seventy six

March
April
1990

1890 A Century of Spirit 1990

THROUGH THE YEARS

REFINING & MARKETING

1886. The newly incorporated Hardison & Stewart Oil Company moves its headquarters from Newhall, California, to Santa Paula. The company completes a 4-inch, 40-mile pipeline to carry crude oil from Newhall to Ventura — the first pipeline to tidewater in the west.

1886. Hardison, Stewart and local businessman Thomas Bard form the Sespe Oil Company. They purchase the Mission Transfer Company the following year, acquiring a network of pipelines that provides access to the growing Los Angeles fuel oil market.

1887. The Hardison & Stewart company builds its first refinery, in Santa Paula. With a capacity of about 14,000 barrels a year, the refinery is the only west coast facility capable of producing light-end products — naphtha and kerosene.

1889. Hardison & Stewart launches the first oil tanker on the west coast, the steam-powered *W.L. Hardison*.

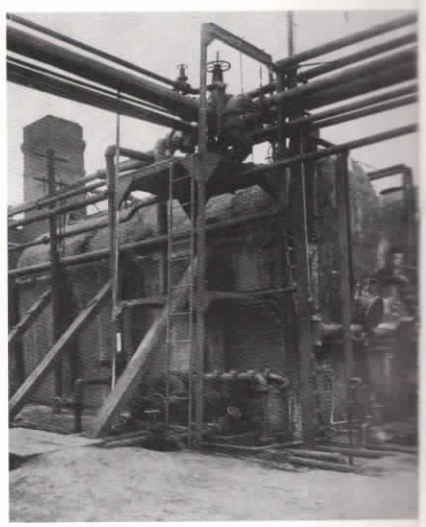
1890. At a meeting in an office above a hardware store in Santa Paula, executives of three oil companies (Hardison & Stewart, Sespe, and Torrey Canyon) merge their operations to form Union Oil Company of California.

1891. Union establishes the first petroleum laboratory in the west at the Santa Paula refinery. The laboratory is charged with the task of finding ways to extract more products — and produce a clear, nonsmoking kerosene — from California's heavy, sulfur-laden crudes.

1894. Union Oil mechanics successfully convert an old Southern California Railway engine into one of the first oil-burning locomotives in the U.S. This important advance creates a significant new market for oil.

1896. Union's new refinery on San Francisco Bay — named for the nearby town of Oleum — goes on stream. The facility can process up to 1,200 barrels of crude oil per day.

1901. The company expands its marketing of fuel oil to Hawaii. By the end of the year, Union has storage capacity totaling 227,000 barrels on three Hawaiian islands.



1902. A new refinery is constructed in Bakersfield to process oil from Union's fields in the Kern River and Coalinga areas of the San Joaquin Valley.

1902. Union christens the steel-hulled steamer *Whittier,* the first oil tanker with engines set far aft to reduce the hazard of fire.

1906. Union's manager of sales, John Baker, Jr., convinces President Theodore Roosevelt to allow Union to build and operate a trans-Panama pipeline. The line supplies oil for the Panama Canal construction crews, and briefly moves some California crude to the Atlantic side of the isthmus.

1906. The company completes a 6-inch pipeline from the oil fields in Santa Barbara and San Luis Obispo counties to Port Harford, where Union builds a tank farm with storage for 250,000 barrels. Combined with the company's terminal in San Pedro, the new facility gives Union two shipping ports.

1910. Union completes a joint pipeline project with the Independent Oil Producers Agency. The 240-mile line links the Taft area oil fields in the San Joaquin Valley to the company's marine terminal at Port Harford.

1910. For the first time, the U.S. petroleum industry produces more gasoline than kerosene. Union purchases its first motorized tank truck.

1913. Union Oil opens one of the first service stations on the west coast, at the corner of Sixth and Mateo streets in Los Angeles. The station offers gasoline, kerosene, lubricants and fuel oil.

1916. The company acquires a site for a new refinery near Los Angeles Harbor. Union plays a major role in development of the harbor facilities, where company tankers dock to supply the new refinery when it comes on stream in 1917.

1917. The U.S. enters World War I, and three company tankers are commandeered to transport oil for the war effort. Two other tankers are lost at sea during the war—one to German torpedoes, another in a storm.

1921. Union Oil Company of Canada, Ltd., a Union subsidiary, begins operating a refinery near Vancouver to supply petroleum products to British Columbia.

1925. The company introduces its first gasoline credit card, a handwritten paper document valid for only two months. Union's network of service stations now comprises over 300 facilities that cater to the mushrooming number of autos and trucks.

1926. Lightning strikes Union's tank farm at San Luis Obispo, causing a spectacular fire. The next day, another bolt from the same storm ignites a Union tank battery in Orange County. The two fires rage for days, destroying 21 steel tanks and 8 million barrels of oil. In response, Union pioneers more effective methods for controlling oil fires.

1926. Union service stations introduce Ethyl gasoline, a new premium-grade fuel that uses tetraethyl lead as an anti-knocking agent.

1928. Union Oil aviation fuel powers the tri-motor *Southern Cross* on a historic flight across the Pacific Ocean. Traveling from Oakland, California to Brisbane, Australia, the plane makes only two stops (in Hawaii and the Fiji Islands) and covers 7,054 miles in 83 hours, 11 minutes of flight time.

1930. The nation's registered motor vehicles now number 26.5 million, including 3.5 million trucks and 40,500 buses. Union operates or leases 760 service stations.

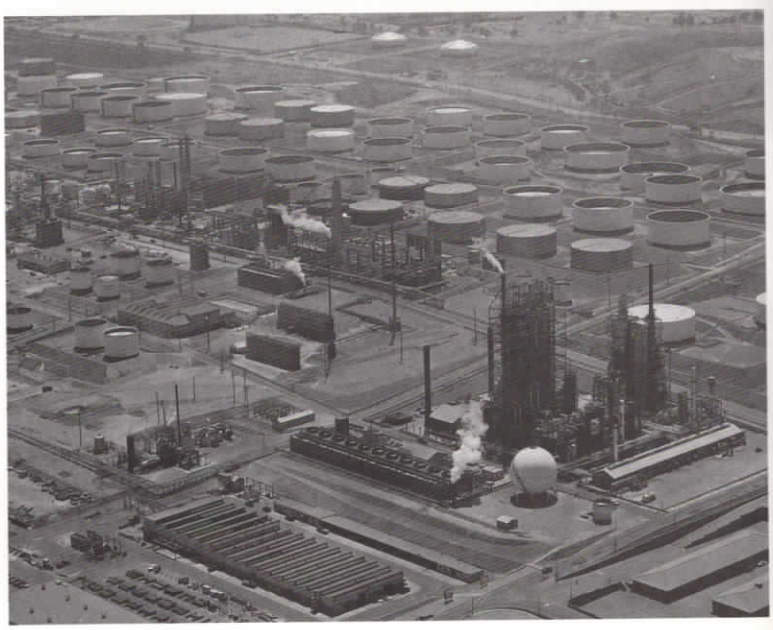
1931. The company organizes Union Service Stations, Inc., a wholly owned subsidiary, to take over and operate failing service stations of Union dealers caught in the Depression's financial squeeze.

1932. The company introduces an improved motor fuel of the highest octane rating possible at the time. The marketing department calls it the "finest anti-knock, non-premium gasoline ever offered." The new Union 76 gasoline, invoking the patriotic "Spirit of '76," is a great success with motorists.

