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January 1973

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Nuclear Survey: Plant sales continue to surge



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Nuclear Survey: 1972 looms as biggest year

by Sheldon D Strauss, Managing Editor

At the time that our last survey was being organized (POWER, January 1971), the nuclear industry was bogged down in issues concerning radiological releases and thermal pollution, as embodied in the famous Calvert Cliffs and

Monticello cases. These issues have long since been resolved, but others have taken their places. Most prominent has been the matter of emergency core cooling systems (ECCS). Under study by AEC since small-scale tests

were held in 1970, the subject assumed proportions of a real technological controversy in May of the following year, precipitating a full-scale investigation on the highest level.

Although interim criteria have been issued, it is still under intensive discussion—and a strong bone of contention for the so-called 'environmental' groups. Only last November, at the annual joint meeting of American Nuclear Society and Atomic Industrial Forum, a leading spokesman for the opposition called on AEC to halt issuance of licenses for all nuclear plants pending agreement on the capability of ECC systems in safeguarding reactors.

Nevertheless, the industry has been enjoying a very busy year, with good prospects for continuation of this outlook through 1973. Into November, U.S. utilities had placed 'firm' orders for 24 units representing 25,350 MW combined capacity. Then Baltimore Gas & Electric Co canceled plans for two nuclear units at Perryman, but Florida Power & Light Corp reactivated its plans for Hutchinson Island 2, and Washington Public Power Supply System ordered a replacement for the reactor at Hanford. Thus, at this writing, nuclear orders account for 24 units which will be placing some 25,000 new megawatts on-line between 1978 and 1982.

As the cover chart indicates, orders for another dozen or so units were anticipated before the end of the year. If these materialize, they would raise the totals to something like 40 units and 40,000 MW—far and away the biggest year ever. (Compare it to the previous high: 30 units for 27,000 MW in 1967.)

Tabulated on the following four pages, you will find the salient design data for nuclear plants larger than 100 MW, under construction or on order in this country as of December 1, 1972. Tables at left summarize those units for which significant engineering information is unavailable (generally those newly ordered) and the 22 units already in operation. Taken together, the three listings give a complete view of the nuclear picture in the U.S. at this time.

Too early for design data on these 1972 orders

Company	Plant	Gross MW	Reactor type	mfr	First operation
Detroit Edison Co	Greenwood 1, 2	1230	PWR	BW	1979, 81
Washington Pub Power Sup Syst	Hanford 3	1200	PWR	BW	1980
Boston Edison Co	Pilgrim 2	1150	PWR	CE	1978
Public Service Electric & Gas Co	Atlantic 1, 2	1150	PWR	WE	1980, 81
State Power Co	Catawba 1, 2	1150	PWR	WE	1979, 80
Massachusetts Electric Co	Comanche Peak 1, 2	1150	PWR	WE	1980, 82
Electric Service of New Hampshire	Seabrook 1, 2	1100	PWR	WE	1979, 80
Madison Electric Co	Douglas Pt 1, 2	1100	BWR	GE	1980
Commonwealth Edison Co	Two units	1100	PWR	WE	1980, 81
Gulf States Utilities Co	Riverbend 1	940	BWR	GE	1979
Virginia Electric and Power Co	Two units*	900	PWR	BW	1980, 81
Florida Power & Light Co	St. Lucie 2†	890	PWR	CE	1979
Southern California Edison Co	Two units†	770	HTGR	GGA	1981

* Capacity of each unit: 450 MW. Plant to serve Dallas Power & Light Co and Texas Power & Light Co. † Station not yet identified.
† Reactivation of plant formerly known as Hutchinson Island 2.

The list of operating nuclear plants is growing

Plant	Company	Gross MW	Reactor type	mfr	First operation
Hanford 1	Washington Pub Power Supply Syst*	862	PWR	AEC	1966
Dresden 3	Commonwealth Edison Co	850	BWR	GE	1971
Quad Cities 1	Commonwealth Edison Co	850	BWR	GE	1972
Quad Cities 2	Commonwealth Edison Co	850	BWR	GE	1972
Dresden 2	Commonwealth Edison Co	809	BWR	GE	1971
H.B. Robinson 2	Carolina Power & Light Co	760	PWR	WE	1971
Palisades	Consumers Power Co	722	PWR	CE	1971
Millstone 1	Millstone Point Co	650	BWR	GE	1970
Conn Yankee	Connecticut Yankee Atomic Power Co	590	PWR	WE	1967
Haddam Neck 1	Connecticut Yankee Atomic Power Co	590	PWR	WE	1968
Monticello	Northern States Power Co	569	BWR	GE	1971
Oyster Creek	Jersey Central Power & Light Co	540	BWR	GE	1969
Vermont Yankee	Vermont Yankee Nuclear Power Corp	540	PWR	GE	1970
Nine Mile Pt	Niagara Mohawk Power Corp	525	BWR	GE	1969
Pt Beach 1	Wisconsin Electric Power Co**	524	PWR	WE	1970
Pt Beach 2	Wisconsin Electric Power Co**	524	PWR	WE	1972
Surry 1	Virginia Electric and Power Co	524	PWR	WE	1971
Robert E. Ginna	Rochester Gas & Electric Corp	470	PWR	WE	1970
San Onofre 1	Southern California Edison Co	450	PWR	WE	1966
Indian Pt 1	Consolidated Edison Co	285	PWR	BW	1962
Dresden 1	Commonwealth Edison Co	200	BWR	GE	1959
Yankee (Rowe)	Yankee Atomic Electric Co	185	PWR	WE	1961

* Reactor owned by U.S. AEC. ** Co-owner: Wisconsin-Michigan Power Co.

