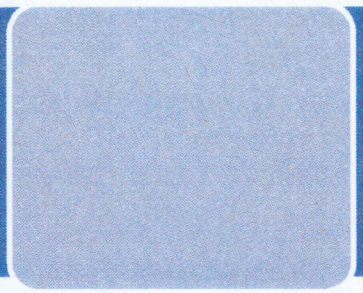
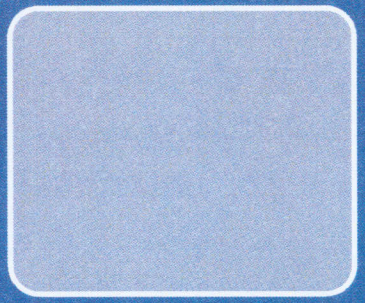
Component Industries in Oil and Gas



UPSTREAM

Exploration, Drilling and Production of Crude Oil

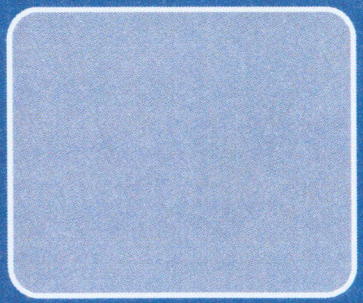
- Integrated companies with Upstream Departments: ExxonMobil, Chevron
- Typical companies: EOG Resources, SM Energy



MIDSTREAM

Gathering, transportation and trading of crude oil to refiners.

- Typical gathering companies: Enterprise Products Partners, DCP Midstream (ConocoPhillips/Spectra JV), Oneok
- Typical transmission companies: Kinder Morgan, Columbia, Dominion, Tennessee Gas, Transcontinental, Williams



DOWNSTREAM

Refining of crude oil into finished products.

Storage of crude oil.

Marketing of crude oil to wholesalers and retailers.

- Integrated companies: ExxonMobil, Chevron, ConocoPhillips, Marathon, BP
- Other companies: Sunoco, Valero, Western Refining, Tesoro

Drilling Rig Companies

- Rowan Drilling Company
- Parker
- Transocean
- Nabors
- Noble
- Patterson/UTI

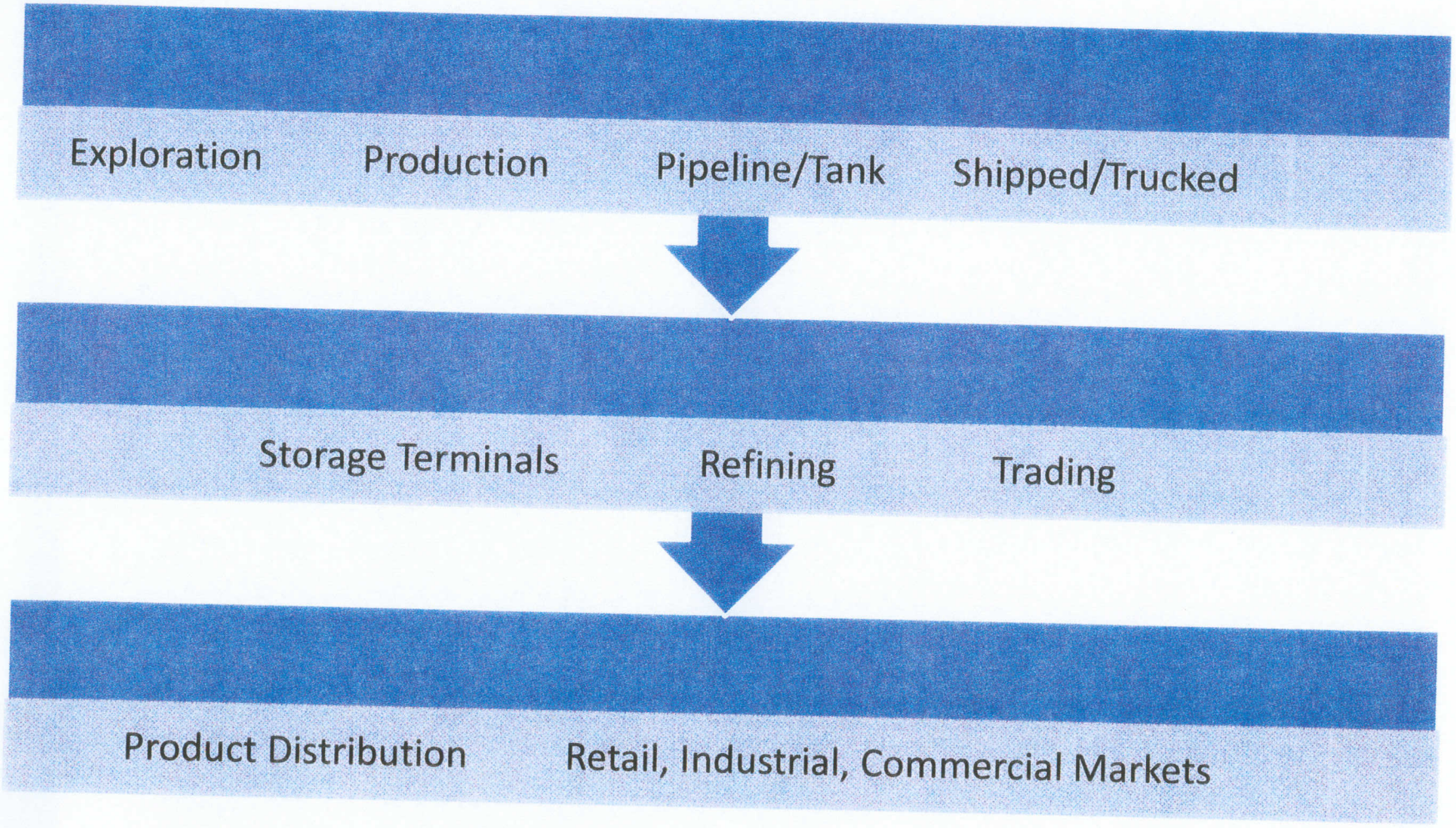
Oil Field Services

- Halliburton provides a variety of oil field services, from pressure pumping to drilling, across North America and about 80 countries.
- Schlumberger offers pressure pumping services, seismic services, fracking and integrated project-management efforts.
- Baker Hughes provides the world's oil & gas industry with products and services for drilling, completion, production and reservoir consulting.

