REFINERY EQUIPMENT OF TEXAS, INC.
5100 Westheimer Road, Suite 200
Houston, Texas 77056

Atmospheric Distillation Unit
Technical Paper

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Modular Process Skids

Each of the following Modular Process Skids are required to achieve the distillates referenced earlier in this proposal. The list has been compiled to be a complete list of the major skids needed to build a typical RETX topping plant. Final equipment may be adjusted as required.

Atmospheric Distillation Unit (ADU)

The ADU (Atmospheric Distillation Unit) separates most of the lighter end products such as gas, gasoline, naphtha, kerosene, and gas oil from the crude oil. The pre-heated crude feed is charged into the atmospheric tower where it is separated into off-gas, light straight-run naphtha, kerosene, gas oil, and heavy fuel oil bottoms. This tower contains fractionation trays, is equipped with top pump and two side draws (for naphtha, kerosene, and gas oil products) if so designed.

Naphtha Stabilizer Unit

The naphtha stabilizer receives the light straight-run naphtha from the ADU and separates remaining light products (pentane and lighter) from the naphtha creating a reduced vapor pressure naphtha suitable for atmospheric tank storage. The off-gas is used as fuel gas or diverted to an emission control device.

Uniflux Crude Oil Heater

Crude oil heating is an excellent application for the Uniflux heater because of the convective heat transfer design. The uniform flux density around the process coil allows for even heating of the crude oil thus reducing coking of the process tubes. This uniform heat flux reduces tube hot spots and prevents scorching of the crude oil. The Uniflux heater control system also provides precise process temperature control for even heating of the process crude oil.

Programmable Automation Control System

The Programmable Automation Controller (PAC) System that is used by Refinery Equipment of Texas, Inc. is a high-performance automation controller and I/O subsystem integrated with easy-to-use Windows© based software. PAC hardware marries high performance, reliability and high I/O density with cost-effective redundancy options. The process modules and I/O system form the basis of a complete distributed control and recording environment capable of continuous analog, logic and sequential control combined with secure data recording at point of measurement; all designed to maximize system integrity. The PAC System is engineered with some of the most advanced, yet proven technologies available, and is very powerful, yet so simple to use. Among its many capabilities, it offers stunning

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visualization and seamless integration between the hardware and software, alongside the Visual intelligent local display and control. In a nutshell, the PAC System fully encapsulates the vast control, recording expertise and reputation that clients can depend on from Refinery Equipment of Texas, Inc. In addition, the PAC System is an integral component of the Expandable and Flexible Control System. This allows for new possibilities of open integration and efficiency that spans production operations and business.

The Skid Components

Supplied with each modular topping plant or skid are the following components where they apply:

- Pressure Vessels
- Main Pumps and Spare Pumps
- Air Coolers
- Heat Exchangers
- Process heaters with Emission Controls
- On-skid piping control valves, manual gate, globe, ball and check valves
- Insulation and aluminum jacketing for piping, vessels and exchangers as needed
- Skid-mounted equipment on heavy-duty steel frames with grating in high traffic areas
- Carbon steel equipment and piping will be sand-blasted and painted
- Instrumentation installed and wired to a skid-mounted junction box
- Electrical equipment installed and wired to a skid-mounted Motor Control Enclosures
- One Year supply of recommended spare parts (optional)

Applicable Design Standards

- ASME Code Section VIII, Division 1, Pressure Vessels and Heat Exchangers
- ANSI B31.3 Petroleum Refinery Piping
- FM Requirements for Burner Control
- API-RP520, Parts I and II, Design and Installation of Pressure Relieving Systems in Refineries
- API-500A Classification of Areas for Electrical Equipment in Petroleum Refineries (Class 1, Group D, Division 2). Seals are placed in all conduits that pass through electrical panels. The heater end of the skid is unclassified.
- NEC section 505 electrical is acceptable

Note: The Codes and Standards above will be determined by the manufacture and are subject to revision based on final destination and overall product safety.

