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CEI WORKS WITH SUPERIOR OPTIMIZATION

and Midstream partner to streamline Acid Gas injection operations.

OVERVIEW

Acid gas has always been a challenge in sour gas facilities. Tighter regulations on flaring make it very costly if your acid gas injection compressor (AGI) is not reliable. In a nutshell, acid gas compression is the last line of process before you dispose of gas down the well. If your compressor goes down, the entire plant must shut in when you reach the pre-determined amount of flaring time allocated by the governing agency. In most cases, fines will be issued if flaring time is exceeded.
For one client, reliability of the AGI compressor was very poor. It was constantly going down on high/low interstage level, and interstage temps and pressure control were not stable. All these factors were making it difficult for this client to operate their facility. In addition, the amine system was up and down due to inconsistent pressure out of the amine tower. Because their AGI compressor was not reliable, it was causing daily plant upsets, unnecessary downtime, and excessive flaring.

CHALLENGES

We broke the issues down into 4 major factors, which were causing most of the upsets on the AGI and/or in the plant.

1. The old AGI control panel was constantly faulting and components failing – causing unwanted and quite often ghost shutdowns. *Not knowing the direct cause*
2. Interstage level transmitters were not working correctly - causing the liquid dumps to be unreliable.
3. Manual louver controls on the cooler – were causing inconsistent liquid condensation, which could have been be contributing to the liquid dumps not working properly.
4. PID controls were not tuned – causing inconsistent flow rates and fluctuating tower pressures.

CHALLENGE 1

The old AGI control panel was constantly faulting and components failing – causing unwanted and quite often ghost shutdowns. *Not knowing the direct cause* Part of the problem was that the old, antiquated PLC equipment was far past its life span. The other problem was the control panel was mounted directly on the AGI skid with no positive pressure purge solution to keep gases out of the enclosure. Acid gas is highly corrosive and will erode all types of metal, other than stainless steel. All the terminal blocks, PLC components and all other electrical connections inside the panel were getting corroded to the point of failure.

SOLUTION (S)

- Custom built control panel with updated Allen Bradley PLC equipment, all components suitable for rating in Class1Div2 ABCD environments.
- Relocating of main control panel 200 ft away in a declassified area to reduce expose to any acid gas.
- Installation of new marshalling junction box on skid to handle all I/O from compressor.
- Installation of positive pressure purge solutions on each cabinet to keep acid gas out.

CHALLENGE 2

Interstage level transmitters were not working correctly - causing the liquid dumps to be unreliable.

SOLUTION (S)

- Replaced existing transmitters with Endress and Hauser differential pressure capillary level transmitters rated for severe service. Accurate level readings helped our dumps from not opening prematurely or for too long.

CHALLENGE 3

Manual louver controls on the cooler – were causing inconsistent liquid condensation, which could have been be contributing to the liquid dumps not working properly.

SOLUTION (S)

- Installed Fisher I/P transducers on all 5 stages of cooling.
- Fixed and/or replaced the 5 Garzo pneumatic actuators on each stage of cooling.
- Installed automatic PID control into the new PLC panel to control each stage of temperature based on an operator entered setpoint. As a result, we have very consistent temperature control and can consistently control the amount of condensation across each stage of compression.

CHALLENGE 4

PID controls were not tuned – causing inconsistent flow rates and fluctuating tower pressures.

SOLUTION (S)

- Created all new PID controls for the compressor controls. Used the Allen Bradley PIDE instruction to allow for more tuning ability and an algorithm based on independent gains. This allowed for more consistent running conditions with less process upsets caused by inadequate tuning.

CONCLUSION

Operational consistency is important when dealing with all facilities, but especially with acid gas. Improving the run times of the facility not only increased the revenue for the client by 5-10 percent, but reduced the risks involved with operating such equipment. Improving the environment to which the workers are exposed, reducing the impact on the environment, and increasing the overall safety of the facility are all contributing factors to reducing the operating risk for the client. The successful completion of this project illustrates the value of innovation, technical expertise, and teamwork. The solution orientated approach to the project delivered the value expected to all stakeholders.