

Power

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Southern Methodist University

1967 ENERGY-SYSTEMS DESIGN ISSUE

The engineer as systems
designer and manager
Equipment and Literature
rundup Design survey
over 1200 projects

19 ENERGY SYSTEMS DESIGN SURVEY 1

The following pages reflect the designer's choice of the many system variables in both new and modernized plants. It includes installations now operating, those being built and others still in the design stage. This year you will find data on both nuclear and hydroelectric plants in addition to fossil fueled central stations. While these tabulations are representative samples of current engineering practice, they should not be considered complete for marketing purposes

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FOSSIL-FUELED CENTRAL STATIONS

Maximum steam conditions stabilize on a plateau

Each project listing covers 4 pages

PROJECT	COMPANY	PLANT NAME	LOCATION	CONSULTING ENGINEER	Unit No., new unit	Date first operation	Unit capacity, mw	BOILER			
								Capacity eq. 1000 lb per hr	Throttle pressure, psig	STEAM	
										Throttle	Exhaust
1	Houston Light & Power Co.	Cedar Bayou	Elston, Texas	Epasco Services, Inc.	1	10-10	175	1200	1200	1010	1000
2	Kentucky Power Co.	Big Sandy	Louisville, Ky.	American Electric Power Service Corp.	2	1959	160	1230	1500	1010	1000
3	Cleveland Electric Illuminating Co.	Avon Lake	Avon Lake, Ohio	Self and Sargent & Lundy	1	1957	124	1650	1500	1305	1200
4	Illinois Power Co.	Baldwin	Baldwin, Ill.	Sargent & Lundy	1	1958	105	1510	1500	1305	1200
5	Ohio Power Co.	Muskingum River	Beverly, Ohio	American Electric Power Service Corp.	5	1958	190	1255	1500	1300	1200
6	Gulf States Utilities Co.	Ray & Benson	West Lake, La.	Stone & Webster Engrg Corp.	4	11-59	350	1380	1500	1300	1200
7	St. Louis Utilities Co.	Willow Glen	St. Gabriel, La.	Stone & Webster Engrg Corp.	3	11-58	365	1440	1500	1300	1200
8	Texas Power & Light Co.	Tradinghouse Creek	Waco, Texas	Brown & Root, Inc.	1	1959	165	1744	1500	1300	1200
9	Arkansas Power and Light Co.	Robert E. Ritchie	Hebena, Ark.	Bechtel Corp.	1	1959	150	1571	1500	1300	1200
10	Vermonter Power Co.	Allen E. King	Barnett, Minn.	Pioneer Service & Engrg Co.	1	1958	150	1525	1500	1300	1200
11	Houston Light & Power Co.	P.H. Robinson	Bacliff, Texas	Epasco Services, Inc.	3	11-58	331	1490	1650	1010	1000
12	Kentucky Power Co.	Lake Catherine	London, Miss.	Epasco Services, Inc.	4	11-59	310	1400	1600	1000	1000
13	Public Service Co. of Indiana	Franklin	Springfield, Pa.	Stone & Webster Engrg Corp.	1	1959	136	1710	1500	1300	1200
14	Georgia Power Co.	Calhoun	Calhoun, Ga.	Southern Services, Inc.	1	1959	150	1550	1500	1300	1200
15	Georgia Power Co.	Hammond	Rome, Ga.	Southern Services, Inc.	4	1959	300	1625	1400	1300	1200
16	Delaware Edison Co.	Arthur Kill	Staten Island, N.Y.	Stone & Webster Engrg Corp.	3	1958	100	1580	1400	1300	1200
17	Tennessee Electric Co.	Old Ford	Memphis, Tenn.	Stone & Webster Engrg Corp.	1	1958	154	1713	1500	1300	1200
18	Florida Power & Light Co.	Northwestern	Orlando, Fla.	Black & Veatch	1	1959	150	1650	1500	1300	1200
19	Florida Power & Light Co.	Turkey Point	South Dade County, Fla.	Bechtel Corp.	1	1957	132	1640	1400	1300	1200
20	Kansas Power and Light Co.	Lawrence	Lawrence, Kan.	Black & Veatch	5	1957	120	1600	1525	1300	1200
21	South Carolina Electric & Gas Co.	Wattagee	Richland County, S.C.	Gilbert Assoc. Inc.	1	12-59	180	1746	1500	1305	1200
22	Texas Electric Service Co.	Graham	Graham, Texas	Epasco Services, Inc.	1	1958	128	1600	1500	1305	1200
23	Dallas Power & Light Co.	Lake Hubbard	Dallas, Texas	Epasco Services, Inc.	1	1959	144	1600	1500	1300	1200
24	Bridgeport Harbor Electric Power Co.	Bridgeport Harbor	Bridgeport, Conn.	Epasco Services, Inc.	1	1958	144	1600	1500	1300	1200
25	Southwestern Electric Power Co.	Wilkes	Lissauer, Texas	Sargent & Lundy	1	1957	152	1584	1300	1300	1200
26	Rocky Mountain Light Co.	Meramec	Denver, Colo.	Self and Sargent & Lundy	1	1958	160	1641	1400	1300	1200
27	Wisconsin Power & Light Co.	Ironwood	Ironwood, Wis.	Sargent & Lundy	1	1959	120	1600	1500	1300	1200
28	Gulf Power Co.	Orist	Pensacola, Fla.	Southern Services, Inc.	6	1959	150	1650	1400	1300	1200
29	Southern Indiana Gas & Electric Co.	Warwick	Newburgh, Ind.	Epasco Services, Inc.	1	1959	150	1600	1500	1300	1200
30	Florida Power & Light Co.	Bennett	Washington, D.C.	Bechtel Corp.	5	1958	125	1624	1400	1300	1200
31	Gulf States Utilities Co.	Victoria	Conroe, Texas	Brown & Root, Inc.	1	1959	150	1600	1500	1300	1200
32	Central Power and Light Co.	Victoria	Victoria, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
33	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
34	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
35	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
36	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
37	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
38	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
39	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
40	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
41	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
42	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
43	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
44	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
45	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
46	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
47	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
48	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
49	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
50	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
51	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
52	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
53	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
54	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
55	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
56	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
57	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
58	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
59	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
60	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
61	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
62	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
63	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
64	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
65	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
66	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
67	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
68	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
69	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
70	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
71	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
72	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
73	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
74	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
75	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
76	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
77	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
78	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
79	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
80	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
81	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
82	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
83	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
84	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
85	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
86	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
87	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
88	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
89	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
90	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
91	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
92	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
93	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
94	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
95	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
96	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
97	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
98	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
99	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200
100	Central Power and Light Co.	John D. Hill	Rocky Hill, Texas	Sargent & Lundy	1	1958	150	1600	1500	1300	1200

500 psig, 1000 F. Outdoor boilers and indoor turbines predominate

[illegible]



