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Energy Issues

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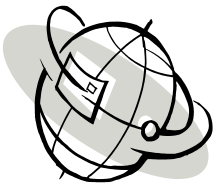


INSIDE THIS ISSUE:

ASOPE

Thermaxx Gate Valve Insulation

Ten Methods for Saving Thousands in the Boiler Room (Part 4) –

(The following is the final part in the series of ways to improve boiler efficiency courtesy of the American Society of Power Engineers - ASOPE)

Method 8 – Eliminate Water Losses

(By: Ron Nuoffer)

Water and steam leaks are a major source of hidden costs. Each valve, piping flange, or drain that leaks, impacts the facility by increasing make-up water expenses.

A pipe flange or a valve packing that leaks 1 drop of water per second will lose 6 ounces of water per hour and 34 gallons per month. Initially, that may not sound like much, but if there are 10 valves or pipe connections dripping; water losses add up to 340 gallons per month.

If the leak increases from a drop to a 1/16" steady stream, the result will be 84 gallons of lost water each day. Accordingly, every month that the leak continues, 2,520 gallons of water are lost.

Not only is lost water expensive to replace directly, but the facility will also incur "indirect" expenses in the form of equipment and metal erosion in valves and piping. Additional expenses will also be realized in water chemistry treatment for the replacement water.

Drain valve leak-through is another major source of water loss. Most drains discharge to flash or blowdown tanks; so if a valve is leaking, this water is lost from the overall steam/water cycle. By monitoring the amount of makeup water added to the steam/water cycle, water loss rates can be determined.

Payback for proper packing adjustment or valve and pipe fitting replacement would be a few days and will keep the facility running efficiently.

NOTE: A pound of water equals a pound of steam. There are 8.33 pounds of water in a gallon.

Method 9 – Install Removable Insulation on Valves and Fittings – (By: Larry Tarvin)

During maintenance, insulation that covers pipes, valves, and fittings is often damaged or removed and not replaced. Pipes, valves, and fittings that are not insulated can be safety hazards and major sources of heat loss.

Removable and reusable insulating pads are available to cover almost any surface. Pads are made of noncombustible outer layers with insulating material inside. The outer layers are made to resist tears, abrasion, oil, and water. Pads also come with straps and buckles to hold them in place.

As a general rule, any surface that reaches temperatures above 120°F should be insulated to protect personnel. Insulating pads can be easily removed for periodic inspection or maintenance, and are replaced as needed. Insulating pads may also contain built-in acoustical barriers to help control noise.

The following table illustrates insulating valve cover energy savings for various valve sizes and operating temperatures. These values were calculated using a computer program meeting the requirements of *ASTMC680-Heat Loss and Surface Temperature Calculations.*

Ten Methods for Saving Thousands in the Boiler Room (Part 4) – (Continued)

Energy Savings from Removable Insulated Valve Covers (Btu/hr.)*

Operating Temperature (°F)	Valve Size (inches)					
	3	4	5	6	7	8
200	800	1,090	1,500	2,200	2,900	3,300
300	1,710	2,300	3,300	4,800	6,200	7,200
400	2,900	3,400	5,800	8,300	10,800	12,500
500	4,500	6,200	9,000	13,000	16,900	19,700
600	6,700	9,100	13,300	19,200	25,200	29,300

* *Based on a 1-inch thick insulating pad on an ANSI 150-pound class flanged valve, with an ambient temperature of 65ºF and zero wind speed.*

Energy savings are defined as the difference in heat loss between uninsulated and insulated valves operating at the same temperature.

Example:
Using the table, calculate annual savings from installing a 1"thick insulating pad on an uninsulated 5" gate valve in a steam line operating at 300°F (about 50 PSI saturated steam). Assume continuous operation with natural gas at boiler efficiency of 80% and a fuel price of $6.00 per million British thermal units (MMBtu).

Operating Temperature (°F)	Valve Size (inches)					
	3	4	5	6	7	8
200	800	1,090	1,500	2,200	2,900	3,300
300	1,710	2,300	3,300	4,800	6,200	7,200
400	2,900	3,400	5,800	8,300	10,800	12,500
500	4,500	6,200	9,000	13,000	16,900	19,700
600	6,700	9,100	13,300	19,200	25,200	29,300

Annual Fuel Savings:
3,300 Btu/hr X 8,700 hours/year x 1/0.80
= 36.1 MMBtu/year

Annual Dollar Savings:
36.1 MMBtu/year x $9.50/MMbtu
= $216.00 per 5-inch gate valve

References:
US Department of Energy, Energy Efficiency and Renewable Energy

Method 10 – Train Your Employees –
(By: Dave Preston)

It's people, not just equipment or processes that make the difference between a well-run facility and one with never-ending problems.

Whether it's how they respond to abnormal operating conditions, how careful they are with plant chemistry, how well they test and maintain critical components, or how they operate the boiler; it's training that makes the difference.

According to industry statistics, power generation facilities will lose between 30% and 50% of their most experienced workers over the next five years.

Employees who leave take valuable experience and knowledge with them and, according to an EPRI survey of 21 power companies, only 30 percent have a formal plan to capture the knowledge lost.

The power generation industry has changed significantly over the past several years and there is little doubt the industry will continue to evolve as the benefits and challenges of deregulation are further debated.

Over the past decade, most power generation companies have transformed themselves into leaner and more competitive companies. Further aggravating the situation has been the purchase and sale of generation assets, creating mixed employee unions, corporate cultures and operating philosophies.

