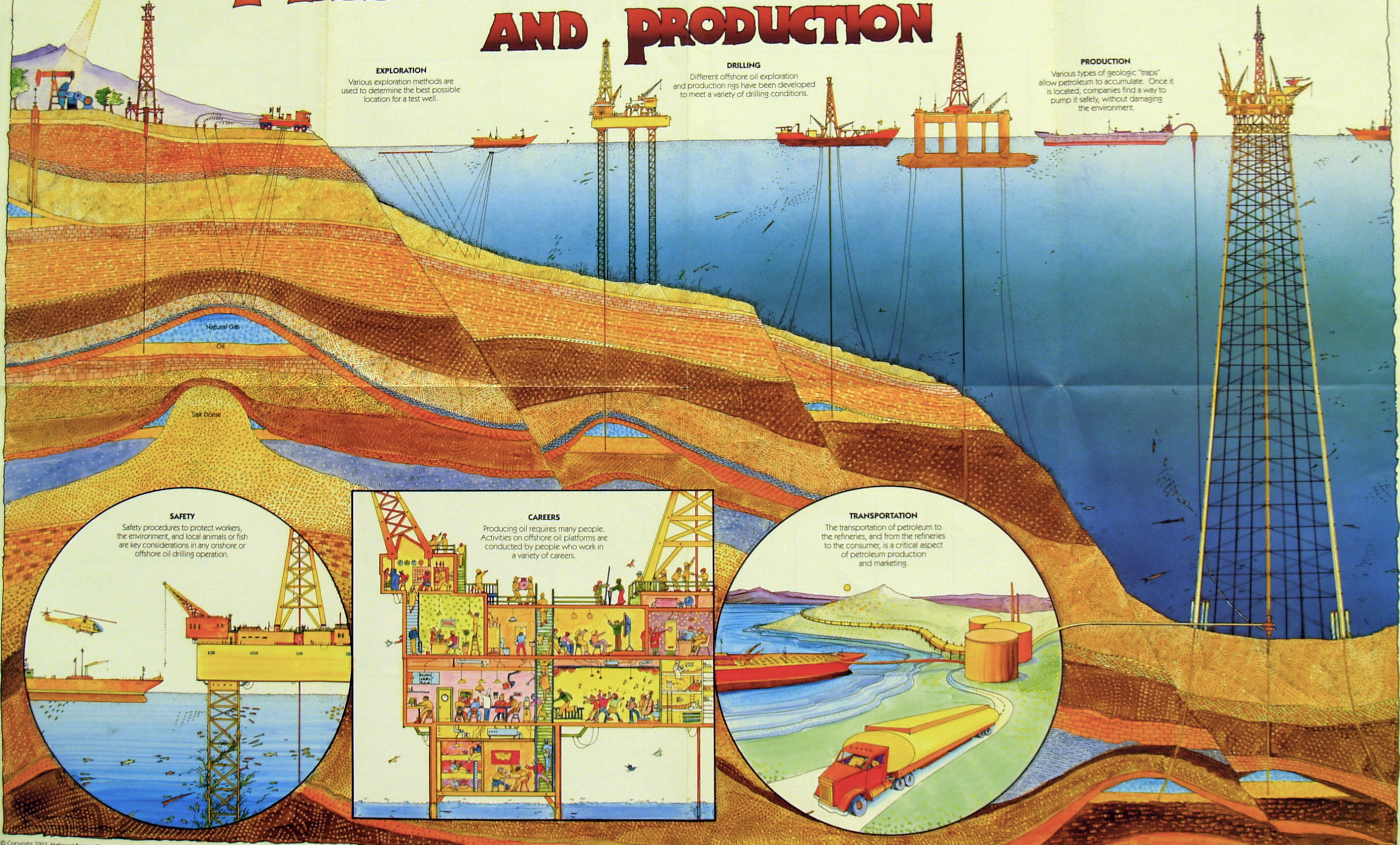


# PETROLEUM EXPLORATION AND PRODUCTION

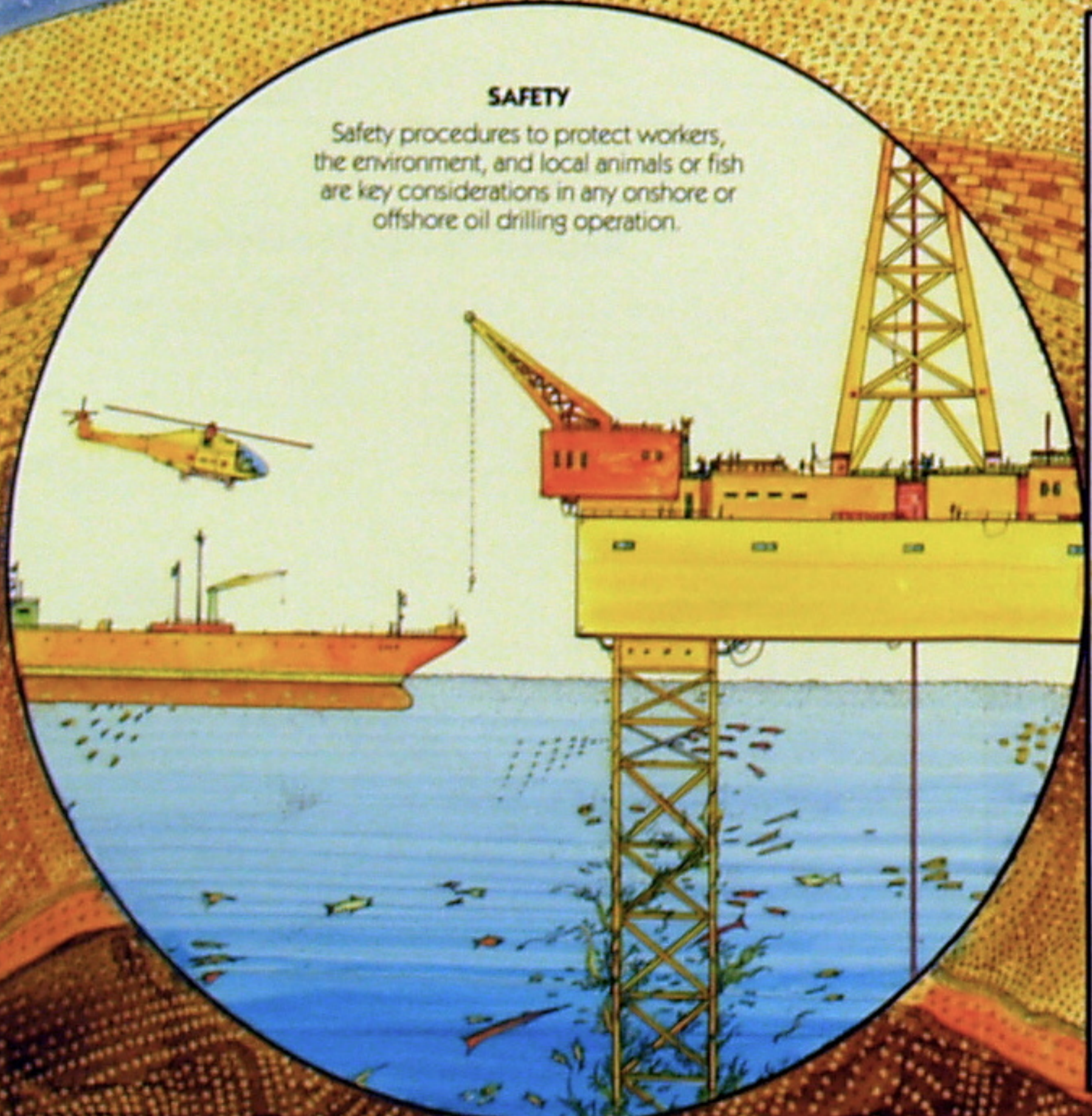
**EXPLORATION**  
 Various exploration methods are used to determine the best possible location for a test well.

**DRILLING**  
 Different offshore oil exploration and