SAFER, SMARTER, GREENER

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Massachusetts C&I Evaluation Contract Project Summary:
Steam Trap Evaluation Phase 2

Project timeframe: Dec 2015 – Feb 2017
Program year(s) evaluated: 2013 - 2014
Research area: Steam Traps

High-level study objectives: Revise steam trap custom savings equation and deemed value for prescriptive projects using guidance from industry experts and empirically derived values from market representative data.

Selected recommendations and key supporting findings

The PAs should use the revised custom savings equation and tool for projects installed in 2017 and moving forward.

- A review of custom steam trap projects from 2013 and 2014 revealed that PAs were using analogous but ultimately different methodologies and assumptions to calculate savings for each steam trap.
  - Based on expert interviews, secondary research, and on-site ride-along visits analysts modified the custom savings equation and incorporated it into a revised custom savings tool.
- Review of the existing methods found that there was, in some instances, an unnecessary amount of complexity incorporated within the savings equation.
  - Input parameters were reviewed on an individual basis and were chosen to be kept, modified, added, removed or omitted from the revised savings formula.
  - Methodological simplifications have been made to the revised tool by reducing the number of variables and number of options of selected variables in an effort to cut down on the chance of misinterpreting the operating status of an individual trap by field staff.
  - In particular, the reduction of leak factor options from four to two non-zero options in a pick list should minimize the opportunity to misinterpret a trap and yield more consistent savings estimates among the PAs.
- There are 2 input parameters that are difficult to observe in the field or estimate with engineering judgment, and are often associated with high uncertainty.
  - Based on individual application review, post-installation site visits, engineering judgment and billing analysis results, analysts empirically derived the values for the trap operating status leak factors and condensate return factor.
- With comparable input parameters, the revised savings equation estimates 13% less savings for sites that were used to empirically derive the most uncertain values.
- Adopting the revised custom savings tool statewide will provide an opportunity for PAs to maintain uniformity and consistency in the estimation of steam trap savings across the state, while moderately improving the tool's predictive ability and reducing the variability of the estimates.

The PAs should update the deemed savings value for prescriptive trap replacements from 25.7 to 12.2 MMBtu/year and should apply it both retrospectively to 2016 prescriptive projects and prospectively for 2017 and going forward.

- The methodology and assumptions used to generate the existing deemed savings value were found to be unrepresentative of the typical customer.
- Trap level details from the custom project trap inventory were used to characterize an average high and low pressure trap. The average input parameters were used in the revised savings equation to generate a annual per trap savings and then blended based on their frequency of observed occurance to arrive at a new single deemed value representative of the current market.

Steam Trap Evaluation Phase 2 Report Summary (cont.)

Comprehensive findings and recommendations matrix

Recommendations		
Program Approaches	*Recommendation 1*	*The PAs should use the revised custom savings equation and tool for projects installed in 2017 and moving forward.*
	Recommendation 2	*The PAs should update the deemed savings value for prescriptive trap replacements from 25.7 to 12.2 MMBtu/year and should apply it both retrospectively to 2016 prescriptive projects and prospectively for 2017 and going forward.*

Findings	Recommendations: Recommendation 1	Recommendations: Recommendation 2
Custom project observations		
A review of custom steam trap projects from 2013 and 2014 revealed that PAs were using analogous but ultimately different methodologies and assumptions to calculate savings for each steam trap.	X	
Review of the existing methods found that there was, in some instances, an unnecessary amount of complexity associated within the savings equation.	X	X
There are 2 input parameters that are difficult to observe in the field or estimate with engineering judgment, and are often associated with high uncertainty.	X	
With comparable input parameters, the revised savings equation estimates 13% less savings for sites that were used to empirically derive the most uncertain values.	X	
Prescriptive project observations		
The methodology and assumptions used to generate the existing deemed savings value were found to be unrepresentative of the typical customer.		X