TOPGUARD Overhead Corrosion Control Programs

Improve long-term reliability and increase profitability
TOTAL OVERHEAD CORROSION PROTECTION

Gone are the days of sweet crudes and simple solutions for overhead corrosion control. With declining crude quality and the high profit potential of opportunity crudes, refiners now face a difficult balancing act: determining the optimum combination of crude blends, unit operations, corrosion control programs, and unit maintenance to achieve the greatest ROI. It’s critical to have an accurate understanding of these factors—an “approximate” feel for what’s occurring is not sufficient.

No one understands this more than Baker Hughes, a GE company (BHGE). Our TOPGUARD™ overhead corrosion control programs help predict and control the corrosive impact of these challenging crude blends and operating conditions by defining the root cause of corrosion, establishing workable mitigation strategies, and providing ongoing monitoring and optimization. This comprehensive approach helps extend equipment run time and prevent unplanned shutdowns—resulting in improved long-term reliability.

Define the root cause

The first step in designing a corrosion control program is a detailed root cause analysis to define the problem. As part of detailed on-site unit surveys, we analyze process systems, piping, deposits, metallurgy and historical data. We also evaluate feedstock variations, temperatures, pressures, slop-oil recycling, and seasonal changes to operations.

Then the real work starts. Unique, advanced analytical techniques are employed to ensure that data from the surveys provide an accurate representation of system conditions. The information gathered is put into the BHGE proprietary TOPGUARD Ionic Model, a process simulation-based technology specifically designed to address overhead system corrosion.

Conventional corrosion control programs rely on estimations and approximations to determine a filming inhibitor and neutralizing amine strategy. But this approach falls short in several respects:

- Before water condenses, neutralizers can react with HCl in the vapor phase to form salts that precipitate and create under-deposit pitting corrosion.
- Condensed water at its dew point is more acidic and more corrosive than water at the accumulator drum, where measurements are typically taken.
- Conventional programs, even those using simple laptop simulators, lack rigorous evaluation of salt-forming potential and the pH profile between the dewpoint and the drum.

Using the rigorous, first-principles-based TOPGUARD Ionic Model, the shortcomings...
of conventional corrosion control programs are avoided. The TOPGUARD Ionic Model is a comprehensive and robust simulation technology that provides critical insight into the phase behavior that leads to corrosion. Using our proprietary thermodynamic database and more than 20 years of application experience, BHGE experts can predict specific outcomes for your refinery, your crude blends, and your operating conditions. With the TOPGUARD Ionic Model we can:

- Determine potential causes of corrosion and the specific conditions under which it will occur.
- Identify potential sites of corrosion in overhead systems, towers, pumparounds/side draws, and more. We can know not only when corrosion can occur, but where.
- Evaluate potential mitigation options. Our experts can define optimal operating conditions, customize neutralizers, establish maximum allowable contaminant limits, specify water wash requirements, and more.
- Predict the impact of changes. You can know in advance the effects of variations in crude slates, operating conditions, contaminant levels, and water wash rates.

Combining this proprietary technology with long-standing knowledge and expertise, BHGE can develop a total corrosion control program that is customized to fit your refinery’s objectives.

An informed strategy for corrosion control

No corrosion control program is complete without an arsenal of effective additives. BHGE chemists have developed a broad portfolio of TOPGUARD corrosion inhibitors and have used the Ionic Model to design TOPGUARD neutralizers specifically engineered to address the increased corrosion potential that occurs with more challenging opportunity crudes.

In addition to additives, there are many other ways to control corrosion, for example, reducing contaminant levels in feedstocks, modifying process conditions, installing or upgrading the water wash, upgrading metallurgy, or redesigning equipment.

BHGE identifies the most suitable options based on your unique circumstances and your short- and long-term goals. The end result is a corrosion control strategy designed to manage even the most difficult corrosion challenges.

Answers on demand

In addition to the standard day-to-day support, BHGE also offers an on-site monitoring system customized to your refinery.

When we build the Ionic Model for your refinery, we create a servicing capability from the TOPGUARD corrosion risk monitor that provides ongoing evaluation of corrosion risk as unit conditions change. You gain the benefits of the most sophisticated simulation technology—available on demand—plus immediate on-site corrosion control answers for any issues that arise.

Monitoring and measuring success

To ensure that our programs are performing properly, BHGE monitors corrosion on a routine basis. The TOPGUARD corrosion risk monitor is only one aspect of a comprehensive monitoring program. Traditional methods such as retractable electrical resistance (ER) probes and weight loss coupons are used along with hydrogen permeation monitoring and process stream analyses. This combination of tools yields tremendous insight into the performance of the corrosion control strategy.

Push your unit to the limit

Learn how a TOPGUARD corrosion control program can help you effectively manage overhead corrosion, improve feedstock flexibility, extend equipment run life, and prevent unplanned shutdows—resulting in improved long-term reliability, and increased profitability. Visit BHGE.com/TOPGUARD.