2 1270.0 64.5
PALO VERDE #3 1270.0 23.6

STATUS TOTAL 3 3810.0

UTILITY TOTAL 3 3810.0

ARKANSAS POWER & LIGHT CO. OPERABLE

ARKANSAS ONE #1 850.0
ARKANSAS ONE #2 912.0

STATUS TOTAL 2 1762.0

UTILITY TOTAL 2 1762.0

BALTIMORE GAS & ELECTRIC CO OPERABLE

CALVERT CLIFFS #1 845.0
CALVERT CLIFFS #2 845.0

STATUS TOTAL 2 1690.0

UTILITY TOTAL 2 1690.0

BOSTON EDISON CO OPERABLE

PILGRIM #1 655.0

STATUS TOTAL 1 655.0

BOSTON EDISON CO OPERABLE

ORDERED

PILGRIM #2 ** 1150.0

STATUS TOTAL 1 1150.0

UTILITY TOTAL 2 1805.0

CAROLINA POWER & LIGHT CO OPERABLE

BRUNSWICK #1 821.0
BRUNSWICK #2 821.0
ROBINSON #2 700.0

STATUS TOTAL 3 2342.0

BEING BUILT

HARRIS #1 900.0 45.0
HARRIS #2 900.0 3.7
HARRIS #3 900.0 1.0
HARRIS #4 900.0 1.0

STATUS TOTAL 4 3600.0

UTILITY TOTAL 7 5942.0

CINCINNATI GAS & ELECTRIC CO BEING BUILT

ZIMMER #1 810.0 96.4

STATUS TOTAL 1 810.0

UTILITY TOTAL 1 810.0

*Utility listing is by lead utility. Other owners, if any, are identified in status listing (pp. 2-19)

**Utility announced cancellation 9-24-81.

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE

CLEVELAND ELECTRIC ILLUMINATING CO BEING BUILT			
PERRY #1		1205.0	75.3
PERRY #2		1205.0	54.7
STATUS TOTAL	2	2410.0	
UTILITY TOTAL	2	2410.0	

COMMONWEALTH EDISON CO OPERABLE			
DRESDEN #1		200.0	
DRESDEN #2		794.0	
DRESDEN #3		794.0	
QUAD CITIES #1		789.0	
QUAD CITIES #2		789.0	
ZION #1		1040.0	
ZION #2		1040.0	
STATUS TOTAL	7	5446.0	

BEING BUILT			
BRAIDWOOD #1		1120.0	62.0
BRAIDWOOD #2		1120.0	49.0
BYRON #1		1120.0	76.0
BYRON #2		1120.0	61.0
LASALLE #1		1078.0	99.0
LASALLE #2		1078.0	82.5
STATUS TOTAL	6	6636.0	

