DISTRICT HEATING

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SEATTLE STEAM CORPORATION OPERATIONS

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The Seattle Steam Corporation, last September, put on the line at its Western Avenue plant a new outdoor boiler with a design pressure of 250 psi, a rating of 200,000 lb per hr for continuous operation, and of 266,000 lb for a two-hour peak with 220F feedwater.

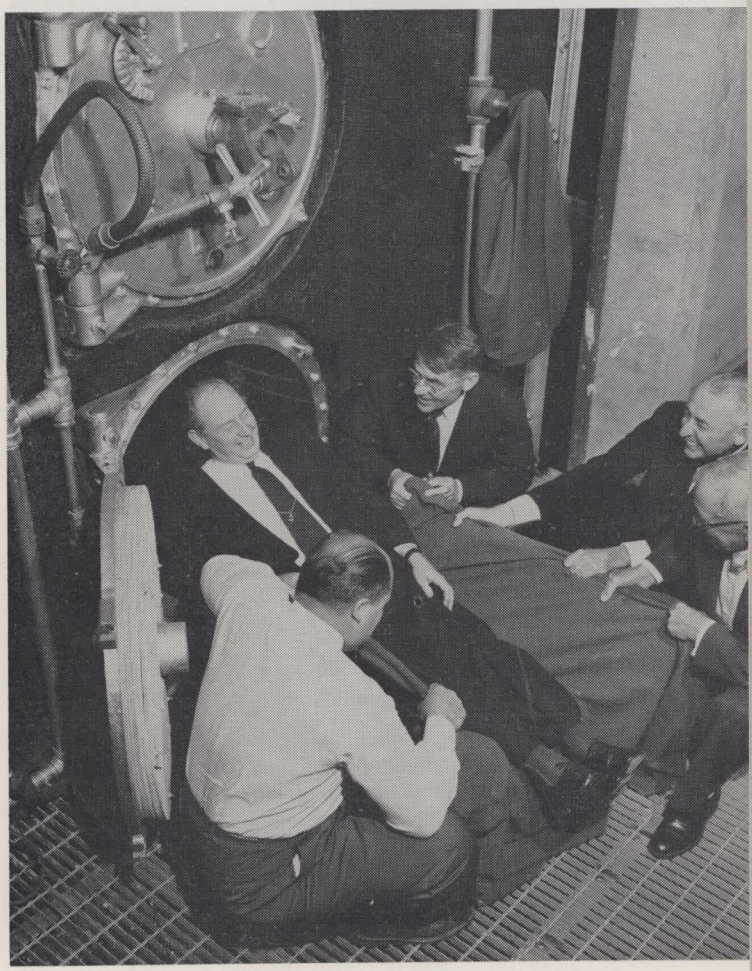
This completion was celebrated with a semi-formal dinner in the boiler furnace with Bumstead-Woolford Company, supplier of the Riley boiler and auxiliaries, as host to the company, its Directors, and others primarily connected with the installation. Bozell & Jacobs, an advertising firm, secured wide publicity for the event on television and in the local press, and the novelty of the dinner in the boiler furnace, with the guests sliding in and out on a chute through a burner opening, made an unusual news event. A similar dinner had been held in the furnace of a 1,000 hp boiler installed in 1925, and this present boiler is the only major piece of new equipment that has been installed on the system since that time.

The Seattle Steam Corporation acquired the district-heating property in Seattle on December 1, 1951 from Puget Sound Power & Light Company, who had previously operated it in conjunction with its electric system. When the City of Seattle, early in 1951, acquired the electric property in Seattle from Puget, as an alternate to taking over the property on expiration of the franchise, Puget decided to discontinue its district-heating business. District heat, while originated to use a by-product, had become a necessity in a large growing city such as Seattle, on account of its advantages of: eliminating smoke and dust from the downtown area; giving the users an unusually dependable source of heat available automatically from thermostat control without even the necessity of the push of a button; eliminating responsibility of the users in maintaining a labor force to operate their own plant and of maintaining their equipment; and of making valuable space in buildings occupied by boiler plants available for rental. The users of steam realizing this necessity formed the Seattle Steam Corporation to take over this property. Stock generally was sold to steam users.

The Company operates in downtown Seattle in the commercial business district. (see front cover) Its mains cover an area of approximately 0.4 sq mi, extending along the waterfront 0.8 mi. and with an average width from the waterfront of approximately 0.5 mi. It serves 640 customers in 428 buildings and supplies in excess of 80 per cent of the potential business adjacent to its mains.

With the installation of this new boiler the Western Avenue plant has sufficient capacity to carry the load except in extreme weather or in event of breakdown of equipment. Western Avenue is operated on base load and one shift of operators is maintained at the Post Street plant on week days during the winter. The two plants are connected with a 12 in. 150 lb steam main.

