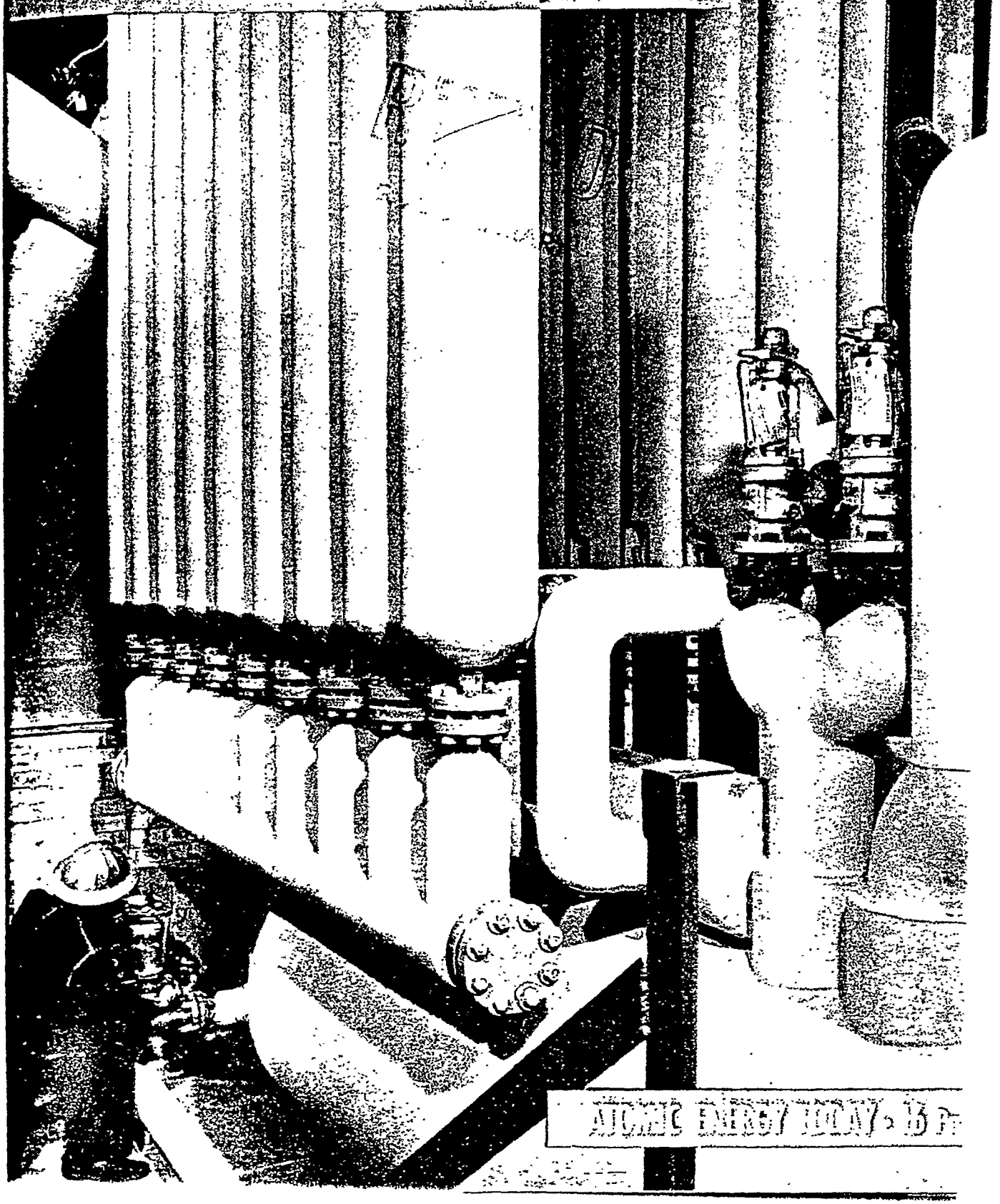
GENERATION, TRANSMISSION AND APPLICATION OF THE

POWER

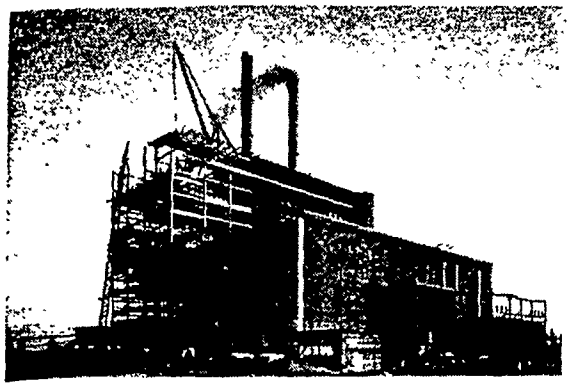
A McGRAW-HILL PUBLICATION July 1953 • 50¢

PLAINTIFF'S EXHIBIT

ZUR-59



ATOMIC ENERGY TODAY, P.



