World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:14, No:06, 2020

Review of Sulfur Unit Capacity Expansion Options

Authors : Avinashkumar Karre

Abstract : Sulfur recovery unit, most commonly called as Claus process, is very significant gas desulfurization process unit in refinery and gas industries. Explorations of new natural gas fields, refining of high-sulfur crude oils, and recent crude expansion projects are needing capacity expansion of Claus unit for many companies around the world. In refineries, the sulphur recovery units take acid gas from amine regeneration units and sour water strippers, converting hydrogen sulfide to elemental sulfur using the Claus process. The Claus process is hydraulically limited by mass flow rate. Reducing the pressure drop across control valves, flow meters, lines, knock-out drums, and packing improves the capacity. Oxygen enrichment helps improve the capacity by removing nitrogen, this is more commonly done on all capacity expansion projects. Typical upgrades required due to oxygen enrichment are new burners, new refractory in thermal reactor, resizing of 1st condenser, instrumentation changes, and steam/condensate heat integration. Some other capacity expansion options typically considered are tail gas compressor, replacing air blower with higher head, hydrocarbon minimization in the feed, water removal, and ammonia removal. Increased capacity related upgrades in sulfur recovery unit also need changes in the tail gas treatment unit, typical changes include improvement to quench tower duty, packing area upgrades in quench and absorber towers and increased amine circulation flow rates.

Keywords : Claus process, oxygen enrichment, sulfur recovery unit, tail gas treatment unit
Conference Title : ICCET 2020 : International Conference on Chemical Engineering and Technology
Conference Location : New York, United States
Conference Dates : June 04-05, 2020