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Energy Issues

IEP Newsletter

How to Avoid Danger, Damage and Dollars Lost in Steam Systems

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INSIDE THIS ISSUE:

Mechanical (Free Float®) Type Steam Trap

Thermodynamic (Disc) Type Steam Trap

(The following article is abridged from the original presented at the 2015 Industrial Energy Technology Conference.)

No one wants to experience Danger, Damage or Dollars lost in a steam system. But common site management practice often overlooks a critical component necessary for successful system performance; maintaining the steam trap population to original design specifications. Some users focus on the identification and repair of leaking traps according to a fixed budget. This approach does not recognize the criticality of proper *(system)* drainage to a plant's optimized operation. Correspondingly, the priority and implementation of corrective trap maintenance may be reduced to a reactive status, subordinate to other site maintenance needs.

A different priority and maintenance strategy is needed to analyze and improve the relative health of a steam system. The strategy should focus on the steam trap population condition threshold values, to obtain an optimized system that provides the best quality heat safely and reliably. This article provides insight into the justification for the continuous time and monetary investment required to optimize steam system performance.

CURRENT STRATEGY AND STRUCTURE

Your Steam System

Your steam system is an important asset that can convey massive amounts of thermal energy efficiently to various process applications. But plant personnel may unknowingly reduce its value by losing sight of the importance of draining condensate from the system, which could have potentially disastrous results.

Basically, there are two (2) important characteristics to consider for a high quality steam system: (1) the supply of dry steam for turbines, atomizing, flaring, soot blowing and other applications; and (2) the rapid condensate drainage from heat exchange equipment to optimize each process application for production quality, quantity, and reduced fouling and/or maintenance issues.

When steam quality is reduced, the condensate that remains causes multiple problems. Typical examples include water hammer from pooled condensate that is propelled downstream by high velocity steam, or stratified/fouled/corroded heat exchange equipment that experiences stall conditions.

It is not uncommon for plants to suffer critical compressor or flare issues, or even shutdowns, all caused by condensate that was not effectively removed. When painful events occur as a result of a non-optimized steam system, employees may begin to consider these events as normal, a sort of necessary burden that befalls all steam systems.

The correlation of such a low cost item, such as a failed steam trap retaining condensate, as being the root cause of a major system failure or plant shutdown is not often recognized.

How to Avoid Danger, Damage and Dollars Lost in Steam Systems *(continued)*

Consequently, steam traps are at times thought of as having little impact on total plant reliability.

A good analogy might be that having a steam trap that no longer discharges condensate *(Discharge Failure)* is similar to putting a rag into the exhaust pipe of an expensive sports car. The equipment may be worth millions of dollars, but without proper and immediate discharge of spent fluids, it operates poorly and may be damaged.

The metrics that typically justify managing a trap population may be wrongly based on recovering steam loss. Survey database studies reveal that steam trap populations may have 18% of traps failed in a leaking mode, while only 13% are failed blocked.

It is a simple economic analysis to determine the return on investment for fixing or replacing, leaking steam traps. However, the analysis to correlate *COLD Failures* from blocked traps requires historical data of prior incidents and the loss values associated with the events. Unless there is a proactive program to track the losses caused by traps that were blocked, valved-out, or removed, the causal relationship of blocked traps to system damage goes either unnoticed or deemed too complex to evaluate. Since determining the true benefits are difficult to assess, or unknown, the short-term gain of replacing *HOT Failures* (leaking steam traps) is incorrectly given priority. However, to avoid danger, damage, and dollars lost it is best to fix *COLD Failures* first.

STRATEGIES SHOULD CHANGE?

What Happens After A Survey?

Databases commonly show the number of *In-Service* (operating) traps to be substantially less than the plant's original design total. If the site has not proactively surveyed and replaced traps on a high priority basis for the preceding 3-4 years, a typical trap population may reflect over 50% of the traps failed.

As trap populations deteriorate, so does the piping system potentially resulting in destructive incidents. Once a painful event occurs it is common for the focus to switch back to the steam trap population. A new survey is typically conducted to learn the current health of the system. So, it becomes a regular expectation that when a site renews its focus on steam traps that there will be a substantial number of the failed traps.

Consider a site with 10,000 steam traps in its system design, but 4,000 traps have failed. In order to bring all traps back to *In-Service*, it would be necessary to replace 333 traps per month. This means 3-4 full-time maintenance teams, a luxury that most plants do not have.

In order to optimize system operation, i.e., reach the target of 10,000 In-Service traps, a change in strategy is required. That change is "Zero Reset Maintenance" (ZRM®). Zero Reset Maintenance is a paradigm shift from the standard approach to steam trap maintenance. It focuses on minimizing system performance issues by prioritizing resources on trap repair/replacement, with initial emphasis on condensate removal. It establishes priorities to make certain that a steam system is adequately drained of condensate before it can cause system damage or waste high-value energy.

"…steam traps are at times thought of as having little impact on total plant reliability"

Thermostatic Type Steam Trap

"…to avoid danger, damage, and dollars lost it is best to fix COLD Failures first."

