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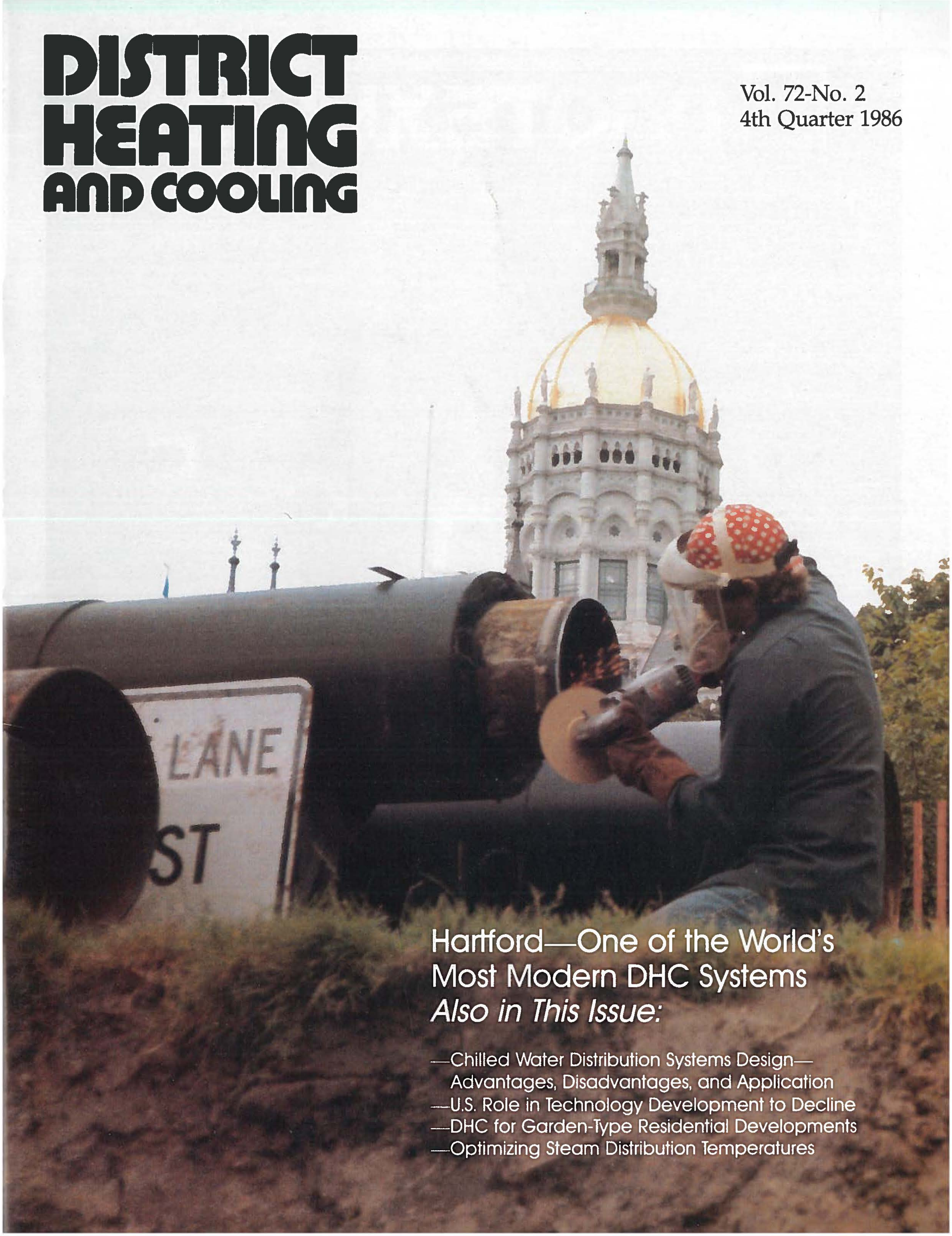

Hartford—One of the World's Most Modern DHC Systems

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eight "taps" were prefabricated into the effluent pipe for future heating and cooling networks.

