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## Introduction

The State of Qatar invested heavily on Gas-to-liquid (GTL) technology in order to diversify the utilization of its natural gas resources and to produce clean fuels and chemicals. Qatar Petroleum in cooperation with Royal Dutch Shell has built the world's largest GTL Plant, the Pearl GTL in Ras Laffan, Qatar. In its full capacity, the Pearl GTL plant is capable of converting up to 1.6 Billion cubic feet of natural gas per day into 140,000 barrels of petroleum liquids. One of the primary products of the GTL plants is Naphtha. GTL Naphtha is classified as ultra clean fuel given that it releases much lower amounts of particulates upon combustion with virtually no aromatics or sulfur contents. These facts provide an extremely powerful environmental incentive for using gasoline obtained from GTL Naphtha as a substitute to its conventional oil counterpart. Especially given that the GTL plant produces it locally in huge quantities. Therefore, it would be about time that the state of Qatar starts implementing the use of GTL locally to protect its atmosphere. The absence of aromatics in GTL Naphtha results in a lower research octane number (RON) of about 40-70, which leads to problems in engine knocking that inhibit smooth combustion. Due to these issues, GTL Naphtha cannot be used directly as a substitute to its conventional oil counterpart. Therefore, it is necessary to identify additives that may boost the RON to values that meet international standards and specifications.

## Fuel Characterization Laboratory



Fuel Characterization Laboratory (FCL) is built to support both research and industrial activities in the area of formulation and characterization of fuels and value-added chemicals.

## Motivation

- Abundance of GTL products in Qatar's local market
- Shortage of local Gasoline production and regional challenges
- Availability of methanol produced locally by QAFAC
- Qatar's high ranking in terms of CO<sub>2</sub> emissions per capita
- GTL Naphtha's classification as ultra clean fuel; releasing lesser particulates upon combustion
- Ability of methanol to increase the low RON of GTL Naphtha to values that meet Gasoline's ASTM specifications

