

A New Technology for Management of HPNA Compounds in Full-Conversion Hydrocrackers

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For hydrocrackers operating in fullconversion service, it is well known that the formation of heavy polynuclear aromatic (HPNA) compounds impacts the performance of the hydrocracker in a negative way. The HPNA compounds are concentrated in the recycle oil and may cause reactor effluent heat exchanger fouling and catalyst deactivation.

A new process for managing buildup of HPNA compounds was developed. In the new process, the recycle oil is separated into a light boiling portion and a heavier boiling portion by adding a simple and inexpensive distillation stage. A very small part of the heavier boiling fraction containing the most harmful HPNA compounds is taken out as bleed.

In the development of the process, numerous pilot tests were carried out to monitor the buildup of HPNA compounds closely and to study how the operating conditions, including the nature of the feedstock, contribute to the formation of HPNA compounds. The work also included filtration experiments to study the solubility of the HPNA compounds, thereby identifying the most harmful HPNA compounds.

The process was simulated in laboratory size equipment. It was demonstrated that the most harmful HPNA compounds are concentrated in the heavier boiling portion.

The process is simple and an easy retrofit to existing units. The obvious benefit is the difference in product values between the hydrocracker products and the recycle oil. Other benefits include a lower catalyst deactivation rate and an extended cycle length.