The Phase 2 feasibility study identified several target sites for further study and provided a detailed assessment of potential customers. These included Seattle-Tacoma International airport, a Container Corporation of America plant, a Metro transit bus base, two buildings at the Boeing Developmental Center and a new business park near the Renton Treatment Plant.

The study evaluated each of these potential users of the energy recovery system in terms of their heating and cooling demands, the type of effluent-based heat pump system necessary to meet these demands and the economics of the effluent-based approach. In the cases of the airport and container plant, the study also explored environmental and institutional issues and general financial feasibility.

Because of the current low cost of conventional fuels, some of the sites are marginally or not at all cost-effective. They will become cost-effective as fuel prices return to 1985 levels. The container plant and new facilities at the business park, however, are economically attractive because of low retrofit costs and proximity to the treatment plant. The container site is also technically simple because it can take advantage of excess production capacity from the treatment plant's internal heat pumps.

Metro recently received funding from the Bonneville Power Administration to prepare final engineering plans and specifications for potential construction of the system at the Container Corporation plant. The agency still must negotiate institutional arrangements with both Container Corporation of America and the future operator of the system. Potential operators include public or private utilities and/or private enterprises.

Thermal Announces Purchase of Boston Steam System

On September 25, 1986, Catalyst Thermal Energy Corporation announced they reached agreement with Boston Edison Company to purchase the Boston Steam Heat System. It is anticipated that Thermal will take over the Boston operation by the end of the year. The system will be operated by a new wholly owned subsidiary called Boston Thermal Corporation.

Carl E. Avers, President of Catalyst Thermal, said "the purchase of the Boston Steam Heat System is another example of our commitment to growth in the district heating and cooling industry." In June, Catalyst announced the purchase of the Philadelphia Steam System. "Catalyst Thermal is the fastest growing company of its type, but within a controlled environment," said Avers.

The Boston system has three steam production plants distributing steam to over 275 customers through 22 miles of underground pipeline. Avers disclosed the purchase price of $32.5 million for the Boston Steam Heat System.

Catalyst Thermal's corporate headquarters is located in Youngstown. It now owns district steam companies in Baltimore, St. Louis and Youngstown. "With the addition of Philadelphia and Boston, we are the second largest company in the country specializing in district steam for heating, cooling and processing," Avers said. The combined steam systems of Catalyst will have annual sales of over $115 million and 11 billion pounds of steam. It is generated from 10 steam production plants and distributed to over 1,400 customers through 93 miles of underground pipeline.

"We continue to be committed to Youngstown as the location for our headquarters and have recently moved to a new downtown office location," said Avers. Avers further stated that their local subsidiary, Youngstown Thermal, benefits from the strength of the larger corporation.

By the end of this year, Youngstown Thermal will have invested $4.0 million for upgraded equipment, pollution control, repair of existing pipeline and the installation of new pipeline. Earlier this year Youngstown Thermal announced plans to spend $5.4 million in the downtown area to upgrade and expand the company facilities. This overall renovation includes $1.1 million dedicated to a pipeline extension to the South Unit Medical Center scheduled for completion next month. In summary, Avers said, "We have made real and substantial investments in Youngstown and we are here for the long-run."

System Expansions and Improvements

PACT Signs New Complex to Steam System

Pittsburgh Allegheny County Thermal Ltd. (PACT) has signed the new Liberty Center to the downtown district heating system. The complex developers found it more economical to tie into district heating than owning and operating new in-building boilers. The 1.3 million square foot center will open in December of 1986 and will average 15,000 pounds per hour and will have a peak demand of 30,000 pounds per hour.

The PACT system is a customer owned cooperative. The current rate of $15.50 is 7 percent lower than the $16.67 price of two years ago. As the system expands, additional rate reductions are expected.

Rochester System Lowers Rates

The Rochester District Heating Cooperative, another customer owned and operated district heating system, was able to lower its steam prices 19 percent after one year of operation.

On September 1 average prices were lowered from $18 per thousand pounds to $14.19.

