PLAINTIFF'S EXHIBIT
GE-111

1956 Design Survey of Typical New ...im Central-Station Installations

Compiled by Althea Thornton, Assistant Editor

Company	Location	Plant name	Consulting engineers
Dallas Power & Light Co	Dallas, Texas	Mt. Creek	Ebasco Services, Inc
Florida Power & Light Co	Miami, Fla	Lauderdale	Bechtel Corp
Indianapolis Power & Light Co	Indianapolis, Ind	Harding St	Gibbs & Hill, Inc
Minnesota Power & Light Co	Cohasset, Minn	Clay Boswell	Ebasco Services, Inc
Northern States Power Co	St. Paul, Minn	High Bridge	Pioneer Service & Engrg Co
Pacific Power & Light Co	Glenrock, Wyo	Dave Johnston	Ebasco Services, Inc
Pennsylvania Power Co	W. Pittsburgh, Pa	New Castle	Commonwealth Assoc, Inc
Southwestern Gas & Electric Co	Mooringsport, La.	Lieberman	Sargent & Lundy
Texas Electric Service Co	Monahans, Texas	Permian Basin	Ebasco Services, Inc
Wisconsin Power & Light Co	Lafayette, Wis	Nelson Dewey	Sargent & Lundy
Wisconsin Public Service Corp	Green Bay, Wis	Pulliam	Pioneer Service & Engrg Co
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	Kingsport, Maine	Mason	Jackson & Moreland
Montana Power Co	Colstrip, Montana	Colstrip	Ebasco Services, Inc
Puerto Rico Water Resources Authority	Guaynabo, P.R.	South Coast	Jackson & Moreland
	San Juan, P.R.	San Juan	Jackson & Moreland
Tacoma City Light	Tacoma, Wash	Cushman	Stone & Webster Engrg Corp
Tucson Gas, Electric Light & Power Co	Tucson, Ariz	Irvington	Jackson & Moreland
Tucson Gas, Electric Light & Power Co	Whitney, Nev	Riverside	Stone & Webster Engrg Corp
Utah Power & Light Co	Castle Gate, Utah	Clark	Sharon Roger Mfg Co
Nova Scotia Light & Power Co Ltd	Halifax, N.S.	Water St	[redacted]
El Paso Electric Co	Dona Ana County, N.M.	Rio Grande	Stone & Webster Engrg Corp
Rhodesian Hydro Electric Co	Veazie, Maine	Edward M. Graham	Chas T. Main, Inc
Central Power & Light Co	Mission, Texas	West Valley	Sargent & Lundy
Missouri Public Service Co	Victoria, Texas	Victoria	Sargent & Lundy
Public Service Co of New Mexico	Portales, N.M.	Ralph Green	Burns & McDonnell
	Albuquerque, N.M.	Person	Howard Person
Saskatchewan Power Corp	Saskatoon, Sask.	A.L. Cole	R.A. Hanright
	Estevan, Sask.	Estevan	R.A. Hanright
Western Light & Telephone Co, Inc	Dodge City, Kans	Fort Dodge	Sargent & Lundy
Lane Electric District Power Co	Scottsville, Kans	Bay Front	Sargent & Lundy
Central Kansas Power Co	Colby, Kans	Colby	Black & Veatch
Empire District Electric Co	Riverton, Kans	Riverton	Black & Veatch
[redacted]	[redacted]	[redacted]	[redacted]

MUNICIPAL, FEDERAL AND COOPERATIVE INSTALLATIONS

Memphis Light, Gas & Water Div	Memphis, Tenn		Burns & Roe, Inc
Tennessee Valley Authority	Memphis, Tenn		
	Rogersville, Tenn	John Sevier	
Central Nebraska Pub Pw & Irrigation Dist	Bertrand, Neb		
Detroit Public Lighting Commission	Detroit, Mich	Canadday	Sargent & Lundy
Hydro Electric Power Commission of Ontario	Toronto, Ontario	Mistersky	Burns & Roe
Los Angeles Dept of Water & Power	Playa del Rey, Calif	Richard J. Hearn	Stone & Webster Engrg Corp
	Los Angeles, Calif	Scattergood	
Imperial Irrigation District	El Centro, Calif	Valley	
Lansing, Board of Water & Elec Light Comm	Lansing, Mich	El Centro	Gibbs & Hill
Wyandotte Board of Municipal Service	Wyandotte, Mich	Monroe Park	Hobby, Benjamin, Windhouse, Penny, Maher & Campbell
City of Austin	Austin, Texas	Municipal	Burns & McDonnell
Eastport Light & Water Dept	Eastport, Fla	Lime Plaster	
Lubbock Municipal Power & Light Dept	Lubbock, Texas	Plant No. 1	Nelson Miner & Co
City of Tallahassee	St. Marks, Fla	St. Marks	Reynolds, Smith & Hills
Camp County Power Commission	Walnut, Ga		Patchen & Zimmerman
City of St. Marys	St. Marys, Ohio	Municipal	Rensselaer, Hoch & Associates
City of Ames	Ames, Iowa		Burns & McDonnell
City of Riverside	Riverside, Ariz		Burns & McDonnell
Atlantic Municipal Utilities	Atlantic, Iowa		Black & Veatch
Borough of Chambersburg	Chambersburg, Pa		A.L. Rhoads Associates
Northeast Power Dept	Kirbyville, Texas	Steel Site	Black & Veatch
[redacted]	[redacted]	[redacted]	[redacted]
Public Utilities Commission	New Ulm, Minn	Municipal	Burns & McDonnell
City of Wellington	Wellington, Kans	Municipal	Phelps & Shultz
Board of Public Works	Clarksville, Miss	Steam Plant	A.C. Kirkwood & Associates
			Hamilton, Reeder & Rice

Unit No.	First ship date	Throttle pressure, psig	Steam temp F: Throttle	Steam temp F: Reheat	BOILERS: Number	Capacity, lbm/hr, 1000 lb/hr	Manufacturer	Surface 1000 sq ft: Boiler & wtr	Surface 1000 sq ft: Superheater	Surface 1000 sq ft: Reheater	Furnace bottom	Economizer surface per boiler, 1000 sq ft	Air heater surface per boiler, 1000 sq ft	Air heater type	I.D. FANS: Drive	I.D. FANS: Air flow, cfm/unit	F.D. FANS: Drive	F.D. FANS: Gas flow control	Firing	TUBES: Type	TUBES: Heating surface, 1000 sq ft	TUBES: Alloy containing 5 cr or more	SUPERHEATERS: Drive	SUPERHEATERS: Final temp	TURBINES: Number	TURBINES: Capacity, rated kw, 1000	TURBINES: Manufacturer	TURBINES: Throttle press, psig	TURBINES: No. bleed points	Fuel storage, days full pressure plant	CONDENSERS: Surface, 1000 sq ft	CONDENSERS: Vac, inches Hg	CONDENSERS: Circ water temp rise, F	CONDENSERS: Circ water velocity, fps
7	1 58	1450	1000		1	1050	BW	11.7		N																							
6	6 57	1450	1000	1000	1	1100	BW	10.0																									
5	1958	1450	1000	1000	1	1100	BW	10.0																									
5	6 58	1450	1000	1000	1	750	CE	19.1	44.2	10.5																							
1	4 58	1450	1000	1000	1	500	RS	29.1	28.5	19.5																							
5	9 56	1450	1000	1000	1	775	BW	5.6	32.7	23.8																							
[redacted]									

1956 Survey of Stationary Gas Turbines in Both Central Stations and Industry

Compiled by Althea Thornton, Assistant Editor

OWNER	LOCATION	Number of Units	Total Rated Capacity, kw	Total Maximum Capacity, kw	Year Installed	Rated Speed, rpm	Maximum Speed, rpm	Rated Temperature, °F	Maximum Temperature, °F	Pressure Ratio	Efficiency, %	Exhaust Heat Recovery	Regenerator	Intercooler	Reheat	Builder	Model	Serial Number	Combustor Type	Cycle Type	Fuel Type	Cooling Type	Turbine	Compressor	Remarks
UNITED STATES																									
Stationary Generating Units																									
Pipe Line Units																									
Miscellaneous and Process Units																									

BUILDER

REMARKS

COMBUSTOR TYPE

CYCLE TYPE

FUEL TYPE

COOLING TYPE

TURBINE

Compiled by Althea Thornton, Assistant Editor

OWNER	LOCATION	Builders	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS: Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine wheels in series
EUROPE													
Huettenwerk Rheinhausen A G	Rheinhausen, Germany	BB	1	1956	15,000 kw	.	1400	5	O	1	3.0	1	.
Huettenwerk Hasoe	Hagen Hasoe, Germany	BB	1	1957	14,000 kw		1400	5	O	1	3.06	1	.
Niederrheinische Huette Duisburg	Germany	BB	1	1956	5,820 kw	. .	1400	5	O	1	4.75	1	
Dortmund Hoerder Huettenunion AG	Dortmund, Germany / Hoerde, Germany	BB	1	1957	100 Mcfm	. .	1400	5	O	1	3.06	1	
Mannesmann Huettenwerke AG	Duisburg-Huckingen, Germany	BB	1	1957	80 Mcfm	.	1400	5	O	1	3.0	1	..
Niederoesterreichische Elektrizitaetswerke, AG	Vienna, Austria	BB	1	1958	13,300 kw	.	1200	4.6	O	1	3.0	1	
Oesterreichische Alpine Montangesellschaft Werk	Donawitz, Austria	BB	1	1957	14,300 kw		1400	5	O	1	3.0	1	
Manfacturas Metalicas Madrilenas	Villaverde, Spain	W	1	1956	5,000 kw	6,250 kw	1350	5.8	O	1	5.74	1	.
Altos Hornos de Viscaya	Baracaldo, Spain	BB	1	.	26.5 Mcfm	.	.		O	1	. .	1	
Societe Romana di Elettricita	Rome, Italy	BB	1	1956	25,000 kw		1200	16	O	2	4.75/3.0	2	
Societe Del Valdarno	Livorno, Italy	BB	2	1956	22,000 kw		1200	16	O	2	4.75/3.0	2	
Iveco	Augusta, Italy	SM	2	1957	3,600 kw	4,000 kw	842	4	FP		3.0		
Azienda Generale Italiana Petroli	Cortemaggiore, Italy	RH	1	1955	900 kw	1,000 kw	1340	4	O	2	11.5/6.0	2	2
Societa Nationale Metanodotti	San Donato, Italy	RH	1	1955	900 kw	1,000 kw	1340	4	O	2	11.5/6.0	2	2
Raffineria di Napoli	Naples, Italy	BB	1	1937	10 Mcfm	. .							
Societe Generale de Gas si de Electricitate	Bucharest, Romania	BB	1	1948	10,000 kw		1100	12.0	O	2	4.0/3.0	2	2
Russia	Russia	EW	1	1958	10,000 kw	12,000 kw	1250	4	C	1	6.6	1	
ASIA													
Palestine Electric Corp	Haifa, Israel	BB	2	1957	10,000 kw		1200	4.6	O	1	3.0	1	
Electricite Board of Beirut	Beirut, Lebanon	W	1	1955	5,000 kw	6,250 kw	1350	5.8	O	1	5.74	1	
Ciments Libanais	Chekka, Lebanon	SM	2	1957	1,500 kw	1,650 kw	842	4.0	FP	1	9.0	1	
Anglo-Iranian Oil Co, Ltd	Agha-Jari, Iran	BB	2	1949		4,700 kw[d]	1100	4.6	O	1	3.8	1	
Basrah Petroleum Co	Basrah, Iraq	RH	3	1957	1,300 hp	1,430 hp	1340	4.0	O	2	11.5/6.0	2	2
Iraq Petroleum Co, Ltd	Dukhan, Bahrain	BB	1	1953	4,000 kw	4,700 kw	1200	4.6	O	1	3.8	1	
Government of Bahrain	Manamah "B" PP, Bahrain	BB	2	1958	6,100 kw		1200	4.6	O	1		1	
Bahrain Petroleum Co, Ltd	Bahrain Island	GE	1	1956	7,000 hp	8,750 hp	1450	6.0	O	1	6.9	1	
Saudi-National National Co for El Pwr	Jeddah, Arabia	BB	2	1955	5,750 kw	.	1200	4.6	O	1	3.6	1	
Arabian American Oil Co	Arabia	CB / CB / BB	5 / 1 / 4	1958 / 1958	8,500 hp / 6,200 kw / 5,000 kw		1350 / 1350 / 1200	4.25 / 4.25 / 4.6	O / O / O	2 / 2	5.0/3.5	1 / 1	2 / 2
Ministry of Finance, Riyadh Pwr Plt	Saudi-Arabia	BB	4	1957	6,000 kw		1290	4.6	O	1	3.6	1	
Kuwait Oil Co, Ltd	Kuwait	RH	1	1953	850 hp	900 hp	1340	4.0	O	2	11.4/6.0[f]	2	2
Pakistan Industrial Development Corp	Karachi, Pakistan	RH	1	1955	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2
Singapore Paris Pantang Power Plant	Singapore	P	1	1-56	1,950 kw	. .	1230	3.69	O	2	6.28/3.0	2	2
Asiatic Petroleum Co	Borneo	W	1	1957	5,000 kw	5,250 kw	1350	5.8	O	1	5.74	1	
Shell Petroleum Co, Ltd	Borneo	MV	1	C	4,500 kw	5,600 kw	1292	5.25	O	1	4.3	1	
Standard Vacuum Oil Co	Wakayama, Japan	W	2	1957	3,000 hp	3,750 hp	1350	4.8	O	1	3.6	1	
Hokkaido Denryoku KK	Hokkaido Tanko, Japan	EW[g]	1	C	2,000 hp		1220	3.2	C	1	13.0	1[h]	
Maruzen Oil Co, Ltd	Wakayama, Japan	TS	1	1956	2,000 kw		1250	4.5	O	2	5.5/4.5	2	2
Standard Vacuum Oil Co	Palembang, Sumatra	W	2	1957	3,000 hp	3,750 hp	1350	4.8	O	1	3.6	1	
Fairbairn Construction Co	Australia	RH	2	1956	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2
UNELCO	Noumea, New Caledonia	SM	1	1956	1,650 kw	1,650 kw	842	4.0	FP	1	9.0[f]	1	
Le Nickel	Noumea, New Caledonia	SM	1	1956	1,650 kw	1,650 kw	842	4.0	FP	1	9.0[f]	1	
AFRICA													
Compagnie des Phosphates	Gafsa, Tunisia / Redeyef, Tunisia / Metlaoui, Tunisia	SM / SM / SM	1 / 1 / 1	1952 / 1956 / 1953 / 1955	600 kw / 2,400 kw / 600 kw	. . . / 1,650 kw / 660 kw	965 / 842 / 842	3.8 / 4.0 / 4.0	FP / FP / FP	1 / 1 / 1	11.7 / 9.0[f] / 11.5[f]	1 / . / .	
Ciments Portland	Tourah, Egypt	SM	1	1957	3,750 kw	4,300 kw	842	4.0	FP	1	9.0	1	
Raymond Arcache & Co	Alexandria, Egypt	BB	1	1949	1,200 kw		1130	3.0	O	1	6.65[f]	1	
UNELCO	Lome, French Togo	SM	1	1956	1,500 kw	1,650 kw	842	4.0	FP	1	9.0[f]	1	
Compagnie Electricite et Gas d'Algerie	Bone, Algeria	O	1	1952	730 kw		1110	3.45	O	1	5.25	1	
Williamson Diamond Mines	Shinyanga, Tanganyika	RH	1	1955	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2
East African Power & Lighting Co, Ltd	Nairobi, Kenya	BT	2	9-54 / 1-56	2,500 kw		1200	4.6	O	1	3.6	1	

BUILDER

AC – Allis-Chalmers Mfg Co, USA
AE – W H Allen Sons & Co, Ltd, England
AR – AiResearch Mfg Co, USA
B – Boeing Airplane Co, USA
BB – Brown, Boveri & Co, Ltd, Switzerland
BE – Brush Electrical Engrg Co, Ltd, England
BT – British Thomson-Houston Co, Ltd, England
CA – Continental Aviation and Engineering Corp, USA
CB – Clark Brothers, USA
DB – David Bugworth, Limited, England
EE – English Electric Co, Ltd, England
ES – E Simone Shipbldg & Engrg Co, Ltd, Den
EM – De Electro-Mecanique, France
EW – Escher Wyss Ltd, Switzerland
FC – Societe des Forges et Ateliers du Creusot – usines Schneider, France
G – Gasturbine Maatschappij, Holland
GE – General Electric Co, USA
HW – Harland & Wolff, Ltd, Ireland
JB – John Brown & Co, Ltd, Scotland
M – Ernest Mercier, designs, France
MN – Mitsubishi-Nippon Heavy Industries, Ltd, Japan
MV – Metropolitan-Vickers Elec Co, England
O – Maschinenfabrik Oerlikon, Switzerland
P – C A Parsons & Co, Ltd, England
PA – Pametrada (Parsons and Marine Engrg Turbine Research and Development Association), England
R – Societe Rateau, France
RG – Rover Gas Turbines Ltd, England
RH – Ruston & Hornsby, Ltd, England
S – Sulzer Brothers, Ltd, Switzerland
SM – GEME (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Indust. Generale de Mecanique Appliquee), France
ST – Svenska Turbinfabrik Aktiebolaget Ljungstrom, Sweden
So – Solar Aircraft Co, USA
St – Stabilimento Ernesto Breda, Italy
T – Societe Turbomeca, France
TS – Tokyo Shibaura Electric Co, Japan
W – Westinghouse Electric Corp, USA

GENERAL FOOTNOTES

a – Thermal effy based on higher heating value of fuel unless otherwise noted
b – Turbines and compressors listed in order of descending pressure for each unit
c – Power shaft geared to 3600 rpm
d – With reduction in ambient temperature
e – L-p and H-p turbines in one casing
f – Double flow
g – One Rutland unit has 85% effectiveness
h – Water-cooled pads facing disks
j – Based on lower heating value of fuel
k – Starting combustor, catalyst case is the operating combustor
m – Power shaft geared to 3000 rpm
n – 120 lb per sec gas at 25 psia, 1050 F

In Both Central Stations and Industry

No. of cylinders	No. of compressor cylinders	No. of intercoolers	No. heating stages	Combustor type	Regeneration effectiveness, %	Type of fuel	PERFORMANCE: Thermal efficiency, %[a]	PERFORMANCE: Work ratio	TURBINES: Type[b]	TURBINES: No. of stages	TURBINES: Engine efficiency, %	TURBINES: Cooling	COMPRESSORS: Type[b]	COMPRESSORS: No. of stages	COMPRESSORS: Discharge pressure, psia	COMPRESSORS: Compression ratio	COMPRESSORS: Compressor efficiency, %	REMARKS
1	0	1	S	75	BG	27		A			D,S	A			5			Blast furnace air and electric generation
1	0	1	S	75	BG	27		A			D,S	A			5			Blast furnace air and electric generation
1	0	1	S	75	BG	26.5		A			D,S	A			5			Blast furnace gas and electric generation
1	0	1	S	75	BG	27		A			D,S	A			5			Blast furnace gas and electric generation
1	0	1	S	75	BG	26.5		A			D,S	A			5			Blast furnace gas and electric generation
1	0	1	S	75	BG	26.5		A			D,S	A			5			Blast furnace gas and electric generation
1	0	1	S	None	G	35.5		A			D,S	A			4.6			Electric generation
1	0	1	S	75	BG	27		A			D,S	A			5			Blast furnace gas and electric generation
1	0	1	W	None	DO	35.0	0.32	A	5			A	16	86.0	6			Electric generation
1	0	1	C		BO			A			None	A						Air to Bessemer converter
2	1	2	S	None	BC	24		A			D,S	A			16			Electric generation
2	1	2	S	None	BO	24		A			D,S	A			16			Electric generation
					BO	34			B			FP						Auxiliary for steam power station. Output turbine by Alsthom; 5 FP engines by SIGMA for each unit
1	0	1	S	None	G	35.9[d]	0.33	A	2.2	84	D,S	A	13	61.8	4.2	83		Combined with exhaust-heat boiler with optional after burning
1	0	1	S	None	G,LO	35.9[d]	0.33	A	2.2	87[e]	D,S	A	13	61.8	4.2	83		Combined with hotwater heater
																		Houdry unit
2		2	S	None	G	22.4		A			None	A						Refinery unit
1	1	1	Ex		PC	28.5		A				A		433				Precooler and intercooler arranged for water heating
1	0	1	S	None	BO	19.5		A			D,S	A			4.6			
1	0	1	W	None	DO	35.0	0.33	A	5			A	16	80.0	6			Electric generation
2	0	1	FP	None	BO	32		A	4			FP						Power source for cement mill
1	0	1	S	None	G	36.4		A			None	A	24		4.6			Fuel gas expanded through separate turbine
1	0	1	S	None	G	35.9[d]	0.33	A	2.2	87	D,S	A	13	61.8	4.2	83		Drives crude oil pumps
1	0	1	S	None	G	36.4		A			None	A	24		4.6			Fuel gas expanded through separate turbine
1	0	1	S	None	G	36.0		A			D,S	A			4.6			
1	0		W		RG	28.0[f]		A[f]	2		D	A	15	85				Petroleum refinery
1	0	1	S	None	BO	39.0		A			D,S	A			4.6			
1	0	1	C	None	DO,G			A	2.1			A	13					Centrifugal compressor drives
1	0	1	S	None	DO,G			A	2.2			A	13					Electric generation
					C	37.0		A			None	A						For oil field operation
1	0	1	S	None	BO	39.0		A			D,S	A			4.6			
1	0	1	C	75	G			A	2.2			A	13					Crude oil pumping plant
1	0	1	C	None	C,LO	35.9[d]	0.33	A	2.2	87	D,S	A	13	61.8	4.2	83		
1	0	1		75	BO,LO	24		A	2.2	85	D	A	12	54.0	3.69	84		Derated standard 2500-kw unit at 85 F
1	0	1	W	None	G	38.6	0.33	A	5			A	16	86.0	6.0			Electric generation
1	0	1	W		G	38.5	0.354	A	5	90		A	16	76.1	5.25	85.5		
1	0	1	W	None	RG	36.0	0.33	A	6			A	14	70.0	4.9			Air and gas compressor drive for refinery
1[g]	1	1	Ex		LO	26.0		A	5			C	3	400				
2	0	1	C	65	BO	30.0		A	3.3		None	A	30.5	66	4.5			Standby unit
1	0	1	W	None	RG	36.0	0.33	A	6			A	14	70	4.9			Air and gas compressor drive for refinery
1	0	1	C		C	35.9[d]	0.32	A	2.0	87	D,S	A	13	61.8	4.5	83		Combined with exhaust-heat boiler
2		2	FP	None	GO	34.0		A	4			FP						
2		2	FP	None	GC	34.0		A	4			FP						
		1	FP		BO	35		A	4		None	FP						Output turbine built by Pennoil
			FP		FL1	34		A	4			FP						2 FP generators supplying 1 turbine
			FP		FL1	30		A	3			FP						Electric generation: Pennoil turbine
			FP		FL	34		A	8			FP						5 FP generators supplying 1 turbine
1	0			RC	BC	31.6		A			None	A	15		3.0			
		1	FP		GO	34		A	4			FP						2 FP generators supplying 1 turbine
1	0	1	C	None	BO	35.6		A	5		B,D	C	3		3.45			Waste heat recovery incidec
1	0	1	S	None	C	35.9[d]	0.33	A	2.2	87	D,S	A	13	61.8	4.2	83		
1	0	1	R	65	BC	21.2		A	5			C	4	55.0	4.6			

o – Power shaft geared to 1800 rpm
p – Turbine efficiency
q – Turbine cooling efficiency
r – Power shaft geared to 3600 rpm
s – Vertor boiler furnace acts as combustor
t – Model in quantity production
u – Oil 115 air np
w – Gas nc
x – 20 lb per sec air at 4 atmospheres
y – Air nc
z – 30 delivered, 70 on order
1 – 10 delivered, 90 on order
2 – Injection rotative
3 – Output speed 3600 rpm 2-stage reducer
4 – Escher Wyss and Fuji Denki
5 – Turbine and compressor in common casing
6 – Two compressors in series and 3 turbines in series all in common shell
7 – Ambient temperature 45 F
8 – Double-flow low-pressure turbine and double-flow-low-pressure compressor
9 – Emergency operation with fuel oil
10 – Output shaft geared to 6000 rpm
11 – Lb per second
12 – Maximum