production rigs have been developed to meet a variety of drilling conditions.

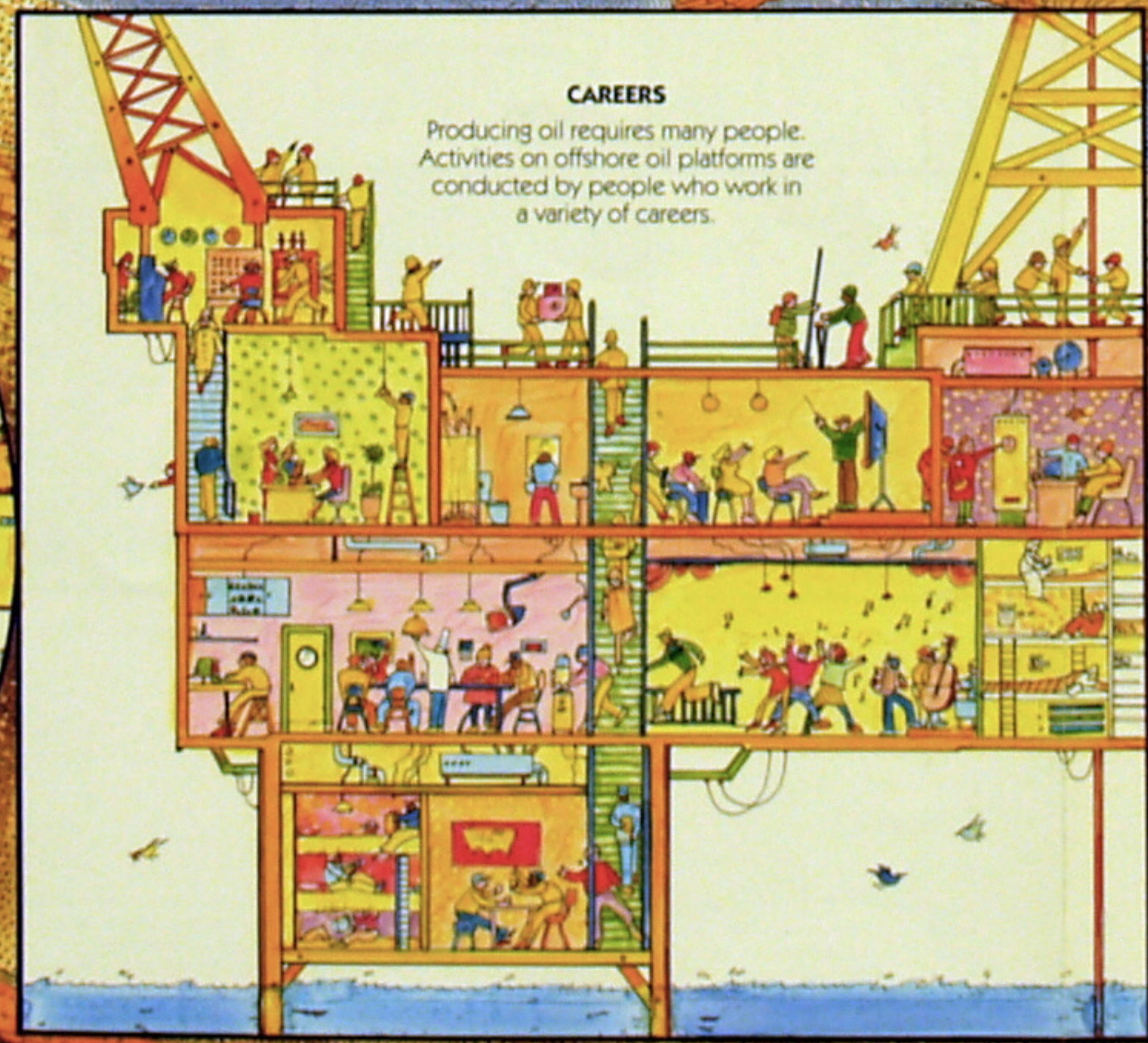
**PRODUCTION**  
 Various types of geologic "traps" allow petroleum to accumulate. Once it is located, companies find a way to pump it safely, without damaging the environment.