1934. Union begins marketing a new motor oil, called Triton—the first motor oil manufactured from heavy western crudes that can match the quality of lighter oils produced in the east. The product is manufactured using a Union-developed propane-solvent process that removes asphalt and other contaminants.

1939. Union introduces a new all-purpose, barium-base grease called Unoba, which replaces scores of specialized greases in automotive and industrial applications.

1940. A new alkylation plant is completed at the Los Angeles refinery, boosting the facility's production of aviation fuel. The fuel is urgently needed the following year when the U.S. enters World War II.



1941. While en route to Vancouver from the California coast, the Union tanker *Montebello* is torpedoed and sunk by a Japanese submarine. The crew manages to escape unharmed in lifeboats.

1943. The company fills and ships up to 4,800 drums of gasoline a day from a secret, camouflaged plant on San Francisco Bay. Altogether, Union workers fill 862,000 barrels with gasoline to supply U.S. military operations in the Pacific.

1943. While transporting critically needed oil to the Allied forces, the Union tanker *Gurney E. Newlin* is torpedoed in the mid-Atlantic by a German U-boat. Only seven of the 41 crew members survive.

1943. Union Oil is awarded a patent for the Unifining process (later renamed "Unionfining"). Developed by company researchers, the catalytic refining process removes sulfur, nitrogen and other contaminants from a variety of petroleum products.

1944. Union's first catalytic cracking plant goes on stream at the Los Angeles refinery. The new process helps boost aviation fuel yields five-fold over 1942 levels.

1947. Union introduces a unique purple motor oil—Royal Triton—which lasts longer than other oils and counteracts rust, corrosion and oxidation in automobile engines.

1947. A survey of west coast motorists reveals that 82 out of every 100 gasoline buyers readily identify "76" as Union Oil's marketing symbol. Company attorneys convince the U.S. Patent Office to register the trademark.

1948. Union researchers develop a new family of oil additives—zinc dialkyl dithiophosphates (ZDDP). These patented compounds form the basis for all subsequent anti-wear, anti-oxidant crankcase oil additives.

1952. Painters transform tank number 304 at the company's Los Angeles refinery into a huge pumpkin, starting a Halloween tradition that has continued ever since.

1955. The company builds the 65-mile Torrey Canyon pipeline, connecting the prolific deep-zone producers of the Torrey Canyon, Oakridge and Tapo fields to the Los Angeles refinery.

1955. Union's new refinery near Santa Maria, California, comes on stream. Its twin coking units, along with the coker installed at San Francisco a few years before, enable Union to produce a higher proportion of gasoline feedstocks from heavy California crude oils.

1956. The company's new Los Angeles terminal begins operation. In addition to providing storage and distribution facilities for a variety of petroleum products, the terminal includes a plant for blending, compounding and canning lubricants and greases.

1957. A new 225-mile pipeline links Union's existing San Joaquin Valley pipeline system to the San Francisco refinery.

1959. Union begins delivery of a new product, 76 Turbine Fuel, to commercial airlines for use in jet airliners.

1959. With the launching of the *Lake Palourde*, Union has three 60,000-ton supertankers transporting crude oil from the Middle East to California.

1962. Union crews complete an 80-mile pipeline linking Alaska's first natural gas field to the city of Anchorage. The line must traverse miles of rugged terrain, as well as the turbulent Turnagain Sound. The project proves to be one of the toughest pipeline-laying jobs in petroleum industry history.

1962. Union establishes a Hong Kong-based subsidiary, called Unoco, to market crude oil and petroleum products in the Far East.

1963. The company introduces new Regular 76 and Royal 76 gasolines, formulated and blended for optimal engine performance in a variety of climates.

1964. The first Unicracker goes on stream at the Los Angeles refinery. Employing a remarkable new catalyst developed by Union scientists, Unicracking can produce nearly five barrels of high-grade fuels from four barrels of feedstock.

1964. Union introduces Super Royal Triton—a long-life motor oil that exceeds all applicable government and automobile manufacturer specifications.

1965. Union merges with Illinois-based Pure Oil Company. The merger lifts Union from regional status to that of a national oil company with operations in 37 states. The expanded company operates nine refineries in six states, has 10,000 miles of pipelines and 18,500 retail outlets.

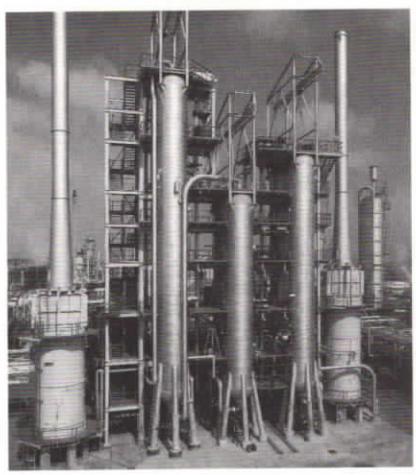
1966. Nearly 7 million polystyrene "76 Satellites"—miniature versions of the orange-and-blue 76 spheres that grace Union service stations—are distributed to customers for their car antennas.

1967. Union and seven other oil companies begin construction of a 40-inch pipeline—named Capline—from Louisiana to Illinois. When completed the following year, Capline is the nation's largest-diameter common-carrier crude oil pipeline.

1968. A new ice-free marine terminal is completed at Kenai, Alaska. The 170,000-barrel storage facility enhances Union's ability to supply Alaskan markets year-round, most notably in winter when the upper Cook Inlet is iced in and closed to tankers.

ROYAL 76 GASOLINE

The Champagne of premium gasolines



1969. Union installs the first commercial Unisar plant at its Beaumont, Texas refinery, acquired in the Pure Oil merger. A second plant is completed at the San Francisco refinery two years later. The Unisar units help Union comply with restrictions on solvent vapor emissions.

1970. The company's new 140,000-barrel-a-day Chicago refinery begins operation. The facility's environmental safeguards are the most advanced of any refinery in the nation.

1970. Union becomes one of the first oil companies to replace its regular-grade gasoline with a low-lead formulation in western markets. Low-lead Regular 76 contains just .5 gram of lead per gallon—80 percent less than conventional regular-grade gasolines.

1971. The company launches a new 70,000-ton tanker, the *Sansinena II,* which transports crude oil from Alaska's Cook Inlet to Union's California refineries.

1972. The Kyung In Energy Company, in which Union holds a 50-percent interest, begins operating a 325-megawatt electrical generating plant at Inchon, South Korea. Later, part of the facility is converted into a 60,000-barrel-a-day refinery. Gasoline and other refined products are marketed under the Sign of the 76 throughout South Korea.

1973. Six Arab states institute an oil embargo against pro-Israeli countries, triggering an "energy crisis" in the U.S. Panicky motorists form gas lines at the nation's service stations. By year end, the OPEC nations have raised oil prices to more than $11.50 per barrel—a 300-percent increase in three months.

1973. At the Los Angeles refinery, two new sulfur plants are completed to comply with environmental requirements. The units are the first to use the Beavon Sulfur Removal Process, co-developed by Union, which removes the last traces of sulfur from gas streams.

1974. Union Oil introduces Unleaded Regular gasoline, becoming the first company to replace all of its leaded regular with an unleaded product in western markets. At 89 octane, the new product is rated two octane points higher than any other unleaded gasoline at the time.

1976. Union of Canada sells its refining and marketing assets to Husky Oil, putting the proceeds to use in an expanded exploration program.

