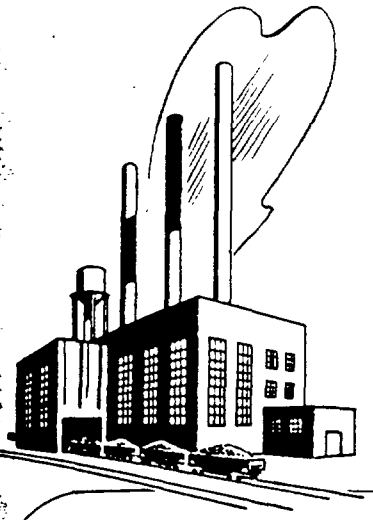
1949 MODERN PLANT SURV



Tables list engineering features of over 450 new utility and industrial steam plants, more than 175 hydroelectric units. Summaries spot design trends of recent recordbreaking years

THE GREATEST PERIOD of construction activity the power field has ever experienced continues unabated. The year 1948 saw almost 6 million kw added to our national power plant: 1949 and 1950 look to be about 10% higher. Figures now available show about 4.7 kw on order for 1951.

Such a period of activity presents an unparalleled opportunity to see where we are headed in power-plant practice. In this vast program virtually all types of construction are involved: new plants, extensions, and "tops": indoor, semi-outdoor and outdoor designs: large plants and small: a wide variety of heat-balance arrangements, plant layouts and equipment selections.

From such a large body of data, relatively reliable conclusions can be drawn. We can see the wide adoption of practices that have proved successful, the gradual abandoning of those not so well received.

The only drawback lies in the fact that the very volume of activity means that most of us are too busy to take the "long look" needed to spot trends and arrive at answers to guide our planning.

It is to meet this need that POWER makes its survey of new-plant construction. Here we do two things to serve the interests of power engineers: (1) We gather, and compile in convenient tabular form, technical details on units currently on order, under construction, or beginning operation. (2) We analyze the survey returns, and other data available to us, to show at a glance what design and equipment-selection patterns are emerging.

To broaden the basis for these trend-spotting summaries, this year we have included data on the past two years, each a record-breaker in its own right. This means that the comparisons and conclusions grow out of the largest volume of plant data ever available for analysis.

Here are facts and figures you can sink your teeth into, facts and figures on which to base the decisions you will have to make when you build a new plant, extend or modernize an older one.