How to Avoid Danger, Damage and Dollars Lost in Steam Systems *(continued)*

"….. the historical fixed budgeting approach to trap repair/replacement does not work. A new way of allocating resources is required to optimize system performance, …."

The most important aspect of this change is that it recognizes the crucial safety and reliability implications of addressing cold traps/draining condensate effectively – as a mandatory conclusion rather than cost-sensitive decision.

To this end, the historical fixed budgeting approach to trap repair/replacement does not work. A new way of allocating resources is required to optimize system performance, ultimately resulting in less Danger, Damage and Dollars Lost.

CONCLUSIONS

An effective and sustainable steam trap population management program needs to be implemented and maintained year to year to keep annual failures at a manageable level. If a site wants to mitigate risk from problems caused by retained condensate, it should follow the approach in ZRM® each year, with focused priority on the repair of cold failures. This is a proven method to help maintain effective drainage of the system for optimal performance and reliability. For additional information go to: http://www.tlv.com/global/US/articles/whay-bad-things-happen-to-good-steam-equipment.html

For site support, product and service information or more on *TLV Steam Theory,* including *Zero Reset Maintenance*, go to TLV's website: http://www.tlv.com/global/US/steam-theory

(TLV is a recognized worldwide authority on steam engineering products and services. They have offices in 12 countries and over 100 distributors worldwide.)

US Supreme Court

Energy Highlights

IEP Staff Writer

- The **US Supreme Court** rejected EPA's regulations to restrict mercury and other emissions from fossil-fired power plants. In a 5-4 vote the court ruled that the EPA must consider industry costs before implementing new requirements.

  The opinion does not restrict the agency from limiting mercury, nor does it formally reject the regulations. It does put this administration, under pressure to rework and cost-justify any rules before the end of Obama's second term.

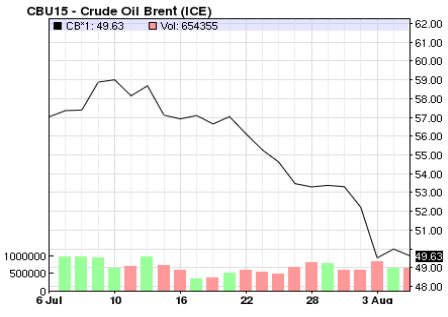
  In a statement a utility spokesperson for a utility objecting to the regulations said "the case underscores that the Supreme Court expects the EPA to implement the Clean Air Act as written, not according to its own policy preferences." *Source: WSJ June 30, 2015*

ARA Storage Facility
Source: Genscape

- **Crude Supply Exceeds Storage**

  Crude oil stocks in June reached 60.6 million barrels at the world's largest trading hub ARA (Amsterdam, Rotterdam, and Antwerp). Stocks have risen by 10 million barrels since April to the highest level in two years, reinforcing that there is a worldwide oversupply of petroleum.

  The global benchmark price for crude was $49.63 per barrel Brent crude on August 3rd. *Source: NASDAQ*



US Government Plans to Restrict Coal-Fired Power Plants

IEP Staff Writer

"If somebody wants to build a coal powered plant, they can, it's just that, it will bankrupt them because they're going to be charged a huge sum for all that greenhouse gas that's being emitted." – *Candidate Barack Obama*

Holding true to his campaign statement to limit the use of coal for power generation, on August 3rd President Obama announced new regulations for power plant carbon emissions that would, if enacted, have a dramatic effect on the cost of electricity for most of the country. The plan calls for a 32 percent cut in emissions by 2030, as compared to 2005. The proposed cut was even greater than previously anticipated.

The reaction by both houses of Congress and the coal industry was swift and predictable. Senator James Inhofe (OK) stated that the rules were "*unachievable without great economic pain"* and *"a burden President Obama thinks the American people should bear for the sake of his legacy."* House Speaker John Boehner said that the proposed regulations *were an "expensive, arrogant insult to Americans trying to make ends meet."*

Murray Energy Corp., the largest private coal company in the country, is planning on filing five law suits to oppose the new regulations.

Based upon the previously anticipated reduction, new regulations were projected to increase the cost of electricity by 13.5% or more for certain sectors of the country. The cost increases based upon the new emissions reduction value are not available.

Source: Fox News and Associated Press

Duke Energy NC
Roxboro Power Plant
2,422 MW

IEP Elects New Board Member

IEP Staff Writer

Mr. Thomas M. Fenimore, PE, PEM, CEM of Duke Energy has been elected to the IEP Board of Directors, filling one of the two vacant positions. Mr. Fenimore has more than 30 years' experience in energy management and related fields. He has been an integral part of the PEM training program and is currently *Technology Development Manager – Emerging Technology Office* for Duke Energy.

Newsletter Change

With the greater acceptance of the *PEM Certification* internationally, we will be changing the designation of our Newsletter. Starting with this issue the IEP Newsletters will be designated by q*uarter*, rather than season (*Fall, Winter, etc*.).

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