The BULLETIN of the NATIONAL DISTRICT HEATING ASSOCIATION

ORGANIZED 1909

Vol. XXXVII No. 2 January, 1952 $1.00 Per Year

TACOMA, WASH.

Low-Pressure Hot-Water Distribution In District Heating*

A. MARGOLIS, Dipl. Ing.**

In many cases it is advantageous to use high-pressure hot water *with moderate temperatures* and to connect hot-water heating plants directly by mixing a proportion of the service water with a proportion of the return water of the heating system.

In my paper*** "Superheated Hot Water From the Standpoint of District Heating", I referred to two district heating plants with high-pressure hot water, Dresden with a flow-water temperature of 285 F and Leningrad (U.S.S.R.) with a flow-water temperature of 240 F.

Large scale development of district heating depends, however, upon fuel economy and this leads to heat-electric generation with high initial-steam pressures and low exhaust steam pressures. The cost of a modern heat-electric station with an initial pressure of say 1500 psi and with low-pressure hot-water distribution is not greater than that of a condensing station. The fuel consumption is reduced to a fraction of that of live steam and by means of large capacity hot-water accumulators as are used in Hamburg and for the Pimlico District Heating Scheme in Westminster, a perfect balance of the heat and electricity loads is attained and the annual load factor of the heat-electric station is increased to that of an average condensing station.

I know that under the American conditions low-temperature hot-water distribution can be used in exceptional cases only, but I think that in many cases high-pressure hot-water distribution with moderate temperatures could be used.

High pressure hot water heating with temperatures as high as 400 F can often be advantageously used for heating of factories, but it has its limitations, as for instance, in regard to the purity of the heating water, temperature control and the sizes of the pipes. Any leakage causes flush, concentration and deposition of salts in the glands, sometimes making valves immovable. The drainage of the heating water as in the case of welding in a new connection or replacement of a valve or gasket is a nuisance. This is, apart from heat-electric generation, the greatest obstacle to the application of high-pressure hot water with high temperatures for district heating. I am really frightened by the idea of high-temperature water for mains from 12 in. to 16 in. of two miles in length, as described on page 427 of the District Heating "Handbook."

In a factory, repairs can be carried out over a week-end, but in the case of district heating a repair has to be carried out in a few night hours. Even for low-temperature hot-water distribution I advocate the use of emptying pumps for refilling the low water mains with return water, but in the case of high-temperature hot water with large mains a sudden great change of temperature is not possible without the danger of overstressing the mains.

---

* On page 424 of the new District Heating Handbook, A Margolis, eminent authority in Great Britain on district heating and long a member of NDHA is quoted as saying "In Europe many industrial heating plants have been changed over from steam to high-pressure hot water. For a district heating plant such a conversion is, however, hardly possible because of the great capital expenditure involved." Mr. Margolis later said that while he appreciated the great advantage of high-temperautre hot-water heating systerms for industrial plants, he advocated low-pressure hot-water distribution because of the increased electric output. We asked Mr. Margolis to give us his views in more detail, which he has done above." J.F.C.

** Of Kennedy & Donkin, Consulting Engineers

*** Presented before the Institution of Heating and Ventilating Engineers at a Special Meeting in London, March 2, 1938.