The reduction in price was due to the cooperative purchasing self-help gas from producers rather than buying gas from the local utility. Additional cost saving measures being investigated are cogeneration and installing condensate return lines.

The cooperative currently has 40 members, and discussions are in progress with the developers of a new Hyatt Hotel.

Solar Energy for District Heating

Trials are in progress at Nykvarns, a small town about 50 km south-west of Stockholm, of the supply of solar energy to the town's district heating system. The trials installation consists of a solar collector array and a short-term water heat store. The solar system, which requires only a minimum of maintenance, meets almost the entire energy requirement of the town during the summer, and makes a modest contribution to heating energy requirements during the winter. Energy cost is expected to work out lower than the cost of energy from any previous installation of this kind.

Nykvarn is a small community of about 500 households and two factories. The Södertälje Energy Company has built a solar district heating plant there, incorporating solar collectors of the leknolerm Central type. The collectors supply heat to a short-term water heat store, which stores heat from sunny to cloudy periods.

Solar energy supplied by the system provides about one-tenth of the town's annual total energy requirement, being almost the entire energy requirement needed during the summer and a minor contribution during the winter.

The collector installation, with an area of about 4 000 m², consists of 320 12.5 m² collectors, connected in series in groups of ten, so that the incoming water temperature is raised from, say, 60°C to 90°C during a sunny summer day.

The solar heat is stored in a water heat store, which can store heat for a couple of days or so. The store is in the form of a 30 m high steel tank, in which the water temperature at the top can reach 95°C.

On a really sunny day, the collectors can supply sufficient heat to the store to meet half a week's heat demand. During the winter, the heat store provides back-up buffer capacity in the event of any of the boilers breaking down. The ability to store heat from night to day also allows the boilers to be operated at maximum efficiency.

The high-temperature solar collectors are of the flat plate type, with glass cover plates and arranged in 12.5 m² modules for ground mounting. They are a development of the collectors used in the Lyckebo project and for other applications. They incorporate specially-designed anti-convection baffles of Teflon between the absorber plates and the glass to reduce heat losses from the absorber to the air and to allow energy to be produced at high temperatures. The stagnation temperature, i.e. the temperature reached if cooling of the absorbers is lost, is 200°C.

The collectors are connected in parallel in 32 groups, with 10 collectors in each group, and connected to a heat exchanger. The liquid circulating through the collectors contains propylene glycol as anti-freeze.

The specific investment cost of the solar collector equipment, including the collectors themselves and the piping, foundations, heat exchanger and control equipment, etc., is SEK 1 600: –/m², allowing energy to be supplied to the store for less than 30 öre/kWh. The cost of the store is often met by the savings it provides in the form of improved boiler efficiency and the value of having a peak load reserve during the winter. As a result, the cost of solar energy from the store is the same as the cost of energy to the store, as heat losses from the store are negligible.

Over 90% of the cost of investment is accounted for by the collectors themselves and by the piping system. The collectors are entirely without moving parts, and the system as a whole has been found to require very little maintenance.

An Underground Piping System Made Entirely of Plastic in Use in Sweden

District heating systems have so far been built in areas where they are most profitable—towns and larger urban areas. They are now expanding to smaller urban areas and to detached house developments in the vicinity of areas with district heating. For such applications, the cost of heat distribution constitutes a higher proportion of the total energy cost. A new method is being tried out for the construction of a district heating system. It is hoped that it will reduce distribution costs considerably by using an underground piping system made entirely of plastic and as simplified method of installation needing a minimum of groundwork. The method is known as GRUDIS, derived from the Swedish GRUppcentralDIStribution (group heating distribution).

A three-year programme of trials has been carried out by Studsvik Energiteknik AB on behalf of the Swedish Council for Building Research, with the aim of developing a means of building district heating systems which can be competitive even in areas with relatively low heat load densities. Such systems will find application in smaller urban areas, detached house developments close to existing district heating systems and new development areas. The system should also be suitable for replacing worn-out group heating distribution systems.

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