

Chapter 1

Developing the Demand

An appraisal of the America of our times need not wait upon an historian of the twenty-first century to look back and note the primacy of oil. Oil has resettled our population, elected our presidents, swayed our foreign policy, and legislated our morality. Oil has not only fueled our wars—the two World Wars, Korea and Vietnam¹—but is equally the sinew of our might in peacetime; it takes oil to be a superpower

Solberg, *Oil Power*

Maybe so, but in order to understand the incredible investments of labor, technology, and capital associated with offshore oil that will unfold in the pages of this volume, it is not enough to understand how we use oil and what it has done for us. We need to go deeper and examine how we came to be so dependent on oil and how such an enormous demand for the product was created. Oil was sold to an enthusiastic and willing public in the form of progress, freedom, and the American way. In the process individuals and corporations became wealthy beyond imagination. The twentieth largest economic entity in the world today is Exxon, followed only by the gross national products of the nineteen wealthiest countries in the world (Morgan 1986).

A part of the story must be understood against the backdrop of U.S. petroleum policy (or lack thereof) from the very beginning and the monopolistic structure of the oil industry from its inception, with the emergence of John D. Rockefeller and the cooperative policies of the international oil cartel between 1927 and 1973. The importance of the dates will become evident as the book unfolds. From this backdrop there are two basic trends that emerge and repeat themselves. First, without some type of control, which has almost never been effectively present, the history of the industry has been one of erratic booms and busts, as each new technological development in oil exploration (location of salt domes, seismic technology), production (drilling, transportation, refining) and consumption (kerosene, the automobile, etc.) spurred inequities between supply and demand.

Second, in the bumpy road to align supply and demand, virtually never has the finite nature of oil reserves been considered as a factor. Early during World War I, shortages of oil emerged, and the federal government worked with industry leaders to increase supply to meet demand. When the production of oil outstripped its consumption following World War I, instead of curtailing supply, the policy, in both the United States and the cartel, came to be to increase demand to meet supply, a feat that was accomplished completely only with the advent of World War II. Only in 1959 with the quota on foreign oil did the issue of curtailing supply emerge and then only with foreign oil and only to avoid a decline in the demand for the domestic oil. Then, with shortages following the oil embargo in 1973–1974, the focus became not curtailing demand but, with Nixon's Project Independence, increased production offshore and through the Trans-Alaska Pipeline; again, increasing supply to meet demand. Both strategies depend on increasing something a process that leads to a spiral of production and dependency. Only fleetingly have considerations been given to decreasing either supply or demand, and, for whatever reasons, they have been notably unsuccessful. Since both these trends have continued to the present and have directly affected offshore development, and since the uncontrolled and monopolistic nature of the playing field for oil persists, it is worth tracing their emergence.

EARLY HISTORY

Crude oil and pitch occur at natural seeps in many parts of the world and have been used in preindustrial times around the globe for a variety of purposes from fuel to road paving, from cosmetics to the caulking of boats. The first use of crude oil by European descendants in the United States was for medicinal purposes. "American Oil" or "Rock Oil," which was found in natural seeps, was touted as the cure for a variety of illnesses by the mid-1800s and was marketed nationwide. One of the more prolific production sites was found in Pittsburgh, Pennsylvania, and one of the imaginative entrepreneurs was found in the person of Samuel Kier. By 1848 Kier was bottling, selling, and extolling the "wonderful medical virtues" of his product, and by a decade later he had sold almost a quarter of a million bottles of it at a dollar each (Solberg 1976: 23). In 1854 a process for the distillation of kerosene from oil was patented by Abraham Gesner, a Canadian, and given that it represented a potential replacement for expensive whale oil, this additional commercial use for petroleum soon emerged in the American market. At the same time Kier was looking into other commercial uses for his product, and after experimenting with distilling his "Rock Oil," he built in 1854 what is generally believed to be the first commercial refinery in Pittsburgh. The refinery had a five-barrel capacity. By 1858 Kier and a local Pittsburgh firm were selling the refined product as an illuminant to New York City distributors. Demand for the product rose and soon petroleum was also finding a use in textile mills as a lubricant. Since supply was limited to that in natural seeps, the time was ripe for a technique that could provide more of the basic product (Giddens 1975).

Meanwhile in 1855, several speculators, after coming in contact with a bottle of "Rock Oil" and judging that it had commercial potential, had purchased land that had several crude oil seeps near Titusville, Pennsylvania. They soon formed the Pennsylvania Rock Oil Co. (the first petroleum company). After investigating the properties of their "Rock Oil," in the winter of 1857, the investors sent "Colonel" Edwin L. Drake, a vagrant with no technical or mining expertise, to Titusville to investigate the possibility of exploiting the seeps on their newly purchased land (Solberg 1976).

