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## Optimization and Modeling of combustion air in Sulfur recovery unit and its effect on productivity and environment

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### ABSTRACT

Sulfur recovery unit is one of the basic units of gas plants, it is very important in economic and environmental issues because it converts the H<sub>2</sub>S into stable and environmentally neutral elemental sulfur. This work is to study the effect of combustion air used in Claus thermal reactor on performance efficiency of SRU and to find its optimality. SRU at Mellitah complex is used as a case study. Set of live tests (Experiments) on distribution control system (DCS) were done to investigate the effect of combustion air on H<sub>2</sub>S conversion, depending on operation parameters (Field data) gathering by using instruments analyzer and transmitter. On the other hand PROMAX® software is used as a tool to simulate and predict the optimal tail gas ratio (H<sub>2</sub>S/SO<sub>2</sub>) that gets the maximum sulfur recovery efficiency. Results shown excess air forms unwanted SO<sub>2</sub> in tail gases and on contradict lack of air cannot completely oxidize H<sub>2</sub>S, The optimal combustion air that get (H<sub>2</sub>S/SO<sub>2</sub>=2), because this ratio provides the maximum sulphur recovery efficiency. Mathematical correlations were created for the relation between acid gas and combustion air as a function of H<sub>2</sub>S concentration in acid gases. The majority of field data were fit to new mathematical models.

**Keywords:** Combustion air, Sulfur Recovery Unit, Gas Plant, Environment, Mellitah Complex.