1949 Listing of Typical Central-Station [Inc...]

For notes on uses and limitations of this tabulation • See page 96

Compiled by B. G. A. Skrotzki, Associate Editor

Company	Location	Plant Name	Consulting Engineers	First Operation, New Units	Nominal Pressure, psi	Nominal Steam Temperature, F	BOILERS: Number	Capacity, each 1000 lb per hr	Manufacturer	Boiler, Waterwall Surface, 1000 sq ft	Superheater Surface, 1000 sq ft	Furnace Volume, 1000 cu ft	Heat release, 1000 Btu per cu ft per hr
1500 PSIG AND ABOVE													
Indiana & Michigan Elec Co	Lawrenceburg, Ind.	Tanners Creek	Amer Gas & Elec Serv	12-50	2000	1050[1]	1	930	BW	29.6	60.5[3]	79.8	16.4
Appalachian Electric Pwr Co	Graham Sta, W Va.	Philip Sporn	Amer Gas & Elec Serv	7-51	2000	1050[1]	1	930	BW	29.6	60.5[3]	79.8	16.4
				10-51	2000	1050[1]	1	930	BW	29.6	60.5[3]	79.8	16.4
Commonwealth Edison Co	Stickney, Ill	Ridgeland	Sargent & Lundy	9-50	1800	1050	2	730	BW	19.3	44.9	35.4	24.1
				9-51	1800	1050	2	730	BW	19.3	44.9	35.4	24.1
Central Hudson Gas & El Corp	Danskammer Pt, N. Y.		Burns & Roe, Inc	1-52	1650	1000[1]	1	500					
Consolidated Edison Co of N. Y.	Brooklyn, N. Y.	Hudson Ave		9-51	1500	1050	1	1300	BW	21.6	50.2	76.7	20.6
1000 TO 1499 PSIG													
Pennsylvania Power Co	West Pittsburgh, Pa	New Castle	Commonw & Southern	10-51	1450	1000[1]	1	690	BW	14.8	52.0	52.3	18.0
Boston Edison Co	Weymouth, Mass	Edgar	Jackson & Moreland	8-49	1450	1000[1]	1	585	CE	14.8	33.0	42.0	17.3
Rochester Gas & Electric Corp	Rochester, N. Y	Russell	Gilbert Associates, Inc	10-51	1450	1000[1]	1	430	CE	20.7			19.4
Con Gas Elec Lt & Pow Co, Balt	Turner, Md.	Riverside		10-51	1450	1050	1	625	BW	11.7	24.1	43.0	18.1
Dayton Power & Light Co	nr Miamisburg, Ohio	O H Hutchings	Ebasco Services, Inc	1950	1450	1000[1]	1	430	CE	20.7		30.4	19.5
Central New York Power Corp	Oswego, N. Y	Oswego		1951	1450	1000[1]	1	656	BW	12.4	54.9	40.3	22.2
N.Y. State Elec & Gas Corp	Johnson City, N. Y.	Goudey	Gilbert Associates	1951	1450	1000[1]	1	560	CE	29.3	34.7[9]	44.6	17.0
Potomac Electric Power Co	Washington, D. C	Benning			1450	1000	1	675	CE	30.7		55.4	14.4
Wisconsin Electric Power Co	Port Washington, Wis.	Port Washington		1951	1450	950[14]	1	640	CE		16.0	61.0	12.3
Pacific Gas & Electric Co	Bakersfield, Calif	Kern	Stone & Webster		1350	925	2	450	BW	9.2	15.2	18.4	30.3[a]
	Moss Landing, Calif.	Moss Landing	Stone & Webster		1300	950	6	475	BW	9.9	20.4	32.0	18.3[a]
	Antioch, Calif	Contra Costa	Bechtel Corp.	1951	1300	950	6	475	CE	25.8	26.2	34.7	16.9
Florida Power Corp	Booth Point, Fla	Higgins	The Kuljian Corp.	2-51	1315	950	1	450	BW	5.8	16.1	26.0	—
	St. Petersburg, Fla	Bayboro	The Kuljian Corp	12-49	860	910	1	340	BW				
The Detroit Edison Co	Detroit, Mich.	Connors Creek		4-51	1300	950	4	600	BW	12.0	26.7	40.0	18.3
Cambridge Electric Light Co	Cambridge, Mass	Kendall Sq	Gilbert Associates, Inc.	12-50	1300	900							
Kansas City Power & Light Co.	Kansas City, Mo	Northeast		11-49	1275	825[17]	1	375	FW	16.0	13.8	26.4	18.1
		Hawthorn	Ebasco Services, Inc	1950	1250	950	2	625	CE	28.4	23.5	45.8	16.9
New Jersey Power & Light Co	Holland, N. J.	Gilbert	Gilbert Associates, Inc.	10-49	1250	950	1	650	CE	27.8	25.5	49.5	18.0
Illinois Power Co	nr Alton, Ill	Wood River	Sargent & Lundy	12-49	1250	1000	2	450	CE	22.1	28.4	30.6	17.8
				12-50	1250	1000	1	450	CE	22.1	28.4	30.6	17.8
Union Electric Co of Missouri	St. Louis County, Mo	Meramec		1952	1250	950[18]	1						
Duke Power Co	Pelzer, S. C.	Lee		12-50[19]	1250	950[18]	2	750	CE	38.5	32.5[19]	63.0	15.6
Pennsylvania Power & Light Co.	nr Sunbury, Pa	Sunbury	Ebasco Services, Inc	5-51	1250	950	1	800	FW	26.1	50.4	82.4	12.1
Carolina Power & Light Co	Lumberton, N C	Lumberton	Ebasco Services, Inc	9-49[23]	1250	950	2	425	BW	9.2	15.7	30.0	18.0
Louisiana Power & Light Co	nr Westwego, La	Ninemile Point	Ebasco Services, Inc.	4-51	1250	950	1	650	CE	22.1	16.8	33.3	27.1
Montauk Electric Co	Somerset, Mass	Somerset	Stone & Webster	9-51	1250	950	1	625	CE	28.2	22.3	45.2	16.0
Virginia Electric & Power Co.	Bremo Bluff, Va	Bremo	Stone & Webster	1950	1250	950	1	625	BW	12.0	26.8	40.0	19.4
Delaware Power & Light Co.	Wilmington, Del	Edge Moor	United Eng & Const	1951	1250	950	2	600	CE	37.9	21.7		16.8
Georgia Power Co	Yates, Ga	Yates	Commonw & Southern	1950	1250	950	2	975	CE	40.9	36.2	74.0	15.4
Alabama Power Co.	Gorgas, Ala	Gorgas	Commonw & Southern	1951	1250	950	1	975	BW	17.0	32.7	58.9	19.4
~~Utah Power & Light Co~~	~~Salt Lake City, Utah~~	~~Salt Lake City~~	~~Bechtel Corp.~~	1951	1250	950	1	620	RS	38.5	35.5	49.0	15.1
Philadelphia Electric Co	Philadelphia, Pa	Richmond		1950	1250	950	2	800	CE	36.5	32.4	60.0	15.5
Dallas Power & Light Co	Dallas, Texas	Parkdale	Ebasco Services, Inc	5-52	1250	950	1	625					
Omaha Public Power District	Omaha, Nebr	Jones Street		7-49	1250	950	1	330	BW	11.2	14.0	24.0	17.3
Northern Indiana Public Serv Co	Michigan City, Ind	Michigan City	Sargent & Lundy	10-50[21]	1250	950	3	375	BW	9.8	17.0	16.7	28.0
Cincinnati Gas & Electric Co.	Cincinnati, Ohio	Miami Fort	Sargent & Lundy	11-49	1250	950	2	400	BW				
Mississippi Power & Light Co	Jackson, Miss	Rex Brown	Ebasco Services, Inc	12-49	850	900	1	450	CE	23.7	7.3	21.0	29.6
				12-49	1250	950	1	650	BW	16.3		36.3	25.0
	Natchez, Miss	Natchez	Ebasco Services, Inc	2-51	1250	950	1	625	BW	16.3		36.3	24.1
800 PSIG TO 999 PSIG													
Illinois Power Co	nr Havana, Ill	Havana	Sargent & Lundy	12-48	850	900	1	285	CE	19.2	11.6	20.2	18.0
				4-50	850	900	2	285	CE	19.2	11.6	20.2	18.0
				6-50	850	900	2	285	CE	19.2	11.6	20.2	18.0
El Paso Electric Co	El Paso, Texas	Rio Grande	Stone & Webster	3-51	850	900	1	335	BW	23.5		14.4	32.3
The Cleveland Elec Illum Co	Cleveland, Ohio	Lake Shore-A		11-50	850	950	2	680	BW	17.5	19.9	34.7	23.8
	Avon Lake, Ohio	Avon		8-49	850	950	2	850	CE	35.3	27.6	64.0	16.2
Wisconsin Public Service Corp	Green Bay, Wis	Pulliam	Pioneer Serv & Engng	9-49	850	900	1	460	BW	12.2	18.2	26.6	22.5
				1951	850	950	1	585	BW	13.6	28.4	39.5	19.0
Florida Power & Light Co	Sarasota, Fla	Sarasota	Ebasco Services, Inc	12-50	850	900	1	235	CE	23.0		11.8	25.1
Gulf Power Co	Pensacola, Fla	Pensacola	Commonw & Southern	8-49	850	900	1	230	RS	19.6	6.6	13.4	22.3
Georgia Power Co	Albany, Ga	Mitchell	Commonw & Southern	11-48	850	900	1	230	BW	21.7	6.6	16.3	17.2
				3-49	850	900	1	230	BW	21.7	6.6	16.3	17.2
	Atlanta, Ga	Atkinson	Commonw & Southern	11-48	850	900	1	600	CE	28.4	13.7	35.0	21.0
	Arkwright, Ga	Arkwright	Commonw & Southern	11-48	850	900	[illegible]	300	BW	9.8	10.4	22.3	22.5
Texas Electric Service Co	Fort Worth, Texas	Handley	Ebasco Services, Inc	10-50	850	900	1	825	CE	47.2	14.6	33.1	26.0
	Colorado City, Texas	Morgan Creek	Ebasco Services, Inc	4-50	850	900	2	220	FW	21.0	7.1	8.6	35.7
		Mountain Creek	Ebasco Services, Inc	5-49	850	900	1	450	BW	26.9	8.5	19.9	31.1
Dallas Power & Light Co	Dallas, Texas						1	250	BW	17.8	7.2	11.7	29.0
		Dallas	Ebasco Services, Inc	1-51	850	900	[illegible]	675	CE	41.6	12.6	37.3	28.0
Houston Lighting & Power Co	Houston, Texas	[illegible]	Ebasco Services, Inc	3-50	850	900	[illegible]	350	RS	18.8	11.0	14.6	33.1
		West Junction	Ebasco Services, Inc	6-51	850	900	1	825	RS	38.8	19.4	36.6	31.0
				2-51	850	900	1	825	RS	38.8	19.4	36.6	31.0
Central Arizona Light & Power Co	Phoenix, Arizona	Phoenix	Ebasco Services, Inc	1948	850	900	1	325	BW	23.0	7.9	16.1	27.2
				1949	600	825	1	150	CE	12.0	3.2	6.1	32.3
				1950	850	900	1	675	CE	41.5	12.7	37.3	25.2
Texas Power & Light Co	Trinidad, Texas	Trinidad	Ebasco Services, Inc	11-49	850	900	2	350	BW	25.8	13.3	22.2	21.8
Kent[illegible]	[illegible]	K U Park	Sargent & Lundy	7-51	850	900	1	325	BW	28.9	12.1	24.4	16.8
Southwestern Gas & Elec Co	Mooringsport, La	Lieberman	Sargent & Lundy	4-49	850	900	1	250	BW	18.9	6.3	13.2	25.0
	Easton, Texas	Knox Lee	Sargent & Lundy	12-50	850	900	[illegible]	300	BW	21.5	7.8	13.2	31.2
Central Power & Light Co	[illegible], Texas	[illegible]	Sargent & Lundy	7-51	850	900	1	330	BW	21.5	7.8	13.2	31.2

A —[illegible]
G —Natural gas
GE —General Electric Co
H —Hydrogen cooled
P —Pulverized coal fired
Pa —C A Parsons & Co, Ltd
PA —Phosphorized admiralty
PB —Phosphor bronze
—Plate
—Regulator
—Red brass
—Regenerative
—Riley Stoker Corp
—Springfield Boiler Co
—Spreader stoker
—Natural circulation
—Magnetic [illegible]
—Motor drive