STEAM SYSTEMS

In the processing industries, large boiler

Table 1 1300 to 400 psig

COMPANY	LOCATION	CONSULTING ENGINEER	Date of initial operation	New or existing plant	Principal steam use	BOILERS					FUEL		FURNACE			
						No. new units, type	Manufacturer	Capacity each, 1000 lb. per hr. at M.Btu	Operating pressure, psig	Operating temp., F	Heating surface, 1000 sq. ft., incl. boiler, waterwall and superheater	Type	Max. sulfur content, %	Furnace type	Process adopted, type of	
INDUSTRIAL STEAM SYSTEMS																
1. Mississippi Power Corp.	Laurel, Miss.	Jargent & Lundy	1968	Ex	Ps	1 F	CE	725	1300	355	0.0	...	Pid	UV	...	
2. Masonite Corp.	Laurel, Miss.	Ford, Bacon & Davis, Inc.	1967	Ex	Ps	1 F	RS	290	1200	325	0.0	...	Pid	UV	...	
3. MacMillan-Bleeker, Ltd.	Power River, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	CE	400	315	350	13.3	...	Pid	UV	...	
4. MacMillan-Bleeker, Ltd.	Power River, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	CE	378	315	325	13.3	...	Pid	UV	...	
5. International Paper Co.	Androscoquin, Me.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	SW	500	300	325	17.7	...	Pid	UV	...	
6. Jones & Laughlin Steel Corp.	Altoona, Pa.	Kurtan Corp.	1968	Ex	Ps, Pr	2 F	CE	350	300	300	43	0.7	...	Pid	UV	...
7. Michigan State University	East Lansing, Mich.	Benjamin, Woodhouse & Guenther, Inc.	1965	Ne	Ps, Pr, CH	1 F	WIB	250	300	335	23.3	...	Pid	UV	...	
8. RMC Corp.	Englewood, N.J.		1957	Ne	Ps	1 F	...	25	300	340	...	...	Pid	UV	...	
9. Head Corp.	Kingsport, Tenn.		1966	Ex	Ps, Pr, CH	1 F	...	300	300	350	...	1.36	Pid	UV	...	
10. St. Regis Paper Co.	Monticello, Miss.	J.E. Dime Co.	1967	Ne	Ps, Pr	2 F	CE	402	375	325	13	0.1	...	Pid	UV	...
11. St. Regis Paper Co.	Monticello, Miss.	J.E. Dime Co.	1967	Ne	Ps, Pr	1 F	SW	420	375	325	12	0.0	...	Pid	UV	...
12. St. Regis Paper Co.	Monticello, Miss.	J.E. Dime Co.	1967	Ne	Ps, Pr	1 F	SW	500	375	325	14	0.0	...	Pid	UV	...
13. MacMillan-Bleeker, Ltd.	Phenix Mill, Ala.	Rust Engineering Co.	1968	Ne	Ps, Pr	1 F	CE	300	375	325	13.3	...	Pid	UV	...	
14. MacMillan-Bleeker, Ltd.	Phenix Mill, Ala.	Rust Engineering Co.	1968	Ne	Ps, Pr	1 F	CE	455	375	325	13.3	...	Pid	UV	...	
15. MacMillan-Bleeker, Ltd.	Phenix Mill, Ala.	Rust Engineering Co.	1968	Ne	Ps, Pr	1 F	CE	517	375	325	13.3	...	Pid	UV	...	
16. Eastland Paper Mills, Inc.	Sheldon, Texas	H.A. Simons Ltd.	1967	Ne	Ps, Pr	1 F	SW	200	375	325	13	0.0	...	Pid	UV	...
17. Eastland Paper Mills, Inc.	Sheldon, Texas	Brown & Root, Inc.	1968	Ne	Ps, Pr	2 F	SW	300	350	325	...	0.3	...	Pid	UV	...
18. Eastland Paper Mills, Inc.	Sheldon, Texas	Brown & Root, Inc.	1967	Ex	Ps, Pr	1 F	SW	175	350	350	28.2	...	Pid	UV	...	
19. Eastland Paper Mills, Inc.	Sheldon, Texas	Brown & Root, Inc.	1967	Ex	Ps, Pr	1 F	SW	150	350	350	26	...	Pid	UV	...	
20. Eastland Paper Mills, Inc.	Sheldon, Texas	Brown & Root, Inc.	1967	Ex	Ps, Pr	1 F	SW	110	355	355	...	...	Pid	UV	...	
21. Abbott Laboratories	Chicago, Ill.	Caramore, Douglass and Prosser	1965	Ex	Ps, CH	1 F	LAS	400	350	350	20.5	0.0	...	Pid	UV	...
22. Abbott Laboratories	Chicago, Ill.	Caramore, Douglass and Prosser	1967	Ex	Ps, CH	2 F	...	30	350	325	...	...	Pid	UV	...	
23. Abbott Laboratories	Chicago, Ill.	Caramore, Douglass and Prosser	1967	Ex	Ps, CH	1 F	...	720	425	350	...	0.0	...	Pid	UV	...
24. Abbott Laboratories	Chicago, Ill.	Caramore, Douglass and Prosser	1967	Ex	Ps, CH	1 F	SW	450	325	325	...	...	Pid	UV	...	
25. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
26. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
27. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
28. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
29. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
30. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
31. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
32. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
33. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
34. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
35. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
36. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
37. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
38. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
39. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
40. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
41. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
42. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
43. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
44. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
45. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
46. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
47. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
48. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
49. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
50. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
51. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
52. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
53. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
54. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
55. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
56. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
57. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
58. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
59. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
60. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
61. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
62. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
63. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
64. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
65. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
66. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
67. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
68. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
69. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
70. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
71. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
72. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
73. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
74. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
75. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
76. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
77. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
78. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
79. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
80. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
81. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
82. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
83. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
84. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
85. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
86. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
87. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
88. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV	...	
89. Northwood Pulp, Ltd.	Prince George, BC, Can.	H.A. Simons Ltd.	1967	Ex	Ps, Pr	1 F	PS	120	725	750	12.5	...	Pid	UV		

requently feed steam turbines generating in-plant electricity

[illegible]

SYMBOLS		In		SO		14	
AA	- Air-atmospheric	I	- Internal water treatment	S	- Space heat	T	- Turbine survey, project No 11
AB	- Balanced draft	LI	- In-leak	SP	- Sootblow pot process	T	- Turbine survey, project No 12
BD	- B&B	LSO	- Lime-soda softening reacid	SS	- Sprayer-Slow	T	- Turbine survey, project No 13
BL	- Black liquor	M	- Melt	SC	- Sulfate condenser	T	- Turbine survey, project No 14
BO	- Blow off boiler fuel	ME	- Mechanical	T	- Turbine	T	- Turbine survey, project No 15
CB	- Coal burners	MIC	- Mixed bed demineralizer	Ta	- Tangential	T	- Turbine survey, project No 16
C	- Coal	MUD	- Multistage demineralizer	Tu	- Tubular	T	- Turbine survey, project No 17
C	- Coal	N	- None	U	- Ultraviolet	T	- Turbine survey, project No 18
C	- Coal	Nat	- Natural circulation	VO	- Vibrating-grate stoker	T	- Turbine survey, project No 19
C	- Coal	Nc	- Noncondensing	W	- Water	T	- Turbine survey, project No 20
C	- Coal	Ne	- New	W	- Water spray of wet scrubber	T	- Turbine survey, project No 21
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 22
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 23
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 24
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 25
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 26
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 27
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 28
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 29
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 30
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 31
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 32
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 33
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 34
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 35
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 36
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 37
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 38
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 39
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 40
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 41
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 42
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 43
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C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 45
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 46
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 47
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 48
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 49
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 50
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 51
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 52
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 53
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 54
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 55
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 56
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 57
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 58
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 59
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 60
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 61
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 62
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 63
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 64
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 65
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 66
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 67
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 68
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 69
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 70
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 71
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 72
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 73
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 74
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 75
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 76
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 77
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 78
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 79
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 80
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 81
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 82
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 83
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 84
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 85
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 86
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 87
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 88
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 89
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 90
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 91
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 92
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 93
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 94
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 95
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 96
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 97
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 98
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 99
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 100
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 101
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 102
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 103
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 104
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 105
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 106
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 107
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 108
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 109
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 110
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 111
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 112
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 113
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 114
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C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 117
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 118
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 119
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 120
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 121
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 122
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 123
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 124
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C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 127
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 128
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 129
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C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 133
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 134
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 135
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 136
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 137
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 138
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 139
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 140
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 141
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 142
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 143
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 144
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 145
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 146
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 147
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 148
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 149
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 150
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 151
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 152
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 153
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 154
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 155
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 156
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 157
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 158
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 159
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 160
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 161
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 162
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 163
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 164
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 165
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 166
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 167
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 168
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 169
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 170
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 171
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 172
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 173
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 174
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 175
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 176
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 177
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 178
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 179
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 180
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 181
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 182
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 183
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 184
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 185
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 186
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 187
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 188
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 189
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 190
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 191
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 192
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 193
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 194
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine survey, project No 195
C	- Coal	Nr	- Nitrogen pressurized	W	- Wet lime water scrubbers	T	- Turbine