**SAFETY**  
 Safety procedures to protect workers, the environment, and local animals or fish are key considerations in any onshore or offshore oil drilling operation.



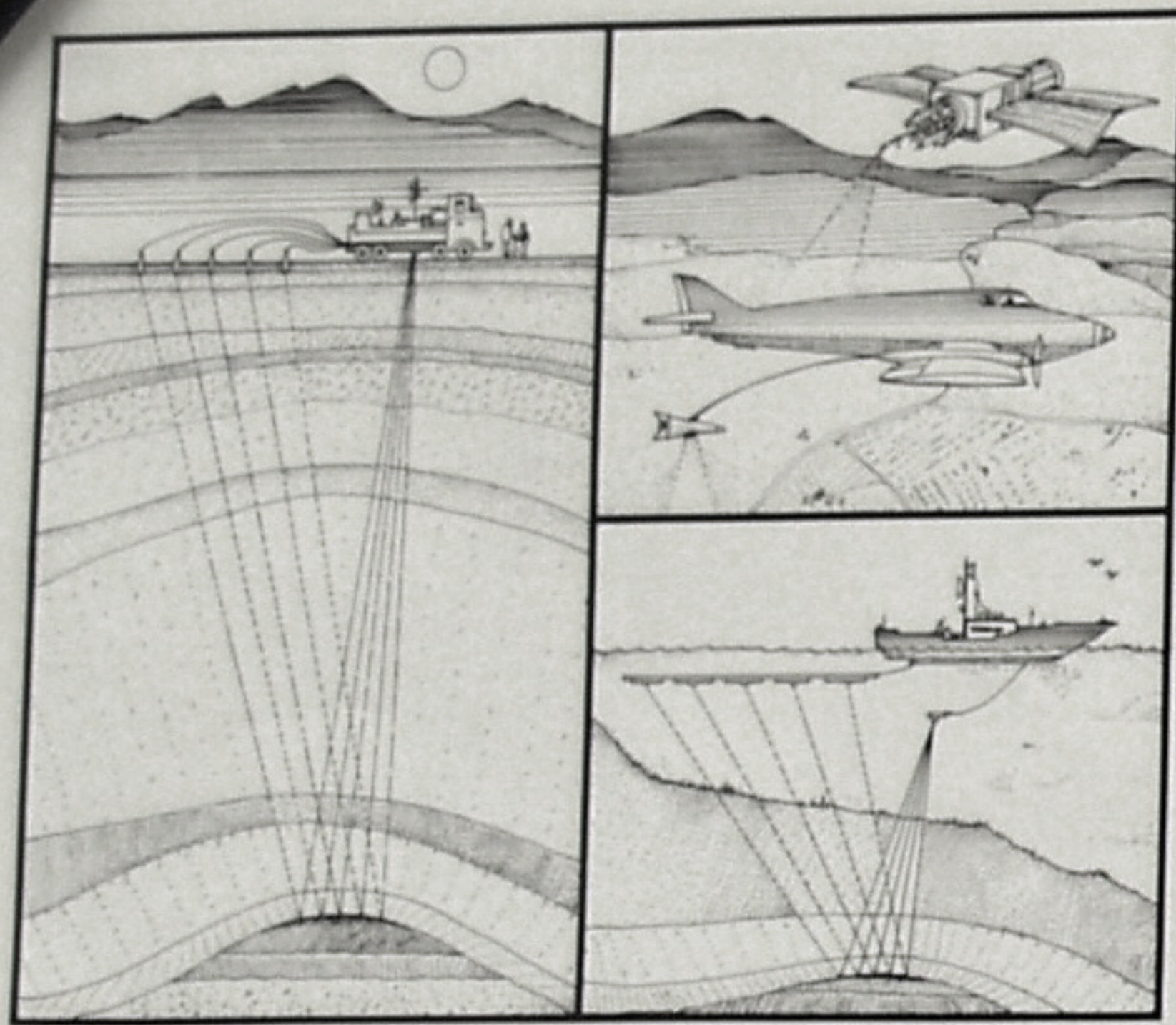
**CAREERS**  
 Producing oil requires many people. Activities on offshore oil platforms are conducted by people who work in a variety of careers.