JUSTIN R WHITING PLANT of Consumers Power Co, near Erie, Mich. Units No. 1, 2 operating, No. 3 building

Smart Insulation Methods Cut Cost In Modern Station

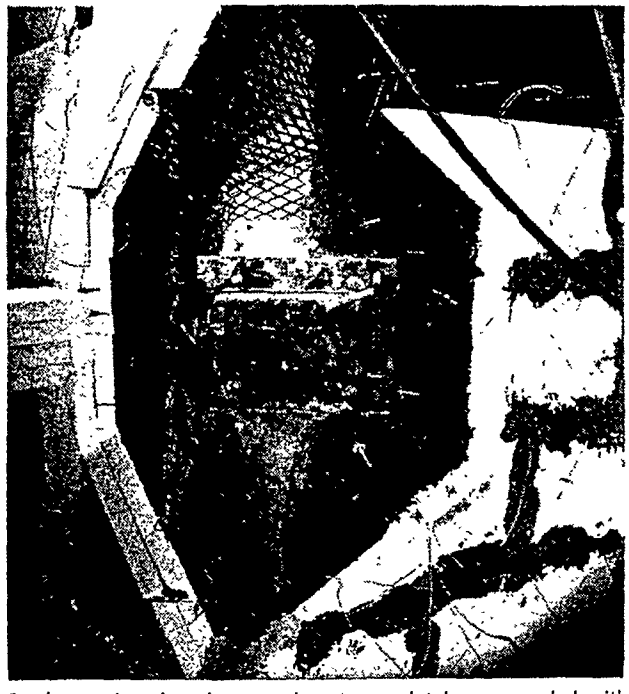
The key to better insulation in any plant is good application of suitable materials. This is especially true in today's high-pressure high-temperature stations where the right materials and methods cut costs from start to finish of installation, and during every day the plant runs.

Here's a picture story showing many of the methods chosen for a 1480-psi 1000-F reheat station of Consumers Power Co, Erie, Mich. Starting at the boiler we follow steam flow to superheater, main steam line and turbine, stopping at each to see the insulation application techniques selected.

Though any insulation saves Btu's, the right material correctly applied does far more. Its maintenance cost is lower, appearance neater, life longer. The insulation shown here is Kaylo (hydrous calcium silicate) but many of the modern installation methods pictured are suitable for other high-temperature insulating materials.