Table 2 400 to 150 psig

Trend toward dust separators gathers speed

Table 2 400 to 150 psig

RANK	COMPANY	LOCATION	CONSULTING ENGINEER	DATE OF INITIAL OPERATION	NEW OR EXISTING PLANT	PRINCIPAL STEAM USE	BOILERS				FUEL		FURNACE			
							No. new units, type	Manufacturer	Capacity each, 1000 lb. per hr. or M Btu	Operating pressure, psig	Operating temp., F	Heating surface, 1000 sq. ft., incl. boiler, waterwall and superheater	Type	Max. sulfur content, %	Furnace type	Furnace safeguard, type
15	Northeast Florida State Hospital	Baker County, Fla.	Reynolds, Smith & Hills	1963	Ex	CH	1	SW	175	400	414	0			Pig	UV
16	State of Tennessee	Denver, Colo.		1966	Ne	CH	1	SW	100	400	420	0			Pig	UV
17	Northwestern College	Hanover, N.H.	Jackson & Moreland Div. United Eng. & Const., Inc.	1966	Ex	CH	1	SW	100	400	420	0			Pig	UV
18	State of Ohio	Danvers, Mass.	"Main"	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
19	Canadian Electric Corp.	Edmonton, Alta., Can.	Power Corp.	1966	Ne	CH	1	SW	100	400	420	0			Pig	UV
20	Armstrong Cork Co.	Elton, N.Y.		1966	Ex	CH	1	SW	100	400	420	0			Pig	UV
21	Emory University	Emory, Ga.	Peter L. Geierling & Assoc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
22	Canadian Electric Corp.	Edmonton, Alta., Can.		1966	Ne	CH	1	SW	100	400	420	0			Pig	UV
23	Reichart Corp.	Danbury, Conn.	Rust Engineering Co.	1966	Ne	CH	1	SW	100	400	420	0			Pig	UV
24	State of Ohio	Dayton, Ohio	Rust Engineering Co.	1966	Ne	CH	1	SW	100	400	420	0			Pig	UV
25	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
26	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
27	State of Ohio	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
28	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
29	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
30	Worcester Polytechnic Inst.	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
31	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
32	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
33	Worcester Polytechnic Inst.	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
34	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
35	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
36	Worcester Polytechnic Inst.	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
37	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
38	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
39	Worcester Polytechnic Inst.	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
40	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
41	Worcester Polytechnic Inst.	Boston, Mass.	Lyons & Hennessy, Inc.	1967	Ex	CH	1	SW	100	400	420	0			Pig	UV
42	Worcester Polytechnic Inst.	Dayton, Ohio	Commonwealth Associates Inc.	1968	Ne	CH	1	SW	100	400	420	0			Pig	UV
43	Worcester Polytechnic Inst.	Lansing, Mich.		1967	Ex	CH	1	SW	100	400	420	0			Pig	

little or nothing is being done to control sulfur pollution

EQUIPMENT	DUST		AIR HEATER		F.D. FANS		I.D. FANS		BOILER FEED SYSTEM		COMBUSTION CONTROL		Chimney height, ft.
Burner	Dust collector type	Dust collector m/c	Type	Manufacturer	No. per boiler	Manufacturer	Type drive	No. per boiler	Manufacturer	Type drive	Type	Control manufacturer	
1. 1000					PA2	M		PA2	M				80
2. 1000					PA2	M		PA2	M				80
3. 1000					AL	M							80
4. 1000					AL	M							80
5. 1000					AL	M							80
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100. 1000					AL	M							80

- Air-atomizing
 - Balanced draft
 - Bark
 - Black liquor
 - Bowl or bucket drive
 - Coal pulverizer
 - Crusher
 - Combined pneumatic and elevator
 - Conveying
 - Cyclone furnace
 - Deaerator
 - Dual drive
 - Diesel standby
 - Electrical or electric
 - Electrostatic
 - Evaporator
 - Existing
 - Flow-through
 - Filtered, hydrated
 - Gas
 - Hammer mill
 - Hydrogen sulfide gas
- IR - Internal water treatment
 - LSC - Lime-soda softening (cold)
 - M - Motor
 - Me - Mechanical
 - W/D - Water bed demineralizer
 - M/D - Multi bed demineralizer
 - N - None
 - Nat - Natural circulation
 - Na - Noncondensing
 - Ns - None
 - N - Nitrogen pressurized
 - OP - Once through
 - PS - Pressurized
 - PA - Packaged Shop-assembled
 - Pr - Pneumatic
 - Pc - Power
 - P - Processing
 - Re - Regenerative
 - GA - Steam atomizing
 - SC - Sawdust
- SW - Soap water
 - Sc - Softener, hot process
 - SE - Spiraxial Stoker
 - Su - Surface condenser
 - T - Turbine
 - Ta - Tangential
 - Tu - Turbine
 - U - Ultraviolet
 - VC - Vibrating-grate stoker
 - W - Wood
 - WC - Water spray or wet scrubber
 - Z - Zeolite water softeners