...and Municipal Power-Plant Installations

Air-Heater Surface per Boiler, 1000 sq ft	Air-Heater Type	F-D Fans: Drive	F-D Fans: Air-Volume Control	I-D Fans: Drive	I-D Fans: Gas-Volume Control	Firing	Fuel: Type	Fuel: Heating Value, 1000 Btu per lb	Fuel: Ash-Softening Temperature, F	Feed Pumps: Drive	Feed Pumps: Flow Control	Turbines: Capacity, 1000 kw	Turbines: Speed, rpm	Turbines: Manufacturer	Turbines: Backpressure, psia	Turbines: No. of Bleed Points	Generator Cooling	Condensers: Surface, 1000 sq ft	Condensers: No. Water Passes	Condensers: Tube Material	Total Boiler Capacity, Incl New Units, 1000 lb	Total Generator Capacity, Incl New Units, 1000 kw
281.4	Re	M	V	M	V	P	C	11.4	2300	3M		125	3600[2]	GE	0.5	6	H	65	1	AsCu	930	125
281.4	Re	M	V	M	V	P	C	11.4	2300	3M		125	3600[2]	GE	0.5	6	H	65	1	AsCu	2790	375
281.4	Re	M	V	M	V	P	C	11.4	2300	3M		125	3600[2]	GE	0.5	6	H	65	1	AsCu	3720	500
155.5	Tu	M	V	M	V	Cy	C	10.0	2000	2M, 1T	R	150	3600[2]	WE	0.5	5	H	100	1	Ad	1460	150
155.5	Tu	M	V	M	V	Cy	C	10.0	2000	3M	R	150	3600[2]	GE	0.5	5	H	100	1	Ad	2020	300
	Tu	M	V	M	V	P, O	C, O			2M		60[4]	3600	GE	0.5	6	H		1	Ad	500	60
354.4	Re	M	V	M	V	P, O	C, O	14.4	2050	2M, 1T		65	3600	WE	400[5]	1	H	....	...	...	11,240	835
227.0	Tu	M	D, Hy	M	D, Hy	P	C	11.0	2100	2M	Hy	85	3600	WE	0.75	5	H	47.5	2	AnAd	1590	171
157.8	Re	M	V	M	V	P, O	C	13.9	2600	2M	R	81.3	3600	WE	0.5	5	H	45.0	1	AlBr	2378	245
128.0	Re	M	V	M	V	P	C	12.8	2100	3M	R	50	3600	GE	0.5	6	H	32.5	2	Ad	930	90
109.6	Re	M	V	M	Hy	P	C	12.5[6]	2400	2M	R	60[8]	3600	GE	0.5	5	H	55	2	AAlBr	2275	255
46.6	Re	M	V	M	Ma	P	C	13.0		3M	R	60[8]	3600	GE	0.75	6	H	45	2	Ad	1500	180
246.8	Re	M		M		P	C	13.1	2050	3M	Hy	80	3600	GE	0.5	7	H	50	1	Ad	3306	320
230.0	Re	M	V	M	V	P	C	12.9	2600	2M	Hy	60[7]	3600	WE	0.5	5	H	42.5	2	AAd	1684	150
122.5	Tu					P	C, O	13.0	2000			25	3600	GE	400	....	H					260
259.2	Re	M	Ma	M	Ma	P	C	12.6	2156	2M, 1T		80	1800	AC	0.25	5	H	83.7	1	AAd	3365	400
67.6	Tu	M	D, V	M	D	O, G	O, G	18.5[12]		2M	R	100	1800	GE	1.4	4	H	35	1	PAd	1800	175
												7.5	3600	GE	2.0	1	A					
76.4	Re	M	D, V	M	D	O, G	O, G	....	......	8M	R	100[14]	3600	GE		4	H					
												100	3600	WE	....	4	H	50	1	.....	2850	300
												7.5[15]	3600	GE	2.0	1	A					
69.8	Re	M	D, V	...	D	O, G	O, G	18.5[12]		8M	R	100[16]	3600	GE	0.75	4	H	50	1	.	2850	300
												7.5[15]	3600	GE	2.0	1	A					
	Tu	M	V	M	D	O	O	18.4		..	R	44	3600	GE	1	5	H	32.5	1	AlBr	450	44
72.2	Re	M	V	M	D	O	O	18.4		M	R	12.5	3600	WE	1	3	A	10	1	AlBr	898	56
142.2	Re	M	Hy	M	Hy	P	C	11.6	2100	3M	Hy	100[14]	1800	WE	0.5	5	H	60	1	Ad	6030	515
												20[34]	3600	WE	0.5	1	H	17.0	2	AlBr	400	32
114.9	Re	M	V	M	Hy	P, G	C, G	10.3	1900	1T	S										2275	166
228	Re	M	V	M	Ma	P	C	10.5	1550	2M		60[8, 14]	3600	GE	1.0	5	H	60	2	AsCu	1250	132
146.4	Re	M	V	Mp	V	P	C	13.0	2000	3		60[8]	3600	GE	0.5	5	H	50	2	Ad	1150	121
95.1	Tu	M	Hy	M	Hy	P, G	C, G	10.7	1950	3M, 1T	R	40[14]	3600	GE	0.5	5	H	30	1	AsCu	900	80
95.1	Tu	M	Hy	M	Hy	P, G	C, G	10.7	1950	1M, 1T	R	40	3600	GE	0.5	5	H	30	1	AsCu	1350	120
							C					110	3600	WE	.....			...				
181.6	Re	M[20]	V	M[20]	Ma	P	C	12.5	2300	4M	R	90[14]	3600	GE	0.75	6	H	65	2	AdI	1500	180
165.6	Re	M	V	M	Ma	P	C[21]	13.7[22]	2100	3M		100	3600	WE	0.75	5	H	60	2	Ad	2400	250
112.6	Re	M	Hy	M	Hy	P	C	13.8	2100	3M	R	40[8, 14]	3600	GE	1.12	5	H	37.5	2	AsCu	850	80
76.0	Tu	M[24]	D, V	M[24]	D, V	O, G	O, G	1000[25]		3M	R	60[8]	3600	GE	0.75	4	H	55	2	Ad	650	60
88.4	Re	M[24]	V	M[24]	Hy	P	C, O	11.7	2200	3M	R	60[8]	3600	GE	0.75	5	H	47.5	2	CuNi	2195	205
119.6	Re	M[24]	V	M[24]	V	P	C	13.6	2300	3M	Hy	60[8]	3600	WE	0.75	5	H	47.5	2	Ad	1025	90
140.0	Tu	M	V	M	S	P	C			6M	Hy	60[8, 14]	3600	GE	0.75	5	H	40.0	1	AlB	1200	120
297.0	Re	M	Hy	M	Hy	P, G	C, G	12.0	2500	3M	Hy	100[14]	3600	GE	1.75	5	H	81.5	2	AAd	1950	200
289.2	Re	M	Hy	M	Hy	P	C	11.7	2550	3M	Hy	100	3600	WE	1.5	5	H	81.5	2	AAd	2375	220
138.6	Re	M[26]	V	M[26]	D		C, O, G[27]	...	1950	2M, 1MT	R	60[8]	3600	WE	1.25	5	H	37.5	1	Ad	620	60
196.4	Re	M	V	M	V	P, O	C, O	12.7	2000	2T	S	165	1800	GE	1.0	4	H	75.0	1	Ad	4840	450
						O, G	O, G	1080[25]		2M		60	3600	GE			H	60	2	AsCu	625	60
67.5	Re	M	V	M	Hy	P	C, G	11.4	1900	1M, 1T	Hy	30	3600	GE	0.5	4	H	30	2	AsCu	1700	137
85.0	Tu	M	D	M	D, Hy	Cy	C	10.8	2100	3M, 1T		60[8, 14]	3600	WE	0.5	5	H	42.5	1	AdCu	1950	208
....	Re	M	V	M	Hy	P	C	12.5	...	3M	R	80	3600		0.5	4	H	55	2	...	......	340
66.6	Tu	M	V	M	D	G	G	1050[25]	...	1M, 1T	...	40[8]	3600	WE	1.25	4	H	40	2	Cu	800	77
....	Re	M	D	M	D	G	G	1050[25]		3M		60[8]	3600	WE	1.25	4	H	55	2	Cu	1450	143
....	Re	M	D, V	M	D, V	G	G	1050[25]		3M	R	60[8]	3600	WE		5	H	55	2	AsCu	625	60
51.4	Tu	M	Hy	M	Hy	P	C	10.3	.	1M, 1T	R	40	3600	GE	0.5	4	H	30	1	...	1140	120
51.4	Tu	M	Hy	M	Hy	P	C	10.3		2M	R	40	3600	GE	0.5	4	H	30	1	.	1710	160
51.4	Tu	M	Hy	M	Hy	P	C	10.3		2M	R	40	3600	GE	0.5	4	H	30	1		2280	200
61.2	Re	M	D, V	M	D	G, O	G, O	1100[25]		2M	R	30	3600	WE	0.75	4	H	25	2	Ad	1074	94
263.8	Re	M[26]	V	M[26]	V	P	C	11.4	2050	6M	R	60[14]	1800	GE	0.5	5	H	47.5	1	RB	2450	240
281.6	Re	M[26]	V	M[26]	V	P	C	11.4	2100	6M, 1T	R	75[14]	1800	GE	0.5	5	H	60	1	RB	4412	340
....	Re	M	Hy	M	Hy	P	C	12.2	2320	3M	R	50	3600	WE	0.75	4	H	32.5	1	AnAd	1355	130
47.3	Re	M	Hy	M	Hy	P	C	12.2	2320	3M	R	62.5	3600	WE	0.75	5	H		1		1940	193
23.0	Re	M	V	M	D	O	O	18.0		2M		20	3600	GE	1.12	4	H	15	1	AlBr	435	35
33.3	Tu	Mp	V	Mp	V	O, G	O, G	950[25]		2M	R	22.5	3600	GE	1.0	3	H	20.4	2	AlBr	460	45
61.0	Re	M	Hy	M	Hy	P	C	12.0	2200	2M	R	22.5	3600	GE	1.0	3	H	20.4	2	Ad	230	22.5
61.0	Re	M	Hy	M	Hy	P	C	12.0	2200	2M	R	22.5	3600	GE	1.0	3	H	20.4	2	Ad	460	45
63.0	Re	M	Hy	M	Hy	P, G	C, G	12.0	2200	2M	R	60	3600	GE	1.0	4	H	47.0	2	Ad	2300	240
36.5	Re	M	Hy	M	Hy	P	C, G	12.0	2200	1M	R	40	3600	GE	1.0	4	H	31.3	2	Ad	1600	160
121.6	Tu	M	D	M	D	G, O	G, O	1062[25]	...	3M	R	60	3600	GE	1.75	4	H	65.0	2	AsCu	1040	106
44.1	Re	M	D	M	D	G, O	G, O	1050[25]		1M	R	18.75[14]	3600	GE	1.75	4	H	15.0	2	AsCu	440	48
81.3	Re	M	V	M	V	G, O	G, O	1080[25]		1M, 1T	R	60[8]	3600	GE	0.75	4	H	50.0	1	AsCu	1400	116
30.0	Re	M	V	M	V	G, O	G, O	1080[25]														
104.7	Tu	M	D, V	M	D, V	G, O	G, O	1080[25]		2M	R	60[8]	3600	WE	1.25	4	H	55.0	2	AsCu	1880	143
57.5	Tu	M	D, V	M	D	G, O	G, O	1018[25]		1M, 1T	...	30[8]	3600	WE	1.25	4	H	30.0	2	AsCu	1350	93
63.5	Tu	M	D, V	M	D	G, O	G, O	1018[25]		1M, 1T	..	60	3600	GE	1.75	4	H	65.0	2	AsCu	1625	174
83.5	Tu	M	D, V	M	D	G, O	G, O	1018[25]		2M		60	3600	GE	1.75	4	H	65.5	2	AsCu	2450	234
56.1	Tu	M	V	M	D, V	G, O	G, O	1100[25]		1M, 1T	R	30[8]	3600	GE	0.75	4	H	25.0	2	AsCu	940	76
20.3	Re	M	V	M	V, D	G, O	G, O	1100[25]		1M, 1T	R	12.7	3600	El	0.75	3	A	11.0	2	AsCu	1090	88
104.7	Tu	M[30]	D, V	M[30]	D, V	G, O	G, O	1100[25]		3M	R	60[8]	3600	WE	0.75	5	H	55.0	2	AsCu	1765	148
55.6	Re	M	D	M	D	G, O	G, O	1072[25]		3M	R	60[8]	3600	GE	.25	4	H	50	2	Ad	2340	161
61.6	Tu	M	V	M	Ma	P	C	12.0	2400	2M	Hy	30[8]	3600	WE	0.75	4	H	27.5	2	PAd	775	65
38.6	Tu	M	V	M	V	G	G			1M, 1T	R	20	3600	GE	1.0	4	H	18.5	1	AsCu	500	40
53.3	Tu	M[29]	V			G, O	G, O			1M	R	30[8]	3600	WE	0.75	4	H	25.0	1	AsCu	600	60
53.3	Tu	M[30]	CP			G	G	1060[25]		1M, 1T		30[8]	3600	GE	0.75	4	H	30.0	2	AAd	330	30