STATUS

C – Under construction
D – Under development
O – In operation
Or – Ordered
T – Under test

COMPRESSOR

A – Axial
AC – Combined axial and centrifugal
C – Centrifugal
FP – Free piston

COMBUSTOR TYPE

A – Annular
CP – Chemical process
D – Double (2 combustors in parallel)
M – Multiple (usually 6 or more combustors in parallel)
F – Furnace
Ex – External heating
R – Refractory lined
S – Single

COOLING TYPE

B – Blade
D – Disk
S – Stator casing

TURBINE

A – Axial
Ra – Radial

CYCLE TYPE

C – Closed cycle
EP – Equipressure cycle
FP – Free-piston cycle
O – Open cycle
S – Semiclosed cycle

FUEL TYPE

BG – Blast-furnace gas
BC – Bunker C or boiler oil
CT – Coal tar
CS – Coal slurry
DO – Distillate oil
FD – Domestic fuel oil
FL – Heavy oil, varied kinds
FL1 – Heavy oil 1
FL2 – Heavy oil 2
G – Natural gas
GO – Gas oil
K – Kerosene
LO – Light oil
O – Oil, unspecified
P – Peat
PC – Pulverized coal
PG – Producer gas
PR – Process reaction
RG – Refinery gas
RO – Residual oil
S – Soil fuels
SG – Sewage gas
WH – Waste heat

No. of cylinders	No. of intercoolers	No. heating stages	Combustor type	Regenerator effectiveness, %	Type of fuel	PERFORMANCE: Thermal efficiency, %[a]	PERFORMANCE: Work ratio	TURBINES: Type[b]	TURBINES: No. of stages	TURBINES: Engine efficiency, %	TURBINES: Cooling	COMPRESSORS: Type[b]	COMPRESSORS: No. of stages	COMPRESSORS: Discharge pressure, psia	COMPRESSORS: Compression ratio	COMPRESSORS: Compression efficiency, %	REMARKS
1	0	.		75	D	22		A	2,1			A	13		4.25	86	}
1	0	.	5	75	BO	22.5	0.33	A	2,2		D,S	A	13	62.8	4.2		} Development tests for British Navy
1	0	.		None	LO	19.9	0.33	A	2,2	87[e]	D,S	A	13	61.8	4.2	83	
1	0	0	5	None	GT	33.6	0.33	A	2,2	87[e]	D,S	A	13	61.8	4.2	83	Combined with exhaust heat boilers
1	0	0	5	None	GT	33.9	0.33	A	2,2	87[e]	D,S	A	13	61.8	4.2	83	Combined with exhaust heat boiler and spray heater
1	0	1	5	None	GT	6.2	0.33	A	2,2		D,S	A	13	61.8	4.2		Combined with waste heat boiler
1	0	1	5	75	LO	22.5	0.33	A	2,2		D,S	A	13	61.8	4.2		Air transportable power plants
1	0	1	5	75	GT	22.5	0.33	A	2,2		D,S	A	13	61.8	4.2		Combined with waste heat boiler
2	1	1		86	WH	25.0		A	8		None	A C	10 3				Input from heat exchange in waste flue of group of continuous vertical retorts in gas works
2	1	1		86	WH		0.27	A	8		None	A C	10 3	161	4.4		heat input from waste flue of gas works vertical retorts
1	0	1	5		50/80	20.6	0.33	A	2,2	87[e]	D,S	A	13	61.8	4.2	83	
1	0	1	5	75	BO	24		A			D,S	A			4.6		Blast furnace air and electric generation
2	.	2	5	76	SO	26	0.37	A	3,4		D	C	2,1	69	3.2,1.55		Unit used in large sewage disposal works. Final output 25,000 cfm free air compressed to 7.5 psig
1		1		None	O	10.0		A	2			C	1		2.7	75	
1		1		None	O	10.0		Ka	1			C	1		2.5		
1	0	1	5		LO			A	6		None	A	14				Provides compressed air for test purposes
3	2	2	W			40						FP	3	56.0	4.0		
4	3	2	5	90	BO	32.0	0.43	A				A,C					Last two compressor stages centrifugal and in same casing
1	0	1	5	None		29		A	.		D,S	A			4.6		Electric generation
					LO	35		A	9		.	FP					Standby and peak load. 8 FP engines built by SIGMA
1	0	1	W	None	LO	17		A	2,2		S	A	14				Standby unit, peak load
2	0	1	5[d]	None	FD	17	0.37	A	2,2		D	A,C	6,1		2.5,1.8		
.			5		LO	30		A	6			FP					Standby and peak load. 6 FP engines built by SIGMA, combustion chamber between generators and turbine
1	0	1	5	60	BO						None	A			3.5		
					FL1	34			4			FP					Electric generation, output turbine built by Alsthom. 2 FP engines built by SIGMA for each unit
.					FL1	34			4			FP					Starting synchronous compensator. Output turbine built by Alsthom. 2 FP engines built by SIGMA for this unit
.					BO	36		A	3	.	None	FP					Output turbine built by Alsthom
1	0	1	5	None	BO	19.5		A			D,S	A	.		4.6		Electric generation
1	0	1	5	75	BG	27		A			D,S	A			5.0		Blast furnace air and electric generation
1			5		BG			A				A					Electric generation and air supply
1	0	1	5	80	BG	28		A	8		None	A	20				Drives turbo-blower for blast furnace
1			5		BG			A				A	.				Electric generation and air supply
1	0	1	5	75	BO	27		A			D,S	A			5		Blast furnace air and electric generation
1	0	1	5	80	BG	24.8	0.31	A	6	89		A	15		4.3	87	Drives alternator and blast furnace blower
1			5		BO			A	.			A					Electric generation and air supply
1	0	.	5	75	BO	26.5		A			D,S	A			5		Blast furnace air and electric generation
.					FG	32			3	.		FP	.				Pumping unit. output turbine built by Pennoet under Rateau license. Houdry unit
	1	.			BO	26.9		A				A		.	.	.	Electric generation
2	1	1	5	None	BO	24		A			D,S	A			15		Electric generation
4	0	.	W		BO	25		A	1,2,3	.	None	A	10,10	154	10.5		Electric generation
4	1	1	5	80	BO	30.4		A	.		None	A					Hydro standby, double flow HP turbine, compressor
3	1	1	5	80	BO	28.7		A			None	A				.	Hydro standby
4	1	1	5		BO	30.0	.	A	.		None	A					Winter hydro backup
1	0	1	5	None	BO	16.9		A	. .	88	None	A	23	61.9	4.4	84.6	Emergency standby
2		.	5	77	BO	30.1	0.25	A	6	86.5		A	21		7.0	87.0	Drives alternator and blast furnace blower
2		.	5		BO[g]	30.1	0.22	A	6	86.5		A	21	.	7.0	87.0	
1	1	.	5	80	BO	24.8	0.31	A	6	89		A	15		4.3	87	Drives alternator and blast-furnace blower
1	0	.	5	75	BO	26.5		A			D,S	A			5		Blast furnace air and electric generation
1	1	.		80	BO	27.5	.	A			None	A	19				

a – Power shaft geared to 1800 rpm
b – Turbine efficiency
c – Turbine coupling efficiency
d – Power shaft geared to 1500 rpm
e – Velox boiler furnace acts as combustor
f – Model in quantity production
g – Or 115 air hp
h – Gas hp
i – 20 lb per sec air at 4 atmospheres
j – Air hp
k – 30 delivered, 70 on order
l – 10 delivered, 90 on order
m – Injection rotative
n – Output speed 1800 rpm, 2-stage reducer
o – Escher Wyss and Fiat Benix
p – Turbine and compressor in common casing
q – Two compressors in series and 3 turbines in series all in common shell
r – Ambient temperature 41 F
s – Double-flow low-pressure turbine and double-flow-low-pressure compressor
t – Emergency operation with fuel oil
u – Output shaft geared to 6000 rpm
v – Lb per second
w – Maximum

STATUS
C – Under construction
D – Under development
O – In operation
Or – Ordered
T – Under test

COMPRESSOR
A – Axial
AC – Combined axial and centrifugal
C – Centrifugal
FP – Free piston

COMBUSTOR TYPE
A – Annular
CP – Chemical process
D – Double (2 combustors in parallel)
M – Multiple (usually 6 or more combustors in parallel)
F – Furnace
Ex – External heating
R – Refractory lined
S – Simple

COOLING TYPE
B – Blade
D – Disk
S – Stator casing

TURBINE
A – Axial
Ra – Radial

CYCLE TYPE
C – Closed cycle
EP – Equipressure cycle
FP – Free-piston cycle
O – Open cycle
S – Semiclosed cycle

FUEL TYPE
BG – Blast-furnace gas
BO – Bunker C or boiler oil
CT – Coal tar
CS – Coal slurry
DC – Distillate oil
FD – Domestic fuel oil
FL – Heavy oil, varied kinds
FL1 – Heavy oil 1
FL2 – Heavy oil 2
G – Natural gas
GO – Gas oil
K – Kerosene
LO – Light oil
O – Oil, unspecified
P – Peat
PC – Pulverized coal
PG – Producer gas
PR – Process reaction
RG – Refinery gas
RO – Residual oil
S – Solid fuels
SG – Sewage gas
WH – Waste heat

Compiled by Althea Thornton, Assistant Editor

OWNER	LOCATION	Builders	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS: Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbines in parallel
Miscellaneous and Process Units													
Shelton Iron, Steel & Coal Co, Ltd	Stoke-on-Trent, England	BB	1	1956	2 500 kw		1200	4.6	O	1	5.35	1	—
Middlesex County Council	Isleworth, England	HW	1	T	830 hp		1300	2.1	O	2	14.0/5.0	2	2
Alfred Holt & Co Ltd	Shipboard	AI	5	1-56	350 kw	350 kw	1380		O	1	15.0	1	.
Anglo-Saxon Petroleum Co Ltd	Shipboard	AI	1		225 kw	125 kw	1310		O	1	23.0	1	.
National Gas Turbine Establishment	Pyestock, England	P	1		20[a]	.	1125	4	O	1	4.6	1	.
FRANCE													
Stationary Generating Units													
Electricite de France	Paris, France	M	1	1949	15 000 kw	. .	1112	4.0	EP	.	.	.	.
	St. Denis, France	EM	1	1949	12 500 kw	. .	1250	11.6	C	2	8.0[m]/3.0	2	2
	St. Dizier, France	BB	1	1956	6 080 kw	. .	1230	4.6	O	1	4.75	1	.
	Cherbourg, France	EM	1	1955	6 000 kw	6,600 kw	925	4.30	FP	1	3.0		
	Angers, France	R	1	1956	6,000 kw	. .	1210	4.0	O	2	4.8/3.0	1	1
	Gaechtzy, France	FC	1	C	6,000 kw	. .	1292	4.5	O	2	5.2/3.0	2	1
	Tours, France	EM	1	1956	5,500 kw	5,800 kw	1200	4.3	FP	1	7.5[m]		
	Paris, France	R	1		2,000 kw	2,500 kw	1300	3.5	O	1	3.0	1	
	Ajaccio, France	SM	2	1955/1956	1,500 kw	1,650 kw	842	4.0	FP		9.0[f]		
	Reims, France	SM	1	1951	1,500 kw	1,700 kw	842	4.0	FP		9.0[m]		
	Reims, France	SM	1	1950	1,250 kw	1,400 kw	865	3.9	FP	1	9.0	1	.
Electricite et Gaz d'Algerie	Santa Cruz, France	BB	2	1956	11,000 kw	12,000 kw	1200	4.6	O	1	3.0	1	
Miscellaneous and Process Units													
Societe Metallurgique de Knutange	Knutange, France	BB	1	1957	14,000 kw	..	1400	5.0	O	1	3.0	1	
		EM	1	C	14,000 kw	. .	1360	5.5	O	1	3.0	1	
		R	1	1958	6,000[f] ahp		1380	4.0	O	1	3.5	1	
USINOR	Denain, France	EM	1	C	14,000 kw		1360	5.5	O	1	3.0	1	
USINOR for Escaudin P.P.	France	BB	1	1957	12,000 kw	...	1400	5.0	O	1	3.0	1	.
Societe des Fonderies de Pont-a-Mousson	Pont-a-Mousson, France	S	1	1958	7,500 kw	.	1256	4.0	O	1	3.85	1	
Societe des Hauts-Fourneaux de la Chiers	Longwy, France	EM	1	C	7,400 kw		1360	5.5	O	1	4.23	1	
		BB	1	1957	7,200 kw	.	1400	5.0	O	1	5.4	1	
Cie des Eaux de la Banlieue de Paris	Suresnes, France	SM	1	1955	900 ghp[m]	1,000 ghp	842	4.0	FP		11.5[3]		
Raffinerie de Berre	Berre, France	BB	1	1945	16 Mcfm								
EUROPE (Excluding France and Great Britain)													
Swedish Power Board	Vasterwik, Sweden	ST	1	1959	40,000 kw[7]				O				
Gumspong Munktors Kraft AB Orebro — Otterbacken Power Plant	Sweden	BB	1	1957	25,300 kw	27,500 kw	1200	16	O	2	4.75/3.0	2	
Ingeniorsfors Power Co	Varberg, Sweden	ST	1	T	10,000 kw[7]		1292		O	3	7.0/5.5/3.0	[b]	1
North East Power Co	Beznau, Switzerland	BB	1	1949	27,000 kw[7]		1112	8.0	O	2	3.0/3.0	3	
	Beznau, Switzerland	BB	1	1948	30,000 kw[7]		1112	8.0	O	2	4.75[m]/3.0	2	1
	Wettingen, Switzerland	S	1	1950	20,000 kw		1200	20.0	S	3	5.0/3.0	3	
Municipal Electric Supply	Neuchatel, Switzerland	BB	1	1939	4,500 kw		1020	4.0	O	1	3.0	1	
Societe Hainaut Sambre SA	Courillet, Belgium	S	1	10-55	7,500 kw		1256	6.6	O	1	4.25	1	
		S	1	4-56	7,500 kw		1256	6.6	O	1	4.25	1	
Societe Anonyme Cockerill-Ougree	Seraing, Belgium	S	1	1957	7,500 kw		1256	4.0	O	1	3.85	1	
Miniere et Metallurgique de Rodange	Rodange, Luxemburg	BB	1	1957	7,200 kw		1400	5	O	1	5.4	1	
Arbed Steel Works	Dudelange, Luxemburg	BB	1		5,400 kw		1112	3.6	O	1		1	

BUILDER

AC – Allis-Chalmers Mfg Co, USA
AI – W H Allen Sons & Co, Ltd, England
AR – AiResearch Mfg Co, USA
B – Boeing Airplane Co, USA
BB – Brown, Boveri & Co, Ltd, Switzerland
BE – Bruss Electrical Engrg Co Ltd, England
BT – British Thomson-Houston Co, Ltd, England
CA – Continental Aviation and Engineering Corp, USA
CB – Clark Brothers, USA
DB – David Budworth Limited, England
EE – English Electric Co, Ltd, England
EI – Elsinore Shipbldg & Engrg Co Ltd, Den
EM – Cie Electro-Mecanique, France
EW – Escher Wyss Ltd, Switzerland
FC – Societe des Forges et Ateliers du Creusot – Usines Schneider, France
G – Gasturbine Maatschappij, Holland
GE – General Electric Co, USA
HW – Harland & Wolff, Ltd, Ireland
JB – John Brown & Co Ltd, Scotland
M – Ernest Mercier (design), France
MH – Mitsubishi-Nippon Heavy Industries, Ltd, Japan
MV – Metropolitan-Vickers Elec Co, England
P – Maschinenfabrik Oerlikon, Switzerland
P – C A Parsons & Co, Ltd, England
PE – Pametrada (Parsons and Marine Engrg Turbine Research and Development Association), England
R – Societe Rateau, France
RG – Rover Gas Turbines Ltd, England
RH – Ruston & Hornsby, Ltd, England
S – Sulzer Brothers, Ltd, Switzerland
SM – SEME (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Indust Generale de Mecanique Appliquee), France
ST – Swenska Turbinfabrik Aktiebolaget Ljungstrom, Swejen
So – Solar Aircraft Co, USA
St – Stabilimento Ernesto Breda, Italy
T – Societe Turbomeca, France
TS – Tokyo Shibaura Electric Co, Japan
W – Westinghouse Electric Corp, USA

GENERAL FOOTNOTES

a – Thermal effy based on higher heating value of fuel unless otherwise noted
b – Turbines and compressors listed in order of descending pressure for each unit
c – Power shaft geared to 3600 rpm
d – With reduction in ambient temperature
e – L-p and h-p turbines in one casing
f – Double flow
g – One Rotland unit has 35% effectiveness
h – Water-cooled pads facing disks
j – Based on lower heating value of fuel
k – Starting combustor, catalyst case is the operating combustor
m – Power shaft geared to 3000 rpm
n – 120 lb per sec gas at 25 psia, 1050 F