ORDERED			
CARROLL COUNTY #1		1120.0	
CARROLL COUNTY #2		1120.0	
STATUS TOTAL	2	2240.0	
UTILITY TOTAL	15	14322.0	

Utility Listing

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE

CONNECTICUT LIGHT & POWER CO OPERABLE			
MILLSTONE #1		660.0	
MILLSTONE #2		870.0	
STATUS TOTAL	2	1530.0	

BEING BUILT			
MILLSTONE #3		1156.0	39.0
STATUS TOTAL	1	1156.0	
UTILITY TOTAL	3	2686.0	

CONNECTICUT YANKEE ATOMIC POWER CO OPERABLE			
HADDAM		580.0	
STATUS TOTAL	1	580.0	
UTILITY TOTAL	1	580.0	

CONSOLIDATED EDISON CO OPERABLE			
INDIAN POINT #2		873.0	
STATUS TOTAL	1	873.0	
UTILITY TOTAL	1	873.0	

CONSUMERS POWER CO OPERABLE			
BIG ROCK PT. PALISADES		72.0 805.0	
STATUS TOTAL	2	877.0	

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

OF
UNITS

CAP(NET)
MWE

CONSTR %
COMPLETE

OF
UNITS

CAP(NET)
MWE

CONSTR %
COMPLETE

BEING BUILT

MIDLAND #1		460.0	63.0
MIDLAND #2		811.0	62.0
STATUS TOTAL	2	1271.0	
UTILITY TOTAL	4	2148.0	

DAIRYLAND POWER COOPERATIVE OPERABLE

LACROSSE		50.0	
STATUS TOTAL	1	50.0	
UTILITY TOTAL	1	50.0	

DALLAS POWER & LIGHT CO BEING BUILT

COMANCHE #1		1111.0	88.0
COMANCHE #2		1111.0	52.0
STATUS TOTAL	2	2222.0	
UTILITY TOTAL	2	2222.0	

DETROIT EDISON CO BEING BUILT

FERMI #2		1093.0	85.0
STATUS TOTAL	1	1093.0	
UTILITY TOTAL	1	1093.0	

DUKE POWER CO OPERABLE

MCGUIRE #1		1180.0	
OCONEE #1		887.0	
OCONEE #2		887.0	
OCONEE #3		887.0	
STATUS TOTAL	4	3841.0	

DUKE POWER CO OPERABLE

BEING BUILT

CATAWBA #1		1145.0	83.4
CATAWBA #2		1145.0	32.0
CHEROKEE 1		1280.0	17.0
CHEROKEE 2		1280.0	1.0
CHEROKEE 3		1280.0	
MCGUIRE #2		1180.0	92.0
STATUS TOTAL	6	7310.0	

ORDERED

PERKINS 1		1280.0	
PERKINS 2		1280.0	
PERKINS 3		1280.0	
STATUS TOTAL	3	3840.0	
UTILITY TOTAL	13	14991.0	

DUQUESNE LIGHT CO OPERABLE

BEAVER VALLEY #1		852.0	
STATUS TOTAL	1	852.0	
UTILITY TOTAL	1	852.0	

DUQUESNE LIGHT CO & DOE OPERABLE

SHIPPINGPORT		60.0	
STATUS TOTAL	1	60.0	
UTILITY TOTAL	1	60.0	

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

			# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE				# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
-----						-----					
FLORIDA POWER & LIGHT CO OPERABLE						GULF STATES UTILITIES CO BEING BUILT					
ST. LUCIE #1		802.0				RIVER BEND #1		934.0	34.6		
TURKEY POINT #3		693.0				RIVER BEND #2		934.0			
TURKEY POINT #4		693.0				STATUS TOTAL	2	1868.0			
STATUS TOTAL	3	2188.0				UTILITY TOTAL	2	1868.0			
-----						-----					
BEING BUILT						HOUSTON LIGHTING & POWER CO BEING BUILT					
ST. LUCIE #2		810.0		71.6		SOUTH TEXAS #1		1250.0	60.1		
STATUS TOTAL	1	810.0				SOUTH TEXAS #2		1250.0	23.2		
UTILITY TOTAL	4	2998.0				STATUS TOTAL	2	2500.0			
-----						-----					
FLORIDA POWER CORP & OTHERS OPERABLE						ORDERED					
CRYSTAL RIVER #3		825.0				ALLEN'S CREEK #1		1150.0			
STATUS TOTAL	1	825.0				STATUS TOTAL	1	1150.0			
UTILITY TOTAL	1	825.0				UTILITY TOTAL	3	3650.0			
-----						-----					
GEORGIA POWER CO OPERABLE						ILLINOIS POWER COMPANY BEING BUILT					
HATCH #1		777.0				CLINTON #1		933.4	79.0		
HATCH #2		784.0				CLINTON #2		933.4	1.5		
STATUS TOTAL	2	1561.0				STATUS TOTAL	2	1866.8			
-----						UTILITY TOTAL	2	1866.8			
BEING BUILT						-----					
VOGTLE #1		1110.0		18.0		INDIANA & MICHIGAN POWER CO OPERABLE					
VOGTLE #2		1110.0		5.0		COOK #1		1054.0			
STATUS TOTAL	2	2220.0				COOK #2		1100.0			
UTILITY TOTAL	4	3781.0				STATUS TOTAL	2	2154.0			
-----						UTILITY TOTAL	2	2154.0			

