

Detailed hydraulic analysis of rich amine piping

The process team recently assisted a Midwest refinery client in the detailed hydraulic analysis of rich amine piping between two units in the facility. The routing being utilized for rich amine transfer was not able to process the required rates of rich amine flow; hence, operational upsets were being observed at both the absorption and regeneration ends of the amine system. The client had attempted to use various additional piping to alleviate the hydraulic concerns, with limited success, and Brindley Engineering was asked to review the hydraulics of the system in detail.

BE the Solution

Brindley Engineering conducted a detailed field survey in order to establish the basis for a hydraulic model. It was observed that flow from three additional process units tied into the line as it transferred rich amine back to the Amine Unit, and that lean amine was also being added along the way as part of a makeshift solution. The various hydraulic circuit options that were analyzed and several thousand equivalent feet of pipe and involved multiple vertical transitions of approximately 20 to 30 feet in height.

Together with this field information, operating data was gathered and client operations personnel were interviewed to determine the exact nature of the hydraulic problems that were being encountered. The data was used to create a hydraulic tabulation of the various circuits such that comparisons could be made between individual cases at each and every section along the route.

Our Challenges

Tight operating parameters, a large / complicated system with multiple input points, and little data to start from made this a challenging study.

BE the Result

Of the four main options analyzed, the most hydraulically favorable routing was determined and presented to the client for implementation. A report summarized not only this preferred routing, but provided details of operational situations that would adversely affect the hydraulic performance of the rich amine line.

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