YUANPING CHEMICAL COMPANY LIMITED

Recover Flash Steam from Blow Down to Heat the Boiler Feed Water

SUMMARY OF THE OPTION

Yuanping city Chemical Co. Ltd is a middle-sized chemical plant with 1679 staff, located in Shanxi Province in China and is Asia's largest producers of oxalic acid, and also produced products like sodium format and formic acid.

The amount of blowdown and flash steam of the company's four superheated boilers was high because there is only a positive ion exchange bed to purify the boiler feedwater, resulting in high very high alkalinity levels.The company installed a steam flasher and indirect heat exchanger to recovering the flash steam from the blowdown and use this to heat the boiler feedwater. Total investment for this option was US$ 82829, annual savings were US$ 131259 and the payback period . It also has good energy and environmental benefits. It will save 5146 tons of coal standard and 71280 tons of fresh water each year. CO_2 emission reductions are about 12896 tons per year.

KEY WORDS

China, Chemicals, Waste Heat Recovery, Boilers and Thermic Fluid Heaters, Flash Steam, Blow down

OBSERVATIONS

The steam generation system in this company is very large and includes nine boilers within which eight are on line all the time. The plant has four superheated boilers with an evaporation capacity of 95 t/h. During the assessment of the boilers, the Team observed that

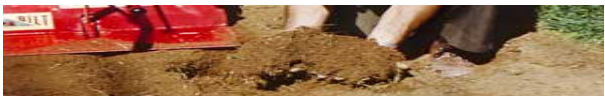
- The blowdown from the four superheated boilers was too high. For example, the blowdown from boiler #9 sometimes reached 3 –5 t/hour, and account for 11% of the evaporation capacity. This should be brought down to 1 t/hour.
- The reason for the high amount of blowdown was that the company only installed a positive ion exchange bed to purify the boiler feedwater, therefore, the boiler water usually had very high degree of alkalinity
- Blowdown water yields lots of flash steam, which was directly emitted to the air

OPTIONS

The Team suggested adding a negative ion exchange bed to further purify the feed water, but this option was turned down due to financial constraints.

The Team then proposed to recover the flash steam from the blowdown. The implementation of this option included

- Installation of a steam flasher to generate flash steam from boiler blowdown
- Installation of an indirect heat exchanger, utilizing the flash steam to heat the boiler feed water
- Collecting the condensate of the flash steam for recycling as feed water. The flow rate of recycled flash steam was estimated to be 9t/hour.



In winter, drainage from the flasher was used together with other waste heat to supply space heating for a residential area of 0.5 million m^2. During other seasons, the drainage was diverted to the catch pit.

The option was fully implemented in July 2005.

RESULTS

Financial benefits

- Investment: US$ 82829
- Annual cost savings: US$ 131259 (5146t X 200RMB/t + 71280t X 0.79 RMB/t = 1085511 RMB)
- Payback period: 8 months

Environmental benefits

- Annual coal savings: 5146 tons, which was calculated as follows:
  - The amount of recovered flash steam was 71280 tons (9t/h X 24h/day X 330 days/yr)
  - It is assumed that the heat transfer efficiency of the indirect heat exchanger was 75% and that boiler thermal efficiency was 80%
  - Coal saving = 2257.2 MJ/t X 71280 t X 75% / (7000 X 4.1868 X 80%) = 5146 tons of coal standard per year
- Annual GHG emission reduction: 12896 tons CO_2
- Annual water savings: 71280 tons, as the condensate of the flash steam was recycled as feed water

FOR MORE INFORMATION

GERIAP National Focal Point for China
Mr. Wang Xin,
Project Management Division I,
Foreign Economic Cooperation Office of State Environmental Protection Administration
No. 115, Xizhimennei Nanxiaojie
Beijing 100035, the People's Republic of China
Tel: +8610 66532316, E-mail: wang.xin@sepa.gov.cn

GERIAP Company in China
Mr. Song Peizhong
Shanxi Yuanping city Chemical Co. Ltd
No 1, Santiao, Qianjin West Street, Yuanping city, Shanxi Province, P.R.China
Tel: +860350, 8222889