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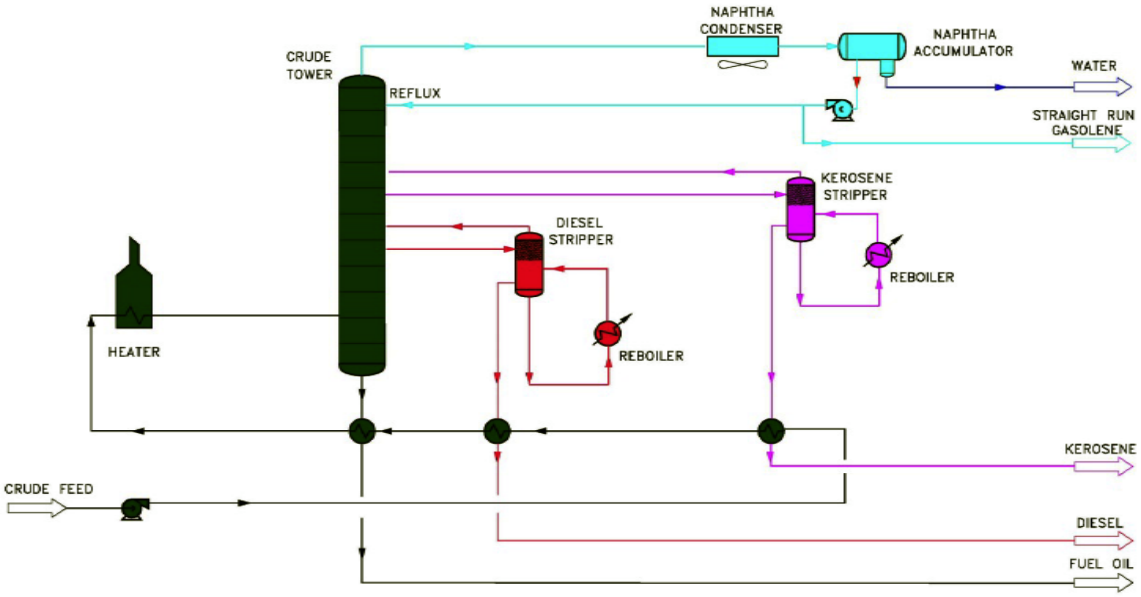
RETX - Basic Process Flow Diagram



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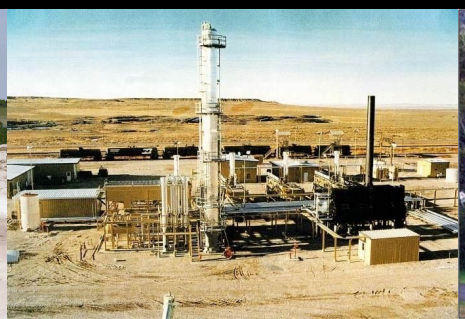
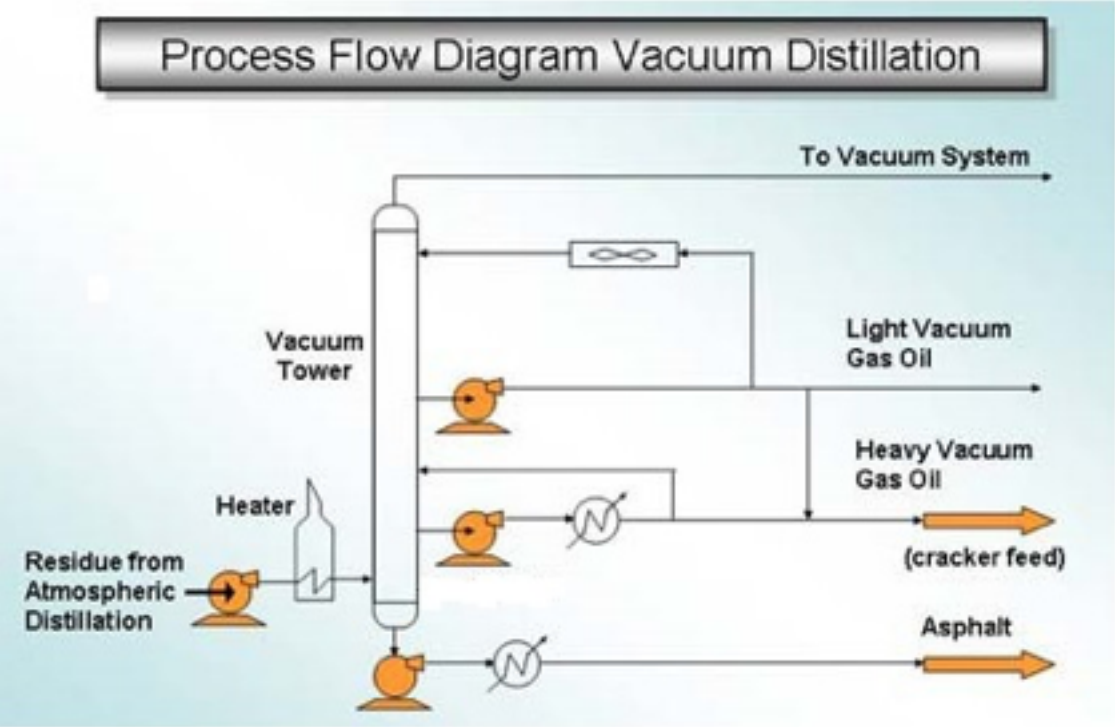



