

THE DOW CHEMICAL COMPANY
LOUISIANA DIVISION
POWER & UTILITIES DEPARTMENT

INTRODUCTION

The Power & Utilities Department of the Louisiana Division is responsible for the safe and economical operation of its assigned facilities and for seeing that they are adequately maintained. Their facilities are as follows:

- Power Plants
- Water Treating Plants and Distribution System
- Sewage Treating Plant and Collection System
- River Water Pump Station and Supply Canals
- Return Water Pump Station and Return Canals
- General Plant Piping and Pipeways
- Electrical Distribution System Including Substations
- Street Lighting
- Fuel Gas Stations and Distribution System (In-Plant)
- Fuel Oil Storage and Distribution
- Water Wells
- Nitrogen Distribution
- Carbon Dioxide Distribution
- Oxygen Distribution

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POWER GENERATION AND DISTRIBUTION

The Louisiana Division Power Plant No. 1 generates and distributes all its electrical power and steam. Steam is generated at 1250 psig and is extracted for process from three single automatic and one double automatic extraction turbine. Distribution pressures are 475 psig and 235 psig. Electrical power is generated at 14.4 KV and is distributed at this voltage to Chlorine rectifiers, motor power substations, and river water pump stations. Excitation for the Generators 1 and 2 is by means of motor generator sets with a full capacity spare exciter available for use. This method of excitation allows for easy maintenance of commutators. Generators 3 and 4 are provided with static exciters with provisions for using the spare motor-driven exciter.

Steam Turbine-Generator Statistical Data

<u>Turbines</u>	<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	<u>No. 4</u>
Make	G. E.	G. E.	G. E.	G. E.
KW	50,000	60,000	60,000	50,000
Throttle Press. & Temp.	1250/950	1250/950	1250/950	1250/950
Throttle Flow	1,060,000#/Hr.	1,250,000#/Hr.	1,250,000#/Hr.	1,250,000#/Hr.
475 psig Ext. Flow	700,000	--	--	1,200,000
235 psig Ext. Flow	200,000	1,000,000	1,000,000	--

Generators

KVA @ 30 psig Hydrogen	58,824	88,235	105,000	85,000
Capability (KW)	55,000	90,000	70	

Condensers

Make	Allis-Chalm.	Worthington	Worthington
Heat Transfer Area	30,000 sq. ft.	40,000 sq. ft.	40,000 sq. ft.

Exciters

	<u>No. 1</u>	<u>No. 2</u>	<u>Spare</u>	<u>No. 3</u>	<u>No. 4</u>
<u>Motors</u>					
Make	G. E.	G. E.	G. E.	G. E.	G. E.
HP	300	380	300	Static	Static
RPM	1190	1190	1190		
Volts	2300	2300	2300		

Generators

KW	200	250	200
Volts	250	250	250
Amps	800	1000	800

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GAS TURBINE-GENERATOR AND AUXILIARIES

Statistical Data

Turbines

Make: Westinghouse
Model: W-191G
Rated Power: 16,470 KW Peak Load
15,290 KW Base Load
Turbine shaft speed: 4,912 RPM
Fuel: Natural gas or fuel oil

Generator

Rating: 16,320 KW @ 0.85 power factor
19,200 KVA, 3-phase, 60 cy., 900 RPM
13,800 volts
Cooling: Open, air cooled

Exciter

Direct connected, open air cooled

Rating: 100 KW, 125 volt DC

Starting Unit

Make: Allis-Chalmers
Model: 25000
Fuel: Diesel
HP: 250
Number cylinders 6, 4 cycle

Emergency Motor-Generator Set

Engine

Make: Detroit (GM)
Model: 6-71
Fuel: Diesel
HP: Approx. 200
Number cylinders 6, 2 cycle

Generator

Make: Allis-Chalmers
Model: 6-GD-150
Type: Brushless, synchronous
Rating: 150 KW
Volts 480
Amps: 225
Cycles: 60
RPM: 1800

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STEAM GENERATORS AND AUXILIARIES