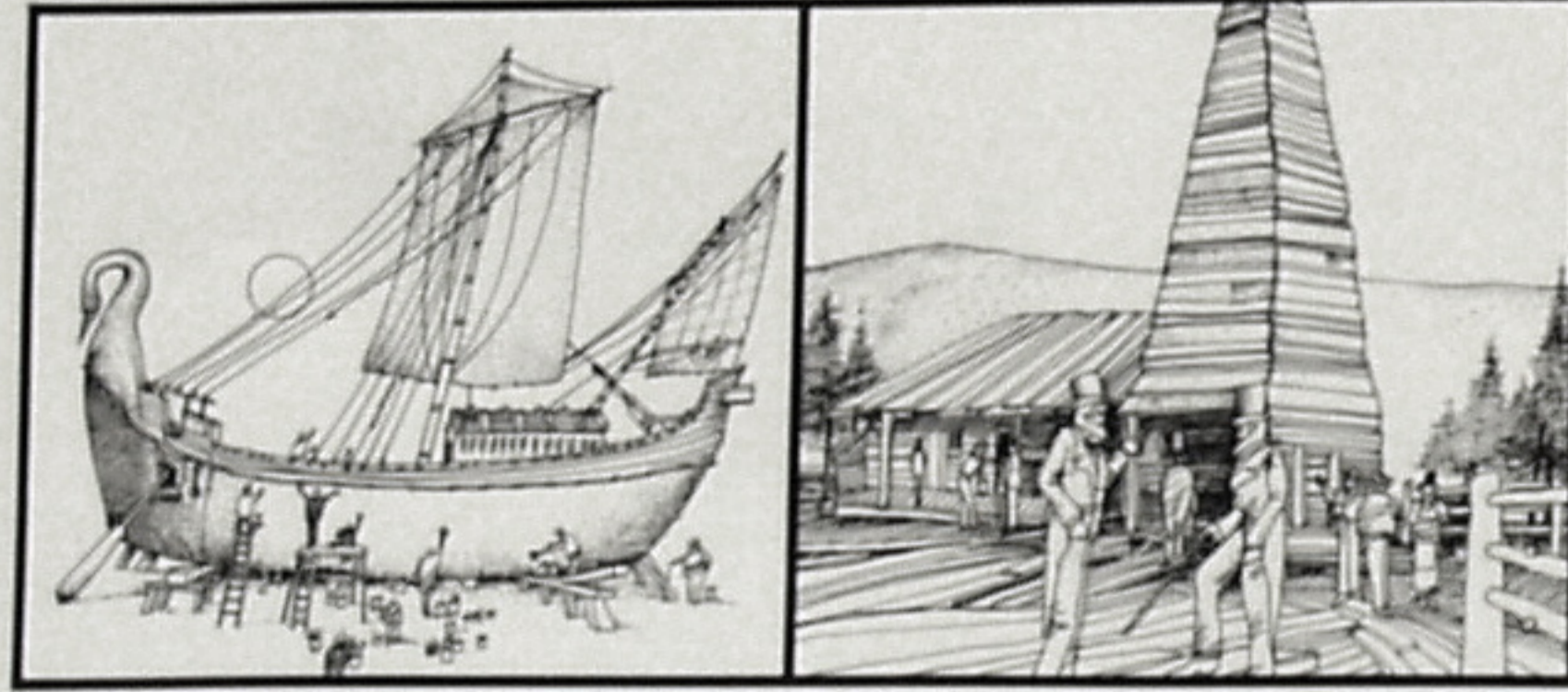
**TRANSPORTATION**  
 The transportation of petroleum to the refineries, and from the refineries to the consumer, is a critical aspect of petroleum production and marketing.