RETX - Vacuum Distillation Process Flow Diagram



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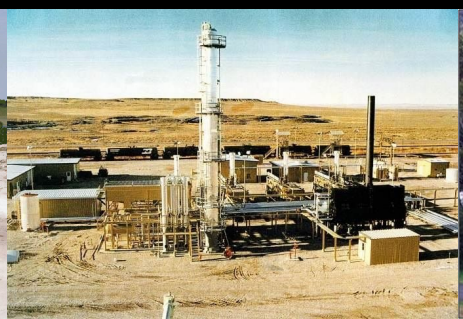


RETX – Single Module - 2,500 BPD

Note: Most equipment arrangements are 14 ft. x 120 ft. (4.25 meter x 36.5 meter) Straight Inline

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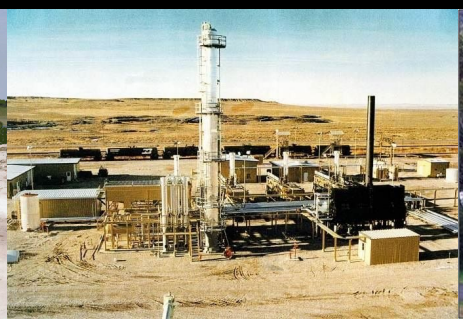


RETX – Single Module - 6,000 BPD

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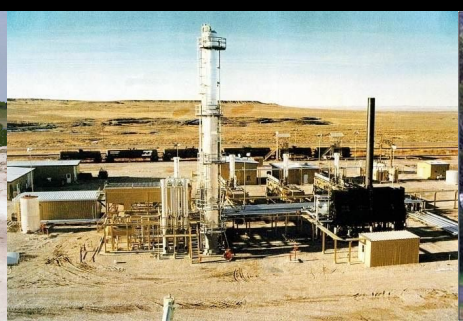


RETX - Scalable Units - Qty (5) x 6,000 BPD

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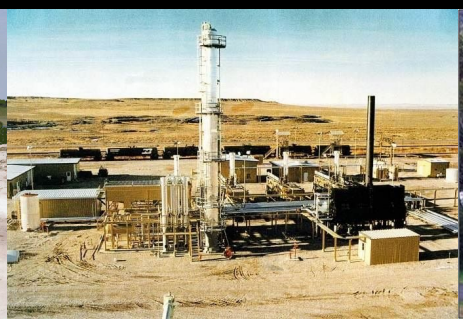