Drake arrived in Titusville in May of 1858 and, after unsuccessful attempts to dig a well at the site of one of the seeps, decided to adapt the local drilling technology that had been used to drill salt wells to petroleum. After several setbacks during 1858, Drake obtained the services of a local salt well driller in the spring of 1859 and, on August 27th of that year, struck oil. The first well produced an estimated eight to ten barrels a day, far more than was available from any other source. More importantly, Drake demonstrated that the expansion of the fledgling petroleum industry did not depend on natural sources of crude oil. In the ensuing decades the expansion of the market for petroleum products was literally to bring about the transformation of industrial society, and the search for oil touched off a process that would ultimately result in the world's most powerful multinational corporations. Drake himself was to die in obscurity in 1880. Even before then, however, two very important characteristics of oil and its use, which would be relevant many decades later in examining the effects of offshore development along the coast of the Gulf of Mexico, were to become apparent, one physical and one social.

CHARACTERISTICS OF OIL

One of the most important factors in the rise to prominence of oil and gas over earlier forms of energy lies in the physical characteristics of the substances themselves, specifically their fluid and gaseous makeup. This property is important for three reasons. First, fluids and gases can be more easily transformed through chemical processes (i.e., "refined" or "cracked") to produce a variety of finished products than can solids. While, for example, wood can be converted into charcoal and coal into coke, these are relatively limited transformations, and many of the volatile compounds associated with the original substances (potentially available for energy) are lost. Second, the ability to be moved in a fluidlike manner through pipes or tubes allows oil and its downstream products or gas to be easily injected into various types of energy and heat-producing devices at the downstream end of the energy use system (internal combustion engines, piston, jet, and turbine; stoves,

furnaces, etc.). The alternative to shoveling coal into a firebox is to pump an alternative energy-producing substance there, and the internal combustion engine is obviously impossible without a combustible fluid or gas to inject into the cylinders. Finally, this same fluid property also allows efficient transportation of the product to market, either before or after refining, with a minimal amount of human handling and hence additional cost. Early oil wells were connected to collection points via pipe, and by the turn of the century the concept of moving oil by pipeline for at least short distances was common.

Today, oil is pumped from the ground into tankers for transportation to many areas of the globe. On arrival, oil is pumped from tankers into pipelines that carry it to refineries. From refineries the downstream products are pumped into pipelines, barges, or trucks for distribution to wholesale and retail outlets, where consumers increasingly pump it themselves into their own automobiles. All of this occurs without the "handling" (loading, unloading by human labor), packaging, and displaying associated with most products we buy.

Imagine an agricultural industry that harvested products in the field mechanically, pulverized and mixed them in central locations, and pumped the resulting product to stations where consumers would fill their own containers, bypassing the entire human harvest, initial packing, wholesale transportation, cooking/mixing, repackaging, displaying in grocery stores, and so on, and you can begin to get an idea of the advantage that oil offers as a product.

Furthermore, although oil and gas differ within limits in their chemical makeup, these differences can be accommodated by the refining process. So to use our agricultural analogy, suppose the process was limited to one crop to further simplify its production, processing, and distribution. It is precisely these properties of petroleum that have at least contributed to the enormous concentration of capital surrounding the harvest, processing, and distribution of petroleum and the vertical integration (control from the well to the automobile) of the multinational corporations that are the result of that capital accumulation.

THE SEARCH FOR OIL

It was the search for and production of petroleum that led to a distinctive social characteristic, which oil shares to a greater or lesser extent with other valuable resources, namely the cyclical nature of development. Only six years after the first oil well and only a few miles away, an instructive example of this, which was to be repeated many times, though perhaps not as strikingly, happened on the scene.

On the flats at the bottom of this hill there was a tiny farm in January, 1865. A well was being drilled. On January 7, the well began to flow oil, a lot of oil! Men rushed here to drill wells of their own. The farm was sold, divided into lots, and Pithole City appeared by summertime. By September, as many as 15,000 people lived on this hillside. Over 50 hotels had been built, and stores, banks, offices and saloons filled the land half-way down the hill. By the next January, some of the wells had played out, and Pithole began to die. Fires burned much of the town, but people leaving quietly to go to richer oil fields led to the rapid decline of Pithole. After a few years, the land at the foot of this hill once again was only farmland along Pithole Creek. (Sign at the "Historic Museum" Pithole, Pennsylvania, 1992)

Pithole was the first oil boomtown. At its heyday, it was a thriving community, where fresh, raw, Chesapeake Bay oysters were served in local restaurants, and fortunes were being made. Pithole was the site of the first oil pipeline, six miles long connecting Pithole with the railroad junction at Miller Farm (Darrah 1972).

Pithole was also the site of the first oil bust. The new technology produced oil at a rate that outstripped the demand, and the price of oil throughout the early years of oil development was extremely unstable, at one point going from \$20 a barrel to ten cents a barrel over the course of a year (Sampson 1975). But ultimately, it was the local availability, not the price of oil, that signaled Pithole's demise. During the fall of 1865 Pithole's wells produced over 900,000 barrels of oil, about a third of the annual U.S. production for 1865. By the

following spring production had fallen and by the fall of 1866, virtually ceased. The reservoir had been drained through overproduction, and the population soon followed the fate of the oil.

