PRINCIPAL POWER-PLANT EQUIPMENT IN EXPANSION PROGRAM

Nekoosa-Edwards Paper Co, Nekoosa, Wis.

STEAM-GENERATING EQUIPMENT:

Boiler, 1 ..... Combustion Engrg-Superheater, Inc
110,000 lb per hr continuous, 125,000 lb per hr for 2 hr—700 TT, 475 psig, 2808-sq-ft waterwalls, 9104-sq-ft boiler surface, 9000-cu-ft furnace volume
Air preheater, 1 ..... Combustion Engrg-Superheater, Inc
Tubular 2 sections, 18,500-sq-ft heating surface
Pulverizers, 2 ..... Combustion Engrg-Superheater, Inc
4 burners, 31,000 lb per hr, Midwestern coal
Induced-draft fan, 1 ..... American Blower Corp
83,350 cfm at 11.6 in. wg, 373 F, 860 rpm, outlet damper
Forced-draft fan, 1 ..... American Blower Corp
43,500 cfm at 9.5 in. wg, 100 F, 1170 rpm, inlet vane damper
Magnetic coupling for I-D fan ..... Electric Machinery Mfg Co
Pulverizer and fan motors ..... Electric Machinery Mfg Co
Dust collector, 1 ..... Western Precipitation Corp
Soot blowers ..... Diamond Power Specialty Corp
2 retractable in-screen tubes, 2 retractable sidewall blowers, 10 stationary
Water columns ..... Diamond Power Specialty Corp
Safety and miscellaneous valves ..... Manning, Maxwell & Moore, Inc; Edward Valves, Inc; Crane Co
Coal-handling equipment ..... Stephens-Adamson Mfg Co
Redler vertical and horizontal conveyor, reciprocating feeder, crusher —Syntron vibrator
Car shaker, 1 ..... National Conveyor & Supply Co
Combustion control, steam meters, etc. ..... Bailey Meter Co

POWER-GENERATING EQUIPMENT:

Turbine-generator, 1 ..... Elliott Co
6000 kw, 0.8 pf, 3600 rpm, 400 psig, 700 F, 2300 v delta, 30-psi, extraction pressure
Condenser, 1 ..... Worthington Corp
4500 sq ft horizontal, 2-pass, divided waterbox
Circulating pumps, 2 ..... Worthington Corp
2500 gpm, double suction, centrifugal, 1200 rpm
Condensate pumps, 2 ..... Worthington Corp
150 gpm, center suction, centrifugal, 1200 rpm
Air ejectors, 2, 108 sq ft ..... Worthington Corp

FEEDWATER EQUIPMENT:

Feedwater heater, 1 ..... Cochrane Corp
Spray—tray type, 400,000 lb per hr
Boiler feed pump, 1 ..... Ingersoll-Rand Co
375,300 lb per hr, 592-psig discharge, 5550 rpm
Boiler-feed-pump turbine, 1 ..... Elliott Co
5550 rpm, 300 hp, 400 psi, 700 F inlet, 5 psi BP
Water-treatment units, 3 .....
Split stream, hydrogen zeolite, 430-gpm maximum rate
Chemical feed pumps ..... Dearborn Ch

MISCELLANEOUS EQUIPMENT:

Liquid-level equipment ..... Fisher Go
Reducing valves .....
Feedwater controls ..... Cochr
Desuperheaters, 3 ..... Bailey M
Makeup pumps, 2 ..... Gould
350 gpm, 150-ft head
Turbine-room crane ..... Industrial Eng
15 ton, 1 hook
Ventilating equipment ..... American Blow
Coal scales, 2 ..... Buck Eng
Oil-filtration system .....
Paper-machine turbine ..... Worthing
Variable speed to 300/4500 rpm, 1000 hp, 400 psi—700 TT, backpressure, multistage, multi-valve, direct connect to Mill double helical speed-reducing gear, 3940/500 rpm, Woodward governor

ELECTRICAL EQUIPMENT:

Switchgear ..... Westinghouse E
15 kv, 1200 amp, 500-mva interrupting capacity
Switchgear ..... Westinghouse E
5 kv, 800 amp, 250-kva interrupting capacity
Motor starters, 2400 v, limit ampere control ..... General Electric
Motor starters, 480 v ..... Cutler-Hamm
Unitrol, fused combination starters
Outdoor transformer ..... Westinghouse Electric
750 kva, 13 kv/2400 v, 3 phase, 60 cycle
Unit substations, 2 ..... General Electric
1500 kva, 2400/480 v with three AL-250 800-1200 amp secondary breakers
Unit substations, 2 ..... General Electric
2000 kva, 2400/480 v with two AL-3-50, 1200 amp, and one AL-3-50 secondary breakers
Bus duct, 2400 v ..... Westinghouse Electric
15 kv, 2000 amp duct
Bus duct, 480 v ..... Ball Dog Electric
LoAX duct in 600-amp and 1200-amp sizes
Cable trays, 6, 12 and 18 in. ..... T J Cope
Station-control battery ..... Electric Storage Battery
Manchex, DME-15, 125 v, 60 cell, General Electric Phase-check 121/2 amp

CONSULTING ENGINEERS ..... Chas T Main, Inc

PAPER MILL EXPANDS *continued*

ing the rest of the time the condenser runs at minimum load. The average condenser load, in fact, amounts to only 2000 kw. What's more, our loading plans call for turbine operation only when loads supplied at the 30-psi-extraction level are available. So we picked a condenser to meet capacity under a 4-in. vacuum at full load. Two half-capacity circulating-water pumps and two half-capacity condensate pumps complete the major condenser auxiliaries. These sizes, we felt, would save power under high-extraction conditions.