No. of compressor cylinders	No. of intercoolers	No. heating stages	Combustion type	Regeneration effectiveness, %[b]	Type of fuel	PERFORMANCE: Thermal efficiency, %[a]	PERFORMANCE: Work ratio	TURBINES: Type[b]	TURBINES: No. of stages	TURBINES: Engine efficiency, %	TURBINES: Cooling	COMPRESSORS: Type[b]	COMPRESSORS: No. of stages	COMPRESSORS: Discharge pressure, psia	COMPRESSORS: Compression ratio	COMPRESSORS: Compression efficiency, %	REMARKS
				None		24		A			D,S	A			3E		Electric generation
				None		24		A			D,S	A			16		Electric generation
				None		24		A			D,S	A			16		Electric generation
			M	None	RG	22.1		A	2		D	A	15	85			Hydro backup and emergency standby
	C		M	RC	BO	21.0		A	2		D	A	15	85			Hydro backup and emergency standby
				None	G	19.0		A			D,S	A			4.6		Electric generation
				None	G	19.2		A			D,S	A			4.6		Electric generation
				None		18.0		A			None	A					
				None		18		A			D,S	A			4.6		Electric generation
				None		18		A			D,S	A			4.6		Electric generation
				None	G	19		A			D,S	A			4.6		Electric generation
	C		M	None	RG	35.6	0.33	A	4			A	14	70	4.9		Air-compressor drive for refinery
			FP	None	FG	30.0			3								Pennant turbine. Natural license, electric generation
			M		G	20.6		A	2		D	A	15	85	6.16		Electric generation
					G,DO	20.87		A	2			A	16	85	6.0		Electric generation
	C		M		G,DO	19.0		A	2		D	A	16	85			Electric generation
			M	None	RG	35.6	0.33	A	2			A	23	68	4.7		Gas-compressor drive for refinery
			M		RG,G	19.0		A	2		D	A	16	85			Electric generation
			M		G	17.1		A	2		D	A	15	85			Electric generation
		C		RC	BO	28.2		A			None	A					Base load unit
	C		S	None	G	28.0		A		88	None	A			4.6	89	Standby unit
1	C		C	None	G	25.9	0.33	A	2.2	87	D,S	A	13	61.8	4.2	83	Electric generation
	C		M		G,DO	19.0		A	2		D	A	15	85			Electric generation
2			S	None	G	24		A			D,S	A			3E		Electric generation at El Convento power plant
					G,DO	20.0			2.6			A	10 15	206	3.6 4.4		Electric generation
		2	C	None	G	24		A			D,S	A			16		Electric generation
1	C		S	TE	G	24		A			D,S	A			4.0		Electric generation
1	C		C	None	G	26.4		A			None	A					
			C	None	BO	20.7		A			None	A	16				
1	C		M		G	18.6	0.33	A	5			A	16	86.0	6.0		Electric generation
					G												Electric generation
1	C			None	G	17		A				A		81	5.5		
1	C		M	None	G	19.0	0.34	A	4			A	12	75.0	5.2		
	C		M		G	19.2	0.265	A	5	89[e]		A	14	72	4.9	84.5	
1	C		C	None	G	25.9	0.33	A	2.2		D,S	A	13	61.8	4.2	83	
1	C		M		G	18.6	0.33	A	5			A	16	86	6.0		Gas compressor drive, pressure maintenance platform
1	C		M	None	G	18.5	0.33	A	2.2		D,S	A	14	78	5.5		Repressurizing drive. 2 single-stage turbines, variable inlet nozzles in 2nd stage
3			M		G,DO	20.6		A	2		D	A	15	85			Power generation. Barge mounted
1	C			TE	GO	27.9		A	7.5 E			A	13 10.5[b]	117.6	{2.0, 2.03 / 2.07}		Two lp turbines in parallel, one driving lp compressor, other hp
1	C		C	TE	GO	26.5	0.355	A	2.6			A	10 14	148	3.25 3.25	82.5	
4	S	2		SE	RG	22.6	0.38	A				A					Built under Escher Wyss license
			C	GT	F		0.30	A	9	86	None	C	C	445	3.9	8.	
2			M	TE	GO	28.0[c]		A	6		None	A	24				Regenerator exhaust provides space heating
1	S		M	None	GO	26.5	0.35	A	2.2		D,S	A	14	60	4.25		For standby service
			M		DO	27.1	0.342	A	5	89.5[e]		A	14	72	4.9	84.5	
		2	C	None	G	28.0[c]		A	4		D,S	A C	6 C	72.5	4.8		For standby service
1			C	GT	CO		0.31	A	9	86	None	C	C	445	3.9	81	

a – Power shaft geared to 1800 rpm
b – Turbine efficiency
g – Turbine coupling efficiency
r – Power shaft geared to 3600 rpm
s – Water tower furnace acts as combustor
t – Model in quantity production
u – Oil 125 air no
w – Gas no
x – 20 lb per sec air at 4 atmospheres
y – Air no
z – 30 delivered, 70 on order
1 – 40 delivered, 90 on order
2 – Injector rotative
3 – Output speed 2100 rpm, 2-stage reducer
4 – Escher Wyss and Fiat Demir
5 – Turbine and compressor in common casing
6 – Two compressors in series and 3 turbines in series all in common shell
7 – Ambient temperature 40 F
8 – Double-flow low-pressure turbine and double-flow low-pressure compressor
9 – Emergency operation with fuel oil
10 – Output shaft geared to 6000 rpm
11 – Lb per second
12 – Maximum

STATUS
C – Under construction
D – Under development
O – In operation
Or – Ordered
T – Under test

COMPRESSOR
A – Axial
AC – Combines axial and centrifugal
C – Centrifugal
FP – Free piston

COMBUSTOR TYPE
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CP – Chemical process
D – Double (2 combustors in parallel)
M – Multiple (usually 6 or more combustors in parallel)
F – Furnace
Ex – External heating
R – Refractory lined
S – Single

COOLING TYPE
B – Blade
D – Disk
S – Stator casing

TURBINE
A – Axial
Ra – Radial

CYCLE TYPE
C – Closed cycle
EP – Equipressure cycle
FP – Free-piston cycle
O – Open cycle
S – Semiclosed cycle

FUEL TYPE
BG – Blast-furnace gas
BC – Bunker C or boiler oil
CT – Coal tar
CS – Coal slurry
DO – Distillate oil
FD – Domestic fuel oil
FL – Heavy oil, varied kinds
FL1 – Heavy oil 1
FL2 – Heavy oil 2
G – Natural gas
GO – Gas oil
K – Kerosene
LO – Light oil
O – Oil, unspecified
P – Peat
PC – Pulverized coal
PG – Producer gas
PR – Process reaction
RG – Refinery gas
RO – Residual oil
S – Solid fuels
SG – Sewage gas
WH – Waste heat

1956 Survey of Stationary Gas Turbines

Compiled by Althea Thornton, Assistant Editor

OWNER	LOCATION	Builders	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS: Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine wheels in series	Efficiency, %
CANADA														
British Columbia Electric Company	Vancouver, Canada	BB	4	1958	23,000 kw	27,300 kw	1200	16	0	2	4.75/3.0	2		
City of Edmonton	Edmonton, Canada	BB	2	1957	20,000 kw	30,000 kw	1200	16	0	2	4.75/3.0	2		
Calgary Power	Canada	BB	1	1957	20,000 kw	20,000 kw	1200	16	0	2	4.75/3.0	2		
British Columbia Power Commission	Vancouver Island, Canada	GE	2 C		16,500 kw	20,650 kw	1450	6.0	0	1	3.6	1		
			2 C		15,200 kw	20,650 kw	1450	6.0	0	1	3.6	1		
Canadian Utilities Limited	Sturgeon Lake, Canada	BB	1	1957	6,200 kw	9,000 kw	1200	4.6	0	1	3.6	1		
	Edmonton, Canada	BB	1	1958	6,000 kw	10,200 kw	1200	4.6	0	1	3.6	1		
	Vermilion, Canada	BB	1	1954	6,900 kw	7,400 kw	1200	4.6	0	1	3.6	1		
Saskatchewan Power Corp	Regina, Canada	BB	2	1958	6,200 kw	9,000 kw	1200	4.6	0	1	3.6	1		
City of Lethbridge	Lethbridge, Canada	BB	1	1958	6,200 kw	9,000 kw	1200	4.6	0	1	3.6	1		
Western Chemicals	Elk Point, Canada	BB	1	1957	6,200 kw	9,000 kw	1200	4.6	0	1	3.6	1		
LATIN AMERICA														
Stationary Generating Units														
Esso Standard Oil Company	Belot, Cuba	W	1	1957	3,000 hp	3,750 hp	1350	4.8	0	1	6.5			
Cervecería Modelo	Havana, Cuba	SM	1	1953	500 kw	560 kw	342	4.0	FP	1	11.5[3]	1		
Planta Electrica at Grupo Industrial	Monterrey, Mexico	GE	2	C	16,000 kw	20,650 kw[4]	1450	6.0	0	1	3.6	1		
Altos Hornos de Mexico	Coan, Mexico	W	1	Or	8,100 kw	.	.		0	1	5.74[5]	1		
		GE	2	C	7,500 kw	9,375 kw	..	6.0	0	1	4.63[5]	1		
Lago Oil & Transport Co	Aruba, B.W.I.	W	1	1957	1,800 hp	2,250 hp	1350	4.6	0	1	8.75	1		
Industria Colombiana de Fertilizantes	Bermeja, Colombia	GE	2	C	7,500 kw	9,375 kw		6.0	0	1	4.63[5]	1		
Empresa Colombiana de Petroleos	El Centro, Colombia	GE	2	1957	5,000 kw	6,250 kw	1450	6.0	0	1	6.9[5]	1		
Lima Light, Power & Tramway Co	Lima, Peru	BB	1	1949	10,000 kw		1100	3.0	0	2	4.75[m] 3.0	2	2	
Cia Peruana del Santo	Chimbote, Peru	BB	1	1949	4,000 kw	4,225 kw	1100	4.6	0	1	3.6	1		
Anglo Ecuadorian Oilfields	Ancon, Ecuador	RH	1	1956	900 kw	1,000 kw	1340	4.0	0	2	11.5, 6.0	2	2	
Electricidad de Caracas	Caracas, Venezuela	GE	1	C	21,800 kw		1450	6.0	0	1	3.29[m]	1		
		BB	1	1957	20,000 kw	.	1200	16	0	2	4.75, 3.0	2	.	
		BB	4	12-56	20,000 kw	.	1200	.		2	4.75, 3.0	2	1	
Shell Caribbean Petroleum Co	Las Monochas, Venezuela	BB	1	1958	20,000 kw	.	1200	16	0	2	4.75, 3.0	2		
CA Venezolana de Cementos	Pertigalete, Venezuela	BB	2	1954	5,300 kw	. .	1200	4.0	0	1	3.6	1		
		BB	1	1954	5,300 kw	.	1200	4.6	0	1	3.6	1		
		BB	2	1949	1,650 kw		1100	3.0	0	1	5.23[n]	1		
Mene Grande Oil Co	San Tome, Venezuela	W	1	1954	5,000 kw	6,250 kw	1350	5.8	0	1	6.74	1		
			2	1955										
			1	1957										
NV De Bataafsche Petroleum Maatschappij	Venezuela	G		Or	2,000 kw									
Shell Oil Co	Maracaibo, Venezuela	G	1		2,000 kw	.	1112	5.5	0	1	6.0	1		
Shell Petroleum Co., Ltd	Maracaibo, Venezuela	MV	1	T	1,750 kw	2,000 kw	1185	5.2	0	1	7.0	1		
Shell Petroleum Co. Ltd	Venezuela	MV	1	1955	1,750 kw	1,750 kw	1182	4.9	0	1	7.0	1		
CA Cementa Curazaoa	Valencia, Venezuela	RH	4	1956	900 kw	1,000 kw	1340	4.0	0	2	11.5, 6.0	2	2	
Miscellaneous and Process Units														
Creole Petroleum Corp	Lake Maracaibo, Venezuela	W	12	1956-1957	8,000 hp	8,750 hp	1350	5.8	0	1	6.0	1		
		GE	10	1953	5,000 hp		1450	5.5	0	2	6.3, 5.0	1[e]	2	
		GE	1	1957	16,500 kw	20,650 kw	1450	6.0	0	1	3.6	1		
GREAT BRITAIN														
Stationary Generating Units														
Central Electricity Authority	Dunston, England	P	1	1955	15,000 kw		1200	8.0	0	3	3.0, 2.9, 2.9	3	2	
Central Electricity Authority	Manchester, England	MV	1	1952	15,000 kw	15,000 kw	1250	10.1	0	2	3.5, 3.0	2	2	
North of Scotland Hydro-Electric Board	Dundee, Scotland	JB	1	1953	12,500 kw		1250	10.0	C	2	3.5, 3.0	2	2	
	Kilmarnock, Scotland	JB	1	1957	12,500 kw		1220	9.5	C	2	3.5, 3.0	2		
National Gas Turbine Establishment	Pyestock, England	P	1		10,000 kw		1200	5.5	0	2	7.8, 3.0	2		
Metropolitan Water Board	Ashford, England	GE	1	T	2,500 kw		1340	4.0	0	2	6.4, 2.0	2	2	
		MV	1	1955	2,500 kw	2,500 kw	1292	4.9	0	2	7.0	2		
		EE	1	T	1,875 kw	2,250 kw	1400	4.8	0	2	8.25, 7.0[n]	1	2	
National Coal Board	Rosyth, Scotland	JB	1	1958	2,000 kw		1220	3.6	C	1	12.75	1		

BUILDER

AC – A. Ecl-Chalmers Mfg. Co., USA
AV – A. V. Alen Diesels & Co. Ltd., England
AR – A. Reach Mfg. Co., USA
B – Blessing & Rohrbe Co., USA
BB – Brown, Boveri & Co., Ltd., Switzerland
BE – Brush Electrical Engrg. Co., Ltd., England
BT – British Thomson-Houston Co., Ltd., England
CA – Continental Aviation and Engineering Corp., USA
CI – Clark Brothers, USA
DB – David Brown Limited, England
EE – English Electric Co., Ltd., England
E – Escher Wyss Ltd. & Engrg. Co., Ltd., Switzerland
EM – A. Electro-Mécanique, France
ES – Ecole Nationale Supérieure [illegible]
FC – Société des Forges et Ateliers du Creusot – Usines Schneider, France
G – Gasturbine Maatschappij, Holland
GE – General Electric Co., USA
HW – Harland & Wolff, Ltd., Ireland
JB – John Brown & Co., Ltd., Scotland
M – Ernest Mercier (design), France
MH – Mitsubishi Nippon Heavy Industries, Ltd., Japan
MV – Metropolitan-Vickers Elec. Co., England
S – Maschinenfabrik Sulzer, Switzerland
P – C. A. Parsons & Co., Ltd., England
PR – Pametrada, Parsons and Marine Engrg. Turbine Research and Development Association, England
R – Societe Rateau, France
RG – Rover Gas Turbines Ltd., England
RH – Ruston & Hornsby, Ltd., England
S – Sulzer Brothers, Ltd., Switzerland
SM – SEMT (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Industr. Generale de Mecanique Appliquee), France
ST – Svenska Turbinfabrik Aktiebolaget Ljungstrom, Sweden
So – Solar Aircraft Co., USA
St – Stabilimento Ernesto Breda, Italy
T – Societe Turbomeca, France
TS – Tosyo Shibaura Electric Co., Japan
W – Westinghouse Electric Corp., USA

GENERAL FOOTNOTES

a – Thermal effy based on higher heating value of fuel unless otherwise noted
b – Turbines and compressors listed in order of descending pressure for each unit
c – Power shaft geared to 3600 rpm
d – With reduction in ambient temperature
e – L.p. and H.p. turbines in one casing
f – Double flow
g – One Rutland unit has 85% effectiveness
h – Water-cooled pads facing disks
j – Based on lower heating value of fuel
k – Starting combustor, catalyst case is the operating combustor
m – Power shaft geared to 3000 rpm
n – 120 lb per sec gas at 25 psia, 1050 F

Compiled by Althea Thornton, Assistant Editor

OWNER	LOCATION	Builders	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS: Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine wheels in series
EXPERIMENTAL AND SHOP TEST UNITS													
United States													
Westinghouse Electric Corp	Lester, Pennsylvania	W	1	1957	17,500 kw	22,300 kw	1350	7.5	O	2	3.6	2	2
Locomotive Development Committee, BCR	Dunkirk, New York	AC	1	1949	3,750 hp	4,500 hp	1300	5.2	O	1	5.7	1	--
Clark Brothers	Olean, New York	RH	1	1956	1300 hp	1,430 hp	1340	4.0	O	2	11.5/6.0	2	2
Foreign													
National Gas Turbine Establishment	Pyestock, England	P	1	1956	10,000 kw		1200	5.5	O	2	3.0/2.8	2	2
			1	1955	25 lb sec		1160	4.05	O	1	4.6	1	--
CA Parsons & Co, Ltd	Heaton, England	P	1	1954	2,500 kw	.	1292	3.8	O	2	6.5/3.0	2	2
			1	1945	500 hp		1200	4.0	O	1	6.0	1	--
English Electric Co, Ltd	Rugby, England	EE	1	4-53	2,750 hp	3,250 hp	1430	4.8	O	2	8.25/7.0	1	2
Metropolitan Vickers Electrical Co, Ltd	Trafford Park, England	MV	1	1949	2,000 kw	. .	1240	3.2	O	2	7.3/5.0	2	2
Ministry of Fuel and Power	England	EE	2	1954 / 1956	2,000 kw	2,000 kw	1430	4.8	O	2	8.25/7.0[c]	1[a]	2
		MV	1	T	2,900 kw	2,000 kw	1200	5.3	O	1	7.0	1	
Brush Electrical Engineering Co, Ltd	Loughborough, England	BE	1		2,000 kw	.	1160	4.9	O	2	5.0/3.0	2	2
Parsons	Wallsend-on-Tyne, England	Pt	1	1949	3,500 hp		1250	5.4	O	2	4.5/3.08	2	2
			1	1952	2,900 hp		1500			1		1	
British Admiralty	Pyestock, England	AI	1	1951	1,000 kw		1200	4.25	O	2	3.0/6.75	2	2
Smith's Dock	Middlesbrough, England	SM	1	1955	1,250 hp[m]	1500 hp[m]	842	4.0	FP	.			
John Brown & Co, Ltd	Clydebank, Scotland	JB	1	1955	1,000 kw		1160	3.2	C	1	13.5	1	1
Ministry of Fuel & Power	Lincoln, England	RH	1	1952	750 kw		1340	4.0	O	2	11.4/6.0[f]	2	2
Ruston & Hornsby, Ltd	Lincoln, England	RH	1	1949	750 kw	900 kw	1340	4.0	O	2	11.4/6.0[f]	2	2
			1	1952	750 kw	1,000 kw	1340	4.0	O	2	11.4/6.0[f]	2	2
W H Allen, Sons & Co, Ltd	Bedford, England	AI	1	1952	200 hp		1436	2.5	O	1	23.0[m]	1	
Brown Boveri & Co, Ltd —	Baden, Switzerland	BB	1	1943	1,500 kw	.	900	4	O	1	6.0	1	
Escher Wyss Engineering Works, Ltd	Zurich, Switzerland	EW	1	1939	2,000 kw		1270	3.8	C	2	8.0/3.0	2	2
Escher Wyss GmbH Ravensburg	Wurttemberg, Germany	EW	1	1955	2,000 kw	2,300 kw	1220	3.6	C	1	12.75	1[s]	.
Maschinenfaorik Oerlikon	Zurich, Switzerland	O	1	1947	1,300 kw		1022	4.0	O	2	4.5/3.0	2	2
Marine Nationale Francaise	Venissieux, France	SM	1	1949	1,550 kw	1,700 kw	842	4.0	FP	1	9.0[f]	1	.
			1	1946	1,250 gnp[m]	1,500 gnp	842	4.0	FP				
Societe Gen de Const Elec et Mecan Alsthom	Belfort, France	A	1	1952	5,000 kw		1472	9	O	2		2	
Electricite de France	Vitry, France	M	1		1,000 hp				EP				
Societe Rateau	St. Denis, France	R	1		2,300 kw		1292	3.8	O	1	4.6[f]	1	
Laboratoires Turbines a Gas	St. Denis, France	T	1	1949	1,600 hp		1300	.	O	1	.		
Elsinore Shipbldg & Engrg Co, Ltd	Elsinore, Denmark	EI	1	1953	3,000 hp		1200	5.0	O	2	6.3/5.4	2	
STAL	Finspang, Sweden	ST	1	1952	2,400 kw		1292	3.9	O	2	5.65/3.0	1	
Stabilimento Ernesto Breda	Milan, Italy	St	1		350 hp								
Tokyo Shibaura Electric Co	Tokyo, Japan	TS	1		2,200 hp		1200		O	1	5.5	1	
Mitsubishi-Nippon Heavy Industries, Ltd	Yokohama, Japan	MN	1	1954	2,500 hp	2,750 hp	1292	10	O	3	17.8/8.5/8.0	3	3
			1	C	200 hp	300 hp	1472	3.75	O	2	29.25/22	1	2
SMALL AUXILIARY AND EMERGENCY UNITS													
Airesearch Manufacturing Co	Phoenix, Arizona	AR	[p]		122 hp		1400	3	O	1	6.0	1	
		AR	[p]		100 hp		1550	3.3	O	1	6.0	1	
		AR	[p]		150 amp[r]		1625	3.4	O	1	42.5	1	
		AR	O		180 amp[r]		1650	3.5	O	1	42.0	1	
		AR	[p]		168 amp[r]		1550	3.5	O	1	41.5	1	
		AR	[p]		120 hp[r]		1550	3.4	O	1	42.1[10]	1	
Boeing Airplane Company	Seattle, Washington	B	120	1953	240 hp	300 hp	1500	3.95	O	2	36.5/2.92	1	2
		B		1953	205 amp[r]	225 amp[r]	1500	3.95	O	2	36.5/29.0	1	2
		B	350	1947	175 hp	210 hp	1550	3.0	O	2	36.5/2.75	1	2
		B	200	1951	140 amp[r]	140 amp[r]	1550	3.0	O	2	36.5/29.0	1	2
Bristol Siddeley Engines, Ltd	Harwich, Essex, England	DB	[p]		50 hp		1430	2.7	O	1	45.0	1	
Continental Aviation and Engrg Corp	Detroit, Mich	CA	[p]	1956	180 amp[r]	80 amp	1460	3.6	O	1	36.0	1	2
		CA	[p]		163 amp[r]	170 amp	1460	3.85	O	1	36.0	1	2
Rover Gas Turbines, Ltd	Clyrnull, Warwickshire, England	RG	[p]	1954	50 kva		1340	3.09	O	1	46.0	1	
United States Air Force	Bureau of Ships	So	400	1952	50 hp		1100	2.35	O	1	44.25	1	
		So	300[t]	1954	250 amp		1450	4.15	O	1	21.0	1	
United States Navy		So	100[t]	1951	50 hp			2.56	O	1	40.3	1	
		So	10	1952	520 hp		1460	4.6	O	1	39.0	1	
United States Air Force		So	2	1953	520 hp		1460	4.6	O	2	39.22	2	2
Turbomeca	Bures, France	T			320 hp	400 hp	1427		O	1	33.0[n]	1	
		T			500 hp	>500 hp			O	1	[n]	1	
		T			2.4[11]	2.5[11]		3.5	O	1	34.0[12]	1	
		T			350 hp	400 hp			O	2	34.5/29	1	
		T			2.4[11]	2.5[11]			O	1	34.0[12]	1	
Societe Industrielle de Mecanique	Tanker "Bernstecn"	SM	1	1952	500 kw	550 kw	842	4	FP	1	9.0[f]	1	