The growth and decline of the community over its 500-day life cycle illustrates several important aspects of the extraction of natural resources that have relevance for understanding offshore development as it began to unfold in the Gulf of Mexico seven decades later. One of the primary characteristics of resource extraction is that extractive activities must locate where the resource is (Bunker 1984; Gramling and Freudenburg 1990). Since there is no necessary correspondence between where natural resources like oil occur and where human populations have settled, extractive activities, unlike manufacturing enterprises, frequently cannot take advantages of existing infrastructure and concentrations of support sectors of the economy. In the absence of this shared location advantage, extractive undertakings must provide everything necessary to support the primary activity and as a result must frequently rebuild the local physical and social environment. The construction of facilities necessary to house and provide amenities to a population of 15,000, as well as to drill for and transport an ultimate total of 3.5 million barrels of oil in an isolated rural setting in the Pennsylvania in 1865, make Pithole an excellent example.

Pithole and the surrounding early development in northern Pennsylvania also illustrate several other attributes of extractive activities. Not only are resources like oil notorious for price fluctuations because of their linkage to the commodity markets in which they are bought, sold, and traded, but ultimately they become exhausted. As this happens in local environs, because the infrastructure built to support one specific extractive activity may not be useful for other activities, communities, facilities, and the human capital of skills, investments, and networks of supply become obsolete and, to greater or lesser extent, may disintegrate. In the case of Pithole, disintegration was total. In addition to the characteristics of oil and the search for oil, the monopolistic structure of the oil industry was also to emerge early and persist through time.

ROCKEFELLER, STANDARD OIL, AND EARLY MONOPOLY

In spite of the uncertainties associated with early oil development, not everyone was cautious about entering the fray. With boundless energy, the mind set of an accountant, and a ruthless determination, John D. Rockefeller leveraged a small refinery in Cleveland, in which he originally owned a partnership, into a monopoly, the remains of which continue to dominate the world economy today. Rockefeller worked long hours, apparently had great organizational ability, and, when possible, operated in total secrecy, but the key to his cornering the petroleum market in the late 1800s was his manipulation of the railroads.

Following the Civil War, the railroads emerged as a primary industrial power in America. Collective owners of hundreds of millions of acres of land, not only did the railroads bring enormous personal fortunes to their owners (e.g., Vanderbilt) and have the ability to control the fortunes of regional enterprises (Cochran and Miller 1942), but, as Cronon (1991) demonstrated, because of the (previously unavailable) mobility they allowed, it was possible for centers of specialization and transition to emerge. Chicago, as a result of the railroads, emerged as both the center and transition point for the exploitation of the tall grass prairie, more euphemistically called the "development of the great west." Although Pittsburgh was the site of the first oil refinery, Cleveland emerged as the early center of refining in the United States.

By 1867 Rockefeller had swallowed up twenty-two of his Cleveland competitors and, as a result, controlled half of the refinery potential in the world. Soon, the newly formed Standard Oil Company was negotiating rebates on oil shipped east with both railroads that served Cleveland (Solberg 1976). The rebates allowed Standard to ship oil at a competitive advantage, and the profits went into buying out the competition. Using the same strategies, Standard quickly moved outside of Ohio, and by 1882, the Standard Oil Company had become the Standard Oil Trust, an interlocking network of over thirty companies, which by the late 1880s was operating in all states and moving aggressively into the international market (Solberg 1976).

Upon encountering competition from a marketing firm formed by two of Alfred Nobel's brothers and financed by the Rothschild

Paris banking interests, Rockefeller created his own international firms, the first, the Anglo-American Petroleum Company in 1888. Before long, however, realizing that competition was counterproductive, Standard, the Nobels, and the Rothschilds entered into deals that divided up the world market in patterns that continue to the present. This international cooperation set a precedent that was to have important implications throughout the twentieth century and that illustrated yet another characteristic of the development of oil. Where monopoly was impossible, cartels were the answer. These monopolistic corporate cooperations controlled the world oil market, with varying degrees of success, for over eight decades, until bowing to a new type of cartel based on oil-producing nations.

Another of Standard's strategies, developing downstream linkages for the marketing of oil, would later turn into full vertical integration, which became a distinguishing characteristic of the industry. Eventually, multinational oil companies controlled their product from the initial leasing, through drilling, production, refining, transportation, wholesaling, and retailing.

Throughout this time period Standard was acquiring interests, often secretly, in key regional wholesale corporations and marketing Standard products. Although petroleum was primarily used at this time in the form of kerosene, by the turn of the century, as the first automobiles appeared on the scene, Standard's marketing network was already nationwide (Solberg 1976). Rockefeller who had started in refining and moved into marketing, strangely, never took the additional step toward upstream linkages—petroleum production.