RETX - Block Flow Diagram - Base Products

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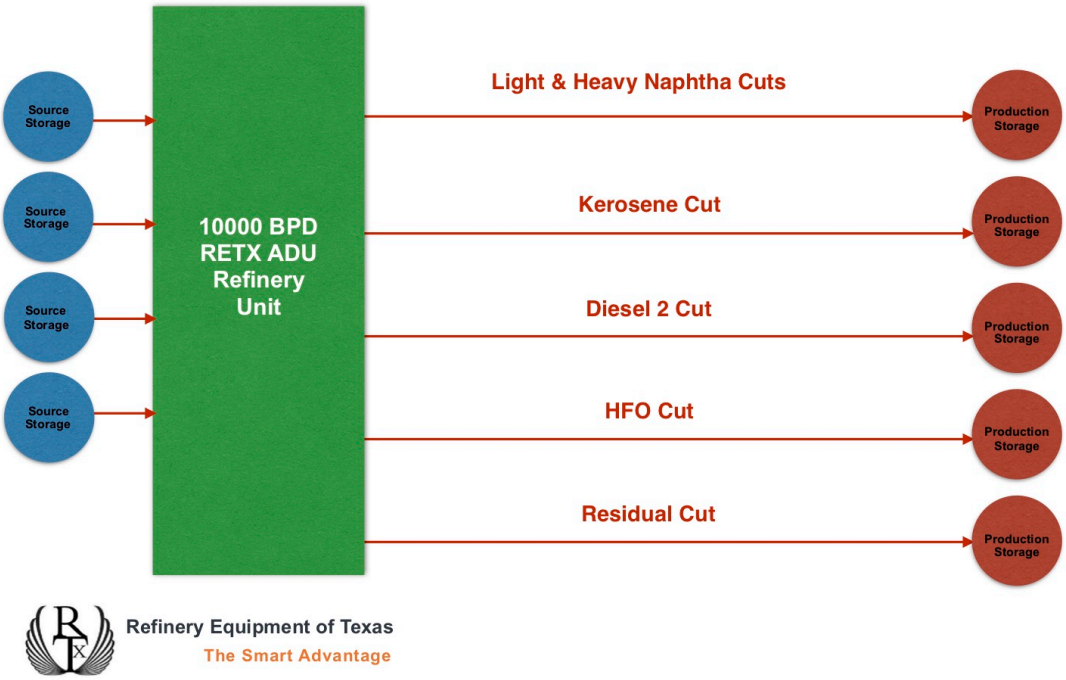

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RETX - Block Flow Diagram - Base Products with High Octane Gasoline

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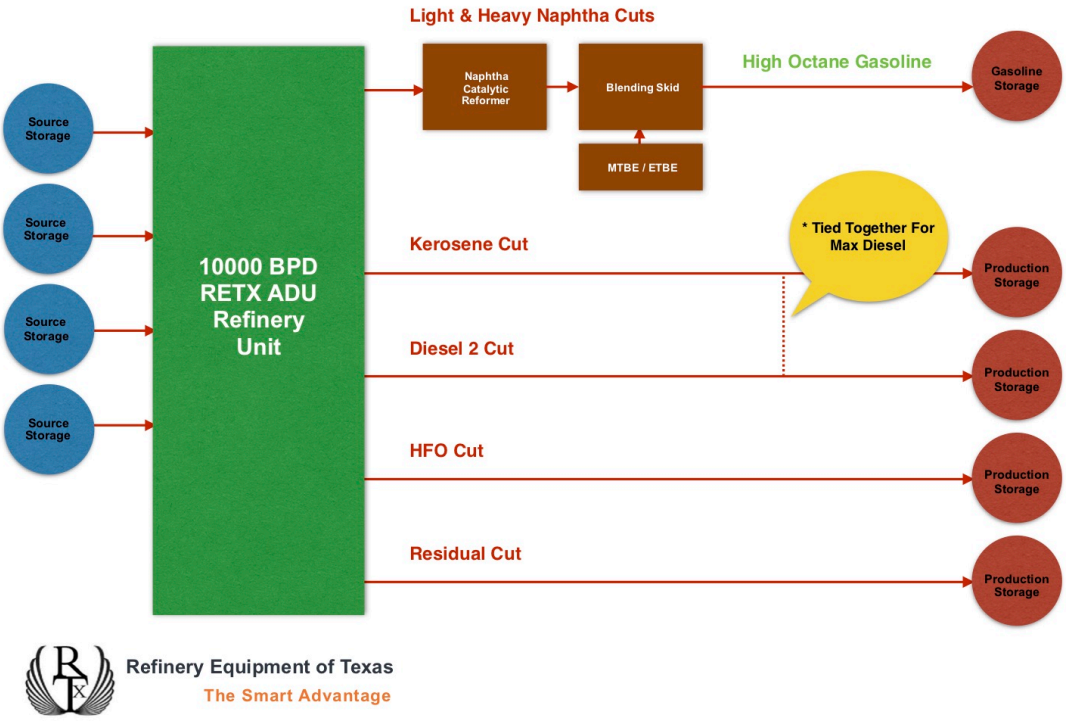

