

phase separation improvements increase plant flexibility and profitability

challenge

A North American ethylene unit, designed to crack gas feeds, began to crack heavier feeds in the late 1990's in order to expand the plant's feed stock flexibility and increase profitability. Excellent corrosion control was maintained in the dilution steam generators using a neutralizing amine for pH adjustment. However, poor separation of the hydrocarbons and water in the quench water separator resulted in high organic levels in the process water stripper condensate. The poor water quality caused significant organic fouling of the downstream piping, steam drums, and generators, reducing process reliability and increasing maintenance costs.

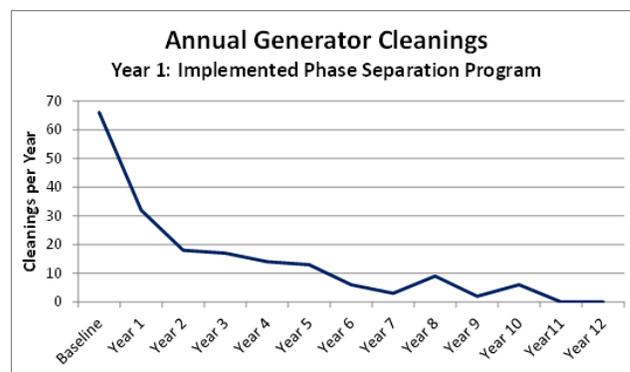
solution

To improve the separation efficiency in the separator and DOX (Dispersed Oil Extraction) unit, SUEZ recommended a program feeding an emulsion breaker into the quench water tower recycle, in conjunction with the injection of a process oil stream into the quench water separator. The emulsion breaker destabilized the emulsion in the quench water tower. The process oil injection aided the separation of the quench water and condensed oils by solubilizing heavy hydrocarbons and floating hydrocarbons out of the water. The addition of process oil decreased the density of the hydrocarbon phase to <0.90, which improved the driving force for the separation. The result was a significantly cleaner process condensate with a turbidity of <50 ntu from the DOX unit. A dispersant was also applied to prevent deposition of hydrocarbons downstream of the DOX unit.

results

These improvements made a significant impact on generator run length. Cleaning costs for the generators were reduced by 85%. Run lengths were increased from weeks to over one year. As part of SUEZ's continuous improvement program, operating and chemical guidelines were developed for each different feed slate the plant wanted to run. The plant was able to crack up to 50% more heavier feeds in their feed slate, enabling them to improve profitability.

With the recent move, back to more economically favourable gas cracking, the plant has continued to utilize the phase separation improvement program. Generator run lengths have increased to more than two years between cleanings. Since the plant commissioning, corrosion control using the non-volatile neutralizing amine has resulted in no tube failures in the generators.



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