Small Auxiliary and Experimental Units

No. of cylinders	No. of intercoolers	No. heating stages	Combustor type	Regenerator effectiveness, %	Type of fuel	PERFORMANCE: Thermal efficiency, %[a]	PERFORMANCE: Work ratio	TURBINES: Type[b]	TURBINES: No. of stages	TURBINES: Engine efficiency, %	TURBINES: Cooling	COMPRESSORS: Type[b]	COMPRESSORS: No. of stages	COMPRESSORS: Discharge pressure, psia	COMPRESSORS: Compression ratio	COMPRESSORS: Compression efficiency, %	REMARKS
2	1	1	M	75	G O	27.0	0.33	A	7			A	29	113.5	8.0		Electric generation
1	0	1	D	55	PC	19.5	0.30	A	6	87.5	D	A	20	75.1	5.2	84	For coal burning operation
1	0	1	S		DO	15.9[c]	0.33	A	2,2	87	D,S	A	13	61.8	4.2	83	Demonstration unit
2	1	1		75	LO	28		A	5,3			A	11,13	80.9	2.2 2.6		Hi-p turbine drives load and l-p compressor
1	1	1			LO			A	6	86	None	A	14	59.5	4.05	83	Supplies variable air conditions for experimental rigs
1	0	1		75	LO BO	24.5		A	2,2	85.2	D	A	12	55.6	3.8	84.2	Prototype standard set
1	0	1		75	O PC	15.6		A	8			A	25		4.0	81	Used for oil and pulverized coal tests
1	0	1	D	65	G O	22.9[c]		A	4		D,S	A,C	6,1	70.5	4.8		Shop test engine
1	0	1	D	56	G	20.5	0.34	A	1 4	86	D,B	A	11	46.6	3.2	86	Shop power supply
1	0	1		65	PC			A	4		D,S	A,C	6,1	70.5	4.8		For coal and gas burning tests
1	0	1	D	None	PC			A	5	89		A	14	76.2	5.3	85	For coal burning tests
1	0	1		None		17.0	0.26	A	2	85	D,S	A	16	71.2	4.9	82	Stator cooling on both turbines
2	1	2	S D	80	LO BO	29[d]	0.38	A' A'	13.8	86		A	{17 11	76.7 29.9	2.63 2.05	{87 84}	Prototype marine propulsion unit under shop test Separate boost turbine drives blower for combustion tests
1	0	2	D	70	LO DO	19.6 43		A	2,1	85	D	A	13	60	4.25	86	Long-life generator set for British Navy Efficiency based on gas hp output
1	1	1	S	90	S		0.285	A	5	88	None	C	3	230	3.5	81	Shop unit for testing solid fuels
1	0	1	S	75	P	22.0	0.33	A	2,2		D,S	A	13	61.8	4.2		Exhaust heat dries incoming wet peat
1	0	1	D	75	BO	23.4	0.33	A	2,2		D,S	A	13	61.8	4.2		Both generate part of factory power supply
1	0	1	S	75	O	22.5											
1	0	1	S	None	DO	8.75		Ra	1			C	1		2.4		Emergency generator set for British Navy
1	0		S[e]	None	BO			A	5			A	10		4		Shop test unit for Velox boiler
3	2	1	D	92	BO	31.5	0.39	A	6	90.3		A	13,9		1.6		
1	1		Ea		PC	26		A	5			C	3	400			Precooler and intercooler used for water heating
	1	1	S	78	BO	22.6	0.32	A	5,5	84	None	C	3	4.0	4.0	88	Shop test unit
		1	FP		FO	34		A	4								Efficiency based on kwht generator output
		1	FP		FL2	43											Efficiency based on gas output
2	1	1			BO	29		A				A					For plant power generation
1	0	1	D		C	15.0		A	3			A	16				Test unit in Vitry steam station
					N				2	86	None						Turbine only, supplied by compressed air
2	1	2	S	90	LO	31	0.37	A	8	86	None	A	24	71	5.0	83	Experimental marine unit
1	0	1	M	50	LO	21		A	5			A	14		3.9	90	Shop test unit
																	Experimental unit
	0	1		None	BO	12		A				A	20				For Railway Technical Research Institute
2	1	2	S	75	BO	31	0.325	A	4	88	D	A,AC	11,5,1	142	3.3 3.1	92 88	Experimental unit
1	0	1	D		N	13	0.21	A	1,1	87	D	C	1	54.1	3.75	80	Expected to be completed summer 1956
	0	1	S		DO			Ra	1			None					Airborne unit depends on pressurized hot air source
	0	1	S		DO			Ra	1			C	2				Airborne auxiliary power unit
	0	1	S		DO	9.9		Ra	1			C	2		3.4		Airborne auxiliary and ground support source of bleed-air power
	0	1	S		DO	9.9		Ra	1			C	2		3.5		Airborne and ground support unit to provide bleed-air power
	0	1	S		DO	9.7		Ra	1			C	2		3.5		Air transportable source of bleed air for ground support
	0	1	S		DO	7.9		Ra	1			C	2		3.4		Airborne auxiliary power unit, shaft hp or bleed air
1	1	1	D		LO	14	0.349	A	1,1	82.5		C	1	60.0	4.1	75	Shaft power, supersedes 175 hp unit
1	1	1	D		LO	14	0.349	A	1,1	82.5		C	1	60.0	4.1	75	Output turbine drives 1-stage compressor supersedes 140 hp unit
1	1	1	D		LO	11	0.349	A	1,1	80.5		C	1	45.5	3.1	73	Out of production-superseded by 240 hp unit
1	1	1	D		LO	11	0.349	A	1,1	80.5		C	1	45.5	3.1	73	Out of Production-superseded by 205 hp unit
1	1	1	A		DO	9.9		Ra	1			C	1				Portable pumping, generating, process heat applications
1	1	1	A		DO			A	2			C	1		3.85		Portable air compressor drive for aircraft ground support
1	1	1	A		DO			A	2			C	1				Portable air compressor drive for aircraft ground support
2	0	1	S	None	DO G	10.4	0.35	A	1	83.7	D,S	C	1	44.8	3.09	77.4	Drives water pumps, electric generators
1	0	1	S		DO	1	1	Ra	1			C	1	34.6	2.35		Electric generation
1	0	1	S	1	DO	5		A	3			A	10	61	4.15		Compressed air and shaft power
1	0	1	S		DO N	1		Ra	1			C	1	37.6	2.56		Pumping or air bleed
1	0	1	S		DO N	15		A	3			A	10	67.6	4.6		Ship/barge generator set
1	0	1	S		DO M	15		A	2,1			A	10	67.6	4.6		Boat propulsion unit suited for stationary applications
1	0	1	A	None	LO			A	1			C	1				*Helicopter ground auxiliary drive*
1	0	1	A	None	LO			A	1			C	1				Helicopter ground auxiliary drive
1	0	1		None	LO			A	1			C	1				Helicopter compressed air supply
1	0	1		None	LO			A	1,1			C	1				For starting equipment
1	0	1			N			A	1			C	1				Air conditioning aircraft cabins on ground, warming up engines
1	0	1	FP		FL2	30		A	1			FP	1				

Plants in the United States

Date of initial operation	Initial capacity, hp	Added capacity, no. of units	Date of added capacity	Ultimate capacity, hp	No. of units installed	Waterwheel capacity, hp	Waterwheel type	Speed, rpm	Static head, ft	Design head, ft	[4]Waterwheel manufacturer	[4]Governor manufacturer	Scroll case, concrete or steel	Penstock valve, type	Generator capacity, kva	Synchronizing, manual or automatic	[5]Thrust-bearing location	Design power factor	Kilovolts	[4]Generator manufacturer
1956	6 000			6 000	2	3 000	Propeller	120	20	20	JL	W	Concrete	Head gate	2 500	Automatic	BG	0.80	2.4	WE
1956	4 500			4 500	3	1 500	Francis	257	40	40	MS	L	Plate steel	Head gate	1 000	Manual	HS	0.80	0.48	WE
1956	10 [illegible]	1	1956	10 100	4	2 525	Propeller	120	20–8	20	MS	L	Concrete	Head gate	2 000	Semi-auto	AG	0.80	4.15	GE
1956	780			780	1	780	Impulse	831	622	622	MS		Cast steel							
1956	220 000			220 000	4	55 000	Francis	126.6	159–119	150	MS	W	Plate steel	Head gate	39 000	Manual	BG	0.90	13.8	WE
1956	2 400			2 400	1	2 400	Francis	400	55–52	57	JL	W	Concrete	Head gate	2 000	Manual	AG	0.80	4.16	GE
1956	200			200	1	200	Francis	360	30	30	MS									
1956	600			600	1	600	Francis	200	28	25	JL		Concrete	Head gate	500	Manual	AG	0.80	0.6	WE
1956	370			370	2	370	Francis	180	18	18	JL		Concrete	Head gate	312	Manual	AG	0.80	0.6	EM
1955	57 000			57 000	1	57 000	Kaplan	138.5	99–72	96	AC	W	Plate steel	Head gate	43 750	Auto or man	BG	0.80	12.5	AC
1956	1 200 000			1 200 000	{6	75 000	Propeller	94.73	86–79	81	AC	AC	Concrete	Head gate	60 000	Auto. or man	BG	0.90	13.8	GE
					{6	75 000	Propeller	94.73	86–79	81	BL	AC	Concrete	Head gate	60 000	Auto or man.	BG	0.90	13.8	GE
1955	30 600			30 600	1	30 600	Francis	120	104	101	MS	W	Plate steel	Head gate	25 000	Automatic	BG	0.90	11.5	GE
1955	30 600			30 600	1	30 600	Francis	120	102	102	MS	W	Plate steel	Head gate	25 000	Automatic	BG	0.90	11.5	GE
1956	18 650			18 650	1	18 650	Francis	112.5	69	67	MS	W	Plate steel	Head gate	16 000	Automatic	BG	0.90	6.9	AC
1957	32 000			32 000	1	32 000	Francis	120	106	104	MS	W	Plate steel	Head gate	25 000	Automatic	BG	0.90	11.5	GE
1957	686			686	1	686	Francis	900	115	115	JL	W	Bronze	Butterfly	690	Automatic	HS	0.90	0.44	EC
1956	8 200	1	1956	20 800	3	8 200	Francis	514	268–258	230	JL	W	Welded pl st	Gate valve	6 750	Semi-auto	AG	0.80	6.9	EC
1955	1 067			1 067	2	{511	Francis	182	25	25	JL		Concrete	Head gate	Drives mill machinery					
						{556	Francis	180	20	20	JL		Concrete	Head gate	Drives mill machinery					
1956	440			440	1	440	Impulse	600	435	435	MS		Cast steel							EC
1956	7 500			3 750	2	3 750	Kaplan	180	30	30	MS		Concrete	Head gate	3 000	Manual	AG	0.80	4.16	EM
1955	11 590	1	1955	11 590	1	2 800	Francis	240	63	63	MS		Concrete	Head gate	Connects to existing GE generator					
1955	650			650	1	650		225							500	Manual	HS	0.80	0.48	WE
1955	143			143	1	143	Francis	62	9	8	JL		Open flume	Head gate	Drives mill machinery					
1956	254			254	1	254	Francis	218	22	22	JL		Concrete	Head gate	Drives mill machinery					
1955	264 000	1	1956	440 000	3	88 000	Francis	90	187–100	150	BL	W	Plate steel	Head gate	84 210	Manual	SG	0.95	13.8	GE
1955	170 000			425 000	2	85 000	Francis	94.7	216–130	170			Plate steel	Head gate	65 000	Manual	SG	0.95	13.8	
1954	460 000	3	1955	460 000	8	57 500	Francis	85.7	145–75	112	AC	W	Plate steel	Head gate	42 105	Manual	SG	0.95	13.8	WE
1956	162 000	2	1957	162 000	3	54 000	Kaplan	75	66–40	48	BL	W	Concrete	Head gate	35 100	Manual	BG	0.95	13.8	GE
1955	340			340	1	340	Francis	300	26	26	JL		Concrete	Head gate	Connects to existing Westinghouse generator					
1955	400			400	1	400	Propeller	277	20	20	JL		Concrete	Head gate	375	Manual	AG	0.80	0.48	GE
1955	140 000			140 000	4	35 000	Kaplan	128.6	82–36	74.5	NN	W	Concrete	Head gate	27 800	Automatic	BG	0.90	14.4	GE
1955	12 570			12 570	1	12 570	Francis	600	526–459	500	MS	W	Plate steel	Butterfly	12 000	Auto or man	AG	0.90	4.16	GE
1957	70 000			70 000	3	23 333	Kaplan	128.6	64–50	56.5	NN	W	Concrete	Head gate	19,610	Auto or man	BG	0.85	6.9	WE
1955	650			650	1	650	Francis	164	19	19	JL		Concrete	Head gate	Connects to existing Electric Machinery generator					
1956	118 400			118 400	{2	55 000	Francis	100	170–104	136	NN	PB	Plate steel	Head gate	44,444	Manual	BG	0.90	13.8	WE
					{1	8 500	Francis	277	176–104	136	JL	PB	Plate	Head gate	6,667	Manual	AG	0.90	13.8	WE
		{1	1930		{2	3 600	1 Tra, 1 pro	100	33–10	30	NN	W	Concrete	Head gate	2,750	Manual	AG	0.80	2.3	GE
1956	7,200	{1	1942	18,200	{1	6 000	Propeller	126.5	33–10	30	NN	W	Concrete	Head gate	5,000	Manual	AG	0.80	2.3	GE
		{1	1955		{1	5,000	Kaplan	128.5	33–10	30	NN	W	Concrete	Head gate	4,500	Manual	AG	0.80	2.3	GE
1955	25,600	2	1955	39 600	2	7,000	Francis	200	65–59	60	JL	W	Plate steel	Head gate	6 250	Manual	HS	0.80	4.16	AC
1955	42 000			42,000	3	14,000	Terry	75	32–14	26	NN	W	Concrete	Head gate	11,111	Manual	BG	0.90	13.8	WE
1955	21 000			21 000	1	21,000	Francis	180	166–76	124	JL	W	Plate steel	Head gate	16,667	Automatic	BG	0.90	13.8	WE
1940	80 000	2	1955	160,000	{2	80,000	Francis	120	195	190	NN	W	Plate steel	Head gate	62 000	Manual	BG	0.90	13.8	WE
at a 102,000-hp	3 906-cfs, 205-ft head pump →				{1	80 000	Francis	105.9	196	190	AC	AC	Plate steel	Head gate	70 000	Manual	BG	0.90	13.8	AC
1956	180 000			180 000	4	45,000	Kaplan	75	60–25	45	BL	W	Concrete	Head gate	31,250	Manual	BG	0.80	13.8	GE
1955	60,000			60,000	3	20 000	Kaplan	60	32	32	NN	W	Concrete	Head gate	15,333	Manual	BG	0.90	13.8	WE
1955	136 000			272,000	{2	68,000	Francis	128.6	228–134	190	EE		Plate steel	Head gate	50 623	Manual	SG	0.95	13.8	WE
					{2	1 000	Francis	600	228–134	190	JL		Plate steel	Head gate	875	Manual	AG	0.80	0.48	WE
1955	550 000			550 000	4	137,500	Francis	100	154–162	152	AC	AC	Plate steel	Head gate	101,660	Manual	BG	0.95	14.4	GE
1955	53 000			53 000	2	26 500	Francis	163.6	168–143	155	NN	W	Plate steel	Butterfly	18,950	Manual	AG	0.95	6.9	EC
1957	33 500			33 500	2	16,750	Francis	181	153–67	107	MS		Plate steel	Butterfly	15,333	Manual	AG	0.90	6.9	AE
1957	158 000			158 000	4	39 500	Francis	163.6	245–114	190	ME	W	Welded pl st	Butterfly	30,000	Manual	AG	0.95	13.8	PO
1956	58 800			58,800	3	19,600	Kaplan	64.5	25–8	22	BL	W	Concrete	Head gate	15 [illegible]	Manual	BG	0.90	13.8	GE
1955	780			780	1	780	Francis	150	22	22	JL		Concrete	Head gate	Connects to existing GE generator					
1955	477			477	1	477	Francis	720	81.5	81.5	MS		Plate steel	Head gate	500	Manual	HS	0.80	2.4	WE
1955	565			565	1	565	Impulse	600	245	230	PB	W	Cast steel		625	Manual	HS	0.80	2.4	WE
1957	7 200			7,000	2	3,500	Francis	360	140–78	120	JL	W	Steel	Head gate	2 750	Manual	AG	0.90	2.4	EC
1956	4 266			4 266	3	1 422	Impulse	1 200		1 525			Cast steel	Head gate	1,710	Manual	HS	0.90	2.4	
1955	1 200			1,200	2	600	Propeller	300	25	25	PB	PB	Concrete	Head gate	500	Manual	AG	0.80	2.4	GE
1955	1 607 000	{5	1955	2 707 000	{10	100,000	Francis	100	179–148	165	NN	AC	Plate steel	Head gate	57,386	Manual	BG	0.95	13.8	WE
		{4	1956		{6	100 000	Francis	100	179–148	165	MS	W	Plate steel	Head gate	67,326	Manual	BG	0.95	13.8	WE
		{4	1956		{2	3 500	Francis	514	179–148	165	PB	PE	Plate steel	Head gate	3 000	Manual	AG	0.80	4.16	EC
1955	1 535 200	{10	53–55	2 233 000	{14	111 300	Kaplan	85.7	97–62	80	ME	AC	Concrete	Head gate	73 684	Manual	SG	0.95	12.5	GE, PEE
		{4	1956		{2	3,500	Francis	277	97–62	80	PB	W	Concrete	Head gate	3 750	Manual	AG	0.80	4.16	EM
1955	96 000			120 500	4	24 500	Kaplan	200	46–26	41	AC	W	Concrete	Head gate	16 667	Manual	BG	0.90	13.8	EC
1957	560 000	1	1956	560 000	4	140 000	Francis	150		385	3 EL, 1 NN	W	Welded pl st	Butterfly	100,000	Auto or man.	AG	0.80	13.8	WE
1956	911 000			1 824 000	8	114 000	Kaplan	85.7	84–49	76			Concrete	Head gate	63 000			0.95	13.8	
1957	364 000			1 729 200	5	106 000	Kaplan	85.7	86–52	75			Concrete	Head gate	75 000			0.95	13.8	
1956	220 000			220 000	4	55 000	Francis	138.5	155–135	162	MS	PB	Plate steel	Head gate	45 000	Manual	BG		13.8	
1955	84 500	1	1955	131 000	3	27 000	Francis	150.6	230–200	227	MS	W	Plate steel	Butterfly	61,000	Manual	BG	0.90	13.8	GE
1955	120 000			120 000	3	60 000	Francis	200	288–248	275	BL	PB	Plate steel	Head gate	47 200	Automatic	BG	0.90	13.8	GE
1957	30 000	1	1957	38 000	2	26 000	Francis	300	287	270	MS	W	Plate steel	Head gate	22,500	Automatic	AG	0.90	6.9	GE
1955	17 000			17 000	2	8 500	Francis	240	129–107	115	JL	PB	Plate steel	Head gate	9,215	Manual	AG	0.95	4.16	EM
1955	5 250			5 250	2	2 600	Francis	240	129–107	115	JL		Plate steel	Head gate	Drives Worthington pumps					
1955	18 000			18 000	1	18 000	Francis	225	188–140	166	PB		Plate steel	Head gate	11,842	Manual	AG	0.95	6.6	
1955	1 400			1 400	2	700	Francis	600	68	60	JL		Concrete	Head gate	Drives pumps					

EE – English Electric Co Ltd
EEC – English Electric Co of Canada Ltd
EM – Electric Machinery Mfg Co
GE – General Electric Co
G&D – Grimes & Gordon Ltd
JL – James Leffel & Co
KMH – KMW of Sweden
L – Lombard Governor Co
MS – S Morgan Smith Co
MSC – S Morgan Smith, Canada Ltd
MVE – Metropolitan Vickers Electrical Co Ltd
NEP – (Neyrpic) Neyret-Beylier & Piccard Pictet
NN – Newport News Shipbuilding & Dry Dock Co
PO – Pacific Oerlikon Co
PE – Perton Div, Baldwin-Lima-Hamilton Corp
SEC – Swedish Electric Co
SGE – Swedish General Electric Co
VIW – Vancouver Iron Works Ltd
W – Woodward Governor Co
WE – Westinghouse Electric Corp
WEI – Westinghouse Electric International Co

[5]AG, indicates thrust bearing is above generator rotor, BG thrust bearing is below generator rotor, HS, horizontal-shaft machine

[6]Vertical-shaft, 4-nozzle type.