In response to the public outcry against the practices of Standard and some of the other major trusts (primarily the railroads), Congress enacted the Interstate Commerce Law in 1897 and several years later the Sherman Antitrust Law, neither of which were enforced by then President Cleveland or his successor McKinley, who received \$250,000 in campaign contributions from Standard Oil (Flynn 1932).

In 1901 McKinley was assassinated, and Teddy Roosevelt entered the White House. Reading the winds of change, Roosevelt directed the Justice Department to prosecute both Standard Oil and the railroads under the Sherman Act. Roosevelt and his suc-

cessor Taft were both out of office by the time the legal battle was fought all the way through the Supreme Court. It was in 1911, the same year that gasoline sales first topped those of kerosene and a year before the Model T was to go into production, that the Supreme Court ordered the Standard Oil Trust broken up into over twenty companies (Solberg 1976).

SPINDLETOP AND MOVEMENT TO THE GULF

While the Standard Oil Trust case was being fought through the courts, events were unfolding along the Gulf of Mexico that were to affect Rockefeller's attempt to control the U.S. petroleum market and that were to have major implications for the movement offshore into the Gulf. The battleground was Texas, and James Henry Hogg was the major protagonist. Hogg, first elected to the office of attorney general and then in 1890 to governor, was a self-proclaimed opponent of the big trusts that, in the wake of reconstruction, were monopolizing commerce in Texas.

The big trusts boiled down to the railroads and Standard Oil, and Hogg's basic tools were a tough state antitrust law, which effectively made it impossible for Standard to operate legally in the state, and the Texas Railroad Commission, which was given broad regulatory powers. At Hogg's insistence the commission was given such wide powers that not only could it regulate railroads but also later take over the regulation of the state's oil, although no one had any reason to believe that Texas had any oil at that time. In fact, John Archbold, one of the directors of Standard, later to become president when Rockefeller stepped down, is said to have laughed at the idea and offered to drink all the oil found west of the Mississippi (Solberg 1976). While the antitrust law was primarily aimed at Standard's distribution network and close cooperation with the railroads, its latent effect was to hobble Standard in its primary activity of refining since Texas did prove to have oil.

The world's first major petroleum reservoir, Spindletop, was tapped on January 10, 1901, near Beaumont, Texas. Named for the hill that lay over it, on which spindly pines grew,² Spindletop

transformed the petroleum industry in the United States. The state's antitrust laws forced Standard Oil to operate in secrecy in Texas, and new players, including Andrew Mellon from Pittsburgh and former governor Jim Hogg, moved into the action. Because the impetus for their entry into the industry began with the discovery of a vast petroleum reserve, these new players did not share Rockefeller's reluctance to become directly involved in the production of oil. Furthermore, in order to compete with Standard's monopoly of downstream products, they were forced to enter all phases of petroleum production, refining, and distribution, in order to market their products. As a result the corporations emerging in Texas, Gulf and the Texas Company (later Texaco), did so as fully vertically integrated entities, controlling their product from the well to the retailer. As Nicholson noted forty years later:

Until discovery of the vast field [Spindletop], big names in the industry were scarce. Yet this huge field marked the beginning of such companies as The Texas Company and Gulf Oil Corporation, and furnished the nucleus for Magnolia Petroleum Company [the first operator on the Outer Continental Shelf]. (Nicholson 1941a, p. 17)

Spindletop and subsequent Gulf Coast discoveries moved the focus of the petroleum industry out of the eastern United States and squarely into Texas and the coastal Gulf of Mexico. Wildcatting operations came into their own with Spindletop, and many Texans, including Howard Hughes and H. L. Hunt, got their start there (Solberg 1976). The unmistakable rough and tumble cowboy image, which was stamped on the emerging "culture" of the industry (Freudenburg and Gramling 1994a) during its development in Texas,³ persists to the present. Throughout the next several decades wildcatting continued successfully in Texas, many of the strikes accompanied by Pithole-like booms, and, like boomtowns everywhere, a raw, reckless way of life flourished. Through it all there emerged a new industrial class of men, those who had struck it big, had newfound wealth and power, and little experience with either. The Texas oil millionaire, long on arrogance and conspicuous consumption and short on manners and

knowledge, became almost a caricature outside of the oil patch and concurrently a hero to the emerging industrial subculture.

WORLD WAR, DEPLETION, AND THE INTERNATIONAL CARTEL

With the push into Texas and with oil production moving away from the small independent producer that had been common on the East Coast, some of the more powerful of the emerging producers began to cooperate for their own political interests. The independents had long argued that, because they "produced" a finite commodity, using up their assets and, hence, capital as they went, they should be allowed to account for this when computing taxes. In 1913 Congress allowed such a depletion, allowing a 5 percent deduction of the gross value of production for mining and oil interests. This was changed in 1916 to the disappointment of the producers, limiting it to a "reasonable allowance" based on the cost of actual exploration. By this time, however, several factors had improved the position of the producers. First, many of the big players had become vertically integrated companies, some to the extent that they controlled petroleum from exploration to the gas tank. Standard Oil of New Jersey, the original linchpin of the Standard Oil Trust, had been taken in this direction by its new president, A. C. Bedford, as had other past members of the trust and most of the big operators in Texas (Gulf, Texaco). Thus, these powerful interests now had a stake in the depletion allowance.

