WE 7:
REUSE WATER FROM CONED STEAM

New York City Plumbing Code; New York City Mechanical Code  Proposal developed by the Water Efficiency & Building Stormwater Committee

Summary

Issue: The water used by Con Edison to make steam is dumped into the sewers after it has been used by buildings. This wastes 5 million to 10 million gallons of clean water a day and stresses wastewater treatment plants.

Recommendation: Require buildings that use utility steam for space heating and/or cooling to reuse at least 50% of the steam condensate produced, unless shown to be unfeasible.

Proposed Legislation, Rule or Study

Amendments to the New York City Plumbing Code:

1. Add a new Section 614.1 as follows:

SECTION PC 614
UTILIZATION OF STEAM CONDESATE

614.1 Applicability. Buildings that use utility steam for space heating and/or cooling shall reuse at least 50% of the steam condensate produced, averaged over one year, using one any means permitted in Appendix C of this code.

Exception. Any water remaining after use for the purposes permitted in Appendix C may be discarded; provided, however, that any such building shall report to the department the percentage of steam condensate discarded.

614.2 Restrictions. The systems for utilization of steam condensate shall be designed to ensure that:

1. Water utilized for toilet/urinal flushing shall not exceed 100°F at any time, unless combined with other sources of water to lower such temperature below 100°F; and

2. Water supplied to any outlet accessible by humans, including hose bibs and laundries, shall not exceed 140°F, unless combined with other sources of water to lower such temperature below 140°F.

Amendments to the New York City Mechanical Code:

1. Add a new Section 307.4 as follows:

307.4 Utility Steam Condensate. In buildings where utility steam condensate is used to provide space heating or cooling, provision shall be made to recover the condensate as required by Section 614 of the New York City Plumbing Code.

Supporting Information

Issue – Expanded
Approximately 2,000 large Manhattan buildings use Con Edison's steam system as a source of energy. When this steam cools into liquid water (steam condensate), it is still far hotter than permissible by the Department of
Environmental Protection for release into the sewers. Typically, this water is then cooled with potable water and disposed. Because of this, between five and ten million gallons of almost potable water (condensate mixed with potable water) is wasted annually.

Five and seven million gallons per day of steam condensate flow into the sewer system, ending up at the Newtown Creek, Wards Island and North River wastewater treatment plants. To the extent that steam condensate can substitute for potable water for certain non-potable uses, such as toilet/urinal flushing, cooling tower makeup water, and sidewalk washing, both potable water and wastewater flows can be reduced.

Some condensate reuse already occurs without any incentive or regulatory requirement due to cost effectiveness. The 100 largest steam consumers (who produce 40% of the system’s total condensate) recovered 30% of their condensate in 2005, compared to about 20% recovery systemwide. A Con Edison-sponsored analysis that assumed far lower water/sewer costs than currently exist found that all but 10% of condensate could be recovered economically.

The intent of this recommendation is that it would only apply to new construction and gut rehabilitations.

**Environmental & Health Benefits**
This proposal will reduce wastewater flows to Newtown Creek and Wards Island plants. It will also reduce water use as condensate replaces potable water for these end uses.

This proposal was found to have a low, positive environmental impact per building and to impact a large number of buildings. It was thus given an environmental score of 2.

This proposal was found to have no significant health impact.

**Cost & Savings**
As described in the Executive Summary, Bovis Lend Lease prepared cost estimates for each Task Force proposal in the context of well-defined construction projects in specific buildings. Where possible, members of the Technical Committees prepared savings estimates for some of these projects and buildings. These cost and savings estimates are presented in the February 1st draft version of Appendix A. The innate uncertainty in how construction and operation will vary from one building to another, the complexity of the Task Force proposals, and the wide range of applications in which the proposals may be realized mean these figures are truly estimates.

For some buildings this proposal will result in no increase of capital costs and for others an increase of up to 0.03%. It was thus categorized as incurring no to a low capital cost increment. This proposal was also estimated to generate financial savings that will pay for the capital costs in less than three years or in three to ten years depending on the building type.

**Precedents**
There are no known precedents for this proposal.

**LEED**
LEED addresses the use of condensate water as a water conservation strategy for irrigation and building sewage conveyance systems. For these purposes, this proposal will assist in achieving all prerequisites and credits in LEED Water Efficiency sections of the various rating systems.

**Implementation & Market Availability**
The technology is readily available. There are no known implementation issues for this proposal.

**Notes**
A separate Task Force proposal, Use Waste Heat from ConEd Steam, requires that the thermal energy in condensate be used to the extent practical. (Added material in Section 6.8 of ASHRAE 90.1 2007.) When there is a use for this energy (e.g., during heating season), the condensate will be available at 100-130°F. However, in the summer, if steam cooling is operating, the condensate will be used only for service hot water heating and may be considerably hotter (180°F or more) when released for these applications. A water-to-air cooling coil (with freeze protection) will therefore be a necessary part of the installations called for in this measure in most cases.

The Committee had originally suggested adding this language to MC 1210.2.3, but that section refers to high pressure steam and is concerned with assuring reliability and safety. PC 614 seems a more natural fit. A reference has been included in the Mechanical Code.