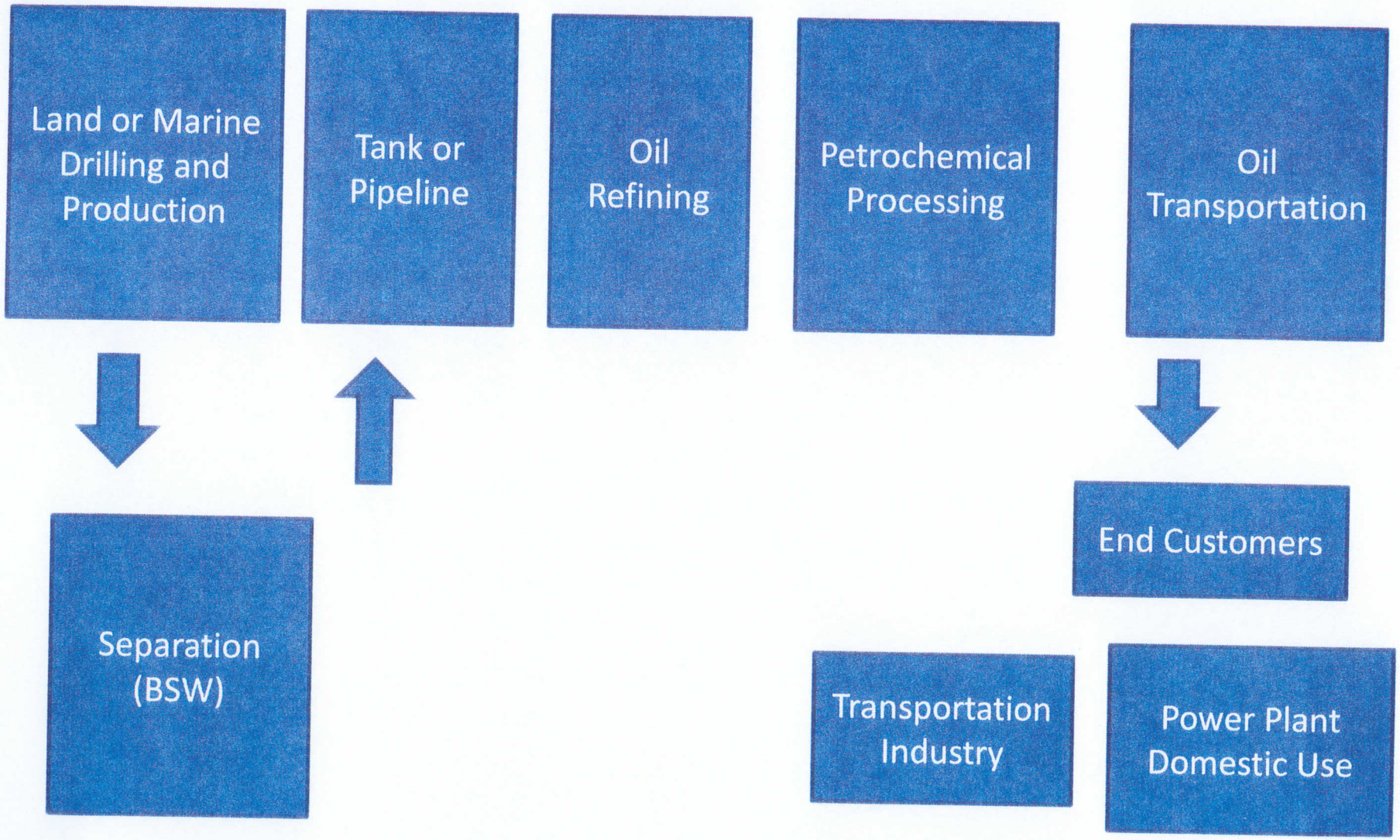
Transportation Services

- Trucking
- Rail

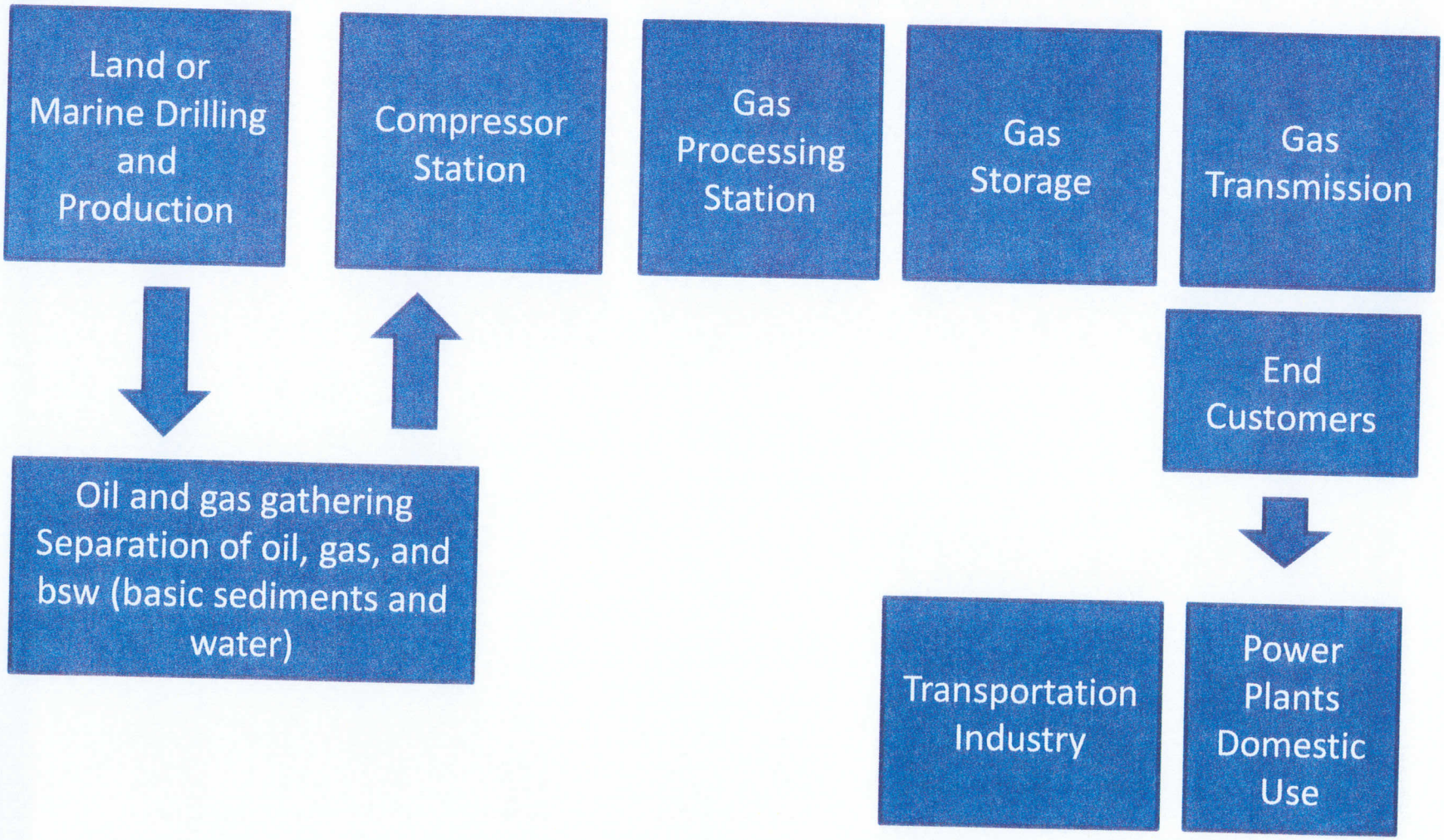