1976. The tanker *Sansinena,* on long-term charter to Union, explodes in Los Angeles Harbor. Authorities determine that a spark set off a build-up of explosive vapors. Within days, Union announces plans to equip company tankers with inert gas systems to prevent a recurrence of the tragedy.

AP/WIDE WORLD PHOTOS

1979. The Iranian revolution, Iran-Iraq war and new OPEC price hikes bring on another energy crisis. Motorists face long lines at service stations once again, and oil prices reach $34 a barrel.

1979. Union introduces Long Distance Purple Motor Oil, which promotes better engine performance and increased mileage. The company also offers a new line of multigrade diesel engine oils.

1981. The company christens three new petroleum product tankers. Each of the 658-foot, 37,500-ton ships is capable of carrying more than 275,000 barrels of refined petroleum products, feedstocks and petrochemicals.

1981. Union introduces Protech, an automotive service and repair program with a money-back guarantee. The company certifies Protech mechanics only after they complete a rigorous training program. Within five years, more than 40 percent of Unocal's full-service outlets in the west are Protech stations.

1983. Union's National Auto/TruckStop network celebrates its 30th anniversary by upgrading old facilities and adding new outlets. By the following year, the system comprises 300 facilities, 150 of which are located on U.S. interstate highways.

1984. Union's product tanker *Coast Range* becomes the first ship to dock at the company's rebuilt wharf at Avila Beach (formerly Port Harford). The concrete and steel structure replaces a 69-year-old wooden wharf that was destroyed by heavy surf in early 1983.

1984. A high-pressure tower at the Chicago refinery ruptures, resulting in a series of explosions and a major fire. Fifteen employees and two contract security guards are killed in the blaze. Nine months after the tragic accident, the facility resumes processing crude oil.

1985. The company begins doing business as Unocal, but retains the famous "76" marketing symbol in its new logotype.

1985. Unocal becomes the largest individual shareholder in the Colonial Pipeline, increasing its stake from about 4 percent to just under 21 percent. The pipeline, which ships 2 million barrels a day of gasoline and distillates between the Gulf Coast and the northeast, is jointly owned by nine major oil companies.

1985. Unocal's Chicago refinery teams with the Chemicals Division to produce its first needle coke, a product used by manufacturers of graphite electrodes for the steel industry. The refinery's new needle coker, which took four years to develop and construct, produces a premium grade of needle coke through use of an innovative desulfurization process.

1986. A worldwide collapse in oil prices—which drop below $10 a barrel for a time—drastically reduces Unocal's exploration and production revenues. The company's refining and marketing profitability improves, however, helping to offset the losses.

1986. Unocal becomes the first oil company in the west to sell only unleaded gasoline, introducing Super 76 Unleaded Premium, which has a 91-octane rating (92 in California). Concurrently, the company introduces Valve Saver, a lead-substitute additive, to accommodate customers with older-model cars. Two years later, Unocal offers a third grade of unleaded gasoline in the west, rated at 87 octane.

1986. Unocal's Refining & Marketing Division undergoes a major reorganization. The restructuring results in a single organization with overall national responsibilities for refining, marketing, auto/truckstops, crude supply and transportation.

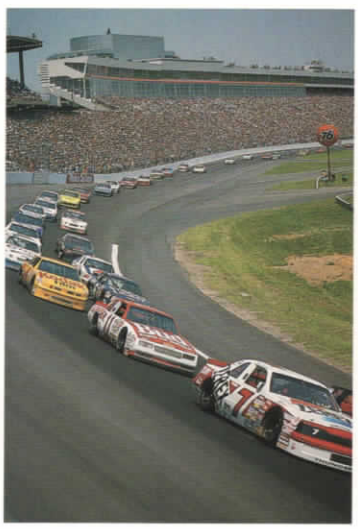
1987. The National Association of Stock Car Auto Racing (NASCAR) celebrates its 40th anniversary, and Unocal continues its long-standing role as the official fuel supplier for NASCAR events. Unocal inherited its association with NASCAR from Pure Oil, whose involvement in stock car racing began in 1951.

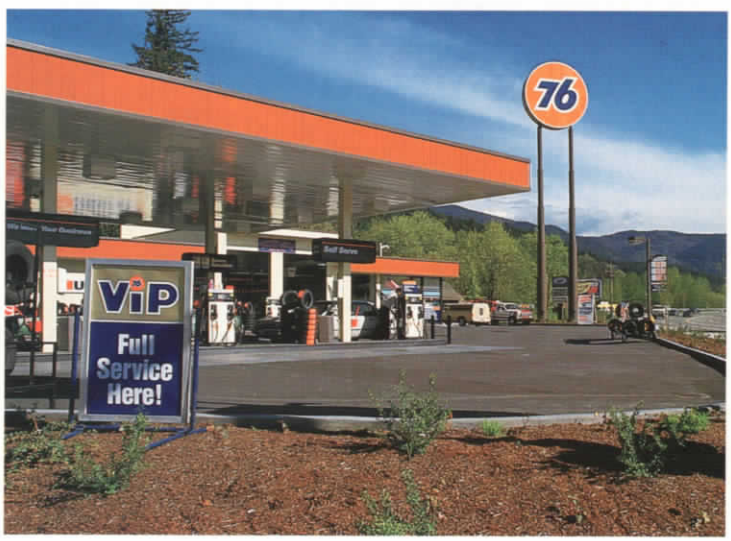
1988. The company halts production of petroleum fuels at its Beaumont refinery, limiting operations to the manufacture of lube oils, solvents and petrochemicals. The move is intended to assure profitability, but the refinery continues to lose money. Unocal announces its closure the following year, with plans to develop the site as a terminal.

1988. Unocal's Auto/Truck-Stop network introduces Access 76—a computerized telecommunications, credit, cash disbursement and invoice system for customers. About 300 Unocal auto/truckstops offer the service, designed to meet the needs of truck fleet operators and their drivers.

1989. Unocal and Petroleos de Venezuela S.A., Venezuela's national petroleum company, sign an agreement that transfers Unocal's Chicago refinery and certain related midwest marketing assets to a newly formed joint venture. Each partner holds a 50-percent interest in this stand-alone venture, which is named The UNO-VEN Company.

1990. To help reduce air pollution in the Los Angeles Basin, Unocal announces a trio of innovative environmental efforts: the South Coast Recycled Auto Program (SCRAP), the Smog-Fighter program, and the Protech Patrol. Their combined effect is expected to eliminate several million pounds of automobile emissions from the air annually.





FROM THE PRODUCER TO THE CUSTOMER

The year 1890 might not have seemed like a promising time for Union Oil Company of California to incorporate. The supply and quality of crude oil fluctuated widely. Factories, ships and trains still relied largely on coal for fuel. The automobile age was far off in the future.

Kerosene, fuel oil, lubricating oils and greases were the main saleable products of the young company, and the huge Standard Oil Company, reaching out from the eastern U.S., already threatened to dominate those markets in the west. Railroads controlled long-distance hauling, exacting from oil producers whatever price the traffic would bear.

Some people, like Thomas Bard, Union Oil's first president and a co-founder of the company, were inclined to go with the flow: sell fuel oil and kerosene in the best available markets, and let it go at that. But Union chairman and co-founder Lyman Stewart had a far broader and more forward-looking view of the business. The real growth, he felt, would be in developing and marketing as many value-added products from petroleum as possible. Given the circumstances, however, that was easier said than done.

