

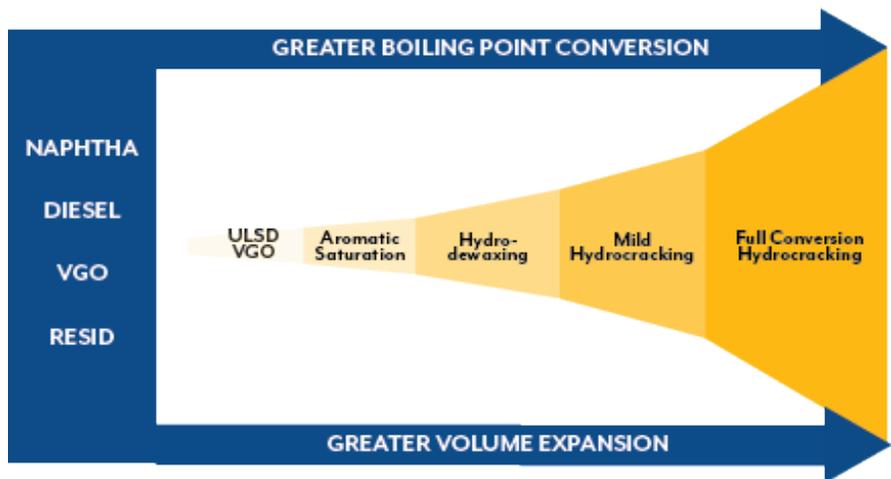
# Hydroprocessing Technology

## In partnership with Shell Catalysts & Technologies

### THE CHALLENGE

Refiners are facing a dynamic business environment. Crude prices are volatile. Heavy, high-sulfur and acidic opportunity crudes are increasingly available. Demand for lighter products including naphtha for petrochemicals is increasing; product legislation and emission standards are tightening; and health, safety and environment mandates also have to be met.

Cutting-edge licensed technologies from Shell Catalysts & Technologies can be leveraged to unlock value in refineries. These technologies can help refiners to raise capacities, take advantage of opportunity crudes and meet stringent specifications.



### ABOUT THE TECHNOLOGY

KBR delivers hydroprocessing solutions through an alliance with Shell Catalysts & Technologies. The alliance pairs KBR's technology, project and engineering expertise with Shell's operations, catalyst and technology experience. Together, we provide hydroprocessing solutions to fit each refiner's unique challenges.

Core capabilities include:

- Hydrotreating
- Mild Hydrocracking (MHC)
- Full Conversion Hydrocracking
- Lube Oil Hydroprocessing
- Engineering and Technical Services

### SHELL AND KBR WORK TOGETHER TO DELIVER

- Co-created client solutions that drive incremental improvement in operations – increased profit margins, throughput and reliability, as well as improved run lengths and energy efficiency.
- Relationships – long-term support and regular reviews to ensure your unit operates effectively.
- Revamps – short- and long-term options for improving product mix, boosting capacity, improving product qualities, and adding new units

Together we bring the expertise to solve your problem and support you in the long run.

# Hydroprocessing Technology

## KBR AND SHELL CATALYSTS & TECHNOLOGIES ALLIANCE

The alliance leverages the key strengths of two industry leaders – Shell’s broad operating experience, and KBR’s bottom-of-the-barrel upgrading capabilities – into a combined ability to deliver solutions on-time, on-budget, and at the highest quality standards.

Together, KBR and Shell Catalysts & Technologies provide hydroprocessing solutions to fit each refiner’s unique challenges.



## KBR and Shell Catalysts & Technologies Strengths

### BUSINESS VALUE

- Because no two units are alike, there is no “standard” design – each refiner needs a solution tailored to specific feedstock, capacity and process objectives, along with flexibility to handle reasonable shifts in market constraints. We deliver solutions to fit your refinery
- Our methodology starts with clear project definition rather than a simple base designs. We deliver the right design on-time, on-spec and on-budget
- Our combined know-how delivers high availability with measurably better asset utilization and does so with consistently high yields with market-leading energy efficiency. We deliver superior total cost of ownership
- Our multidisciplinary teams bring deep domain expertise in operations, technology and engineering to ensure solutions integrate both within the unit and within the refinery for maximum impact. We deliver experience
- Operating insight at both the control room and the multi-refinery level ensures that solutions deliver the refining performance required for both the current and future fuel quality regulations. We deliver market-leading operational support

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