

Flareless Start-up of Ethylene Plant: A Possibility

- Nihar Gulwadi, Project Development, Ingenero
- Jim Brigman, EVP – Projects, Ingenero

Flaring is an inherent part of a start-up activity for an ethylene unit. A start-up of a typical ethylene plant requires a significant flaring of hydrocarbon. This is not just a loss of product but also causes heavy carbon emission, sooty flames & community nuisance.

An in-depth analysis of various ethylene production technologies & operating procedures of more than 10 facilities indicated beyond a doubt that modifications to the operating strategy of most of the plants results in saving of ~60% of feed material during each start-up. With the saving realized in feed utilization, other benefits like ~20% reduction in start-up time & ~70% reduction in stack emissions have been observed in actuals.

Case Study:

For an ethylene producing plant (450 KTA) with 5 crackers following activities allowed reduction in the flaring quantity & start-up time:

- a. Analysis of the start-up & shutdown activities of the unit & equipments (compressors)
- b. Survey of the various flaring points
- c. Study of the process & technology specifics
- d. Detailed tech-economic feasibility of various start-up & shutdown schemes to reduce flaring
- e. Recommendation of cost effective modifications required for reducing the flaring during start-up of plant

The implementation assistance for the recommendations that was provided to the manufacturer included:

- Calculation of the required inventories and line sizes
- HAZOP
- Preparation of SOPs
- Training of operators

- Basic/Detailed Engineering of the suggested modifications
- Part wise implementation of the procedure especially during planned/unplanned shutdowns/startups for operators to gain valuable experience

Benefits – With some simple modifications to operations & procedures, following benefits were realized by the Ethylene producing facility:

1. 80% reduction in flare load
2. 25% reduction in start-up time
3. Reduced flaring for reduced time