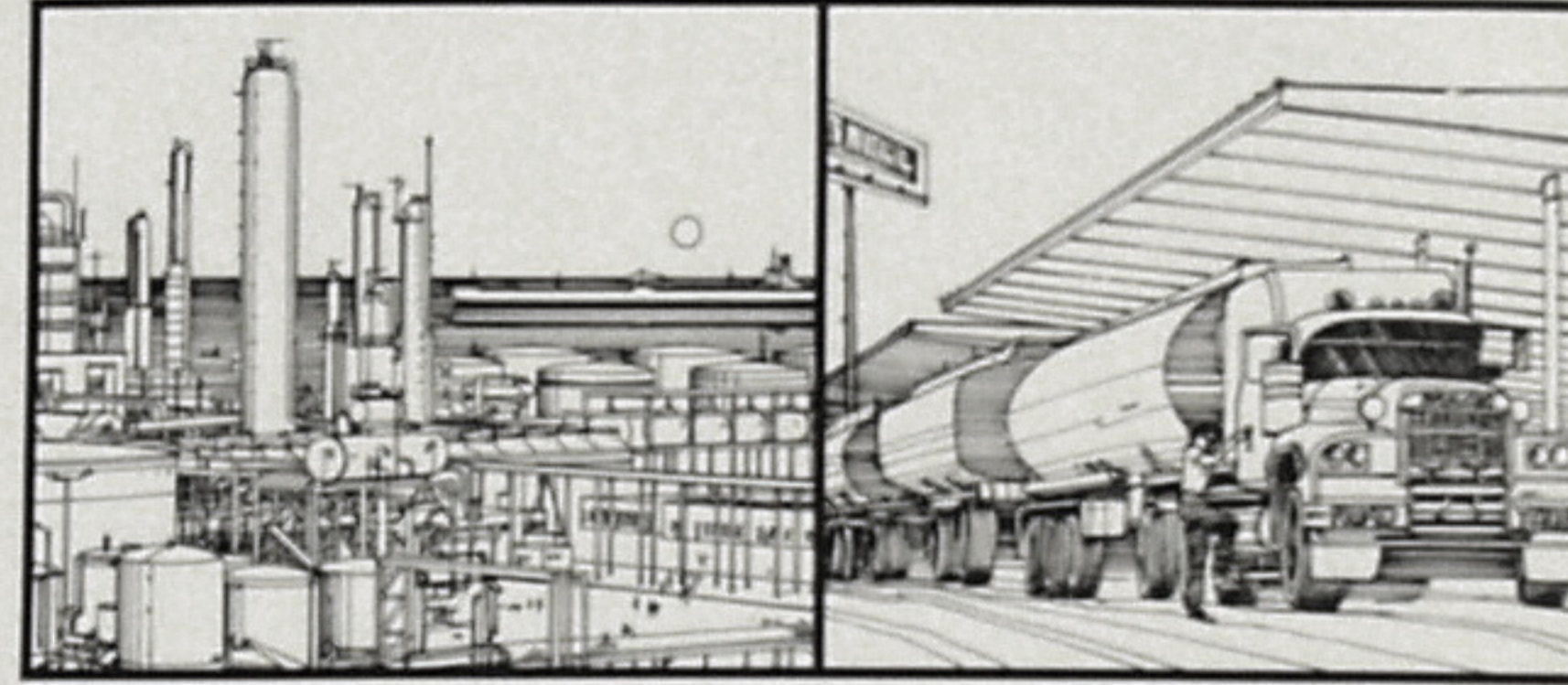
# PETROLEUM EXPLORATION AND PRODUCTION



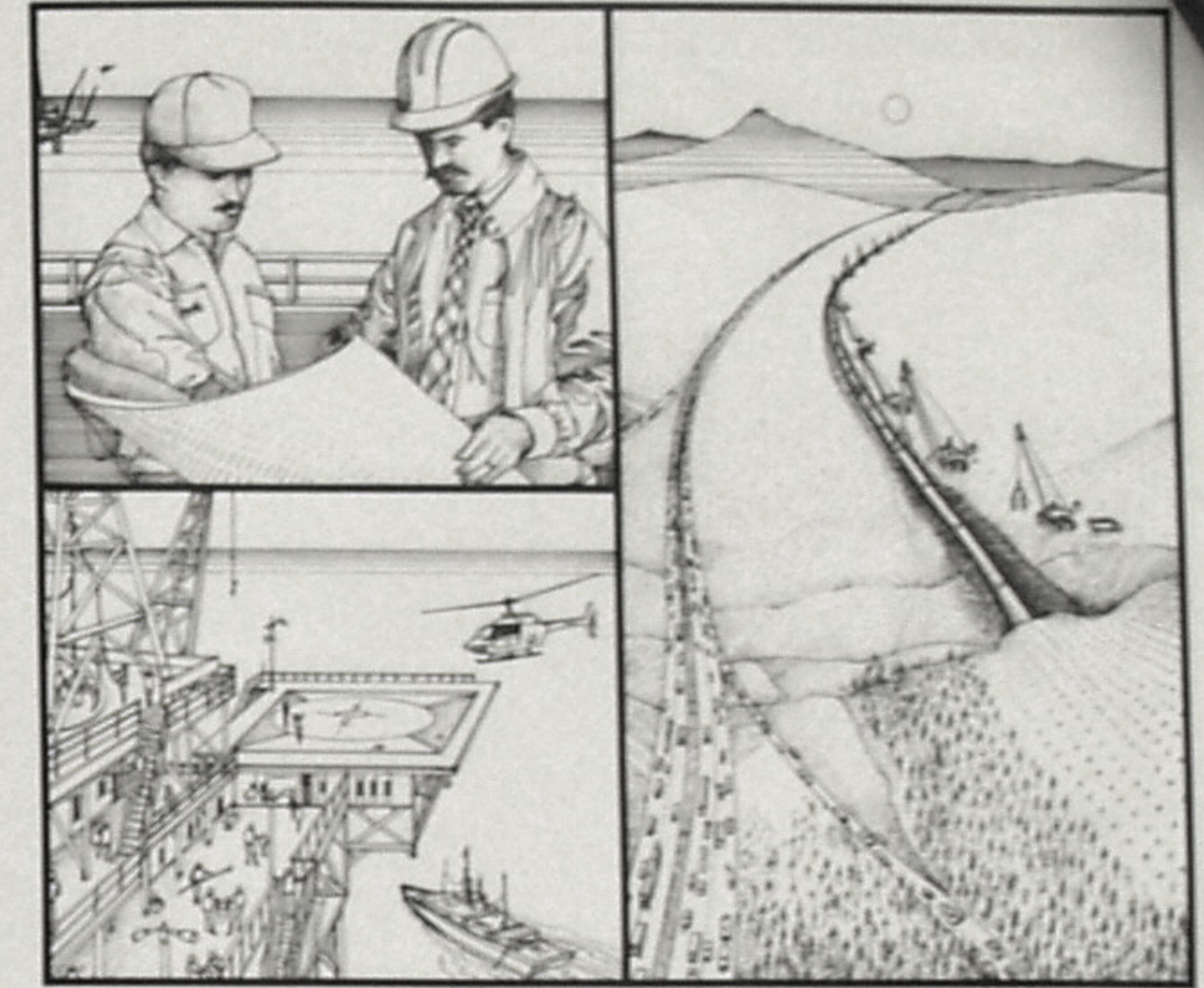
Left: Geophone System Upper Right: Satellite Observation Lower Right: Ping Sound Technique



Left: People using petroleum products centuries ago Right: First oil well in the U.S.



