Research probes UO_2 at 3500X

ower

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agazine of ENERGY SYSTEMS ENGINEERING

NERGY SYSTEMS DESIGN ISSUE

- h and development, a 24 page staff report
- nt and literature roundup
- systems design survey, a 48 page special report

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Energy-systems design survey

This exclusive report gives design data from over 1200 projects and analyzes trends affecting utilities, ...strial plants, ...mercial buildings and institutions

Power

October 1968

1 FOSSIL-FUELED CENTRAL STATIONS

Outdoor boilers are in majorit

Each project listing covers 4 pages

PROJECT	COMPANY	PLANT NAME	LOCATION	CONSULTING ENGINEER	Unit No., new unit	Date first operation	Unit capacity, MW	BOILE: Capacity as, 1000 lb per hr	BOILE: Throttle pressure, psig
1	Tennessee Valley Authority	Cumberland	Cumberland City, Tenn		1,2[3]	72,73	1300	9300	3500
2	Houston Lighting and Power Co	Cedar Bayou	Eldon, Texas	Ebasco Services Inc	2	11-71	775	5200	3500
3	Texas Power & Light Co	Tradinghouse Creek	Waco, Texas	Brown & Root, Inc	2	12-71	775	5456	3675
4	Appalachian Power Co	Mitchell	Moundsville, W Va	American Electric Power Service Corp	1	1970	760	5280	3500
5	Appalachian Power Co	Mitchell	Moundsville, W Va	American Electric Power Service Corp	2	1971	760	5280	3500
6	Southern California Edison Co	Mohave	Clark County, Nev	Bechtel Corp	1,2[3]	70,71	755	5450	3500
7	Louisiana Power & Light Co	Nineemile Point	Westwego, La	Ebasco Services Inc	4	1-72	750	5400	3675
8	Pennsylvania Power & Light Co	Montour	Washingtonville, Pa	Ebasco Services Inc	1	9-71	730	5700	3675
9	Pacific P & L Co and Washington Water Power Co	Centralia	Centralia, Wash	Bechtel Corp	1	9-71	725	4907	2400
10	Georgia Power Co	Etowah	Stilesboro, Ga	Southern Services, Inc	1	4-71	700	5035	3500
11	Ohio Edison Co	W H Sammis	Stratton, Ohio	Commonwealth Associates Inc	6	10-68	623	4628	3785
12	Cincinnati Gas & Electric Co[5]	J M Stuart	Aberdeen, Ohio	Ebasco Services Inc	1,2,3[3]	71,70[28]	604	4374	3500
13	New England Electric System	Brayton Point	Somerset, Mass	Stone & Webster Engrg Corp	3	4-69	578	4050	3675
14	Potomac Electric Power Co	Morgantown	Morgantown, Md	Bechtel Corp	2	4-71	575	4250	3675
15	Potomac Electric Power Co	Morgantown	Morgantown, Md	Bechtel Corp	1	4-70	573	4250	3675
16	Dallas Power & Light Co[7]	Big Brown	Freestone County, Texas	Ebasco Services Inc	1,2[3]	71,72	543	4025	3825
17	Louisiana Power & Light Co	Little Gypsy	Laplace, La	Ebasco Services Inc	3	1-68	531	3980	3500
18	Kansas City Power & Light Co	Hawthorn	Kansas City, Mo	Ebasco Services Inc	5	4-69	513	3500	2625
19	Oklahoma Gas & Electric Co	Seminole	Konawa, Okla	Brown & Root, Inc	1	2-71	510	3590	2400
20	Oklahoma Gas & Electric Co	Seminole	Konawa, Okla	Brown & Root, Inc	2	2-73	505	3590	2400
21	Detroit Edison Co	Saint Clair	Saint Clair, Mich		7	12-68	500	3580	2520
22	Tampa Electric Co	Big Bend	Tampa, Fla	Stone & Webster Engrg Corp	2	4-72	450	2856	2400
23	Florida Power & Light Co	Fort Myers	Tice, Fla	Bechtel Corp	2	9-69	432	2640	2400
24	Indianapolis Power & Light Co	Petersburg	Petersburg, Ind	Stone & Webster Engrg Corp	2	5-69	421	2640	2400
25	Long Island Lighting Co	Northport	Northport, NY	Ebasco Services Inc	2	5-68	380	2550	2520
26	Texas Power & Light Co	Valley	Savoy, Texas	Brown & Root, Inc	3	12-70	375	2595	1890
27	Pacific Power & Light Co	Dave Johnston	Glenrock, Wyo	Ebasco Services Inc	4	5-72	360	2450	1800
28	Utah Power & Light Co	Naughton	Kemmerer, Wyo	Stearns-Roger Corp	3	8-71	330	2520	2400
29	Central Louisiana Electric Co Inc	Tecna	Baldwin, La	Sargent & Lundy	3	1-71	329	2500	2400
30	Louisville Gas and Electric Co	Cane Run	Louisville, Ky	Pioneer Service & Engrg Co	6	5-69	268	1853	2400
31	Southwestern Public Service Co	Clifford B Jones	Lubbock, Texas		1	7-71	232	1783	2150
32	Savannah Electric & Power Co	Port Wentworth	Port Wentworth, Ga	Stone & Webster Engrg Corp	4	3-71	116	875	1800
33	Northern Indiana Public Service Co	Mitchell	Gary, Ind	Sargent & Lundy	11	10-70	115	821	1800
34	Puerto Rico Water Resources Authority	San Juan	San Juan, P R	Jackson & Moreland Div, United Eng. & Const, Inc	7,8[3]	1966	114	787	1800
35	Sierra Pacific Power Co	Fort Churchill	Reno, Nev	Stone & Webster Engrg Corp	2	5-71	105	770	1890
36	West Texas Utilities Co	Paint Creek	Haskell, Texas	Sargent & Lundy	4	4-71	105	765	1875
37	Pacific Gas and Electric Co	Geysers	Sonoma County, Calif		5	6-71	55	907[49]	100
38	Black Hills Power & Light Co	Wyodak	Wyodak, Wyo	Stearns-Roger Corp	5	9-69	20	220	850
39	Pacific Power & Light Co	Trona	Green River, Wyo	Bechtel Corp	1	8-68	15.6	200[41]	600

MUNICIPAL AND COOPERATIVE INSTALLATIONS

40	City of Austin	Decker Creek	Austin, Texas	Brown & Root, Inc	1	5-70	321	2250	2000
41	Lower Colorado River Authority	Sim Gideon	Bastrop, Texas	Brown & Root, Inc	3	5-72	315	2280	2050
42	Associated Electric Cooperative	Thomas Hill	Thomas Hill, Mo	Burns & McDonnell	2	4-69	270	2100	2520
43	Minnkota Power Cooperative	Central	Center, ND	Sanderson & Porter, Inc	1	1970	227	1650	1800
44	Omaha Public Power District	North Omaha	Omaha, Neb	Gibbs, Hill, Durham & Richardson, Inc	5	5-68	200	1600	2520
45	Big Rivers Rural Electric Cooperative Corp	Kenneth C Coleman	Hawesville, Ky	Parsons-Jurden Corp	1,2[3]	69,70	163	1160	1800
46	City of Springfield	James River	Springfield, Mo	Burns & McDonnell	5	1-70	105	725	1250
47	Lansing Board of Water and Light	O E Eckert	Lansing, Mich		6	1970	80	675	1250
48	Brazos Electric Power Cooperative	R W Miller	Lake Pato Pinto, Texas	Tippett & Gee	1	8-68	48.7	456	900
49	Columbia Water and Light Department	Municipal	Columbia, Mo	Black & Veatch	8	4-70	34	342	630
50	City of Houma	Municipal	Houma, La	Barnard and Burr, Inc	14	5-67	14.4	140	

SYMBOLS

Ad - Anthracite
Adl - Anthracite, lo
AtB - Anthracite, bu
AsCu - Anthracite, cu
Alt - Anthracite
B - Bituminous
Bal - Bituminous
C - Coal, bituminous
Cc - Cross compound
Cm - Compound
D - Distillate
DB - Dry bottom
De - Distillate
EA - Exciter, ac
Ed - Exciter, dc
Exao - Exciter, ac
FR - Fuel oil
G - Gas
GR - Fuel oil, re
H - Hydrogen
HVC - Hydrogen, co
S - Steam, ga
L - Liquid

new units will generate supercritical steam

BOILER						FURNACE					F.D FANS						I.D FANS						
CE, 1000 SQ FT															DRIVE						DRIVE		PROJECT
Reheater	Economizer	Air heater	Superheat control	Reheat control	Pressure, in water	Volume, 1000 cu ft	Heat release, 1000 Btu per cu ft per hr	No. of burners	Type	Per boiler	Capacity ea, 1000 cu ft min	Manufacturer	Flow control	Hp	Manufacturer	Per boiler	Capacity ea, 1000 cu ft min	Manufacturer	Flow control	Hp	Manufacturer	
215.8	408.4	1209.6	Att FR	Att GR	18.2	956		44	Pd ST	2	1130	...	S[17]	8000	BB	N	N	N	N	N	N	1
70.16	16.5	252.6	FR	EA	23.6	236.5	30.2	24	Pd DB	2	647.4	APC	V	6000	WE	N	N	N	N	N	N	2
66.6	...	507	WS	WC	26	222.5	30.7	24	Pd	2	677		S	17 400	DL[31]	N	N	N	N	N	N	3
151.167[24]	252	844	Att FR	Att PD	21	477	14.4	36	Pd DB	2	1000	SW	D	7000	GE	N	N	N	N	N	N	4
151.167[24]	252	844	Att FR	Att PD	21	477	14.4	36	Pd DB	2	1000	SW	D	7000	GE	N	N	N	N	N	N	5
110	220	1145	WS FR	TB WS	36	416		80	Pd DB	2	1180	.	V,D	7000	.	N	N	N	N	N	N	6
72	329	643.6	FR	EA	25	230	30.95	20	Pd	2	298	.	...	.	.	N	N	N	N	N	N	7
174.4	245.3	652.6	WC	WS TB	15.95	463	14.7	48	Pd	2	992	SW	V	5500	GE	N	N	N	N	N	N	8
53	94	465	WS	TB	-0.1	527	12.2	8	Bal.DB	2	446.5	SW	V	1750	GE	2	1055	HOW	D	4500	GE	9
146	220	107	WS TB	WS TB	24	396	17	48	Pd	2	946	SW	V	7000		N	N	N	N	N	N	10
152.8	249.9	746.4	Att	Att GR	18.2	366	15.54	24	Pd DB	2	800	AS	V	5500	GE	N	N	N	N	N	N	11
131	307	1225	Att	GR	18	390	14	24[16]	Pd DB	2	640	SW	V	6650	WE	N	N	N	N	N	N	12
190	220	539	WS	WS GR	...	353	15	20	Pd DB	2	657	SW	V	3500	WE	N	N	N	N	N	N	13
121	275	1212.4	FR	TB	-0.1	298.8	18.1	40	Bal.DB	2	666	....	V	2000	EM	2	925.8	.	HC	4500	EM	14
121	275	1212.4	FR	TB	-0.1	288.8	18.1	40	Bal.DB	2	666	....	V	2000	EM	2	925.8	....	HC	4500	EM	15
115	65	347	WS	TB WS[32]	-0.1	512	...	64	Bal DB	2	455	SW	V	1250	AC	2	1241	APC	V	4000	AC	16
64.5	45	564.6	WS FR	WS D	2C	200	25.9	24	Pd	2	301	AS	V	2500	WE	N	N	N	N	N	N	17
53.6	156	288.6	WS	TB	16.25	347	15.4	24,40[13]	Pd	2	647	AS	D	4700	WE	N	N	N	N	N	N	18
41	133	402	WS Att	WS EA	30	134	38.3	12	Pd	2	584	APC	V	4000	GE	N	N	N	N	N	N	19
41	133	402	WS Att	WS EA	30	134	38.3	12	Pd	2	584	APC	V	4000	GE	N	N	N	N	N	N	20
52.7	171	790.8	WS	TB	-0.1	270.4	17.2	48	Bal.DB	2	471	WE	V	1750	WE	2	697	WE	V	3500	WE	21
131.5	56	370.7	WS D	WS D	-23	222	.	24	Pd.ST	2	512	AS	V	3500	EM	N	N	N	N	N	N	22
84.5	86.5	307	WS D	WS D	26	184	20.8	18	Pd	2	491	BF	HyC	3500	LA	N	N	N	N	N	N	23
37.8	115	368.2	WS TB	WS TB	13.5	310	15.5	20	Pd.DB	2	588	WE	D	3000	WE	N	N	N	N	N	N	24
94	95	295	WS TB	GR TB	32	230	14.9	16	Pd.DB	2	467	AS	V,D	2500	EM	N	N	N	N	N	N	25
16.3	176.8	N	Att	Att	20	95.3	.....	16	Pd	1	826.2	APC	V	5000	AC	N	N	N	N	N	N	26
34	71	419	WS	WS TB	-0.15	280	12.35	28	Bal.DB	2[30]	359	.	V	900	GE	2	793	....	V	4000	GE	27
27	81.5	274	WS TB	WS TB	0	235	13	20	Bal.WB	2	....	....	.....	.....	.....	2	....	....	.....	.....	.....	28
...	...	...	Att EA	Att EA	.	.....	.....	48	Pd	2	....	....	.....	.....	.....	N	N	N	N	N	N	29
22.6	59	235.2	WS	TB	0	146.8	17.1	20	Bal DB	2	347	SW	V	1250	GE	2	538	SW	HyC	2000	GE	30
14.6	103.5	278.2	WS TB	TB WS[32]	19	97.4	23.1	32	Pd	2	304	.....	V,D	1750	GE	N	N	N	N	N	N	31
6.24	41.5	87.6	TB	TB	13.35	34.77	34.9	16	Pd	2	146.5	WE	V	900	GE	N	N	N	N	N	N	32
18.2	9.5	132.2	Att GR	Att	-0.1	76.13	14.2	12	Bal.DB	2	203	AS	V	700	AC	2	228	AS	HyC	900	AC	33
9.86	12.9	239.2	Att	GR	12	42.52	24.4	9	Pd	2	140	SW	V	700	WE	1	130	GF	D	300	WE	34
7.9	15.9	79.2	EA Att[36]	EA,Att[36]	8.9	42.44	26	8	Pd	1	310	WE	V	1500	....	N	N	N	N	N	N	35
7.2	28.9	166.5	Att	Att	.....	28.8	35.1	6	Pd.DB	1	291	....	D	....	..	N	N	N	N	N	N	36
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	37
N	N	47	WS	N	.	16.15	18.1	4	Pd	1	81.9	SW	V	300	AC	N	N	N	N	N	N	38
N	N	.	WS	N	. .	1.5	..	1	Pd.DB	1	90.5	CF	V	1000	WE	N	N	N	N	N	N	39
26	120	522	WS TB	WS TB	17	147	30	16	Pd	2	405	APC	V	2250	WE	N	N	N	N	N	N	40
23	144	424	WS TB	WS TB	19.15	147	30	16	Pd	2	...	APC	HyC	...	WE	N	N	N	N	N	N	41
36	46	468	Att GR	Att GR	16	103	25.8	8	Pd ST	2	344	WE	V	5000	AC	N	N	N	N	N	N	42
.	.	.	WC	GR	.	.	.	7	Bal.ST	2	354	GF	V	3500	WE	2	689	GF	D	3500	WE	43
51.5	44.7	274.4	WS D	D	12.9	126	16.6	12	Pd.DB	2	294	AS	V	1750	GE	N	N	N	N	N	N	44
36.3	74.7	321	Att	D	...	98.2	...	6	Pd.DB	2	219	AS	V	1200	GE	N	N	N	N	N	N	45
25.6	5.6	82.7	WS	D	-0.1	55.6	18.1	6	Bal DB	2	165	SW	V	600	WE	2	251	SW	D	1000	WE	46
N	4.92	198.4	Att	N	-0.1	46.6	17.4	9	Bal.DB	2	105	.....	V	200	.	2	105.6	.	D	300	...	47
N	N	207.3	Att	N	17	23.9	39.1	8	Pd	2		APC	V	500	WE	N	N	N	N	N	N	48
N	N	22.4	WS	N	21.6	11.05	40.4	4	Pd	1	91.4	GF	V	2x250	GE	N	N	N	N	N	N	49
N	N	16.2	WS	N	6	4.35	38.7	5	Pd	1	41.2	BF	S V	150,75	GE	N	N	N	N	N	N	50