PLANT	PLANT OWNER	PLANT NAME	LOCATION	CONSULTING ENGINEER	Unit number	Date of commercial operation	Initial net capacity, MW	Initial gross capacity, MW	Multiple units capacity, MW (est.)
1	Mississippi Power & Light Co.	Grand Gulf	Port Gibson, MI	Bechtel Corp.	1	12/78	1290	1324	
2	Duke Power Co.	McGuire	Mount Holly, NC	Self	1,2	7/77	1181	1220	129
3	Tennessee Valley Auth.	X-14, X-15	Self	Self		7/77 4/78	1175	1224	132
4	Tennessee Valley Auth.	Watts Bar	Rhea County, TN	Self	1,2	5/77 2/78	1169	1218	127
5	Tennessee Valley Auth.	Saguavan	Vic of Chattanooga, TN	Self	1,2	11/74, 7/75	1140	1183	127
6	Southern California Edison Co.	San Onofre	San Onofre, CA	Bechtel Corp.	2,3	4/78 4/79	1140	1175	117
7	Portland General Electric Co.	Trojan	Prescott, OR	Bechtel Corp.	1	5/78	1130	1178	119
8	Pacific Gas and Electric Co.	Mendocino	Mendocino County, CA	Bechtel Corp.	1,2	3/78 6/79	1120	1168	118
9	Louisiana Power & Light Co.	Waterford	Taft, LA	Ebasco Services Inc.	3	1/77	1113	1153	120
10	Detroit Edison Co.	Enrica Fermi	Monroe, MI		2,3,23	4/76...	1113	1205	2
11	Georgia Power Co.	Vogtle	Hancock Landing, GA	Bechtel Corp.	1,2	7/80	1100	1167	
12	Nagars Monawee Power Corp.	Nine Mile Point	Onwego County, NY	Stone & Webster Engrg. Corp.	2	7/78	1100	1150	115
13	Nashua Public Power Supply System	Hanford	Richland, WA	Burns and Roe Inc.	2	9/77	1100	1150	115
14	Public Service Electric & Gas Co.	Salem	Lower Alloways Creek Twp., NJ	Self	1,2	10/74 5/75	1090	1132	117
15	Pacific Gas and Electric Co.	Diablo Canyon	San Luis Obispo, CA	Self	1,2	3/75 3/76	1083	1136	116
16	Commonwealth Edison Co.	LaSalle	LaSalle, IL	Sargent & Lundy	1,2	12/77 3/78	1078	1122	112
17	Public Central Power & Light Co.	Foxwood River	Lacey Twp., NJ	Burns and Roe Inc.	1	5/78	1079	1123	114
18	Public Service Electric & Gas Co.	Newbold Island	Sorrentown Twp., NJ	Self	1,2	5/78 5/79	1067	1118	
19	Public Service Electric & Gas Co.	Peach Bottom	York County, PA	Bechtel Corp.	2,3	5/72 3/73	1065	1098	115
20	Tennessee Valley Auth.	Browns Ferry	Limestone County, AL	Self	1,2,3	4/73 1/74 8/74	1065	1098	115
21	Philadelphia Electric Co.	Limerick	Montgomery County, PA	Bechtel Corp.	1,2	2/75 3/77	1055	1090	115
22	Indiana & Michigan Electric Co.	Donald C. Cook	Brigman, MI	American Electric Power Service Corp.	1,2	7/31	1054	1089	113
23	Commonwealth Edison Co.	Zion	Zion, IL	Sargent & Lundy	1,2		1050	1085	
24	Pennsylvania Power & Light Co.	Susquehanna	Salem Twp. PA	Bechtel Corp.	1,2	5/79 5/81	1040	1085	115
25	Arkansas Power & Light Co.	Arkansas Nuclear One	Russellville, AR	Bechtel Corp.	2	10/75	320	350	376
26	Jersey Central Power & Light Co.	Three Mile Island	Dauphin County, PA	Burns & Roe Inc.	2	5/75	905	959	358
27	South Carolina Electric & Gas Co.	Summer	Summerville, SC	Gilbert Associates, Inc.	1	1/77	900	950	350
28	Carolina Power & Light Co.	Harris	Bonsal, NC	Ebasco Services Inc.	1,4	3/77 3/80	900	950	350
29	Sacramento Municipal Utility District	Rancho Seco	Sacramento City, CA	Bechtel Corp.	1	10/73	883	928	364
30	Consolidated Edison Co. of N.Y., Inc.	Indian Point	Suchanwan, NY		2,3		873		1083
31	Toronto Edison Co.	Davis-Besse	Oak Harbor, OH	Bechtel Corp.	1	12/74	872	906	306
32	Florida Power Corp.	Crystal River	Crystal River, FL	Gilbert Associates, Inc.	3	9/73	355	385	
33	Virginia Electric & Power	North Anna	Louisa County, VA	Stone & Webster Engrg. Corp.	1,2	7/4 75	352	382	327
34	Quebec Light Co.	Beaver Valley	Shippingport, PA	Stone & Webster Engrg. Corp.	1,2	10/74	352	391	324
35	Duke Power Co.	Oconee	Seneca, SC	Self and Bechtel Corp.	1,2,3	7/3, 7/3, 7/4	347	383	923
36	Virginia Electric & Power Co.	North Anna	Louisa County, VA	Stone & Webster Engrg. Corp.	3,4	6/78	345		
37	Millstone Point Co.	Millstone	Waterford, CT	Bechtel Corp.	2	4/74	330	360	
38	Alabama Power Co.	Farley	Vic of Dothan, AL	Southern Services, Inc. and Bechtel Corp.	1,2	4/75 1/77	329	361	398
39	Power Auth. of the State of N.Y.	Friedpatrick	Scriba, NY	Stone & Webster Engrg. Corp.	1	10/73	321	350	383
40	Carolina Power & Light Co.	Brunswick	Southport, NC	United Engineers & Constructors, Inc.	1,2	3/75 3/74	321	347	347
41	Arkansas Power & Light Co.	Arkansas Nuclear One	Russellville, AR	Bechtel Corp.	1	8/73	320	380	880
42	Metropolitan Edison Co.	Three Mile Island	Dauphin County, PA	Gilbert Associates, Inc.	1	11/73	319	376	276
43	Consumers Power Co.	Midland	Midland, MI	Bechtel Corp.	2	5/78	315	355	387
44	Long Island Lighting Co.	Shoreham	Brookhaven, NY	Stone & Webster Engrg. Corp.	1	5/77	313	344	378
45	The Cincinnati Gas & Electric Co.	Zimmer	Moscow, OH	Sargent & Lundy	1	10/75	310	340	340
46	Florida Power & Light Co.	St. Lucie	Hutchinson Island, FL	Ebasco Services Inc.	1,2	7/4 79	310	353	353
47	Baltimore Gas & Electric Co.	Calvert Cliffs	Luxley, MD	Bechtel Corp.	1,2	7/3 74	300	337	910
48	Maine Yankee Atomic Power Co.	Main Yankee	Yuccasport, ME	Stone & Webster Engrg. Corp.	1	5/72	293	330	363
49	Georgia Power Co.	Hatch	Baxley, GA	Southern Services, Inc. and Bechtel Corp.	1,2	7/4 75	286	313	349
50	Nevada Public Power District	Couder	Brownville, NE	Burns & Roe, Inc.	1	7/73	278	301	336
51	Delmarva Power & Light Co.				1,2	7/80		270	270
52	Florida Power & Light Co.	Turkey Point	Biscayne Bay, FL	Bechtel Corp.	3,4		268	290	250
53	Northern Indiana Public Service Co.	Bailly	Dune Acres, IN	Sargent & Lundy	1	2/77	257	285	285
54	Boston Edison Co.	Plymouth	Plymouth, MA	Bechtel Corp.	1	11/72	255	287	287
55	Puerto Rico Water Resources Auth.	Aguirre	Central Aguirre, PR	Gibbs & Hill, Inc.	1	1/76	253		
56	Northern States Power Co.	Prairie Island	Red Wing, MN	Pioneer Service & Engrg. Co.	1,2	8/73 5/74	245	260	533
57	Wisconsin Public Service Corp.	Kewaunee	Kewaunee, WI	Pioneer Service & Engrg. Co.	1	4 73	240	262	582
58	Lowell Electric Light & Power Co.	Duane Arnold	Palo Alto, CA	Bechtel Corp.	1	12/73	229	255	583
59	Consumers Power Co.	Midland	Midland, MI	Bechtel Corp.	1	5/77	191	226	552
60	Omaha Public Power District	Fort Calhoun	Fort Calhoun, NE	Gibbs, Hill, Durham & Richardson, Inc.	1	6/73	155	181	508
61	Public Service Co. of Colorado	Fort St. Vrain	Platteville, CO	Gulf General Atomic, Inc.	1	72	330	342	