Compiled by F. A. Annett
Contributing Editor

Company or government agency	Design or consulting engineers	Project name	[1] New or redeveloped	River	State	Project started, date	[2] Dam type	Crest length, ft	Max height, ft	[3] Type of installation
NEW ENGLAND STATES										
Central Maine Power Co	Central Maine Power Co	Bar Mills	Red.	Saco	Me.	1955				I
St Croix Paper Co	Chas T Main, Inc	Woodland	Red.	St Croix	Me.	1954				I
Bangor Hydro-Electric Co	Bangor Hydro-Electric Co	Milford No. 3A	Red.	Penobscot	Me.	1955	CG	960	50	I
Northern Chemical Industries			New		Me.	1955				I
Connecticut River Power Co	Chas T Main, Inc; N. E. Power Service Co	Littleton	New	Connecticut	N.H. & Vt.	1952	CSE	3,148	180	I
Citizens Utilities Co	Stone & Webster; Citizens Utilities	Newport No 11	Red.	Clyde	Vt.	1956	CG	90	9	I
Southworth Co		West Springfield	New		Mass.	1955				I
American Writing Paper Corp		Holyoke	Red.		Mass.	1955				I
Parsons Paper Co		Holyoke	Red.		Mass.	1955				I
Electric Power, Inc	Chas T Main, Inc	Shepaug	New	Housatonic	Conn.	1953	CG	1,412	139	I
MIDDLE ATLANTIC STATES										
Power Authority of the State of N.Y.	Sanderson & Porter, Uhl, Hall & Rich	Barnhart Island	New	St Lawrence	N.Y.	1954	CG CG	3,200 3,100	172 126	S
Niagara Mohawk Power Corp	Niagara Mohawk Power Corp	Five Falls	New	Raquette	N.Y.	1953	C&E	500	50	I
Niagara Mohawk Power Corp	Niagara Mohawk Power Corp	Rainbow Falls	New	Raquette	N.Y.	1954	C&E	600	78	I
Niagara Mohawk Power Corp	Niagara Mohawk Power Corp	Blake Falls	New	Raquette	N.Y.	1954	C&E	600	50	I
Niagara Mohawk Power Corp	Niagara Mohawk Power Corp	Stark	New	Raquette	N.Y.	1955	C&E	235	40	I
Eastman Kodak Co	Company engineering staff	Waste treatment	New	Genesee	N.Y.	1955		10	115	I
New York State Electric & Gas Corp	Company engineering dept	High Falls	New	Saranac	N.Y.	1955	CG	274	58	I
Brownville Board Co		Brownville	Red		N.Y.	1954				I
Ambridge Water Authority		Ambridge	New		Pa.	1955				
EAST NORTH CENTRAL STATES										
Northern States Power Co		Menomonie	New	Menomonie	Wis.	1955				I
Kimberly-Clark Corp	Company engineering staff	Quinnesec	Red.	Menomonie	Wis.	1954	CG	200	22	I
Kansas City Star		Park Falls	New		Wis.	1954				I
Whiting Plover Paper Co		Stevens Point	Red		Wis.	1954				I
Clark Bros Milling Co		Augusta	Red.		Wis.	1955				I
WEST NORTH CENTRAL STATES										
U. S. Corps of Engineers	U.S. Corps of Engr; Chas T Main, Inc	Garrison	New	Missouri	N.D.	1945	EF	12,000	210	I
U. S. Corps of Engineers	U.S. Corps of Engr; Chas T Main, Inc	Oahe	New	Missouri	S.D.	1948	EF	9,300	242	I
U. S. Corps of Engineers	U.S. Corps of Engr; Erik Floor & Assoc	Fort Randall	New	Missouri	S.D.	1946	EF	10,500	160	I
U. S. Corps of Engineers	U.S. Corps of Engr; Harza Engrg Co	Gavins Point	New	Missouri	S.D. & Neb.	1948	EF	8,700	74	I
Lanesboro Public Utilities		Lanesboro	Red		Minn.	1954				I
Amana Woolen Mills		Amana	New		Iowa	1954				I
SOUTH ATLANTIC STATES										
Virginia Electric & Power Co	Stone & Webster Engrg; Chas T Main, Inc	Roanoke Rapids	New	Roanoke	N.C.	1953	CG	3,060	72	S
Nantahala Power & Light Co	Aluminum Company of America	Tennessee Creek	New	E. Fork Tuckasegee	N.C.	1952	EF,RF	310 385	185 135	I
Tapoco, Inc	Aluminum Company of America	Chilhowee	New	Little Tennessee	Tenn.	1955	EF,RF	1,410	82	I
Marlet Mills		Cherokee Falls	Red		S.C.	1954				I
U. S. Corps of Engineers	U. S. Corps of Engineers Erik Floor & Associates	Buford	New	Chattahoochee	Ga.	1950	Earth	1,630	192	I
Crisp County Power Comm	J. E. Sirrine & Emmet S. Killebrew	Flint River	New	Flint	Ga.	1928	CG	450	30	I
Georgia Power Co	Georgia Power Co	Goat Rock	New	Chattahoochee	Ga.	1954	CG	1,548	67	I
U. S. Corps of Engineers	U. S. Corps of Engineers	Jim Woodruff	New	Apalachicola	Fla.	1947	CG	6,134	106	I
EAST SOUTH CENTRAL STATES										
Tennessee Valley Authority	Tennessee Valley Authority	Nottely	New	Nottely	Ga.	1941	E&RF	2,300	184	I
Tennessee Valley Authority	Tennessee Valley Authority	Hiwassee	New	Hiwassee	N.C.	1937	CG	1,255	308	S
								This unit also operates in reverse		
U. S. Corps of Engineers	U.S. Corps of Engr; Ambursen Engr Corp.	Old Hickory	New	Cumberland	Tenn.	1951	CG&EF	5,750	98	I
U. S. Corps of Engineers	U.S. Corps of Engineers	Cheatham	New	Cumberland	Tenn.	1950	CG	495	75	I
WEST SOUTH CENTRAL STATES										
U. S. Corps of Engineers	U.S. Corps of Engineers	Table Rock	New	White	Ark.	1952	CG&EF	6,388	250	I
MOUNTAIN STATES										
Washington Water Power Co	Ebasco Services, Inc	Noxon	New	Clark Fork	Mont.	1955	CG&EF	4,200	190	O
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Alcova	New	North Platte	Wyo.	1951	EF	753	255	I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Glendo	New	North Platte	Wyo.	1954	EF	4,540	207	I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Palisades	New	Snake	Idaho	1952	EF	2,200	206	I
U. S. Corps of Engineers	Sverdrup & Parcel, Inc	Albeni Falls	New	Pend Oreille	Idaho	1951	CG	755	93	I
Idaho Falls Electric Light Dept			Red		Idaho	1955				I
City of Soda Springs		Soda Creek No. 4	New	Soda Creek	Idaho	1954				I
Parowan City Corp		Red Creek	New	Red Creek	Utah	1954				I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Provo River	New	Provo	Utah	1955	EF	1,300	235	I
Sunnyside Power Association, Inc	Harza Engineering Co	Boulder	New	Boulder Creek	Utah	1956	EF	150	30	I
Truckee-Carson Irrigation Dist		Drop No. 5	New		Nev.	1954				I
PACIFIC COAST										
U. S. Corps of Engineers	U. S. Corps of Engineers	Chief Joseph	New	Columbia	Wash.	1949	CG	2,315	235	I
U. S. Corps of Engineers	U. S. Corps of Engineers	McNary	New	Columbia	Wash. & Ore.	1947	CG&EF	8,200	157	I
PUD No. 1 Pend Oreille County	Harza Engineering Co	Box Canyon	New	Pend Oreille	Wash.	1952	CG	290	105	I
City of Seattle	Stone & Webster Engineering Corp	Ross	New	Skagit	Wash.	1937	CA	1,300	540	I
Public Utility Dist of Grant County	Harza Engineering Co	Priest Rapids	New	Columbia	Wash.	1955	CG&EF	8,900	100	I
Public Utility Dist of Grant County	Harza Engineering Co	Wanapum	New	Columbia	Wash.	1956	CG&EF	8,400	128	I
City of Tacoma, Dept of Public Util	Harza Engineering Co	Mayfield	New	Cowlitz	Wash.	1956	A&G	875	245	I
Puget Sound Power & Light Co	Stone & Webster Engineering Corp	Lower Baker No. 3	New	Baker	Wash.	1957				I
Puget Sound Power & Light Co	Stone & Webster Engineering Corp	Upper Baker	New	Baker	Wash.	1956	CG	1,200	300	I
Puget Sound Power & Light Co	Stone & Webster Engineering Corp	Snoqualmie Falls No. 2	New	Snoqualmie	Wash.	1956				I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Chandler	New	Yakima	Wash.	1953	CG	768	8	I I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Roza	New	Yakima	Wash.	1956				I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Kennewick	New	Yakima	Wash.	1953	CG	768	8	I

[1] The term "New" applies to a project on a site not developed before. "Redeveloped" indicates a project on a site that has been developed before and now has new turbines, settings, generators or a new plant.

[2] CA, concrete arch; CSE, concrete and earth; CG, concrete gravity; CG&EF, concrete gravity and earth fill; CG S&B, concrete gravity, slab & buttress; CS&B, concrete slab and buttress; EF, earth fill; EF&RF, earth-faced rock fill; E&RF, earth and rock fill; EFCW, earth fill with concrete core wall; HF, hydraulic fill; RF, rock fill; RFCF, rock fill, concrete face; REF, rolled earth fill; SG sector gates; S&H, sluiceways and rock fill; TC timber crib.

[3] I, indoor; S, semi-outdoor; O, outdoor; U, underground.

AIC – Allis-Chalmers Mfg Co
AE – American Elin Corp
BL – Baldwin-Lima-Hamilton Corp
CAC – Canadian Allis-Chalmers Ltd
CBS – Charles Barber & Sons
CGE – Canadian General Electric Co Ltd
CVL – Canadian Vickers Ltd
CWC – Canadian Westinghouse Co Ltd
DEC – Dominion Engineering Co Ltd
EC – Elliott Co

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Contributing Editor

Company or government agency	Design or consulting engineers	Project name	[1] New or redeveloped	River	State	Project started, date	[2] Dam type	Crest length, ft	Max height, ft	[3] Type of installation
PACIFIC COAST STATES, cont.										
U. S. Corps of Engineers	U. S. Corps of Engineers	The Dalles	New	Columbia	Wash. & Ore.	1951				
U. S. Corps of Engineers	U. S. Corps of Engineers	The Dalles Fishway	New	Columbia	Wash. & Ore.	1951	CG			I
U. S. Corps of Engineers	U. S. Corps of Engr. Sverdrup & Parcel	Ice Harbor	New	Snake	Wash.	1956	CG	2,090	100	I
Portland General Electric Co	Ebasco Services Inc	Pelton	New	Deschutes	Ore.	1956	CA	650	200	O
California Oregon Power Co	Pioneer Service & Engrg Co	Lemolo No. 1	New	North Umpqua	Ore.	1953	RFCF	885	120	O
California Oregon Power Co	Pioneer Service & Engrg Co	Lemolo No. 2	New	North Umpqua	Ore.	1953	CG&B	195	35	O
U. S. Corps of Engineers	U. S. Corps of Engr. Stevens & Thompson Engrs.	Lookout Point	New	Middle Fork Willamette	Ore.	1949	CG&EF	4,740	253	I
U. S. Corps of Engineers	U. S. Corps of Engineers	Dexter	New	Middle Fork Willamette	Ore.	1953	EF	2,355	80	I
Idaho Power Co	International Engr Co / J P Growdon, / H C Steele, & Harold Stearns	Brownlee	New	Snake	Ore. & Idaho	1955	E&R	1,320	395	O
Idaho Power Co		Oxbow	New	Snake	Ore. & Idaho	1955	E&R	1,100	200	O
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Pit No. 4	New	Pit	Calif.	1953	CG,G&B	415	74	
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Poe	New	Feather	Calif.	1954	CG	430	60	O
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Butt Valley	New	Butt Creek	Calif.	1956	HF	1,250	130	I
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Caribou No. 2	New	Feather	Calif.	1956	Earth	1,370	80	I
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Belden	New	Feather	Calif.	1957	CG	505	150	I
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Kings River	New	Kings	Calif.	1959	Arch	130	383	O
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Balch	Red.	Kings	Calif.	1956	Arch	388	148	O
Pacific Gas & Electric Co	Pacific Gas & Electric Co	Haas	New	Kings	Calif.	1955	RF	950 / 3,350	360 / 370	U
Los Angeles Dept of Water & Power	Prof F J Converse, Raton R Proctor, Chas T Leeds & Chester Markwave	Pleasant Valley	New	Owen	Calif.	1954	EF	530	116	O
Southern California Edison Co	S C Edison & Bechtel Corp	Portal	New		Calif.	1955	EF	838	55	O
Oakdale & S San Joaquin Irr Dist	Tudor-Woodenough Engineers, International Engrg Co & Geo E Goodall Co	Tri-Dam Tulloch	New	Stanislaus	Calif.	1965	CG	1,600	200	I
Oakdale & S San Joaquin Irr Dist		Tri-Dam Donnells	New	Stanislaus	Calif.	1955	CA	900	477	I
Oakdale & S San Joaquin Irr Dist		Tri-Dam Beardsley	New	Stanislaus	Calif.	1955	EF	1,000	320	I
Imperial Irrigation District	Bates & Rogers Const Corp	Pilot Knob	New	All-American Canal	Calif.	1954				I
U. S. Corps of Engineers, U. S. Bureau of Reclamation	U. S. Corps of Engineers, U. S. Bureau of Reclamation	Folsom	New	American	Calif.	1947	CG&EF	10,230	340	S
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Nimbus	New	American	Calif.	1952	CG	813	50	S
U. S. POSSESSIONS										
Petersburg Light & Power Co			New		Alaska	1954				I
N. Y. Alaska Gold Dredging Corp	Company engineers	Nyac	New	Tuluksak	Alaska	1954				S
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Eklutna	New	Lake Eklutna	Alaska	1951	EF			I
Metlakatla Indian Community	Hubbell & Hailer Engrg Corp	Purple Lake	New		Alaska	1954				I
Puerto Rico Water Resources Authority	Jackson & Moreland	Yauco No. 1	New	Guayo	P. R.	1953	CG	585	190	I
Panama Canal Co		Gatun Hydro	Red.	Chagres	Canal Zone	1954				I
CANADA					Province					
Union Electric Light & Power Co Ltd		Trinity	New	Trinity	N.F.	1954				I
United Towns Electric Co Ltd	Power Corp of Canada Ltd	New Chelsea	New	Chelsea	N.F.	1955	EF			I
Nova Scotia Power Commission	N. S. Power Comm & K E Whitman	Ridge	New	Bear	N.S.	1956	EF DH	2,966	42	I
New Brunswick Electric Power Comm	Shawinigan Engineering Co	Beechwood	New	St John	N.B.	1955	CG	50	100	I
Quebec Hydro-Electric Comm	H G Acres & Co, Frazer Brace Engrg	Rapids No. 2	New	Ottawa	Que.	1951	CG	1,025	110	I
Quebec Hydro-Electric Comm	H G Acres & Co	Bersimis-Lac Casse	New	Bersimis	Que	1953	RF	2,215 / 1,042	200 / 230	U
Manicouagan Power Co	H G Acres & Co	McCormick Dam	New	Manicouagan	Que.	1951	CG	4,575	95	I
Eastern Smelting & Refining Corp	Montreal Engineering Co	Smelter Power	New	Chicoutimi	Que.	1955	CG	460	50	I
Price Brothers & Co	Montreal Engineering Co	Chute Wilson	New	Shipshaw	Que.	1956				I
Shawinigan Water & Power Co	Shawinigan Engineering Co	Trenche	New	St Maurice	Que.	1946	CG			I
Shawinigan Water & Power Co	Shawinigan Engineering Co	Rapide Blanc	New	St Maurice	Que.	1930	CG			I
Shawinigan Water & Power Co	Shawinigan Engineering Co	La Tuque	New	St Maurice	Que.	1938	CG	1,325	131	I
Gatineau Power Co		Paugan	New	Gatineau	Que.	1926	CG			I
Northern Quebec Power Co	Power Corporation of Canada Ltd	Quinze	New	Ottawa	Que.	1921	S&R	2,500	50	I
Hydro-Electric Power Comm of Ontario	Hydro-Electric Power Comm of Ontario	Sir Adam Beck-Niagara No. 2	New	Niagara	Ont.					I
Hydro-Electric Power Comm of Ontario	Hydro-Electric Power Comm of Ontario	Sir Adam Beck-Niagara No. 2	New	Niagara	Ont.	1952	RF	24,967	68	O
Hydro-Electric Power Comm of Ontario	Hydro-Electric Power Comm of Ontario	Robert H Saunders	New	St. Lawrence	Ont.	1954	CG / CG	3,200 / 3,100	172 / 125	O
Hydro-Electric Power Comm of Ontario	Hydro-Electric Power Comm of Ontario	Manitou Falls	New	English	Ont	1953	CG	1,059	40	I
Hydro-Electric Power Comm of Ontario	Hydro-Electric Power Comm of Ontario	Whitedog Falls	New	Winnipeg	Ont.	1955	CG	1,120	80	I
Great Lakes Power Co	Harza Engineering Co	Centre Falls	New	Montreal	Ont	1956	CG	1,100	130	I
Great Lakes Power Co	Harza Engineering Co	Upper Falls	New	Montreal	Ont	1955	CG	1,300	90	I
Brompton Pulp & Paper Co	H G Acres & Co	Bridgeridge Falls	Red	North Muskoka	Ont.	1956				I
Canadian Electric Light & Water Co	H G Acres & Co	Jones Falls	New	Rideau Canal	Ont	1946				I
Ontario Minnesota Pulp & Paper Co	Company engineers	Fort Francis	Red	Rainy	Ont	1954	CG	700	50	I
Miller Bros Ltd		Trenton	New		Ont	1955				I
Manitoba Hydro-Electric Board	H G Acres & Co	McArthur Falls	New	Winnipeg	Man	1952	CG&EF	31,300	70	I
Calgary Power Co	Montreal Engineering Co	Interlakes	New	Kananaskis	Alta.	1954	EF	400	70	I
Calgary Power Co	Montreal Engineering Co	Pocaterra	New	Kananaskis	Alta	1954	REF	2,000	90	I
Calgary Power Co	Montreal Engineering Co	Cascade Extension	New	Cascade	Alta	1956				I
Aluminum Company of Canada	B. C. International Engrg Co	Kemano	New	Nechako	B.C.	1951	RF	1,550	319	U
British Columbia Electric Co	B. C. International Engrg Co	Seton	New	Seton & Cayoosh Creek	B.C.	1954	TC / CG	300 / 450	20 / 25	I
British Columbia Electric Co	B. C. Engineering Co, Dr Terzaghi & Dr V Cornejo	Cheakamus	New	Cheakamus	B.C.	1954	EF	2,000	90	I
British Columbia Power Comm	B. C. Power Comm & H G Acres & Co	Puntledge	Red	Puntledge	B.C.	1953	CG	200	15	I
British Columbia Power Comm	H G Acres & Co	Ladore	New	Campbell	B.C.	1955	CG			S
British Columbia Power Comm	B. C. Power Comm & H G Acres & Co	Whatshan	New	Whatshan	B.C.	1948				I
British Columbia Power Comm	H G Acres & Co	Upper Campbell Lake	New	Campbell	B.C.	1955	EF	1,700	170	S
Northern British Columbia Power Co	Power Corp of Canada Ltd	Shawatlans	Red		B.C.	1954				I
Yukon Hydro Co Ltd	Phelps & Scott Engineers	Porter Creek	New	Porter Creek	Yukon	1955	EF	230	25	I

[1] The term "New" applies to a project on a site not developed before. "Redeveloped" indicates a project on a site that has been developed before and now has new turbines, settings, generators or a new plant.

[2] CA, concrete arch; CAE, concrete and earth; CG, concrete gravity; CG&EF, concrete gravity and earth fill; CG, S&B concrete gravity, slab & buttress; CS&B, concrete slab and buttress; EF, earth fill; EF&RF, earth-faced rock fill; E&RF, earth and rock fill; EFCW, earth fill with concrete core wall; HF, hydraulic fill; RF, rock fill; RFCF, rock fill, concrete face; REF, rolled earth fill; SG sector gates; S&R, sluiceways and rock fill; TC timber crib.

[3] I, indoor; S, semi-outdoor; O, outdoor; U, underground.