Second, the United States entered World War I in 1917, and the War Industries Board with its National Petroleum War Service Committee and its director Mark Requa actively encouraged the cooperation of the major players in the oil industry in order to be able to supply the war effort in Europe. As Solberg put it:

Overnight, the industry, with President Wilson's support, was doing what the Sherman Antitrust Act forbade. Six years after the dissolution of Standard Oil's trust, its chief executive was in Washington helping direct industry's cooperation with government. (Solberg 1976: 73)

The end results of this cooperation was that the Revenue Act of 1918 allowed oil producers to base the depletion on a "reasonable

allowance" of either the cost of discovery or of the fair market value of the discovery, which for most companies averaged between 28 and 31 percent of their gross income (Solberg 1976).⁴ This enormous tax break, initiated during the last year of the war, greatly encouraged exploration and drilling, as it was intended to. After the war, however, following initial confusion with the abrupt dismantling of wartime controls by the Wilson administration and periodic shortages for several years (Nash 1968), the increased levels of production of foreign⁵ and Gulf Coast oil quickly led to a glut on the world oil market. In addition to the depletion allowance, closer cooperation, at the urging of Requa, led Rockefeller and others to the formation of the American Petroleum Institute immediately after the war in 1919.

Oil, by this time, was truly an international activity. By 1920 world annual production of crude oil was up from 6,000 barrels in 1859 (the year Drake drilled the first well) to 689 million barrels (*Oil Weekly* staff 1946a), or approximately the current annual capacity of the Trans-Alaska Pipeline. The supremacy of Standard had not only been challenged in the United States (by Gulf and the Texas Co.), necessitating a sharing of the power, but several international corporations had risen to dominance. Chief of these was the Anglo-Dutch Shell Oil Company, led by Sir Henry Deterding. Not only had Shell moved into the West Coast of the United States, but it had massive holdings and markets worldwide. By the mid-1920s Shell was the world's largest producer. Production outstripped demand, and serious international competition, including a price war in India, led some of the major players to realize that competition was not in their best interests. In September of 1927, Deterding invited the chairman of Standard of New Jersey, Walter Teagle, and the chairman of Anglo Persian, the other major British company, to a castle he had leased at Achnacarry, Scotland. They were soon joined by representatives of other major companies. The result of these meetings was the Pact of Achnacarry or the "as is" agreement, as it came to be known (Solberg 1976; Engler 1961; Ghanem 1986). This illegal (at least under United States laws) agreement in effect created a world oil cartel, where the current division of the world market was affirmed, a number of production quotas were set, and the necessity for competition was eliminated. Each market could be supplied from the nearest

source, but a constant price was assured. The cost, no matter where supplied from or to, would be based on the current cost of the oil in the Gulf of Mexico (read Texas) market, plus the cost to ship from the Gulf.⁶ The agreement ensured orderly, carefully controlled marketing and development, and though uncovered by the Federal Trade Commission in 1952 (Federal Trade Commission 1952), the principles, for all practical purposes were in effect until the oil embargo of 1973–1974, though it had begun to unravel after the formation of the Organization of Petroleum Exporting Countries (OPEC) in 1960.

THE DEPRESSION AND PRORATIONING

While the Pact of Achnacarry settled the problems of world competition, the problem of overproduction was not finished. A little over two years later and shortly after newly elected President Hoover withdrew federal lands from leasing in an attempt to control overproduction (Nash 1968), the United States stock market crashed, securities lost \$26 billion in value, and the emerging world economy went into a depression. For the first time the petroleum industry had to seriously consider supply-side regulation, and the word that came down was prorationing. The idea behind *prorationing* was that all producers would cut their production and thus *ration* their output but would retain their *proportion* of the total output. The smaller producers with less of a profit margin were opposed to the idea, while the major producers were in favor of it in order to cut supplies and raise prices.