MANUFACTURERS

AC	Atlas Chalmers Mfg. Co.	BMN	Beckman Instruments Inc.	EM	Electric Machinery Mfg. Co.	IW	Illinois Water Treatment Co.
ACL	Atomic Energy of Canada Ltd.	CAL	Calgon Corp.	F	Fisk Corp.	KSB	Klein Schanzlin & Becker
ACC	Atomic Energy Commission	CDC	Control Data Corp.	FIS	Fischer & Porter Co.	LA	The Louis Allis Co. Inc.
AEI	Associated Electrical Industries Ltd.	CE	Combustion Engineering Inc.	FW	Foster Wheeler Corp.	LAW	LA Water Treatment Div., Chromalloy
AEL	Associated Electric Industries Ltd.	CEP	Controls of Environmental Pollution Inc.	GE	General Electric Co.	AMC	American Co.
AFC	Aqua-Chem Inc.	CFL	California Filter Company	GEI	General Electric Co. Ltd.	LPE	Liquid Process Equipment Interface Corp.
AG	Algonquin Power Corp.	CGE	Canadian General Electric Co. Ltd.	GEI	General Electric Co. Inc.	MLW	MLW Worthington Ltd.
AGS	Algonquin Gas & Electric Co.	CHU	Chubu Corp.	GGA	Gulf General Atomic Inc.	MR	Milton Roy Co.
AGT	Algonquin Thermal Corp.	COG	Coastal Oil & Gas Corp.	GW	Graver Water Conditioning Co.	MS	Maryland Shipbuilding & Drydock Co.
AGW	Algonquin Water Corp.	CPI	Compressor Products Inc.	H	Honeywell Inc.	NMC	Nuclear Measurements Corp.
AM	Algonquin Municipal Corp.	CDC	Central Data Corp.	HDP	Hawden Parsons, licensed by Air	NMI	Neptune Microfilm, Inc.
AMC	Algonquin Municipal Corp.	DE	Diamond Power Specialty Corp.	HT	Hungerford & Taylor Inc.	PP	Pacific Pumps Div., Dresser Industries Inc.
APC	Algonquin Power Corp.	EE	English Electric Co. Ltd.	IM	International Business Machines Corp.	RI	Royal Industries Inc.
AW	Algonquin Water Corp.	EIL	Engineering Instrument Corp.	N	Nucleon Products Co.	SEC	Sentry Equipment Corp.
BWL	Birmingham-Wallamet Co.	EL	Elmer Co. Carter Corp.	NR	Northern Rando Co.		