—Turbine drive
—Traveling-grate stoker
—Tubular
—Underfeed stoker
—Union Iron Works
—Vane control
—Henry Vogt Machine Co
—Wood
—Wm Bros Boiler & Mfg Co
—Westinghouse Electric Corp
—Worthington Pump & Mach Corp
(x) —Sq ft stoker area

1—Reheat to 1000 F
2—H-p shaft 3600, l-p 1800 rpm
3—Reheater 30,200 sq ft
4—Condenser is turbine foundation
5—400 to 275 psig
6—Ranging up to 13,900 Btu per lb
7—75,000-kw capability
8—AIEE-ASME preferred standard
9—Reheater 9000 sq ft
10—Reheat to 950 F
11—30,350 on oil, 32,300 on gas
12—Gas, 1000 Btu per cu ft
13—18,300 on oil, 19,400 on gas
14—2 units being installed
15—3 house units being installed
16—3 units being installed
17—Reheat to 750 F
18—2nd unit starts 6-51
19—Reheater 10,500 sq ft
20—2 fans per unit
21—70% bituminous, 30% anthracite
22—Anthracite 12,500 Btu per lb
23—2nd unit starts 6-50
24—2 motor-dr ... fans
25—Btu per cu ft
26—2-speed motor
27—Also pitch
28—Second unit in 10-51
29—F-d fan only, furnace designed for pressure operation
30—Drives controllable-pitch blower for pressurized furnace
31—Revised, originally listed in 1948 survey
32—Second-hand unit
33—17,000 on coal, 27,000 on wood
34—Automatic-extraction unit