Oil Supply Chain

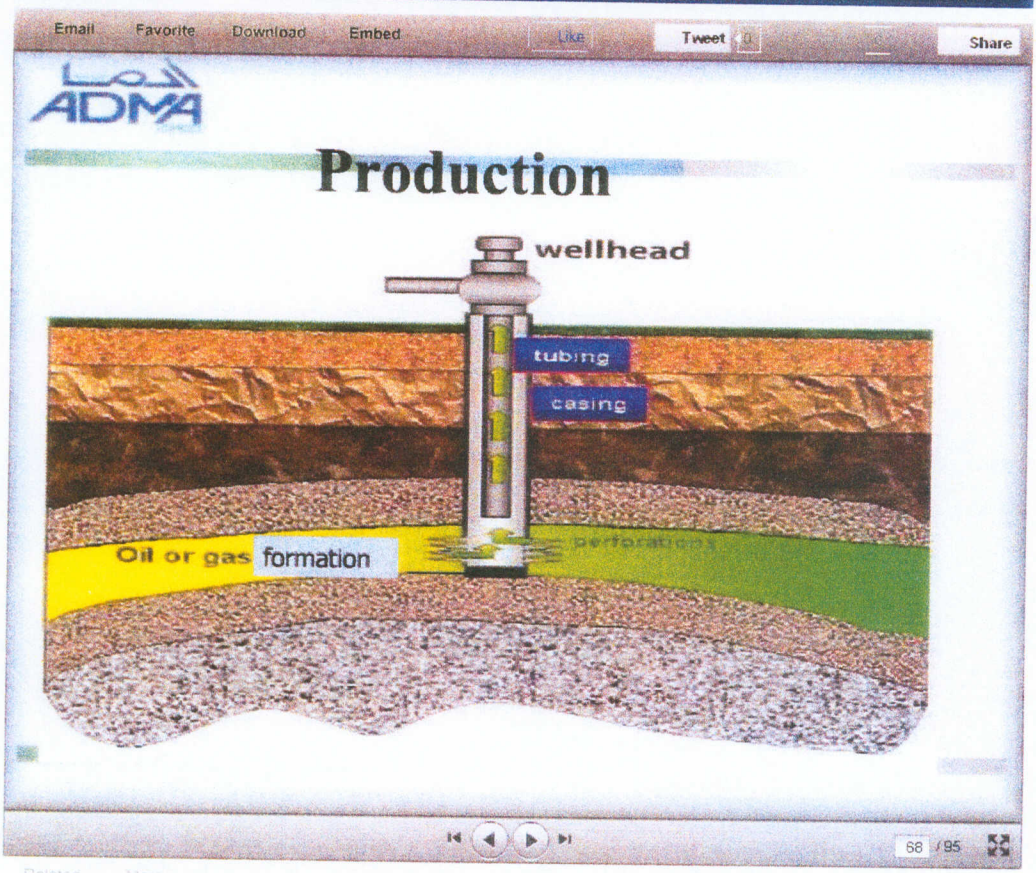


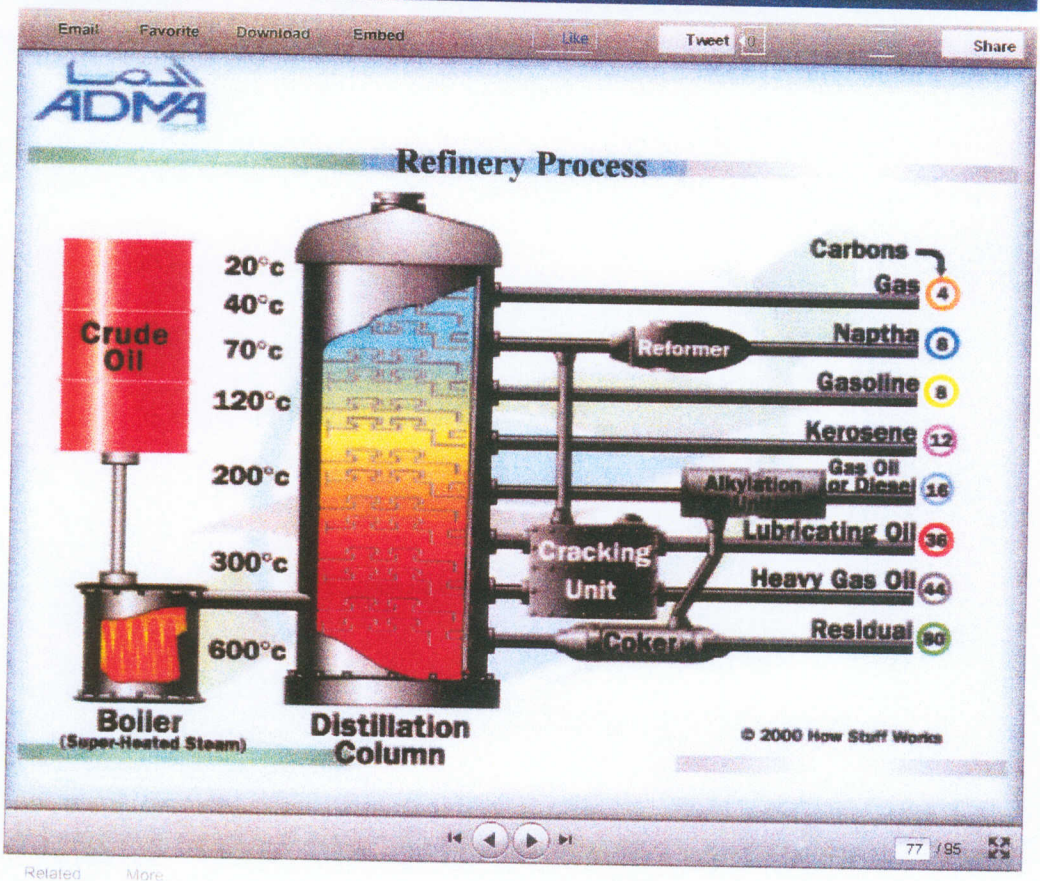
Crude Oil Supply Chain Process