A year after “Black Friday” the supply situation got totally out of hand with the discovery of the largest oil field to date in east Texas. The field was too big for the majors to control, and oil began to flood into the market. The price of oil fell first to ten cents a barrel and then to two cents a barrel. The Texas Railroad Commission tried to control the flow, but producers started transporting their crude to other states. As Solberg describes it:

As days passed, more and more such “hot oil” poured onto the markets. Down went prices until water cost more than oil—two cents a barrel for crude oil, four cents a gallon for

"Eastex" gasoline distilled at the field's ninety-odd small refineries and offered at pumps with a free chicken dinner, a dozen eggs, or a crate of tomatoes with a fill-up. When officials tried to shut down small producers and stop trucks, rioting erupted. Governor Ross Sterling proclaimed martial law.⁷ (Solberg 1976: 125)

Franklin Roosevelt took office in 1933, inheriting the growing problems from Hoover. Although a number of antitrust actions against the larger firms in the oil industry were pursued early in Roosevelt's administration and although Roosevelt's Secretary of Interior, Harold Ickes,⁸ was convinced the oil industry should be regulated like public utilities, the federal government's role was minimal. The attempted resolution of the problem came in the form of the Connally Hot Oil Act, which was supported by the then House majority leader, Sam Rayburn of Texas. The act forbid the interstate sale of oil and allowed the states involved to attempt to control production through prorationing at the state level. This was in marked contrast to the way in which most industries were handled under the National Recovery Administration (declared unconstitutional by the Supreme Court in 1935) under Roosevelt. Neither approach appeared to be particularly successful, for both the New Deal and the oil industry. It took war to achieve their goals (Solberg 1976).

If attempts to limit supply were generally not very productive, efforts to increase demand met with more success. Before and during World War II corporations controlled primarily by General Motors, but also with interests by several of the major oil companies and rubber companies, systematically bought up and scrapped mass transit systems in major cities throughout the country (Snell 1974). The replacement for these systems was, of course, buses built by General Motors, and what was quickly becoming the quintessential American artifact, the automobile.

MOVEMENT INTO THE MIDDLE EAST

During the same time period that the major oil companies were entering into agreements to control the world oil market and

scrambling to regulate oversupply and build demand, discoveries were emerging in the Middle East that almost five decades later were to prove to be the undoing of that control. Oil was discovered in what is now Iraq in 1927, in Bahrain in 1931, and in Saudi Arabia and Kuwait shortly thereafter. Given the new spirit of cooperation produced by the Achnacarry agreement and with the support of the U.S. government, five of the major U.S. oil companies entered into a consortium with British, Dutch, and French interests, forming the Turkish Petroleum Company. The company, later renamed the Iraq Petroleum Company, was formed to exploit the reserves of the former Ottoman Empire, which had been dismembered after World War I. The consortium and a series of additional agreements between the original companies and new entrants into the Middle East soon led to a complex series of agreements and interlocking directories that virtually completely controlled oil production in the Middle East (Kaufman 1978).⁹ Although these finds were later to prove to contain the majority of the world's proven crude oil reserves and to become the focus of much foreign policy by the industrialized nations of the world and the source of a war in 1990–1991, their full development would have to wait until another war, World War II, was over.

WORLD WAR II

With the breakout of war in Europe in 1939, the oil crisis again moved quickly from oversupply to the need for increased production. Roosevelt put Ickes in charge of the new thrust delegating him Petroleum Coordinator for National Defense. Ickes convinced (with some pressure from Roosevelt) the Department of Justice to suspend antitrust suits against the oil industry, came out against oil exports to Japan (which continued through 1940 and the first part of 1941), and, because of the increasing danger to tankers in the Gulf from German submarines, pushed for pipelines from the midcontinent oil fields to supply the East Coast. Exports to Japan were halted in 1941, leading directly, some believe, to Pearl Harbor (Solberg 1976). By 1943 the "Big Inch" pipeline (24 inches in diameter) was supplying oil to the East Coast from the fields in Texas

and Oklahoma, averting a shortage and coincidentally transforming the long-range transportation of oil.

World War II was fought with oil and over oil. Japanese strategy throughout hinged on imports for their island nation, particularly to supply the navy, and allied strategy, on denying those imports. Rommel's push into Africa, threatening Middle Eastern supplies led to Allied response and, once the threat was over, for Ickes (now "Petroleum Administrator for War") to push for a pipeline from the Saudi fields to the Mediterranean and for greater United States access to Middle Eastern oil (Nash 1968). This latter thrust, which eventually led to greater dependence on this source, was to have major implications for offshore development three decades later when the source was interrupted. The war period also saw the first major exploration of the Alaskan arctic. Ironically, a map published in 1946 in *The Oil Weekly* (Thomas 1946) for a proposed pipeline route for then still-undiscovered oil near Barrow, Alaska, closely parallels the current Trans-Alaska Pipeline. The Trans-Alaska Pipeline was to become coupled with the controversy over increased offshore exploration and production three decades later.

The war saw the organization of oil production under Ickes and enormous increases in actual production. Between 1935 and 1948, United States oil production doubled (see Table 1.1). Following the war, three fundamental policy initiatives and a cluster of incentives favoring the growth of the automobile as the primary form of transportation ensured that consumption would parallel this trend.

First, in addition to the push away from public transportation caused by the cooperative dismantling of systems across the country by General Motors and some of the major oil and rubber companies (Snell 1974), Solberg notes the variety of factors that pulled consumers to the automobile.

