

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU

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IN REPLY REFER TO:
WAS 12.37

March 19, 2012

Dear Wastewater Customer:

Subject: Revised Cooling Tower Sewer Credit Policy

The City and County of Honolulu, Department of Environmental Services has revised their policy on sewer credit for dischargers of cooling tower water. Please see the attached policy dated February 2012.

The policy was revised to comply with the Uniform Plumbing Code (UPC) 311.5 which states:

"No fitting, fixture and piping connection, appliance, device or method of installation which obstructs or retards the flow of water, wastes, sewage or air in the drainage or venting systems in an amount greater than the normal frictional resistance to flow, shall be used unless it is indicated as acceptable in this Code or is approved by the Administrative Authority as having a desirable and acceptable function of the plumbing system."

You may have installed a meter in the blow down line which measures the amount of water being discharged to the sanitary sewer system. We were informed by the Department of Planning and Permitting Mechanical Code Branch that compliance with UPC 311.5 requires that you remove this meter so as not to obstruct or retard the flow of blow down water. Since direct measurement of the blow down volume is no longer possible, the revised policy estimates the blow down at 13.4 percent of make-up water to the cooling tower based on a typical cooling tower operation. The remaining 86.6 percent is lost due to evaporation and drift.

If you have any additional questions, please contact Paul Friel at 768-3327.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy A. Houghton", is written over a large, loopy scribble.

Timothy A. Houghton
Executive Assistant

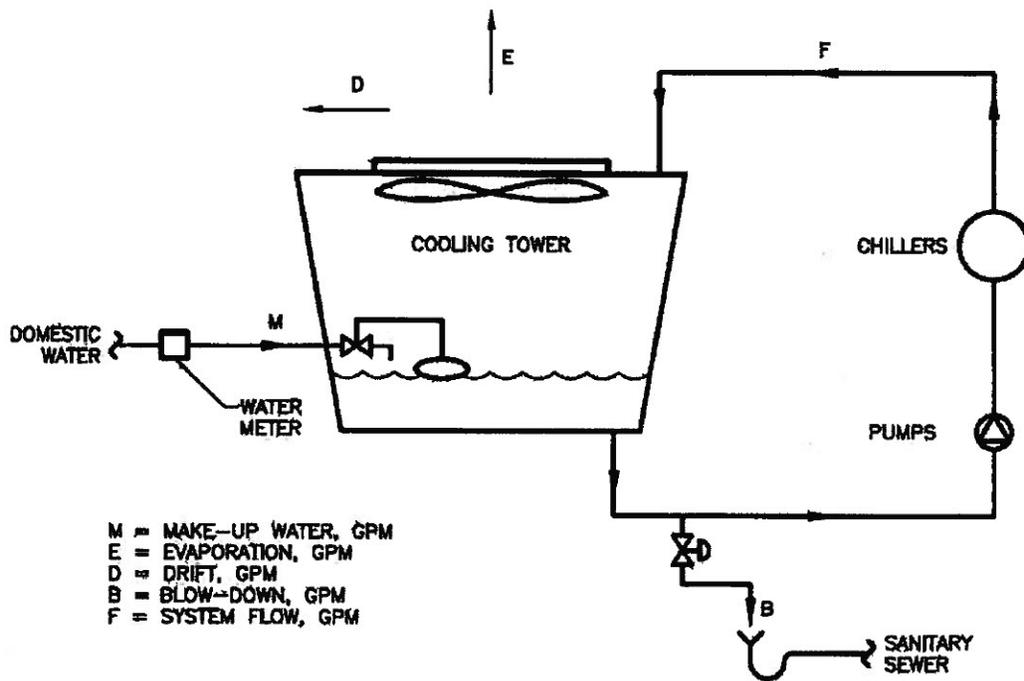
Attachment

Cooling Tower Discharge Credit Policy
 Office of Administrative Support
 Department of Environmental Services (ENV)
 March 2012

The purpose of this policy is to establish a sewer fee credit for the make-up water that evaporates or drifts and does not enter the sewer system.

Most of the make-up water that is introduced into a cooling tower either evaporates or drifts, while a small amount is discharged to the sanitary sewer (blow down). For sewer charge determination, this discharge to the sanitary sewer would be measured with a flow metering device. However, the Department of Planning and Permitting informed ENV that installation of a flow metering device could obstruct flow and be in noncompliance with Section 311.5 of the Uniform Plumbing Code. ENV, therefore, is establishing an average discharge as a percentage of incoming makeup water for sewer charge purposes, using the following calculations*.

*Calculations prepared by Richard Beall, Beall and Associates, July 2011.



Water balance:

$$M = E + D + B \quad \text{Eqn. 1.0}$$

Heat balance:

$$E = \{ F (T_{in} - T_{out}) C_p \} / H_v \quad \text{Eqn. 2.0}$$

$T_{in} - T_{out} = 10$ degrees for typical cooling towers

$C_p =$ specific heat of water = 1 Btu/lb/degree F

Hv = heat of vaporization = 1,000 Btu/lb
Result: E = 1 percent of system flow rate Eqn. 2.1

Assume D = 0.01 percent of system flow rate for towers with drift eliminators Eqn. 2.2

Chloride balance:

$M(X_m) = D(X_c) + B(X_c)$ No chlorides in evaporated water Eqn. 3.0

Cycles = $X_c/X_m = M/(D + B)$

Assume typical cycles for well-maintained tower is 7

$$7 = M/(D + B)$$

Combine with equation 1.0:

$$7D + 7B = M = E + D + B$$
$$B = E/6 - D$$

From 2.1 and 2.2, Drift is 1 percent of Evaporation, i.e. $D = E/100$

Using Equation 1.0:

$$M = E + E/100 + E/6 - E/100$$

$$E/M = 6/7 = 85.7 \text{ percent of make-up water is evaporated}$$

Therefore, $D = 0.9$ percent of make-up water is lost to drift

Finally: **Blow down, B = 13.4 percent of make-up water**

The Department of Environmental Services, Office of Administrative Support, will use 13.4 percent of the incoming make-up water volume for a conventional cooling tower as the average discharge to the sewer (blow down). The remaining 86.6 percent of the make-up volume, which either evaporates or drifts, will be reimbursed as a credit. The sewer fee rate used to calculate the monthly sewer bill will be from Chapter 14 revised Ordinances of Honolulu 1990, Appendix 14-B at the "non-residential metered wastewater" rate.

APPROVED:


Timothy A. Houghton, Executive Assistant
Department of Environmental Services


Date