PROJECT	FUEL										TURBINES				CONDENSERS				FEEDWATER				COOLING			
	Chemical form	Physical form	Max burnup (equilibrium cycle), MW day/metric ton	Enrichment by zones, percent	Avg power density, kW/g fuel	Avg heat flux (equilibrium cycle), 1000 Btu/hr sq ft	Avg fuel temp, F	Number per unit	Ultimate capacity, MW	Type	Number of exhausters	Number of bleed points	Exhaust pressure, in Hg abs	Manufacturer	Surface area, 1000 sq ft	Number of water passes	Tube material	Air removal	Manufacturer	Makeup treatment	Manufacturer	Condensate treatment	Manufacturer	Source	Flow to condenser in winter, 1000 gpm	
1	UO ₂	Pel	33,000	2.04, 2.58, 3.20	25.9	159.7	217.2	1	1220	TC Idr	5	7	1.7	WE	733	1	SSr	J	BLH	De	IW	De		Riv	540	
2	UO ₂	Pel						1	1330	TC Idr	5	8	1.8, 2.9	BB	900	1	SSr	R _o	De	De			Riv	452		
3	UO ₂	Pel		2.25, 2.80, 3.30	39	217.2	557	1	1098	TC Idr	5	7	2.0	WE	324	1	Adl	R _o	IR	De	LAW	De	COC	Riv	522	
4	UO ₂	Pel		2.2, 2.7, 3.2	39.5	217	530	1	1183	TC Idr	5	7	2	WE	672	1	Adl	R _o	IR	De				Riv	522	
5	UO ₂	Pel	33,000	1.9, 2.3, 2.9	35.7	205.1	617	1	1175	TC	6	6	1.5	GE	581	1	Adl	R _o	IR	De	FIE			Ocn	370	
6	UO ₂	Pel	22,000	2.3, 2.3, 3.3	29.1	217.2	557	1	1220	TC Idr	5	7	1.4	GE	966	1	Adl	CuN	J	WE	De	VMI, CFL	De		Riv	405
7	UO ₂	Pel	13,512		22.1	163.2	560	4	1168	TC	6	5	1.75	GE	534	1	Adl	CuN	J	WE	De			Ocn	347	
8	UO ₂	Pel	50,000	1.9, 2.3, 2.9	26	205		1	1207	TC	6	5	2.5	WE	775	1	SSr	R _o	IR	De				Riv	355	
9	UO ₂	Pel	28,960	1.10, 2.50	22.5		560	1	1203	TC	6	4	1.5	EE	771	1	Adl	R _o , J	IR	De				Riv		
11	UO ₂	Pel	50,000	2.25, 2.80, 3.30	34.5	217.2	560	1	1167	TC Idr	5	6	3.5	GE		1	SSr, Adl	J		De				Riv	500	
12	UO ₂	Pel	27,500		22.1	164.4	560	1	1156	TC	5	6	2.0	IR		1	Adl	CuN	R _o , J	WE	De			Pon	550	
13	UO ₂	Pel	20,000	1.10, 2.50	22.1	163.2		1	1150	TC Idr	5	7	2.5	WE	792	1	Adl	CuN	R _o , J	WE	De	CFL	Ion	GW	550	
14	UO ₂	Pel	24,400	2.25, 2.90, 3.30	37.3	213	557	1	1181	TC	6	6	1.5	WE	900	1	Adl	CuN	R _o	FW	De	COC		Bay	1100	
15	UO ₂	Pel	50,300	2.2, 2.7, 3.2	34	207	720	1	1135	TC	6	5	1.5	WE	518	1	Adl	CuN	J	IR	De	AOC, CAL		LPE	Ocn	363
16	UO ₂	Pel	16,600	1.30	22	163	558	1	1122	TC	5	6	3.5	GE	350	1	SSr	J	WE	De				Pon	500	
17	UO ₂	Pel	23,250	1.3, 2.3, 2.9	35.7	205	627	1	1250	TC Idr	5	1	2.5	BB	350 ⁹	1	Adl	R _o	IR	De	LAW	De	LAW	Bay	700	
18	UO ₂	Pel	20,000		22.1	163	560	1	1166	TC Idr	6	5	5	GE	820	2	Adl	J	IR	De				Riv	552	
19	UO ₂	Pel	19,000	2.19, 3.1	22.3	163		5	1152	TC Idr	6	5	1.5	GE	790	1	Adl	J	IR	De	IW	Ion	GW	Riv	743	
20	UO ₂	Pel		2.19	22.3	163.2	558	1	1152	TC Idr	3	5	2	GE	666	1	Adl	R _o , J	FW	De	COC	Ion	GW	Riv	500	
21	UO ₂	Pel	19,000	2.19, 3.1	22.3	163		1		TC Idr	6	5	3.5	GE		1	Adl	J		De				Riv		
22	UO ₂	Pel	33,000	2.2, 2.7, 3.2	33	207		1	1130	TC Idr	5	6	1.5	GE, BB	480 ¹⁵	1	Adl	J	WE, IR	De	PM			Pon	510	
23	UO ₂	Pel	33,000	2.2, 2.7, 3.2	207			1	1085	TC	6	6	1.5	WE	594	1	SSr	R _o , J	WE	De				Pon		
24	UO ₂	Pel	27,300	2.2, 3.1	22.5	163	560	1	1172	TC Idr	6	5	3.5	GE	880	1	Adl	R _o , J	IR	De		DeSF		Riv		
25	UO ₂	Pel	33,000	2.1, 2.3, 2.9	35.9	205	557	1	377	TC	4	7	1.6	GE	743	1	Adl	R _o	SWE	De	HT	N		Riv, Pon	405	
26	UO ₂	Pel	31,700	2.29, 2.54, 2.90	33.8	168	654	1	959	TC	5		2.5	WE	610	1	SSr	R _o	IR	De		LAW	De	LAW	Riv	300
27	UO ₂	Pel	33,000	2.2, 2.7, 3.3	34.5	217	657	1	954	TC Idr	4	7	2.2, 3.1	GE	252	1	SSr	R _o	SWE	De				Pon	900	
28	UO ₂	Pel	33,000	1.9, 2.5, 3.1	217			1	960	TC Idr	4		2.5		690	1				De				Pon		