Gas Supply Chain Process







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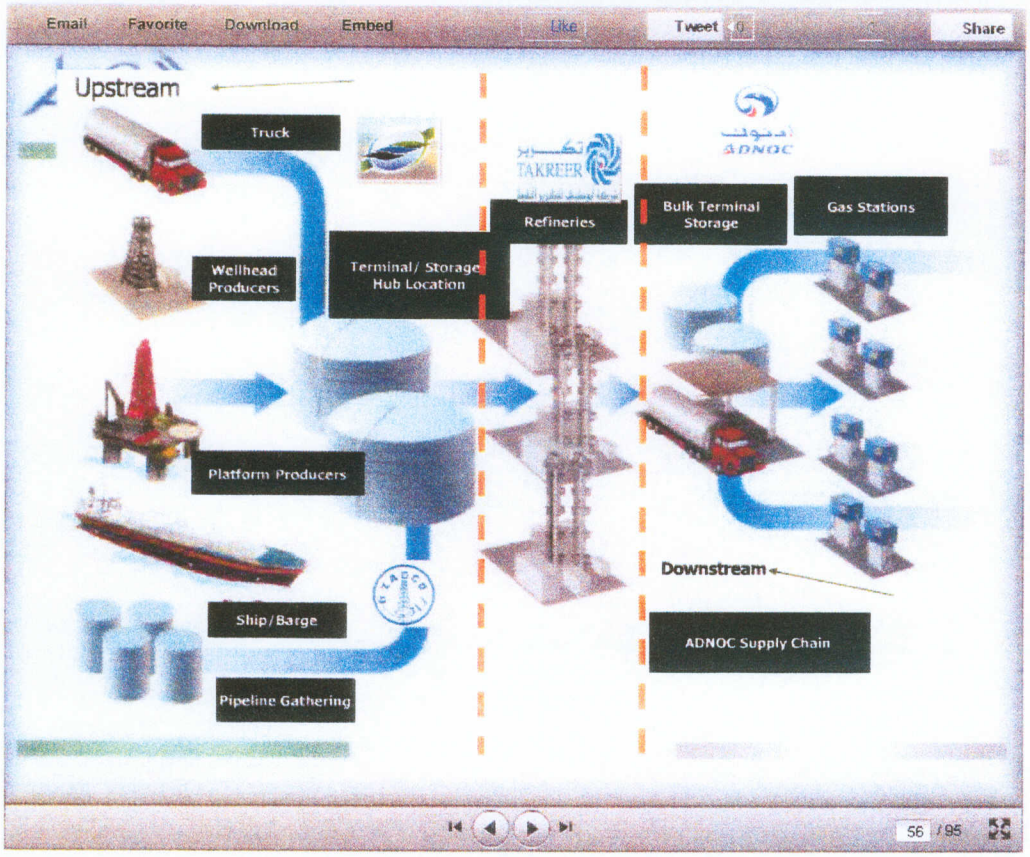

