

# Steam Reduction Plan

## 2011

The Steam Reduction Plan of 2011 incorporates recommendations that will assist in the reduction of steam use on campus. The plan is comprehensive in that it addresses various facets of the steam system. By design the plan provides information that is brief and to the point. It is expected that principles from the plan will migrate into standards, operating procedures and policies of the Central Utility Plant. The plan is focused on three main areas:

- Steam production cost reduction
- Steam distribution cost reduction
- Building steam use reduction

Some reduction strategies impact usage in all areas, while others are area specific.

### Steam Trap Inspection

An annual steam trap inspection is key to insuring that the system is not routinely discharging live steam into the condensate lines. In addition, steam traps should also be checked when there are problems in the steam loop (steam loss, excess condensate, etc).

|    | Type of Inspection | Recommended Frequency   |
|----|--------------------|---|
| 1. | All traps          | Annual Inspection   |
| 2. | Individual traps   | After trap replacement, when there is a question as to the trap operating properly, problems with the loop operating properly |

Steam traps should be replaced as quickly as possible when failed.

### Steam Trap Inspection Instrument

Recommendation: Our recommendation is that any steam trap inspection should be conducted with a TLV Trapman V test instrument.

Steam trap inspection is a *science* with the proper instrumentation or an *art* with the more commonly used instruments. We use a TLV Trapman V steam trap testing instrument. It has the ability to compare the actual steam trap ultrasonic signature with that of a properly working trap of the same design, and often the same model. The instrument can also estimate the approximate quantity of steam bypassing a partially working trap.

Older ultrasonic instruments require the technician to determine the condition of the trap by the sound.

### Steam Trap Database

Recommendation: All steam trap inspection data should be downloaded into a preventative maintenance database.

Once a steam system is inspected, it is important to track the performance of traps in specific applications. For example, if a trap has a high failure rate in a specific application, there may be other factors that contribute to a shorter service life. In addition, a database that also collects the estimate leakage and failure mode can estimate the steam system losses.

### Steam Trap Selection

There are many different types of steam traps. Each trap is specified based on the following parameters:

- Working pressure (For example: Low Pressure (15 psi) vs. Normal Pressure (100 psi))
- Condensate flow
- Temperature range
- Air Venting

Each steam trap design has a functional loss rating. The functional loss is the quantity of steam lost with the normal operation of the system. Ball float types of traps have a very low functional loss (0.1 lb/Mlb for a TLV float). Thermodynamic and Bucket traps have a 3-5 lb/Mlb loss.

|    | Type of Trap       | Recommended Replacement |
|----|--------------------|-------------------------|
| 1. | Bucket Trap        | Ball / Float *          |
| 2. | Thermostatic Trap  | No Replacement Required |
| 3. | Thermodynamic Trap | Ball / Float *          |
| 4. | Orifice            | Ball / Float *          |

\*Note: Ball / float traps should be ordered with a thermostatic vent for air venting.

Most problems with operating steam traps are related to incorrect sizing for the condensate discharge. It is important to properly pipe to include a drip leg to capture particulate that may block discharge ports.

### Summer Usage

We have examined summer time steam usage for low steam usage buildings. In general, most of the summer steam usage is related to the need to produce hot water for HVAC reheat systems. Many of these buildings still require additional reheat when the system is configured for dehumidification.

We are exploring using solar water heating to supply summer heating needs for small load buildings. Preliminary results were too expensive, but we are evaluating different solar technologies that may lower the cost.

Initial recommendations are to leave the current steam systems connected during the summer, but continue researching alternatives to replace the heating source with solar water heating in warm months.

### **Pipe Insulation**

As a general rule, the steam pipe insulation in most areas is adequate for the application.

We continue to inspect mechanical rooms. In most areas, the insulation is in place on the steam lines. We issue work orders for insulation repair when we find areas where insulation is missing. Insulation repair is an ongoing program. Many times insulation is removed during a repair.

We recommend that insulation inspection be added to a facilities maintenance PM inspection. No other changes are required.