Left: From pipeline or tanker to refinery Right: From refinery to customer



Top Right: Studying safety regulations Lower Right: Safety exercise on an oil rig  
Left: Restoring the land after pipeline is laid

## Exploration

Petroleum exploration begins with the identification of geologic structures which can trap or store pockets of natural gas and oil. Methods to locate and map these geologic structures vary greatly. Satellites can now map huge areas of the earth and locate promising topographical features which are difficult to see from a more narrow perspective. Aircraft are used to photograph prospective drilling areas, chart magnetic fluctuations in the earth's crust, and carry various other recording and measurement devices.

Specific geologic areas are further examined through seismic studies in which vibrations or sound waves are sent into the earth's crust and then recorded when they reflect off the various layers of rock in the underground formations. This type of examination is important in determining an exact spot in which to locate an exploratory well.

## History

Man has used petroleum for thousands of years, but most of the early sources for petroleum centered on natural seeps. The oil or bitumen found in these natural settings were very crude, so uses were limited. It is believed that people centuries ago used a crude form of oil, an asphalt-like substance, to coat wood for protection from water and weather. The first recorded effort to drill for oil and natural gas occurred in China about 347 A.D. Using bamboo

poles and crude bits, these ancient people drilled to a depth of approximately 800 feet where a deposit of petroleum and natural gas was located. This astounding feat was unknown to the western world when in 1859, Edwin Drake drilled for oil in Pennsylvania. Drake drilled 69 1/2 feet and established the first modern production oil well.

## Transportation

Petroleum products need to be transported from the well to the refinery and from the refinery to the various markets using this valuable resource. In the case of natural gas, pipelines serve as the chief method of transportation no matter where the resource is being taken. Oil, on the other hand, can be transported by pipeline, tanker ship, tanker truck, or by rail in tanker cars. Once processed, petroleum products are packaged in all types of

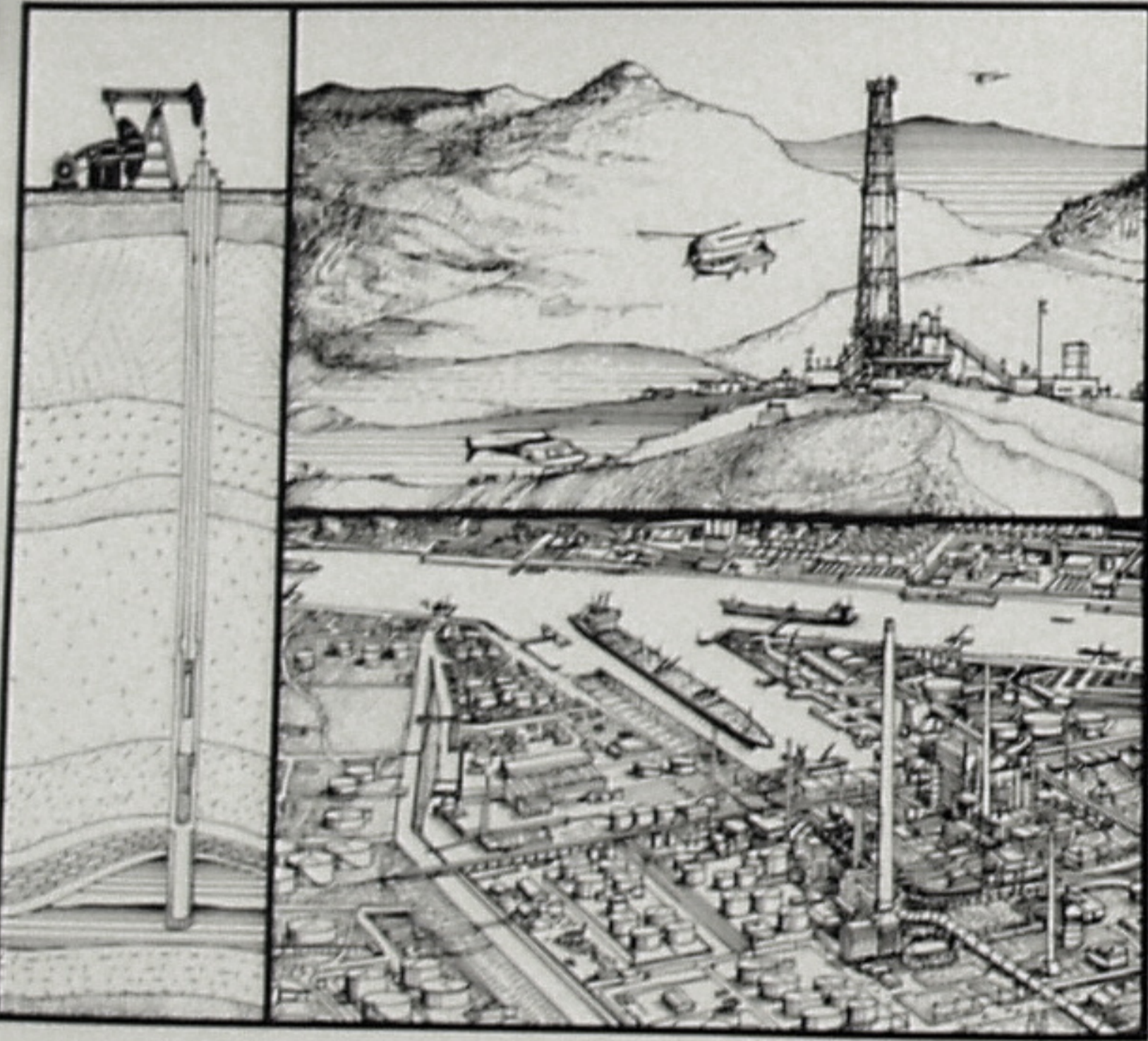
containers and shipped by every known method of transportation.