Union Oil did have an infrastructure, inherited from its predecessor companies. Feeder lines from the producing wells in the Newhall field and around Santa Paula connected to a pipeline that carried the oil to a shipping terminal in Ventura. This was the first pipeline to tidewater on the west coast.

To ship oil by rail, Thomas Bard had thirty 130-barrel tank cars constructed in 1887 at a cost of $810 each. That same year, the Santa Paula refinery was built. One of the first refineries in California, it was a rudimentary plant with a capacity of about 14,000 barrels a year. The main product was kerosene, which didn't always measure up well against the superior kerosenes made from lighter eastern crudes.

Union Oil also had the "ghost" of a tanker—the *W.L. Hardison*, named for Wallace Hardison, another of Union's founders. Launched in 1889, the steam-powered ship was the first true oil tanker built on the west coast. It was also one of the first vessels to be lighted by electricity. Unfortunately, just six months after its launch, the ship burned at the dock in Ventura when a crewman lowered a lantern into a tank to check the oil level.

The *Hardison*, however, had already made six trips to San Francisco at a considerable savings over the railroad tariff. Even after its destruction, the *Hardison* served as a reminder to the railroads that their shipping monopoly was not invulnerable.

Lyman Stewart fervently believed in developing new markets for oil and petroleum products—even though his efforts didn't always initially bear fruit. For example, the Pacific Coast maritime trade offered vast market potential for fuel oil, and Stewart managed to arrange a trial on the lumber carrier *Pasadena*. Unfortunately, on the first attempt water got mixed with the fuel oil, and the ship had to be towed back to port. The problem was soon solved, however, and the *Pasadena*—launched in 1887—was probably the first Pacific Coast vessel to be powered by fuel oil.

As more and more oil discoveries were made in California, Stewart intensified his efforts to develop new markets. Among Union's early fuel-oil customers were the Whittier Reform School, the Los Angeles Iron and Steel Company, and the luxurious Hotel del Coronado in San Diego.

Bard and Stewart were also aware of the successes in using oil to power steam locomotives in Russia and Peru. They proposed a trial to California Southern Railway, which loaned them an old steam locomotive for the experiment. After some modifications to the burner, the oil-fueled engine began making successful trips over the Tejon grade at a substantial cost saving over coal. A new market for fuel oil was born, and steadily grew.

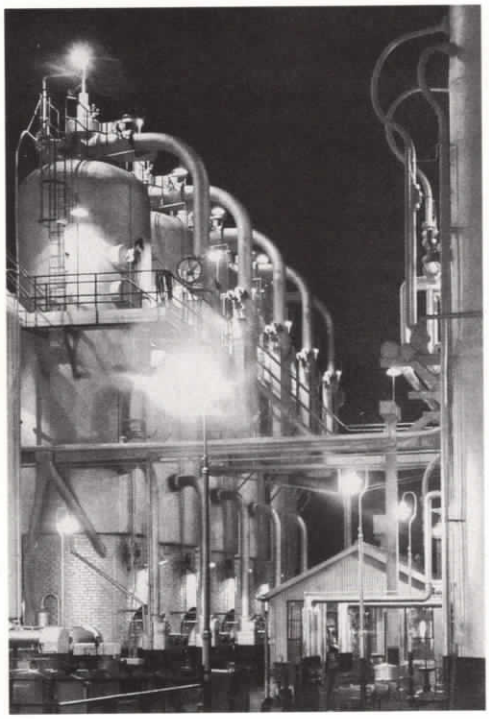
While the volume of oil the company sold was obviously important, Stewart maintained that the oil's value could be enhanced by developing, manufacturing and marketing new products from it. The Santa Paula refinery produced a variety of lubricants—including engine oil, cylinder oil, valve oil and machine oil. Asphalt was also produced and sold for caulking, coating roofing paper, and paving streets. The lighter distillates—benzene, naphtha and gasoline—filled special orders for paint solvents and thinners. So-called "gas oil"—used in a popular new type of gaslight—was another profitable product.

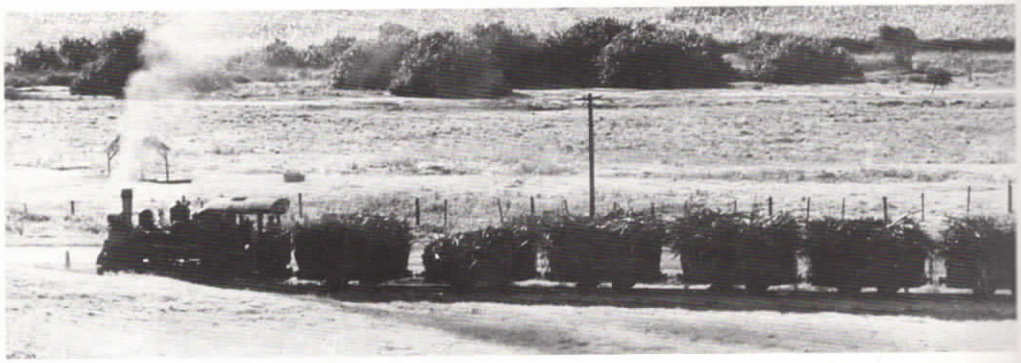
Above left, in 1894 Union Oil mechanics modified this steam locomotive to burn oil rather than coal. Center, clockwise from top left: a Union driver delivers fuel oil in San Diego circa 1910; the tanker Hardison *is destroyed by fire; an early view of the Santa Paula refinery. Far right, tank wagons fill up at a Union Oil terminal.*

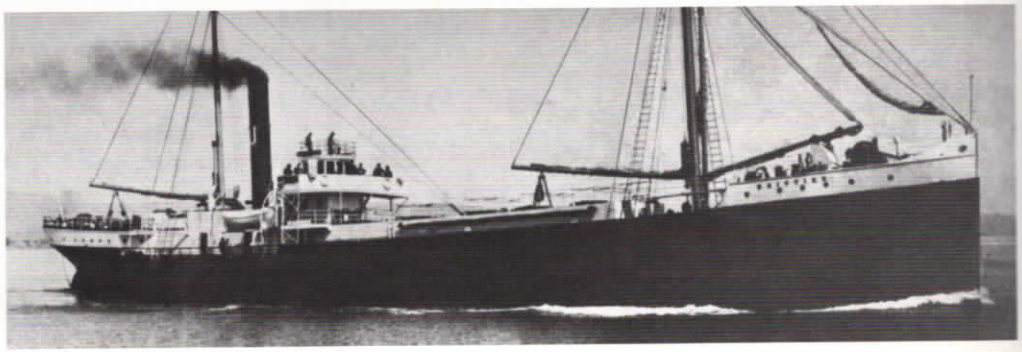
The early automobile, slowly sputtering toward its 20th-century destiny, was virtually ignored by petroleum marketers. The first motorists had to buy gasoline in cans at hardware stores, or drive to a refinery or distribution terminal to purchase it. The first service stations would not appear until more than two decades after Union's founding.

Lyman Stewart and his brother Milton, who was a major investor in Union, were excited about the possibility of exploiting new processes to make inks and dyes from petroleum. As it happened, neither of these ventures panned out. But the Stewarts' interest in expanding product research led to the hiring of a Swiss chemist named Frederick Salathe, who had been experimenting with crude oil. Put in charge of the Santa Paula refinery in 1891, Salathe set up the first petroleum research lab in the western U.S. He was paid $10,000 a year, quite an impressive salary at the time.