29	UO ₂	Pel	29,750	2.0, 2.7, 3.0	33.4	190	650	1	966	TC	4	6	2.5	WE	732	2	SSr	J	WE	De	COC	De	COC	Riv	445	
30	UO ₂	Pel	33,000	2.2, 3.1	33.1	176	716	1	1021	TC Idr	6	6	1.5	WE	306	1	Adl	J	WE	De	FIE, De	WE	De		Riv	504
31	UO ₂	Pel	27,300	2.32, 2.68, 3.18	176			1	915	TC Idr	4	6	1.5	GE		1		J		De				Pon		
32	UO ₂	Pel	27,300					1	885	TC	4	6	2	WE	596	1	CuN	R _o	FW	De	DeSo	COC	De	GW	Pon	580
33	UO ₂	Pel	31,500		11.2	208		1	927	TC Idr	4	6		WE	596	1	SSr	J	IR	De	FIE, De	WE	De	DeSF	Riv, Pon	325
34	UO ₂	Pel	31,000	1.95, 2.55, 3.1	20	207	720	1	924	TC Idr	4	6	1.6	WE	720	1	SSr	J	FW	De				De	Pon	480
35	UO ₂	Pel	29,731	2.0, 2.1, 2.15	31	171	510	1	327	TC Idr	6	5	1.0	GE	510	1	SSr	J	BLH	De	IW	Ion	GW	Pon	453	
36	UO ₂	Pel	55,000			214		1	394	TC Idr	5	7	0.5	WE	770	1	SSr	J	IR	De				Riv, Pon	883	
37	UO ₂	Pel	30,000	2.25, 3.1	29.4	177	500	1	880	TC	6	6	1.5	GE	430	1	CuN	J	IR	De				Bay	344	
38	UO ₂	Pel	33,000	2.0, 2.7, 3.4	20.4	208	557	1	398	TC Idr	4	5	3.5	WE	540	1	Adl	J	WE	De	GW	De		Riv	625	
39	UO ₂	Pel				164	560	1	383	TC Idr	4	5	1.5	GE	370	1	SSr, Adl	J	WE	De	COC	De	COC	Pon	160	
40	UO ₂	Pel	19,000	1.3				1	849	TC Idr	4		1.6	GE	581	1	CuN	J	IR	De		De, Ion		Riv	524	
41	UO ₂	Pel	20,000	2.06, 2.72, 3.05	31.3	171	654	1	938	TC Idr	4	6	1.5		1016	1	Adl	R _o	WE	De	HT	De	LAW	Riv, Pon	764	
42	UO ₂	Pel	21,700	2.06, 2.72, 3.05	31.3	172	654	1	475	TC	6	6	2.5	GE	578	1	SSr	J	IR	De	IW	De	LAW	Riv	286	
43	UO ₂	Pel	31,790	2.3, 2.5		194	611	1	397	TC Idr	4	5	2.5	GE	566	1	Adl	J	FW	De				De	PM	268
44	UO ₂	Pel	27,500	2.1, 2.5	22.7	165	558	1	880	TC Idr	4	5	1.6	GE	420	1	CuN	J	IR	De				De	IN	573
45	UO ₂	Pel	25,000	1.8, 2.4	22.3	165		1	840	TC Idr	4	7	1.5	WE	550	1	Adl	CuN	J	WE	De	PM	De	COC	Riv	448
46	UO ₂	Pel	21,060 ¹¹	1.80, 2.48, 2.93	26	170	658 ¹¹	1	853	TC Idr	4	5	2.5	WE	546	1	Adl	CuN	J	WE	De			Ocn	184	
47	UO ₂	Pel	22,550	2.05, 2.45, 2.99	30.9	175	650	1	910	TC Idr	5	6	2	GE	453	1	CuN	R _o	MS	De	GW	DeSF	GWDL	Bay	1200	
48	UO ₂	Pel	30,000	2.01, 2.4, 2.95	29.5	170		1	863	TC	4	5	1.5	WE	400	1	Adl	CuN	J	IR	De			Bay	440	
49	UO ₂	Pel	25,000	2.5, 2.0, 1.7, 1.3	22.3	165	564	1	349 ¹⁴	TC Idr	4	5	2.4	GE	560	2	SSr, Adl	J	FW	De	GW	De	GW	Riv	556	
50	UO ₂	Pel	19,000 ¹¹	2.15 ¹¹	51.15 ¹¹	164		1	801	TC	4	5	2	WE	465	1	SSr	J	MS	De	COC	Ion	GW	Riv	650	
51	UO ₂	Pel	34,000	3.3	1620	68	1575	1	749	TC	4	12	3.5	AC		1										
52	UO ₂	Pel	21,300	1.85, 2.55, 3.1		172	557	1	750	TC Idr	2	7	2.5	WE	564	1	Adl	CuN	J	FW	De	COC	De	COC	Bay	524
53	UO ₂	Pel	19,000 ¹¹		22.5 ¹¹	165	558	1	886	TC	2	6	1.5	GE	500	1	SSr, Adl	J	WE	De				Pon	215	
54	UO ₂	Pel		2.18	17.327 ¹¹	121		1		TC	4	5	1.5	GE	284	1	Adl	J	IR	De				Bay	320	
55	UO ₂	Pel			25.57 ¹¹	202		1	549	TC Idr	2	6	2.5	WE	430	1	Adl	J	WE	De				Bay		
56	UO ₂	Pel	33,000 ¹¹	2.2, 3.3, 3.40	30.5	191	612	1	560	TC	4	5	1.5	WE	425	2	SSr	J	IR	De	IW	De	De	Riv	584	
57	UO ₂	Pel	33,000	2.1, 2.9, 3.4	24.4	131	614	1	562	TC	2	5	1.5	WE	300	1	Adl	J	FW	De	LAW	De	De	Pon	100	
58	UO ₂	Pel	18,350	1.1, 2.2	22.5	164	550	1	569	TC Idr	2	6	2.0, 2.75	GE	410	1	SSr	J	FW	De	CFL	Ion	De	Riv	247	
59	UO ₂	Pel	31,790	2.3, 2.5		164	611	1	552 ¹⁴	TC Idr	2	5	3.5	GE	190	1	Adl	J	IR	De			De	PM	Riv	245
60	UO ₂	Pel	27,700	1.4, 2.4, 3.2	29	167	536	1	508	TC Idr	4	6	1.5	GE	350	2	SSr	R _o	FW	De	DeSo	HT	De	Riv	210	
61	UO ₂	Pel	30,000	93	15			1	312	TC	2	5	2.5	GE	114	2	Adl	J	IR	De	COC	De, pH	COC	Riv	156	

