



Fortune 500 E&C Firm Helps Customers Reduce CO₂ Emissions and Lower Costs

Fluor uses aspenONE® Engineering rate-based modeling solution to ensure accurate modeling of the acid gas cleaning process and prevent over-design of distillation equipment, as well as downstream processing units.

Fluor Corporation (www.fluor.com) is a Fortune 500 company that delivers engineering, procurement, construction, maintenance (EPCM) services, and project management to governments and clients in diverse industries around the world. Since its founding, Fluor has built a reputation for applying innovative methods and performing precise engineering and construction work within the emerging petroleum industry. Today, Fluor continues to develop and implement innovative solutions for complex projects.

An issue that still greatly influences how projects are completed is the environment. More specifically, it has led many chemical and petrochemical companies to examine ways to reduce acid gas (CO₂, H₂S, etc.) emissions. Acid gas scrubbing is typically performed using amines in absorber and stripper columns.

Fluor turned to AspenTech and its aspenONE Engineering solutions for innovative distillation modeling that uniquely captures rate effects, which are critical in acid gas scrubbing. Unlike traditional equilibrium stage models, aspenONE rate-based models deliver more accurate simulation over a range of operating conditions, ultimately reducing emissions, lowering costs, and helping with regulatory compliance.

“The aspenONE solution consisting of Aspen Plus RADFRAC column model with Aspen Rate-Based Distillation provides a robust modeling environment for amine-based gas treating units.”

— Soumitro Nagpal, Process Specialist, Fluor New Delhi

Customer Profile

Fluor Corporation

Engineering Services – Energy & Chemicals

Challenge:

Supply clean energy by converting coal and biomass to synthetic natural gas

Solution:

Aspen Rate-Based Distillation to design and optimize the acid gas cleaning process

Best Practice:

Efficient Design of Emerging Energy and Environmental Solutions

Benefits:

- Provides systematic improvement of Fluor Econamine™ FG technology
- Accurately predicts open-source VLE data for Amine-CO₂/H₂S system
- Offers systematic model validation and tuning flexibility

FLUOR®



aspenONE®

Predict CO₂ Absorption in Selective Amine Processes

Fluor's goal was to design optimal plants with smaller equipment and lower energy consumption. It was important to have an accurate model of the absorber/stripper distillation columns to optimize column design, design efficient downstream process equipment, determine CO₂ and H₂S tray efficiencies, and study the effect of tray and packing design on absorption efficiency. Models would also be used to understand the effect of blending amines to enhance CO₂ absorption, and to predict CO₂ slip over a wide range of typical plant operating conditions. It was determined that a rate-based model would be required to predict the parameters necessary for optimal plant design.

Fluor's Experience with Aspen Rate-Based Distillation Model

aspenONE Engineering—and specifically Aspen Rate-Based Distillation—leverages its modular nature to allow systematic validation and refinement of individual model components. The platform can be used for advanced modeling of CO₂ capture units using various types and concentrations of amines and amine blends. Aspen Rate-Based Distillation has facilitated a rational and systematic improvement of Fluor's Econamine™ FG technology. Econamine™ FG uses special aqueous alkanolamine to capture CO₂ from combustion gases.

A rate-based amine simulation was also developed to study selective gas treating applications over a range of operating conditions. This model uses the ELECNRTL property method. The ELECNRTL vapor liquid equilibrium (VLE) model was validated using open source VLE data.

Plant Optimization

Construction of CO₂ capture units entails enormous capital investment and operating costs. But the potential for significant savings can be realized by optimal design of the distillation columns and downstream processing units. Rate-based distillation can be a valuable tool in attaining these savings and enable Fluor engineers to make better investment decisions.

About AspenTech

AspenTech is a leading supplier of software that optimizes process manufacturing—including oil and gas, petroleum, chemicals, pharmaceuticals and other industries that manufacture and produce products from a chemical process. With integrated aspenONE solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit www.aspentech.com.



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