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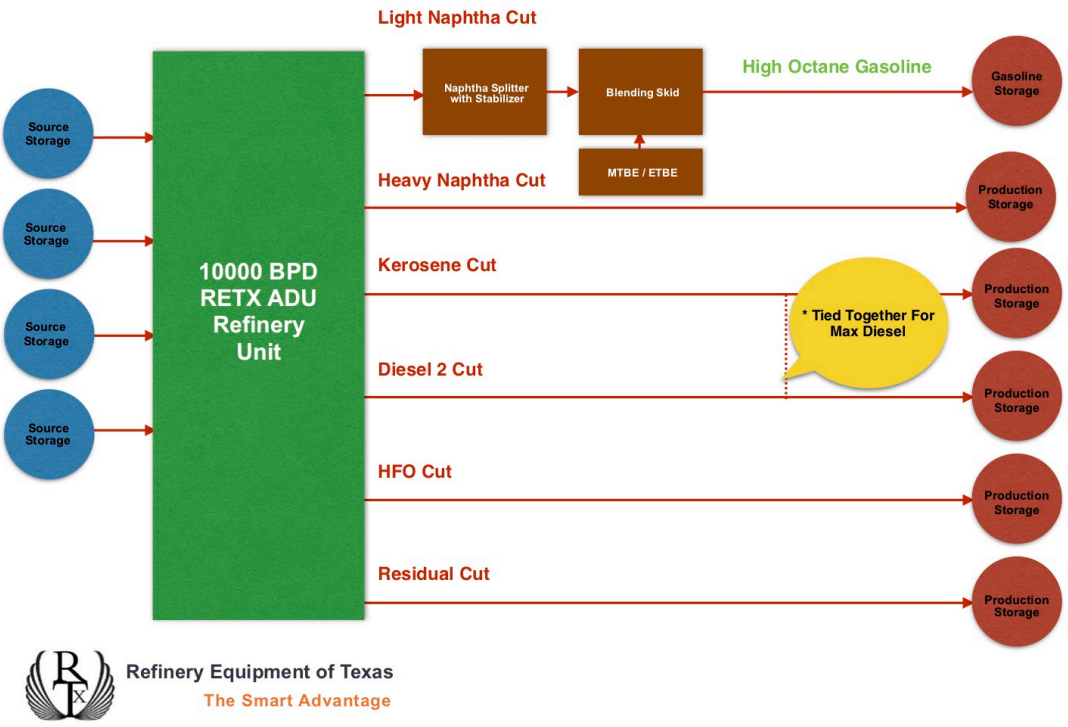
RETX - Block Flow Diagram - Base Products with High Octane Gasoline ("Cowboy Gasoline")



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RETX - Block Flow Diagram - Base Products with High Octane Gasoline (“Cowboy Gasoline”), Maximize IMO 2020 Bunker Fuel

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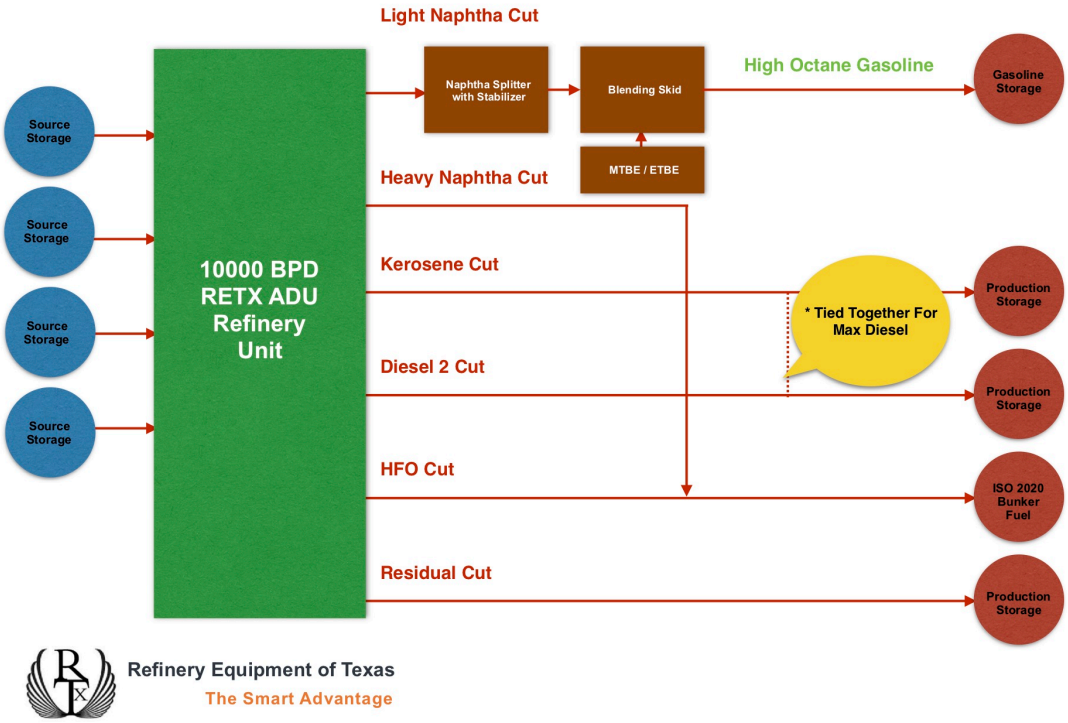