Electrical Equipment. While we definitely tied turbine size to our Nekoosa plant's steam needs we still had the problem of fitting this 6000-kw source of electric energy into a 2-plant system, which up to then totaled 13,000 kw. We started with an intensive review of electrical connections between the plants.

They tie together through a 15-kv system originating at the Centralia, Wis. 3600-kw hydro station and linking up with hydro and steam plants of Port Edwards and Nekoosa. The new 6000-kw unit exceeded the existing interrupting capacity at most of these locations, and particularly at Nekoosa. So here again a complete revision took place.

A new outdoor 7500-kva 3-phase transformer went in between the 15-kv line and the turbine room. We split the existing 480-v distribution bus to add safety to the older switchgear and put in a new 2000-kva, 3-phase, 15,000- to 480-v transformer. Then 15-kv metal-clad air-break switchgear were supplied for the new transformers as well as for the older 15-kv to 480-v and 15-kv to 2300-v transformers. All were rated at 500-mva interrupting capacity, which is ample for a long time to come.

A new 2300-v distribution center in the turbine room supplies the boiler room, and the new paper-machine ca-pacity. It ties back through the 750-kva transformers in the old system. This feed arrangement was considered to add stability to the system, of particular importance to the new paper machine in any plant difficulties.

Power reaches this new paper ma-chine at both 2300 and 480 v. All paper machine motors over 200 hp oper-ate at 2300 v, and smaller sizes run at 480 v. Boiler room has a 2000-kva, 2300- to 480-v transformer load center. Com-plete metalclad motor starters operate under remote controls installed in the boiler panelboard.

Two 1500-kva, 2300- to 480-v trans-former load centers serve the 480-v mo-tors in the paper machine and stock preparation rooms. All motor starters are the latest metalclad type. All equip-ment is housed in separate rooms with space enough for expansion of circuits

STEEL DRUMS carry by far the major share of industrial lubricants entering the average plant. Careless handling or storage can completely ruin them and their contents

Here Are Storage and Handling...

POINTERS ON LUBES*

▶ MODERN OILS AND GREASES for lubricating services are refined and manufactured to meet rigid standards. Many oils carry special additives to equip them with precise properties for particular duties. Careless or even haphazard handling and storage at your own plant can destroy the very values you may have paid a premium to get. Problems. For example, exposure to thermal temperatures or contamination from moisture or dirt—two strong possibilities—can bring on leakage or produce deterioration that destroys a lubricant's suitability. We'll see why later. Of course, careless handling of the containers themselves may result in dents and split seams that take their toll in direct loss. Here are some simple rules for storage and handling.

Abnormal Temperature. Both oils and greases experience considerable change under temperature variations. Their effectiveness as lubricants is reduced by hot locations. These make heavy-bodied oils thinner, tend to evaporate the required moisture content of (1) soluble cutting oils, leaving behind a jelly-like mass (2) certain greases where oil separates out from the soap.

Cold areas, on the other hand, make lubricating oils and greases more difficult to handle. The oils flow more slowly, and the greases become stiffer. Oils containing fatty materials congeal them out of solution under low-temperature conditions. In addition, soluble oils, cold enough to freeze their moisture content, prove useless.

Somewhat along the lines of temperature effect is spoilage in long storage. Soluble cutting oils suffer most from this cause through a loss of moisture. But preventing this loss is more a problem of stock control than of storage or handling.

Contamination. An improperly protected lubricant supply is almost certain to experience dust and dirt contamination. No plant man worthy of the name needs to have pointed out to him the dangers of dirt in lubricating oils and greases.

Moisture contamination is a major problem, too. Oils are more likely to be contaminated than greases. Some oils are designed to function as a lubricating emulsion in the presence of moisture, or even small amounts of water, but water contamination during storage can render them useless for later service. This holds true for most steam-cylinder oils and similar ones meant for duties like lubricating the bearings of the wet ends of paper machines. Nonsoluble cutting oils and heat-treating oils suffer complete destruction if contaminated by appreciable quantites of water.

Still another form of contamination develops. This is the introduction or unwanted mixing of different oils when dispensing them within your plant. It stands to reason oils of different qualities when blended produce a third, entirely new oil. You must take certain precautions, and then exercise definite care to keep original oils effective.

(More on next page)

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