V Vane control
WB Wall bottom furnace
WL Wall slag

FOOTNOTE

[ ] Design
[ ] Estimate
[ ] Data new to each unit
[ ] Units are interconnected respectively
[ ] Heater 1 and deaerator 1 respectively
[ ] Units with Columbia & Southern Ohio
[ ] Air flow for Power and Light Co
[ ] Units with Texas Electric Service Co
and Texas Power & Light Co
[ ] One of the drives and pump
[ ] Turbine drive
[ ] Unit 1 starts serves units 1 and 2
[ ] Steam drives
[ ] Operates under condense
[ ] Starting or emergency use
[ ] Operates under pressure
[ ] Gas and gas heater
[ ] Cyclone furnaces

[12] Three-pressure condense
[13] Two-nozzle burners
[ ] Steam turbine drive
[16] Eight heating stages, one deaerator
[ ] Deaerators on
[ ] Condensate treatment equipment
[ ] High pressure units only
[ ] Gulf types of air cooler
[ ] Each of two generators
[ ] Double-ended turbine driving main
[ ] Dump and booster pump
[ ] Turbine and motor respectively
[ ] Individual turbine on each shaft
[ ] To come in the order listed
[ ] Against base line start up to 25% load
[ ] Drum type evaporator
[ ] Axial vane control fans
[ ] Each rated at 50% BMCR
[ ] One turbine drives two fans
[ ] Water spray in emergency
[ ] When commissioned two of the world's largest opposed-fired units
[ ] Approximately 40% of total air
[ ] Each unit has one set
[ ] Main and deaerators respectively

[36] Makeup taken from Units 2's treatment plant
[ ] Unit 3 serves primarily for peaking service
[38] Aftercooler in emergency
[39] Cooling tower makeup is sewage plant effluent
[ ] Geothermal steam
[ ] Two packaged boilers supply one turbine
[ ] Three boilers serve two boilers
[ ] Feed pumps take note to main and start up pump respectively
[ ] Furnace has six front wall cyclone burners

Tandem-compound turbines predominate in sizes

PROJECT	BOILER FEED PUMPS						DRIVE		FUEL			FIRING		SOOT		DUST			HEATERS			
	Number per unit	Capacity ea, gpm	Discharge, psig	Manufacturer	Flow control	Drive type	Hp each motor or turbine	Manufacturer	Type	1000 Btu per lb	Net unit heat rate, Btu/kWh	Pulverizers per boiler	Manufacturer	Blower type and medium	Manufacturer	Collector type	Manufacturer	Stack height, ft	Number	Feedwater exit, F	Max deaerating pressure, psia	
1	2	10,700	4575	....	S	T	34,000	BB	C	11.2	9872	11	BW	Air,Ret	DP	El	....	1000	16[10]	550	109	SWE
2	2	6220	4620	DL	S	T	18 050	DL	G	1018[2]	7828	N	N	N	N	N	N	215	7	493	160	FW,W
3	1	13,750	....	DL	S	T	38 200	DL[8]	G	1029[2]	....	N	N	N	N	N	N	198	7	488	147	....
4	1	12 550	4570	IR	S	T	34,800	WE	C	12	9660	5	FW	St Ret	DP	El	RC	1200[9]	7	550	98	WU
5	1	12,550	4570	IR	S	T	34,800	GE	C	12	8660	6	FW	St,Ret	DP	El	RC	1200[9]	8	548	103	WU
6	2	6220	4130	....	S	2T	19 000	....	C	11	9100	10	CE	Air,Ret	DP	El	....	500	6	500	101	COC
7	2	5580	4420	....	S	T	18,400	WE	G,O[11]	1063[2]	....	N	N	N	N	N	N	126	7	512	....	....
8	2	7087	4470	WO	S	T	20,320	DL	C	12.26	7890	6	CE	St,Ret	CV	El	....	600	10	554	80.5	FW
9	2	6750	2950	PP	S	T	15 000	....	C	8.1	....	6	CE	St,Ra,Ret	DP	El	....	....	7	504	59	WE
10	2	9650	4650	BJ	S	T	21,550	WE	C	12	....	6	CE	Ro,Ret	CV	El	RC	1000	9	500	148.6	GW
11	2	5880	4560	PP	S	T	17 600	WE	C	12.18	....	6	BW	Air,Ret	DP	El	WP	850	8	543	159	WU,CHM
12	2	5500	4510	WO	S	2T	18 000	GE	C	11	8898	6	BW	Air,Ret	DP	El	BU	900	8	553	63.3	FW,STE
13	1	9260	4600	IR	S	T	30,200	WE	C	11.5	....	5	BW	Air,Ret	DP	El	KC	350	8	560	110	BLM,FR
14	2	5000	4472	..	S	T	....	GE	O,C	12.8,18.5[12]	8600	5	CE	St,Ro,Ret	CV	El	RC	700	7	507	82.2	WE
15	2	4880	4485	....	S	T	....	WE	O,C	12.9,18.5[12]	8600	5	CE	St,Ro,Ret	CV	El	RC	700	7	508	65.5	WE
16	1	9700	4375	DL	S	T	31,500	DL	L	7.59	9710	8	CE	Air,Ret	CV	El	RC	400	7	501	....	FW,YU
17	2	4960	4500	WO	S	T	13,700	GE	G	1033[2]	N	N	N	N	N	N	....	600	7	500	....	WE
18	1	8700	3090	PP	S	T	16,000	GE	C,G	11.3,9742	....	6	CE	St,Ret	CV	El	BU	600	7	483	....	YU
19	2	4306	3038	BJ	S	T	8380	GE	G	9752	....	N	N	N	N	N	N	280	6	480	174	WE
20	2	4306	3038	BJ	S	T	8380	WE	G	9752	....	N	N	N	N	N	N	280	6	476	171	WE
21	1	9300	3017	IR	S	T[25]	16,390	WE	C	11.5	....	6	CE	Air,Ro,Ret	CV	El	AS	600	7	485	....	WE
22	1	....	3400	PP	S	T	14,500	WE	C	11.13	....	3	RS	St,Ret	....	El	WP	499	7	494	....	BLM
23	2	3350	3035	BJ	HyC	M	3500	LA	O	18.25	....	N	N	St,Ret	DP	Me	AT	400	7	471	....	YU
24	2	4185	3000	OL	HyC[27],RC	MTS,M	4000	AC	C	10.4	8433	5	CE	St,Ro Ret	DP	Me,El	RC	551	7	478	....	SWE
25	1	6290	2815	IR	HyC	MTS	12,090	....	O	18.3	....	N	N	Air,Ro,Ret	CV	Me	AT	600	7	467	....	WE
26	1	6200	2260	IR	S	T	10,400	GE	G	1050[2]	....	N	N	N	N	N	N	160	3	325	....	SWE
27	2	3075	2445	OL	RC	M	5000	GE	L	6.8	10,500	7	CE	Air,Ret	....	....	....	315	6	465	170	COC
28	2	3030	3290	BJ	S	T	7050	WE	C	9.5	9950	5	CE	St,Ro,Ret	CV	El	....	250	5	476	375	WE
29	....	....	....	....	....	....	11,900	....	G	1060[2]	....	N	N	N	N	N	N	....	6	....	....	....
30	2	2350	3235	AC	HyC	M	5500	GE	C	11.6	9175	5	CE	St,Ret	CV	El	BU	500	6	485	130	BLM,CHM
31	2	3090	2083	WO	HyC	M	4500	GE	G	1000[2]	9945	N	N	N	N	N	N	70	5	473	103	YU
32	2	1965	2750	BJ	RC	M	1750	GE	G	1039[2]	9843	N	N	St,Ret	DP	....	....	198	5	468	65	YU
33	2	2013	2232	IR	HyC,RC	M	1750	WE	C	11.3	10,075	4	BW	Air,Ro,Ret	CV	El	AS	236	5	459	10	CHM
34	2	990	2250	PP	RC	M	1500	LA	O	18	....	N	N	N	N	N	N	....	6	465	....	WE,SWE
35	2	935	2250	PP	RC	M	1500	..	O,G	1090[2]	....	N	N	N	N	N	N	....	5	458	62.7	YU,CHM
36	2	945	2296	....	RC	M	....	....	G	1096[2]	9970	N	N	N	N	N	N	143	....	....	....	....
37	N	N	N	N	N	M	N	N	N[40]	....	21,900	N	N	N	N	N	N	N	N	N	N	N
38	2	520	1178	BPC	RC	M	450	GE	O[24]	9035	....	2	FW	St,Ret	DP	Me	....	110	4	368	40	YU
39	3[42]	560	830	IR	RC	M	400	WE	O,G[11]	1000[2]	....	N	N	N	N	N	N	120	1	250	51	CHM
MUNICIPAL AND COOPERATIVE INSTALLATIONS																						
40	2[43]	4550 90	2300 1350	BJ	S,RC	T,M	10 300,1500	WE	G	1038[2]	....	N	N	N	N	N	N	....	5	460	125	YU
41	....	4550	2445	AC	S	T	10 500	GE	G	1022[2]	....	N	N	N	N	N	N	....	5	....	....	....
42	2[43]	4950 1750	2950	BJ	HyC,RC	MTS,M	4000	GE	C	10	9500	N[44]	N	Air,Ro,Ret	DP	El	RC	400	....	489	150	YU,CHM
43	2	2080	2280	BJ	RC	M	3500	GE	C	9.9	....	....	....	St,Ret	DP	Me	RC	250	5	465	60	YU,CHM
44	2	810	3025	PP	HyC	M	4500	AC	O,G	12.5 1000[2]	....	3	FW	St,Ret	DP	El	BU	320	5	468	87.2	FW,CHM
45	2	430	2400	AC	RC	M	2500	AC	O	11.2	....	4	FW	St,Ret	CV	El	RC	350	5	444	108	SWE,CHM
46	2	400	2600	PP	RC	M	1750	AC	O,G	12.5,1052[2]	9820	3	RS	St,Ro,Ret	CV	El	RC	250	4	440	77	YU,CHM
47	2	450	2625	....	RC	M	2000	....	G	1052[2]	....	3	BW	Air,Ro,Ret	DP	El	AS	269	5	440	72	YU,CHM
48	2	915	820	WO	HyC	M	1250	LA	G	1050[2]	8741	N	N	N	N	N	N	60	5	430	....	SWE
49	2	375	1400	BPC	RC	M	430	....	O,G[11]	1000[2]	....	N	N	N	N	N	N	50	....	....	....	....
50	2	500	1000	PP	RC	M	290	GE	O,G[11]	1050[2]	10,600	N	N	N	N	N	N	60	3	363	60	OLD

