石油资源

Petroleum, consisting of crude oil and natural gas, seems to originate from organic matter in marine sediment. Microscopic organisms settle to the seafloor and accumulate in marine mud. The organic matter may partially decompose, using up the dissolved oxygen in the sediment. As soon as the oxygen is gone, decay stops and the remaining organic matter is preserved.

石油是由原油和天然气组成，都源自于海洋的有机沉淀。微小的有机物定居在海底并堆积在海泥里，有机物会局部分解，消耗沉淀里的溶解氧，当氧气消耗殆尽分解便停止，留下剩余的有机物。

Continued sedimentation—the process of deposits' settling on the sea bottom—buries the organic matter and subjects it to higher temperatures and pressures, which convert the organic matter to oil and gas. █As muddy sediments are pressed together, the gas and small droplets of oil may be squeezed out of the mud and may move into sandy layers nearby. █Over long periods of time (millions of years), accumulations of gas and oil can collect in the sandy layers. █Both oil and gas are less dense than water, so they generally tend to rise upward through water-saturated rock and sediment. █

持续的沉积——堆积物沉积到海底的过程将有机物埋在海底使之受到海底温度、高压的影响，最终转变成油和气体。当泥状沉积物被挤压在一起时，天然气和石油液滴会被挤出泥层，然后进入附近的沙层。经过很长的一个周期（数百万年），积聚的天然气和石油会在沙层中聚集。因为石油和天然气的密度都比水低，所以他们通常通过饱含水的岩层和沉积物往上升。

Oil pools are valuable underground accumulations of oil, and oil fields are regions underlain by one or more oil pools. When an oil pool or field has been discovered, wells are drilled into the ground. Permanent towers, called derricks, used to be built to handle the long sections of drilling pipe. Now portable drilling machines are set up and are then dismantled and removed. When the well reaches a pool, oil usually rises up the well because of its density difference with water beneath it or because of the pressure of expanding gas trapped above it. Although this rise of oil is almost always carefully controlled today, spouts of oil, or gushers, were common in the past. Gas pressure gradually dies out, and oil is pumped from the well. Water or steam may be pumped down adjacent wells to help push the oil out. At a refinery, the crude oil from underground is separated into natural gas, gasoline, kerosene, and various oils. Petrochemicals such as dyes, fertilizer, and plastic are also manufactured from the petroleum.

油床是宝贵的地下石油积聚处，而油田是被一个或多个油床覆盖区域。当人们发现油床或油田时，就会把井钻到地下。固定的塔称为井架，建造井架是为了控制长距离的钻杆。现代使用的便携式钻井机安装使用完成后，会被拆除和移走。因为石油的密度与在下层的水不同，或者因为石油上面的气体扩张形成的压力，当井探至油床时，石油通常会上升至井内。现在石油的上升已经可以很好的进行控制，但在过去，井喷或管涌经常发生。气体压力逐渐减小，然后油从井中被抽出。水或蒸汽会通过相邻的井被注入，以帮助推出石油。在炼油厂，地下的原油被分离成天然气、汽油、煤油和各种油类。石油还可用来生产石油化工产品，如染料、化肥、塑料制品等。

As oil becomes increasingly difficult to find, the search for it is extended into more-hostile environments. The development of the oil field on the North Slope of Alaska and the construction of the Alaska pipeline are examples of the great expense and difficulty involved in new oil discoveries. Offshore drilling platforms extend the search for oil to the ocean's continental shelves—those gently sloping submarine regions at the edges of the continents. More than one-quarter of the world's oil and almost one-fifth of the world's natural gas come from offshore, even though offshore drilling is six to seven times more expensive than drilling on land. A significant part of this oil and gas comes from under the North Sea between Great Britain and Norway.

随着石油越来越难以找到，石油勘探已经开始到更恶劣的环境中进行。比如，在最新发现的油田案例中，阿拉斯加北部斜面油田就是一个管道建设尘本高、难度大的例子。海底钻探平台将寻找石油的区域延伸到了海洋大陆架上——陆地附近浅海下缓缓的斜坡。世界上四分之一以上的石油和近五分之一的天然气都来自近海，尽管近海钻井的成本比陆地钻井高 6 至 7 倍。世界上相当一部分的石油和天然气来自大不列颠和挪威之间的北海。

Of course, there is far more oil underground than can be recovered. It may be in a pool too small or too far from a potential market to justify the expense of drilling. Some oil lies under regions where drilling is forbidden, such as national parks or other public lands. Even given the best extraction techniques, only about 30 to 40 percent of the oil in a given pool can be brought to the surface. The rest is far too difficult to extract and has to remain underground.

当然，地下还能发现更多的石油。油床可能太小或远离潜在的市场而不适宜开采。一些石油存在于禁止钻井的地区，如国家公园或其他公共土地。即使提供最好的采油技术，油池中也只有大约百分之三十到四十的石油可以挖掘至地面。其余的因为太难抽取而不得不留在地下。

Moreover, getting petroleum out of the ground and from under the sea and to the consumer can create environmental problems anywhere along the line. Pipelines carrying oil can be broken by faults or landslides, causing serious oil spills. Spillage from huge oil-carrying cargo ships, called tankers, involved in collisions or accidental groundings (such as the one off Alaska in 1989) can create oil slicks at sea. Offshore platforms may also lose oil, creating oil slicks that drift ashore and foul the beaches, harming the environment. Sometimes, the ground at an oil field may subside as oil is removed. The Wilmington field near Long Beach, California, has subsided nine meters in 50 years; protective barriers have had to be built to prevent seawater from flooding the area. Finally, the refining and burning of petroleum and its products can cause air pollution. Advancing technology and strict laws, however, are helping control some of these adverse environmental effects.

此外，从地下和海底获得石油运送到消费者的途中的任何地方都会产生环境问题。如果石油运输管道因为故障或塌方损坏，将会造成了严重的石油泄漏。运载石油的油轮在发生碰撞或意外搁浅（如在 1989 年阿拉斯加发生的油轮搁浅）的情况下，石油泄露会使得海上产生浮油。海上钻井平台也可能会泄露石油，生成的浮油漂流到岸上造成海滩污染，损害环境。有时一个油田的石油被抽取后，地面会发生下沉。加州长滩附近的威尔明顿油田，已经在 50 年内下沉了 9 米；人们不得不建造保护围墙以防止海水流进这个地区。最后，石油炼制、燃烧以及其产品也会造成空气污染。不过不管怎样，先进的技术和严格的法律正在协助控制这些对环境的不利影响。