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE		# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
-----				-----			
IOWA ELECTRIC LIGHT & POWER CO OPERABLE				LOUISIANA POWER & LIGHT CO BEING BUILT			
ARNOLD #1		538.0		WATERFORD #3		1113.0	89.5
STATUS TOTAL	1	538.0		STATUS TOTAL	1	1113.0	
UTILITY TOTAL	1	538.0		UTILITY TOTAL	1	1113.0	
-----				-----			
IOWA POWER & LIGHT CO. ORDERED				MAINE YANKEE ATOMIC POWER CO OPERABLE			
VANDALIA		1270.0		MAINE YANKEE		825.0	
STATUS TOTAL	1	1270.0		STATUS TOTAL	1	825.0	
UTILITY TOTAL	1	1270.0		UTILITY TOTAL	1	825.0	
-----				-----			
JERSEY CENTRAL POWER & LIGHT CO OPERABLE				METROPOLITAN EDISON CO OPERABLE			
OYSTER CREEK		650.0		THREE MILE #1		819.0	
STATUS TOTAL	1	650.0		THREE MILE #2		906.0	
UTILITY TOTAL	1	650.0		STATUS TOTAL	2	1725.0	
-----				-----			
KANSAS GAS & ELECTRIC CO BEING BUILT				MISSISSIPPI POWER & LIGHT CO BEING BUILT			
WOLF CREEK		1150.0	76.0	GRAND GULF #1		1250.0	86.0
STATUS TOTAL	1	1150.0		GRAND GULF #2		1250.0	24.0
UTILITY TOTAL	1	1150.0		STATUS TOTAL	2	2500.0	
-----				-----			
LONG ISLAND LIGHTING CO BEING BUILT				NEBRASKA PUBLIC POWER DISTRICT OPERABLE			
SHOREHAM		819.0	88.0	COOPER		778.0	
STATUS TOTAL	1	819.0		STATUS TOTAL	1	778.0	
UTILITY TOTAL	1	819.0		UTILITY TOTAL	1	778.0	

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE		# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
-----				-----			
NIAGARA MOHAWK POWER CORP OPERABLE				OMAHA PUBLIC POWER DISTRICT OPERABLE			
NINE MILE #1		620.0		FORT CALHOUN		490.0	
STATUS TOTAL	1	620.0		STATUS TOTAL	1	490.0	
				UTILITY TOTAL	1	490.0	
-----				-----			
BEING BUILT				PACIFIC GAS & ELECTRIC CO OPERABLE			
NINE MILE #2		1099.8	29.7	HUMBOLDT BAY		65.0	
STATUS TOTAL	1	1099.8		STATUS TOTAL	1	65.0	
UTILITY TOTAL	2	1719.8					
-----				-----			
NO INDIANA PUBLIC SERVICE CO BEING BUILT				BEING BUILT			
BAILLY *		643.8		DIABLO #1		1084.0	99.6
STATUS TOTAL	1	643.8		DIABLO #2		1106.0	90.5
UTILITY TOTAL	1	643.8		STATUS TOTAL	2	2190.0	
				UTILITY TOTAL	3	2255.0	
-----				-----			
NORTHERN STATES POWER CO OPERABLE				PENNSYLVANIA POWER & LIGHT CO BEING BUILT			
MONTICELLO		545.0		SUSQUEHANNA #1		1050.0	88.0
PRAIRIE ISLAND #1		530.0		SUSQUEHANNA #2		1050.0	59.0
PRAIRIE ISLAND #2		530.0		STATUS TOTAL	2	2100.0	
STATUS TOTAL	3	1605.0		UTILITY TOTAL	2	2100.0	
UTILITY TOTAL	3	1605.0					
-----				-----			
OHIO EDISON CO BEING BUILT				PHILADELPHIA ELECTRIC CO OPERABLE			
BEAVER VALLEY #2		833.0	43.2	PEACH BOTTOM #2		1065.0	
STATUS TOTAL	1	833.0		PEACH BOTTOM #3		1065.0	
UTILITY TOTAL	1	833.0		STATUS TOTAL	2	2130.0	

*Utility announced cancellation 8-26-81

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
---------------	-----------------	----------------------

# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
---------------	-----------------	----------------------