First of all, an automobile owner was required to pay very small taxes on it. Second, the gasoline tax, while higher, went directly to build more roads used by the private car. Third, both federal and state governments subsidized the highway construction program while abandoning support of public transportation. Fourth, the social and environmental costs of automotive growth-highway deaths, traffic snarls, smog,

Table 1.1. U.S. and World Petroleum Production (Thousands of Barrels)

YEAR	U.S.	WORLD	U.S.%	YEAR	U.S.	WORLD	U.S.%
1860	500	509	98.23	1900	63,621	149,137	42.66
1861	2,114	2,131	99.20	1901	69,389	167,440	41.44
1862	3,057	3,092	98.87	1902	88,767	181,809	48.82
1863	2,611	2,763	94.50	1903	100,461	194,879	51.55
1864	2,116	2,304	91.84	1904	117,760	217,948	54.03
1865	2,498	2,716	91.97	1905	135,602	215,091	63.04
1866	3,598	3,899	92.28	1906	127,565	213,263	59.82
1867	3,347	3,709	90.24	1907	167,889	263,957	63.60
1868	3,646	3,990	91.38	1908	182,988	285,257	64.15
1869	4,215	4,696	89.76	1909	183,171	298,709	61.32
1870	5,261	5,799	90.72	1910	209,557	327,763	63.94
1871	5,205	5,730	90.84	1911	220,449	344,361	64.02
1872	6,293	6,877	91.51	1912	222,935	352,443	63.25
1873	9,894	10,838	91.29	1913	248,446	385,345	64.47
1874	10,927	11,933	91.57	1914	265,763	407,544	65.21
1875	8,788	9,977	88.08	1915	281,104	432,033	65.07
1876	9,133	11,051	82.64	1916	300,767	457,500	65.74
1877	13,350	15,754	84.74	1917	335,316	502,891	66.68
1878	15,397	18,417	83.60	1918	355,928	503,515	70.69
1879	19,914	23,601	84.38	1919	378,367	555,875	68.07
1880	26,286	30,018	87.57	1920	442,929	688,884	64.30
1881	27,622	31,993	86.34	1921	472,183	766,002	61.64
1882	30,350	35,704	85.00	1922	557,531	858,898	64.91
1883	23,450	30,255	77.51	1923	732,407	1,015,736	72.11
1884	24,218	35,969	67.33	1924	713,940	1,014,318	70.39
1885	21,859	36,765	59.46	1925	763,734	1,068,933	71.45
1886	28,065	47,243	59.41	1926	770,874	1,096,823	70.28
1887	28,283	47,807	59.16	1927	901,129	1,262,582	71.37
1888	27,621	52,165	52.95	1928	901,474	1,324,774	68.05
1889	35,164	61,507	57.17	1929	1,007,323	1,485,867	67.79
1890	45,824	76,633	59.80	1930	898,011	1,410,037	63.69
1891	54,293	91,100	59.60	1931	851,081	1,373,532	61.96
1892	50,515	88,739	56.93	1932	785,159	1,309,677	59.95
1893	48,431	92,038	52.62	1933	905,656	1,442,146	62.80
1894	49,344	89,337	55.23	1934	908,065	1,522,218	59.65
1895	52,892	103,692	51.01	1935	996,596	1,654,488	60.24
1896	60,960	114,199	53.38	1936	1,099,687	1,791,540	61.38
1897	60,476	121,993	49.57	1937	1,279,160	2,039,231	62.73
1898	56,122	124,979	44.91	1938	1,214,355	1,988,041	61.08
1899	57,071	131,147	43.52	1939	1,264,926	2,085,444	60.65

Table 1.1. continued

YEAR	U.S.	WORLD	U.S.%	YEAR	U.S.	WORLD	U.S.%
1940	1,353,214	2,142,189	63.17	1966	3,027,763	12,021,786	25.19
1941	1,402,228	2,247,549	62.39	1967	3,215,742	12,914,340	24.90
1942	1,368,645	2,060,353	66.43	1968	3,329,042	14,146,318	23.53
1943	1,503,614	2,300,579	65.36	1969	3,371,751	15,222,511	22.15
1944	1,677,753	2,621,934	63.99	1970	3,517,450	16,718,708	21.04
1945	1,710,275	2,768,885	61.77	1971	3,453,914	17,662,793	19.55
1946	1,764,561	2,849,953	61.92	1972	3,455,368	18,600,745	18.58
1947	1,856,987	3,022,139	61.45	1973	3,360,903	20,367,981	16.50
1948	2,020,185	3,443,234	58.67	1974	3,202,585	20,537,727	15.59
1949	1,841,940	3,404,142	54.11	1975	3,056,779	19,502,335	15.67
1950	1,973,574	3,803,027	50.95	1976	2,976,180	21,191,540	14.04
1951	2,247,711	4,282,730	52.48	1977	2,985,360	21,900,695	13.63
1952	2,289,836	4,531,114	50.54	1978	3,178,216	22,158,251	14.34
1953	2,357,082	4,798,055	49.13	1979	3,121,310	22,765,050	13.71
1954	2,314,988	5,016,591	46.15	1980	3,146,365	21,746,164	14.47
1955	2,484,428	5,625,659	44.16	1981	3,128,624	20,380,505	15.35
1956	2,617,283	6,124,676	42.73	1982	3,156,715	19,375,125	16.29
1957	2,616,901	6,438,444	40.64	1983	3,170,999	19,210,924	16.51
1958	2,448,987	6,607,750	37.06	1984	3,249,696	19,753,368	16.45
1959	2,574,590	7,133,238	36.09	1985	3,274,553	19,488,948	16.80
1960	2,574,993	7,674,460	33.55	1986	3,168,252	20,329,092	15.58
1961	2,621,758	8,186,213	32.03	1987	3,047,378	20,169,163	15.11
1962	2,676,189	8,881,858	30.13	1988	2,979,123	21,045,249	14.16
1963	2,752,723	9,538,346	28.86	1989	2,778,773	21,383,918	12.99
1964	2,786,822	10,309,644	27.03	1990	2,684,687	21,664,210	12.39
1965	2,848,514	11,062,515	25.75	1991	2,707,039	21,464,024	12.61