Table 3 150 psig and below HTW, Overseas systems

COMPANY	LOCATION	CONSULTING ENGINEER	Date of initial operation	New or existing plant	Principal steam use	BOILERS				FUEL		FURNACE			
						No. new units, type	Manufacturer	Capacity each, 1000 lb per hr or M Btu	Operating pressure, psig	Operating temp., F	Heating surface, 1000 sq ft, incl boiler, water-wall and superheater	Type	Max. sulfur content, %	Furnace type	Furnace sequence, type
109 Stanley Furniture Co.	Stanleytown, Va.	R J Rubeo Assoc.	1967	Ex	Pr, SH	1 F, RS	30	150	Sat	150	1.1	1	N	UV	
110 Procter Laboratories	North Chicago, Ill.	Laramore, Douglass & Ponom	1966	Ne	Pr	1 F, LAS	20	150	Sat	150	1.1	1	30	UV	
111 Northern Ohio Legal Co.	Fremont, Ohio		1966	Ne	Pr	1 F, UR	20	50	Sat	150	1.1	1	30	UV	
112 Dockwards Jewette & Ruby Co.	Dixon City, Iowa		1966	Ne	Pr	1 F, BW	40	150	156	150	1.1	1	30	UV	
113 Evanson Township High School	Evanson, Ill.	Schares & Co.	1968	Ex	SH, A	1 F, BW	30	150	156	150	1.1	1	30	UV	
114 Gulf Oil Corp.	Calumet City, Ill.		1966	Ex	Pr	1 F, NIB	50	150	Sat	150	1.1	1	30	UV	
115 Hyde Park High School	Hyde Park, Ill.	Beijing Engineering Co.	1965	Ex	Pr	1 F, ON	25	150	155	150	1.1	1	30	UV	
116 Washington High School	Dix, Ill.	McGraw & McGraw	1965	Ex	Pr	1 F, MW	23	150	Sat	150	1.1	1	30	UV	
117 Oak Creek High School	Oak Creek, Wis.	A M Kline, Inc.	1966	Ne	Pr, SH	1 F, MW	23	150	Sat	150	1.1	1	30	UV	
118 Harrison Fine Co.	Philadelphia, Pa.	Dav and Zimmerman, Inc.	1967	Ne	Pr	1 F, AEE	50	40	253	150	1.1	1	30	UV	
119 Bronx Hospital	Brooklyn, N.Y.	Jensen & Pagan	1967	Ex	Pr, SH	1 F, JR	20	140	Sat	150	1.1	1	30	UV	
120 Cuyahoga Falls City	Cuyahoga Falls, Ohio	Shogers & Paxon	1968	Ne	Pr	1 F, MW	23	150	Sat	150	1.1	1	30	UV	
121 University of Delaware	Newark, Del.	H L Shaw Assoc.	1967	Ex	Pr	1 F, DE	50	150	Sat	150	1.1	1	30	UV	
122 Eastern Michigan University	Ypsilanti, Mich.	Dummins & Sanford, Inc.	1967	Ex	Pr	2 F, EIC	100	125	Sat	150	1.1	1	30	UV	
123 St. Cloud State College	St. Cloud, Minn.	Helmick & Lutz	1967	Ex	Pr	2 F, BRO	20	125	253	150	1.1	1	30	UV	
124 St. Joseph College	Moorehead, Minn.		1967	Ex	Pr	1 F, JR	20	125	240	150	1.1	1	30	UV	
125 Wayne Township	Packard, Me.		1966	Ex	Pr	1 F, JR	20	125	Sat	150	1.1	1	30	UV	
126 Detroit Diesel Corp.	Detroit, Mich.		1967	Ex	Pr, SH	1 F, BW	40	125	Sat	150	1.1	1	30	UV	
127 Ochsberg Oil Co. Products	Oversburg, Tenn.	Robert & Co. Assoc.	1967	Ex	Pr	1 F, BW	40	125	150	150	1.1	1	30	UV	
128 Fort Hays Kansas State College	Hays, Kan.		1967	Ne	SH	1 F, MW	42	125	Sat	150	1.1	1	30	UV	
129 Holy Cross Hospital	Salt Lake City, Utah	Boutton, Christofferson & Shauer	1966	Ex	Pr	1 F, RS	40	125	253	150	1.1	1	30	UV	
130 Hammond & Waring, Inc.	Auburn, N.Y.	E. J. Johnson	1968	Ex	Pr	1 F, BW	40	125	253	150	1.1	1	30	UV	
131 St. Joseph Hospital	Watson, N.Y.	Whitman, Redwood & Assoc.	1968	Ex	Pr	1 F, AEE	25	125	Sat	150	1.1	1	30	UV	
132 Eastern State Hospital	Williamsburg, Va.	Wagner & Jones	1967	Ex	Pr, SH	1 F, AEE	25	125	Sat	150	1.1	1	30	UV	
133 University of South Carolina	Columbia, S.C.	Reed, Flemming & Assoc.	1967	Ex	Pr	1 F, DE	35	125	Sat	150	1.1	1	30	UV	
134 New Deerpark City GMC	Dick, N.J.		1967	Ex	Pr	2 F, BW	20	125	253	150	1.1	1	30	UV	
135 State Industrial Institution	Huntington, Pa.	Roushev, Smith & Miller	1968	Ex	Pr, SH	1 F, KEES	25	125	253	150	1.1	1	30	UV	
136 Holy & Holy Catholic Co.	Dixon City, Iowa	Pack Assoc.	1966	Ex	Pr	2 F, AEE	44	125	Sat	150	1.1	1	30	UV	
137 General Electric Corp. of Teachers	Nashville, Tenn.	H. J. Thompson & Assoc.	1963	Ex	Pr	1 F, DE	21	125	106	133	1.1	1	30	UV	
138 General Electric Corp. of Teachers	Toronto, Ont.	United Engineers & Constructors, Inc.	1967	Ex	Pr, SH	1 F, DE	40	120	150	150	1.1	1	30	UV	
139 Annapolis City	Bayport, Minn.	Evans, Chasley, McNaught, Halberst, Erickson	1967	Ex	Pr, SH	1 F, BRO	20	120	343	0.50	1.1	1	30	UV	
140 National Animal Disease Lab	Ames, Iowa		1966	Ex	Pr	1 F, MW	43	115	Sat	150	1.1	1	30	UV	
141 U.S. Forest Service	Pendergrass, Ga.		1967	Ex	Pr	1 F, BW	40	110	Sat	150	1.1	1	30	UV	
142 Rocky College	Peabody, Idaho		1966	Ex	Pr	1 F, JR	20	105	147	150	1.1	1	30	UV	
143 Douglas County & Max Security Prison	Jackson, Ga.	Jones & Fellers	1967	Ne	Pr, SH	1 F, MW	20	100	Sat	150	1.1	1	30	UV	
144 Eastern Washington State College	Cheney, Wash.	H Jack Reeves	1966	Ex	Pr	1 F, RS	30	100	Sat	150	1.1	1	30	UV	
145 United States Medical Center	Frederick, Md.	Henry Adams, Inc.	1966	Ex	Pr	1 F, BW	24	100	135	150	1.1	1	30	UV	
146 St. Joseph's Hospital	Proctor, Wis.		1967	Ex	Pr	1 F, BW	20	100	135	150	1.1	1	30	UV	
147 St. Joseph's Hospital	Proctor, Wis.	Lytle & Fiedershausen, Inc.	1966	Ex	Pr	2 F, DE	20	100	135	150	1.1	1	30	UV	
148 Elkhart County & Nemours & Co.	Circleville, Ohio		1967	Ex	Pr, SH	1 F, FW	20	50	125	150	1.1	1	30	UV	
149 Long Island University	Brooklyn, N.Y.	Paul C. Efinger & Assoc.	1967	Ne	Pr	1 F, BW	20	75	Sat	150	1.1	1	30	UV	
150 TEMPERATURE WATER SYSTEMS Total capacity	1 million Btu per hr		1968	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
151 Rutgers University	New Brunswick, N.J.	Paul C. Efinger & Assoc.	1968	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
152 Rutgers University	Bath, N.J.	Ford, Barch & Davis, Inc.	1968	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
153 Rutgers University	Camden, N.J.	Paul C. Efinger & Assoc.	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
154 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
155 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
156 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
157 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
158 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
159 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
160 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
161 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
162 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
163 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
164 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
165 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
166 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
167 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
168 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
169 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
170 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
171 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
172 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
173 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
174 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
175 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
176 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
177 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
178 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
179 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
180 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
181 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
182 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
183 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
184 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
185 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
186 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
187 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
188 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
189 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
190 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
191 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
192 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
193 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
194 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
195 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
196 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
197 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
198 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
199 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	
200 Rutgers University	Darien, N.J.	Karen & Johnson	1967	Ex	Pr	1 F, BW	100	150	150	150	1.1	1	30	UV	

1. *Staphylococcus aureus* (100%)

STON

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- ## COSTNOTES

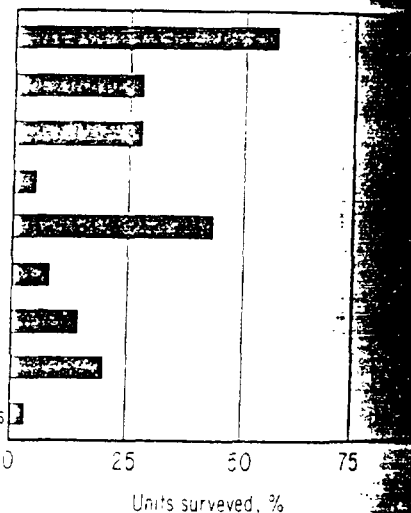
6 STEAM TURBINES

Pulp and paper industry ups generating capacity

R J BENDER, Consulting Editor

The pulp and paper industry leads the way in number of installations accounting for 41% of those surveyed. Exhaust steam is used mainly for process, although two projects for universities, a housing development and a municipal plant in Germany employ steam for space heating. A total of 49 turbines in 49 installations are tabulated below. Design details for the associated steam generators can be obtained from the steam system survey when there is a corresponding boiler project number tabulated on the right. Turbines are arranged in order of descending throttle pressure from a high of 1250 psig to a low of 215 psig. Steam temperature ranges from 448 F to 977 F. Top capacity is 81,500 kw. The smallest unit, in Krefeld, Germany, has a capacity of 1000 kw.