1949 Listing of Typical Central-Station [inc...]

For notes on uses and limitations of this tabulation ● See page 96

Compiled by B G A Skrotzki, Associate Editor

Company	Location	Plant Name	Consulting Engineers	First Operation, New Units	Nominal Pressure, psi	Nominal Steam Temperature, F	BOILERS: Number	Capacity, each 1000 lb per hr	Manufacturer	Boiler, Waterwall Surface, 1000 sq ft	Superheater Surface, 1000 sq ft	Furnace Volume, 1000 cu ft	Heat release, 1000 Btu per cu ft per hr	Furnace Bottom
Public Service Co of Indiana	Edwardsport, Ind	Edwardsport	Sargent & Lundy	1–49	850	900	2	400	RS	34.4	14.1	29.0	17.6	DB
Savannah Electric & Power Co	Savannah, Ga	Riverside	Stone & Webster	1–50	850	900	1	200	CE	7 1	7 6	9.3	28.2	DB
Tampa Electric Co	Tampa, Fla	Hookers Point	Stone & Webster	7–48	850	900	2	200	BW	14.5	5.0	8.7	32.0	DB
Central Illinois Electric & Gas Co	Rockford, Ill	Sabrooke	Stone & Webster	11–49	850	900	1	205	FW	22 3	4.4	10.5	26.2	—
Western Massachusetts Elec Co	West Springfield, Mass	West Springfield	Stone & Webster	9–49	850	900	1	400	CE	15 6	1 .9	29.2	17.3	DB
Virginia Electric Power Co	nr Dumfries, Va	Possum Point	Stone & Webster	1951	850	900	1	650	CE	43.0	....	45.5	16.9	DB
~~West Penn Power Co~~	~~Pittsburg, Pa~~	~~Millsboro~~	~~Sanderson & Porter~~	7–50	850	900	2	210	RS	22.6		15.5	17.9	DB
The United Illuminating Co	New Haven, Conn	English	Westcott & Mapes	11–49	850	900	1	320	BW		15.2	22 7	16.9	DB
Indianapolis Power & Light Co	Martinsville, Ind	White River	Gibbs & Hill	12–51	850	900	1	400	CE	25 5	13.8	23.2	22.5	ST
~~South Carolina Power Co~~	~~Charleston, S C~~	~~Hagood~~	~~Gilbert Associates~~	5–50	850	900	1	230	RS	19 6	7.4	13.4	21.6	DB
				6–51	850	900	1	310	RS	24.9	10.0	....	21.6	DB
Philadelphia Electric Co	W Norriton Town, Pa	Barbadoes		2–49	850	900	2	600	FW	30.5	20 8	47 1	15.4	DB
Duquesne Light Co	South Heights, Pa	Frank R Phillips		1949	850	900	1	600	FW	23.9	17 1	35.0	20.9	DB
				1950	850	900	2	600	FW	23 9	17.1	35.0	20.9	DB
West Texas Utilities Co	Lake Pauline, Texas	Lake Pauline	Sargent & Lundy	3–51	850	900	1	250	BW	15.8	6.3	10.6	30.8	DB
	Amherst, Texas	Plant "X"		2–52	850	900	1	500	CE	34.5		22.2	29.0	DB
Southwestern Public Service Co	Amarillo, Texas	Eastside		3–51	650	825	1	400	BW	32.2	9.8	17.8	29.7	DB
	Roswell, N M	Roswell	Stearns-Roger Mfg Co	7–50	650	825	1	210	BW	15.8	3.6	9 0	29.7	DB
	Abernathy, Texas	Tuco	Stearns-Roger Mfg Co	7–49	600	825	1	275	BW	18.3	5 3	11.2	32.0	DB
	Springfield, Ohio	Mad River	Commonw & Southern	1–49	850	900	1	250	RS	18.0	6.2	15.0	23.0	DB
Ohio Edison Co	Toronto, Ohio	Toronto	Commonw & Southern	9–49	800	875	1	600	BW	11.4	16.5	44.1	18.4	DB
				1–50	800	875	1	600	BW	11.4	16 5	44.1	18.4	DB
	Akron, Ohio	Gorge	Commonw & Southern	12–48	800	875	1	450	BW	11 4	17.9	30.9	19.1	DB
Oklahoma Gas & Electric Co	W. of Okla. City, Okla.	Mustang	Pioneer Serv & Engrg	3–50	850	900	1	475	BW	11 2	18 3	30.1	20.6	DB
				3–51	850	900	1	475	BW	11.2	18 3	30.1	20.6	DB
Northern States Power Co	Minneapolis, Minn	Riverside	Pioneer Serv & Engrg	7–49	850	900	1	570	BW	13 5	22.9	37.5	20.0	DB
	Sioux Falls, S D	J L Lawrence	Pioneer Serv & Engrg	9–48	650	825	1	125	BW	15.5	5.3	7.9	22.0	—
	Mankato, Minn	G H Wilmarth	Pioneer Serv & Engrg	10–48	650	825	1	125	BW	15.5	5.3	7.9	22.0	—
	St. Cloud, Minn	Whitney	Pioneer Serv & Engrg	6–48	450	750	1	125	Vo	10.8	2.4	5.5	33.0	—
	La Crosse, Wis	French Island	Pioneer Serv & Engrg	4–48	450	750	1	125	EM	14.9	5.1	7 5	29.7	—
	Grand Forks, N D	Grand Forks	Pioneer Serv & Engrg	9–48	400	750	1	65	WB	9 3	2.0	4.2	23.0	—
Madison Gas & Electric Co	Madison, Wis	Blount	Mead & Hunt	11–48	825	825	1	200	BW	19.3		....	15.2	DB
600 PSIG TO 799 PSIG														
Pennsylvania Electric Co	Indiana County, Pa	Seward	Gilbert Associates	1950	650	825	2	300	BW	28.5	....	19.3	19.3	DB
Holyoke Water Power Co	Holyoke, Mass.	No. 1	Jackson & Moreland	10–48	650	750								
~~Interstate Power Co~~	~~Sherburn, Minn~~	~~Fox Lake~~	~~Sargent & Lundy~~	9–50	600	900	2	120	RS	14.3	0.9	9.9	17.5	DB
Central Louisiana Electric Co	St Landry, La	Coughlin	Sargent & Lundy	9–49	600	825	1	120	CE				29.2	
Fitchburg Gas & Elec Light Co	Fitchburg, Mass.	Sawyer Passway	Chas T Main, Inc.	12–49	600	825	1	150	CE	18.7		8.7	20.5	DB
Texas Electric Service Co	Wichita Falls, Texas	Wichita Falls	Ebasco Services, Inc	5–49	600	825	1	150	CE	12.0	3.2	6.1	33.1	DB
Dallas Power & Light Co	Dallas, Texas	Mountain Creek	Ebasco Services, Inc.	3–50	600	825	2	150	CE				33.1	
Imperial Irrigation District	El Centro, Calif	El Centro	Gibbs & Hill, Inc.	4–49	600	825	1	260	CE	17.0	4.0	9.3	32.8	DB
Minnkota Power Cooperative, Inc.	Grand Forks, N. D	Grand Forks	Ellerbe & Co	11–49	600	825	2	72	RS	9.5	2.5	4.0	28.0	DB
Public Service Co of New Mexico	Albuquerque, N. M	Prager	Stearns-Roger Mfg Co.	12–48	615	825	1	125	BW	11.6	1.4	5.0	34.1	
The Tucson Gas, Elec Lt & Pwr Co	Tucson, Arizona	No. 3	Sanderson & Porter	1949	615	825	1	150	BW	13 3	3 3	5 6	....	DB