...to 775 MW—only four cross-compounds appear

TURBINE				CONDENSER					FEEDWATER			GENERATOR			CONTROLS					
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, rotor stator	Combustion, mfr	Feedwater, mfr	Closed-circuit tv mfr	Data logger mfr	Computer mfr	PROJECT
[illegible]	8	8	[illegible]	414	[illegible]	Adl,CuNi[23]	...		De	De,Pax		24	722[24]	H_2,Li	BM	BM	N	...	...	1
1.5	[illegible]	4	GE	[illegible]	[illegible]	CuNi	Ro	SWE	De	De	LAW IW[21]	24	65[illegible]	H_2,Li	BM	BM	N	N	GE	2
1.5	[illegible]	4	GE	224	[illegible]	SSt	Ro	BLH	De	Pdx		22	875	H_2,Li						3
2.27	6	4[10]	WE	[illegible]		AsCu	Ro	IR	So,SF	De,SF	PM,CRL[21]	26	907	Li	HCC	HCC	DP	N	N	4
2.27	7	4[10]	GE	560		AsCu	Ro	WO	So,SF	De,SF	PM,CRL[21]	26	907	Li	HCC	HCC	DP	N	N	5
1.5	6	[illegible]	GE	355			J,Ro	IR	So	De	..	22	475,434	H_2	HCC	HCC	...	N	N	6
[illegible]		4	WE			SSt	Ro		De	De,pH		22		H_2,Li			N	N		7
4.02	7	[illegible]	GE	270	[illegible]	SSt	Ro	IR	De	Pdx,pH	COC	24	895	H_2,Li	LN	LN		LN	LN	9
[illegible]	6	4	WE	[illegible]		Adl	J	WE	De	....		20	814	H_2				...		9
1.5		4	WE	[illegible]	[illegible]	AdB	Ro	WE	De	De	.	25	945	H_2,Li			N	N	N	10
[illegible]	8	6	WE	220[15]	[illegible]	Adl	Ro	WE	De	De	IN	20	800	H_2	BM	BM		GE	GE	11
[illegible]	9	4	GE	225	2	AsCu	Ro	IR	De	De,pH	IW,GR	24	678	Li	BM	BM	DP	GE	GE	12
[illegible]	6	6	WE	[illegible]	[illegible]	CuNi	J	IR	Evap	De	..	20	695	H_2	HCC	HCC	DP	N	N	13
[illegible]	[illegible]	[illegible]	GE	310.25		CuNi	RP	WE	De	De,SF,pH	...	24	695	H_2,Li	...	....	.	....	...	14
[illegible]	7	4	WE	315.25	[illegible]	CuNi	RP	WE	De	De,SF,pH	....	18	695	H_2	....	....	....	....	....	15
[illegible]	7	2	WE	21[illegible]		SSt	Ro	BLH	De	Pdx	GW	18	645	H_2	LN	LN	.	N	N	16
[illegible]		4	GE	2[illegible]4	[illegible]	Adl	Ro	FW	De	De	COC	24	665	H_2,Li	BM	BM	N	CDC	CDC	17
[illegible]	6	4	GE	215	4	Adl	Ro	WE	De	N	PM	24	572	H_2	LN	LN	CPL	LN	N	18
[illegible]	6	2	GE	[illegible]		Adl	Ro	WE	De	pH	IW	22	630	H_2		..	N	H	N	19
[illegible]	6	2	WE	[illegible]	1	Adl	Ro	WE	De	pH	IW	22	630	H_2	..	.	N	...	N	20
1.5	7	[illegible]	WE	[illegible]	[illegible]	SSt,AdB	RP	WE	De	pH	..	18	605	H_2	HCC	HCC	...	N	GE	21
[illegible]	7	2	WE	[illegible]	[illegible]	SSt	Ro	BLH	De	De	...	24	...	H_2	...	.	N	...	...	22
1.5	7	2	GE	210	1	A B	J	FW	De	N	IW	22	473	H_2,Li	BM	BM	DP	N	N	23
1.5	16	4	GE	220	2	SSt	Ro	IR	De,So	Pdx	IWT GW	22	520	H_2,Li	LN	BM	DP	BM	BM	24
[illegible]	7	4	GE	130	1	AlB	RP	WO	De	.	IW	22	430	H_2,Li	HCC	HCC	N	...	N	25
[illegible]	4	2	GE	147.4	1	Adl	Ro	SWE	De[36]	De	COC,IN[21]	22	440	H_2,Li	F	F	...	...	....	26
1.5	6	1	GE	164	2	Adl	Ro	SWE	Evap,So	....	....	22	400	H_2,Li	....	...	...	....	...	27
[illegible]	6	2	WE	140	2	SSt,AdB	J	WE	De	De	....	24	384	H_2	BM	...	....	....	....	28
[illegible]	6	1	WE		.		....	....	De	...	...	20	410	H_2	...		..	...	...	29
[illegible]	6	2	WE	170	2	Adl	J	IR	De	pH	IW,PM	22	320	H_2	HCC	HCC	DP	GE	GE	30
1.5	6	2	WE	143	[illegible]	SSt	J	WE	Sub,De[39]	De	..	22	275	H_2	LN	LN	KNT	GE	GE	31
[illegible]	5	2	GE	60	[illegible]	Adl	.	FW	De	....	..	13.8	140	H_2,Li	BM	BM	DP	N	N	32
[illegible]	4	1	GE	65	[illegible]	SSt,Adl	Ro	IR	De	...	PM	14.4	150	H_2	....		DP	LN	N	33
[illegible]	6	1	GE	75	[illegible]	AlB	J	WE	De	De,SF	COC	13.8	140	H_2	F	F	DP	F	F[29]	34
[illegible]	4	2	GE	47.5	2	Adl	Ro	IR	De	.	IW	13.8	135.3	H_2	F	F	N	N	N	35
[illegible]	5	2	GE		...	.	...	....	Evap	pH	..	14.4	128	H_2	.		....	.	...	36
[illegible]	N	1	[illegible]	6	1	N	J	IR	N	N	N	13.8	66	H_2	N	N	N	N	N	37
1.5	4	1	GE	Dry	N	Steel	J	GEA	De	pH	COC	13.8	20	H_2	BM	BM	N	N	N	38
[illegible] psig	N	.	GE	N	N	N	N	N	De	..	.	13.8	19	Air	BM	BM	N	N	N	39
2.5	6	2	WE	[illegible]	[illegible]	Adl	Ro	BLH	De	N	IW	24	414	H_2	RF	RF	N	RI	N	40
2.5	6	2	GE	[illegible]		Adl	Ro	SWE	De		..		390	H_2	...		...	...	.	41
1.5	7	.	WE	[illegible]	2	Ad	Ro	FW	De	Pdx	GW	15	325	H_2	BM	BM	DP	F	F	42
1.5	6	2	GE	[illegible]	2	SSt	J	MS	De	..	COC	22	255	H_2,Li	FIS	FIS	DP	FIS	N	43
[illegible]	7	2	GE	[illegible]	2	SSt,AsCu	Ro	FW	De	De	...	20	256	H_2,Li	BM	BM	N	N	N	44
2	5	2	WE	[illegible]	2	CuNi,AsCu	Ro	MS,NSH	De	N	PT	[illegible]	205	H_2	HCC	HCC	N	N	N	45
2	5	2	GE	[illegible]	2	Adl	J	MS	De	..	COC	13.8	126	H_2	BM	BM	N	N	N	46
1.5	5	.	GE	50	[illegible]	Adl	J	[illegible]	.	N	.	13.8	88.2	H_2			.	N	N	47
1.5	5	.	WE	60	2	AdB	Ro	SWE	De	pH	IN,BE	13.8	88.2	H_2	BM			N	N	48
2	[illegible]	.	GE	30	.	Adl	Ro	SWE		.....	..	13.8	39.5	H_2	BM	BM	N	N	N	49
2.5	4	.	GE	[illegible]	2	Adl	.	FW	De	De	CPL	13.8	14.9	H_2	RF	RF	N	N	N	50

WE — Westinghouse furnace
W — Water spray

Three-pressure condenser
Two-nozzle burners
Steam-turbine drive
Eight heating stages, one deaerator
Condensate treatment equipment
CuNi tubes in air cooler
Each of two generators
Double-ended turbine driving main pump and booster pump
Turbine and motor, respectively
Hydraulic coupling on main shaft
Automatic turbine start up to 25% load
One turbine drives two fans
Water spray in emergency

Makeup taken from Unit ... treatment plant
Unit output primarily for peaking service
Attemperation in emergency
Cooling tower makeup is sewage plant effluent
Geothermal steam
Two packaged boilers supply one turbine
Three pumps serve two boilers
Feed pump data refer to main and start-up pump respectively
44 Furnace has six front-wall cyclone burners