Source: *Oil Weekly* staff, 1946; American Petroleum Institute, 1986, 1993.

high-speed roads through parks and residential neighborhoods, for instance—were accepted by the community at large. Finally and most important, all political and economic institutions, from the Congress in Washington to the mortgage bank down the street, supported an automobile-dominated organization of urban and suburban development. In short, just about all the resources in the society stood committed to producing automobility, no matter what the consequences. (Solberg 1976: 142)

More cars, bigger cars, bigger engines, and more gasoline consumption were the story through the 1950s and 1960s (see Table 1.1) and were major factors in the growing consumption of crude oil.

This greater freedom in transportation led to the flight from the central cities to the suburbs, a trend reinforced by federal policy. The Federal Housing Administration and the Veterans Administration (under the terms of the G.I. bill) made low-cost housing available, and both the laws and implementation of guidelines favored the new suburbs over the central cities (Solberg 1976). Not only did commuting to work from the suburbs consume petroleum products, but the new single-family dwellings heated by fuel oil added comfort at the expense of increased energy consumption.

A second basic policy consideration, which added fuel to the consumption fire, was the postwar policy for the rebuilding of Europe and Japan. The Marshall Plan for the rebuilding of Europe called for a switch from coal, the dominant source of power before and during the war, to oil. Given the massive increase in consumption of oil this plan would lead to and given the European interest in the Iraq Petroleum Company, the strategy became to supply much of this oil from the Middle East. Under occupation, Japan was also encouraged to switch its industries from coal to oil, and much of this was also supplied from the Middle East through U.S. oil companies (Engler 1977). Thus, the postwar recovery of Europe and the miraculous development of Japan were fueled by oil.

A third major force for increased consumption was Eisenhower's Interstate Highway and Defense System. Justified during the growing cold war as a necessity for rapid evacuation of the cities in case of nuclear attack, the \$27 billion system not only moved transportation of goods away from more energy-efficient systems (railroads and waterways) and onto the highways but exacerbated the flight to the suburbs. Over half of the \$27 billion was actually spent in the cities, where increased access and egress to the central cities through urban freeways, created with little or no social planning, brought new traffic problems, destroyed neighborhoods, displaced populations, and further reduced the appeal of the city as a place to live, adding new impetus to the flight to the suburbs (Solberg 1976; Llewellyn 1981).

In addition to these factors affecting the increased consumption of petroleum, the aftermath of World War II also brought the "Tidelands" disputes, a major political battle between the federal government and the coastal states over the ownership of offshore lands. It was the Tidelands dispute that saw Ickes resignation under the Truman administration. The incident was Truman's nomination of Edwin Pauley to be Undersecretary of the Navy early in 1946. Ickes contended that Pauley had worked vigorously on behalf of the states and had tried to bribe him (Ickes) to drop a pending federal suit against several coastal states (including Louisiana, California, and Texas) to secure federal ownership of offshore lands (Solberg 1976; Nash 1968). In the ensuing conflict with Truman, Ickes resigned, and one of the most determined champions of the stewardship of federal lands retired from the scene. Two pieces of legislation arising out of these disputes, the Submerged Lands Act and the Outer Continental Shelf Lands Act, both passed in 1953, were to become the underpinning of the movement offshore in search of oil (chapter 2).

Thus, by the mid-1950s a dizzying spiral of petroleum consumption had been put in motion. The economic consequences of this were not to become apparent for two decades, and realization of the environmental consequences took even longer. As Catton (1986) has noted, the growth of technology made possible the exponential increase in the amount of energy the average American could consume, reinforcing the supply-demand cycle noted earlier. This increased consumption potential led to the search for oil in the most unlikely of places, under the open seas. The evolution of the technology and the legal structure to allow the recovery of oil under the open seas are covered in chapter 2.