

Title: Crude Fractionation Facilities

Date: 2014-2015

Scope: Basic and detailed engineering

Location: Gulf Coast Texas, USA

About Petromax.

Petromax Refinery Ltd (PRL), is a privately owned petroleum refinery, using natural gas condensate as feedstock. The Refinery Plant is located at Mongla Industrial Area on the bank of the Poshur River.

Converting gas condensate into liquid products involves a considerable level of complex technology. PRL, a pioneer of this kind of technology in the private sector, has partnered with some of the world's biggest energy companies in this field to build world-scale gas condensate-to-liquids conversion projects as another avenue to monetize condensate reserves and to meet a growing demand for premium grade gasoline.

Petromax Refinery will produce a range of globally marketable environmentally friendly liquid products and synthetic fuels.

Executive Summary:

Project scope included the design of new Crude Fractionation facilities to process 25,000 BSPD of light crude (API 38.2° or API 45.8). The facilities handle single crude streams or a combination of these two feed stocks mixed at any ratio.

Fractionation facilities consisted of an Atmospheric Distillation Unit (ADU) designed to process 25,000 BSPD and to provide products run to storage facilities along with the utilities required to support the proper and safe operation of the process systems.

Challenges:

1. Aggressive fast-track schedule of 13 months, from FEED to mechanical completion.
2. Available plot area for the plant facilities very limited. 33,000 ft² for the process areas (ISBL) and 17,000 ft² for utilities areas (OSBL).

Vepica Solutions:

1. Concurrent engineering execution rather than sequential execution, optimizing the engineering design cycle. Design engineering, procurement and construction were integrated to reduce the elapsed time required to complete the project in a more traditional sequential scheme.

2. Early identification of the critical path and main elements that drove the project's overall duration, to sharpen the control over engineering execution, identifying and pro-actively managing the interfaces.
3. Key factor for success was working with the client as an integrated team; close follow-up of the information and expediting the review and approval of technical documents, keeping the project integrated, standardized and focused on the goals.
4. Project Execution manual, procedures and Design Basis developed during the early stage of the project to set the guidelines to be followed during project execution.
5. Maximization of modularization of process equipment to reduce the footprint requirements
6. 3D Model design for piping, electrical, civil and instrumentation performed by VEPICA integrating three offices (Houston, Venezuela and Colombia) in a common database which allowed for the efficient exchange of information and design integration. The 3D model was also used on-site during the construction phase to support the site team (Basic Equipment) providing a better visual aid for understanding the facilities design.
7. Implementation of early design reviews (inter-offices and with client's participation) which improved the efficiency and team collaboration in the design process.
8. Early execution of documents and activities associated with procurement (BoM, MTO, etc.) and construction (technical drawings)
9. Focus on team's coordination and anticipation. Engineering schedule was adapted to match construction priorities / sequence and the deliverables tailored to the needs of construction execution.
10. Close communication with procurement to keep track on the status of purchase orders and to identify early on, the impact of any delay over the project's execution.