Project overview

Rendering Cooker Flash Steam Recovery

Project code	P.PIP.0521
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Brief summary

The aim of this project was to design an improved system for recovering heat from rendering cooker condensate while it is still at high pressure. A common type of heat recovery is to use a flash steam recovery vessel to pre-heat the boiler feed water. This is usually done by installing a flash vessel between the cooker and the boiler feed tank and using a steam heat exchanger to condense the flash steam by pre-heating the boiler feed water. This flash vessel is normally operated at less than 2 bar pressure so that it does not interfere with the operation of the cooker steam traps. The result is that the maximum temperature the boiler feed water can be heated to is typically less than 130°, limited by the pressure and therefore temperature of the flash steam. This lower temperature limits the amount of heat that can be recovered.

Objectives

The project objectives are to demonstrate an alternate means of recovering waste flash steam.

1. Install the heat recovery system

2. Install sensors around the heat recovery to monitor its operation

3. Modify the system controls (PLC and SCADA) to enable ongoing tracking of energy usage

4. Prepare energy usage reports and also system alarms for when the heat recovery requires maintenance

The project has been installed and proof of concept demonstrated, for 90% of the time.

Project outcomes

This research has provided proof of concept for an innovative heat recovery system that is cheaper and more efficient than conventional systems. This project recovers the heat from the cooker condensate while it is still at high pressure. This allows the condensate to be cooled while it is still at high pressure and therefore higher temperature. This results in: higher boiler feed water temperature, typically 160°C; simpler system with less controls being required; no flash steam vessel required; smaller heat exchangers; and higher heat recovery for lower cost. Data logging of the cooker flash steam recovery system has shown savings of 10% of the energy used in the Rendering Plant's cooker, and up to 15%. There was a periodic water hammer and modifications were designed to fix this issue. The project also included pipework between the rendering plant and the abattoir that has the potential to replace the Abattoir's hot water heating, providing savings of well over $50,000 each year.

Benefits to industry

This project demonstrated that savings can be accurately calculated simply using condensate temperature measurements, and calculating a percentage saving, rather than needing to go to the expense of measuring gas or water flow.

Future research and recommendations

The heat recovery system was designed and built in Sydney and transported to site. There have been numerous issues with the pipework and controls. Generally, the issues have been resolved and a final design is being discussed prior to major modifications being made. Heat recovery at higher pressures offers double the heating of the conventional lower pressure systems. It is expected that it will be cheaper to install, as there are less components.