BEING BUILT

LIMERICK #1		1055.0	61.9
LIMERICK #2		1055.0	28.1
STATUS TOTAL	2	2110.0	
UTILITY TOTAL	4	4240.0	

PUBLIC SERVICE CO OF INDIANA BEING BUILT

MARBLE HILL #1		1130.0	27.0
MARBLE HILL #2		1130.0	11.0
STATUS TOTAL	2	2260.0	
UTILITY TOTAL	2	2260.0	

PORTLAND GENERAL ELECTRIC CO OPERABLE

TROJAN #1		1130.0	
STATUS TOTAL	1	1130.0	

PUBLIC SERVICE CO OF NEW HAMPSHIRE BEING BUILT

SEABROOK #1		1200.0	50.0
SEABROOK #2		1200.0	8.0
STATUS TOTAL	2	2400.0	
UTILITY TOTAL	2	2400.0	

ORDERED

PEBBLE SPRINGS #1		1260.0	
PEBBLE SPRINGS #2		1260.0	
STATUS TOTAL	2	2520.0	
UTILITY TOTAL	3	3650.0	

PUBLIC SERVICE CO OF OKLAHOMA BEING BUILT

BLACK FOX #1		1150.0	2.0
BLACK FOX #2		1150.0	.5
STATUS TOTAL	2	2300.0	
UTILITY TOTAL	2	2300.0	

POWER AUTHORITY OF STATE OF NEW YORK OPERABLE

FITZPATRICK		821.0	
INDIAN POINT #3		965.0	
STATUS TOTAL	2	1786.0	
UTILITY TOTAL	2	1786.0	

PUBLIC SERVICE ELECTRIC & GAS CO OPERABLE

SALEM #1		1090.0	
SALEM #2		1115.0	
STATUS TOTAL	2	2205.0	

PUBLIC SERVICE CO OF COLORADO OPERABLE

FORT ST. VRAIN		330.0	
STATUS TOTAL	1	330.0	
UTILITY TOTAL	1	330.0	

BEING BUILT

HOPE CREEK #1		1067.0	30.5
HOPE CREEK #2		1067.0	
STATUS TOTAL	2	2134.0	
UTILITY TOTAL	4	4339.0	

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
BEING BUILT			

PUGET SOUND POWER & LIGHT CO ORDERED			
SKAGIT #1		1277.0	
SKAGIT #2		1277.0	
STATUS TOTAL	2	2554.0	
UTILITY TOTAL	2	2554.0	

ROCHESTER GAS & ELECTRIC CORP OPERABLE			
GINNA #1		470.0	
STATUS TOTAL	1	470.0	
UTILITY TOTAL	1	470.0	

SACRAMENTO MUNICIPAL UTILITY DISTRICT OPERABLE			
RANCHO SECO		918.0	
STATUS TOTAL	1	918.0	
UTILITY TOTAL	1	918.0	

SO CALIFORNIA EDISON CO OPERABLE			
SAN ONOFRE #1		436.0	
STATUS TOTAL	1	436.0	

BEING BUILT			
SAN ONOFRE #2		1100.0	93.0 *

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
BEING BUILT			
SAN ONOFRE #3		1100.0	78.0
STATUS TOTAL	2	2200.0	
UTILITY TOTAL	3	2636.0	

SO CAROLINA ELECTRIC & GAS CO BEING BUILT			
SUMMER		900.0	97.0
STATUS TOTAL	1	900.0	
UTILITY TOTAL	1	900.0	

TENNESSEE VALLEY AUTHORITY OPERABLE			
BROWNS FERRY #1		1065.0	
BROWNS FERRY #2		1065.0	
BROWNS FERRY #3		1065.0	
SEQUOYAH #1		1148.0	
SEQUOYAH #2		1148.0	
STATUS TOTAL	5	5491.0	

BEING BUILT			
BELLEFONTE #1		1213.0	75.0
BELLEFONTE #2		1213.0	59.0
HARTSVILLE A-1		1233.0	34.0
HARTSVILLE A-2		1233.0	26.0
HARTSVILLE B-1		1233.0	
HARTSVILLE B-2		1233.0	
PHIP BEND 1		1233.0	22.0
PHIP BEND 2		1233.0	
WATTS BAR #1		1177.0	74.0
WATTS BAR #2		1177.0	58.0
YELLOW CRK #1		1285.0	25.0
YELLOW CRK #2		1285.0	
STATUS TOTAL	12	14748.0	
UTILITY TOTAL	17	20239.0	

*Physical construction completion percentage modified to include startup activities.