Cleaver Books Fire-Tube Boiler

Cleaver Books Industrial Water-Tube Boiler

Typical Boiler Water Treatment System – Courtesy of Cleaver Brooks

Ten Methods for Saving Thousands in the Boiler Room (Part 4) – *(Continued)*

Boiler Training

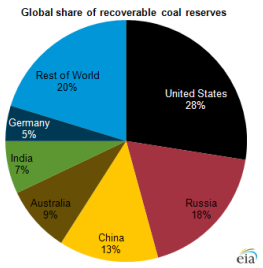
Industry keeps saying a major issue for many power companies is the challenge to locate, hire and train a well-qualified workforce. To meet this challenge, leading power companies are offering their employees various types of "blended earning".

Blended learning simply means the combining of multiple training methods (for example, OJT from retired workers being hired back, classroom training, self-study training, Web-based training, and others). This type of learning tends to produce a more effective training program. The blended approach has shown that costs are reduced, levels of knowledge comprehension are higher, and time required to complete training is shorter.

For facilities in the market for new equipment, don't forget to include personnel training in the RFP (Request for Proposal). The most cost effective time to train employees on new items purchased is when these items are installed and tested.

So, if you want to save "Thousands in your Boiler Room", stop and take a good hard look at how your employees operate and maintain the equipment you have. Operating Procedures, System Descriptions, Lesson Plans, JPMs (Job Performance Measures) are all training tools in your operating tool kit that need to be "sharpened" (reviewed and up dated) periodically.

Effective and efficient use of your employees is your #1 cost savings tool.



Global Share of Recoverable Coal Reserves

The Quandary of Coal

By: Thomas D. Mull, PE, PEM, CEM

The headline of a recent article in the Wall Street Journal caught my attention: *Buried in Coal, the U.S. Imports Even More*. It struck me as a bit odd, based upon what I've come to know about the coal industry in the United States. The article detailed why the U.S., as a net exporter of coal, is actually increasing its importation and closing mines. Before explaining this seemingly unusual statement a bit of background is in order.

According to the *US Energy Information Administration (EIA),* "The United States is home to the largest estimated recoverable reserves of coal in the world. In fact, we have enough estimated recoverable reserves of coal to last more than 200 years, based on current production levels." The U.S. has 28% of the known recoverable coal reserves.

Going back as far as my available data (1980), coal production in the US has exceeded consumption ever year, hence we have been a net exporter of coal. That trend is expected to continue.

Approximately 93% of the coal consumed in the United States is used for generating electricity. This accounts for about 40% of the total electrical generation. This percentage is expected to go down as more restrictive environmental regulations are phased-in and utilities displace coal with natural gas for generation. Even so,

93% of Coal in U.S. is used for Electrical Generation

The Quandary of Coal

(Continued)

coal will continue to be a major energy source, not only for the U.S., but for the rest of the world.

Coal is an attractive fuel in the respect that it can be used to generate electricity inexpensively. Electricity can then be utilized in a wide variety of end use applications. However, it is not a clean burning fuel. Utilities have invested hundreds of millions of dollars in technologies and dramatically reduced stack emissions. Even so, the US Environmental Protection Agency has additional pending restrictions that threaten to shut down an estimated 8.5% of the U.S. coal generating plants. But, that's a topic for another time.

U.S. coal production over recent years has fluctuated somewhat, trending slightly down in the most recent years. However, the EIA has projected an increase in domestic consumption of about 3% for 2014, attributed to colder temperatures experienced earlier in the year. Regardless, the U.S. continues to be a net exporter. So, why are we shutting down mines and importing coal?

It all comes down to basic economics. Coal within the U.S. is transported by train. Each car contains about 100 tons. With 100 cars per train, one train can transport 10,000 tons of coal at a cost of $26 per ton from Central Appalachia to Florida. A coal ship can haul 50,000 tons, thereby bringing their transportation cost per ton down. Coal from Columbia is now being imported at a transportation cost of $15 per ton, according to IHS Energy.

Coal imports surged 44% during the first six months of this year, compared to 2013. Of this, two-thirds of the coal came from Columbia. Other factors attributing to increased importation include:

- Lower cost of production in Columbia, high Btu content coal, and mines near coastal areas
- Higher cost of production for Central Appalachia mines due to more mature coal seams and lower Btu content coal
- Weak global demand for coal (Europe and China) has depressed prices.

Later in the WSJ article a spokesman for Peabody Energy, which owns mines in Wyoming and the Illinois basin, is quoted noting that coal imports are for "a niche market for coastal power plants." So, what impact is the increased importation of coal really having?

Coal imports comprise only about 1% of overall U.S. consumption. But, it is impacting higher cost coal mines that have been struggling over the past several years, causing some to shut down operations.

So, while at first glance it may seem odd that with vast coal reserves and as a net exporter, the U.S. is importing coal, the decision to import is based upon sound business and economic principles.

Worldwide demand for coal will continue for the foreseeable future. It will be a major player in developing nations and some industrialized countries. In fact, it has been rumored that Germany is getting back into coal-fired electrical generation, due to its lower cost and improved technologies. Fortunately for the United States, supply of this energy source is not an issue. How effectively we utilize it remains to be seen.

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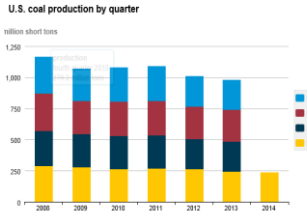

U.S. Coal Production by Quarter

PEM
Professional Energy Manager

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