2 NUCLEAR-POWERED CENTRAL STATIONS

Nuclear attraction still grea

PROJECT	REACTOR					STEAM GENERATOR					PRIMARY OR FEED PUMPS							FUEL				
	Moderator	Coolant	Inlet temp, F	Outlet temp, F	Pressure, psig	Number per unit	Manufacturer	Outlet temp, F	Pressure, psig	Steam flow, 1000 lb per hr	Number per unit	Capacity each, gpm	Discharge pressure, psig	Manufacturer	Flow control	Drive	Drive horsepower	Drive manufacturer	Material	Enrichment, percent	Burnup, MW-days/tonne	Maximum center temp, F	Element form
1	H_2O	H_2O	....	....	....	4	WE	....[16]	790	14,905	4	....	....	WE	N	T	....	....	UO_2	....	....	....	Rod
2	H_2O	H_2O	420	563	1020	N	N	....	....	....	2	45,200	710[4]	GE	S	M	7635	GE	UO_2	2.57[34]	25,140	4380	7x7 rod array
3	H_2O	H_2O	539	602	2235	4	WE	519	805	14,120	4	88,500	2235	WE	N	M	6000	WE	UO_2	2.2,2.7,3.2	12,000[28]	4450	204 rod assem
4	H_2O	H_2O	539	602	2235	N	N	....	....	13,380	2	45,000	1329	BJ	S	M	....	....	UO_2	2.56[27]	25,000	4380	Pel,rod
5	H_2O	H_2O	378	540	1000	N	N	....[18]	1000	14,000	3	12,270[10]	1175	BJ	S[3]	T	7200	GE	UO_2	2.19[27]	19,000	4380	Pel;7x7 rod array
6	H_2O	H_2O	539	608	2250	4	WE	506	705	14,120	4	88,500	277[8]	WE	....	T	....	BB	UO_2	2.2-3.2	21,800[27]	4100	Pel,pins
7	H_2O	H_2O	539	602	2250	4	CE	512	743	13 383	4	88,500	277[6]	WE	N	M	6000	WE	UO_2	2.2,2.7,3.2[4]	21,800[27]	4100	15x15 rod array
8	H_2O	H_2O	539	602	2250	4	WE	506	720	14 300	4	86,500	2485	WE	S	T	7760[7]	WE	UO_2	2.17-2.67	33,000	4100	15x15 rod array
9	H_2O	H_2O	539	602	2250	4	WE	506	705	13,990	4	98,500	2250	WE	R,S	T,M	9350	WE	UO_2	2.2,2.7,3.2	....	....	204 rod assem
10	H_2O	H_2O	543	596	2225	4	WE	556	1085	3315[4]	4	89,700	272[8]	WE	....	T	8000	WE	UO_2	2.7[27]	14,500[28]	4090	Pel
11	H_2O	H_2O	549	607	2250	4	WE	514	755	3315[4]	4	88,500	277[8]	WE	N	M	5000	WE	UO_2	3.2[34]	31,000	4250	15x15 rod array
12	H_2O	H_2O	555	603	2185	2	BW	570	910	10,600	4	88,000	2500	BJ	....	T	9000	....	UO_2	2.29,2.64,2.30	28,200	4160	Pel
13	H_2O	H_2O	388	512	1500	12[37]	CE	538	835	12,300	6	31,000	1750	BJ	S	D	9100	EL	U	....	....	....	Tubular
14	H_2O	H_2O	555	603	2135	2	BW	570	910	5300[4]	4	88,000	2500	BJ	N	T	10,000	....	UO_2	1.5-3.0	27,000	4160	Pel
15	H_2O	H_2O	555	603	2185	2	BW	570	910	5300[4]	4	88,000	2500	BPC	N	M	5600	AC	UO_2	2.29,2.64,2.94	24,560	4160	Rod
16	H_2O	H_2O	555	603	2185	2	BW	570	910	5300[4]	4	88,000	370[8]	BPC	N	T	7200	WE	UO_2	2.4[27]	28,000	4160	Pel
17	H_2O	H_2O	420	....[18]	1005	N	N	....[18]	1005	....	2	45,200	....	GE	....	....	....	....	UO_2	2.23[27]	19,000	4380	Pel,rod
18	H_2O	H_2O	550	604	2235	2	CE	520	800	11,176	4	83,300	2235	....	....	M	5500	....	UO_2	2.5	25,000	4300	14x14 rod array
19	H_2O	H_2O	555	603	2185	2	BW	569	910	10,521	4	88,000	2500	BPC	N	T	....	AC	UO_2	2.94	28,200	4160	Pel
20	H_2O	H_2O	555	603	2185	2	BW	570	910	5300[4]	4	88,000	362[8]	BPC	...[12,M]		6950[33]	AC	UO_2	2.94[34]	28,230	4160	15x15 rod array
21	H_2O	H_2O	549	611	2250	3	WE	516	763	10,596	3	....[32]	280[8]	WE	N	M	5000	WE	UO_2	....	31,500	....	Rod
22	H_2O	H_2O	550	604	2235	2	CE	520	800	5360[4]	4	81,200	....	BJ	N	....	....	WE	UO_2	3.03	28,000	3775	Pel,rod
23	H_2O	H_2O	550	604	2235	2	CE	520	800	5360[4]	4	81,200	....	BJ	N	....	....	WE	UO_2	3.03	28,000	3775	Pel,rod
24	H_2O	H_2O	555	603	2185	2	BW	570	910	5300[4]	4	88,000	....	....	....	....	....	....	UO_2	2.8	25,000	4160	....
25	H_2O	H_2O	543	606	2235	3	WE	505	695	10,600	3	88,500	91.5[8]	WE	N	M	6000	WE	UO_2	2.44,2.54,2.99[4]	21,800	4100	15x15 rod array
26	H_2O	H_2O	543	606	2235	3	WE	510	730	10 600	3	88,500	91.5[8]	WE	N	M	6000	WE	UO_2	2.44,2.54,2.94[4]	21,800[27]	4100	15x15 rod array
27	H_2O	H_2O	387	545	020	N	N	545	1020	....	2	....	....	....	....	T	....	....	UO_2	2.03	19,000	4380	7x7 rod array
28	H_2O	H_2O	530	545	000	N	N	545	1000	8620	2	45 000	....	BJ	S	M	9000	GE	UO_2	2.0[27]	15,000	3725	Rod
29	H_2O	H_2O	520	545	000	N	N	545	1000	8620	2	45,300	....	BJ	S	M	9000	GE	UO_2	2.0[27]	15,000	3725	Rod
30	H_2O	H_2O	367	543	1005	N	N	....	..	9560	2	12,300[10]	1082	BJ	S	T	8700	OL	UO_2	2..5[27]	19,000[27]	4380	7x7 rod array
31	H_2O	H_2O	550	602	2235	3	CE	520	800	10,720	3	....	....	....	....	....	....	....	UO_2	....	30,000	....	Pel;rod
32	H_2O	H_2O	383	546	1005	N	N	546	1005	....	2	45,200	1060	BJ	S	M	5000	GE	UO_2	2.20	24,800	5000	Pel;rod
33	H_2O	H_2O	545	595	2100	3	WE	510[13]	745[13]	10,000	3	88 800	2568	WE	R	M	5000	WE	UO_2	....	27,000	4000	Pel
34	H_2O	H_2O	547	600	2290	3	WE	510	745	10 000	3	88,000	2250	WE	....	M	5500	WE	UO_2	2.5	27,000	....	15x15 rod array
35	H_2O	H_2O	550	591	2100	2	CE	514	770	9400	4	83,000	2308	BJ	N	T	4500	AC	UO_2	2.74	24,000	....	Pel
36	H_2O	H_2O	523	545	1000	N	N	545	1000	7600	2	45 000	1375	....	S	M	3500	....	UO_2	2.18	25,000	3400	7x7 rod array
37	H_2O	H_2O	363	545	1015	N	N	546	1015	6740	3	9760[10]	1650	IR	R	M	7000	GE	UO_2	2.07[27]	15,000	3500	Rod
38	H_2O	H_2O	545	584	2150	4	WE	502	675	19 39[4]	4	67,200	2235	WE	....	M	4000	WE	UO_2	3.3[27]	25,000	3300	Pel;rod
39	H_2O	H_2O	365	545	1000	N	N	545	1000	6740	2	39 000	1375	....	S	M	3000	....	UO_2	3	15,000	4500	Rod
40	H_2O	H_2O	366	545	1000	N	N	545	1000	....	2	27,100	1350	....	S	M	3500	..	UO_2	2.28,2.55[14]	18,900;24,930[14]	5080	Pel;7x7 rod array
41	H_2O	H_2O	555	603	2145	2	BW	570	910	10,500[36]	4	88,000	....	....	....	....	....	....	UO_2	2.8	25,000	4160	....
42	H_2O	H_2O	545	607	2250	2	WE	510	735	7090	2	89 000	2500	WE	....	M	4500	WE	UO_2	3	21,000	....	Rod
43	H_2O	H_2O	372	540	1005	N	Y	540	1000	....	2	28,200	1137	BJ	HyC	M	4500	WE	UO_2	2.29	20,000	3170	7x7 rod array
44	H_2O	H_2O	545	568	2235	2	WE	511	735	7090	2	89,000	2235	WE	..	M	5000	..	UO_2	2.4-2.9	21,800	....	14x14 rod array
45	H_2O	H_2O	301	540	1050	N	N	540	1000	5655	5	32,300	1069	BJ	S	M	4000	GE	UO_2	1.19,1.67,2.42[4]	15,000	3200	Pel
46	H_2O	H_2O	544	546	1000	N	Y	546	1000	....	5	36 900	1050	BJ	S	M	1000	GE	UO_2	2.10	23 200	3600	Pel,rod
47	H_2O	H_2O	552	560	1035	2	WE	513	739	3008[4]	2	89,600	2335	WE	N	M	6000	WE	UO_2	2.8	24,500	4050	Pel,7x7 rod array
48	H_2O	H_2O	552	560	1035	2	WE	513	739	3008[4]	2	89 300	2335	WE	N	M	6000	WE	UO_2	2.8	24,500	4050	Pel,7x7 rod array
49	H_2O	H_2O	546	587	2250	4	WE	502	675	6194	4	53,000	2050	WE	N	M	3080	WE	UO_2	3 4,3.6,4.2	12,000[28]	..	Rod
50	H_2O	H_2O	547	558	2085	2	CE	514	755	3112[4]	4	47 500	2085	BJ	N	M	3000	....	UO_2	1.6-2 95	27 360	4320	Pel,176 rod assem
51	H_2O	H_2O	552	607	2225	2	WE	518	781	2750[4]	2	90 300	2225	WE	N	M	4500	WE	UO_2	3 05	27,300	3929	Pel,rod array
52	H_2O	H_2O	553	597	2085	3	WE	505	695	5706	3	59 500	2100	WE	N	M	4000	WE	UO_2	3.15-3.85	27,000	3960	Pel
53	H_2O	H_2O	750	820	720	3	GA	1000	1400	3220	4	870 000[15]	700	GA	S	T	5750	GA	U,Th	93	100 900	....	Coated particles[16]
54	H_2O	H_2O	552	570	1535	4	BW	452	415	2220	6	76 400	1150	WE	N	M	3600	WE	UO_2	4 1[17]	22,500	3250	Pel,pin
55	H_2O	H_2O	544	546	1010	4	FW	546	1010	7600	4	..	....	....	....	....	....	..	UO_2	1.5	18,000	5010	Pel
56	H_2O	H_2O	495	533	2000	3	WE	460	440	2170	4	52 100	2500	WE	..	M	....	WE	UO_2	4 1-4 9	12 000	3300	Pel
57	H_2O	H_2O	550	580	2000[26]	3	GA	512	600	1494	3	3 300[19]	..	BJ	..	M	300	GE	U,Mo	9 4,25,6[26]	6000	3325	Pin
58	H_2O	H_2O	550	580	1995	4	WE	486	565	1940	4	....	..	WE	..	..	..	..	UO_2,ZrO$_2$	Nat 93[23]	7830	3433	1626[23] Rect pel
59	H_2O	H_2O	550	580	1995	4	WE	486	565	1940	4	....	..	WE	..	..	..	..	UO_2	2.2	11,000	2250	Pel
60	H_2O	H_2O	525	547	1020	N	N	547	1020	5715	2	....	....	....	....	....	....	....	UO_2	2.6,2.3[14]	11,300	2250	Pel
61	H_2O	H_2O	495	539	1900	N	N	525	560	6316	2	....	....	....	....	....	....	....	UO_2	2.2,93[25]	7800	4215,1270[25]	Pel SSI cermet[25]
62	H_2O	H_2O	363	538	1295	N	N	....	....	....	2	15 300	85[8]	AC	HyC	M	350	AC	UO_2	3.67	15,300	4850	10x10 rod array
63	H_2O	He	552	1128	1035	2	NTR	300	1450	368.4	2	227 300[15]	325	CLM	HyC	M	1900	EL	U,Th	93	50,300	2427	Coated particles[16]
64	H_2O	H_2O	450	930	922	2	FW	525[24]	500	225	..	..	....	....	....	....	....	..	UO_2,ThO$_2$	93	6700	....	Pel,5x5 rod array

SYMBOLS USED ABOVE (continued)

- Chem - Chemical reaction
- [illegible]
- [illegible]
- Dies - Diesel drive (with turbine)
- Elec - Electric motor
- Evap - Evaporator
- Fluid - Fluid-heated reactor
- [illegible]
- [illegible]
- HTGR - High temperature gas-cooled reactor

- HyD - Hydraulic coupling
- HyP - Hydrostatic power
- H_2 - Hydrogen
- H_2O - Light water
- He - Helium
- IR - Internal recirculation
- L - Liquid metal
- M - Motor
- Mo - Molybdenum
- N - None
- Na - Sodium
- Nat - Natural uranium

