A US Gulf Coast refiner was experiencing severe corrosion damage in the top section of their crude unit atmospheric tower due to monoethanolamine-hydrochloric acid (MEA-HCl) salt deposition. The persistent corrosion damage compromised the integrity of the atmospheric tower overhead and resulted in shorter than desired run lengths.

The refiner asked Baker Hughes for a fast, on-site method to quantify the amount of monoethanolamine (MEA) in their raw crude, correlate the MEA concentration to a corrosion risk in the overhead, and most importantly, prescribe mitigation options that would enable them to reliably operate the tower without the risk of MEA-HCl salt deposition. Being able to accomplish these objectives quickly and reliably would also allow the refiner to optimize their use of Baker Hughes EXCALIBUR™ contaminant removal additive that was being used to acidify the desalters.

To begin, Baker Hughes deployed the TOPGUARD™ field amine measurement services (FAMS), a unique methodology to reliably detect low-level concentrations of MEA in raw crude. The testing takes place onsite and provides data feedback in as little as 1-2 hours. The data obtained was then fed into the TOPGUARD™ corrosion risk monitor (CRM) to determine the potential for MEA-HCl salt deposition in the tower overhead system. Once this determination was made, data from the TOPGUARD CRM was used to propose mitigation options to reduce the risk of MEA-HCl salt deposition as necessary.

**Results**
- Saved refinery USD 400,000 per year
- Proactively mitigated corrosion in the top sections of the refiner’s crude unit atmospheric tower
- Optimized usage of EXCALIBUR contaminant removal technology

**Challenges**
- Provide an on-site and fast method to test for the presence of MEA in the raw crude
- Correlate the MEA in the crude to corrosion risk in the tower overhead system
- Determine what actions needed to be taken to mitigate MEA-HCl salt deposition
- Improve additive usage

**Baker Hughes solution**
- TOPGUARD FAMS
- TOPGUARD CRM
- EXCALIBUR contaminant removal technology
The graph illustrates how the data obtained from TOPGUARD FAMS and TOPGUARD CRM was used to help the refiner reliably operate their atmospheric tower without the risk of MEA-HCl salt deposition in the overhead. The data not only allowed the refiner to proactively mitigate MEA-HCl salt deposition, but it also resulted in additive cost savings of USD 400,000.

This case history is presented for illustration purposes only, as the results may vary between applications.