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

	# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE		# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
-----					-----		
TOLEDO EDISON CO OPERABLE				BEING BUILT			
DAVIS-BESSE #1		906.0		NORTH ANNA #3		907.0	7.0
STATUS TOTAL	1	906.0		STATUS TOTAL	1	907.0	
UTILITY TOTAL	1	906.0		UTILITY TOTAL	5	4275.0	
-----				-----			
UNION ELECTRIC CO BEING BUILT				WA PUBLIC POWER SUPPLY SYSTEM & DOE OPERABLE			
CALLAWAY #1		1120.0	73.0	N REACTOR		850.0	
CALLAWAY #2		1120.0	.7	STATUS TOTAL	1	850.0	
STATUS TOTAL	2	2240.0		UTILITY TOTAL	1	850.0	
UTILITY TOTAL	2	2240.0		-----			
-----				WASHINGTON PUBLIC POWER SUPPLY SYSTEM BEING BUILT			
UNITED STATES GOVERNMENT ORDERED				WPPSS PROJECT #1		1218.0	51.0
CLINCH RIVER		350.0		WPPSS PROJECT #2		1093.0	85.9
STATUS TOTAL	1	350.0		WPPSS PROJECT #3		1240.0	32.0
UTILITY TOTAL	1	350.0		WPPSS PROJECT #4		1218.0	26.5
-----				WPPSS PROJECT #5		1240.0	14.3
VERMONT YANKEE NUCLEAR POWER CORP OPERABLE				STATUS TOTAL	5	6009.0	
VERMONT YANKEE		514.0		UTILITY TOTAL	5	6009.0	
STATUS TOTAL	1	514.0		-----			
UTILITY TOTAL	1	514.0		WISCONSIN ELECTRIC POWER CO OPERABLE			
-----				POINT BEACH #1		497.0	
VIRGINIA ELECTRIC & POWER CO OPERABLE				POINT BEACH #2		497.0	
NORTH ANNA #1		907.0		STATUS TOTAL	2	994.0	
NORTH ANNA #2		907.0		UTILITY TOTAL	2	994.0	
SURRY #1		777.0		-----			
SURRY #2		777.0		WISCONSIN PUBLIC SERVICE CORP OPERABLE			
STATUS TOTAL	4	3368.0		KEWAUNEE #1		535.0	
				STATUS TOTAL	1	535.0	

*Reflects recent reappraisal of remaining construction work.

U.S. CENTRAL STATION NUCLEAR ELECTRIC GENERATING UNITS

Utility Listing

# OF UNITS	CAP(NET) MWE	CONSTR % COMPLETE
---------------	-----------------	----------------------

WISCONSIN PUBLIC SERVICE CORP
OPERABLE

UTILITY TOTAL	1	535.0
---------------	---	-------

YANKEE ATOMIC ELECTRIC CO
OPERABLE

YANKEE		175.0
--------	--	-------

STATUS TOTAL	1	175.0
--------------	---	-------

UTILITY TOTAL	1	175.0
---------------	---	-------

STATUS OF U.S. CENTRAL STATION NUCLEAR CAPACITY ^{1/}

STATUS	NO. OF UNITS	CAPACITY ^{2/} MWE (NET)
OPERABLE ^{3/}		
LICENSED BY NRC	75	57,590.0
AUTHORIZED BY DOE ^{4/}	2	910.0
BEING BUILT		
CONSTRUCTION PERMIT	80	87,939.4
LIMITED WORK AUTHORIZATION	2	2,300.0
ORDERED	13	15,074.0
TOTAL	172	163,813.4

^{1/} As of July 1, 1981.

^{2/} The latest changes in unit power capacity have been incorporated and in the foregoing listing of nuclear units.

