Raw natural gas usually contains various contaminants which mainly are acid gases (CO2, H2S, etc.), water, other gases (nitrogen, helium) and mercury. Raw gas was first fed into a three-phase separator where gas was separated into sour gas, condensate, and water condensate respectively. After proper filtration treatment, condensate was then sent to a condensate stabilization plant and then was fractionated into sales LPG/gasoline. The water was purified with proper treatments in a water treatment plant, meanwhile, sent to a stripper to recover hydrocarbon carried over.

Sour gas first flows through an amine absorber where CO2, H2S are removed by lean amine. Rich amine then flows into a regeneration column, where acid gases are released into a Claus unit and lean amine is regenerated and recycled. Following the Amine Absorber, there is Dehydration unit where sweet gas is dehydrated by using MEG. The Dry gas then goes through a chiller to a Fractionation Column where condensates are sent to Fractionation plant, and sales gas are transferred through a transmission plant. Meanwhile, rich MEG needs to be regenerated by a stripping column. However, rich MEG contains traces of rust, dust and solid particles which must be removed prior to the Stripper, otherwise, it may cause corrosion of the re-boiler.

Pentair just delivered that solution! After evaluating the process and reviewing the spec sheet, Pentair’s ProcessOR was sized to fit the application as well as an AdsorbOR filled with our Active Carbon Catridge, IntelliSep. As indicated in dark blue in PFD (Process Flow Diagram), a pre-filter with a 25um rating is applied to remove most of the contaminants. Followed by an active carbon filter, where rich MEG is even purified by removing color and odors. A 10 um rating PrecessOR is positioned after the AdsorbOR to remove active carbon powder carried over if any.

Pentair won this project by working with the China Petroleum Engineering Co., Ltd (CPE). CPE is a branch of China National Petroleum Corporation (CNPC), and is mainly focused upon upstream oil & gas market and licensed with EPC certificate.

Apart from MEG filtration, there are also many others applications during natural gas processing, such as ProcessOR in both lean and rich amine, LiquiSep in rich amine, and UltiSep for sour gas, sweet gas and dry gas, etc. Even Polarex can be found of use when NGL is treated. This project is the first step for Pentair and we are looking forward to winning more and winning right.