					615	825	1	150	BW	13.3	3.3	5.6	....	DB
Grand River Dam Authority	Pryor, Oklahoma	Chouteau	W R Holway & Assoc	11–49	600	750								
New Hampshire Gas & Electric Co	Portsmouth, N. H.	Portsmouth	Gilbert Associates, Inc	6–50	600	825	1	100	CE	12.4		6.0	23.7	DB
UNDER 600 PSIG														
Omaha Public Power District	Omaha, Neb	South Omaha		6–48	450	750	1	200	CE	14.5	.....	7.9		DB
~~Central Ohio Light & Power Co~~	~~Bluffton, Ohio~~	~~Woodcock~~	~~Sargent & Lundy~~	12–47	425	835	1	120	RS	14.0	3.1	8.0	20.0	DB
				6–50	425	835	1	120	RS	14.0	3.1	8.0	20.0	DB
Iowa-Illinois Gas & Electric Co	Coralville, Iowa	Coralville	United Lt & Rwy Serv	8–49	425	740	1	60	RS	8.9	0.7	3.2	26.8	DB
Public Service Co of New Mexico	Santa Fe, N. M.	Santa Fe	Stearns-Roger Mfg Co	11–49	415	750	2	50	CE	2.4	0 3	0.3	....	
Georgia Power & Light Co	Waycross, Ga	Waycross	Gibbs & Hill	11–48	410	725	3	44 5	CE	2.4	0.3	0.3		DB
Missouri Public Service Corp	Sedalia, Mo	Sedalia	Burns & McDonnell	11–49	400	750	1	90	BW	12 0	.....	5 0	29 0	
Public Service Co of Colorado	Grand Junction, Colo	Grand Junction		4–48	400	750	1	60	BW	9 8	1 5	6.2	13.6	ST
			Stone & Webster	1–50	400	750	1	85	RS	10 3	0.8	4 6	25 0	DB
Wellsboro Electric Co	Wellsboro, Pa	Wellsboro	Zack C Hinds	7–47	400	650	2	36	K	4 0	....	1 3	39.6	—
	Beulah, N D	Beulah	Stearns-Roger Mfg Co	11–49	400	750	2	50	BW	6.1	....	2.7	28 2	—
Montana-Dakota Utilities Co	Bismarck, N D	Bismarck	C M Garland & Co	6–48	175	450	1	60	RS	8 1	1.3	2.6	37 0	—
	Kincaid, N D	Kincaid	Stearns-Roger Mfg Co	11–48	200	520	1	60	BW	8.2	....	3.3	27 0	—
Public Service Co of Oklahoma	Lawton, Okla	Lawton		7–48	300	600	1	200	BW	18.4	....	9 0	30 5	DB
New York Steam Corp	New York, N Y	60th Street	Baker & Spencer Inc.	1–48	300	Sat	1	300	BW	35.7	0	17 1	21 9	—
The Connecticut Power Co	Stamford, Conn	Stamford	Stone & Webster	1–49	190	500	2	125	BW	11.9	0.5	5 8	28.9	—
Hope Natural Gas Co	Hastings, W Va	Hastings	Dravo Corp	1948	175	500								—
MUNICIPAL PLANTS														
Board of Public Utilities	Kansas City, Kan		Burns & McDonnell	1951	850	900	1	300	BW	18 3		20 0	21.4	ST
Electric Department	Austin, Texas		Burns & McDonnell	6–50	850	900	1	200	CE	21 2	6.3	11.3	24 3	—
				6–51	850	900	1	200	CE	21.2	6 3	11.3	24.3	—
City of Springfield	Springfield, Ill	Lakeside	Burns & McDonnell	7–49	700	875	1	250	SP	12 1	7 7	14 0	24 2	DB
City of Cleveland	Cleveland, Ohio	Lakeside	Burns & McDonnell	1951	650	835	2	300	FW	24 0		14.5	31.0	ST
~~City Electric Dept~~	~~Rochester, Minn~~	~~Silver Lake~~	~~Sargent & Lundy~~	6–49	600	825	1	90	RS	13 2	2 2			DB
~~Eugene Water & Electric Board~~	~~Eugene, Oregon~~	~~Steam~~		10–49	600	825	1	175	RS	28.7	3 6	13.0	17.0[a]	—
City of Ames	Ames, Iowa		Burns & McDonnell	7–50	600	825	1	95	RS	13 9		5.8	24.3	—
City of Henderson	Henderson, Ky		Burns & McDonnell	7–51	600	825	2	60	BW	12 7	....	3 4	24.4	—
Municipal Electric Light Plant	Hagerstown, Md		Albert C Wood	9–49	460	730	2	70	EC	8 3		2 6	35.0	—
Columbia City	Columbia, Ind	Light			450	750	1	60	EM					—
Municipal Power & Light	Trinidad, Colo		Rocky Mountain Co	1–50	450	750	2	55	CE				25.0	—
City of Coleman	Coleman, Texas		Ferrell Bartlett Engr	9–49	450	750	1	28	BW					—
Municipal Power & Light	Pella, Iowa		Brown Engrg Co	4–48	450	750	1	25	BW	4 3	1 1	1 4	25.4	DB
Municipal Utilities	Owensboro, Ky		Black & Veatch		425	750	2	100	BW					—
City of Alliance	Alliance, Neb		Black & Veatch	7–49	425	750	1	30	MI	5 8	1 2	2 1	25.0	—
Valley City	Valley City, N D			11–[illegible]	400	700	1	60	EC	6 7		2 4	37.0	—
Board of Public Works	Hannibal, Mo	Hannibal	Black & Veatch	5–50	400	850	1	100	MI	11 8	3.5		....	—
[illegible] Valley Water Users Assn	[illegible], Ariz	[illegible]	[illegible]	6–49	400	750	3	37 5	BW	5 7	1 0	0 6	....	—
Municipal Public Utilities	Owatonna, Minn		Pfeifer & Shultz	1950	400	750							....	—
Department of [illegible]	[illegible]		Black & Veatch		400	750	1	23	MI	2 9	0 4		......	—
[illegible]	[illegible]	[illegible]			400	700							....	—
[illegible]	[illegible]		Black & Veatch	5–48	400	725	1	54	CE	8 3	[illegible]	3 6	......	—
Municipal Utilities	Morrison, Minn		Perkin & McWayne	5–49	350	700	2	35	EM	6 5			....	—
Borough of Etna	Etna, Pa		Joseph Bresovec	6–4[illegible]	300	700	1	40	CE	5 0			....	—
Municipal Light Plant	[illegible]town, Pa		Gilbert Associates, Inc	5–48	335	550	1	40	CE	5 1	...		29 5	—
City of Hamilton	Hamilton, Ohio		[illegible]ery, Markest, [illegible]	9–4[illegible]	330	630	1	125	BW				....	—
Municipal Power & Water	Metropolis, Ill		Rogers Schmidt		315	720	1	40	RS					—
Water & Light Dept	Clarksdale, Miss		Black & Veatch	6–49	300	550	1	70	CE	9 0	1 9		26 7	—
Public Utilities Commission	Redwood Falls, Minn		C M Orr Engrg Co		250	550	2	25	[illegible]	3 5			...	—
[illegible]	[illegible]		[illegible]	4–48	225	500	[illegible]	50	BW					—
Municipal Water & [illegible]	[illegible]		[illegible]	[illegible]	200	500								—