[4] AC – Allis-Chalmers Mfg Co
AE – American Elin Corp
BL – Baldwin-Lima-Hamilton Corp
CAC – Canadian Allis-Chalmers Ltd
CBS – Charles Barber & Sons
CGE – Canadian General Electric Co Ltd
CVL – Canadian Vickers Ltd
CWC – Canadian Westinghouse Co Ltd
DEC – Dominion Engineering Co Ltd
EC – Elliott Co

Year of initial operation	Initial capacity, hp	Added capacity, no. of units	Date of added capacity	Ultimate capacity, hp	No. of units installed	Waterwheel capacity, hp	Waterwheel type	Speed, rpm	Static head, ft	Design head, ft	[4]Waterwheel manufacturer	[4]Governor manufacturer	Scroll case concrete or steel	Penstock valve, type	Generator capacity, kva	Synchronizing manual or automatic	[5]Thrust-bearing location	Design power factor	Kilovolts	[4]Generator manufacturer
					[14]	122,000	Kaplan	85.7	91-60	83	JL	PG	Concrete	Head gate	22,105	Manual	BG	0.95	13.8	BGE
1957	1,179,600			2,179,200	[2]	15,600	Kaplan	200	51-60	74	AC	PB	Concrete	Head gate	14,200	Manual	AG	0.95	13.8	WE
					[5]	4,500	Francis	277	91-60	83	PB	W	Service units		1,500	Manual	BG	0.80	4.16	EM
1961	435,000			855,000	3	145,000	Kaplan	90	105-78	94	MS		Concrete	Head gate	94,737	Auto. or man.	BG	0.95	13.8	
1941	161,000			161,000	3	55,000	Francis	138.5	156-150	150	MS	W	Plate steel	Head gate	36,000	Manual	BG	0.90	13.8	GE
1955	40,000			40,000	1	40,000	Francis	400	756-745	710	AC	W	Welded pl st	Butterfly	30,527	Automatic	AG	0.95	11.5	WE
1956	45,000			45,000	1	45,000	Francis	400	727-704	705	AC	W	Welded pl st	Butterfly	34,737	Automatic	AG	0.95	11.5	WE
1955	57,500			57,500	3	52,500	Francis	126.6	233-126	185	PB	W	Plate steel	Head gate	42,222	Manual	BG	0.90	13.8	GE
1955	20,700			20,700	1	20,700	Kaplan	128.6	58-51	55	NN	W	Concrete	Head gate	15,000	Automatic	BG	1.00	13.8	GE
1958	554,300			634,300	4	139,000	Francis	128.6	177-176	174	MS	W	Plate steel	Head gate	100,100	Manual	BG	0.90	13.8	WE
	332,000			349,000	4	56,300	Francis	100	117-111	115		W	Plate steel	Head gate	42,000	Manual	BG	0.90	13.8	WE
1955	125,400			125,400	2	64,200	Francis	225	382-367	340	NN	W	Welded pl st	Butterfly	50,000	Manual	AG	0.90	13.8	GE
1958	152,000			152,000	2	76,000	Francis	225	492-467	421	PB	PB	Cast & pl st	Butterfly	59,000	Automatic	AG	0.90	13.8	GE
1958	50,000			50,000	1	50,000	Francis	200	360-295	313			Cast & pl st	Butterfly	40,000	Automatic	AG	0.90	13.8	GE
1956	152,000			152,000	2	76,000	Impulse	257	1,152-1,130					Butterfly	61,000	Automatic	AG	0.90	13.8	GE
1961	152,000			152,000	2	76,000	Francis	300	770	685			Cast & pl st	Butterfly	65,000	Automatic	AG	0.90	13.8	
1961	90,000			90,000	1	60,000	Francis		793-709	739			Cast & pl st	Butterfly	49,000	Automatic	AG	0.90	13.8	
1958	46,000	1	1958	184,000	2	67,000	Impulse	400	2,389-2,350	2293			Cast steel	Spherical	54,000	Automatic	AG	0.90	13.8	AC
1960	184,000			184,000	2	92,000	Impulse	400	2,444-2,224	2324			Cast steel	Spherical	75,000	Automatic	AG	0.90	13.8	WE
1958	4,200			4,200	1	4,200	Francis	550	76-52	68	JL	W	Plate steel	Butterfly	4,000	Manual	HS	0.80	4.16	EC
1960	24,000			24,000	2	24,000	Francis	300	230	210	MC	W	Welded pl st	Butterfly	20,000	Auto. or man.	AG	1.00	4.8	GE
1958	24,000			24,000	2	12,000	Francis	240	157-74	153	MS	W	Plate steel	Head gate	9,500	Manual	AG	0.90	6.9	EC
1957	74,500			74,500	1	74,500	Impulse[6]	240	1,461-1,285	1151	AC	AC	Cast steel	Butterfly	67,500	Auto. or man.	AG	0.80	13.5	AC
1961	34,000			34,000	1	34,000	Francis	300	264-122	258	AC	AC	Riveted pl st	Butterfly	31,000	Manual	AG	0.90	6.9	AC
1956	57,500			57,500	3	28,300	Kaplan	125.6	48	48	BL	W	Concrete	Head gate	20,000	Manual	HS	0.80	4.16	EC
1955	222,000	1	1958	222,000	3	74,000	Francis	163.6	340-145	300	NN	W	Plate steel	Head gate	60,000	Manual	AG	0.90	13.8	WE
1955	18,800			18,800	2	9,400	Kaplan	150	51-20	42	MS	PB	Concrete	Head gate	7,500	Manual	AG	0.90	4.16	EC
1956	3,100			3,100	1	3,100	Impulse	600		1000	AC	W			2,500	Manual	HS	0.80	4.1	AC
1959	500			1,230	[1]	500	Francis	600	71	71	MS	L	Plate steel	Head gate	350	Manual	HS	0.80	4.1	AC
					[1]	730	Francis	514	71	71	JL	W	Plate steel	Head gate	625	Manual	HS	0.80	4.1	WE
1959	50,000			50,000	2	25,000	Francis	600	870-780	800	NN	W	Cast steel	Butterfly	16,667	Manual	AG	0.90	6.9	PO
1956	7,535			5,295	[2]	1,765	Francis	900	321-287	306	JL	W	Cast steel	Butterfly	1,250	Manual	HS	0.80	2.4	EC
1955	34,000			34,000	1	34,000	Impulse	257	978-793	740	PB	W	Cast steel	Spherical	25,000	Auto. or man.	AG	0.80	13.8	WEI
1956	10,320			20,970	[2]	4,440	Francis	257		75	PB	PB	Concrete	Head gate	3,750	Auto. or man.	AG	0.80	6.9	GE
					[1]	6,750	Francis	189.5		75	PB	PB	Concrete	Head gate	5,625	Auto. or man.	AG	0.80	6.9	GE
1955	2,000	1	1956	4,000	2	2,000	Francis	720		260					1,800	Manual	HS	0.80	6.9	CGE
1956	5,600			5,600	1	5,600	Francis	514		275	DEC	W	Plate steel	Butterfly	5,000	Auto. or man.	AG	0.80	6.9	CWC
1957	5,300			5,300	1	5,300	Francis	360	144-147	140	MSC	W	Plate steel	Butterfly	5,000	Automatic	AG	0.80	6.6	CGE
1958	90,000			135,000	2	45,000	Kaplan	109.1	61-20	57	DEC	SGE	Concrete	Head gate	40,000	Manual	BG	0.80	13.8	CGE
1954	46,000	1	1955	84,000	3	12,000	Francis	120	59-54	58	DEC	W	Concrete	Head gate	15,000	Manual	BG	0.85	ICGE, 2CWC	
1956	600,000			1,200,000	[4]	150,000	Francis	277	880-850	785	EEC	W	Plate steel	Spherical	120,000	Automatic	AG	0.95	13.8	CGE
					[4]	150,000	Francis	277	880-850	785	NBP	NBP	Plate steel	Spherical	120,000	Automatic	AG	0.95	12.8	CGE
1951	112,400	1	1957-58	337,200	[2]	56,200	Francis	112.5	126-116	124	MSC	W	Welded pl st	Head gate	37,500	Automatic	AG	0.95	13.8	CGE
					[3]	65,000	Francis	112.5	126-116	124	CAC	CAC	Welded pl st	Head gate	50,000	Automatic	AG	0.80	13.8	CGE
1957	42,000			42,000	1	42,000	Francis	257	282-277	268	MSC	W	Welded pl st	Head gate	40,000	Automatic	AG	0.80	13.8	CGE
1957	60,000			60,000	1	60,000	Francis		275-270	259	KMW	W	Plate steel	Butterfly	70,000	Automatic	BG	0.90	13.8	CWC
1960	325,000	1	1958	390,000	3	65,000	Francis	128.6	150	150	DEC	W	Plate steel	Head gate	52,000	Automatic	AG	0.90	13.8	CGE
1930	200,000	1	1955	244,500	[5]	40,000	Francis	109.1	117-95	108	DEC	DEC	Plate steel	Head gate	36,000	Manual	BG	0.85	11.0	CWC
					[5]	44,500	Francis	109.1	117-93	105	DEC	W	Plate steel	Head gate	36,000	Manual	BG	0.85	11.0	SGE
1940	178,000	1	1955	221,500	[4]	34,000	Francis	109.1	124-104	114	DEC	DEC	Plate steel	Head gate	40,000	Manual	AG	0.90	11.0	CGE
					[4]	45,000	Francis	109.1	124-104	114	DEC	W	Plate steel	Head gate	40,000	Manual	AG	0.90	11.0	CGE
1929	264,000	1	1955	285,000	[2]	34,000	Francis	129	136	133	DEC	W	Plate steel	Head gate	28,500	Manual	AG	0.80	6.6	CWC
					[2]	42,000	Francis	128.6	136	133	DEC	W	Plate steel	Head gate	36,000	Manual	AG	0.90	6.6	CGE
		[14]	1955-58	1,680,000	[14]	105,000	Francis	150	305-294	292	DEC	W	Plate steel	Head gate	80,000	Automatic	AG	0.95	13.8	CGE
1954	1,260,000	[2]	1958		[2]	45,000	Kaplan	92.3	57-40	52	EEC	W	Plate steel	Head gate	34,000	Manual	BG	0.95	13.8	CWC
1957	270,000			270,000	These units operate in reverse as 55,000-hp 4,600-cfs 75-ft head pumps Head range 59 to 80 ft															
					[2]	75,000	Propeller	94.7		81	EEC		Concrete	Head gate	60,000	Automatic	BG	0.95	13.8	CGE
1956	1,200,000			1,200,000	[2]	75,000	Propeller	94.7		81	EEC		Concrete	Head gate	60,000	Automatic	BG	0.95	13.8	CGE
1956	74,000			81,500	4	18,500	Propeller	150	59-44	54	DEC	W	Concrete	Head gate	15,000	Automatic	AG	0.90	13.8	CGE
1957	81,000			81,000	2	27,000	Propeller	105.9	54-40	50	DEC	W	Concrete	Head gate	24,000	Automatic	BG	0.90	11.5	CWC
1955	10,500			30,500	1	30,500	Kaplan	240	116-100	110			Plate steel	Head gate	27,222	Manual	BG	0.90	11.5	
1955	45,600	1956		91,307	3	30,500	Francis	240	249-196	225	MSC	W	Plate steel	Head gate	25,000	Manual	BG	0.90	13.8	CWC
1956	1,700	1956		3,134	1	665	Francis	400	34	34	CBS		Steel	Head gate	500	Manual	HS	0.80	4.16	CGE
1956	3,000	1957		3,000	1	1,500	Francis	400	60-56	56	CBS	W	Plate steel	Head gate	1,000	Manual	HS	0.80	2.4	CGE
1956	40,000			40,000	5	8,000	Propeller	200	29	25	CVL	W	Concrete	Head gate	6,000	Manual	AG	0.80	6.9	CGE
1956	25			290	1	290	Francis	180	14	14	JL		Concrete	Head gate						CWC
1954	80,000	4	1955	80,000	5	10,000	Propeller	85.7	23.5	23.5	DEC	W	Concrete	Head gate	8,500	Automatic	BG	0.90	6.9	CGE
1955	3,960			3,960	1	1,900	Francis	257	114-74	99	CAC	W	Plate steel	Butterfly	3,600	Automatic	AG	0.90	4.16	CWC
1955	18,400			18,400	1	18,400	Francis	240	210-185	180	CAC	W	Welded pl st	Butterfly	15,000	Automatic	BG	0.90	13.8	CWC
1957	42,000	1957		42,000	1	22,000	Francis	300	340-320	320	DEC	SGE	Plate steel	River	20,000	Automatic	AG	0.85	13.8	CWC
					[3]	150,000	Impulse[6]	327	2,570	2,500	DEC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CGE
					[3]	150,000	Impulse[6]	327	2,570	2,500	DEC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	EEC
1954	450,000	[3]	1955	1,400,000	[3]	150,000	Impulse[6]	327	2,570	2,500	CAC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CGE
		[3]	1957		[3]	150,000	Impulse[6]	327	2,570	2,500	PB&VIW	PB	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CWC
		[3]	1958		[3]	150,000	Impulse[6]	327	2,570	2,500	PB&VIW	PB	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	EEC
1956	88,500			88,500	1	88,500	Francis	120	160-129	147	CAC	W	Plate steel	Head gate	40,000	Automatic	BG	1.00	13.8	CWC
1957	140,000			140,000	1	99,000	Impulse	400	1125-1065	1,000	PB&VIW	PB	Cast steel	Butterfly	80,000	Automatic	AG	0.90	13.8	CWC
1955	35,000			35,000	1	35,000	Francis	277	360-339	342	CAC	W	Plate steel	Pivot	31,000	Automatic	AG	0.90	13.8	CWC
1956	70,000			105,000	3	35,000	Francis	138.5	174-73	155	DEC	W	Plate steel	Butterfly	30,000	Automatic	BG	0.90	13.8	CGE
1950	90,000	1956		90,000	1	45,000	Francis	90	75-68	69	CAC	W	Welded pl st	Butterfly	32,500	Manual	AG	0.90	6.9	CGE
1951	45,000			135,000	3	45,000	Francis	138.5	150-95	140	CAC	W	Plate steel	Butterfly	37,500	Automatic	BG	0.90	13.8	CWC
1955	4,140			8,140	2	2,140	Francis	600	257	231	EEC	W	Welded pl st	Head gate	1,650	Manual	HS	0.80	4.16	EEC
1955	850			850	1	850	Francis	1200	213	211	CAC	G&G	Plate steel	Head gate	750	Auto. or man.	AG	0.80	2.30	CWC

EE – English Electric Co Ltd
EEC – English Electric Co of Canada Ltd
EM – Electric Machinery Mfg Co
GE – General Electric Co
G&G – Gilkes & Gordon Ltd
JL – James Leffel & Co
KMW – KMW of Sweden
L – Lombard Governor Co
MS – S Morgan Smith Co
MSC – S Morgan Smith Canada Ltd
MVE – Metropolitan Vickers Electrical Co Ltd
NBP – Neyrpic-Nevret-Bevrier & Piccard Pictet
NN – Newport News Shipbuilding & Dry Dock Co
PG – Pacific Oerlikon Co
PB – Peiton Div. Baldwin-Lima-Hamilton Corp
SEC – Swedish Electric Co
SGE – Swedish General Electric Co
VIW – Vancouver Iron Works Ltd
W – Woodward Governor Co
WE – Westinghouse Electric Corp
WEI – Westinghouse Electrical International Co

[5]AG indicates thrust bearing is above generator rotor, BG, thrust bearing is below generator rotor, HS, horizontal-shaft machine.

[6]Vertical-shaft, 4-nozzle type.

Government agency	Project	State or Possession	River	Ultimate capacity, hp	Initial capacity, hp	Installed capacity, hp	On order or being installed, hp
	Eklutna	Alaska	Lake Eklutna	50,000	50,000	50,000	.....
U. S. Bureau of Reclamation	Grand Coulee	Wash.	Columbia	3,102,000	538,000	3,102,000	..
	Hungry Horse	Mont.	S. Fork Flathead	420,000	420,000	420,000	. .
	Bonneville	Ore. & Wash.	Columbia	729,000	137,000	729,000	....
	Big Cliff	Ore.	North Santiam	26,500	26,500	.	. ..
	Lookout Point	Ore.	N. Fork Willamette	157,500	157,500	157,500	. ..
	Detroit	Ore.	North Santiam	140,000	140,000	140,000	. .
U. S. Corps of Engineers	Dexter	Ore.	N. Fork Willamette	20,700	20,700	20,700	. .
	Chief Joseph	Wash.	Columbia	2,707,000	1,607,000	207,000	1,400,000
	Dalles	Ore. & Wash.	Columbia	2,770,200	1,779,300	. .	1,779,800
	McNary Dam	Ore. & Wash.	Columbia	2,226,000	1,565,200	1,120,000	445,200
	Ice Harbor	Wash.	Snake	358,000	429,000	. .	429,000
	Albeni Falls	Idaho	Pend Oreille	58,800	58,800	58,800	.....
	Chandler	Wash.	Yakima	17,000	17,000	.	17,000
	Roza	Wash.	Yakima	18,000	18,000	.	18,000
	Anderson Ranch	Idaho	Boise	55,500	37,000	37,000	. .
	Minidoka	Idaho	Snake	26,500	9,000	19,500	. ..
U. S. Bureau of Reclamation	Palisades	Idaho	Snake	158,000	158,000	.	158,000
	Shasta	Calif.	Sacramento	522,000	419,000	522,000	.
	Nimbus	Calif.	American	18,800	18,800	18,800	. ..
	Keswick	Calif.	Sacramento	102,000	102,000	102,000	.
	Folsom	Calif.	American	225,000	225,000	225,000	. . .
	Drop No. 2	Calif.	All American Canal	15,000	15,000	15,000	
	Drop No. 3	Calif.	All American Canal	15,000	7,500	7,500	. .
Imperial Irrigation District	Drop No. 4	Calif.	All American Canal	28,300	13,300	28,300	. .
	Pilot Knob	Calif.	All American Canal	52,600	52,600	.	52,600
	Parker Dam	Ariz. & Calif.	Colorado	160,000	120,000	160,000	.
	Davis Dam	Ariz. & Calif.	Colorado	311,000	311,000	311,000	
	Hoover Dam	Ariz. & Nev.	Colorado	1,557,000	522,300	1,742,300	.
	Elephant Butte	N. M.	Rio Grande	34,500	34,500	34,500	.
	Green Mountain	Colo.	Blue	30,000	30,000	30,000	
	Estes Park	Colo.	Colo. Big Thompson	63,000	63,000	63,000	
	Mary's Lake	Colo.	Colo. Big Thompson	11,300	11,300	11,300	
	Pole Hill	Colo.	Colo. Big Thompson	47,500	47,500	47,500	
	Flatiron	Colo.	Colo. Big Thompson	108,000	108,000	108,000	. .
U. S. Bureau of Reclamation	Kortes	Wyo.	North Platte	55,500	55,000	55,000	. . .
	Shoshone	Wyo.	Shoshone	20,000	20,000	20,000	
	Heart Mountain	Wyo.	Shoshone	9,300	8,300	8,300	
	Boysen	Wyo.	Big Horn	21,300	21,000	21,000	..
	Alcova	Wyo.	North Platte	53,300	53,000	53,000	
	Glendo	Wyo.	North Platte	33,500	33,500	.	33,500
	Seminoe	Wyo.	North Platte	45,000	45,000	45,000	.....
	Provo	Utah	Provo	7,000	7,000	.	7,000
	Canyon Ferry	Mont.	Missouri	70,500	70,500	70,500	. .
	Angostura	S. D.	Cheyenne	1,675	1,675	1,675	. ..
	Fort Peck	Mont.	Missouri	150,000	70,000	120,000	
	Fort Randall	S. D.	Missouri	460,000	460,000	460,000	.
	Oahe	S. D.	Missouri	485,000	194,000	.	
	Garrison	N. D.	Missouri	440,000	264,000	176,000	88,000
	Gavins Point	S. D. & Neb.	Missouri	162,000	162,000	.	
U. S. Corps of Engineers	St. Mary's Falls	Mich.	St. Mary's	72,750	23,925	23,925	
	Norfolk	Ark.	North Fork	168,000	42,540	84,540	
	Blakely Mountain	Ark.	Ouachita	104,000	104,000	104,000	.
	Bull Shoals	Ark.	White	419,000	211,000	211,000	. . .
	Table Rock	Ark.	White	272,000	272,000	.	136,000
	Narrows	Ark.	Little Missouri	36,000	24,000	24,000	. .
	Fort Gibson	Okla.	Grand	96,000	64,000	64,000	
U. S. Corps of Engineers	Tenkiller Ferry	Okla.	Illinois	47,000	47,000	47,000	.
	Denrison Dam	Okla. & Texas	Red	282,080	56,080	114,080	. . .
International Boundry & Water Comm	Falcon Dam	Texas & Mex.	Rio Grande	88,500	88,500	88,500	. . .
	Whitney Dam	Texas	Brazos	41,400	41,400	41,400	.
U. S. Corps of Engineers	Wolf Creek	Ky.	Cumberland	377,000	377,000	377,000	.
	Kentucky	Ky.	Tennessee	220,000	176,000	220,000	.
	Pickwick	Tenn.	Tennessee	302,000	96,000	302,000	. .
	Wilson	Ala.	Tennessee	610,000	206,000	610,000	. . .
	Wheeler	Ala.	Tennessee	360,000	90,000	360,000	. . .
	Guntersville	Ala.	Tennessee	141,000	120,000	141,000	. . .
	Hales Bar	Tenn.	Tennessee	140,000	72,000	140,000	.
	Chickamauga	Tenn.	Tennessee	144,000	108,000	144,000	.
	Watts Bar	Tenn.	Tennessee	210,000	120,000	210,000	. . .
	Norris	Tenn.	Clinch	132,000	132,000	132,000	.
	Fort Loudoun	Tenn.	Tennessee	176,000	88,000	176,000	.
	Cherokee	Tenn.	Holston	166,000	83,000	166,000	
Tennessee Valley Authority	Douglas	Tenn.	French Broad	154,000	83,000	154,000	
	South Holston	Tenn.	South Holston	49,500	49,500	49,500	.
	Pat Patrick Henry	Tenn.	S. Fork Holston	50,000	50,000	50,000	.
	Boone	Tenn.	S. Fork Holston	103,500	103,500	103,500	.
	Watauga	Tenn.	Watauga	69,000	69,000	69,000	.
	Fontana	N. C.	Little Tennessee	274,000	183,000	274,000	. . .
	Appalachia	Tenn.	Hiwassee	106,000	106,000	106,000	
	Hiwassee	N. C.	Hiwassee	160,000	30,000	160,000	. .
	Chatuge	N. C.	Hiwassee	13,800	13,800	13,800	. .
	Nottely	Ga.	Nottely	21,000	21,000	21,000	
	Ocoee No. 3	Tenn.	Ocoee	33,500	33,500	33,500	. .
	Ocoee No. 2	Tenn.	Ocoee	25,000	20,000	25,000	..
	Wilbur Dam	Tenn.	Watauga	9,700	9,700	9,700	...
	John H. Kerr	Va. & N.C.	Roanoke	290,000	290,000	290,000	. ..
	Pelham	Va.	Smith	19,640	19,640	19,640	. . .
	Central Hall	Tenn.	Carney Fork	188,750	188,750	188,750	. ..
	Dale Hollow	Tenn.	Obey	75,000	50,000	75,000	.....
	Old Hickory	Tenn.	Cumberland	180,000	180,000	.	180,000
U. S. Corps of Engineers	Cheatham	Tenn.	Cumberland	60,000	60,000	.	60,000
	Allatoona	Ga.	Etowah	152,300	102,900	102,900	
	Buford	Ga.	Chattahoochee	225,400	118,400	.	118,400
	Sam Rayburn	Texas	Chattahoochee	42,000	42,000	42,000	.
	Clark Hill	Ga. & S. C.	Savannah	388,600	388,600	388,600	.
Total Capacity				26,329,310	19,304,130	16,380,442	4,922,500