STEAM GENERATION 23

COOLING WATER			CONTROL OF RADIOACTIVITY										GENERATORS				CONTROLS MFRS				PLANT NAME	PROJECT
Treatment	Cooling tower type	Thermal effects study?	Treatment of gases	Locations for monitoring gaseous discharges	Gas monitor system mfr	Treatment of liquids	Liquid monitor system mfr	Low level waste disposal	High level waste disposal	Ecological study	Study frequency	Voltage, kV	Rating each MVA	Stator cooling	Rotor cooling	Reactor controls	Major plant controls	Computer, core performance	Computer, plant performance	Data logger		
Can	N	Yes	Hup	2		Hup E1	OSS	OSS	Pro	Pro Po0	Cin	24	1450	H2	H2	GE	WE	GE	GE	GE	Grand Gulf	2
Can	Wet Hup	Yes	Hup	10		Hup E1	OSS	OSS	Pro	Pro Po0	Cin	24	1480	H2	H2	GE	WE	GE	GE	GE	McGuire	3
Can	Wet Hup	Yes	Hup	10		Hup E1	OSS	OSS	Pro	Pro Po0	Cin	24	1411	H2	H2	GE	WE	GE	GE	GE	X 14 X 15	4
Can	Wet Hup	Yes	Hup	10		Hup E1	OSS	OSS	Pro	Pro Po0	Cin	24	1356	H2	H2	GE	WE	GE	GE	GE	Watts Bar	5
Can	N	Yes	Hup	12		Hup E1	OSS	OSS	Pro	Pro Po0	Cin	22	1313	H2	H2	GE	WE	GE	GE	GE	San Onofre	6
Can	Wet Chl	Yes	Hup	5	CEP	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1280	H2	H2	WE	GE	GE	GE	GE	Trojan	7
Can	Wet Chl	Yes	Hup	5		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	25	1350	H2	H2	GE	GE	GE	GE	GE	Mendocino	8
Can	Wet Chl	Yes	Hup	19	GE	Hup M110	GE	OSS	Pro	Pro Po0	Cin	24	1333	H2	H2	GE	GE	GE	GE	GE	Waterford	9
Can	Wet Chl	Yes	Hup	19	GE	Hup M110	GE	OSS	Pro	Pro Po0	Cin	22	1350	H2	H2	GE	GE	GE	GE	GE	Enrico Fermi	10
Can	Wet MD	Yes	Hup	12	GE	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	25	1348	H2	H2	GE	GE	GE	GE	GE	Vogtle	11
Can	Wet MD	Yes	Hup	10	GE	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	25	1236	H2	H2	GE	WE	WE	WE	WE	Nine Mile Point	12
Can	N	Yes	Hup	18	WE	Hup E1	TL	OSS	Pro	Pro Po0	Cin	25	1300	H2	H2	WE	WE	WE	WE	WE	Hanford	13
Can	Wet Chl	Yes	Hup	18	WE	Hup M110	WE	OSS	Pro	Pro Po0	Cin	25	1300	H2	H2	WE	WE	WE	WE	WE	Salem	14
Can	Wet Chl	Yes	Hup	16		Hup PF110	LdB	OSS	Pro	Pro Po0	Cin	22	1300	H2	H2	GE	GE	GE	GE	GE	Diablo Canyon	15
Can	Wet Hup	Yes	Hup	2		Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	23	1390	H2	H2	GE	GE	GE	GE	GE	LaSalle	16
Can	Wet Chl	Yes	Hup	2		Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	25	1300	H2	H2	GE	GE	GE	GE	GE	Forked River	17
Can	Wet Chl	Yes	Hup	12		Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	22	1280	H2	H2	GE	GE	GE	GE	GE	Newbold Island	18
Can	Wet Chl	Yes	Hup	12		Hup PF110	GE	OSS	Pro	Pro Po0	SA	22	1280	H2	H2	GE	GE	GE	GE	GE	Peach Bottom	19
Can	Hup NaC	Yes	Hup	2	WE	MFI110	OSS	OSS	Pro	Pro Po0	Cin	22	1280	H2	H2	GE	GE	GE	GE	GE	Brown's Ferry	20
Can	N	Yes	Hup	2		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	26	1280	H2	H2	GE	GE	GE	GE	GE	Limerick	21
Can	Wet Chl	Yes	Hup	12		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	24	1220	H2	H2	WE	WE	WE	WE	WE	Donald C Cook	22
Can	Wet Chl	Yes	Hup	9		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	24	1280	H2	H2	GE	GE	GE	GE	GE	Zion	23
Can	Wet Chl	Yes	Hup	25		Hup M110	OSS	OSS	Pro	Pro Po0	An	22	1045	H2	H2	CE	CE	CE	CE	CE	Susquehanna	24
Can	Wet Chl	Yes	Hup	25		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1068	H2	H2	BM	BM	BM	BM	BM	Arkansas Nuclear One	25
Can	Wet Chl	Yes	Hup	10		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1101	H2	H2	WE	WE	WE	WE	WE	Three Mile Island	26
Can	Wet Chl	Yes	Hup	5	TL	Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	22	1045	H2	H2	BM	BM	BM	BM	BM	Summer	27
Can	Wet Chl	Yes	Hup	5	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1070	H2	H2	BM	BM	BM	BM	BM	Harris	28
Can	N	Yes	Hup	5	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	27	1126	H2	H2	WE	WE	WE	WE	WE	Rancho Seco	29
