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Nitrogen rejection using a proven adsorbent shows ground breaking cost and process efficiency

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During the last three years, Zechstein Midstream has investigated with certain German and international exploration & production companies a pressure swing adsorption process which utilizes a resin based adsorbent that has been in wide use for the past twenty years for adsorption of hydrocarbons from water and air. The envisioned application of the adsorbent for nitrogen rejection is highly promising since separation of the nitrogen from hydrocarbons can be done by pressure swing adsorption while achieving a very high level of efficiency versus other media. At the same time, the use of pressure swing for regeneration substantially reduces the amount of energy required compared to some other nitrogen rejection solutions and in addition offers environmental advantages.

The efficiency of the rejection process with the resin based adsorbents is in excess of 99% in a single pass and can be further enhanced depending on design details. As a result, the TA Luft requirements of less than 50mg of hydrocarbons per m^3 can be met with a sufficient margin.

The footprint is very limited and the solution is modular and can be fitted into standard intermodal shipping containers for simple installation, expansion and removal. Turn down from 100 to 0% allows for a high level of flexibility in managing operating expenses. In addition, large flows can be processed with a plant of limited size while the flexibility of the process accommodates wide variations in nitrogen content without a structural adjustment to the plant.

A pilot plant is currently in operation in the United States which separates nitrogen from methane. The test results from this pilot plant confirm previous laboratory and field results and extend the technology to nitrogen rejection from hydrocarbon streams. Additionally, studies indicate significant cost and environmental advantages over conventional cryogenic approaches. It is our intention to share these results together with other analysis with the audience in Celle in April.

This enhancement of existing PSA technology offers the potential to structurally change the landscape for producing pipeline specification methane from the high nitrogen sources.