- Once - Once through
- PIX - Powdered ion exchange
- Pel - Pellet
- PM - Pump control
- Recirc - Recirculation from cooling pond
- PWR - Pressurized water reactor
- R - Regulator control
- Ro - Rotary pump or blower
- RP - Reciprocating pump
- S - Speed control
- SC - Single cylinder

rger units because of low fuel-cycle cost

TURBINE			CONDENSER					FEEDWATER			GENERATOR				CONTROLS					PLANT NAME	PROJECT
No. of bleed points	Exhaust pressure, in Hg	Manufacturer	Surface, 1000 sq ft	No. of water passes	Tube material	Air removal	Manufacturer	Makeup treatment	Condensate treatment	Cooling water	Voltage, KV	Rating, MVA	Stator cooling	Rotor cooling	Reactor, mfr	Feedwater, mfr	Data logger, mfr	Computer, mfr	Closed-circuit tv, mfr		
7	2	WE	....	....	....	....	....	....	....	....	24	1356	H_2O	H_2	WE	....	....	....	WE	Sequoya	1
6	2	AEI	725	1	AlB	J	....	Evap	De,pH	Once	22	1222	H_2O	H_2	GE	GE	....	GE	GE	.....	2
6	1.5	WE	618	1	CuNi	Ro,J	IR	Evap,De	Chem	Once	25	1260	H_2O	H_2	WE	WE	N	....	....	Diablo Canyon	3
5	2	GE	666	1	Ad CuNi	J	FW	De	Pdx	Once	22	1280	H_2O	H_2	GE	GE	....	GE	GE	Browns Ferry	4
5	1.5	GE	790	1	Ad,CuNi	J	IR	De	De	Once,CTo	22	1280	H_2O	H_2	GE	....	....	....	GE	Peach Bottom	5
6	1.5	GE	....	1	AsCu	....	....	De	pH	Once	26	1280	H_2O	H_2	WE	..	N	WE	WE	Donald C Cook	6
6	1.5	WE	800	1	304 SS	Ro	..	De	Chem	Once	25	1260	H_2O	H_2	....	....	....	....	....	Salem	7
..	1.5	WE	....	....	....	....	....	....	....	....	24	1260	H_2O	H_2	....	....	....	....	....	Diablo Canyon	8
6	1.5	WE	594	1	SS	Ro,J	WE	De	pH	Once	24	1220	H_2O	H_2	WE	....	....	....	WE	Zion	9
6	1.3	WE	306[9]	1	Ad	J	WE	Evap	..	Once	22	1126	H_2	H_2	....	....	....	....	....	Indian Point	10
6	1.5	WE	915	1	Ad	J	WE	Evap	pH	Once	22	1126	H_2	H_2	....	....	....	....	....	Indian Point	11
6	1.6	WE	....	1	....	....	....	De	De	Once	22	....	H_2	H_2	BM	BM	N	BM	BM	Russellville	12
4	1.5	GE	207	2	Ad	J	WE	De	Pdx	Once	22.5	432	H_2O	H_2	RKR	BM	DEC	IS	IS	Hanford No 1	13
6	2	WE	596	1	SS	RP	..	De,So	De	Once	22	984	H_2	H_2	BM	BM	..	BM	BM	Crystal River	14
6	2-8	GE	678	....	....	....	IR	De	Pdx	Hyp	19	968	H_2,H_2O	H_2	BM	BM	BM	....	BM	Three Mile Island	15
6	1.0-	GE	510	1	SS	J	BLH	De	....	Once	19	1038	H_2O	H_2	BM	BM	....	....	GE	Oconee	16
6	1.5	GE	450	1	....	J	....	De	De	Once	20	1000	H_2O	H_2	GE	....	....	...	GE	Bell	17
..	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	Millstone	18
6	2	WE	600	29	CuNi	Ro	....	De	De	Once	22	949	H_2	H_2	BM	BM	N	BM	BM	Oyster Creek	19
6	2.5	WE	...	....	....	....	....	De	De[11]	CTo	22	1070	H_2	H_2	BW	BM	....	....	BM	Rancho Seco	20
6	1.5	WE	390	1	SS	J	..	De	....	Once	22	946	H_2	....	WE	WE	N	WE	WE	Beaver Valley	21
6	1.5	GE	453	1	CuNi	Ro	MS	De	....	Once	19	1000	H_2O	H_2	....	....	....	..		Calvert Cliffs	22
6	1.5	WE	453	1	CuNi	Ro	MS	De	...	Once	22	1000	H_2	H_2	....	....	....	....	....	Calvert Cliffs	23
..	..	GE	....	....	....	....	....	De	De	Pond	....	970	H_2O	H_2	BW	....	....	....	..	Midland	24
6	1.5	WE	580	1	CuNi	J	IR	Evap,De	pH[11]	Once	22	941	H_2	H_2	WE	....	N	....	....	Surry	25
6	1.5	WE	....	1	....	J	IR	....	pH[11]	Once	22	942	H_2	H_2	WE	HCC	N	WE	WE	North Anna	26
....	....	GE	....	....	....	....	....	....	....	CTo	....	....	....	....	....	....	....	....	....	Edwin I Hatch	27
4	1.5	GE	650	1	SS	J	IR	De	De	Once	18	920	H_2O	H_2	GE	CV	....	GE	GE	Dresden	28
4	1.5	GE	650	1	SS	J	IR	De	Pdx	Once	18	920	H_2O	H_2	GE	CV	....	GE	GE	Quad Cities	29
5	2	WE	465	1	SS	J	MS	De	Pdx	Once	22	983	H_2	H_2	GE	....	....	GE	GE	Cooper	30
6	1.5	WE	....	1	....	J	....	De	....	Once	22	900	H_2	H_2	....	....	...	....	....	Bailey Point	31
5	2.0	GE	330	1	SS,Ad	Ro,J	WE	De	De	Once	18	935	H_2O	H_2	GE	GE	....	GE[31]	GE[31]	.....	32
6	2.1	WE	2257	1	SS,Ad	RP	WE	De	Chem	Once	22	854	H_2	H_2	....	....	....	WE	WE	H B Robinson	33
7	2.5	WE	....	1	....	....	FW	De	....	Once	22	894	H_2	H_2	....	BM	....	....	....	Turkey Point	34
10	2	WE	510	1	SS,Ad	J	IR	De	....	Once	22	....	....	....	....	....	....	....	....	Palisades	35
5	1.5	GE	384	1	AlB	J	....	De	De	Once	24	780	H_2O	H_2	....	....	....	....	....	Pilgrim	36
5	1.5	GE	443	1	AlB,CuNi	Ro,J	IR	Sub	De	Once	24	735	H_2	H_2	GE	GE,CV	....	GE	GE	Millstone	37
6	1.5	WE	1757	1	SS,Ad	J	WE	De	Chem	Once	19	667	H_2	H_2	WE	HCC	N	IBM	N	Haddam Neck	38
5	1.75	GE	390	2	Ad	J	WO	De	Pdx	Once,CTo	22	632	H_2O,H_2	H_2	....	....	....	....	....	Monticello	39
5	1.5	GE	....	....	CuNi	J	....	....	....	Once	22	622	H_2O	H_2	GE	..	....	....	GE	Shoreham	40
....	....	GE	....	....	....	....	....	De	De	Pond	....	663	H_2O	H_2	BW	....	....	....	....	Midland	41
5	1.5	WE	....	....	..	....	....	....	....	....	19	659	H_2	H_2	....	....	....	....	....	Prairie Island	42
5	2.25	GE	315	1	Ad	J	SK	De	pH	Once	22	626	H_2O,H_2	H_2	..	....	....	..	....	Vermont Yankee	43
....	1.5	WE	....	....	....	....	....	De	De	Once	19	659	H_2	H_2	WE	WE	....	....	....	Kewaunee	44
3	1.5	GE	423	1	AlB	J	WO	De	De	Once[20]	24	687.5	H_2O	H_2	GE	GE	N	N	N	Oyster Creek	45
6	1.5	GE	400	1	SS,Ad	R,J	WE	De	De	Once	24	755	H_2O	H_2	GE	GE	....	GE	GE	Nine Mile Point	46
5	1.35	WE	1257	1	Ad	J	WE	De	Chem	Once	19	582	H_2	H_2	WE	....	....	WE	WE	Point Beach	47
5	1.35	WE	1257	1	Ad	J	WE	De	Chem	Once	19	582	H_2	H_2	WE	....	....	WE	WE	Point Beach	48
..	1.5	....	....	....	....	....	....	De	N	Once	..	..	....	....	....	....	....	....	....	Malibu	49
6	1.5	GE	350	2	SS	Ro	FW	De	....	Once	22	591	H_2O	H_2	....	....	....	....	....	Fort Calhoun	50
5	1.35	WE	125.57	1	SS,Ad	J	WE	De	pH	Once	19	608	H_2	H_2	F	F	N	WE	WE	Robert E Ginna	51
5	1.5	WE	300	1	CuNi	J	WE	Evap	pH	Once	18	500	H_2	H_2	F	HCC	CHU	CMC	N	San Onofre	52
6	2.5	....	....	2	Ad	J	..	De	De	CTo	22	403	H_2O	H_2	....	....	....	....	....	Fort St Vrain	53
4	2	WE	2127	1	Ad	J	IR	Evap,De	....	Once	16.5	330	H_2	H_2	GE	BM	CHU,RCA	N	N	Indian Point	54
..	..	GE	..	....	....	..	....	....	....	....	14.4	245.5	H_2	H_2	..	....	....	....	....	Dresden	55
..	1.5	WE				..	....	....	....	....	18	160	H_2	H_2	WE	....	....	....	....	Yankee	56
....	1	AC	..	..	..	....	....	De	....	Once	18	186	H_2	H_2	AC	....	....	N	N	Enrico Fermi	57
....	1.5	WE	..	..	..	....	....	De	De	Once	15.5	316	H_2O	H_2	WE	..	....	....	....	Shippingport	58
..	1.5	..	..	....	....	....	....	..	....	....	13.8	78	H_2O	H_2	GE	GE	....	GE	GE	Big Rock Point	59
..	3.5	GE	..	..	....	....	....	De	De	Once	13.8	76.8	H_2	H_2	GE	....	....	....	....	Humboldt Bay	60
..	..	AC	....	....		..	..	De	De	Once	13.8	86	H_2	H_2	AC	....	....	N	N	Pathfinder	61
2	0.5	AC	70	2	Ad	Ro,J	AC	De	De	Once	13.8	76.6	H_2	H_2	VRL	F	..	....	....	LaCrosse (LACBWR)	62
4	1.5	WE	30	1	Ad,SS	Ro,J	WE	De	Pdx	Once	13.6	54	H_2	H_2	CCC	F	GPL	N	N	Peach Bottom	63
1	....	1.5	EL	..	....	....	....	..	De	SF	Once	13.8	27.2	H_2O	Air	AC	....	....	N	N	Elk River	64

BW - Babcock & Wilcox Co
CCC - Consolidated Controls Corp
CE - Combustion Engineering, Inc
CHU - Conu Corp
CLA - Clark Bros Div of Dresser Industries
CV - Copes-Vulcan Div, Blaw-Knox Co
DEC - Diamond Electric Corp
D - De Laval Turbine, Inc
DMC - DataMaster Corp
EL - Elliott Co, Div of Carrier Corp
F - The Foxboro Co
FW - Foster Wheeler Corp
GE - General Electric Co
GGA - Gulf General Atomic Inc
GPL - General Precision, Inc
GR - Griscom-Russell Corp
HCC - Hagan Controls Corp
Sub of Westinghouse Electric Corp
IBM - International Business Machines Corp
IR - Ingersoll-Rand Co
IS - Instrument Systems, Inc
MS - Maryland Shipbuilding & Drydock Co
NTR - Nooter Corp
RCA - Radio Corporation of America
RKR - Rucker Co
SHK - Schutte & Koerting, Inc
VRL - Vard Co, Div of Koval Industries, Inc
WE - Westinghouse Electric Corp
WO - Worthington Corp

...Mfg Co
...Electrical Industries Ltd
...pment Associates, Inc
...Inc
...on Corp
...Co
...Co
...F Atkinson Co

Table 2 250 to 135 psig

More oil-fired boilers use additive[illegible]