Can	N	Yes	Hup	26		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	25	1056	H2	H2	BM	BM	BM	BM	BM	Indian Point	30
Can	Wet Chl	Yes	Hup	10	EIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	984	H2	H2	BM	BM	BM	BM	BM	Davis Besse	31
Can	Wet Chl	Yes	Hup	2	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1030	H2	H2	WE	WE	WE	WE	WE	Crystal River	32
Can	Wet Chl	Yes	Hup	2	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1026	H2	H2	BM	BM	BM	BM	BM	North Anna	33
Can	Wet Chl	Yes	Hup	15		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	19	1038	H2	H2	BM	BM	BM	BM	BM	Beaver Valley	34
Can	N	Yes	Hup	15		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1105	H2	H2	BM	BM	BM	BM	BM	Oconee	35
Can	Wet Chl	Yes	Hup	12	TL	Hup M110	OSS	OSS	Pro	Pro Po0	An	24	1011	H2	H2	CE	CE	CE	CE	CE	North Anna	36
Can	Wet Chl	Yes	Hup	9	GE	Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	24	1045	H2	H2	WE	WE	WE	WE	WE	Millstone	37
Can	Wet Chl	Yes	Hup	9	GE	Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	24	981	H2	H2	GE	GE	GE	GE	GE	Farley	38
Can	Wet Chl	Yes	Hup	9	GE	Hup PF110	OSS	OSS	Pro	Pro Po0	Cin	24	963	H2	H2	GE	GE	GE	GE	GE	FitzPatrick	39
Can	Wet Chl	Yes	Hup	9	TL	Hup M110	OSS	OSS	Pro	Pro Po0	An	22	1003	H2	H2	BM	BM	BM	BM	BM	Brunswick	40
Can	Wet Chl	Yes	Hup	12	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	19	958	H2	H2	BM	BM	BM	BM	BM	Arkansas Nuclear One	41
Can	Wet Chl	Yes	Hup	12	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	24	1006	H2	H2	BM	BM	BM	BM	BM	Three Mile Island	42
Can	Wet Chl	Yes	Hup	12	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	24	978	H2	H2	GE	GE	GE	GE	GE	Midland	43
Can	Wet Chl	Yes	Hup	12	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	22	975	H2	H2	GE	GE	GE	GE	GE	Shoreham	44
Can	Wet Chl	Yes	Hup	14	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	1000	H2	H2	CE	CE	CE	CE	CE	Zimmer	45
Can	Wet Chl	Yes	Hup	7	WE	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	25	1020	H2	H2	CE	CE	CE	CE	CE	St. Lucie	46
Can	Wet Chl	Yes	Hup	11	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	900	H2	H2	GE	GE	GE	GE	GE	Calvert Cliffs	47
Can	Wet Chl	Yes	Hup	34	BG	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	24	1060	H2	H2	GE	GE	GE	GE	GE	Main Yankee	48
Can	Wet Chl	Yes	Hup	10	TL	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	22	983	H2	H2	GE	GE	GE	GE	GE	Hatch	49
Can	Wet Chl	Yes	Hup	34		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	26	870	H2	H2	WE	WE	WE	WE	WE	Cooper	50
Can	Wet Chl	Yes	Hup	19		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	894	H2	H2	GE	GE	GE	GE	GE	Turkey Point	51
Can	Wet Chl	Yes	Hup	19		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	24	762	H2	H2	GE	GE	GE	GE	GE	Baldy	52
Can	Wet Chl	Yes	Hup	19		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	24	780	H2	H2	GE	GE	GE	GE	GE	Pilgrim	53
Can	Wet Chl	Yes	Hup	19		Hup M110	OSS	OSS	Pro	Pro Po0	Cin	20	685	H2	H2	WE	WE	WE	WE	WE	Aquidneck	54
Can	Wet Chl	Yes	Hup	16	SIC GEL	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	19	659	H2	H2	WE	WE	WE	WE	WE	Prairie Island	55
Can	Wet Chl	Yes	Hup	2	WE	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	19	658	H2	H2	WE	WE	WE	WE	WE	Kewaunee	56
Can	Wet Chl	Yes	Hup	2	WE	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	664	H2	H2	GE	GE	GE	GE	GE	Duane Arnold	57
Can	Wet Chl	Yes	Hup	4	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Mo	22	670	H2	H2	BM	BM	BM	BM	BM	Madison	58
Can	Wet Chl	Yes	Hup	4	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	591	H2	H2	GE	GE	GE	GE	GE	Fort Calhoun	59
Can	Wet Chl	Yes	Hup	4	VIC	Hup M110	OSS	OSS	Pro	Pro Po0	Cin	22	403	H2	H2	GGA	F				Fort St. Vrain	60