Steam Generators

Make:	Riley-Stoker
No. of Units	2
Type:	2-drum, balanced draft furnace
Fuel:	Natural gas/Fuel oil
Capacity:	500,000#/Hr. at 1250 psi, 950° F.
Air Preheater:	Tubular, 1-per unit
Economizer:	Continuous tube type, 1-per unit
F. D. Fans:	2 per unit
I. D. Fans:	2 per unit
Combustion Control:	Foxboro electro-pneumatic

Make:	Babcock & Wilcox
No. of Units:	1
Type:	2 drum, forced draft
Fuel:	Natural gas/ Fuel oil
Capacity:	750,000 #/hr. at 1250 psi, 950° F.
Air Preheater:	Ljungstrom
Economizer:	Continuous tube type
F. D. Fans:	2
Combustion Control:	Foxboro electro-pneumatic

Make:	Riley
No. of Units	1
Type	1 drum, pressurized furnace
Fuel:	Natural Gas
Capacity:	1,100,000 #/hr. at 1250 psi, 950° F.
Air Preheater:	Ljungstrom
Economizer:	Finned Tube
F. D. Fans:	2
Combustion Control:	Republic Electro-pneumatic

Make:	Riley
No. of Units:	1
Type:	1 drum, Pressurized Furnace
Fuel:	Natural Gas
Capacity:	1,600,000 #/hr. at 1250 psi, 950° F.
Airheater:	Ljungstrom
Economizer:	Finned Tube
F. D. Fans:	2
Combustion Control:	Foxboro

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STEAM GENERATORS AND AUXILIARIES (CONT'D.)

Boiler Feed Pumps

Make:	4 Allis-Chalmers, 4 Pacific
	3-6 X 6 BBDH-9
	1-8 X 8 BBDH-7
	2-6 X 6 LL-BFI
	2-8 X 8 BFIS
Capacity:	3-1160 gpm pumping 275 F. water vs. 4000' TDH
	1-1590 gpm pumping 275 F. water vs. 4000' TDH
	2-1250 gpm pumping 275 F. water vs. 4000' TDH
	2-1250 gpm pumping 275 F. water vs. 4000' TDH
Motors:	3-1250 hp with 25% S. F.
	1-1500 hp with 25% S. F.
	2-1750 hp with 15% S. F.
	2-2250 hp with 15% S. F.

Spray Water Pump

Pump

Manufacturer:	Pacific Pumps
Size:	4" S
Type:	BFIC (Barrel, centrifugal)
Stages:	8
RPM:	3570
Capacity:	720 gpm @ 3879 ft. head

Driver:

Manufacturer	Allis-Chalmers
HP:	1000
RPM:	3550
Phase:	3
Cycle:	60
Volts:	2300
F. L. Amps:	215

POWER II FACILITIES

2-72^{MM} Turbodyne Gas Turbine units with Deltak Regenerator and Heat Recovery steam generators supplying 235 psig and 30 psig process steam. Necessary auxiliary equipment, including Cooling Tower.

MOTOR POWER DISTRIBUTION SUBSTATIONS
STATISTICAL DATA

Consists of ten subs with metal-clad, draw-out type switchgear.

Substations 1 and 3

- 2 - 13.8 KV, 1200 Amp, 750 MVA Incoming ACB's
- 4 - 4.16 KV, 1200 Amp, 150 MVA feeder ACB's
- 1 - 13,800/2400 V, 7500/9375 KVA Transformer
- 1 - 60 cell, 130 volt station battery and charger
- 1 - Supervisory panel for remote indication and control

Substations 2 and 4

- 2 - 13.8 KV, 1200 Amp, 750 MVA Incoming ACB's
- 3 - 4.16 KV, 1200 Amp, 150 MVA Feeder ACB's
- 1 - 4.16 KV, 2000 Amp, 150 MVA Feeder ACB's
- 1 - 13,800/2400 V, 7500/9375 KVA Transformer
- 1 - 60 cell, 130 volt station battery and charger
- 1 - Supervisory panel for remote indication and control.

Substation 5

- 2 - 13.8 KV, 1200 Amp, 750 MVA Incoming ACB's
- 4 - 4.16 KV, 2000 Amp, 250 MVA Feeder ACB's
- 1 - 13,800/2400V, 10,000/12,500 KVA Transformer
- 1 - 60 cell, 130 volt station battery and charger
- 1 - Supervisory panel for remote indication and operation.