PROJECT	COMPANY	LOCATION	CONSULTING ENGINEER	Date of initial operation	New or existing plant	Principal steam use	BOILERS: No. new units, type	BOILERS: Manufacturer	BOILERS: Capacity each, 1000 lb per hr or M Btu	BOILERS: Operating pressure, psig	BOILERS: Operating temp, F	BOILERS: Heating surface, 1000 sq ft, incl boiler, waterwall and superheater	FUEL: Type	FUEL: Max. sulfur content [illegible]
55	Cooper Tire & Rubber Co	Texarkana, Ark	Sofyanos Associates	1968	Ex	Pr,SH	1 Pk	UR	60	250	406	5	G	N
56	University of New Mexico	Albuquerque, N M	Bridgers & Payton	1969	Ne	SH	1 Pk	CE	100	235	500	....	G	N
57	Holy Cross Hospital	Chicago, Ill		1968	Ex	SH	1 Pk	BW	40	250	Sat	4	0,G	1
58	Schenuit Rubber Co	Baltimore, Md		1968	....	Pr	1 Fi	KEE	40	250	Sat	3.8	0	[illegible]
59	U S Plywood Co	Oxford, Miss		1968	Ne	Pr,SH	1 Fi	RU	70.7	235	400	6.7	G,Wd,Bk	[illegible]
60	Kind & Knox Gelatine Co	Camden, NJ	H M Wilson Co	1968	Ex	Po,Pr	1 Pk	BW	50	230	Sat	....	0	[illegible]
61	The Boeing Co	Everett, Wash	Bumstead-Woolford Co	1968	Ex	SH	1 Pk	UR	125	230	399	15.2	0,G	....
62	Kimberly Clark Corp	Beech Island, SC		1968	Ne	Pr,SH	2 Pk	CE	130	225	Sat	....	0,G	....
63	Spaulding Pulp & Paper Co	Newberg, Ore	H A Simons, Ltd	1967	Ex	Pr	2 Pk	CE	125	225	Sat	....	G	N
64	Versicol Chemical Corp	Memphis, Tenn	A M Kinney, Inc	1968	Ex	Pr	1 Pk	CE	75	225	440	6.3	0,G	0.35
65	Eastman Kodak Co	Gates, NY		1968	Ne	Po,SH	1 Pk	MIW	70	225	Sat	....	0,G	1.4
66	General Motors Corp, Chevrolet Div	Saginaw, Mich	Giffels & Rossetti, Inc	1968	Ex	SH	2 Pk	CE	120	212	Sat	10.4	0,G	2.8
67	U S Sugar Corp	Clewiston, Fla	Arthur G Keller, Inc	1968	Ex	Po,Pr	2 Fi	UR	150	210	492	20.7	0,Bg	....
68	Armco Steel Corp	Butler, Pa		1968	Ne	Po,Pr	1 Pk	BW	50	210	465	4.6	G	N
69	International Paper Co	Gatineau, Que, Can	Sandwell & Co	1968	Ex	Pr	1 Fi	CE	300	200	450	20	0	2.5
70	University of Toronto	Toronto, Ont, Can	H G Acres & Co, Ltd	1968	Ex	SH	1 Fi	BWC	200	200	Sat	12.4	0,G	3
71	McMaster University	Hamilton, Ont, Can	H G Acres & Co, Ltd	1968	Ex	SH	1 Fi	FW	150	200	415	7.914	0	3
72	Washington State University	Pullman, Wash	W O Stevens & Co	1968	Ex	SH	1 Fi	CE	125	200	Sat	11.4	0,G	....
73	Baltimore Gas & Electric Co	Baltimore, Md		1968	Ex	Pr,SH	1 Pk	CE	110	200	Sat	6.6	0,G	2.5
74	Kendall Co, Textile Div	Bethune, SC	Lockwood-Greene Engineers, Inc	1967	Ex	Pr	1 Pk	CE	100	200	381	9.3	0,G	2.8
75	Canadian International Paper Co	Matane, Que, Can	Sandwell & Co	1967	Ne	Pr,SH	2 Pk	BW	80	200	Sat	5	0	3
76	Hoffmann-LaRoche Inc	Belvidere, NJ	Wigton-Abbott Corp	1969	Ne	Pr,SH	1 Pk	CE	70	200	Sat	....	0	....
77	General Foods Corp	Woburn, Mass		1967	Ex	Pr	1 Pk	CE	110	190	Sat	7.4	0	....
78	Tennessee Paper Co	Chattanooga, Tenn	Weigel Engineering	1968	Ex	Pr	2 Pk	BW	100	185	Sat	....	0,G	....
79	Libby, McNeill & Libby	Gridley, Calif		1968	Ex	Pr	1 Pk	MIW	60	185	Sat	....	0,G	....
80	Rexall Chemical Co	Joliet, Ill	Blaw-Knox Co	1968	Ex	Pr	1 Pk	BW	75	180	380	....	G	N
81	GMC	Warren, Mich	Argonaut Realty Co	1968	Ex	Pr,SH	1 Pk	CE	200	175	377	....	0,G	1
82	Pittsburgh Plate Glass Co	Lake Charles, La		1968	....	Pr	2 Pk	CE	100	175	Sat	....	G	N
83	The Columbia Mills, Inc	Minetto, NY	Burns Bros	1968	Ex	Pr,SH	1 Pk	CE	70	175	Sat	5.4	0,G	2.2
84	Hunt-Wesson Foods	Oakdale, Calif		1968	Ex	Pr	1	BW	150	170	....	....	G	N
85	Northern States Power Co	Minneapolis, Minn	Pioneer Service & Engrg Co	1967	Ex	SH	1 Fi	RS	150	160	380	13.5	C,G	4
86	General Electric Co	Waterford, NY	United Engineers & Constructors Inc	1969	Ex	Pr,SH	1 Pk	BW	125	160	....	8	0	2.5
87	Dartmouth College	Hanover, NH	Jackson & Moreland	1968	Ex	SH	1 Pk	CE	70	160	470	....	0	....
88	Philip Carey Corp	Memphis, Tenn		1968	Ex	Pr	1 Pk	MIW	25	160	Sat	....	G	N
89	General Mills Inc	Chicago, Ill		1968	Ex	Pr,SH	1 Pk	BW	60	160	Sat	5	0,G	....
90	Vollrath Co	Sheboygan, Wis		1968	Ex	Pr,SH	2 Pk	MIW	40	160	Sat	....	0,G	....
91	Consolidated Paper Corp Ltd	Grand' Mere, Que, Can	H G Acres & Co, Ltd	1969	Ex	Pr,SH	1 Fi	FW	300	150	Sat	20	0,G	3
92	Logan International Airport	Boston, Mass	Francis Associates	1968	Ex	Pr,SH	1 Pk	KEE	100	150	Sat	10.7	0,G	2.35
93	Anheuser-Busch, Inc	Jacksonville, Fla	H K Ferguson Co	1969	Ne	Pr	3 Pk	BW	80	150	366	5.9	0	1.5
94	Allis-Chalmers Mfg Co	Springfield, Ill		1967	Ex	Pr,SH	1 Pk	CE	60	150	415	....	G	N
95	Haodite Finishing Co	Taunton, Mass	Jensen & Associates, Inc	1968	Ex	Po,Pr	1 Fi	UR	60	150	Sat	6.1	0,G	....
96	South Dakota State University	Brookings, SD	Ray L Roby & Associates	1968	Ex	SH	1 Fi	BW	55	150	Sat	7.1	C,G	3
97	Libby, McNeill & Libby	Sunnyvale, Calif		1968	Ex	Pr	1 Pk	MIW	50	150	Sat	....	G	N
98	Fairfax County Hospital	Fairfax, Va	Henry Adams, Inc	1968	Ne	SH	2 Pk	BW	50	150	Sat	....	0,G	....
99	Murphy Oil Co	Superior, Wis		1967	Ex	Pr	1 Pk	BRO	42	150	Sat	4.2	0,G	3
100	Rutgers University	New Brunswick, NJ	Paul L Geiringer & Associates	1968	Ex	SH	1 Pk	BW	40[30]	150	365	3.65	0	2.35
101	Caterpillar Tractor Co, Inc	York, Pa		1968	Ex	Pr	1 Pk	KEE	40	150	Sat	3.8	G	N
102	Humble Oil & Refining Co	Baton Rouge, La		1968	Ex	Pr	2 Pk	MIW	38.5	150	Sat	....	G	....
103	Swift & Co, Inc	Stockton, Calif	A G McKee Co	1968	Ne	Pr	2 Pk	MIW	38.5	150	Sat	....	0,G	....
104	National Bureau of Standards	Washington, D C		1968	....	Pr,SH	2 Pk	BW	30	150	Sat	....	0,G	....
105	St Mary's Hospital	Duluth, Minn	Orr-Schelen-Mayeron & Assoc	1968	Ex	SH	3 Pk	BRO	20	150	Sat	1.8	0,G	....
106	Bates Manufacturing Co	Lewiston, Me		1968	Ex	Pr	1 Pk	BW	120	135	Sat	8	0	....
107	Holland-Suco Color Co	Huntington, W Va		1967	Ex	Pr,SH	1 Pk	CE	70	135	Sat	....	G	N
108	Monsanto Co	Muscatine, Iowa		1968		Pr,SH	1 Pk	BW	60	135	Sat	....	0,G	....

MANUFACTURERS

AAF American Air Filter Co, Inc
AC Allis-Chalmers Mfg Co
AL [illegible]
AMB American Blower [illegible]
AMP American Marsh Pumps, Inc
APC The Air Preheater Co
[illegible]
CIR Canadian Ingersoll-Rand Co
[illegible] Cochrane Div, Crane Co
[illegible] Coen Co
[illegible] Combustion Engineering Corp
[illegible] Canada Pumps Ltd
[illegible] Dean Brothers Pumps, Inc
[illegible] De Laval Turbine Inc
[illegible] Detroit Stoker Co
[illegible] DURAG Hamburg
[illegible] Combustion Control
[illegible] Electronics Corp of America
[illegible] The Fly Ash Arrestor Corp
[illegible] Fisher Governor Co
[illegible]
H Honeywell Inc
HAL Halberg AB
HAY The Hays Corp
HCC Hagan Controls Corp
Sub of Westinghouse Electric Corp
HOP Howden Parsons
HOW James Howden Co
IBW International Boiler Works Co
[illegible] Iron Fireman-Webster, Inc
IR Ingersoll-Rand Co
[illegible] E Kardt
[illegible] John Rogers Co, Inc
KEE Keeler Co
[illegible] Kraftanlagen AG
[illegible] Klein, Schanzlin & Becker
[illegible] Kohlenscheidungs Gesellschaft
[illegible]
MIW [illegible]
[illegible]
PP Pacific Pumps Inc,
Div of Dresser Industries, Inc
PPC Pennsylvania Pump & Compressor [illegible]
RAT Turbines Rateau
RC Research-Cottrell, Inc
RD Republic Div, Rockwell Mfg Co
ROC Rockwell Mfg Co
RS Riley Stoker Corp
SEF SEMAC, France
SFF Svenska Flaktfabriken
SH Siemens & Halske AG
SHA Schaub Engineering Co
SON Sonvico-Langnau
SP Springfield Boiler Co
SR Stein & Roubaix SA
SUL Sulzer Bros Ltd
SW Sturtevant Div
Westinghouse Electric Corp
TIC Taylor Instrument Cos
TR The Trane Co
[illegible] Todd Shipyards Corp, Products Div
UOP Universal Oil Products Co,
Air Correction Division
UP Union Pump Co
UR Union Iron Works
Sub of Riley Stoker Corp
VEN Ventec
WE Westinghouse Electric Corp