Also drumming

- 41 Units are kW/yr
- 42 Summer data
- 43 Joint ownership with Cleveland Electric Illuminating Co
- 44 Joint ownership with Ohio Edison Co and Pennsylvania Power Co
- 45 Also scrubbing
- 46 Joint ownership with Columbus & Southern Ohio Electric Co and Dayton Power & Light Co
- 47 Cryogenic distillation
- 48 Maximum value
- 49 For unit 1, 25.7 MW for unit 2
- 50 Air ion exchange, precast filtration solidification
- 51 Units are kW/yr

Equilibrium condition

- 52 For unit 1, unit 2 1002F
- 53 For unit 1, unit 2 575 deg
- 54 For unit 1, unit 2 5292
- 55 1,800,000 lb/hr helium
- 56 Hexagonal graphite block containing bonded rods of fuel particles
- 57 Burnup in MWD prior
- 58 Enrichment zones: 1 24, 1 33, 1 57, 1 88, 2 11
- 59 Across condenser
- 60 For gamma radiation surveillance, 7 stations for monitoring particulates and gaseous iodine
- 61 Also evaporation, diethanol solidification
- 62 Joint ownership with Wisconsin Public Service Corp, Wisconsin Power & Light Co, Madison Gas & Electric Co

For unit 1, unit 2 1002F

- 63 T for discharge to cooling pond, blowdown cooling reduces this to 1 degree before discharge to river
- 64 Possible cooling tower for blowdown cooling and service water
- 65 Chlorine infection
- 66 Also post-demineralization and deaerated
- 67 Also liquid radioactive recycle
- 68 4,050,000 lb/hr steam extracted at crossover for process steam to Dow Chemical Co

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