Non-condensing
No extraction
Single extraction
Double extraction
Condensing
No extraction
Single extraction
Double extraction
More than 2 extractions



NONCONDENSING TURBINES account for over half the
Condensing units without extraction are in the

COMPANY	LOCATION	No. of new turbines	Manufacturer	Date of initial operation	Capacity, kw	Speed, rpm	Throttle temperature, F	Throttle pressure, psig	Type	No. of extraction points	Extraction pressure, psig	Backpressure, in. Hg or psia	Extraction steam use	Type condenser	Condenser manufacturer	Generator manufacturer	Cooling	Cooling medium
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
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Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0	NO	GE	GE	H ₂ O	...
Emmepi Papi e Carta Co.	San Carlos, La	1	MAN	1968	31,500	1800	448	1250	NC	1	148	12.5	0					

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Motor-driven. Computers control eight major units

TURBINE					CONDENSER			FEEDWATER			GENERATOR			CONTROLS						
Type	Exhaust, in. Hg	No. of bleed points	No. of exhausts	Manufacturer	Surface, 1000 sq ft	No. of water passes	Tube material	Air removal	Manufacturer	Makeup treatment	Condensate treatment	System manufacturer	Voltage, kv	Rating, mva	Cooling	Combustion, mfr	Feedwater, mfr	Closed-circuit tv mfr	Data logger mfr	Computer mfr
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SAE	SAE	SAE	SAE	SAE	SAE	11.8	100	SAE	SAE	SAE	SAE	SAE	SAE
GE	10.0	1	1	GE	1000	1	SA													

- Radiolysis and contamination
- Condenser J-F
- Sample
- Ion detector
- Detector array
- Access 3
- Electrostatic
- Evaporator
- Filtration
- Gas
- First gas detector

- Hydrogen
- Molecular Oxygen
- Nitrogen
- Steam
- Ash
- Sulfur
- Freon
- Volatile Solids
- Noise
- ...
- Producing Gases

- PS Pressurized
- FIX Fixed ion-exchange
- PR Pressure
- RG Regulator
- Rel. Reliability
- FC Feed, pump or driver
- RP Reciprocating pump
- SC Speed control
- SO Simple control
- SF Separate filters

SS	Softener
SS	Stainless steel
ST	Steam
ST	Slag tap
Sub	Submerged tube evaporator
T	Turbine
TB	Tilling burners
TC	Tandem compound
V	Vane control
WS	Water spray

[illegible]

- Maximal treatment equipment
- at least 2 emergency use
- used and or effectively.
- full gas and or breath vel.
- used and gas respectively.
- Revised as - "intended for"
- may secondly - "intended for"
- children to "new set"
- frame etc - "the conditions"
- Unapproved barrier equipment
- full of patients to "not for patients"

- First Riven once-through unit
- Heating unit
- Steam-Coolant heat exchanger
- Multiple very different pump instances
- No 3D visualization
- Gas process in turbine operation
- Cooling tower for steam condensation
- Maximized condensate treatment
- Reductive
- Two owners supply one turbine - each takes its own part

- 32 - Turbine has automatic extraction, supplies
- 33 district heating steam to city
- 34 - Four-hour peak rating: 995,000 lb/hr
- 35 Tangential-flow package boiler
- 36 - Steam turbine drive
- 37 Topping turbine — exhausts at 225 psig to
- 38 district heating system.
- 39 1 million lb/hr softening plant
- 40 - Geothermal steam
- 41 Cooling tower makeup is sewage plant effluent
- 42 - Existing equipment to serve new unit.

3 HYDROELECTRIC PLANTS



While hydro generating

R J ABERBACH, Assistant Editor

Hydroelectric power generation is still increasing at a substantial pace; but across the United States, the percentage of the total electric power supply that hydroelectric plants contribute continues to decrease. By 1980, its contribution will be less than 15%. See graph, right.

Since hydroelectric generating units already operate at high efficiencies (hydroturbines normally operate at 90% efficiency or better), there's little new in design trends aimed towards attaining better efficiency. The most significant trend is the leaning towards larger installations with larger unit sizes. The graph, far right, compares unit sizes noted in this survey with data from POWER's last hydro survey.

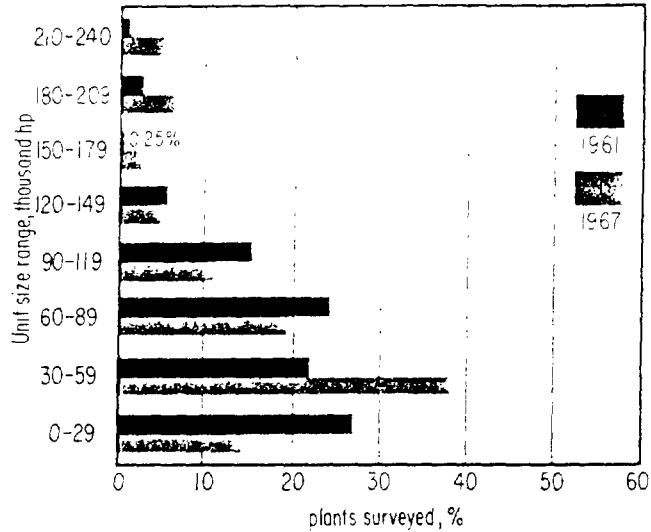
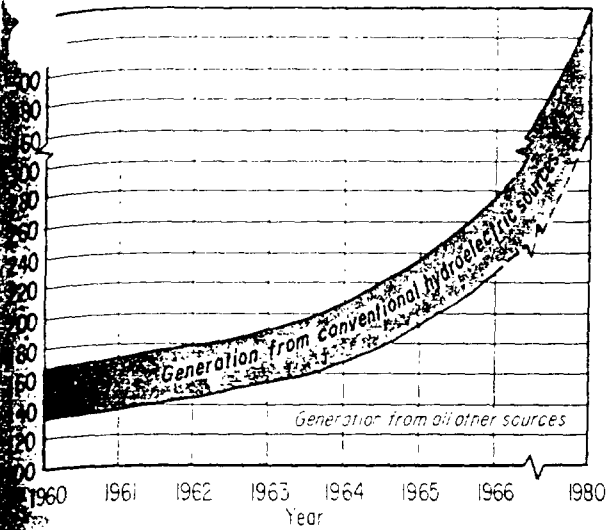
Our returns also show that more and more hydro projects are going to remotely controlled stations, and that increasing numbers of plants are demonstrating that underground power houses are feasible and economical.

I took a good deal of pleasure in seeing that there's a growing attempt to incorporate, wherever possible, maximum recreational facilities into hydroelectric projects. It reflects quite well on power people and hydro developers to be able to say that they recognize man's social needs as well as his appetite for generated electricity.