tively few inject them into furnace

EQUIPMENT: Burner No. per boiler	Burner Manufacturer	Fuel additive	DUST: Dust collector type	Dust collector mfr	AIR HEATER: Type	Manufacturer	F-D FANS: No. per boiler	Manufacturer	Type drive	I-D FANS: No. per boiler	Manufacturer	Type drive	BOILER FEED SYSTEM: No. of pumps	Manufacturer	Type drive	Feedwater treatment	COMBUSTION CONTROL: Type	Control manufacturer	Chimney height, ft	PROJECT
		N	N	N	N	N	1	CF	M	N	N	N	1	IR	M	Z,In	E	..	24	55
	CE	N	N	N	N	N	1	....	T	1	....	T	1	..	T	Z	Co	BM,TIC	15	56
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	DHP	M,T	Z,Da,In	Co	BM	90	57
	TS	Fu	N	N	N	N	1	CF	M	N	N	N	2	IR	M	Z	E	CCI	....	58
	CEC	N	Me	B..	N	N	1	SW	T	1	SW	T	2	PE	M,T	In	Pn	F	80	59
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	GP	M,T	Z,In	Pn	BM	....	60
	CE	Fu	N	N	N	N	1	WE	M,T	N	N	N	1	IR	M	In	Pn	BM,F	....	61
	CE	N	N	N	N	N	1	CF	M	N	N	N	33	WO	M,T	Z,In	Pn	....	....	62
	COE	N	N	N	N	N	1	FAA	M	N	N	N	1	WO	M,T	Z	Pn	..	....	63
	CE	N	N	N	N	N	1	AS	T	N	N	N	2	IR	T	Ft,Z,In	Pn	BM	30	64
	COE	N	N	N	N	N	1	CF	M,T	N	N	N	2	IR,FRE	M,T	Z,In	Co	BM	55	65
	CE	Fu	N	N	N	N	1	BF	T	N	N	N	1	IR	M	Z,In	E	MAY	47	66
	PEC	N	Me	AC	Tu	UR	1	AS	M,T	1	AS	M,T	1	IR	M,T	Z	Pn	....	....	67
	COE	N	N	N	N	N	1	COE	M	N	N	N	24	WO	M,T	Z,In	E	COE	58	68
	CE	N	N	N	Re	APC	1	....	M	N	N	N	2	BPC	M,T	Ft,Z,In	Pn	BM	140	69
	PEC	N	Me	AAF	Re	HOP	1	CBF	M	N	N	N	3	BW	M,T	Z,In	Pn[13]	BM	300	70
	PEC	N	....	....	N	N	1	CBF	M,T	N	N	N	2	WO	M,T	Z,In	Pn[13]	BM	200	71
	PEC	N	N	N	St,Re	APC	1	CHB	M,T	N	N	N	2	WO	M,T	So,Ft,Z,In	Pn	....	200	72
	PEC	Bu	N	N	Re	APC	1	BF	M	N	N	N	2	GP	M	Z	E	MAY	150	73
	PEC	N	N	N	N	N	1	WE	M	N	N	N	2	WPI	M	In	Pn	BM	....	74
	BW	N	N	N	N	N	1	HOW	M	N	N	N	....	....	....	Ft,Z,In	..	....	....	75
	PEC	N	N	N	Re	APC	1	CF	M,T	N	N	N	....	....	....	Z,In	Pn	BM	55	76
	COE	N	N	N	N	N	1	FAA	M	N	N	N	1	DL	M	So,Z,In	Co	BM	....	77
	BW	N	N	N	N	N	1	....	M	N	N	N	1	GP	T	Ca Ft,Z	Pn	HCC	175	78
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	IR	M	In	E	COE	....	79
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	GP	M	Mu D,In	E	ECA	50	80
	CE	N	N	N	Re	APC	1	WE	....	N	N	N	Ex	Ex	Ex	Z,In	Pn	BM	....	81
	CE	N	N	N	N	N	1	CF	M	N	N	N	3	APD	M	In	Pn	BM	40	82
	CE	N	N	N	N	N	1	CHB	M	N	N	N	3 Ex	WO,AC	M	Z,In	E	CCI	225	83
	BW	N	N	N	N	N	1	SW	M	....	....	....	1	IR	M	In	N	N	50	84
	..	N	Me	WP	N	N	1	AS	M	1	GF	T	Ex	Ex	M,T	Z,So,Mu D	Pn	BM	256	85
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	WO	M,T	Ft,Z,In	Co	BM	100	86
	COE	N	N	N	Re	APC	1	FAA	M	N	N	N	1	WO	M	Z	Pn	HCC	....	87
	MW ZI	N	N	N	N	N	1	CF	M	N	N	N	Ex	....	....	....	E	CCI	....	88
	COE	Fu	N	N	N	N	1	AL	M	N	N	N	2	IR	M	Z	Pn	BM	135	89
	COE	N	N	N	N	N	1	AL	M	N	N	N	2	....	M	Z,In	E	CCI	57	90
	PEC	N	N	N	Re	HOP	1	WE	M	N	N	N	Ex	Ex	Ex	Ex	Pn[13]	....	....	91
	PEC	Fu	Me	UOP	Re	APC	1	....	T	1	....	T	2	....	M,T	In	Pn	BM	....	92
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	IR	M,T	Z	Pn	BM	53	93
	CE	N	N	N	N	N	1	....	M	N	N	N	1	AC	M	Z	Co	BM	40	94
	PEC	Fu	N	N	N	N	1	WE	M	N	N	N	2	IR	M	Z,In	Pn	BM	50	95
	WEB	N	Me	UOP	N	N	1	CF	M	1	CF	M	Ex	....	....	Z,In	Pn	BM	....	96
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	COP	T	In	E	COE	....	97
	PEC	N	N	N	N	N	1	....	....	N	N	N	1	WO	M	Z	E	....	....	98
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	....	M	Ex	....	....	....	99
	BW	N	Me	UOP	N	N	1	CF	M	N	N	N	1	WO	M	Z,In	Pn	BM	150	100
	PEC	N	N	N	N	N	1	CF	M	N	N	N	Ex	Ex	Ex	Ex	Pn	BM	....	101
	COE	N	N	N	N	N	1	AL	M	N	N	N	2[11]	UP	M	Ex	E	COE	30	102
	COE	N	N	N	N	N	1	AL	M	N	N	N	....	....	....	Z	E	COE	....	103
	PEC	N	N	N	N	N	1	CF	M	N	N	N	3	WO	M,T	Z,In	Co	HCC,M,CCI	100	104
	COE	Fu	N	N	N	N	1	COE	M	N	N	N	2	IR	M,T	Z,Da,In	E	COE	140	105
	BW	N	N	N	N	N	1	CF	M	N	N	N	Ex	Ex	Ex	Z,In	Pn	BM	250	106
	CE	N	N	N	N	N	1	....	M	N	N	N	....	....	....	....	E	..	....	107
	COE	N	N	N	N	N	1	COE	M	N	N	N	2	IR	M	Z,In	Pn	COE	40	108

- Engrs Div, Midland-Ross Corp
- The Babcock & Co
- Best Combustion Equipment Co
- ington Corp
- Preparation
- Joy Mfg Co
- Pumps, Inc
- Pump Mfg Co
- Zink Co

- ...ing
- ...ed air
- ...sse
- ...
- ... liquor
- ... ash
- ...re injected at burner
- ..., bituminous
- ...ator
- ... grate
- ... pneumatic and e...
- ...ls
- ...mace
- ...ize
- ...ical or e...
- ... injected e...
- ...

- Ev - Evaporator
- Ex - Existing
- F - Fire injected
- FT - Fire tube boiler
- I - Inverted fluidization
- FA - Additive in fuel in storage
- L - Lignite
- Hy - Hydrogen
- Mu - Multi
- MW - Multi-wall
- ... - Multi-zone
- ... - Natural gas
- ... - Oil
- ... - Oil burners
- ... - Open
- ... - Overfeed
- ... - Pneumatic
- ... - Pulverized coal
- ... - Refuse
- ... - Retractable
- ... - Roof
- ... - Single
- ... - Spreader stoker
- ... - Steam
- ... - Tangential
- ... - Traveling-grate stoker
- ... - Tubular
- ... - Underfeed stoker
- ... - Universal
- ... - Vibrating-grate stoker
- ... - Wood
- ... - Wet scrubber
- ... - Zeolite

FOOTNOTES
- ... pumps for 3 boilers
- ... As used for 3 gas, furnace gas, coke-oven gas
- ... pumps for 2 boilers
- ... gas as standby
- ... for 125 psig fuel and refinery gas
- ... Foreign built system

- Re - Regenerative
- SA - Steam-atomizing
- Sat - Saturated
- Sc - Sawdust
- SH - Space heating
- Sh - Shell and tube
- So - Sorbene
- SS - Spreader stoker
- St - Steam
- T - Turbine
- Ta - Tangential
- TG - Traveling-grate stoker
- Tu - Tubular
- TY - Closed circuit TV
- UF - Underfeed stoker
- UR - Uranium
- VG - Vibrating-grate stoker
- Wd - Wood
- WS - Wet scrubber
- Z - Zeolite

- ... - Oil backup for coal
- ... - Above roof
- ... - Continuous ion-exchange demineralizing
- ... - Black liquor spray oscillator
- ... - 2 pumps for 4 boilers
- ... - 2 pumps for 5 boilers
- ... - 3 pumps for 5 boilers
- ... - 3% excess air
- ... - With Foster Wheeler economizer
- ... - Refinery gas and light condensate
- ... - Vertical glass tubes in part
- ... - Air condensers after fine mechanical-drive turbocompressors
- ... - Cooling with N_2, in turn water-cooled
- ... - 3 pumps for 5 boilers
- ... - 350GE in future
- ... - Pulverized coal and bark in future
- ... - 5 Sc for wood
- ... - 3 pumps for 6 boilers
- ... - HTW system, nitrogen-pressurized
- ... - Will be 850 psig-825 F rate
- ... - 3 pumps for 5 boilers
- ... - HTW, steam-pressurized
- ... - Also coke-oven gas
- ... - 2 pumps for 4 boilers
- ... - Steam drive for 2 HTW cascade installation

When hourly production is b

PROJECT	COMPANY	LOCATION	CONSULTING ENGINEER	Date of initial operation	New or existing plant	Principal steam use	BOILERS: 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, fuel boiler, waterwall and superheater	FUEL: Type
109	Hercules, Inc	Covington, Ga		1968	Ex-	Pr	1 Pk	MW	25	125	Sat		O,G
110	Crompton-Shenandoah Co	Waynesboro, Va		1968	Ex	Pr	1 Pk	KEE	60	130	360	5.6	O,G
111	University of Delaware	Newark, Del	H L Shay & Assoc	1968	Ex	SH	1 Fi	CE	50	130	Sat		O
112	Florida State University	Tallahassee, Fla	Connel, Pierce, Garland & Friedman	1968	Ex	SH	1 Pk	BW	120	125	Sat		O,G
113	Goodyear Tire & Rubber Co	Akron, Ohio	Glaus, Pyle & Schomer	1967	Ex	Pr,SH	2 Pk	BW	100	125	450	6.1	O,G
114	National Brewing Co	Baltimore, Md	Egli & Gompf	1967	Ex	Pr	1 Fi	CE	90	125	353	8	G
115	F & M Schaefer Brewing Co	Brooklyn, NY	Harold H Friedman & Assoc	1967	Ex	Pr	1 Pk	CE	75	125	Sat	5.3	O
116	Aluminum Co of Canada Ltd	Kitimat, B C, Can	Acres Quebec, Ltd	1967	Ne	Pr,SH	1 Pk	BW	70	125	Sat	4.3	O
117	Sicks Rainer Brewing Co	Seattle, Wash	L Rustvold & R Kesanger	1968	Ex	Pr	1 Fi	CES	65	125	354	5.5	O,G
118	University of Arizona	Tucson, Ariz	Keller & Gannon	1967	Ex	SH	1 Pk	CE	54	125	Sat	7.1	G
119	Rensselaer Polytechnic Institute	Troy, NY		1968	Ex	SH	1 Pk	BW	50	125	353	6.4	O
120	Madison State Hospital	Madison, Ind	James T Lee & Assoc	1968	Ex	Po,SH	1 Fi	KEE	50	125	Sat	7	C
121	Blitz-Weinhard Co	Portland, Ore		1968	Ex	Pr,SH	1 Pk	CE	50	125	Sat	....	O,G
122	Aetna Life Insurance Co	Hartford, Conn		1969	Ex	SH	2 Fi	BW	40	125	Sat	....	O,G
123	Wolverine Worldwide, Inc	Muscatine, Iowa		1968	Ex	Pr	1 Pk	MW	40	125	Sat	....	G
124	St John's Hospital	Springfield, Ill	Berners, Schober & Kulp	1969	Ex	Pr,SH	2 Fi	CE	40	125	Sat	....	O,G
125	Abbott Laboratories	Rocky Mount, NC	A M Kinney, Inc	1968	Ne	Pr,SH	2 Pk	MW	40	125	Sat	4.9	O,G
126	Stanley Home Products, Inc	Easthampton, Mass		1968	Ex	SH	1 Pk	MW	35	125	Sat	....	O,G
127	Iowa Methodist Hospital	Des Moines, Iowa	Brooks-Borg & Skiles	1967	Ex	SH	2 Pk	MW	30	125	Sat	....	O,G
128	Travenol Laboratories	Hays, Kan	Howell-Stiggleman Co	1967	Ne	Pr	1 Pk	BW	30	125	350	3.6	O,G
129	Lima Memorial Hospital	Lima, Ohio	Terry P Smith, Inc	1968	Ex	SH	1 Pk	MW	27.5	125	Sat	....	O,G
130	Miles Laboratories, Inc	West Haven, Conn	A M Kinney, Inc	1968	Ne	Pr,SH	2 Pk	BW	26.5	125	353	3	O,G
131	Fanches Furniture Co	Salamanca, NY	John Rogers Co	1968	Ex	SH	1 Pk	MW	26	125	Sat	....	G,Bd
132	Holy Name Hospital	Teaneck, NJ		1968	Ex	SH	1 Pk	BW	24	120	Sat	2.7	O,G
133	Victoria General Hospital	Halifax, N S	Acres Atlantic, Ltd	1969	Ex	SH	1 Pk	FW	100	100	Sat	7.5	O
134	Creighton University	Omaha, Neb		1968	Ex	SH	1 Pk	BRO	60	100	Sat	5.2	O,G
135	White Bros Rose Corp	Medina, NY		1968	Ex	SH	1 Pk	UR	30	100	Sat	3.2	O
136	State Capital Building	Des Moines, Iowa	Moore & Bouse	1968	Ex	SH	1 Pk	MW	25	100	Sat	....	O,G
137	St John's Hospital	St Paul, Minn	D W Hickey & Co	1968	Ex	SH	1	BRO	17.5	100	Sat	1.65	O,G
138	Radford College	Radford, Va	Wiley & Wilson	1967	Ex	SH	3 Fi	KEE	40	90	Sat	4.3	O,G
	HIGH-TEMPERATURE WATER SYSTEMS												
139	U S Naval Academy	Annapolis, Md	W A Brown	1968	Ne	SH	3 Pk	1 BW	100[24]	400	440	13.4	O,G
140	Emhart Corp	Berlin, Conn	Ford, Bacon & Davis, Inc	1967	Ex	Pr,SH	2 Pk	1 BW	50[24]	400	400	5.1	O
141	Oakland University	Rochester, Mich	Migdal, Layne & Sachs	1967	Ex	SH	1 Pk	CE	32[27]	250	400	2.7	G
142	Central Plants, Inc	Los Angeles, Calif	Daniel, Mann, Johnson & Mendenhall	1966	Ne	SH	2 Pk	1 BW	30[24]	300	375	3.4	O,G
143	DuBois Chemicals Div, W R Grace & Co	Sharonville, Ohio	A M Kinney Co	1967	Ne	Pr,SH	2 Pk	1 BW	20[24]	250	300	2.1	O,G
144	White Plains Plaza	White Plains, NY	Slocum & Fuller	1967	Ne	SH	1 Pk	1 BW	10[24]	450	400	....	O
	OVERSEAS STEAM SYSTEMS												
145	Rheinische Olefinwerke	Wesseling, Germany		1967	Ne	Po,Pr	1 Pk	BW	220	2050	980	14	G
146	Esso AG	Karlsruhe, Germany	Ing Fichtner, Stuttgart	1967	Ne	Po,Pr	1 Fi	BW	242	1650	978	13.3	O,G[15]
147	B Rawe & Co	Nordhorn, Germany	Ing Schumacher, Muenster	1967	Ex	Po,Pr	1 Fi	BW	100	1300	985	9.5	G
148	Heiz Kraftwerk Stuttgart GmbH	Stuttgart-Wangen, Germany		1968	Ex	Po,SH	1 Fi	KSG	275	1280	932	27.5	O
149	Esso Chimie	Port Jerome, France		1967	Ex	Po,Pr	1 Fi	SR	615	1220	932	59	O,G[15]
150	Cellulose Billerud, SARL	Figueirada Foz, Portugal	Sandwell and Co, Ltd	1966	Ne	Pr	1 Fi	FW	110	1060	930	14	O
151	Cellulose Billerud, SARL	Figueirada Foz, Portugal	Sandwell and Co, Ltd	1966	Ne	Pr	1 Fi	BW	157	1060	900	....	O
152	Parsons & Whittemore, Inc	Arauco, Chile	H A Simons Ltd	1969	Ne	Po,Pr	1 Fi	BW	340	550	750	....	C,O,Bk
153	Parsons & Whittemore, Inc	Arauco, Chile	H A Simons Ltd	1969	Ne	Po,Pr	1 Fi	BW	200	650	750	21	O,BL
154	Central Pulp Mills, Ltd	Fort Songad, India	Sandwell International Inc	1968	Ne	Po,Pr	1 Fi	BW	50	600	750	14	BL
155	Central Pulp Mills, Ltd	Fort Songad, India	Sandwell International Inc	1968	Ne	Po,Pr	1 Fi	BW	77	600	750	4.5	O
156	Alcan Jamaica Ltd	Kirkvine, Jamaica	H G Acres & Co, Ltd	1967	Ex	Po,Pr	1 Fi	BW	210	420	760	19.6	O
157	Union Sucrière de l'Aisne	Laon, France		1968	Ex	Po,Pr	1 Fi	SR	110	410	680	17	O
158	Olinkraft Ltda	Lages, Brazil	Sandwell International Inc	1967	Ex	Pr	1 Fi	BW	27.6	350	675	4.6	BL
159	Union Laitière Cooperative	Toulouse, France		1969	Ne	Pr	1 Fi	BW	33	265	Sat	....	O
160	SOPRODIVAG	Grasse, France		1968	Ex	Pr	1 Pk	BW	362	220	446	7.4	L