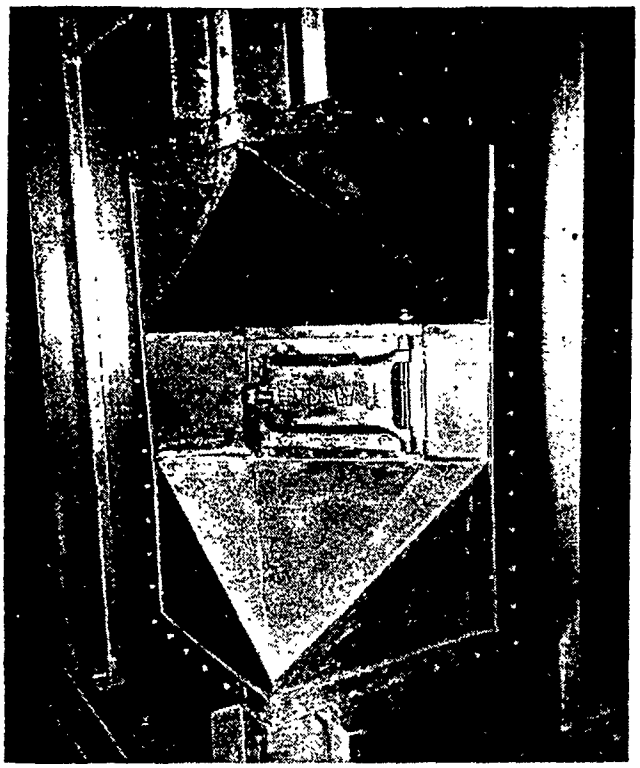
For more pictures, turn page ►

1 Early stage in insulation application around corner inspection door on boiler. Lath, studs, tie wires ready



2 Inspection door is now almost completely surrounded with insulation. Tie wires have been pulled through, fastened

3 Sheet-steel casing is applied over insulation after the insulating cement is dry. Casing helps protect the job

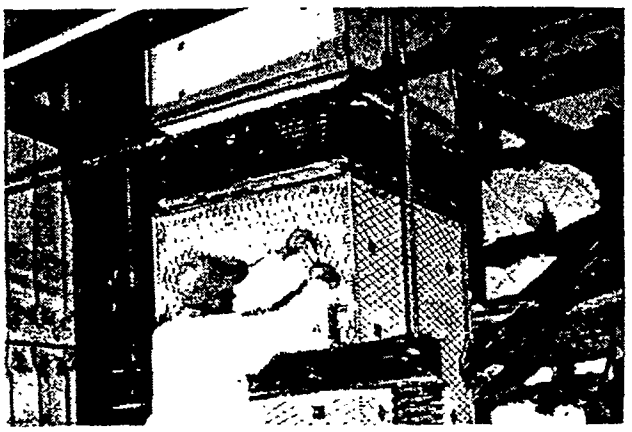


4 Finished inspection door has neat appearance, is tight and trouble-free. Shape of opening permits easy access

5 Top of boiler side wall with 4-in.-thick blocks in place. Metal lath, insulating cement separate blocks from tubes

8 Securing tie wires for block insulation on boiler superheater wall. Block joints pointed with insulating cement

9 Breeching, *top*, showing metal lath applied over blocks. The induced-draft fan duct, *bottom*, is block insulated



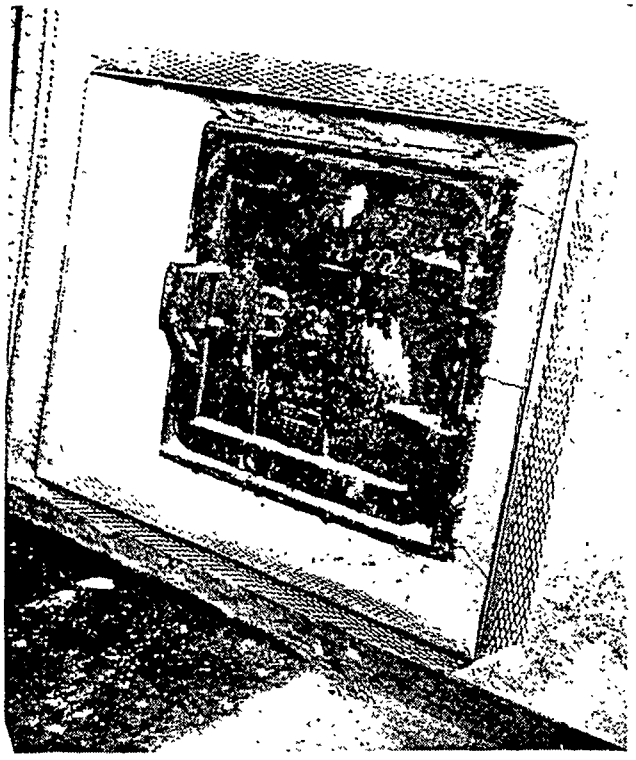
10 Here half-nuts are being applied to a welded stud on the *recirculating-air* duct. Stucco lath is over insulation

cks in place.
.s from tubes

over blocks.
lock insulated

ed stud on the
ver insulation

6 Metal straps tie insulating blocks to mesh on back wall of air heater. Note the expansion joint at lower right



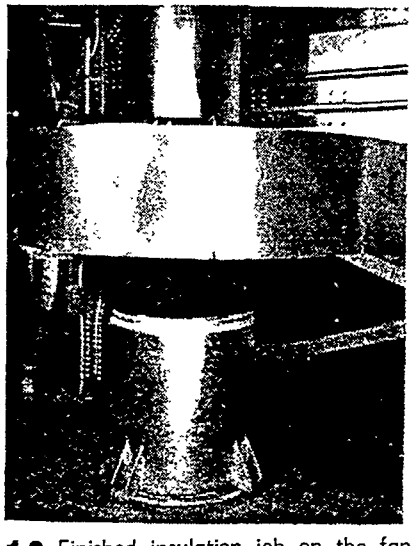
7 Air-heater inspection door showing corner beading, lath and tie wires. Metal straps (not shown) are also used