PROJECT NO.	OWNER OR CONTROLLING AGENCY	CONSULTING ENGINEERS	PLANT NAME	RIVER	LOCATION	Ultimate capacity, 1000 hp	Date started	DAM	
								Type	Cost, \$ mil.
1	U.S. Army Engineers	U.S. Army Engineers	John Day	Columbia	Ore	1339.4	1958	CG E&F	500
2	U.S. Army Engineers	U.S. Army Engineers	The Dalles	Columbia	Ore	1110	1952	CG E&F	100
3	U.S. Army Engineers	Bechtel Corp., Landsburg	Brandywine	Panama Canal	Wash.	1118	1952	CGA	1560
4	U.S. Army Engineers	Bechtel Corp.	John Day	Columbia	Ore	1114	1951	CGA	460
5	U.S. Army Engineers	Bechtel Corp.	Lower Monumental	Snake	Wash.	1072	1961	CG E&F	3800
6	Idaho Power Co.	Bechtel Corp.	Heils Canyon	Snake	Idaho	570	1964	CG	910
7	U.S. Army Engineers	U.S. Army Engineers	White	Ark.	Ark.	556.3	1947	CG	120
8	U.S. Army Engineers	U.S. Army Engineers	De Harbo	Ark.	Ark.	412	1951	CG E&F	100
9	U.S. Army Engineers	U.S. Army Engineers	White Rock	Ark.	Ark.	404	1955	CG	100
10	U.S. Bureau of Reclamation	Bechtel Corp.	Yellowtail	Big Horn	Mont.	350	1951	CG	140
11	U.S. Bureau of Reclamation	Bechtel Corp.	Hoover	Colorado	Calif.	245	1941	CG	130
12	U.S. Bureau of Reclamation	Bechtel Corp.	Conowingo	Susquehanna	Md.	180	1952	CG	100
13	U.S. Bureau of Reclamation	Bechtel Corp.	Waterbury	Chesapeake	Ark.	210	1953	CG	100
14	U.S. Bureau of Reclamation	Bechtel Corp.	White Rock	Ark.	Ark.	19	1954	CG	100
15	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
16	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
17	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
18	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
19	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
20	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
21	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
22	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
23	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
24	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
25	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
26	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
27	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
28	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
29	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
30	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
31	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
32	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
33	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
34	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
35	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
36	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
37	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
38	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
39	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
40	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
41	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
42	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
43	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
44	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
45	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
46	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
47	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
48	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
49	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
50	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
51	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
52	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
53	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
54	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
55	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
56	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
57	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
58	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
59	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
60	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
61	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
62	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
63	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
64	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
65	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
66	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
67	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
68	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
69	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
70	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
71	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
72	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
73	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
74	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
75	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
76	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
77	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
78	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
79	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
80	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
81	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
82	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
83	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
84	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
85	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
86	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
87	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
88	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
89	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
90	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
91	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
92	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
93	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
94	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
95	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
96	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
97	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
98	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
99	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100
100	U.S. Army Engineers	U.S. Army Engineers	Snake	Snake	Wash.	100	1951	CG E&F	100

MANUFACTURERS: 101 - Riva Calzoni; 102 - Siemens Schuckert; 103 - Tokyo Shibaura Electric Co.; 104 - J.M. Voith GmbH; 105 - Westinghouse Electric Corp.; 106 - Woodward Governor Co.; 107 - Westinghouse Iron & Steel; 108 - Woodruff.

Capacity grows, its role in total picture shrinks



GENERATING CAPACITY from all sources increases greatly each year. The trend holds true for hydro generation, but its percent contribution to the total is decreasing. Now about 10%, it will be considerably less (below 15%) in 1980

LARGER UNIT SIZES are being favored. In 1961 most plants surveyed had units in 0-29,000 hp range. Now most are in 30-59,000 hp range. In 1961, only about 4% of those units surveyed exceeded 150,000 hp; now about 14% top that size

UNIT DESCRIPTION					TURBINES					GENERATORS									
UNIT DESCRIPTION					TURBINES					GENERATORS									
Present (total)	Committed for future	Initial operation, year	Final completion, year	Capacity of each unit, 1000 hp	Type	Shaft speed, rpm	Design head, ft	Head range, ft	Manufacturer	Governing manufacture	Shaft case structure	Pentstock valve type	Manufacturer	Capacity, mva	Design power factor	Voltage, kv	Synchronizing (manual or automatic)	Thrust bearing location	Method of excitation
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	1961	1961	100	Francis	120	100	100	BLH	BLH	CO	CO	GE	100	0.95	11.8	Both	Age	DCE
1	1	196																	