Substations 6, 7, 8, 9, and 10

- 2 - 13.8 KV, 1200 Amp continuous, 1000 MVA interrupting capacity, incoming ACB's
- 4 - 4.16 KV, 2000 Amp continuous, 150 MVA interrupting capacity @ 2400V ACB's
- 1 - 13800/2400V, 11200/14000 KVA, 65° Rise Transformer
- 1 - 60 cell, 130 volt station battery and charger
- 1 - Supervisory panel for remote indication and control

One (1) of the above subs, No. 9, has five (5) feeder ACB's

Each substation has a preferred feeder off one bus at the power plant and a standby feeder off another power plant bus. Loss of the preferred feeder initiates automatic transfer to the standby feeder.

WATER SUPPLY AND TREATING EQUIPMENT

I. Supply

The source of all water used in the Louisiana Division except for fire fighting is the Mississippi River. The water is pumped into a distribution canal, from which the various plants take their supply for cooling purposes.

II. Clarification

The Water Treating Plant takes raw river water from the distribution canal and treats it for various uses. The water is clarified in two (2) 7500 gpm units and two (2) 10,000 gpm units, by treatment with cationic polyelectrolyte and an anionic aid. This water is distributed to the filtration plant and to the process plants.

III. Filtration

The portion of process water that flows to the filters is filtered through four rapid sand filters then chlorinated. This effluent is used as potable water. Water for the demineralizer plant is filtered through three (3) pressure filters.

IV. Demineralizer Water

The pressure filter effluent is dechlorinated prior to entering the demineralizer units. After demineralization the water flows to the Power Plant's two (2) 500,000 gallon condensate storage tanks.

V. River Water Pumps

Supply

Make:	4-Peerless with Allis-Chambers Motors 1-Peerless with G.E. Motor 1-Fairbanks-Morse
Size:	3-48", 1-66", 1-72", and 1-84"
Capacity:	3-50,000gpm, 1-120,000 gpm 1,150,000 gpm, and 1-200,000 gpm
Motor Size:	3-600 HP, 1-1250 HP, 1-1500 HP 1-2000 HP

Return:

Make:	Same as above
Size:	4-66", 1-72", and 1-84"
Capacity:	3-80,000 gpm, 1-120,000 gpm 1-150,000 gpm and 1,200,000 gpm
Motor Size:	3-800 HP, 1-1250 HP, 1-1500 HP and 1-2000 HP.

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WATER SUPPLY AND TREATING EQUIPMENT, (Con't)

VI. Water Treating Equipment

Clarifiers

Make:	Infilco Accelator
No. of Units:	4
Capacity:	2-7500 gpm each, and 2-10,000 gpm each
Storage:	500,000 gal. ground level tank, 250,000 gal. elevated.

Filters

Make:	Infilco
Type:	Rapid sand
No. of Units:	4
Capacity:	500 gpm each
Storage:	Underground, 100,000 gal. capacity

Filter, Pressure

Make:	Best Manufacturing
Type:	Pressure
No. of Units:	3
Capacity:	920 GPM Each
Storage:	None

Cations

Make:	Graver-Best Manufacturing-Mosites
No. of Units:	3-Graver, 1-Best, 1-Mosites
Capacity:	680 GPM Avg.
Resin volume:	625 cu. ft. each
Resin:	Dowex 50W, H ₂ cycle

Vacuum Degasifier

No. of Units	2
Make:	Graver
Capacity:	No. 1-1500 gpm, No. 2-2500 gpm

Weakly Basic Anions

Make:	Graver-Best Manufacturing-Mosites
No. of Units:	2-Graver, 1-Best, 1-Mosites
Capacity:	540 GPM Avg. Each
Resin Volume:	625 Cu. Ft. Each
Resin:	Dowex 4, OH cycle, Units 1 and 2 Dowex 44, OH cycle, Unit No. 3 and 4

WATER SUPPLY and TREATING EQUIPMENT, (Cont'd)

Strongly Basic Anions

Make:	Graver, Best Manufacturing, Mosites
No. of Units:	2-Graver, 1-Best, 1-Mosites
Capacity:	540 GPM, Avg. Each
Resin Volume:	475 Cu. Ft. Units No. 1&2, 600 Cu. Ft. Units No. 3&4
Resin:	Dowex 21-K, OH cycle