Many Application Methods Are Used in Insulating a Modern Boiler

Careful planning and accurate fitting insure a tight job, good for many years of service. In this photo story, neat finish shows work quality

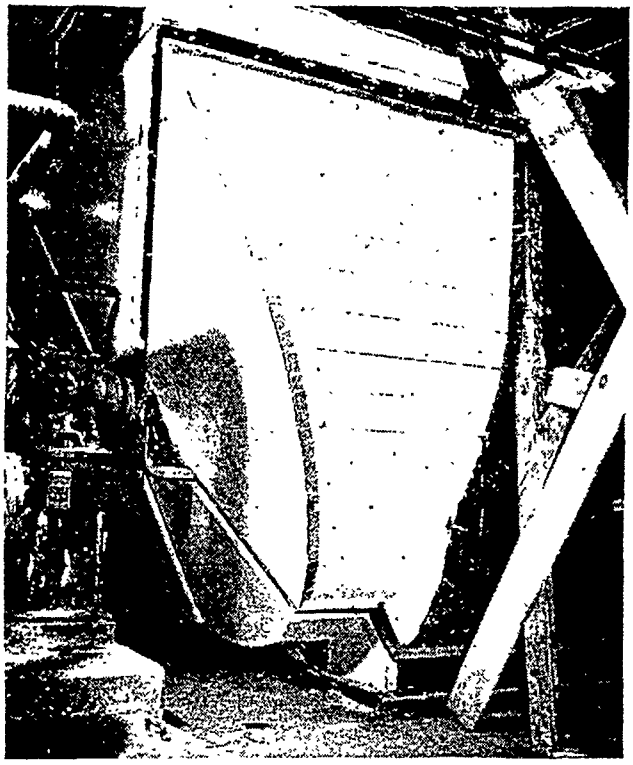
11 Early steps in applying the block insulation to cyclone separators