While a brilliant research chemist, Salathe was an ineffective manager who couldn't get the refinery to produce products of consistent quality. Thomas Bard complained of "our inability to supply customers a second time with the oil we have sold them on trial." After nearly three years, the company finally lost patience and Salathe was fired.







By 1895, the Santa Paula refinery's equipment was becoming run-down. Early that year Union purchased a site for a new and larger refinery on San Francisco Bay. The following year, the facility—named for the nearby town of Oleum—went on stream, supplied with crude by tanker from Ventura.

In 1900, after repeated conflicts with Lyman Stewart, Thomas Bard sold his holdings in Union Oil and left the company. With a freer hand to build the kind of organization he wanted, Stewart promptly moved corporate headquarters to Los Angeles. With the help of his son, William L. "Will" Stewart, he proceeded to further expand marketing operations.

Among the new people Stewart hired was an aggressive young salesman named John Baker, Jr. When a severe crude oil glut developed in 1901, Baker proved his value. Hitting the road, he ventured far afield to sell the company's products. In Hawaii, a U.S. possession paid little attention by oil marketers at the time, he signed three sugar plantation owners to five-year contracts for fuel oil to run their cane-grinding mills.

To service this profitable if distant market, the company built storage tanks in Hawaii and put a tanker—the sailing ship *Fullerton*—on a supply run from the west coast. Before the year was out, Union's storage capacity on three Hawaiian islands stood at 227,000 barrels.

In 1903, a new tanker, the *Whittier*, went into service. Built in San Francisco, the ship was distinctive for its innovative configuration, which set the pattern for tankers over the next 60 years. The engines and crew quarters of the vessel were set aft rather than amidships, and its tanks were an integral part of the steel hull. On one of its first voyages, the powerful *Whittier* responded to a critical fuel shortage in Hawaii. Loaded with crude itself, the ship towed two other loaded vessels, delivering a combined cargo of 35,200 barrels of oil to the islands in just 10 days—a remarkable feat of seamanship.

Above left, the Oleum refinery's propane-solvent plant, which produced Triton motor oil. Above right (top), a train carries sugar cane to a Hawaiian mill, several of which were powered by Union fuel oil. Bottom, the Whittier, *commissioned in 1903, was Union's first steel-hulled tanker.*

Meanwhile, the energetic Baker continued to expand his territory. Soon promoted to manager of sales, manufacturing and the marine department, he seemed to be everywhere. In one year alone Baker traveled 50,000 miles—an amazing distance in the pre-air travel days—peddling Union's wares as far afield as the U.S. east coast, Central and South America, Europe and Asia. He also won President Theodore Roosevelt's support for construction of a Union Oil pipeline across Panama. The line supplied the Panama Canal builders with oil, and briefly moved some California crude to the Atlantic side of the isthmus.

Baker's successes helped the company continue to expand. By the time he left Union Oil in 1907 to go into the asphalt business, the company's refining and transportation capacity was at least five times as large as it was at the turn of the century.

Union supplied its customers from a growing number of marketing terminals. Its first facility was established in 1899 in San Pedro. Tank wagons filled at the terminal were hauled by teams of horses and mules to supply customers, slogging over muddy, rutted roads in all kinds of weather. By 1916, the company had opened facilities in Los Angeles, Pasadena, Riverside, Burbank, Santa Ana and Santa Barbara—as well as five terminals in South America.

Before motorized trucks took over about the time of World War I, the Los Angeles terminal stabled as many as 125 horses and mules at one time. By contrast, the early Burbank station was operated by a single individual who served as tank wagon driver, yardman and sales agent. He was equipped with one team of horses, a tank wagon and one 17,000-gallon storage tank.

In 1902, Union built a refinery in Bakersfield to help process the company's growing production in the central San Joaquin Valley. When the San Francisco earthquake hit in 1906, forcing temporary closure of the Oleum refinery and interrupting a sizable expansion program, the Bakersfield facility helped to take up the slack.

In 1910, the company constructed an 8,000-barrel plant at Port Harford (now Avila) on California's central coast to handle crude from the growing number of fields in the southern San Joaquin Valley. The next year an 11,000-barrel unit was completed at Brea, east of Los Angeles, following discoveries there. The Los Angeles refinery, located near the city's growing harbor, was brought on stream in 1917.

As Union Oil grew, so did the pipeline system that gathered the oil and carried it to the refineries and terminals. In 1904, Union constructed a six-inch line from the town of Orcutt to the coast at Port Harford, a distance of 32 miles. The remarkable engineer and geologist William W. Orcutt—whom the town was named after—was in charge of the project.

The versatile Orcutt mapped out the pipeline route, negotiated for the rights-of-way, procured materials and oversaw the actual construction. The line, which moved oil from Union's San Luis Obispo and Santa Barbara county oil fields, was completed early in 1905. By then, the company's Port Harford terminal had tankage to store 250,000 barrels of crude oil.

Above, an early view of the company's shipping terminal at Port Harford. Oil from Union fields in San Luis Obispo and Santa Barbara counties—and later, San Joaquin Valley production—was transported here by pipeline.

In 1909, Union began a joint pipeline project with the Independent Oil Producers Agency, a consortium of 150 small producers in the San Joaquin Valley. Facing the usual pressure of Southern Pacific's stiff freight charges, the company organized the Producers Transportation Company to build an 8-inch pipeline from the valley to Port Harford.

It was a massive undertaking for its time, requiring the laying of 240 miles of pipe and construction of 15 pump stations. One thousand men started work on the project in July of 1909. The line was completed in under nine months, and oil began flowing in March of 1910. Eventually, the line carried 30,000 barrels of oil a day.

The company's tanker fleet also grew rapidly in the first decades of the 20th century. Union's maritime department purchased five new ships in 1907, and added several more by charter and purchase over the following years. Three of the company tankers were commandeered by the U.S. Navy to transport fuel during World War I.

Following the war, Union Oil Company's rapid growth fed on the automobile. The first Union filling station, with one hand-operated pump, was opened in 1913 in Los Angeles at the corner of Sixth and Mateo streets. At that time, there were fewer than 125,000 automobiles in all of California. Nine years later there were more than 810,000 registered in the state.

As the number of automobiles mushroomed, more and better roads had to be constructed to accommodate them. The amount of asphalt used annually for paving in the U.S. more than tripled between 1914 and 1924, and Union supplied a large share of it in the west.

Throughout the Roaring Twenties, Union couldn't seem to open new service stations fast enough. By 1925, there were 400 company retail outlets on the west coast. The square, stucco, tile-roofed stations—featuring an overhang to shelter motorists at the pumps—were designed to blend in with surrounding residential neighborhoods. In 1925, the company issued its first credit cards. Signed by the local district sales managers, the paper documents were valid for two months.

Late in 1926, Union Ethyl gasoline was introduced as "the new super fuel." The addition of a tetraethyl lead compound to fuels brought a notable improvement in the performance of automobiles, and the company's marketing effort reflected this. Pickwick Stages, the largest bus company on the west coast, ran a test trip to San Francisco from Los Angeles using Union Ethyl. The driver reported that the engine of his 33-passenger bus never faltered or knocked, even on the steepest hills.

Union marketers also foresaw a big future for aviation fuel in the 1920s. Airplane watchers in the west could sometimes spot a biplane overhead, sporting a Union Oil sign on the side of its boxy fuselage. By the late '20s, Union had its own aviation department under the management of Charles F. Lienesch, a military-trained pilot who had been a chemist at the Oleum refinery. The main purpose of the new department was to promote Union aviation products throughout the west.

