

PRECIOUS SAVINGS

How reviewing steam processes can help achieve many benefits

Company: Vale Europe Ltd.

Location: Acton, London

Objective: Update the current system to speed up the process cycle, reduce energy costs and improve efficiency, while addressing safety concerns and simplifying maintenance.

Solution: Complete design and supply of modular boiler house upgrade and introduce a network of new steam systems.

Results: Highly efficient steam system, achieving 60% cost reduction.



Energy conscious Vale Europe, specialists in precious metal refining, wanted to speed up process efficiency while reducing energy consumption of its Acton site. Following a steam system audit, a complete re-design of its dated system was deemed the only answer. The company has since improved production levels and more importantly, operates in a much more sustainable manner.

The precious metal refining industry notoriously consumes significant amounts of heat and chemicals to extract impurities from noble metals. As a large user in chemicals and energy, Vale Acton is always looking for ways to reduce its carbon footprint.

Over the years Vale Acton has gradually updated specific sections of its steam system in order to suit the various changes in production requirements. However, the majority of its steam network was in the region of 35 – 40 years of age. This was not only limiting process efficiency throughout the site, but the aging pipework was also compromising safety and costing the business a significant amount in maintenance.

Recognising that improvements were needed to uphold the company's commitment to the environment, Darren Matthias, Project Manager at Vale Acton, engaged with Spirax Sarco to understand their complex steam distribution system.

Refining the issue

The Acton refinery primarily uses steam for process heating but it is critical for production too.

Production processes include reactor vessels, both coil and jacketed, which are used to control the temperature of reactants, heater battery and tank heating applications, unit heaters, direct injection systems and steam hose stations for cleaning tanks, vessels, and process equipment.

Unfortunately processes were impacted by both an out-dated condensate return system and boiler house which in turn were causing knock-on effects to other plant equipment.

“The condensate return system was inefficient and costly to operate which was becoming a major issue, with corrosion to pipework, as well as inconsistent water and blowdown quality problems,” says Darren Matthias. “Condensate was returned to a common tank located in a tank farm which is extensively cooled by a plate heat exchanger before finally being sent to the effluent plant.”

He continued: “We were using two boilers – one oil and one gas – to generate steam for the entire plant. Steam was generated in the boiler house at 3.8 bar g and the two boilers in question were operating at half the efficiency they should have been.

CASE STUDY: VALE EUROPE LTD.

This, coupled with an unreliable condensate recovery system, spelled a toxic combination of unsustainable operation and high costs.”

The perfect catalyst

Vale Acton’s steam system underwent a detailed audit to identify the specific issues which needed addressing, with its ethos for protecting its environment and staff being a key driver for this change. “Admittedly steam isn’t our core area of expertise, so we enlisted the help of Spirax Sarco to conduct a steam system audit,” Darren said. “After analysing our entire system and completing a Hazard and Operability Study (HAZOP), the decision was made to design and supply new process steam, condensate and cooling systems.”

Because of the various uses of steam throughout the facility it was essential that a bespoke solution was developed to meet the exact needs of each production process.

Darren said: “Working closely with Spirax Sarco, we identified the problems and created solutions that would support our safety and environmental policies. Spirax recommended a complete design and supply of new steam, condensate and cooling water systems which would help streamline our steam network and improve process and production cycles.”

What’s more, all-new control valves, steam traps and condensate return units were fitted, with the addition of contamination detection systems – bringing the Acton facility up-to-speed with current technologies.

Modular boiler house

Following the success of the initial project, Vale Acton invited Spirax Sarco to carry out the design and supply of its boiler house, replacing the burners with two efficient gas boilers.

Darren continued: “We were given two options to consider. We could either hire two boilers for a period of time while the upgrade took place in the existing boiler house, or, Spirax could complete the full design of the boiler house off-site. This meant the new boiler house could be assembled in a separate location so there was no disruption on-site.”

Two boilers fired only by gas were installed, as a more energy efficient and maintenance-friendly alternative to oil. The new boiler house is designed to allow a third boiler to be installed when Vale Acton are ready to increase capacity. An added benefit was that one of the new burners also allows the use of heat from a Combined Heat & Power (CHP) system, for even greater efficiency.

Once built, the modular boiler house was dismantled and delivered to site where it was erected, reconnected and put into operation, before being commissioned and inspected by a third party insurance company.

More precious than gold

“All in all, the two new boilers are consuming much less energy than before and are operating at approximately 95 percent efficiency. They have been cleverly fitted with an oxygen trim, which



measures the gas emission in the flue and automatically brings it back in to line with our defined emission level when needed,” says Darren.

New controls have also enabled staff at Vale Acton to take back control of their energy consumption. Data is now easily accessible, while improved visibility of energy consumption has allowed the company to track their environmental impact more effectively.

“By replacing the oil and gas burners with two gas boilers we have saved a significant amount in energy. We are achieving 55 percent less nitrogen oxides (NOx) emissions than we were from our old oil boiler and we’re also proud to be emitting zero sulphur oxides (SOx).

“Since switching to gas we’ve already seen a 60 percent cost reduction and a considerable improvement in our operational efficiency. This has resulted in a faster process cycle and production levels,” says Darren.

Safety is a key priority for the firm so the installation of double, block and bleed isolation valves has been an added benefit, allowing for safe maintenance to take place during production. In addition employees were provided with an on-site Boiler Operation Accreditation Scheme (BOAS) course to ensure that safety and efficiency is always prioritised by staff.

“We pride ourselves on being a leader in promoting environmental responsibility and with Spirax Sarco’s help we have been able to achieve our goals and provide a more sustainable service. By prioritising our impact to the environment we have also been able to advance production levels and protect the safety of our staff – something we simply can’t put a price on.”

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