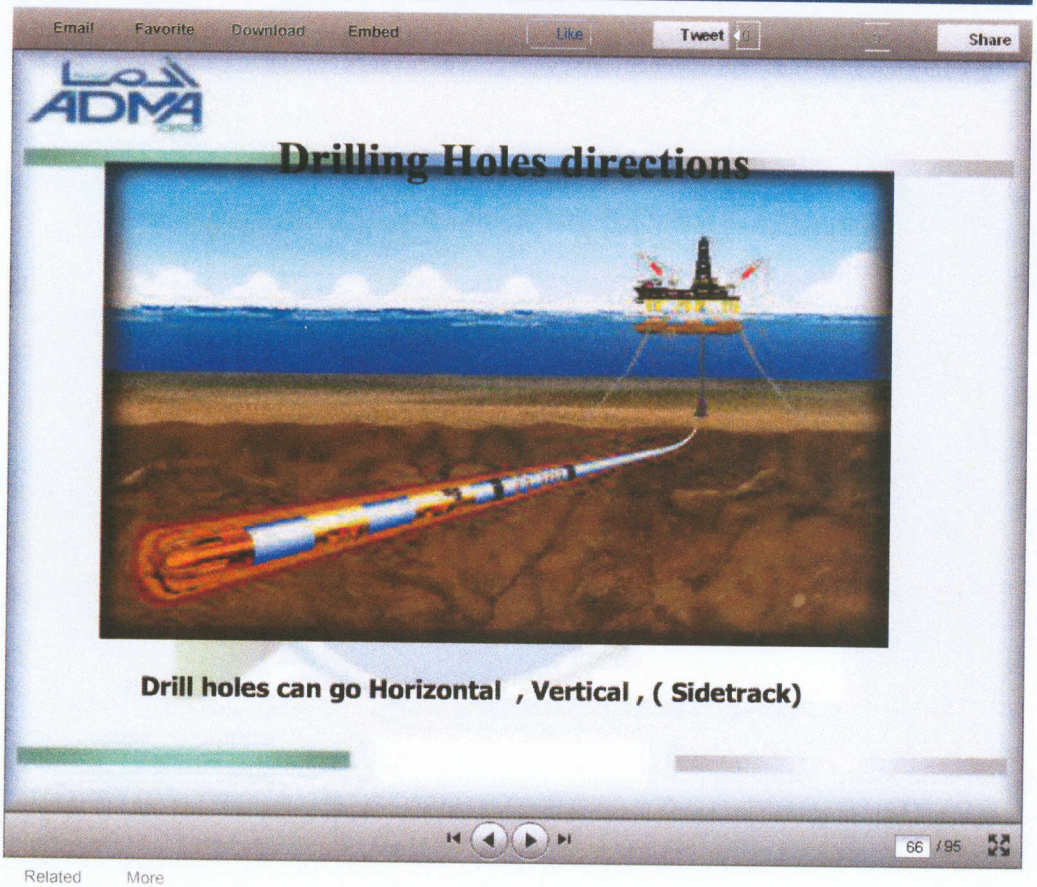

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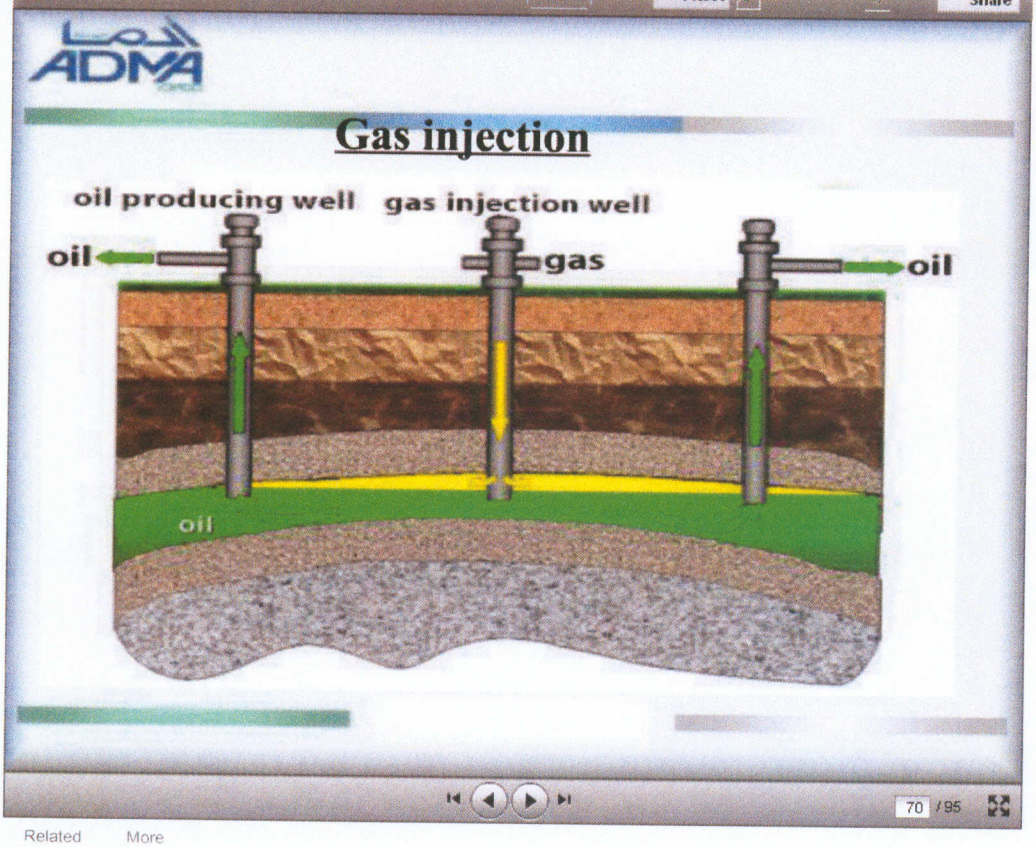