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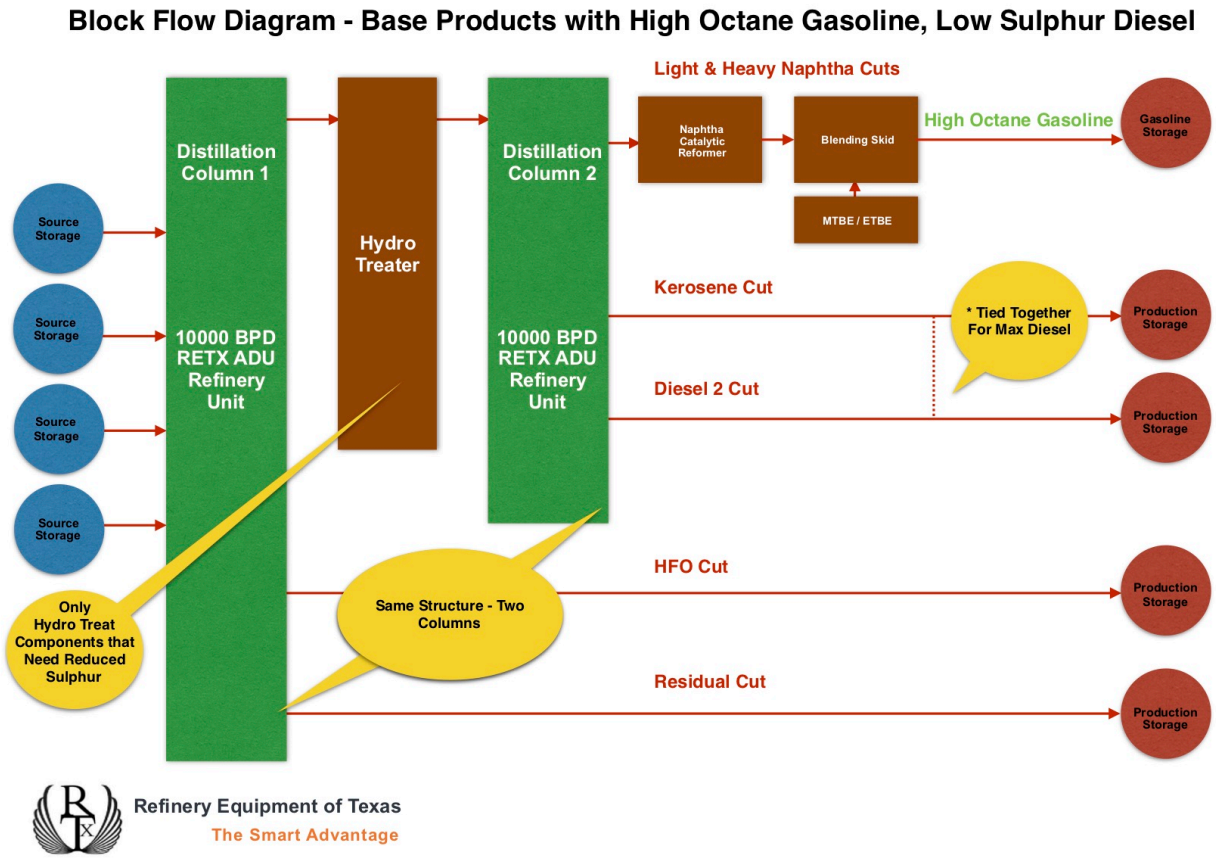
RETX - Block Flow Diagram - Base Products with High Octane Gasoline, Low Sulphur Diesel