000 lb most boilers in U.S. are packaged type

EQUIPMENT			DUST		AIR HEATER		F-D FANS			I-D FANS			BOILER FEED SYSTEM				COMBUSTION CONTROL			PROJECT
Burner No. per boiler	Manufacturer	Fuel additive	Dust collector type	Dust collector mfr.	Type	Manufacturer	No. per boiler	Manufacturer	Type drive	No. per boiler	Manufacturer	Type drive	No. of pumps	Manufacturer	Type drive	Feedwater treatment	Type	Control manufacturer	Chimney height, ft	
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	IR	T	Ex	E	COE	....	109
	TS	N	N	N	N	N	1	CF	M	N	N	N	2	DL	M,T	Z,In	Pn	HCC	160	110
	TS	Fu	N	N	N	N	1	CF	M,T	1	CF	M,T	3	FRE	T	In	Pn	BM	40	111
	BW	N	N	N	Re	APC	1	FAA	T	N	N	N	1	IR	M,T	Z,Da,In	E	HAY	...	112
	BW	N	N	N	N	N	1	. .	M	N	N	N	2	IR	M	So,Z,In	Pn	BM	230	113
	PEC	N	N	N	N	N	1	CF	M	N	N	N	1	WO	T	Ft,Z,In	Pn	....	150	114
	PEC	N	N	N	N	N	1	FAA	M	N	N	N	Ex	Ex	Ex	In	Pn	HCC	....	115
	BW	N	N	N	N	N	1	CBF	M	N	N	N	2	CPL	M	Z,In	Pn[13]	BM	100	116
	CE	N	N	N	N	N	1	CHB	M	N	N	N	1	WPM	M	Z,In	Pn	BM	....	117
	TS	N	N	N	N	N	N	N	N	1	CF	M	1	IR	T	Z,In	Pn	ROC	....	118
	BW	Fu	N	N	N	N	1	CF	M	N	N	N	2	WO	M	Z,In	Pn	BM	118	119
	N	N	N	N	N	N	1	CHB	M	1	CHB	M	2	PE	M,T	Z,In	Co	HAY	150	120
	COE	N	N	N	N	N	N	N	N	N	N	N	2	GP	M	In	Co	....	....	121
	BW	Bur	N	N	N	N	1	....	M	N	N	N	1	....	M	In	Pn	RD	....	122
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	GP	M	Z,In	Pn	RD	....	123
	CE	N	N	N	N	N	N	N	N	N	N	N	....	....	M	Z,In	E	CE	....	124
	COE	N	N	N	N	N	1	COE	M	N	N	N	1	WO	M,T	In	E	HCC	42	125
	.	Fu	N	N	N	N	1	L,W	M	N	N	N	2	WPI	M,T	In	Co	....	150	126
	COE	N	N	N	N	N	1	AL	M	N	N	N	2	IR	M	Z,In	E	COE	....	127
	BW	N	N	N	N	N	1	CF	M	N	N	N	2	COC	M	Ft,Z	Pn	BM	45	128
	PEC	N	N	N	N	N	1	CF	M	N	N	N	2	COC	M	Z,Ev	E	H	....	129
	COE	N	N	N	N	N	1	COE	M	N	N	N	1	WO	M	MuD,In	Pn	COE	30	130
	.	N	N	N	N	N	1	CF	M	N	N	N	2	MR	M	In	E	H	80	131
	BW	Fu	N	N	N	N	1	CF	M	N	N	N	1	SHA	M	Z	Co	BM	146	132
	PEC	N	N	N	N	N	1	CBF	M,T	N	N	N	3	Ex	M,T	N	Pn	BM	....	133
	TS	N	N	N	N	N	N	N	N	N	N	N	2	APD	M	Z,In	E	....	135	134
	COE	N	N	N	N	N	N	N	N	N	N	N	2[4]	IR	M	Z,In	Co	....	50	135
	COE	N	N	N	N	N	1	AL	M	N	N	N	Ex	Ex	Ex	....	Pn	RD	....	136
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	GP	M	N	E	COE	....	137
	COE	N	N	N	N	N	1	COE	M	N	N	N	2	PE	M,T	In	E	COE	....	138
	COE	N	N	N	N	N	1	AL	M	N	N	N	1	....	M	Z	E	HAY	....	139
	WNB	N	N	N	N	N	1	CHB	M	N	N	N	. . .	....	....	Z,In	E	BM	20	140
	PEC	N	N	N	N	N	1	CF	M	N	N	N	....	....	....	....	E	PEC	....	141
	IBW	N	N	N	N	N	1	I BW	M	N	N	N	....	....	....	....	E	....	20[9]	142
	FLA	N	N	N	N	N	N	N	N	N	N	N	....	....	....	....	....	....	....	143
	WNB	Fu	N	N	N	N	1	TR	M	N	N	N	....	....	....	Z,In	E	CCI	....	144
	BW	N	N	N	St,Tu	BW	2	BW	T	2	BW	T	2	HAL	M,T	Ex	Co	SH	165	145
	SDW	N	N	N	St,Re	BW	1	BW	M	N	N	N	2	HAL	M	Ex	....	....	485	146
	BW	N	....	....	St,Re	BW	1	BW	M	N	N	N	2	HAL	M	Ev,In	Co	SH	255	147
	KSG	N	N	N	Re	KL	1	BW	M	N	N	N	Ex[19]	KSB	M,T	MuD,In	E	JCE	328	148
SA,Ta	SR	N	N	N	Tu[16]	ECO	3	LP	M	N	N	N	2	KSB	M,T	MuD,In	E	BM	200	149
	PEC	N	N	N	Re	KL	1	SW	M	N	N	N	....[3]	KSB	M,T	MuD,In	Pn	F	145	150
	BW	N	Et	SFF	St	....	2	SW	M	2	SW	M	....[3]	KSB	M,T	MuD,In	Pn	BM	180	151
	BW	N	Me	FAA	Tu	AS	1	....	M	1	....	M	33	....	....	MuD	....	....	....	152
BL	BW	N	Et	....	St	....	1	....	M	1	....	T	33	....	....	MuD	....	....	....	153
SA,[14]	BW	N	Me	BW	St	AMB	1	CF	M	1	CF	M	1	WO	M,T	Ca,F(,MuD,In	Pn	BM	88	154
	BW	N	N	N	N	N	1	CF	M	N	N	N	1	WO	M,T	Ca,Ft,MuD	Pn	BM	65[8]	155
	BW	N	....	....	Re	HOP	1	WE	M	N	N	N	Ex	....	....	Ex	Pn	BM	150	156
	SR	Bur,Eco	N	N	N	N	1	VEN	M	N	N	N	2	RAT	M	Ev,In	E	SH	100	157
	BW	N	WS	BW	St	AS	1	CF	M	1	CF	T	2[11]	WO	M,T	Ca,So,Z,In	N	N	34[8]	158
	PIL	N	N	N	N	N	1	....	....	N	N	N	2	KSB	M	So,Ev,In	E	....	40	159
	N	N	Me	GEN	N	N	2	VEN	M	1	VEN	M	1	SUL	M	Ca,So,Ft,Z,In	Co	SEF	....	160

- Engg Env., M'chanics Corp.
- Electrostatic Corp.
- Best Combustion Equipment Co.
- Combustion Corp.
- Precipitator
- Joy Mfg. Co.
- Peerless Mfg.
- Pump Mfg. Co.
- Zink Co.
- ...zing
- ...ced draft
- ...
- liquor
- ...all
- ...injection at burner
- ...bituminous
- ...ignation
- ...grate
- ...ess pneumatic and mechanical
- ...ising
- ...furnace
- ...ize
- ...or ash
- ...injection at burner
- ...ers

Ex - Evaporator
Ex - Ex s...
F - Fired, electric
Fi... - Fire-tube boiler
F... - Fluidized hydration
Fu - Additive for use in storage
G... - Gas
H... - Hydrogen
Hyd... - Hydrate
H... - Hydrogen ...
H... - Hydrogen ...
... - ...
... - ...
M... - Multi...
Mu... - Multiple ...
Mu... - Multiple ...
N... - None
Nu... - Nucleonics, Inc.
Nw... - New
O... - Oil
Pn... - Pulverized ...
Pn... - Pulverized ...
Pn... - Pneumatic
R... - Rotary
R... - Rotary
S... - Stoker
S... - Stoker
Sa... - Saturated ...
Sc... - Scrubber
Sh... - Shell and tube
Sp... - Spray
St... - Stoker
St... - Stoker
St... - Steam
T... - Turbine
Ta... - Tangential
T... - Three-retort stoker
T... - Tubular
T... - Tubular
U... - Underfeed stoker
U... - Underfeed
V... - Vibrating-grate stoker
W... - Water
W... - Wet scrubber
Z... - Zeolite

FOOTNOTES:
- 1 pump for 3 boilers
- Also uses natural gas, refinery gas, coke-oven gas
- 2 pumps for 2 boilers
- See also 3 in section
- Also uses natural gas and refinery gas
- For existing system

- Oil backup for coal
- Above roof
- Continuous ion-exchange demineralizing
- Black liquor spray oscillator
- 1 pumps for 4 boilers
- 1 pumps for 5 boilers
- 2% excess air
- With Foster Wheeler economizer
- Refinery gas and light condensate
- Vertical glass tubes in part
- Air condensers after final
- mechanical drive turbocompressors
- Cooling with No. 6 in turn water-cooled
- 2 pumps for 5 boilers
- 1500F in future
- Drive-fed coal and bark in future
- 2 FA-2 for wood
- 3 pumps for 5 boilers
- HTW system nitrogen-pressurized
- With de-...ssip-ECE F-Rate
- 2 pumps for 3 boilers
- HTW system-pressurized
- Also coke-oven gas
- 2 pumps for 4 boilers
- Steel tower for a
- HTW cascade installation