

# *Eddy's Boilerhouse News*

## TIP OF THE MONTH FOR THE MAINTENANCE DEPARTMENT

By Eddy Emerson

### **Improve Boiler Efficiency**

Have you seen the cost of fuel? It's so high I had to walk to work today, but I have gotten so fat lately that I had to start walking yesterday to get here on time. This fuel cost is out of control, so we had better get back to looking at ways to save some of that cash.

**Lead/lag boiler controls** is one way to save fuel. Its cost is moderate (that means more money than a Big Mac and less than a Big Mac Truck). But, the potential savings is large (that means it is worth doing).

The basic problem here lies in the operation of more boilers than are actually needed to meet the heat or steam demand. The penalty for this type of operation is almost a 100% loss for the boiler that isn't needed. My wife says I am a 100% loss and not needed, but that's another story.

If the boiler is cycling on and off continuously this loss could be as much as 15% to 20%. For example, boilers go through a light off or pre-purge cycle where cold air is used to clear any fuel vapors from the combustion chamber each time the burner starts. This cold air has a cooling effect on the boiler that must be recovered. There is also a post-purge on most boilers that is only 15 seconds but its heat losses must be recovered also.

There are even more losses for the exterior of the hot boiler that is not needed. These are losses out the top and sides of the boiler. The larger the boiler the greater the losses (I figured that out on my own without any help). Also, older boiler will have more insulation problems that if not corrected will add to the loss.

There is even more, most boilers are their most efficient when firing at mid-range. We have losses at low fire because of the excess air that must be added to the combustion process to achieve a good mix at the burner. The excess air must be heated. At the high end of the firing rate we'll lose energy because of contact time (that is the amount of time the heat is in contact with the water side of the boiler). If we are pushing the heat through the boiler at a high rate of speed our combusted fuel is passing through too quickly to be absorbed.

Having a hot standby boiler is really nice, but can we pay the price? The answer to this is to use a control system to stage boiler operation to avoid losses. This can be done with a lead/lag system programmed to match and anticipate system demands and avoid low load operation.

Get that standby boiler off the line so we can afford to get back in the lunch line. See you later, I have a Big Mac getting cold.

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