In addition to this new boiler the Western Avenue plant has nine boilers ranging in capacity from 15,000 lb per hr to 60,000 lb per hr, and Post Street has eight boilers, all 500 hp, with a capacity of 22,000 lb per hr.



IN THE FOYER

Clockwise starting at the left front: Melvin Lysne and E. E. Stephens, respectively Erection Superintendent and Sales Manager, Bumstead-Woolford Company; Richard McKay, General Manager, Seattle Steam Corporation; Dale Bumstead, President, Bumstead-Woolford Company; and Andrew Steers, President, Seattle Steam Corporation.

The distribution system installed prior to 1930 was made up of the conventional steel pipe with insulation installed in wood-log casing, and this makes up the bulk of the existing system. In construction after 1930 concrete tile was used instead of the wood-log casing. Radiation loss on the pipes approximates 15 percent of the steam send-out, which is excessive in relation to a new system, but does not justify the high cost of digging up the congested streets for replacement. Study of history

[1]General Manager, Seattle Steam Corporation.

of replacements indicates that there is very little loss of the pipes themselves due to corrosion from external water.

An active business development program was initiated by Seattle Steam immediately on taking over the system to acquire additional business adjacent to its mains, which was necessary for profitable operation. With its divorce from the electrical system it was necessary for the business to operate at a profit. There was no generating capacity available for new business and, as a temporary expedient, two 15,000 lb-per-hr fire-tube boilers were installed after determination that they would pay for themselves in less than two years. In the four years of its operation the company added approximately $180,000 in annual revenue from new business, with only a nominal expenditure for additional mains.

BANQUET IN THE BOILER

Around the table clockwise, starting at the left front: Donald H. Yates, Myron C. Law, D. Roy Johnson, Charles H. Gordon and Frank A. Dupar—all directors of the Seattle Steam Corporation. Charles F. Clise, Director and Vice-President, Seattle Steam Corporation; Andrew Steers, Director and President, Seattle Steam Corporation; Richard McKay, General Manager, Seattle Steam Corporation Dale Bumstead, President, Bumstead-Woolford Company, the contractors; E. E. Stephens, Sales Manager, Bumstead-Woolford Co.; B. K. Sullivan, Superintendent, Seattle Steam Corporation; Clayton Watkins, Vice-President, Seattle First National Bank; G. E. Wieland, Consulting Engineer; and William L. Shannon, Consulting Engineer, William D. Shannon & Associates.

A study was immediately initiated of the desirability of adding new steam-generating equipment, to give capacity for added load, improve reliability, increase efficiency, and eliminate smoke. The completion of the present boiler was a result of this study. Plans call for the eventual installation, in the Western Avenue plant, of three additional boilers similar to the one just installed, replacing old equipment at the plant. This will take care of load requirements in the foreseeable future and is the maximum that should be installed economically at this location.

To make room for this new boiler and oil storage tank, it was necessary to dismantle the pulverizing coal plant including the concrete building installed in 1917, which at the time was the last word in pulverizing plants. Four 300 hp boilers of the vintage of approximately 1900 were also dismantled to make room for a deaerator and other auxiliary equipment. The concrete building was an unusually sturdy building and the major contractor sublet the demolition. A good story, if true, was circulated that the subcontractor was interested in the steel in the concrete and was told that the building was built during the war times when steel was hard to get and, undoubtedly, there would be a minimum of steel. Actual demolition showed that the concrete had sufficient steel and quality to stand forever, and we can only hope that the subcontractor made money on his job.

The interesting features of this installation are: The boiler is out of doors, the front being integrated with the existing building to give an enclosed firing aisle. It departs from the conventional in that it has a pressure furnace with only a forced draft fan. It has an unusually high efficiency with a test guarantee of 88.2 per cent at 160,000 lb-per-hr load. Feed-water treatment is internal as the high quality of city water being used does not justify the high capital cost for external treatment. A deaerator feed-water heater is installed to improve steam quality.

While this installation was necessary, primarily to add capacity for new load and to improve reliability of the generating plant, it was economic due to fuel, labor, and maintenance savings. Installation, complete with deaerator, auxiliaries, and building changes will cost approximately $600,000, or $3.00 per lb of continuous rating.

All of our operations including this new boiler now burn heavy fuel oil. The new boiler is designed to burn natural gas with only minor changes, and is set so that it can be converted to future use of pulverized coal. Use of coal appears improbable but it does not require any major investment to provide for the possible future conversion to coal. The maximum hourly send-out requirements of our load at the present time is 470,000 lb per hr, and the comparable system capacity with this new boiler is 580,000 lb.

The installation of this unit materially improves the reliability of the generating supply, gives added capacity to take on new loads, and should result in smoke-free operation from the company's plants except under extreme loads when some of the old handfired boilers will have to be operated.