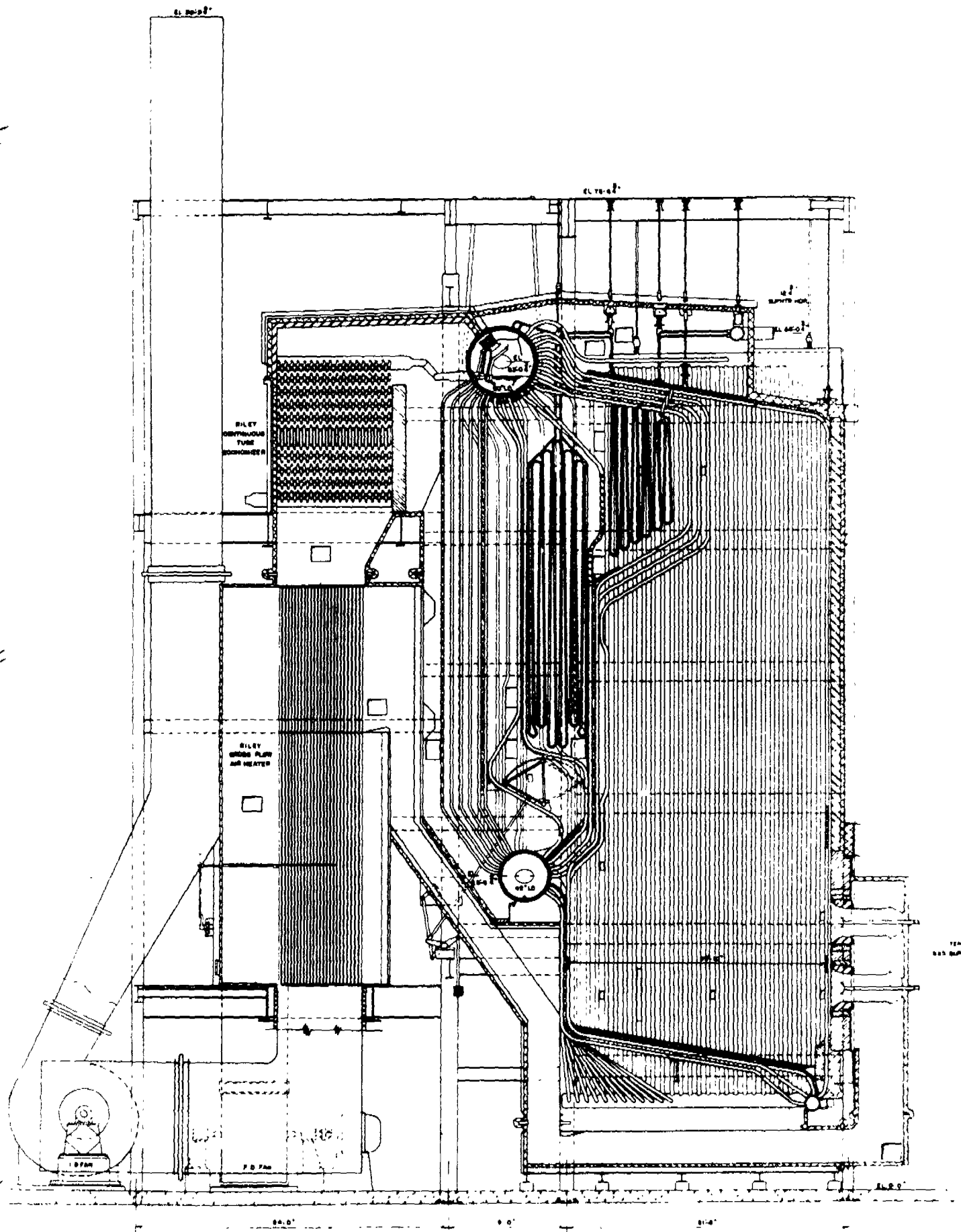
VII. Sewerage System Equipment

Collection System

No. of Lift Stations:	7
Type:	Wet Pit

Treating System

Capacity:	90 GPM
Type:	Primary digester, biological filter and final clarifier, with sludge recirculation.



BOILER 167

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