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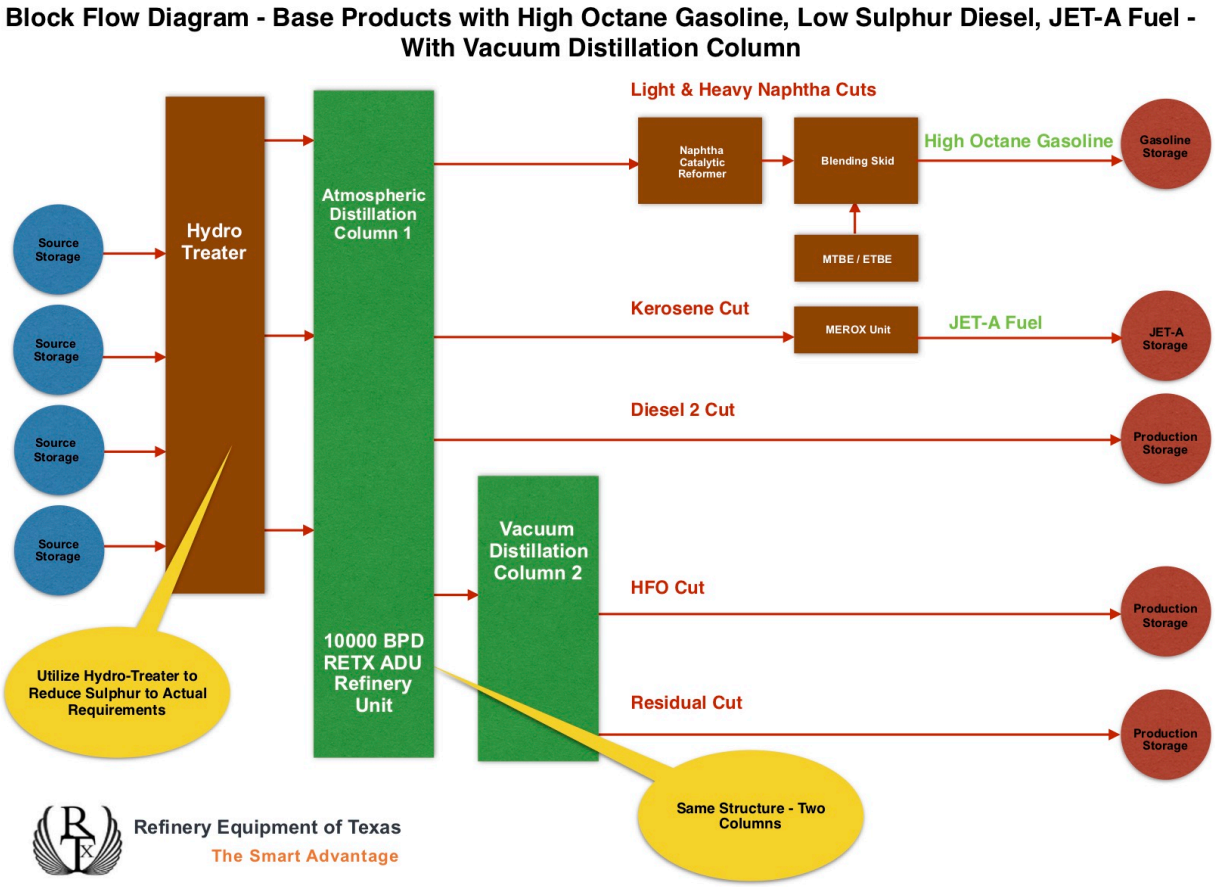
RETX - Block Flow Diagram - Base Products with High Octane Gasoline, Low Sulphur Diesel, JET-A Fuel - With Vacuum Distillation Column



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