1956 Design Survey of Typical Steam Central-Station Installations

Compiled by Althea Thornton, Assistant Editor

Company	Location	Plant name	Consulting engineers	Unit No.—new units	Unit No.—existing units	Duplicate reheater units	Turbine-generator units: Turbine	Turbine-generator units: Rating	Boilers: Number	Boilers: Capacity (1000 lb per hr)	Boilers: Manufacturer	Boilers: Rating (1000 lb per hr)	Boilers: Steam conditions (psig/°F)	Boilers: Fuel	Boilers: Firing	Boilers: Type	Boilers: Heating surface (1000 sq ft)	Boilers: Air heater type	Boilers: Air heater manufacturer	Boilers: Air heater drive	Boilers: Air flow control	Boilers: Draft equipment: Forced draft: Drive	Boilers: Draft equipment: Forced draft: Air flow control	Boilers: Draft equipment: Induced draft: Drive	Boilers: Draft equipment: Induced draft: Gas flow control	Fuels: Type	Fuels: Heating value (1000 Btu per lb)	Fuels: Ash softening temperature (°F)	Feed pumps: Number	Feed pumps: Drive	Feed pumps: Flow control	Turbines: Number	Turbines: Capacity each (1000 kw)	Turbines: Manufacturer	Turbines: Reheat pressure (psia)	Turbines: No. bleed points	Turbines: Full-load temperature (entering steam) (°F)	Condensers: Number	Condensers: No. water passes	Condensers: Type	Condensers: Total power (kw) for circ water pumps (1000 kw)	Condensers: Total power (kw) for condensate pumps (1000 kw)
— Philadelphia Electric Co	Eddystone, Pa	Eddystone																																						
	Eddystone, Pa	Eddystone																																						
	Philadelphia, Pa	Schuylkill																																						
Ohio Power Co	Philo, Ohio	Philo	American Gas & Electric Service Corp																																					
	Powel, Ohio	Muskingum River	American Gas & Electric Service Corp																																					
American Gas & Electric System																																								
— Cleveland Electric Illuminating Co																																								
— Cincinnati Gas & Electric Co	Avon Lake, Ohio	Avon																																						
	Near New Richmond, Ohio	Walter C. Beckjord	Sargent & Lundy																																					
— Dayton Power & Light Co	Dayton, Ohio	Frank M. Tait	Gilbert Associates, Inc																																					
— Duke Power Co	Pelzer, S.C.	Lee																																						
— Metropolitan Edison Co	Portland, Pa	Portland	Gilbert Associates, Inc																																					
— South Carolina Electric & Gas Co	Lake City	Silas C. Vetterlein	Gilbert Associates, Inc																																					
— Ohio Edison Co			Commonwealth Associates, Inc																																					
— Public Service Electric & Gas Co	Linden, N.J.	Linden																																						
Virginia Electric & Power Co	Remo, Bluff, Va	Remo																																						
	Portsmouth, Va	Portsmouth	Stone & Webster Engineering Corp																																					
	Yorktown, Va	Yorktown	Stone & Webster Engineering Corp																																					
Appalachian Electric Power Co	Cresap #, W. Va	Kanawha	American Gas & Electric Service Corp																																					
	Glen Lyn, Va	Glen Lyn	American Gas & Electric Service Corp																																					
	Sterns, New York, N.Y.	Astoria																																						
	Staten Island, N.Y.	Arthur Kill																																						
— Consolidated Edison Co of New York	New York, N.Y.	Astoria																																						
Consumers Power Co	Essexville, Mich	John C. Weadock	Commonwealth Associates, Inc																																					
Jersey Central Power & Light Co	Sayreville, N.J.	Sayreville	Sverdrup & Parcel, Inc																																					
— Narragansett Electric Co	Providence, R.I.	South St	United Engineers & Constructors																																					
— Union Electric Co	St. Louis County, Mo	Oak Creek																																						
— Wisconsin Electric Power Co	Milwaukee County, Wis																																						
— California Electric Power Co	San Bernardino County, Calif	San Bernardino	Ebasco Services, Inc																																					
Southern California Edison Co	Tidal Mass	Edison Plant	Stone & Webster Engineering Corp																																					
Baltimore Gas & Electric Co	Bear Island County, Va	Chesterfield A. Wagner																																						
Carolina Power & Light Co	Moncure, N.C.	Cape Fear	Ebasco Services, Inc																																					
	Wilmington, N.C.	Lloyd V. Sutton	Ebasco Services, Inc																																					
— Connecticut Light & Power Co	Devon, Conn	Devon	United Engineers & Constructors																																					
Florida Power Corp	St. Petersburg, Fla	Paul L. Bartow	Black & Veatch																																					
Alabama Power Co	Fargas, Ala	Gorgas No. 3	Southern Services, Inc																																					
— Georgia Power Co	Newman, Ga	Yates	Southern Services, Inc																																					
Mississippi Power Co	Gulfport, Miss	Gulf Coast	Southern Services, Inc																																					
— Hartford Electric Light Co	Middletown, Conn	Middletown	Stone & Webster Engineering Corp																																					
— Houston Lighting & Power Co	Freeport, Texas	Sam Bertron	Ebasco Services, Inc																																					
	Galveston, Texas	Deepwater, Texas	Ebasco Services, Inc																																					
— Kansas City Power & Light Co	Montrose		Ebasco Services, Inc																																					
— Kansas Power & Light Co	Tecumseh, Kans	Tecumseh	Black & Veatch																																					
— Kansas City Power & Light Co	Port Jefferson, N.Y.	Port Jefferson	Ebasco Services, Inc																																					
Louisiana Power & Light Co	Sterlington, La.	Sterlington	Ebasco Services, Inc																																					
— Montana Power Co	Hanover, Mass.	Sea Coal	Stone & Webster Engineering Corp																																					
— New York State Electric & Gas Corp	Endicott, N.Y.																																							
Northern Indiana Public Service Co	Lake Tarleton	Michigan	Ivanhoe Associates, Inc																																					
Consumers Power Co	Hudson, Mich.	Dean H. Mitchell	Sargent & Lundy																																					
Northern States Power Co	Hamilton, Ohio	Hamilton Plant	Sargent & Lundy																																					
— Pacific Gas & Electric Co	Contra Costa, Calif	Contra Costa																																						
Sacramento Municipal Utility District	Sacramento, Calif	Rancho Seco																																						
Southern California Edison Co	Redondo Beach, Calif	Redondo	Stone & Webster Engineering Corp																																					
— Southern Nevada Power Co	Las Vegas, Nev	Reid Gardner																																						
Texas Power & Light Co	Dallas, Texas	Stevens Creek																																						
West Penn Power Co	Connellsville, Pa	Ebasco Services, Inc																																						
— United Illuminating Co	Bridgeport, Conn	Bridgeport	Stone & Webster Engineering Corp																																					
— United States Steel Corp	Gary, Texas	Gary																																						
— Central Illinois Public Service Co	Peoria, Ill.	R.S. Wallace	Commonwealth Associates, Inc																																					
Central Illinois Light Co	St. Landry, La.	Coughlan	Sargent & Lundy																																					
Central Louisiana Electric Co	Opelousas, La.	Opelousas	Ebasco Services, Inc																																					
Central Telephone & Utilities Corp	Clarksville, Iowa	Clarksville	Stone & Webster Engineering Corp																																					

AC — Allis Chalmers Mfg Co
Ad — Admiralty
AdA — Admiralty A
AdB — Admiralty B
AdU — Admiralty, unalloyed
Al — Aluminum
AlB — Aluminum Bronze
AlBr — Aluminum Brass
An Ad — Antimonial Admiralty
AsAd — Arsenical Admiralty
AsAlBr — Arsenical Aluminum Brass
AsCu — Arsenical copper
RB — Babcock & Wilcox Co
BWC — Babcock & Wilcox & Golden McCulloch Ltd
C — Cast steel
CF — Composition Engineering Inc
Cm — Cupro nickel
Con — Condenser deaeration
CP — C.A. Parsons & Co. Ltd
Cu — Copper
Cy — Cyclone furnace
D — Damper
DB — Dry bottom
DL — DeLaval Steam Turbine Co
Du — Duan turbine and motor
EE — English Electric Co Ltd
EL — Elliott Co
FR — Foster Wheeler Corp
FW — Fuller Engineering Co
G — Gate valve
GL — Globe valve
Gr — Grid
H — Hand
HT — Hydraulic turbine
I — Induction
M — Motor
O — Oil
P — Pulverized
PG — Power-gas
R — Regenerative
RS — Riley Stoker Corp
S — Spray control
SS — Sprayton stoker
Stg — Stag up
T — Turbine drive
TG — Traveling grate stoker
V — Vane control
WE — Westinghouse Electric Corp
WO — Worthington Corp
Ye — Yarrow/Admiralty metal
(4GB) — Stoker grate area, sq ft
1 — Once-through boiler
2 — Double reheat
3 — Two motor-driven constant speed reserve with one turbine-driven variable speed. Two cycles in parallel
4 — Future gas
5 — Revised data, previously listed 9-54
6 — Oil
7 — Constant speed
8 — Pressurized furnace
9 — Hp 3600 rpm, lp 1800 rpm
10 — Outdoor installation
11 — Nonperiodic
12 — Two motor-driven pumps for three boilers
13 — Future coal
14 — High viscosity oil
15 — Delayed coke refinery gas
16 — For two boilers
17 — Topping unit
18 — Maximum
19 — Two automatic extraction points 250 and 150 psig
20 — Preferred standard
21 — Revised data, previously listed 9-52
22 — Future gas and bituminous coal
23 — Revised data previously listed 9-53
24 — Btu per cu ft
25 — Future lignite
26 — Revised data previously listed 9-55
27 — Fusion temperature
28 — Feed pump on main generator shaft
29 — Gas turbine
30 — Gas turbine exhaust supplies boiler air

1956 Design Survey: Typical Industrial Institutional Plants, Below 250 psi

Compiled by R C Bellas, Assistant Editor

Company & Location	Consulting Engineers	First operation, new units	Operating steam pressure, psig	Operating steam temperature, F	BOILERS: Number	BOILERS: Capacity, each, 1000 lb per hr	BOILERS: Manufacturer	BOILERS: Firing	Ash handling	TURBINES: Type	TURBINES: Manufacturer	ELECTRICAL POWER: Source	ELECTRICAL POWER: Plant distribution voltage, kv	ELECTRICAL POWER: Transformer type	ELECTRICAL POWER: Switchgear relay protection	ELECTRICAL POWER: Neutral grounding	Total boiler capacity including new units, 1000 lb per hr	Total generating capacity including new units, kw
200 TO 249 PSIG																		
Case Institute of Technology, Cleveland, Ohio	McGeorge & Haigert	1956	225	Sat	1	24	BW	O	-	-	-	-	-	-	-	-	97	-
Overbrook Hospital, Cedar Grove, N J	Gilbert Assoc Inc	6-56	220	450	3	50	LI	P O	-	-	-	-	-	-	-	-	150	-
Dominion Fur & Garment Co, Montreal, Quebec		3-56	210	Sat	1	15	CV	O	-	-	-	PP	0.55	O	2v Ind	N	33	-
General Electric Co, Louisville, Ky	Fairbrother Mgmts	1953	200	430	4	150	RS Va	SS	Pn		-	PP	13.8	O Dr As	Air	Pr Se	600	-
General Motors Corp, Pontiac, Mich		10-56	200	390	2	70	BW	SS	Pn	-	-	PP	4.8	O Dr	Air	Pr Se	290	-
Boston State Hospital, Thorndike, Mass	Whitman Engineers Inc	7-56	200	390	1	40	EC	O	-	-	-	PP G	2.3	O	-	N	120	0.8
Interstate Tissue Mills, S E of Hamilton, Ont		11-55	200	380	1	22.5	FWL	SS	Pn		-	-	-	-	-	-	-	-
Imperial Chemicals Co, Corunna, Ont		-	200	-	1	24	BW	O	-		-	PP	-	-	-	-	-	-
Canadian Kimberly-Clark Ltd, Nanaimo, B C		3-56	200	-	1	18	CV	O	-		-	PP	0.36	O	-	-	18	-
250 TO 299 PSIG																		
British American Oil Co, Montreal, Quebec		3-57	290	475	1	150	BWG	O G	-	-	-	-	-	-	-	-	400	-
Allentown School District, Allentown, Pa	Peter F Loftus Corp	1956	290	384	1	30	CE	TG	Mr	-	-	-	-	-	-	-	-	-
Anglo-Canadian Pulp & Paper Co, Lake St Peter, Que		7-56	280	550	2	50	CE	O B	-	-	-	-	-	-	-	-	100	-
Allied Mills Inc, Evanston, Ill		3-56	280	366	1	11	BW	UF	Mr	-	-	-	-	-	-	-	-	-
Reinhold Boiler Plant, Pittsburgh, Pa	Peter F Loftus Corp	8-57	275	377	1	100	BW	TG	Pn	-	-	-	-	-	-	-	-	-
Gulden Petroleum Corp, Big Spring, Texas		55-56	275	550	1	90	CE	O G	-	-	-	-	-	-	-	-	165	-
Midland Cooperatives, Inc, Spring Okla		7-56	275	400	1	37	EC	G	-	-	-	-	-	-	-	-	-	-
American Synthetic Rubber Corp, Louisville, Ky		1-57	275	Sat	2	26	EC	O G	-	-	-	-	-	-	-	-	130	-
Lone Materials Co, Lone Star Plant, Clarksville, Ark		9-56	275	365	1	16	CB	O	-	-	-	PP	0.44	O	-	-	-	-
E B Eddy Co, Hull, Quebec		2-56	265 [2]	490 [2]	1	100	FWL	P	Pn	-	-	-	-	-	-	-	240	-
Libby-Owens-Ford Glass Co, Toledo, Ohio	Emery, Mercer & Campbell	2-56	260	Sat	1	135	BW	O	Hy	-	-	PP	7.2	O	Air	N	470	-
American Oil Co, Texas Point, Tex		1-57	260	420	2	100	BW	O G	-	-	-	PP	13.8	O	Air	Se	200	-
Kimpo Fringe Co, Cicero, Ill	Raphael Benson Inc	8-55	260	-	1	100	BW	O G	-	Co	E	PP PP	-	O	-	-	175	-
Westinghouse Electric Corp, Sharon, Pa	Peter F Loftus Corp	7-56	260	-	2	57	CE	SS	Pn	-	-	-	-	-	-	-	-	-
		12-53	260	370	2	30	FW	O	-	-	-	-	-	-	-	-	-	-
Food Machinery & Chemical Corp, Baltimore, Md		11-55	260	-	2	30	BW	O	-	-	-	PP	6.5	O	Dv	Pr Se	100	-
Price Brothers & Co Ltd, Kenogami, Que		11-56	260	450	1	100	CE	P B	Pn	-	-	-	-	-	-	-	500	-
		12-57	250	365	1	150	HRM	P B	Hy	-	-	-	-	-	-	-	410	-
Cabot Carbon Co (Cabot Plants), Fitchburg, Mass		11-55	260	360	2	15	BW	O	-	-	-	PP	0.55	Pr Dr	Dv	-	30	-
Tubiran Chemicals Ltd, North Vancouver, B C	Howard Fortischemical Inc	6-57	250	Sat	1	100	FWL	O	-	-	-	PP	12.0	O	Air	Se	200	-
Carlisle Finishing Co, Camden, S C	J E Sirrine Co	9-56	250	366	3	75	BW	SS	Hy	-	-	PP	9.6	O	Dv	N	225	-
Refinery, Hamilton, Ont		-	250	-	1	60	FW	SS	Pn	-	-	PP	13.8	As	Dv	N	-	-
Arthur D Little Inc, Cambridge, Mass		7-55	250	365	1	60	UI	SS TG	-	-	-	PP	0.52	O	Dv	Se	100	-
Atlantic Wool Co, Nashville, Mass		8-56	250	366	1	50	EC	O				PP	0.46	O	Dv	Se	85	-
Montefiore Medical Center, Newark, N J	Vogelbach & Neumann	10-55	250	366	3	48	BW	-				-	-	-	-	-	-	-
		11-55	250	366	2	45	FW	O	-	-	-	-	-	-	-	-	-	-
Veterans Administration Center, Wood, Wis	Kaiser Engineers	4-57	250	Sat	2	43	Bw	O G W	-	-	-	PP	1.16	O	Dv Ind	Se	100	-
Mercy Hospital Center, Cleveland, Ohio	Rost Engineering	10-55	250	370	1	40	RS	SS TG	Mr	-	-	-	-	-	-	-	180	-
					1	40	EC											
Tobacco Products Machinery & Equipment Co, Long Island City, N Y	Pressley & Mellick, Verlenden	4-56	250	466	1	40	W	O G	-	-	-	-	-	-	-	-	-	-
Electric Power Co, Ltd, Hong Kong		-	250	366	1	40	W	O	-	Cr	Fl	PP	-	O As	Dv	Se	120	-
Electric Power Co, Ltd, Hong Kong		7-53	250	366	1	35	CE	SS	-	-	-	-	-	-	-	-	-	-
Mail Tube Factory, College Manor, Md		55	250	366	1	37.5	Va	TG	Pn			PP	4.16	O	Dv	Pr Se	113	-
Pennsylvania Rubber Co, Jeannette, Pa		1-56	250	366	1	35	FWL	O	-	-	-	-	-	-	-	-	85	-
The Sarah Lee Corp, Hillside, N Y		10-56	250		2	33	Ke	O				PP	0.24	O	Dv	N	90 Z	-
					1	24 Z												
Pipe Line Service Co, Morningside, Ill		10-55	250	Sat	1	25	BW	UC	Pn			PP	0.34	O	Dv	-	78	-
Aviation Service Depot, Atlanta, Ga	Harold Leder	1-55	250	358	3	30	FC	SS	Pn	-		PP	2.2	O	Dv	Pr Se	90	-
Central Illinois Light Co, Canton, Ill	and E Keyes Co	4-56	250	366	1	24	Ke	SS TG SS	Pn			PP	2.3	O	Ind	Pr	81	-
National Steel Corp, Weirton, W Va		-	250	366	1	25	FWL	SS	Mr			PP	13.8	O	Dv	N	100	-
Midwest Rubber Reclaiming Co, Akron, Ohio	Evans & Phillips	9-55	250	366	3	22	CE	O G				PP	4.16	O	-	-	66	-
Eastman Kodak Co, Rochester, N Y	William Filett & Erickson	55-56	250	750	-	2	21	BW	O			PP	0.22	O		Pr Se	21	-
Tennessee Mills, Port Deposit, Md		6-56	250	-	1	17	OS	O									50	-
Kimberly-Clark Corp, Niagara Falls, N Y		3-56	250	366	1	-	CE	O Ca	Mr									
Sterling Pulp & Paper Co, Sterling, Mass					4	15	Bl	O G				PP	0.22	O	Dv	Pr Se	60	-
Electric Power Co, Ltd, Hong Kong		11-55	245	-	1	10	AW	UF	Mr			-	-	-	-	-	-	-
Kimberly-Clark Corp, Niagara Falls, N Y		3-56	245	-	2	17.2	Jl	O				PP	0.44	O	Dv	Pr	35	-
Kimberly-Clark Corp, Niagara Falls, N Y		4-55	240	Sat	3	25	Jl	O										
Pharmaceutical Co, Kalamazoo, Mich		9-56	240	-	1	45	AW	O		Cr	Fl	PP	7.2	O	Dv	Pr Se	110	-
Chemical Co, Niagara Falls, N Y	Sanderson & Porter, Chicago	11-55	240	Sat	2	40	Cl	O				PP	-	-	-	-	160	-
Shoe Co, Lynn, Mass		1956	240	Sat	1	10	Ke	O				PP	-	-	-	-	40	-

Abbreviations:

As - Asarel; B - Bark; Bd - Babcock & Wilcox Co; BwG - Babcock & Wilcox Co water wall; C - Coal, bituminous; Co - Condensing; CV - Combustion Vehicles; Cd - Cleaver-Brooks Co; Cr - Combustion Engineering Inc Universal; Di - Diamond; Dr - Drive; EC - Erie City Iron Works; Ei - Elliott Co; FW - Foster Wheeler Corp; FWL - Foster Wheeler Limited; G - Gas; GE - General Electric Co; GP - Self-generated power; Gr - Green; Hy - Hydraulic; Ji - John Inglis Co Ltd; Ke - F Keeler Co; KR - Kennedy-Ross Corp; Mr - Mechanical; Mn - Manual; N - None; NC - Non-condensing; O - Oil; OS - Oil & Sembower Inc; O Overfeed; P - Pulverized fuel firing; Pn - Pneumatic; Pu - Purchased power; Py - Pyroney; Riley Stoker Corp; Sa - Sawdust; Se - Secondary; Sp - Springfield Boiler Co; SS - Spreader stoker; Su - Superior Combustion Industries Inc; T - Terry Steam Turbine Co; TG - Traveling grate stoker; Ts - Titusville Iron Works Co; UF - Underfeed stoker; UI - United Iron Works; Vo - Henry Vogt Machine Co; W - Water gas; We - Westinghouse Electric Corp; WF - William Bros Boiler & Mfg Co; Wi - Wickes Boiler Co; Wo - Worthington Corp; 1 - All types Dr Dis Gr; 2 - Future, press and temp, 650 psig, 950 F; 3 - Emergency capacity; 4 - Engine-driven alternators; 5 - Equipment by U S Atomic Energy Commission.