By the 1920s, Union Oil service stations (above left) had become a common sight in the west. Above right, Union fueled the Southern Cross *on its historic trans-Pacific flight in 1928. The company also sponsored notable female pilots such as Ruth Elder (inset).*

Union sponsored several major aviation events in the '20s, including Captain Charles Kingsford-Smith's record-breaking 7,054-mile flight in the tri-engine *Southern Cross* from Los Angeles to Brisbane, Australia in 1928. The company also backed a number of noted female pilots, including Amelia Earhart, Ruth Elder, Marvel Crosson, Bobbie Trout and Florence "Pancho" Barnes, most of whom set speed, distance or altitude records in planes bearing the Union Oil shield.

In the effort to formulate products of ever higher quality, the company opened a new research and development laboratory at the Los Angeles refinery in 1922. Constructed under the watchful eye of Technical Director E. I. Dyer, the 40,000-square-foot facility was designed in large measure by R. E. Haylett, Union's manager of Research and Development. Its gleaming, well-equipped laboratories were state-of-the-art.

A wide range of Union products were developed and tested at the facility during the ensuing years. One of the most successful was introduced in 1932. That year, the company unveiled new "Union 76" gasoline, touting it as "the finest anti-knock, non-premium gasoline ever offered."

The name was suggested by Robert D. Matthews, who had been Union's head of manufacturing and distribution before becoming executive vice president. The Welsh-born Matthews had been inspired by "the Spirit of '76" when he studied U.S. history in the process of becoming a naturalized citizen.

Coincidentally, the octane rating of the new gasoline was also 76, which caused the U.S. Patent Office to reject Union's application to register the 76 trademark. The government held that Union couldn't be the proprietor of a name based on an octane number. It took 15 years of appeals before the Patent Office finally granted certification.

In developing Union 76 gasoline, the company's researchers and marketers were well aware of the changing needs of the motoring public. Automobile manufacturers had been steadily increasing the compression ratios of engines. At the same time, many motorists, caught in the financial pinch of the Depression, were either foregoing the more expensive premium gasolines for cheaper grades or mixing the two, which caused knocking in the higher-compression engines. Union 76 gasoline provided a lower-priced and more effective alternative.

The marketing department, under Victor H. Kelly, mounted the biggest campaign since the introduction of Union Ethyl in 1926. "Take the ten-gallon test," they urged motorists. Lots of people did, and were converted to the new gasoline. It was hardly the best of times for marketing, however. Price wars often erupted among gasoline retailers, eroding profit margins, and by the early '30s the Depression's impact was being severely felt. Union's sales dropped from a 1929 high of $89 million to $51 million by 1932.

As the Depression deepened, auto sales slumped and motorists curtailed their driving. Many dealers, with their profit margins squeezed out of existence, were going broke. To help assure the viability of its service station network, the company formed a new subsidiary, Union Service Stations, Inc., which took over more than 750 weak or failing outlets. Service station operators became company employees, and in those times were glad to get the job.

Above left, "truth conquers all" was the motto above the entrance to the company's research center, opened in 1922 at the Los Angeles refinery. Above right, Union Ethyl was introduced in 1926 as "the new super fuel."

To win more customers and keep them coming back, Union intensified its emphasis on customer service. Stations were upgraded, and the company enlarged its merchandising program, adding tires, batteries, and accessories such as spark plugs and windshield wipers to its regular line of fuel and lubricant products. Attendants, who were put through a detailed training program, were outfitted in bright white uniforms.

The service guidelines for Union attendants were clear: Meet all incoming cars immediately, fill the radiator and clean the windshield in addition to pumping gas, ask permission to check the oil level and tires for proper inflation, keep the washrooms spotless, maintain service records for the motorist, keep gas pumps and hoses clean. In 1939, "Minute Man" service was introduced, promising even stricter standards and a brisker response to customer needs. These innovations set the standard for Union's full-service commitment that carries on to this day.

There were other challenges to meet on the product development side. From the early days, Union had to struggle hard to overcome the superiority of eastern lubricating oils.

The lighter, paraffin-based Pennsylvania lube oils simply performed better than those refined from the heavier, asphalt-based crudes of the west. By 1933, the eastern oils had captured almost half the $80-million west coast lubricant market.

Union researchers intensified their efforts to find ways of producing high-quality motor oils from California's heavy crude. By 1934 they had perfected a process that removed most of the asphalt, sulfur and other unwanted substances. The result was a new, high-quality motor oil that the company named Triton. The new product—which more than matched the eastern motor oils in quality—was an immediate success.

Union marketing personnel remained busy on several fronts. In 1932, the company was awarded a contract by the U.S. Navy to supply $3 million worth of fuel oil and Diesol (Union's diesel fuel) for the next fiscal year. It was believed to be the largest fuel oil contract ever awarded to a single company. In addition, Union became a major supplier of petroleum products to the builders of Hoover Dam.

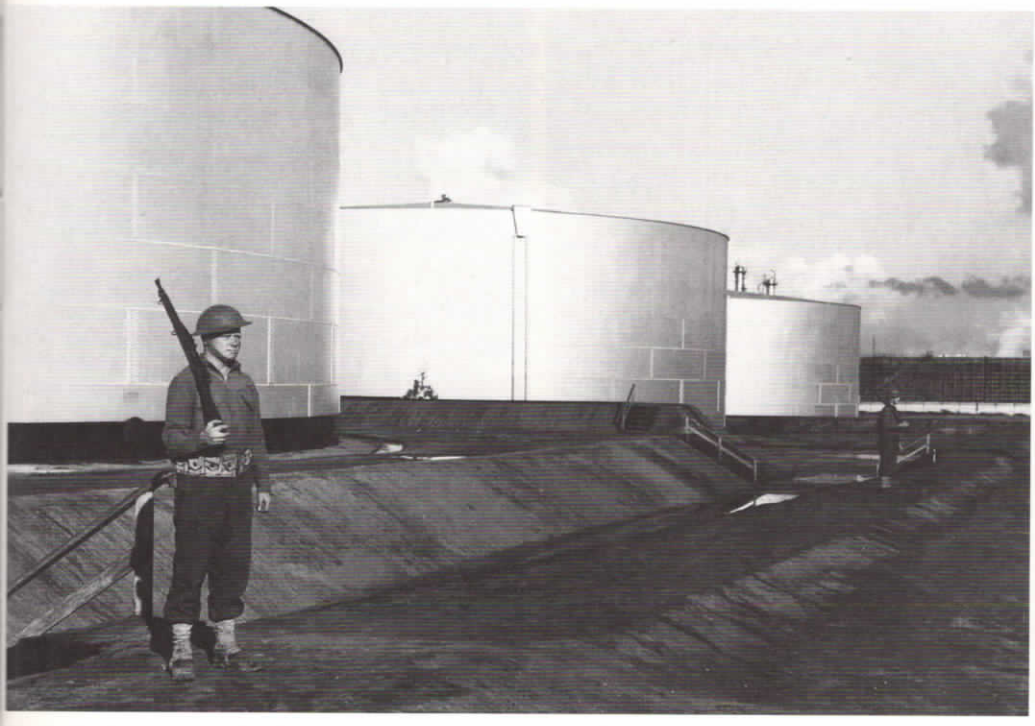
During the 1920s and '30s, Union also focused on improving safety at company facilities. The threat of fire was always worrisome, and events in April of 1926 provided a lesson for Union and all oil companies. Lightning from a heavy Pacific storm front ignited 3 million barrels of oil stored in covered earthen reservoirs at the Union Oil tank farm in San Luis Obispo. Within minutes a second bolt exploded a huge steel storage tank, and the fire was out of control. The same storm moved southeast and started another fire at Union's tank farm near Brea.