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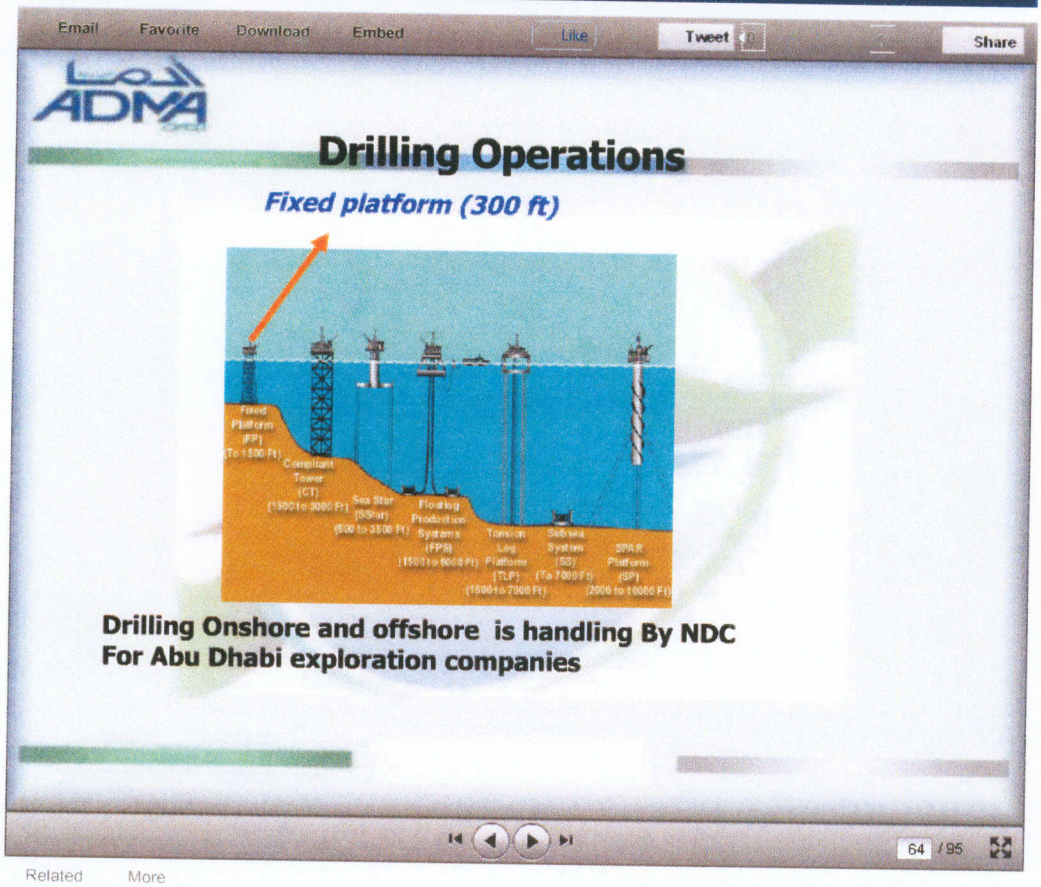

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Gas gathering lines

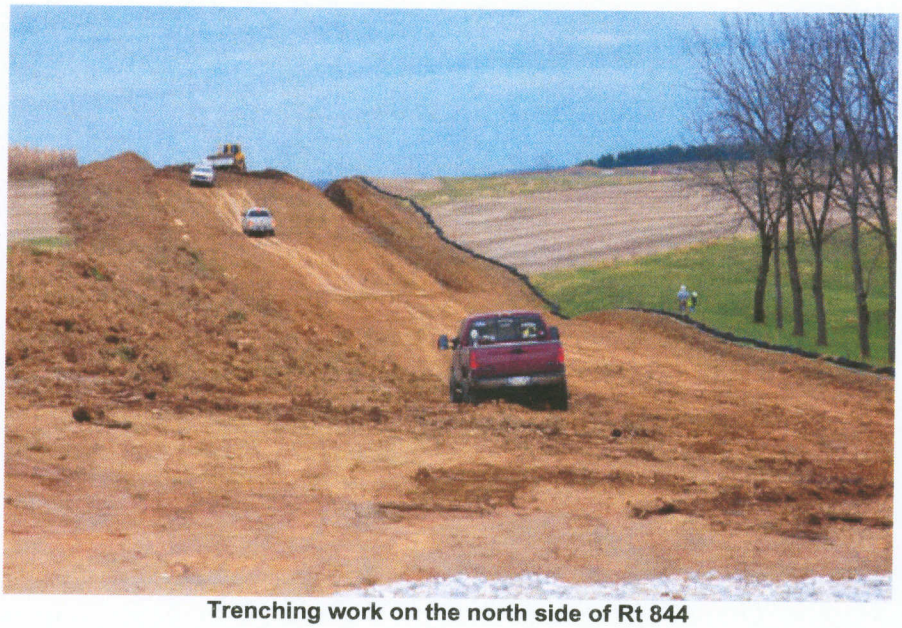
Foster Unit
Franklin Lakeview Estates
Godwin Unit
Goettel Unit
Harbison Unit
Hoskins Unit
Kearns Unit
LBROS Unit
Lowry Unit
Miller, John Unit
Miller, Lois Unit
Ohio Valley LBC
Renz Well
Rodenski Unit
Rush, John Unit
Sierzega Unit
Trax Farms
Troyer/Space Mgmt
Ward Unit
Weimer Unit
West, Eleanor
Worstell Unit
West Virginia wells

give you an idea of what to expect when a gas gathering line is installed from a Marcellus Shale gas well to a compressor station.

Gas gathering line construction near the Wm. Black well pad

Green coated gas pipe laid out along the right of way

Excavators working near the south side of Route 844



Trenching work on the north side of Rt 844

Backfilling the gas gathering pipeline trench

Close-up of the gas gathering line trench prior to backfilling

Aerial view of the Route 844 pipeline crossing

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El Paso Corporation

Ruby Pipeline Project: Rockford is constructing 126 miles of 42" for El Paso Corporation's Ruby Pipeline Project. This project is expected to include approximately 675 miles of 42" natural gas transmission pipeline, beginning at the Opal Hub in Wyoming and terminating at interconnects near Malin, Oregon. Construction began in June 2010.

To view photos of this project, click on the numbered links above the photo at right.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Pacific Gas & Electric

Ruby Interconnect Project: Rockford is currently constructing a meter station to interconnect the Ruby Pipeline with Pacific Gas and Electric 42" and 36" transmission lines.

