CFCL Gadepan-I

WRITE UP ON ENERGY SAVING SCHEMES

1. Insulation of HPBFW pump discharge going to Urea plant for quenching.

Background:

In Urea-I plant, BFW is used, from intermediate stage of BFW pump of Ammonia plant, for quenching of MS Steam in Urea-I plant. This temperature remained at lower temperature 102^{o}C ~ 109 ^{o}C against design temperature of 126oC as this line was not insulated.

Observations / Modification:

By insulating this line, there was increase in quench water temperature resulting in more quench water flow to maintain MS steam temperature. Thereby this additional flow of quench water resulted in additional MS steam flow.

Technical and financial analysis:

This modification was able to save 260 Kg/Hr of MS steam equivalent to Rs.18.8 Lacs /year. Total investment in the scheme was Rs 0.9 Lacs .Pay back period was less than 1 month.

Impact of Implementation

Additional MS steam generation after saving heat loss from the line.

CFCL Gadepan-II

WRITE UP ON ENERGY SAVING SCHEMES

1. *Installation of Purge Gas Pre-heater using Steam Trap Condensate*

Background:

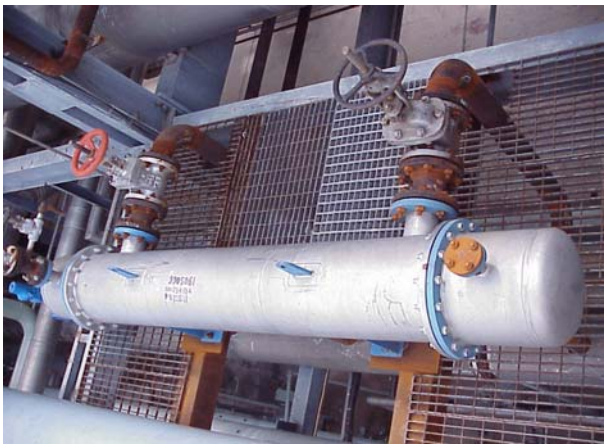
In Ammonia-II plant, Steam condensates from raw naphtha feed heater, sweet naphtha feed heater, natural gas fuel heater and medium & low-pressure steam traps were being routed to an atmospheric flash tank (FA905). Non-condensable along with flashed low pressure steam were vented to atmosphere. The remaining condensate at 125°C was cooled through exchanger (EA905) using Cooling water and recovered as water for boiler use after polishing.

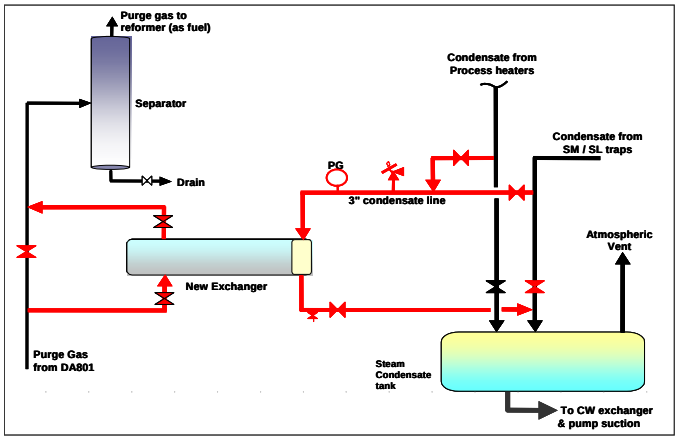
Observations / Modification:

Removal of bottlenecks

A detailed in-house study of steam condensate loop was done to identify the bottlenecks for smooth transport of condensate from steam traps to the header so that any local draining / venting could be avoided. Accordingly new sizing of steam condensate lines has been made. On that basis a certain portion of steam condensate headers has been changed to 3" from existing 1" header.

A corrugated tube exchanger was installed for maximum heat recovery. As shown in Fig–I, the exchanger was erected on pipe rack near the purge gas header route. Steam condensate was passed through its tube side and purge gas on its shell side. The steam condensate is being cooled from 125°C to 78°C in this exchanger. Purge gas is being heated from 35°C to 85°C.





Existing 3" condensate header was modified to divert condensate through the new exchanger with the provision to bypass exchanger in case of need, as shown in Figure – II.

Technical and financial analysis:

As envisaged, the modification was able to save 0.120 Mkcal/hr energy equivalent to Rs.13.8 Lacs/year. Total investment made for the scheme was 5.2 Rs / Lacs. Pay back period - 5 months.

Impact of Implementation

Apart from directly saved energy in pre-heating purge gas fuel, there was reduced heat sink to Cooling water, reduced noise / environmental pollution due to leaky steam traps.