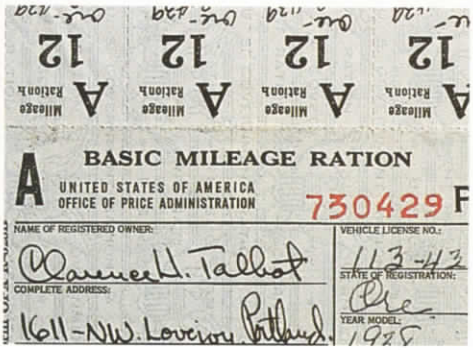
Altogether, Union lost 8 million barrels of oil, 21 steel tanks, miles of pipeline and much adjoining property in the two fires. The insured loss was more than $9 million—the worst fire loss since San Francisco burned after the 1906 earthquake, according to the underwriters.

As a result, the company established a "fire lab," which trained Union personnel in the latest techniques and technology of fire prevention and control. The lab was the forerunner of the company's present-day Fire Protection School, conducted annually in Reno, Nevada. The fire-fighting tactics that are researched, tested and taught there are shared with local fire departments around the country.

By the end of 1938, the Depression had taken a heavy toll on Union Oil Company. When Reese Taylor became Union's president that year, he took over a company whose infrastructure had declined alarmingly. Of Union's five refineries, only the San Francisco, Los Angeles and Bakersfield plants were actually manufacturing products. Transportation facilities were inadequate to handle the potential output of crude, which was one reason nearly half of Union's producing wells were shut in.

Research and manufacturing, under Bill Stewart Jr. (one of Lyman's grandsons) and R. E. Haylett, had enjoyed some significant successes. Along with Union 76 gasoline, Diesol and Triton, researchers had also developed a new all-purpose, barium-based grease called Unoba, which was introduced in 1939 and replaced dozens of specialized greases in automotive and industrial applications. However, the L.A. refinery research lab, which had been such a source of pride in the early 1920s, was now overcrowded and outmoded.





Taylor's response was to embark on a massive rebuilding program, financed largely with money raised from the Wall Street investment community. Included in the program was a much-needed modernization of the Los Angeles refinery, where the installation of a new alkylation plant capable of producing 100-octane aviation gasoline was one of the improvements. The Oleum refinery was also refurbished and expanded, and Union's network of service stations was further upgraded. By 1940 the company had more than 5,000 outlets, and the network had expanded into Utah, Arizona and Idaho.

When the U.S. entered World War II, Union shifted its priorities fully to the war effort. Taylor sent a message to all employees: "We recognize the prior claim of the government upon all the petroleum products the company is capable of producing," he said. "So long as the war lasts, supplying government needs must be the company's first responsibility."

Above, left to right: Dr. Ulric B. Bray, one of the developers of Triton motor oil; lightning sparks a fire at the San Luis Obispo tank farm in 1926; guarding stored petroleum at a Union facility during World War II; the Union tanker Montebello, *later sunk by a Japanese submarine; wartime gasoline ration stamps.*

Union was promptly called upon to quadruple its production of aviation gasoline. Fortunately, the company was able to complete the refinery units already under construction. Manufacturing still couldn't keep up with the wartime demand, however, and in 1942, Reese Taylor returned to New York to raise more money for further expansion. By the end of the war, Union had boosted its aviation gasoline production to seven times what it had been in 1941.

During the war years, Union's entire tanker fleet was commandeered by the government. Company tankers served with distinction throughout the war, supplying the Allied forces with critically needed fuel and petroleum products. The fleet did not emerge unscathed, however. Just two weeks after Pearl Harbor, the Union tanker *Montebello*, en route to Vancouver from Port Harford, was attacked and sunk by a Japanese submarine. Its crew was able to make shore in lifeboats without any loss of life. The crew of the tanker *Gurney E. Newlin* was less fortunate. In 1943, it was torpedoed by a German sub in the mid-Atlantic. Thirty-four of the crew of 41 were lost.

Union Oil contributed more than its tanker fleet to the war effort. In a secret operation called "Roll Out the Barrels," Union employees filled and shipped 4,800 drums of gasoline a day from a special plant on San Francisco Bay. By the end of the war, they had supplied 46 million gallons of gasoline for military campaigns in the Pacific.

In mid-1944, with the war still in progress, Union started up a new catalytic cracking unit at the Los Angeles refinery. Unlike the thermal cracking units commonly employed by refiners, which used heat to separate crude oil components, the "cat cracker" passed vaporized oil over special catalysts. This advanced refining process yielded a higher percentage of light-end products from a barrel of crude, which in turn enabled production of cleaner-burning gasolines with higher octane ratings.

When the war ended, a public that had been deprived of fuel for four years was itching to get on the move again. Union's marketing department—headed by Arthur Stewart, another of Lyman's grandsons—was ready to respond. Hiring the best people he could find, Stewart gave them intensive training in the research and refining departments before sending them out in an aggressive sales and service campaign.

Stewart also leased the service stations acquired by the company during the Depression back to the dealers, believing that a network of outlets operated by independent businessmen would achieve better results. The move paid off for both the dealers and the company: Union's sales volume increased by 500 percent during the next decade.

Among Union's new products introduced after the war was Royal Triton, a unique purple-hued motor oil containing a detergent. Royal Triton not only held up longer in car engines, it successfully counteracted rust, corrosion and oxidation. The new motor oil was an immediate hit with the motoring public. Its quality was so high, in fact, that Union was able to turn the tables by invading the east coast market.

By 1950, Royal Triton and other Union products were sold in every state in the nation—as well as in Canada, Cuba and other countries—and the Union 76 symbol had become the most recognizable oil company logo in the west. After a 1947 survey of west coast motorists revealed that 82 out of every 100 readily identified "76" as Union's symbol, company attorneys finally convinced the U.S. Patent Office to register the trademark.

As Union Oil entered the 1950s, its system of pipelines also continued to expand. Back in the 1890s, Lyman Stewart had wanted to build a pipeline from the Santa Paula area to Los Angeles, but the fiscally conservative Thomas Bard had overruled him. In 1955, Reese Taylor was able to accomplish what Stewart couldn't. Through a shared ownership arrangement with the Santa Clara Pipeline Company, a 65-mile line was completed connecting the Torrey Canyon, Oakridge and Tapo fields with the Los Angeles refinery.

In 1956, the Oleum pipeline began moving oil from the southern San Joaquin Valley fields to the Union refinery on San Francisco Bay. The new 225-mile pipeline had an 80,000-barrel-per-day capacity. By the end of the 1950s, Union's California network included nearly a thousand miles of major pipelines and about 500 miles of feeder lines.

The larger pipeline system allowed Union to expand its tanker operations from the California coast to other parts of the globe. During this period, Union tankers began shipping oil from the huge Middle Eastern fields to the company's refineries. Union's first "supertanker," the 470,000-barrel *Sansinena*, was launched in 1954 as part of this expanded maritime presence.