12 Secondary collector during application of the curved block insulation

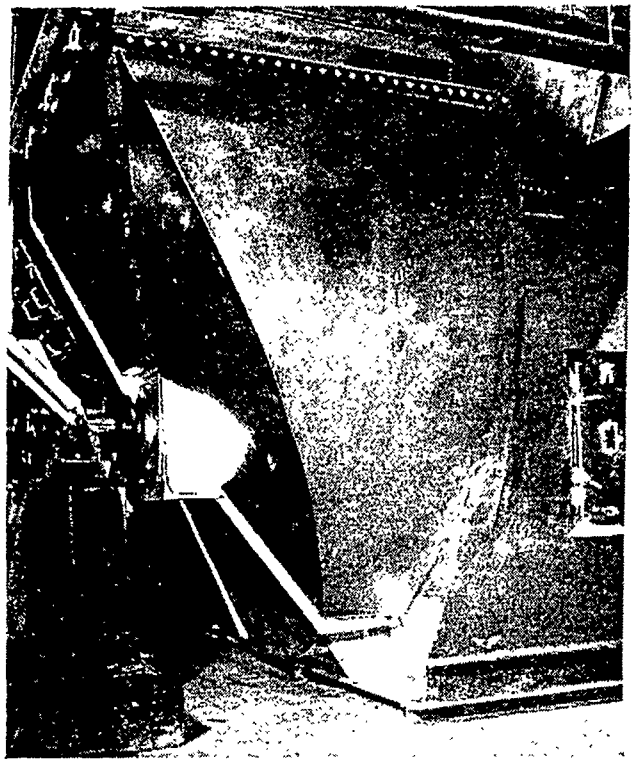


13 Finished insulation job on the fan above the secondary dust collector

turn page ►

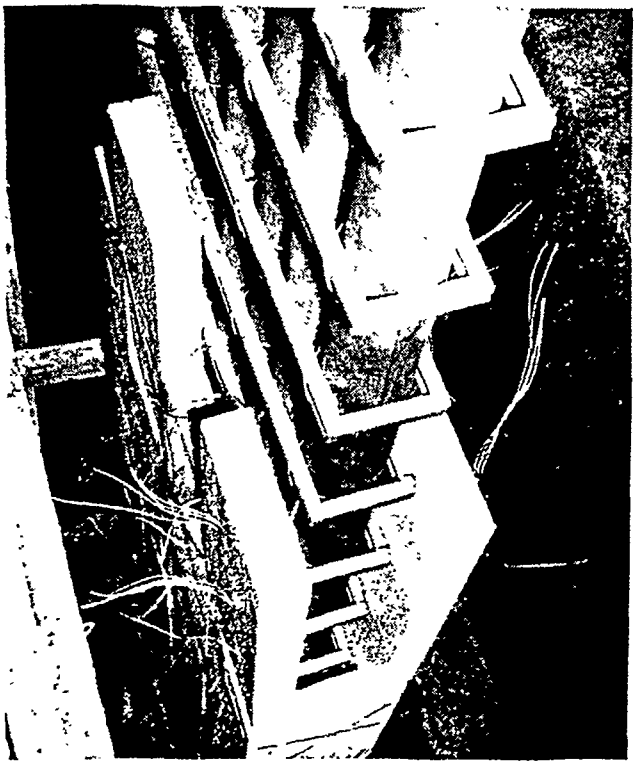


14 Block-insulated induced-draft fan. Studs hold blocks in place and corner-beaded lath gives a neat edge trim



15 Finished induced-draft fan after application of surface finish and paint. The smooth exterior is easy to clean

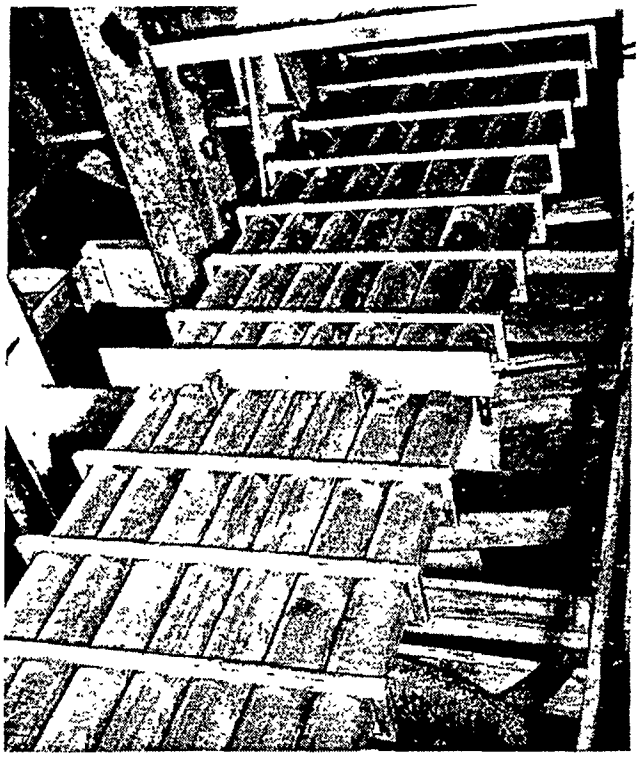
Induced-Draft Fan and Main Steam Lines Take Two Layers of High-



18 Start of block application to main steam lines showing the tie wires that hold the blocks to frames on pipes

19 Second layer of block insulation is wired to main steam lines. Pointing cement already applied to first layer

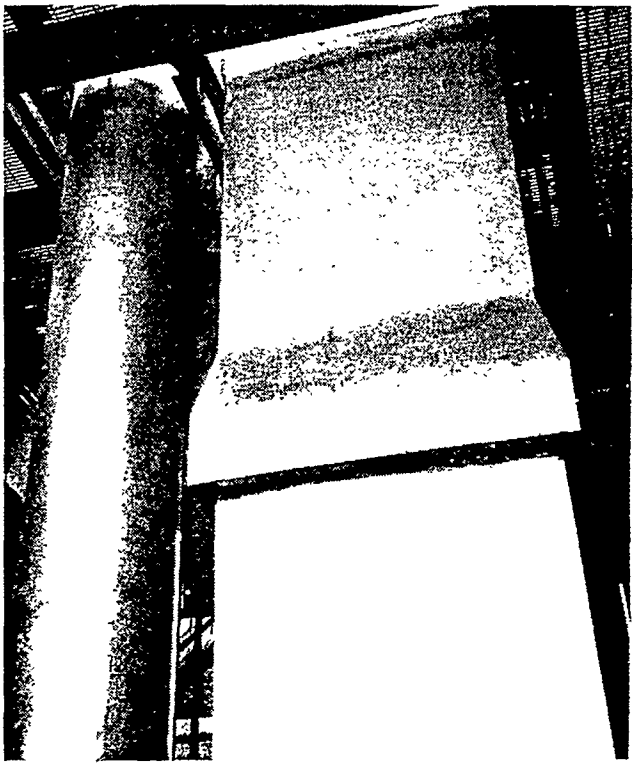
16 Steam at 1000 F leaves boiler from two secondary outlet headers having seven 5-in. tubes. Two layers on tubes