In recent years, much attention has been given to the methods used for transporting petroleum products, since oil spills represent potential hazard to the environment. New industry regulations and improved equipment are making all forms of petroleum transportation safer and more efficient.

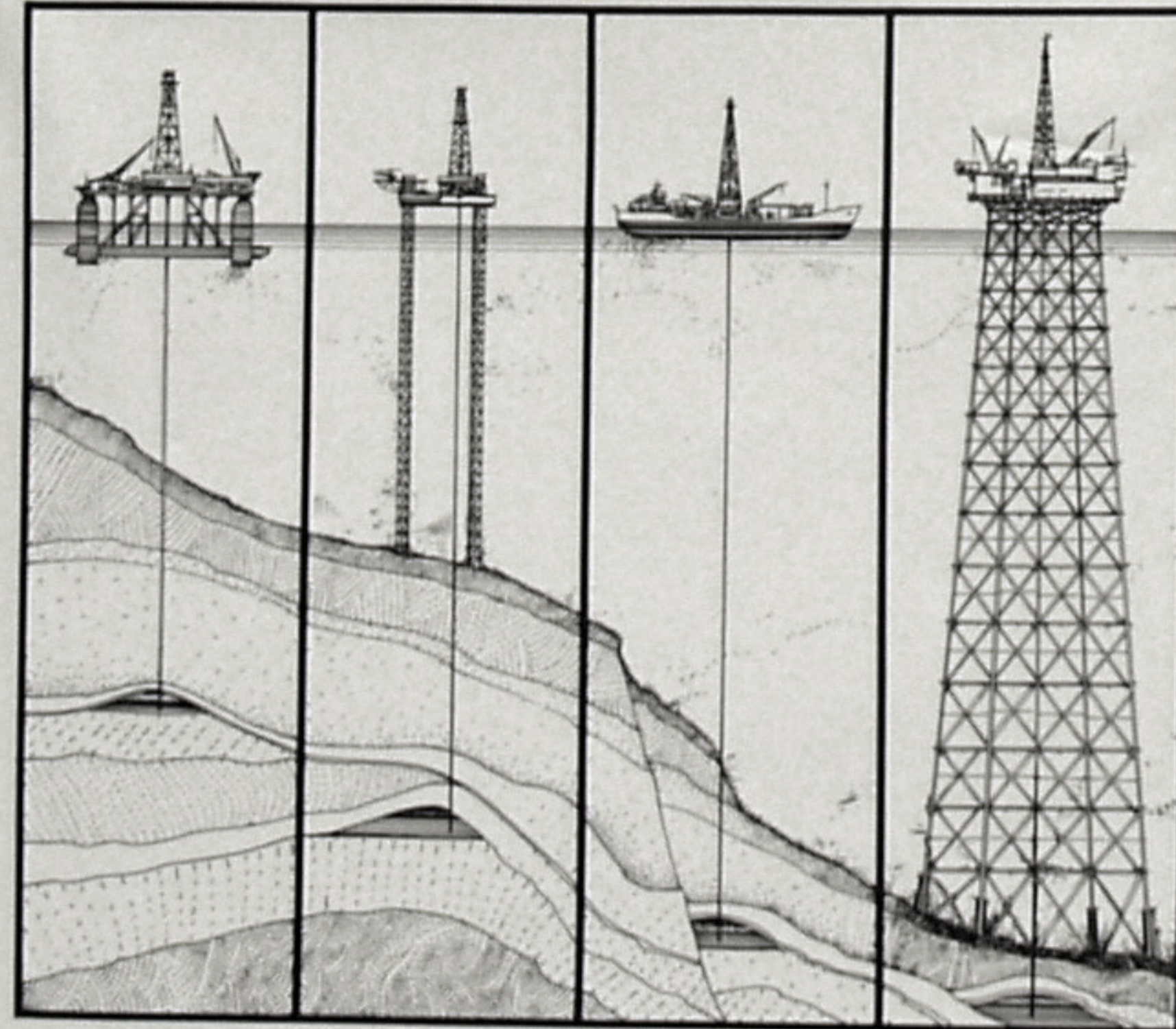
## Safety

When drilling offshore, oil companies must obtain 17 federal permits and comply with 90 sets of government regulations in addition to the many state permits and regulations. Most of these permits and regulations have been created to check and double-check safety procedures for oil company employees and the environment in which they are working and impacting. One reason imported oil is cheaper than domestically produced oil,