To view photos of this project, click on the numbered links above the photo at right.

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Pacific Gas & Electric

Sonal Project: Rockford is currently constructing a project for Pacfic Gas & Electric that consist of 1200 feet of 24" pipe.

To view photos of this project, click on the numbered links above the photo at right.

1 2 3 4 5 6

Gas Proussing Plant

http://www.mgiprocess.com/user/cimage/Linde-gas.jpg

4/19/2012

Refinery in CA

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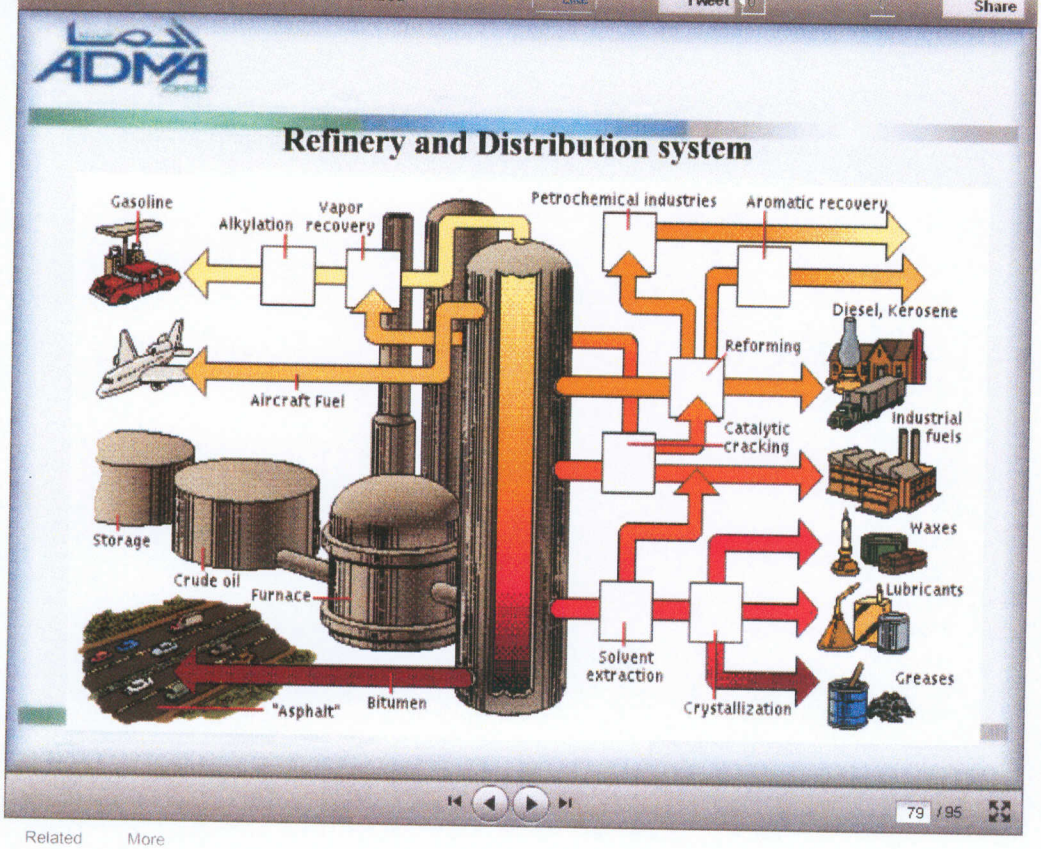

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A Discovery Company

How Offshore Drilling Works

by Robert Lamb

Inside this Article

A spar production platform floats at sunset in the Gulf of Mexico. The structure's massive cylindrical hull extends down into the depths for hundreds of feet.

Getty Images/Handout/Getty Images News/Getty Images

More Offshore Production Platforms

In the last section, we looked at some of the varieties of offshore production platforms that allow petroleum companies to reach drill sites as deep as 3,500 feet (1,067 meters). But there's a great deal of oil under the world's oceans, and more than a few methods of reaching it. Some of these designs do away with the traditional concept of an oil platform altogether, while others elevate some of the designs from the last section to even grander proportions.

Floating production system: These platforms can take the form of either floating semisubmersible platforms or drill ships. The basic idea behind their design is that, once the well has been drilled, much of the production equipment can be mounted on the seafloor and the petroleum pumped to the surface facilities through flexible **risers**. Meanwhile, the platform or ship stays in position with anchors or a dynamic positioning system. This approach allows oil companies to reach depths of up to 6,000 feet (1,829 meters).

Tension leg platform: This platform is essentially a king-sized version of the Sea Star platform, except the tension legs extend from the ocean floor to the platform itself. It experiences more horizontal motion and a certain degree of vertical motion, but it allows oil companies to drill at depths of up to 7,000 feet (2,134 meters), well over a mile (1.6 kilometers) beneath the waves.

Subsea system: This approach takes the idea of mounting the wellhead on the sea floor and applies it to even greater depths -- 7,000 feet (2,1334 meters) or more. Once the well has been drilled by a surface platform, the automated systems transfer the oil and natural gas to production facilities by either risers or undersea pipelines.

Spar platform: Finally, if you absolutely need to drill a hole at a depth of 10,000 feet (3,048 meters), then the spar platform is the oil rig for you. With this design, the drilling platform sits atop a giant, hollow cylindrical hull. The other end of the cylinder descends around 700 feet (213 meters) into the ocean depths. While the cylinder stops far above the ocean floor, its weight stabilizes the platform. A network of taunt cables and lines trail out from the cylinder to secure it to the ocean floor in what is called a **lateral catenary system**. The drill string descends down through the length of the cylinder's interior and down to the ocean floor.

As technology improves and existing petroleum reserves wane, exploration will continue to dive into the subterranean depths. This combination of deeper waters and deeper oil wells will pose even greater challenges for oil companies.