17 From tubes, steam flows through these main lines before entering turbine. Frames on lines will support blocks

Temperature Insulation, Have Smooth, Well-Finished Exteriors

20 Specially notched block being applied to the expansion joint in the insulation surrounding the main steam lines



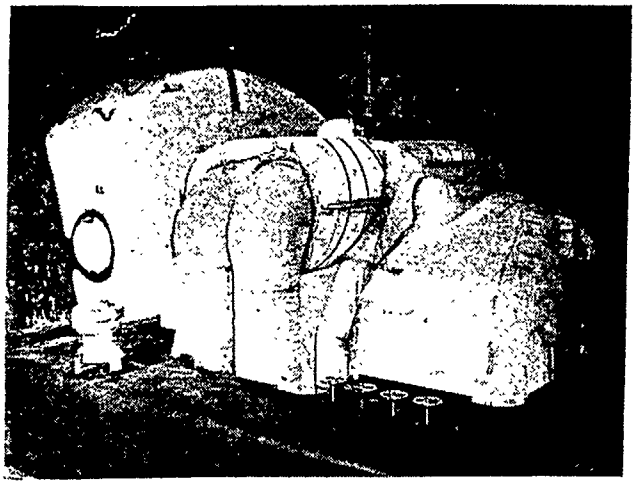
21 Finished expansion joint in vertical steam lines running between boiler and turbine. The work is neat and clean

22 Tightening tie wire around insulation on heater bleed from turbine

23 First layer of insulation on 14-in. reheat line. Total thickness is 6 in.

24 Second layer, finish and expansion-joint covering on the reheat lines

25 Insulation and supports for main steam and reheat lines, Unit No. 1



26 High-pressure end of turbine for No. 2 unit with insulation applied. Casing over insulation completes the job

Details of Whiting Plant Insulation

Table below gives schedule of thicknesses chosen for various temperatures and pipe sizes at Whiting. All high-temperature insulation is Kaylo (hydrous calcium silicate) preformed for application on flat and curved equipment and pipes in the plant.

Pipe insulation is nested; that is, outside diameter of first layer is a size that permits second layer to fit snugly. Fastening method varies with surface insulated, wires, studs and lath being used as illustrated. Pipes and valves are finished with canvas and cement to give a smooth exterior, easy to paint and keep clean at all times.

Expansion joints in pipe, duct and flat-surface insulation are specially constructed and carefully located to insure freedom of movement without danger to the insulation. Metal corner beads protect block edges, give a neat and true finish of lasting quality.

Though only high-temperature insulation is illustrated here, a number of other materials are used in the 40-90 F range. Table below shows typical specifications for them.

With Units No. 1 and 2 operating, and No. 3 nearing completion, experience proves the application methods illustrated give good service.

Insulation Thickness for Various Pipe Sizes and Temperatures

	Pipe Sizes in inches, With High and Low Temperatures											
	½-¾		1-1½		2-4		5-8		10-14		16 & over	
Degrees, F	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
150- 350	—	1	—	1	—	1	—	1½	—	1½	—	1½
350- 450	—	1½	—	1½	—	1½	—	2	—	2½	—	2½
450- 550	—	2	—	2	—	2	—	2½	—	3	—	3
550- 650	2	—	2	—	1½	1½	1½	2	1½	2	1½	2½
650- 800	2	—	2	—	1½	2	1½	2½	1½	2½	2	2½
800- 900	2	—	2	—	2	2	2½	2	2½	2½	2½	3
900-1000	2	—	1½	1½	2	2½	2½	2½	3	2½	3	3
1000-1200	2½	—	1½	1½	2	2½	2½	2½	3	3	3	3½

40-60	Two ½-in. layers of antisweat covering (well water and drinking water)
60-90	One layer of 1-in. wool felt (river water)
60-90	Cork spray built up to a minimum of ½-in. thickness Sheet-metal protective covering Asbestos-cloth protective covering Waterproof cement
40-90	One layer 1-in. hair felt tied on with jute twine or No. 14 Copperweld wire on 6-in. centers, ½-in. asbestos cement; poultry netting with ¼-in. waterproof cement finish