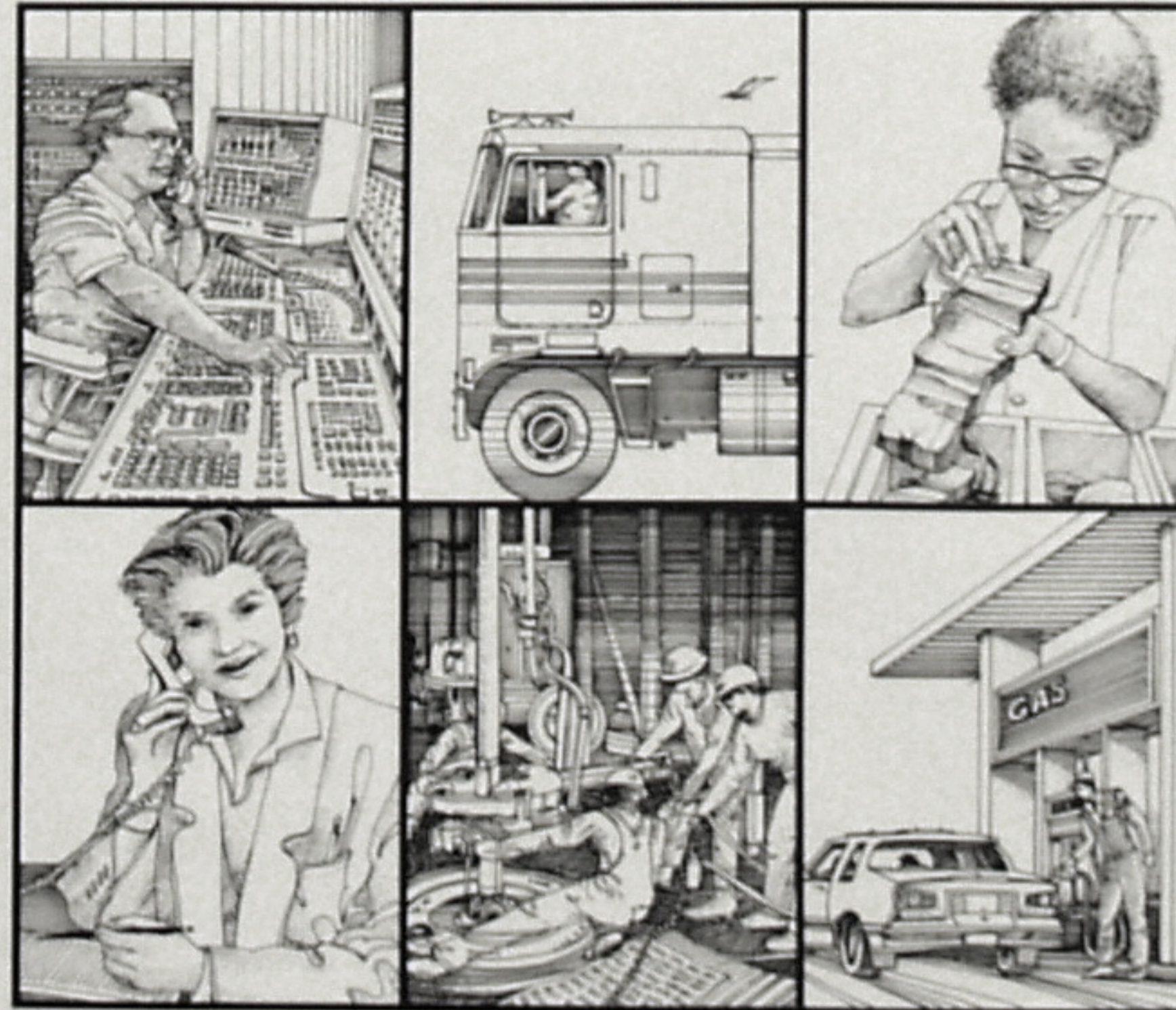
is that foreign oil producers do not have the mandated safety procedures and environmental protection requirements of domestic producers. Even though some people complain about the higher cost of domestic petroleum products, no one wants to give up the safety record and responsible environmental policies of the major United States oil producers.



Left: Beam Pump Upper Right: Drilling Rig Lower Right: Oil Refinery



From Left to Right: Semi-submersible, Jack-Up, Drill Ship, Fixed-leg, Drilling Methods



Top Right: Control Operator, Truck Driver, Geologist Lower Row: Accountant, Roustabouts, Station Attendant

## How To Use This Poster

Prior to displaying the poster, photocopy the information on the back side for classroom use. The information on the back of the poster relates to the illustrations on the front. Teachers are encouraged to use all or part of the poster information for class-

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## NATIONAL ENERGY FOUNDATION

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## Drilling

While onshore drilling rigs are quite similar (differing mostly in size), offshore oil drilling rigs vary a great deal in order to accommodate the various conditions encountered while drilling in the open sea. Some drilling rigs, such as the drill ships, are used almost exclusively for exploratory drilling, while the platform rigs are primarily production ori-

ented structures. Matching the available drilling equipment to the job and the drilling conditions has made drilling operations more efficient and safe. Since 1975, U.S. drilling regulations have been so strict, and drilling safety measures so extensive, there has been a 99.99% safety record for offshore drilling.

## Production

Once an oil field has been identified as large enough to produce commercial quantities of gas and/or oil, production wells are drilled and product transportation channels are established to bring the raw petroleum to refinery facilities and then to established markets. As a rule, many production wells are drilled around a central distribution point so that product transportation resources such as pipelines, tankers, or tanker trucks can be loaded and routed most efficiently.

One of the key factors in the production process is the location and capability of refinery facilities in relationship to the oil field. Many times, refineries are built specifically to serve a major petroleum reserve. In some instances, however, wells are capped because there are no convenient refineries to economically process the product being produced. As can be imagined, the petroleum production phase is a varied and complex set of related activities.

## Careers

The petroleum industry has always provided a wide range of career possibilities. Work is available in a variety of work settings as well as locations throughout the world. Geologists, chemists, accountants, production managers, and marketing specialists are a few of the professional careers that exist in the industry. Roustabouts, refinery workers, truck drivers, warehousemen, and security positions are a few of the blue collar jobs in the petroleum field.

Because of the size of the industry and the variety of vocational positions, there is ample opportunity for women in all levels of the petroleum job market. People wishing to work in this field should concentrate on developing high performance skills because the petroleum industry rewards and promotes the employees who are exceptionally productive in their jobs.

For further information about oil exploration and production, contact the American Petroleum Institute, 1220 L Street, N.W., Washington, D.C.

20005, or one of the oil companies located throughout the United States.