## Analytical Equipment



Density  
ASTM D4052



Octane Number  
ASTM D2699



Vapor Pressure  
ASTM D6378



Distillation  
ASTM D86



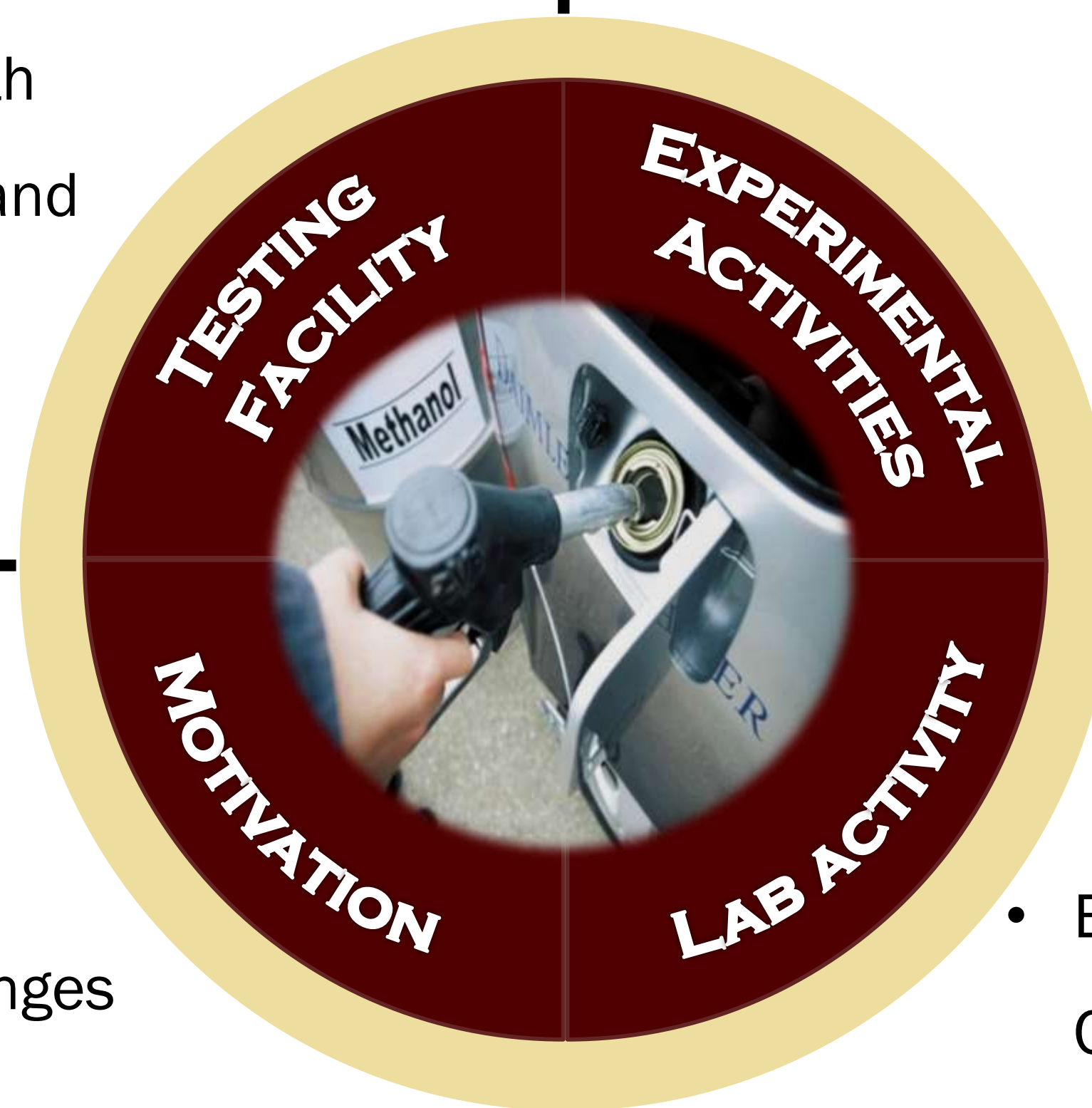
DHA by Clarus 400 GC  
ASTM D6730



GC - FID

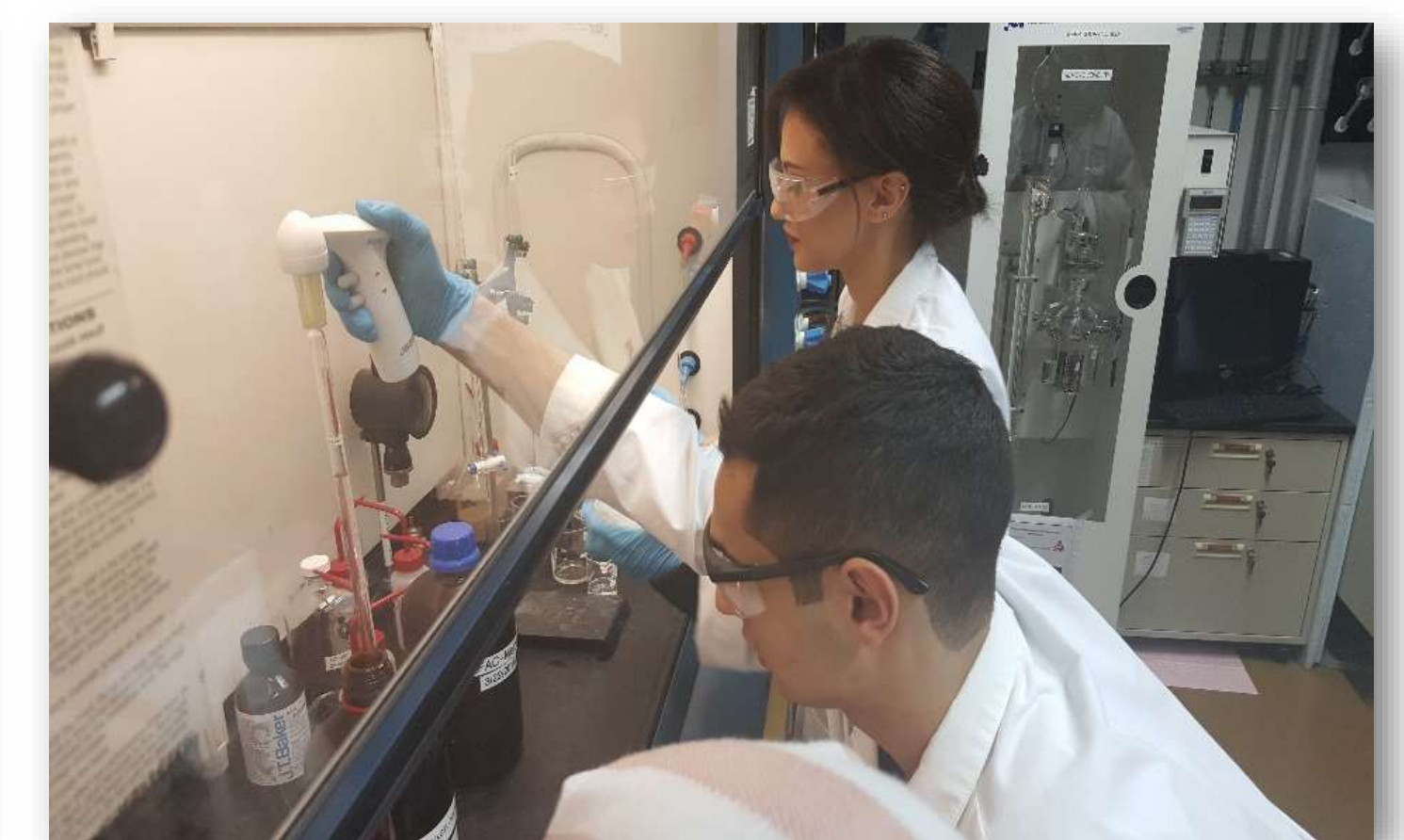


Moisture Analyzer-  
Astm D6304



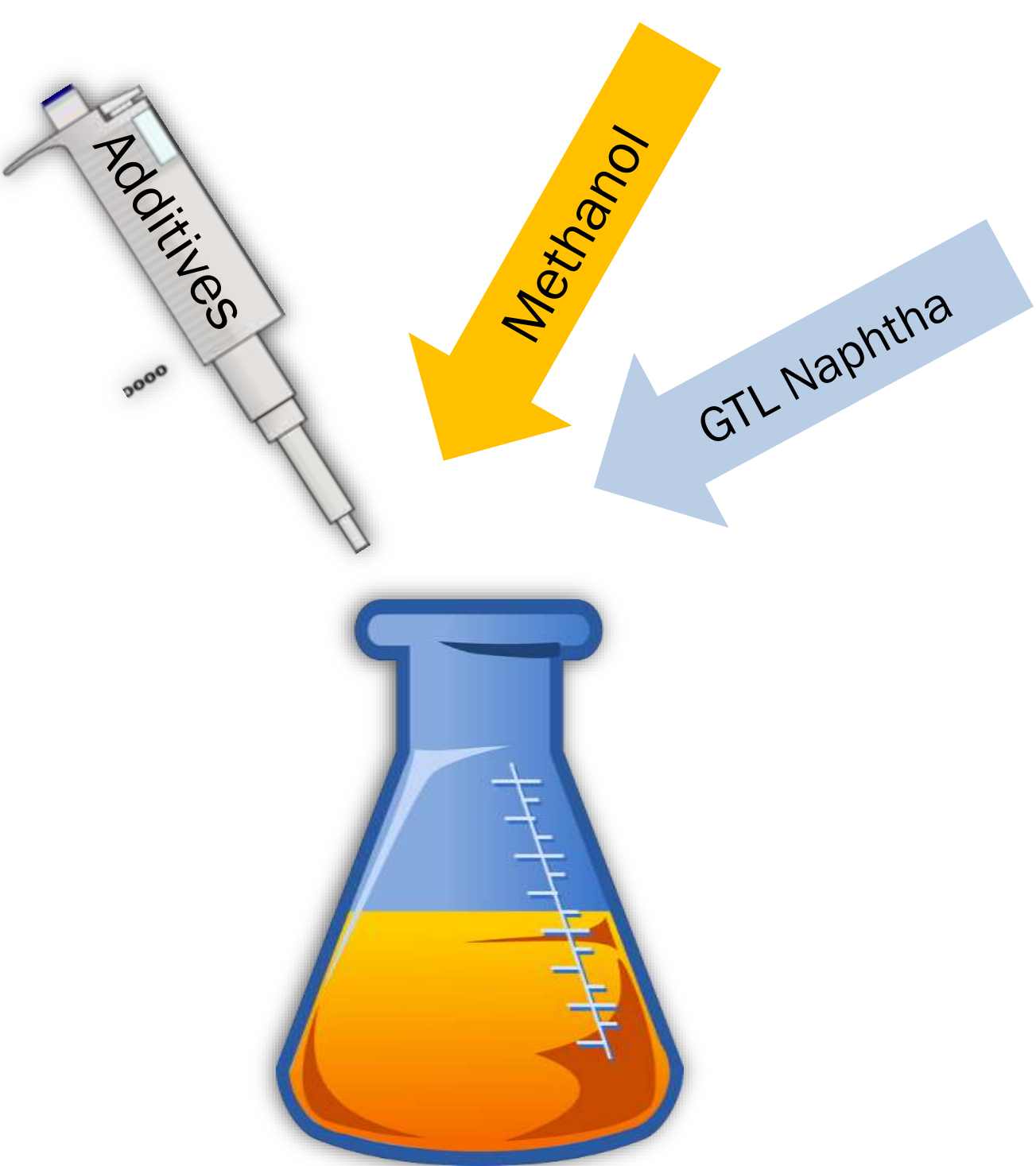
## Lab Activity

- Experiments were performed at Texas A&M University Fuel Characterization Laboratory
- The Laboratory follows strict Quality, Safety & Data Management Systems with ISO-9001 certification



**Campaign:** Using GTL Naphtha and methanol as the blending stock to enhance its octane rating without compromising any other critical physical properties of the fuel.

ASTM D5797-17-Standard Specification for Methanol Fuel Blends (M51-M85)



## Collaborators



شركة قطر للإضافات البترولية المحدودة  
QATAR FUEL ADDITIVES CO.LTD.

## Acknowledgments

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