Municipal Power Plant ...

Boiler	Air Heat	F-D FANS Drive	Air-Volume Control	I-D FANS Drive	Gas-Volume Control	Firing	Type	FUEL Heating Value, 1000 Btu per lb	Ash-Fusion Temperature, F	FEED PUMPS Drive	Flow Control	TURBINES Capacity, 1000 kw	Speed, rpm	Manufacturer	Backpressure, psia	No. of Bleed Points	Generator Cooling	CONDENSERS Surface, 1000 sq ft	No. Water Passes	Tube Material	Total Boiler Capacity Incl New Units, 1000 lb	Total Generator Capacity Incl New Units, 1000 kw
140.8	Re	M	D, Hy	M	D, Hy	P	C	11.0	2100	3M		37.5	3600	GE	0.75	4	H	32.5	2	Ad	1720	D 7.5
27.7	Re	M	D, V	M	Dm V	O	O	18.4		3M	R	20[5]	3600	WE	1.0	4	H	16	2	AAd	680	56
	Re	M	V	M	D	O	O	18.0		2M, 1T	R	30[5]	3600	WE	0.75	4	H	30	2	AlB	400	30
18.0	Tu	M	V	M	D, S	SS 12[3]	C	10.6	1950	2M	R	20[5]	3600	AC	0.75	4	H	16.5	2	Ad	205	20
94.4	Re	M	D, Hy	M	D, Hy	P	C	12.5[6]	2000	2M, 1T	R	40	3600	GE	0.75	4	H	37.0	2	Ad	400	45
98.6	Re	M[10]		M[10]		P	C	13.0	2300	3M	R	60[5]	3600	GE	0.75	5	H	50	2	Ad	1300	120
120	Tu	M	V	M	D	P	C	13.6	2300	3M		20[5,14]	3600	WE		4	H	13	2	Ad	420	40
82.6	Re	Mp	V	Mp	V	P, O	C, O	13.7	2800	2M, 1T		30[5]	3600	GE	0.75	5	H	27.5	2	AlBr	1280	105
89.7	Re	Mp	V	Mp	V	P	C	11.0	1950	2M, 1MT	R	40[5]	3600	GE	0.75	4	H	30	2	AAd	1200	120
39.7	Re	Mp	V	Mp	V	P	C			2M	R	22.5	3600	WE	1.0	3	H	20.4	2	AlBr	460	45
33.2	Re	Mp	V	Mp	V	O	O			2M	R	30[5]	3600	WE	1.0	4	H		2	AlBr	770	75
15.2	Re					O	O															
196.[illegible]	Re	M	V	M	Hy	P, O	C, O	13.8	2000	4M		60[5,14]	3600	WE	0.75	5	H	37.5	2	Ad	1760	180
161.6	Re	M	V	M	D	P	C	12.0	2100	1M, 1T	S, R	65	3600	WE	0.75	5	H	50	1	Ad	1600	125
161.6	Re	M	V	M	D	P	C	12.0	2100	1M	S, R	65	3600	WE	0.75	5	H	50	1	Ad	2800	190
161.6	Re	M	V	M	D	P	C			1M, 1T	R	20	3600	GE	0.75	4	H	18.0	1	AsCu	550	35
34.1	Tu	M[10]	CP			G, O	G, O	1080[25]		2M, 1T	R	40[5]	3600	GE	1.75	4	H	42.5	2	AAd	500	40
	Re	M	V	M	D	G, O	G, O			2M, 1T	R	30[5]	3600	GE	1.75	4	H	37.5	2	AAd	975	65
45.7	Re	M	V	M	V	G, O	G, O	957[25]		3M	R	15[5]	3600	GE	1.75	4	H	20.0	2	AAd	500	26
27.6	Re	M	V	M	D, V	G, O	G, O	1000[25]		2M	R	20[5]	3600	GE	1.75	4	H	22.5	2	AAd	370	35
	Re	M	V	M	V	G, O	G, O					20[5]	3600	GE	0.5	4	H	18.2	2	Ad	780	60
43.0	Tu	M	Hy	M	Hy	P	C	11.0	2200	2M	R	60[5]	3600	WE	0.75	4	H	45.0	2	Ae	3150	235
151.0	Tu	Mp	D	Mp	D	P	C	11.0	2200	2M	R	60[5]	3600	WE	0.75	4	H	45.0	2	Ad	3750	295
151.0	Tu	Mp	D	Mp	D	P	C	11.0	2200	2M	R											
85.6	Tu	Mp	V	Mp	D	P	C	11.0	2200	2M	R	35	3600	WE	0.5	4	H	32.5	2	AnAd	1740	137
304.0	Re	M	Hy	M	Hy	G, P	G, C	1100[25]	2000	2M		50	3600	WE	1.25	5	H	45	2	Ad	475	50
304.0	Re	M	Hy	M	Hy	G, P	G, C	1100[25]	2000	2M		50	3600	GE	1.25	5	H	45	2	Ad	950	100
141.6	Re	M[10]	Mo	M[10]	Mo	P, G	C, G	10.4	1900	2M, 1T		50	3600	GE	0.75	4	H	45	2	PAD	3120	192
0		M	V	M	Ma	TG-SS(306)	C	10.4	1990	1M, 1T		12.5	3600	AC	0.5	4	A	11.0	2	PAD	125	12.5
0		M	V	M	Ma	TG-SS(306)	C	10.4	1990	1M, 1T		12.5	3600	AC	0.5	4	A	9.5	2	PAD	125	12.5
0		M	V	M	D	UF-(230)	C	13.8	2500	1M		12.5	3600	WE	0.5	4	A	9.5	2	PAD	225	20
0		M	V	M	D	SS	C	10.4	1930	1M		12.5	3600	AC	0.5	4	A	7.5	1	PAD	275	22.5
0		M	D	M	D	SS	C	10.4	1930	1M		12.5	3600	AC	0.5	4	A	7.5	1	PAD	275	22.5
5.8	Tu	M	V	M	D	TG-SS(230)	L	6.6	2043	1M, 1T	R	5.0	3600	WE	0.75	3	A	5.0	2	Ad	202	13
79.7	Re	M	V	M	Hy	P	C	11.0	2000	1M	R	20[5]	3600	WE	0.75	4	H	12.5	1	PB	950	70
	42.0	Tu	M	V	Mp	V	P	C	12.0	2295	2M	R	40	3600	WE	0.75	4	H	37.5	2		1802	120
													15	3600	GE	0.75	3	H	16.5	2	Mo		42.5
	21.7	Tu	M	V	M	Ma	P	C, G	10.5	1950	1M, 1T		10	3600	WE	0.5	4	A	10.0	2	AdI	240	12.5
		Tu	M	D	M	D	G	G	1164[25]		1M	R	10	3600	GE	0.75	3	A	10.0	2	Ad	300	25
	34.6	Re	M	V	M	D	P, O	C, O	13.8	2100	1M, 1T, 1MT		10	3600	GE	1.0	4	A	10.0	2	RB	465	32
	[illegible]	Pl	M	D	M	D	G, O	G, O	1050[25]		1M, 1T	R	11.5[8]	3600	EI	1.75	4	A	11.0	2	AsCu	526	35.9
		Re	M	D	M	D	G, O	G, O	1080[25]		2M	R	11.5[8,14]	3600	EI	1.0	3	A	11.0	2	AsCu	1700	141
		Re	Mp	V	Mp	D	G, O	G, O	1050[25]		2M, 1T		20	3600	WE	1.0	3	H	20.0	2	Ad	260	20
	[illegible]	Tu	M	V	M	S	TG-SS(196)	L, O	7.0	2200	2M, 1T	R	5	3600	DL	0.75	2	A	6.8	2	Ad	144	23