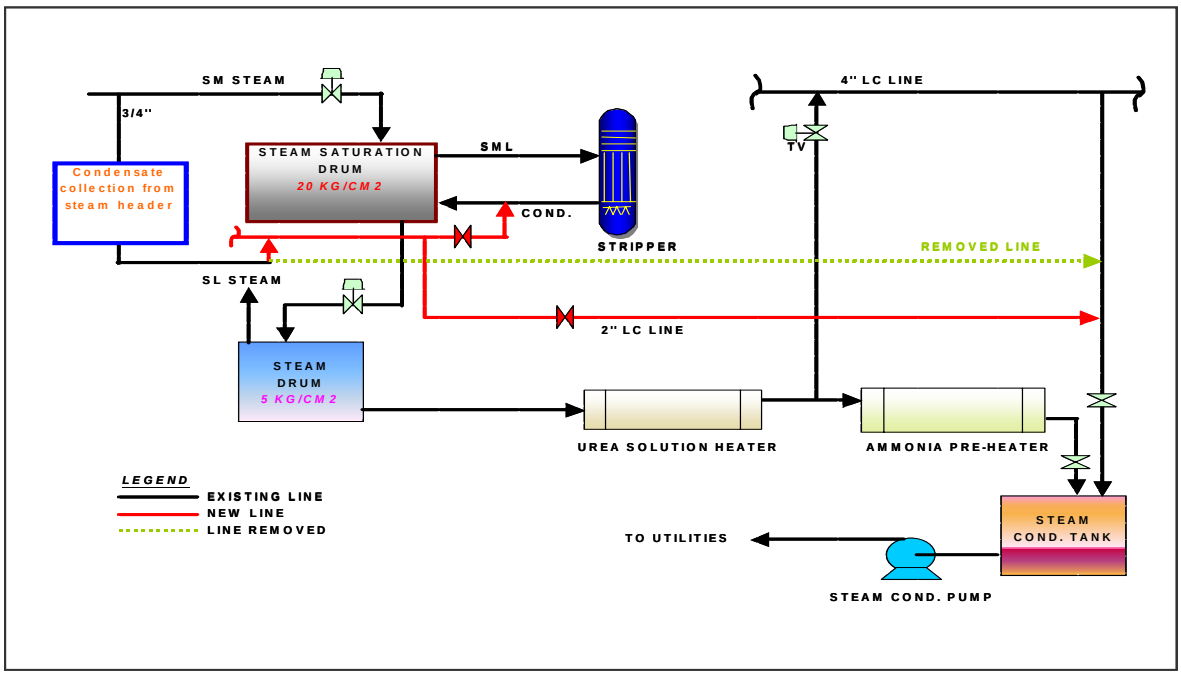
2. ***Heat Recovery from SM Traps Condensate***

Background:

In Urea-II plant, steam condensates from medium pressure steam traps were being routed to an atmospheric flash tank. Non-condensable along with flashed low pressure steam were vented to atmosphere. The remaining condensate used to be cooled through exchanger using Cooling water and reused as water only.

Observations / Modification:

The medium pressure steam traps were lined up to a new 2" condensate header. The header was routed to steam saturation drum operating at 20 Kg/Cm², thus generating 17.4 Kg/hr additional flash steam. The condensate from steam saturation drum was let down to steam drum and generated additional 20 Kg/hr flash steam at pressure 5 Kg/Cm².



Technical and financial analysis:

As envisaged, the modification was able to save 0.048 MKCal/hr energy, equivalent to Rs.5.5 Lacs/year. Total investment in the scheme was Rs 3.2 Lacs and Pay back period is 6 months.

Impact of Implementation

Apart additional steam generation, there was reduced heat sink to Cooling water, reduced noise / environmental pollution.

3. Optimum use of Electrical lights in Urea-II plant

Background:

In Urea-II plant, Lux level was measured at different location such as Plant area, Control UPS/Battery/Dining/Computer/Monitoring room and Rack room e.t.c. After the survey, it was found that illumination in most of the areas was exceeding the required standard lux level.

Observations / Modification:

Certain lights were switched off after confirming the lux values are well within limit. Separate switching arrangements were also provided wherever it is required.

Technical and financial analysis:

This modification was able to save about 259 kWH/day resulting in saving of Rs.3 Lacs /year. Total investment in the scheme was Rs 0.4 Lacs .Pay back period was less than 2 months.

Impact of Implementation

Saving in electrical power.

4. Replacement of CS impeller with SS impeller of Ammonia-II Cooling Tower pump.

Background:

Ammonia-II Cooling Tower pumps are having 990 mm diameter CS impeller. There was problem of pre-mature impeller wear out and propagation of crack at impeller casing volute tip resulting in lower efficiency of pump. This issue was discussed with vendor and it was concluded to replace the impeller with high diameter impeller.

Observations / Modification:

In one Ammonia-II Cooling Tower pump, Existing CS impeller with diameter of 990 mm was replaced with high diameter 1020 mm SS impeller to avoid inter re-circulation, which was causing damage and inefficiency.

Technical and financial analysis:

Annual saving after modification is Rs.13.2 Lacs /year. Total investment in the scheme was Rs 18.2 Lacs .Pay back period – 1.4 Yrs.

Impact of Implementation

There is saving in 0.3 T/Hr of Medium pressure steam due to reduction in pump RPM and stoppage of internal re-circulation for required duty.