HYDROELECTRIC PLANTS

Unit sizes increase; remote control gains popularity

RANK	OWNER OR CONTROLLING AGENCY	CONSULTING ENGINEERS	PLANT NAME	RIVER	LOCATION	Ultimate capacity, 1000 hp	Date started	DAM	
								Type	Height, ft
1	U.S. INSTALLATIONS (Continued)								
11	Sacramento Municipal Utility Dist.	Bechtel Corp.	Lizardi	Silver Creek	Calif.	125	1958	DA	525
12	U.S. Army Engineers	U.S. Army Engineers	Corbett Hall	Cumberland	Tenn.	124.6	1963	DIG, EAF	156
13	U.S. Army Engineers	U.S. Army Engineers	Drain Lock	Arkansas	Ark.	123	1965	DIG, EAF, PG	70
14	U.S. Bureau of Reclamation	McClure-Koritsky Engrs. Stanley Engr. Co.	Morrow Point	Guninson	Calif.	120	1963	RF	168
15	Placer County Water Agency	McClure-Koritsky Engrs. Stanley Engr. Co.	Middle Fork	Guninson	Calif.	114	1963	RF	168
22	Pacific Gas and Electric Co.	Pacific Gas and Electric Co.	Beiden	Feather, North Fork	Calif.	113	1966	E, RF	472
23	U.S. Bureau of Reclamation	U.S. Army Engineers	Flaming Gorge	Green	Utah	110	1958	DA	118
24	Grand River Dam Authority	R. R. Holway and Assoc., Inc.	Markham Ferry	Grand	Okla.	140	1962	DIG, EAF	120
25	Pacific Gas and Electric Co.	Pacific Gas and Electric Co.	Pit No. 7	Pit	Calif.	140	1962	DIG	207
26	U.S. Bureau of Reclamation	U.S. Army Engineers	Trinity	Trinity	Calif.	140	1950	EAF	120
27	U.S. Army Engineers	Esasco Services Inc.	Broken Bow	Mountain Fork	Okla.	138	1951	EAF	770
28	U.S. Army Engineers	U.S. Army Engineers	Greens Ferry	Little Red	Ark.	132.5	1959	DIG	170
29	Public Service Co. of Indiana, Inc.	Jargen & Lundy Harza Engineering	Marshall	Ohio	Ind.	131.5	1954	EAF	230
30	Elmore Water & Electric Board	Bechtel Corp.	Carmen-Smith (Carmen Sta.)	Smith, McKenzie	Ore.	130	1960	EAF	110
31	Sacramento Municipal Utility Dist.	Bechtel Corp.	Loon Lake	Loon Lake, Gentle Creek	Calif.	112	1966	RF	230
32	U.S. Army Engineers	U.S. Army Engineers	Green Peter	Middle Santiam	Ore.	110	1961	DIG	1517
33	Pacific Gas and Electric Co.	Pacific Gas and Electric Co.	Pit No. 6	Pit	Calif.	105	1962	DIG	502
34	Placer County Water Agency	McClure-Koritsky Engrs. Stanley Engr. Co.	Railton	American, Middle Fork	Calif.	106	1962	DIG, EAF	418
35	U.S. Army Engineers	Overcup and Parcel & Assoc., Inc.	Webbers Falls	Arkansas	Okla.	101.4	1968	DIG, EAF, PG	457
36	U.S. Army Engineers	Overcup and Parcel & Assoc., Inc.	Keystone	Arkansas	Okla.	98.0	1959	DIG, EAF, PG, SG	457
37	U.S. Bureau of Reclamation	Bechtel Corp.	Blue Mesa	Juniper	Calif.	93.0	1962	EAF	770
38	Yakima, Inc.	Yakima, Inc.	Narrows Development	Yakima	Wash.	92.0	1953	DIG	114
39	Shreve-Warwick Irrigation Dist.	Bechtel Corp.	South Fork-Woodleaf	Feather, South Fork	Calif.	91.0	1960	REF	160
40	Local County Water Agency	International Engineering Co., Inc.	New Narrows	Yuba	Calif.	70.0	1967	AG	100
41	Tennessee Valley Authority	Tennessee Valley Authority	Tims Ford	E. A.	Tenn.	52.0	1956	OR	100
50	Pacific Gas and Electric Co.	Pacific Gas and Electric Co.	Drum No. 2	Bear	Calif.	59.0	1963	REF	200
51	Nevada Irrigation Dist.	Esasco Services Inc.	Chicago Park	Bear	Calif.	50.0	1963	REF	200
52	Sacramento Municipal Utility Dist.	Bechtel Corp.	Union Valley	Union Creek	Calif.	49.5	1953	EAF	245
53	Overcup and Parcel & Assoc., Inc.	Bechtel Corp.	South Fork-Forestown	Feather, South Fork	Calif.	29.0	1960	DA	90
54	Washington Public Power Supply System	R. W. Beck and Assoc.	Packwood Lake	Lake Creek	Wash.	16.7	1962	DIG, EAF	90
57	Sacramento Municipal Utility Dist.	Bechtel Corp.	Robes Peak	Silver Creek	Calif.	14.5	1963	DIG	45
58	Nevada Irrigation Dist.	Esasco Services Inc.	Dutch Flat No. 2	Bear	Calif.	31.0	1963	REF	200
59	Placer County Water Agency	McClure-Koritsky Engrs. Stanley Engr. Co.	French Meadows	American, Middle Fork	Calif.	14.1	1963	REF, SG	120
60	U.S. Bureau of Reclamation	Bechtel Corp.	Pontefract	Green	Wyo.	14.1	1963	EAF	120
61	Shreve-Warwick Irrigation Dist.	Bechtel Corp.	South Fork-Kelly Ridge	Feather	Calif.	13.0	1960	REF	120
62	U.S. Army Engineers	U.S. Army Engineers	Narrows Dam	Little Missouri	Ark.	12.0	1953	DIG	90
63	U.S. Bureau of Reclamation	U.S. Army Engineers	Copper Mine	Big Creek, Cottonwood Creek	Calif.	12.0	1953	REF	90
64	Elmore Water & Electric Board	Bechtel Corp.	Carmen-Smith Trail Bridge Sta.	McKenzie	Ore.	11.7	1960	EAF	90
65	Pacific Gas and Electric Co., San Joaquin MUD	Bechtel Corp.	Chili Bar	American, South Fork	Calif.	9.0	1963	DIG	375
66	Placer County Water Agency	McClure-Koritsky Engrs. Stanley Engr. Co.	Oxow	American, Middle Fork	Calif.	9.0	1963	DIG, EAF	375
67	U.S. Bureau of Reclamation	U.S. Army Engineers	Lower Molokai	Big Creek, Cottonwood Creek	Calif.	6.30	1953	REF	90
68	U.S. Bureau of Reclamation	U.S. Army Engineers	Lewiston	Trinity	Calif.	125	1957	EAF	245
CANADIAN INSTALLATIONS									
69	Ontario Power Generation	James Canadian Builders	Churchill Falls	Churchill	Newfound	4000	1966	EAF, PG, RF	120
70	Ontario Power Generation	H. J. Ames & Co. Ltd.	Municipal	Municipal	Que.	1360	1962	H, D, D	120
71	Manitoba Hydro	H. J. Ames & Co. Ltd.	Sand Rapids	Saskatchewan	Man.	400	1960	REF, EAF, D	120
72	Manitoba Hydro	H. J. Ames & Co. Ltd.	Patte	Manitoba	Man.	100	1960	DIG, EAF	120
73	Manitoba Hydro	H. J. Ames & Co. Ltd.	Macdonald	Manitoba	Man.	100	1960	REF	120
74	Manitoba Hydro	H. J. Ames & Co. Ltd.	Bay of Islands	Manitoba	Man.	100	1960	REF, RF	120
75	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
76	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
77	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
78	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
79	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
80	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
81	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
82	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
83	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
84	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
85	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
86	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
87	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
88	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
89	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
90	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
91	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
92	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
93	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
94	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
95	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
96	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
97	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
98	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
99	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120
100	Manitoba Hydro	H. J. Ames & Co. Ltd.	Manitoba	Manitoba	Man.	100	1960	DIG, EAF	120

powerplant at the head end of Whiskey Creek, a tributary of the Sacramento River. Water from Whiskey Creek is then delivered through a series of tunnels and conduits to Spring Creek powerplant, located on the Keswick River. Four powerplants, Oxow (with Ralston Dam), French Meadows (with French Meadows Dam), and Keswick (with Keswick Dam), are also located on the Keswick River.

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Hydroturbine designs permit development of low head power sites

PLANT DESCRIPTION				TURBINES										GENERATORS									
NO. UNITS				Type	Shaft speed, rpm	Design head, ft	Head range, ft	Manufacturer	Governor manufacturer	Scroll case structure	Pentstock valve type	Manufacturer	Capacity, m-cu	Design power factor	Voltage, kv	Synchronizing (manual or automatic)	Thrust bearing location	Method of excitation					
Present (total)	Committed for future	Initial operation, year	Final completion, year																				
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC	AC	WPS	SC	GE	100	0.9	13.8	Bohr	AGe	DCe					
1	1	1957	1957	Francis	120	110	107-103	AC															

Lower Middle Fork with well more Dam and **Interbay** (with Interbay Dam) together make up **The American River Project**. **Conterra**, **American River Constructors** (a joint venture of the contractor and sponsor) and **managers** **Frederick Engineering** handled the construction. **Automatic** remote control will be operated by **automatic** remote control from the **Electric Powerplant**.

- 5 Project built adjacent to existing flood control-
- 6 navigation project consisting of dams and locks,
- 7 constructed by U.S. Army Engineers. Powerhouse
- 8 constructed behind cofferdams adjacent to dam.
- 9 • No power house. Small reservoir diverts water
- 10 to Garner station.
- 11 • Feeder ditches collect water from several small
- 12 streams and reservoirs in the watershed of Big

Creek and Cottonwood Creek, and deliver it through the Bonham-Cottonwood pipeline to the Upper Molina penstock. Water discharges from Upper Mo. into the Mo. the Equalizing Reservoir is then delivered through the Lower Molina penstock to Lower Molina powerplant.

- Four dams make up this project:
 - Woods - Length 5100 ft. height 70 ft.