^{3/} Includes the following units:

- Humboldt Bay, 65 MWe, shut down 7-2-76 pending a decision on whether to make seismic and other modifications or to decommission.
- Three Mile Island 1, 819 MWe, shut down in accordance with an NRC restraining order pending completion of modifications and other actions related to the accident at Three Miles Island 2.
- Three Mile Island 2, 906 MWe, shut down since the accident on 3-28-79.
- Sequoyah 2 which was issued a provisional power license on 6-25-81; a full power operating license was issued 9-15-81.
- McGuire 1, which as of 6-12-81 was issued a provisional power license; a full power operating license was issued 7-8-81.
- Dresden 1, 200 MWe, shut down 10-31-78 for upgrading of its emergency core cooling and system and for chemical cleaning. Outage expected to last through mid-1986.

Does not include Indian Point 1, rated at 265 MWe; the operating authority of this unit was revoked on 6-19-80 by the NRC.

^{4/} Shippingport (60 MWe) and N Reactor (850 MWe).

U.S. UTILITY NUCLEAR STEAM SUPPLY SYSTEM ORDERS 1/, 2/
NO. OF UNITS AND MWE NET CAPACITY

	NO.	GE MWE	WESTINGHOUSE NO. MWE	NO.	B&W MWE	NO.	COMB. MWE	NO.	TOTALS <u>3/</u> MWE	
THRU 1965	8	3,716.0	7	3,287.0				18	8,233.0	
1966	9	7,691.0	6	4,947.0	3	2,593.0	2	1,295.0	20	16,526.0
1967	7	6,192.8	13	10,858.0	5	4,386.0	5	4,187.0	30	25,623.8
1968	7	6,194.0	4	4,532.0	3	2,177.0			14	12,903.0
1969	3	2,944.0	3	3,189.0					6	6,133.0
1970	3	2,940.0	4	4,090.0	2	2,426.0	4	4,225.0	13	13,681.0
1971	2	2,192.8	10	9,793.0	1	907.0			13	12,892.8
1972	9	10,776.0	9	9,502.0	1	1,218.0	2	1,960.0	21	23,456.0
1973	7	7,527.8	6	7,046.0	1	1,260.0	10	12,730.0	24	28,563.8
1974	3	3,743.0	2	2,260.0	2	2,478.0	3	3,810.0	10	12,291.0
1976					1	1,270.0			1	1,270.0
1978			2	2,240.0					2	2,240.0
	58	53,917.4	66	51,744.0	19	18,715.0	26	28,207.0	172	163,813.4

1/ As of July 1, 1981.

2/ Does not include units ordered and cancelled prior to 7-1-81.

3/ Includes three units ordered from "Other" contractors prior to 1965 totaling 1230 MWe; does not include eight units totaling 301.3 MWe permanently shut down. Does not include Indian Point 1, rated at 265 MWe; the operating authority of this unit was revoked 6-19-80 by the U.S. Nuclear Regulatory Commission.

SCHEDULE OF COMMERCIAL OPERATION 1/, 2/

YEAR	MWE NET ANNUAL	CUMULATIVE	NO. OF UNITS ANNUAL	CUMULATIVE
THRU 1975		37,104.0		54
1976	2,897.0	40,001.0	3	57
1977	6,327.0	46,328.0	7	64
1978	3,819.0	50,147.0	4	68
1979	1,114.0	51,261.0	2	70
1980	1,819.0	53,080.0	2	72
1981	5,356.0	58,436.0	5	77
1982	8,503.0	66,939.0	8	85
1983	12,686.4	79,625.4	12	97
1984	15,693.0	95,318.4	14	111
1985	7,003.0	102,321.4	7	118
1986	15,046.8	117,368.2	13	131
1987	6,903.0	124,271.2	6	137
1988	5,556.4	129,827.6	5	142
1989	5,083.8	134,911.4	5	147
1990 ON	13,684.0	148,595.4	12	159
INDEFINITE	15,218.0	163,813.4	13	172

1/ Based on information as of July 1, 1981 furnished by utilities to DOE.

2/ Does not include eight plants that have been permanently shut down:
 Hallam (75 MWe) Piqua (11.4 MWe) BONUS (16.5 MWe)
 Pathfinder (58.5 MWe) Elk River 22 MWe) CVTR (17 MWe)
 Fermi (60.9 MWe) Peach Bottom 1 (40 MWe)

Does not include Indian Point 1 (265 MWe).