	5.9	Tu	M	V	M	D	G	G	1060[25]		2M	R	11.5[5]	3600	GE	0.75	4	A	12.0	2	Ad	423	38
	12.7	Tu	M	Hy	M	D	G, O	G, O	1100[25]		2M	R	12.5	3600	WE	1.0	3	A	4.1	4	Ad	150	12.5
	12.7	Tu	M	Hy	M	D	G, O	G, O	1100[25]		1M	R	11.5[8]	3600	WE	1.0	4	A	4.1	4	Ad	300	24.0
													10	3600	GE	1.25	3	A	12.0	2	Ad	960	30
36	5.1	Tu	M	V	M	V	SS(241)	C, O	12.2	2100	1M	R	2.5[24]	3600	GE	0.75	1	A		2	Ad	180	10
0	23.1	Re	M	D	M	D	G, O	G, O	1005[25]		1M	R	15	3600	GE	1.0	2	H	14.0	2	AsCu	600	20
0	19.5	Tu	M	D	M	Hy	P	C	12.0	2300	2M	R	10	3600	WE	0.75	4	A	15.0	2		330	27.5
0	19.5	Tu	M	D	M	Hy	P	C	12.0	2300	2M	R	10	3600	WE	0.75	4	A	15.0	2		450	37.5
0			M	V	M	D, Hy	TG-SS(168)	C, G		2000	1M											120	9
0	0		M	V	M	V	G	G	1060[25]		2M	R	6	3600	GE	0.75	2	A	7.3	2	Ad	80	6
0		Tu	M	V	M	V	G	G	1060[25]		1M, 1T	R	4.25	3600	GE	0.75	0	A	3.8	2	CuNi		
0	0		T	S			O	O	18.5		1M, 1T	R	7.5	3600	GE	1.0	3	A	10.0	2	AsCu	210	11.5
35	0		M	V	M	S, D	G, O	G, O	1030[25]		1M, 1T	R	7.5	3600	GE	1.0	3	A	10.0	2	Ad	147	8.9
0	5.0	Tu	M	D	M	D	P	C	10.8	2800	2T	S, R	5.0	3600	WE	0.75	3	A	6.0	2	Ad		
30	4.7	Tu	M	D	M	D	SS(221)	C	11.5	2100	2M, 1T	R	7.5	3600	GE	0.75	2	A	7.0	2	AdI	85	7.5
0	2.1	Tu	M	D	M	D	SS(88)	C	13.1	2350	1M, 1T	R, S	3.5	3600	Wo	1.0	2	A	4.8	2	Ad	72	5.9
0	4.9	Tu	M		M	D	SS(135)	L	7.0	2200	2M, 1T	R	7.5	3600	GE	0.75	3	A	8.5	2	Ad	246	13.5
0	8.0	Tu	M	D	M	D	TG(212)	L	7.0	2200	1T	R	5.0[22]	3600	GE	1.0	2	A	8.3	2	AlBr	156	11.3
0		Tu	T	D	T	D	TG-SS(163)	L	6.4	1900	1M, 1T	R	4.0[22]	3600	GE	1.0	0	A	8.3	2	CuNi	109	6
0	20.4	Tu	M	V	M	D, Hy	G, O	G, O	1002[25]		1M, 1T	R	15	1800	GE	1.0	1	A	24.0	1	AnAd	510	30
0	0		T	D	T	D	O	O	18.4		2T	R										300	0
0	0		M	D, V	M	D, V	O	O	18.0		1M, 1T	R											
													1.5	3600	EI	2.0	1	A					
0	67.3	Re	M	S, V	M	Hy	P	C	11.8	1900	2M	R	30	3600	WE		4	H	32.5	2		1050	100
0	20.6	Tu	M	D, V	M	D, V	G	G	1000[25]		3M	R	20[5]	3600	WE	0.75	4	H	17.0	2	Ad	640	44
0	29.6	Tu	M	D, V	M	D, V	G	G	1000[25]		3M	R	20[5]	3600	WE	0.75	4	H	17.0	2	Ad	840	64
0	36.1	Re	M	Hy	M	Hy	P	C	10.0	1950	2M, 1T		20	3600	AC	0.5	4	H	20.0	2	Mo	880	60
0	71.8	Re	M	S, V	Mp	D	P	C	12.0		2M	R	25[24]	3600	BB	0.5	4	A	25.0	2	Ae	1500	87.5
0	11.6	Pl	M	Hy	M	Hy	P, G	C, G	11.8		1M, 1T	R	7.5	3600	WE	0.5	4	A	8.0	2	AdI	340	20
0	27.5	Tu	T	D	T	D	SS(540)	C, W	12.0	1950	2M, 1T	R	11.5[6]	3600	WE	1.0	4	A	12.0	1	Ad	400	30
5.4	0		M	Hy, D	M	Hy, D	TG-SS 272)	C, G	9.2	1950	1M, 1T	R	7.5	3600	GE	0.5	3	A	10.0	2	Ad	235	16.5
4.9	0		M	V	M	S, D	TG-SS(135)	C	9.6	1900	3M, 1T	R	5.0[14]	3600	DL	0.5	3	A	6.0	2		120	10
0	3.7	Tu	Mp	V	M	D	SS(136)	C	14.0	2400	1M	R	5	3600	Wo		2	A	6.2	1	Ad	270	18
			M		M		SS	C	11.6		1M		3.5	3600	WE				6.0			100	7
			M		M		SS	C	13.0		2M, 1T	R	3.0	3600	WE		2	A				110	6
0			M		M	D	G	G	1000[25]		2T	R	1.0	3600	WE	1.5	1	A	1.3	2	Ad	46	1.8
1.7	0		M	V, Hy	M	Hy	TG-SS(67)	C	9.4	1850	1M, 1T	R	1.5	3600	EI		2	A	2.0	2	Ad		3.3
0	0		Mp	D	Mp	D	P	C	10.0	2000	3M, 1T	R	7.5	3600	WE		2	A	10.0	2		300	22.5
3.6	0		M	V	Mo	D	SS(124)	L	9.3		2M, 1T		5	3600	GE	0.75	3	A	5.5	2	Ae	107	5
0	5.2	Tu	T	D	M	D	TG-SS(150)	L	6.8		3T	R										185	5
3.5	0		M	S, D	M	Hy	SS	C	11.0		1M, 1T	R	10	3600	WE		3	A	14.0	2	Ad	240	23.5
1.4	0		T	S			G, O	G, O	1100[25]		1M		7.5	3600	GE	1.0	2	A	9.0	2	AsCu	418	30
													4.0	3600	WE			A	6.0	2			8.6
	0				Mp	D	G	G	1000[25]		1M, 1T	R										36.7	2.3
											1M, 1T	R	10	3600	GE	1.0	4	A	11.0	2	Ad		47.5
	5.5	Tu	M	D	Mp	D	G, O	G, O	1050[25]		1M, 1T	R	4	3600	EI	1.0	3	A	7.0			118	8
	0		M	V			UF	C	12.2	2250	1M, 1T	R	1.5	3600	WE	2.5	2	A	2.5	2		65	2.8
	0		T	S	M	S, D	TG-140)	C	13.0	2200													1.6
	0		M	D	T	S, D	SS(112)	C	12.0													80	4.5
		Tu	MT		MT	D, V	UF	C	13.0	2900	3M, 1T		2.0	3600	WE							470	23.5
							TG	C	12.0		1M, 1T											66	3.5
0	7.6	Tu	M		Mo	D	G, O	G, O	960[25]		1M, 1T	R	3.5	3600	WE	1.0	1	A	4.0	2	Ad	160	7.5
0	0		M	D			SS 90)	C					2.0	3600	WE	2.5	0	A	3.5	2	Ad	50	3.7
	0		M	V	T	S	TG-SS	C	12.5		1T	S										110	3.2
													1.5	3600	WE	1.25	2					85	4
0	6		M				TG 130	C					1.25	3600	GE		1	A		1			1.9