Salmon 1530 ft and 130 ft
South Cutoff 1200 ft and 25 ft
North Cutoff 1250 ft and 130 ft
Salmon dam is rock fill type, others are rolled earth fill. A second stage, consisting of three more units (another 300,000 cu yds) is under construction for operation in 1972

5 - New Buntarcs Bar Dam

OIL AND GAS ENGINES

Industrial, commercial
and institutional

Plant expansion accounts for over 41%

Table 2 4320 to 660 hp

	COMPANY	LOCATION	Horsepower	Revolutions per minute	Brake mean effective pressure	No. of units	Engine builder	Type engine	No. of cycles	Cylinder block type	Type fuel	Installed in	New or existing	Starting date	Principal use	Cooling method	Heat recovery	Manufacturer	Rating, hp
17	Luvenshine Machine Co.	Superior, Wis.	1500	514	175	1	VM	DP	4	See	Oil	P	Exp	1968	P	Air	...	...	...
18	San Antonio Portland Cement Co.	San Antonio, Texas	4320	514	176	...	VM	DP	4	See	Oil	P	Exp	1968	OP	Air	...	WE	3100
19	Franks Engine Co.	Phoenix, WY	2750	514	177	1	VM	DP	4	See	Oil	P	Exp	1968	OP	Air	...	EP	3000
20	Luvenshine Machine Co.	Superior, Wis.	2750	514	177	1	VM	DP	4	See	Oil	P	Exp	1968	OP	Air	...	EP	3000
21	Bell Telephone Co. of Penn.	Philadelphia, Pa.	1390	514	177	1	FM	DP	4	See	Oil	P	Exp	1968	OP	Air	...	FM	2070
22	Ellis and Sons	Miami, Fla.	2570	500	172	1	VM	DP	4	See	Oil	P	Exp	1967	OP	Air	...	EP	1800
23	Luvenshine Machine Co.	Superior, Wis.	1500	514	175	1	VM	DP	4	See	Oil	P	Exp	1967	OP	Air	...	EP	1800
24	United Air Lines	San Diego, Calif.	1295	500	15	1	FM	DP	4	See	Oil	P	Exp	1967	OP	Air	...	FM	1500
25	Franks Engine Co.	Phoenix, WY	2000	500	148	1	MC	DP	4	See	Oil	P	Exp	1968	OP	Air	...	...	...
26	Luvenshine Machine Co.	Superior, Wis.	1550	500	150	1	WDE	DP	4	See	Oil	P	Exp	1968	OP	Air	...	...	...
27	United Chemical Co.	Kenilworth, N.J.	1270	100	16	1	FM	DP	4	See	Oil	P	Exp	1967	AF	Air	...	FM	1365
28	West Coast Airplane Service	Redding, Neb.	1250	240	147	1	WDE	DP	4	See	Oil	P	Exp	1967	OP	Air	...	...	...
29	Western Electric Co.	New York, NY	1015	400	90	1	AP	DP	4	See	Oil	P	Exp	1967	OP	Air	...	EP	1250
30	Western Electric Co.	Chicago, Ill.	1015	400	90	1	AP	DP	4	See	Oil	P	Exp	1967	OP	Air	...	EP	1250
31	Western Electric Co.	Los Angeles, Calif.	1015	400	90	1	VM	DP	4	See	Oil	P	Exp	1967	OP	Air	...	...	...
32	Northern Illinois Gas Co.	Chicago, Ill.	500	500	160	1	WDE	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
33	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	WDE	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
34	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
35	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
36	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
37	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
38	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
39	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
40	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
41	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
42	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
43	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
44	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
45	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
46	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
47	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
48	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
49	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
50	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
51	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
52	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
53	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
54	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
55	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
56	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
57	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
58	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
59	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
60	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
61	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
62	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
63	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
64	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
65	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
66	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
67	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
68	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
69	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
70	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
71	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
72	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
73	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
74	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
75	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
76	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
77	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
78	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
79	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
80	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
81	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
82	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
83	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
84	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
85	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
86	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
87	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
88	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
89	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
90	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
91	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
92	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
93	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
94	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
95	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
96	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
97	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
98	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
99	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...
100	Chicago Gas Co.	Chicago, Ill.	500	500	160	1	FM	DP	4	See	Oil	P	Exp	1966	OP	Air	...	...	...

U.S. DEPT. OF JUSTICE

- Compressor drive
- Continuous power
- Dross oil
- Cooling tower using intermediate heat exchanger
- Dual fuel
- Diesel oil
- Exhaust cooling system

le 660 to 330 hp

[illegible]

AC	Acid species
OC	Once through cooling
CC	Concentrated caustic
PC	Preheating power
FC	Feed drive
EC	Exhaust
EC	Exhaust compressor

- Sig - Spark-ignition gas
- St - Standby power
- T - Turbine
- Vec - Vector window block
- 1 - No. 1 fuel
- 2 - No. 2 fuel
- 3 - No. 3 fuel

Worldwide uses of engines vary with over

Table 4 9200 to 3200 hp

COMPANY	LOCATION	Horsepower	Revolutions per minute	Broke mean effective pressure	No. of units	Engine builder	Type engine	No. of cycles	Cylinder block design	Type fuel	Installed in	New or existing	Starting date	Principal use	Cooling method	Heat recovery	Manufacturer	Rating, kw
Bahamas Electric Power Co., Ltd.	Freeport, Bahamas	1200	1800	115	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	660
Jordanian Electric Power Co., Ltd.	Amman, Jordan	1150	1800	115	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	500
Yamalo Electric Power Co., Ltd.	Amman, Jordan	1150	1800	115	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	500
Yamalo Electric Power Co., Ltd.	Kuching, Borneo	1150	1800	115	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	500
Jordanian Electric Power Co., Ltd.	Amman, Jordan	1150	1800	115	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	500
Mitsubishi Kasei	Yachusi, Japan	1000	1800	110	1	MHI	Full	4	See	See	See	See	1967	See	See	See	See	470
Yamalo Electric Power Co., Ltd.	Yamalo, Japan	1000	1800	110	1	MHI	Full	4	See	See	See	See	1967	See	See	See	See	470
Yamalo Electric Power Co., Ltd.	Yamalo, Japan	1000	1800	110	1	MHI	Full	4	See	See	See	See	1967	See	See	See	See	470
Yamalo Electric Power Co., Ltd.	Yamalo, Japan	1000	1800	110	1	MHI	Full	4	See	See	See	See	1967	See	See	See	See	470
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.	1000	1800	110	1	WM	Full	4	See	See	See	See	1967	See	See	See	See	400
Bahamas Electric Power Co., Ltd.	Nassau, Bahamas, B.W.I.																	

YM	-Nordberg Int'l Co., Ltd.
NP	-Nucoro Pipephone
DET	-Officine Elettriche Bussone
PCA	-O.A. Parsons, Ltd.
PL	-Orbicon, Ltd.
PL	-Ruston & Hornsby Ltd.
SAFM	-Société Alsacienne de Construction Mécanique et de Travaux
TOL	-Zhongguo Denglu Co., Ltd.
DEL	-Zhongguo Electric Co., Ltd.
CH	-Siemens & Halske, AG
NE	-Siemens Schuckertwerke
CA	-Siemens Limited (Kangaroo)
PO	-Tosyo Denki Seisaku K.K.

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COMPANY

LOCATION

[illegible]

- Toshiba Machine Co.
- Tokyo Shokoku Electric Co., Ltd.
- Nippon Steel, Ltd. (The Nippon Steel Co.)
- Nipponkoku Electric Co., Ltd.
- Nipponkoku Electric Co., Ltd.
- Nipponkoku Electric Co., Ltd.

[illegible]

EXP	- EXPANSIVE-CONSCIOUS
EXP	- PLANT EXPANSION
FLU	- FLU-CLOSE
G	- GER
INS	- INSULTION-BUILDING
IND	- INDUSTRIAL PLANT
INT	- INTER
INT	- INTERNAL-GAS-ENGINE COMPRESSOR
JAM	- JAMMER-WATER
KER	- KEROSINE NO. 1
MOD	- MODERNIZATION
NEW	- NEW-ER
NEW	- NEW-SCIENCE

One	• Once through cooling
Op	• Opened piston
Pe	• Peaking power
Pun	• Pump drive
Ra	• Radial
Co	• Refrigeration compressor
Sig	• Spark-ignition gas
St	• Standby power
Ti	• Ti-tube
Vee	• Vee cylinder block
W	• No. 2 fuel
X	• No. 3 fuel
Z	• No. 4 fuel

FOOTNOTES:

- TIFP - Tenteram: 3/12/01
- DOWEL - Dowel: 3/12/01
- Also note: 3/12/01