While technology plays a vital role in offshore drilling, these massive constructions are also home to large crews of workers. In the next section, we'll take a look at life on an oil rig.

HELLISH HEAT AND CHILLING DEPTHS

Deep-sea waters reach nearly freezing temperatures, contain pressures great enough to crack iron casings and are subject to rough, deep-sea currents. Engineers have to design equipment that can stand up to the pressure, while also preventing boiling oil from hot, underground depths from cooling to a solid form and rupturing pipes when it emerges into the chilly ocean environment. While antifreeze has played an important part in preventing this thus far, more advanced methods are under development [source: Wired].

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NGLs And Olefins

Natural Gas Liquids and Olefins

Below you will find additional information on the Natural Gas Liquids and Olefins that we trade. We encourage you to **contact us** with any questions you may have or to begin working together today.

Natural Gas Liquids

Producers of natural gas, otherwise known as methane (which is a gas at atmospheric pressure), also produce a significant quantity of hydrocarbon liquids. These liquids include ethane, propane, butane (normal and iso), and pentanes. These liquids must be separated from the methane gas in order to move the product efficiently down the pipeline, but also because the methane and the liquids can have dramatically different uses or intended destinations. The methane is mostly used as a heating or industrial fuel. The liquids can be used as a fuel, as a feedstock to the chemical industry, or for blending into unleaded gasoline.

Thus the raw gas is quickly sent from the producer's wellhead to a separation plant to remove the liquids, and then the liquids are run through a fractionation plant. Fractionation is the process through which each of the liquids is chemically separated into the individual ethane, propane, butanes, and pentanes. The individual liquids can then be sent to their intended destination via pipeline, railcar, truck, or ship. Safety, in addition to logistics, is a factor in determining how the individual products are moved.

The New York Mercantile and Intercontinental Exchanges both offer financial & physical contracts tied to TET, Mt. Belvieu and Conway for each of the Natural Gas Liquids. In addition, these products trade financially and physically in the Over-the-Counter (OTC) Market.

Propane

Propane demand comprises about 40% of the natural gas liquids market. This market is also the largest and most liquidly traded market of the natural gas liquids. Its primary demand components are for home heating and as a feedstock for the chemical market. Much of this product physically moves through the U.S. Gulf Coast due to its proximity to major chemical/refinery complexes, liquids pipeline and storage hub, and major energy shipping ports. The Southwest U.S. and Gulf of Mexico are a major North American natural gas producing region. Mt. Belviue, TX has long been the worldwide hub for propane and much of the natural gas liquids trading, specifically because of its vast saltdome storage capacity and pipeline, which connects Mt. Belviue to the Northeast and numerous places in between. This is commonly known as the "TET" pipeline.

Most of the liquidity in the propane market is due to the physical and financial contracts tied to the TET pipeline pricing. This has developed, as the TET pipeline is the largest single propane pipeline in the world and directly impacts propane pricing for the Southwest, Southeast, Ohio Valley, and Northeastern United States.

The second most liquid U.S. propane location is Conway, Kansas. This location in southern Kansas is a Midwest production gathering site and chemical/refinery complex. Conway is also tied to Mt. Belivieu by a mostly southerly flowing pipeline.

Ethane

Ethane, the lightest of the natural gas liquids, makes up almost 25% of total NGL demand. Ethane is almost exclusively used as a feedstock to chemical plants for the production of Ethylene and Propylene, the building blocks of the plastics industry. It can also be used for fueling or at times even left in the natural gas (methane) stream, depending on current economics.

The vast majority of ethane trades along the Gulf Coast of the United States, as this is the largest producing region and home to most of the demand from Gulf Coast chemical complexes. The major hub for ethane trading is Mt. Belvieu, TX. Ethane is transported via pipelines, as it is very volatile and not well suited for truck or container transport.

Butane

Butane is used in the petrochemical industry as normal butane and iso butane. Both are naturally occurring byproducts of natural gas production and crude refining. Normal butane is primarily used for unleaded blending (roughly 85%) — this is almost exclusively in the winter when the RVP specs are higher. Cracking demand is steady throughout the year and is responsible for most of the remaining demand, aside from the chain smokers' butane lighter demand. The largest traded location for butane is at Mt. Belvieu, Texas. This location includes refinery grade LDM product, and fractionation grade NON-LDM product.

Natural Gasoline

Natural gasoline is a mixture of liquid hydrocarbons pentanes and heavier originating from natural gas production and crude oil refining. Demand is comprised of roughly 50% for chemical cracking and 50% for unleaded blending. A growing percentage is used as a crude diluent. The supply/demand picture is clouded by the market for the related product naphtha. C5 is the favored ngl unleaded blendstock in the summer when the tightest or lowest unleaded RVP spec of 7.8 psi is in place. Natural gasoline's most liquid trading hub is also at the Mt. Belvieu location at NON-LDM storage.

Olefins

Olefins are petrochemical derivatives produced by cracking (processing) feedstocks such as ethane, propane, butane, naphtha and gas oil. The primary olefins products are ethylene, propylene, butadiene and C4 derivatives. These petrochemical derivatives are used to produce plastics, chemical intermediates and industrial solvents. Ethylene and propylene are the two most actively traded olefins in the spot market.

Ethylene

Ethylene (C2=) is a colorless gas and is the most produced organic compound in the world. The typical unit measurement of ethylene is in pounds, and it is distributed via pipelines. Ethylene is traded both physically and financially in the over-the-counter spot market. Both physical and financial Ethylene are clearable through several New York Merchantile Exchange contracts, which are tied to the Mt. Belvieu Williams system.

Propylene

Propylene can be broken into three main categories: Chemical Grade Propylene (CGP), Polymer Grade Propylene (PGP) and Refinery Grade Propylene (RGP). Of the three, RGP is more likely to be traded on the spot market and is also a colorless gas. The typical unit measurement for RGP is in barrels.