1956 Design Survey: Typical Industrial, Institutional Plants, 250 psi and Above

Compiled by R C Baltes, Assistant Editor

Company & Location	Consulting Engineers	First operation, new units	Operating steam pressure, psig	Operating steam temperature, F	BOILERS: Number	BOILERS: Capacity, each, 1000 lb per hr	BOILERS: Manufacturer	BOILERS: Boiler & WW surface, 1000 sq ft	BOILERS: Superheater surface, 1000 sq ft	Furnace volume, 1000 cu ft	Heat release, 1000 Btu per cu ft per hr	Economizer surface per boiler, 1000 sq ft	Air-heater surface per boiler, 1000 sq ft	Air-heater type	Dust-collector type	Firing
600 TO 1450 PRESSURE																
Sonoco Products Co Hartsville S C	Lockwood-Greene	1-58	1330	950	1	275	RS	19.5	-	11.8	26.2	7.1	20.6	Tu	Me	SS
United States Steel Corp Duluth	United Engrs & Const Inc	12-55	900	825	2	100	CE	17.6	3.3	8.3	18.1	1.6	6.4	Tu	Me	TG
Reynolds Metals Co Gregory Texas	Reichtel Corp	6-57	875	825	1	225	BW	-	-	-	-	-	-	-	-	G
			315	425	1	225	BW	-	-	-	-	-	-	-	-	G
			315	425	2	40	BW	-	-	-	-	-	-	-	-	G
John Deere Ankeny Tractor Mfg Ankeny Iowa		8-54	850	835	1	185	So	19.4	-	10.5	-	11.4	N	N	Me	SS
U S Marine Corps Cherry Point N C	W C Olson Associates	10-55	850	825	1	180	RS	-	-	-	-	-	-	-	-	P,O
[redacted]		9-55	750	640	1	17.3	FW	24.2	0.18	0.74	29.3	-	-	-	-	G
Escambia Bay Chemical Co Pensacola Fla	Chemical Construction Co	11-56	630	750	1	90	RS	8.23	1.47	4.25	30.3	N	9.3	Re	N	O,G
St Regis Paper Co Eastport Fla	J E Sirrine Co	1-57	625	750	2	200	CE	15.1	-	9.1	27.0	N	22.9	Tu	-	O
			1	135	CE	13.4	-	5.7	34.7	N	12.8	Tu	Me	B		
Resligneurie Co Ltd Ahuntsic P Q	H G Acres & Co Ltd	4-56	625	700	2	125	FW	16.2	2.7	10.7[8]	16.5	-	16.0	Tu	Me	P,B
Franconia Paper Corp Lincoln N H	Z C Hines	10-56	625	700	1	65	BW	6.6	-	2.9	-	2.5	-	-	Me	SS,B
Elk Falls Co Ltd Duncan Bay B C	H A Simons	8-56	600	675	1	217	BW	27.4	5.4	-	-	6.5	-	Tu	E	BL
Transcontinental Gas Pipe Line Corp Eatontown Miss		1-57	600	750	1	75	CE	7.3	-	3.2	-	N	9.3	Tu	N	G
BELOW 600 PSI PRESSURE																
West Virginia Pulp & Paper Co Covington Va		10-55	565	700	1	325	BW	31.7	6.0	21.0	21.2	16.3	-	-	Me	SS,B
E I du Pont de Nemours & Co Orange Texas		-	550	725	1	165	BW	-	-	7.4	30.9	N	7.6	Tu	-	G
Parke Davis & Co Detroit Mich	Haldy Benjamin & Knothouse	8-56	550	720	-	-	-	-	-	-	-	-	-	-	-	-
Sun Oil Co Toledo Ohio		3-55	475	560	1	60	BW	7.4	0.6	-	-	2.0	N	N	N	O,G,WH
Aluminum Co of America Point Comfort Texas		5-56	470	750	1	2.5	BW	0.45	0.20	-	-	0.47	-	-	-	WH
Ashland Oil & Refining Co Ashland Ky	Lummus & Douglass Inc	8-56	450	725	1	200	BW	16.1	-	14.7	-	-	-	Tu	N	P,O,G
Steel Co of Canada Ltd Hamilton Ont		11-56	450	750	1	175	CE	-	-	-	-	-	-	-	-	G
E I duPont de Nemours Niagara Falls N Y		1-56	450	544	1	150	RS	16.9	-	10.1	17.5	-	20.8	Tu	Me	P,O
Keystone Steel & Wire Co Peoria Ill		12-55	450	750	1	140	CE	13.4	1.9	6.8	29.5	8.7	-	-	Me	SS
Northwest Nitro-Chemicals Ltd Shelburne Ont Alta	Ford Bacon & Davis Inc	10-56	450	600	2	33	FW	3.6	0.2	-	-	-	-	-	-	G
Lubrizol Corp Refining Facilities Wickliffe Ohio	Emery Manuel & Campbell	11-55	425	750	1	140	BW	-	-	-	-	-	-	-	-	US
A E Staley Mfg Co Decatur Ill	Burns & McDonnell Engrg Co	8-57	425	700	1	125	RS	15.6	-	8.5	20.2	5.4	N	N	N	TG
U S Pipe & Foundry Co Birmingham Ala		7-57	425	750	3	120	Rw	16.4	-	12.5	14.0	N	18.1	Tu	N	BF,P
Florida State Hospital Chattahoochee Fla	Reynolds Smith & Hills	10-55	425	575	1	60	RS	2.99	0.6	3.3	-	-	5.7	Tu	Me	P,O
Magnolia Petroleum Co Beaumont Texas		12-56	425	675	2	250	CE	21.0	3.31	11.8	29.7	N	14.8	Re	N	O,G
St Regis Paper Co Pensacola Fla		-	420	650	1	140	Rw	12.7	-	-	-	N	14.3	-	-	-
Rohm & Haas Co Pasadena Texas		6-55	400	500	1	70	Rw	6.9	0.7	3.1	28.8	N	N	N	-	-
Scott Paper Co Everett Wash	Chas T Main Inc	55-56	300	550	2	150	CE	14.1	1.3	7.3	24.8	-	12.8	Tu	N	O
Kimberly-Clark Corp Niagara Wisconsin		10-55	300	544	2	45	MI	5.4	N	47.5	-	-	-	-	-	O,G
Diamond Match Co Barberton N Y	Gibbs & Hill	7-56	270	412	2	25	K	3.5	N	-	-	N	-	-	Me	SS
Stone & Webster Industrial Savannah Ga	Thomas & Hutton	11-55	265	500	2	25	Rw	3.8	0.5	1.1	-	-	-	-	-	O,G
Lone Star Gas Co Corsicana Texas	Ford Alexander	56-57	900	825	1	120	Rw	19.2	4.5	9.5	25.8	11.5	-	-	Me	SS
U S Industrial Chemicals Baytown Tex	Ebasco & Clarke	-	740	500	2	60	CE	-	-	-	25.0	-	-	-	-	O
Dunlop Tire & Rubber Corp Buffalo N Y	Day & Zimmermann	10-55	250	500	2	50	Rw	6.8	0.65	3.8	28.5	-	2.3	Tu	Me	SS
St Marys Hospital Rochester Minn	[redacted]	9-56	250	650	1	40	RS	3.9	0.13	-	-	0.89	N	N	N	O,G
Hercules Powder Co Parlin N J		5-56	250	544	2	30	K	-	-	-	-	-	-	-	-	O,G

Company & Location	Consulting Engineers	FUEL: Type(s) and sizing	FUEL: Heating value, 1000 Btu per lb	FUEL: Ash-softening temperature, F	F-D FANS: Drive	F-D FANS: Air-volume control	I-D FANS: Drive	I-D FANS: Gas-volume control	Water treatment	Ash handling	FEED PUMPS: Drive	FEED PUMPS: Flow control	TURBINES: Capacity, each, 1000 kw	TURBINES: Manufacturer	TURBINES: Backpressure, psia	TURBINES: No of bleed or auto-extraction sts	TURBINES: Type	CONDENSER: Surface, 1000 sq ft	CONDENSER: No. water passes	CONDENSER: Tube material	ELECTRICAL POWER: Source	ELECTRICAL POWER: Generator nameplate voltage, kv	ELECTRICAL POWER: Plant distribution voltage, kv	ELECTRICAL POWER: Transformer type	ELECTRICAL POWER: Switchgear arc-rip protection	ELECTRICAL POWER: Neutral grounding	Total boiler capacity, incl new units, 1000 lb per hr	Total generator capacity, incl new units, 1000 kw
600 TO 1450 PRESSURE																												
Sonoco Products Co Hartsville S C	Lockwood-Greene	C,B	13.5	2200	M	V	M	D	Dr	Hy	M,T	R	12.5	GE	0.5	4	Al Cn	9.5	1	Al	PP,GP	13.2	13.2	Un Ax	Air[4]	Fr Sw			
United States Steel Corp Duluth	United Engrs & Const Inc	CB CO	10.2	-	T	D	T	D	So	Me	M	R	-	-	-	-	-	-	-	-								540	
Reynolds Metals Co Gregory Texas	Reichtel Corp	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									
		G	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	PP,GP	11.5	4.2	11	Air[4]	Fr Sw	900	75
		G	-	-	-	-	-	-	-	-			2.5	GE	0.5	1	NC	-										
John Deere Ankeny Tractor Mfg Ankeny Iowa		C,G	10.7	-	T	S,D	T	S	Dr	Pn	PT	T	2.5	GE		2	Cn		-	Al	PP,GP	13.7	13.2	4.1	Air[4]	Fr Sw	240	2.5
U S Marine Corps Cherry Point N C	W C Olson Associates	C,O	-	-	-	-	-	-	-	Hy	-	-	6.5[5]		1	2	Cn				PP,GP	11.5	12.5	12	Air[4]	Fr Sw	360	30
[redacted]		G	10[6]	-	M	D			Sn	-	20 Hy	R																175	
Escambia Bay Chemical Co Pensacola Fla	Chemical Construction Co	G,G[7]	10[6]	-	M	V	M	D	Sn	-	M,T	R					-												
St Regis Paper Co Eastport Fla	J E Sirrine Co	O	-	-	M	V	M	V	So	-	2T	S	30	GE	3.0	2	Cn	19.0	2	Al Br	GP	13.5		Air	Air[4]	Fr	220	12
		B	5.1	-	M	V	M	Hy	So	Pn	1M	P																	
Resligneurie Co Ltd Ahuntsic P Q	H G Acres & Co Ltd	C	11.7	2000	M	V	M	D Hy	So	Pn	1M,T	R	5	BR	3.0	2	Al NC				GP	4.8	4.8	Un Ax	Air[4]	Fr	220	12
Franconia Paper Corp Lincoln N H	Z C Hines	C,B	14.0	2650	Du	V	Du	D	Re	Pn	M,T	R	5.5	GE	3.0	1	Al		-	-	PP,GP	13.8	6.4	1.1	Air	N	330	-
Elk Falls Co Ltd Duncan Bay B C	H A Simons	BL	6.0	-	T	V	T	S	So	-	M,T	R		We		-			-	-	PP,GP	6.6	1.1		Air[4]	N	85	4.0
Transcontinental Gas Pipe Line Corp Eatontown Miss		G	11[6]	-	M	D	M	D	Dr	-	2T	R	4.2	Del	2.8	-	NC		2	Al	GP	0.44					90	
BELOW 600 PSI PRESSURE																												
West Virginia Pulp & Paper Co Covington Va		C,B	13.3	2400	M	V	2T	S,D	-	-	-	-	-	-	-	-	-	-	-	-								
E I du Pont de Nemours & Co Orange Texas		G	13[6]	-	T	S,D	T	D,V	So	-	T	S	-	-	-	-	-	-	-	-	PP,GP	6.6	6.6	11	Un	N	660	30
Parke Davis & Co Detroit Mich	Haldy Benjamin & Knothouse	-	-	-	-	-	-	-	-	-	-	-	2.5	Del	2.0	1	Al NC	-	-	-	PP,GP	4.8	0.44	11	Un Ax	N	230	2.5
Sun Oil Co Toledo Ohio		Q,G,CO2	-	-	M	V	-	-	So	N	M,T	R	-	-	-	-	-	-	-	-	PP	-	17.5	11		Fr	1(tank)	
Aluminum Co of America Point Comfort Texas		WH	-	-	-	-	-	-	Ev	-	M	R	-	-	-	-	-	-	-	-	-							
Ashland Oil & Refining Co Ashland Ky	Lummus & Douglass Inc	C,O,G	12.4	1900	M	D	T	D	De So	Hy	2M,1T	R	-	-	-	-	-	-	-	-	PP	-	-	11	Un		540	
Steel Co of Canada Ltd Hamilton Ont		L,S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
E I duPont de Nemours Niagara Falls N Y		C,O	13.5	2300	T	S,V	T	S,D	So	Pn	M,T	S	-	-	-	-	-	-	-	-	GP	-	-	-	-		Air	
Keystone Steel & Wire Co Peoria Ill		C	10.5	2100	M	D	Du	D	De So	Hy	M	R	15.6	GE	1	2	Al Cn	-	2	Cu Al	GP	6.6	6.6		Air[4]	Fr Sw	440	47.5
Northwest Nitro-Chemicals Ltd Shelburne Ont Alta	Ford Bacon & Davis Inc	G	10[6]	-	M	-	-	-	So	-	M,T	S	0.8	GE	5	-	Cn	0.5	2	Al	PP,GP	0.48	4.2	1	Un	Fr	45	0.8
Lubrizol Corp Refining Facilities Wickliffe Ohio	Emery Manuel & Campbell	C	-	-	-	-	-	-	-	Hy	-	-	7.5	We	1	2	Cn Al	-	-	-	PP,GP	2.7	2.2	11	Air[4]	N	140	15.5
A E Staley Mfg Co Decatur Ill	Burns & McDonnell Engrg Co	C	10.5	1930	M	V	M	Ma	So	Hy	T	S	-	-	-	-	-	-	-	-								
U S Pipe & Foundry Co Birmingham Ala		BF	0.09[6]	-	T	S	T	S	I	Hy	2T	S	12.5	We	1		Cn	Bar	-	-	PP,GP	6.6	6.6	11	Air[4]	Fr Sw	360	17.5
Florida State Hospital Chattahoochee Fla	Reynolds Smith & Hills	C,B	13.7	2270	M	D	M	D	So	Hy	2M	R	2.0	We	1.25	1	Al Cn	2.5	2	Al	GP	4.1	2.4	[illegible]	[illegible]	Sw		
Magnolia Petroleum Co Beaumont Texas													2.5	GE	165	-	NC	-	-	-								
St Regis Paper Co Pensacola Fla		B,S	10.5	-	T	S	N	N	So	-	T	S	10.0	GE	165	-	NC	-	-	-	GP	15.8	13.8		Air[4]	Fr	[illegible]	5.5
Rohm & Haas Co Pasadena Texas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Scott Paper Co Everett Wash	Chas T Main Inc	-	-	-	-	-	-	-	Sc	-	2T	S									PP		2.3	11	Un	N	140	
Kimberly-Clark Corp Niagara Wisconsin		B	18.0	-	T	D	N	D	So	N	M,T	R	-	-	-	-	-	-	-	-	PP		35	11	Un Ax	Air[4]	Fr Sw	825	-
Diamond Match Co Barberton N Y	Gibbs & Hill	B,S	18.3	-	T	V	-	-	So	N	2T	R	-	-	-	-	-	-	-	-	PP		2.3	11	Un	Fr Sw	110	
Stone & Webster Industrial Savannah Ga	Thomas & Hutton	C	13.5	2150	Du	-	Du	-	So	Pn	M,T	R	-	-	-	-	-	-	-	-	PP		0.5	11	Un		50	
Lone Star Gas Co Corsicana Texas	Ford Alexander	B,G	18.9	-	Du	Ma	Du	Ma	So	-	M,T	R	0.3	We	100	-	NC	-	-	-	PP,GP	0.5	0.5			Sw	50	0.8
U S Industrial Chemicals Baytown Tex	Ebasco & Clarke	C	-	1950	M	V	M	D	So	Me	3M,T	R	10	GE		3	Al Cn	11.0	2	-	PP,GP	4.2	4.2	11	Air[4]	Fr	540	25.5
Dunlop Tire & Rubber Corp Buffalo N Y	Day & Zimmerman	B	18.5	-	M	V	M	V	So	-	3M	R	1.0	GE	25	-	NC				PP,GP	6.0	2.4	11	Un		470	
St Marys Hospital Rochester Minn	[redacted]	C	13.7	-	D	V	D	D	So	Me	-	R									PP	-	4.2	11	Un	Fr Sw	120	
Hercules Powder Co Parlin N J		B,S	-	-	Du	V	N	N	So	-	2M,1T	R	2.5	WE			Al		-	-	PP,GP	2.4	-	1	Un Ax	Sw	150	
		B,Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								

Motor drive
Magnetic coupling
Mechanical
Murray Iron Works
None
Non-Condensing
Oil
Overfeed

P - Pulverized fuel firing
PF - Pressured furnace
Pi - Pitch
Pl - Plate
Pn - Pneumatic
PP - Purchased power
Pr - Primary
R - Regulator

Re - Regenerative
RS - Riley Stoker Corp
S - Speed control
Sa - Sawtooth
Se - Secondary
So - Sectional
Sp - Springfield Boiler Co
SS - Spreader stoker

T - Turbine drive
TG - Traveling grate stoker
Tu - Tubular
US - Underfeed stoker
V - Vane control
WE - Westinghouse Electric Corp
WH - Waste heat
Wi - Wickes Boiler Co

Bn - Brethington Cone
1 - Reverse flow TAS report
3 - Two units installed
4 - All types Pr on Gr
5 - Exc
6 - 1000 Btu per cu ft
7 - 1P gas CO
8 - Exc power has additional 20% in ft gas furnace

AC - Allis-Chalmers Mfg Co
Ad - Admiralty
Aci - Inhibited admiralty
AE - Aghecatic extraction
AlBr - Aluminum brass
As - Arsenic
As Cu - Arsenical copper
B - Base
Bm - Bailey Meter Co
BF - Blast furnace gas
Br - Bigelow Co
BL - Black Liquor
Bw - Babcock & Wilcox Co
C - Coal, bituminous
CB - Coke breeze
CE - Combustion Engineering Co
CO - Coke oven gas
Co - Condensing
COn - Carbon monoxide
CuAs - Copper Admiralty
D - Damper
De - Demineralizer
Del - De Laval Steam Turbine Co
Di - Differential
Dr - Dry type
Du - Dual drive
E - Electrostatic
EC - Erie City Iron Works
El - Elliott Co
Ev - Evaporator
Fr - Foster Wheeler Corp
FW - Foster Wheeler Ltd
G - Gas
GE - General Electric
GP - Self-generated pr
Gr - Ground
Hy - Hydraulic
I - Internal
K - F Kerner Co
L - Lignite