As the decade progressed, the nation's demand for light-end products—gasoline, diesel and aviation fuel—continued to increase. The company responded by continuing to upgrade and expand its manufacturing facilities. In 1952, a new $9-million catalytic cracking unit went on stream at the Los Angeles refinery, nearly doubling the company's cat-cracking capacity to 56,000 barrels a day. In 1955, Union opened a new refinery near Santa Maria, California. Its twin coking units, along with the coker installed at Oleum a few years before, enabled Union to produce a higher proportion of gasoline feedstocks from heavy California crude.

Also in the early '50s, the company's 300-person research staff was moved from the old, overcrowded L.A. refinery research laboratories to a new $8 million facility in Brea, completed in 1951. The center was designed to foster a team approach to research, under which scientists and technicians could work jointly on projects with individuals assigned from the operational groups.

The approach was so successful that A.C. "Cy" Rubel, who became Union's president in 1956, was able to boast that "Union gets more from researchers than does any other company because...each project is guided by a sponsoring group from the field or the refineries."

By the middle of the decade, 40 other oil companies and chemical manufacturers had licensed technologies developed by Union. One major licensing success was Unionfining (originally called Unifining), a revolutionary process developed and patented by company researchers in the 1940s. A catalytic refining process, Unionfining removes sulfur, nitrogen and other contaminants from a variety of petroleum products. By the mid-1950s, Union's commercial development department—headed by an aggressive young engineer named Fred L. Hartley—had sold Unionfining licenses to more than 100 other refiners.

Above, left to right: Union 76 stations of the 1950s featured broad canopies; the company opened a new research center at Brea in 1951; an early '60s view of the Los Angeles refinery; the "Sparkle Corps" pays a visit to a dealer.

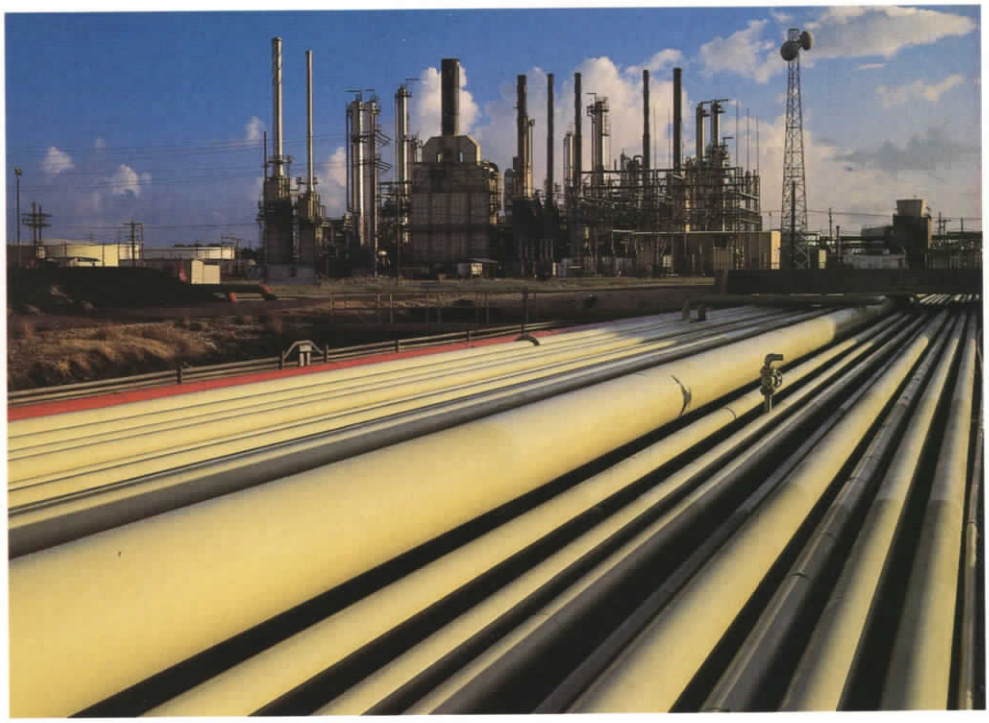
Union researchers were also testing another major refining advance—a way to achieve hydrocracking under relatively low pressures. The secret of the new process—named Unicracking—was a remarkable new catalyst developed by Union scientists. "This new process," Reese Taylor explained, "is based on a novel catalyst which causes hydrogen to react with the feedstock under relatively mild conditions of temperature and pressure. Complete conversion of feed to gasoline can be achieved with a yield of about 115 volume percent."

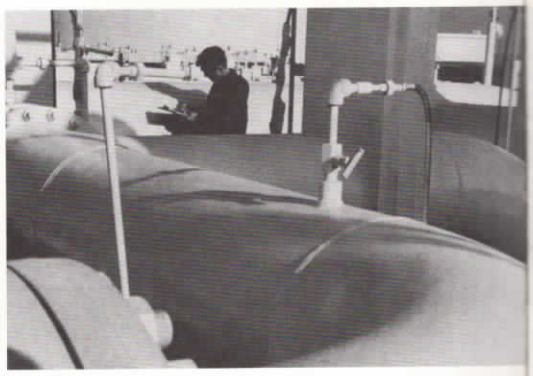
In effect, Unicracking could convert 100 barrels of feedstock into 115 barrels of gasoline or other high-value products. After years of testing and perfecting the process, Union brought the first full-scale commercial Unicracker on stream at the Los Angeles refinery in 1964.

Fred Hartley's success in guiding the company's licensing efforts—and later, in directing the research department as a whole—impressed Reese Taylor. "You should be heading up all of our marketing," Taylor told Hartley one day in 1959. "This would be a radical change from your engineering and research work, so take your time in making a decision." Within an hour, Taylor was demanding that Hartley make up his mind.

Hartley took to the road to "learn marketing from the dealers and the motoring public," as he recalled. He found that while production and sales volumes had more than doubled through the 1950s, profit margins were getting thinner. Competition was intense, and Hartley saw the need for a revitalized marketing approach. The strategy he devised was very straightforward. "Instead of being merely distributors of commodities, our dealers became merchandisers," Hartley explained. "Our goal was to sell profitably, rather than to increase volume just for growth's sake."

Unprofitable Union stations were pruned from the system, others were spruced up or rebuilt, and new stations were opened at selected locations. Customer service and product quality continued to be stressed in the company's advertising, and some special projects were undertaken to highlight those themes. The uniformed women of the "Sparkle Corps," for example, underscored the cleanliness of Union 76 service stations by carrying out white-gloved inspections.





By the early 1960s, growth had pushed Union's corporate structure to its limits. In 1962, Taylor undertook a major streamlining. Operational groups were reorganized into independent profit centers, each under a senior vice president. Fred Hartley was appointed head of the Refining & Marketing Division. In June of that year, Taylor died suddenly and unexpectedly. Cy Rubel, who had served as president under Taylor, came out of retirement to assume the presidency once again. Two years later, Hartley took over the reins as Union's president and chief executive officer. Senior Vice President John Towler replaced him as head of Refining & Marketing.

In 1965, just one year into Hartley's stewardship, Union Oil underwent a major and far-reaching transformation by merging with The Pure Oil Company. Founded in 1924, Illinois-based Pure was an integrated oil company with refining and marketing operations in 24 states east of the Rockies. The merger lifted Union from regional status to that of a national oil company with operations in 37 states.

Pure's upstream operations were quickly folded into Union's exploration and production organization. The merger of the two companies' downstream segments was more involved. During a two-year transition period, Pure's refining and marketing operations, along with petrochemicals, were organized into a new profit center, the Pure Oil Division. The president of the new division was Claude Brinegar, who was also charged with directing the merger and reorganization of the two companies.

Integrating the Union 76 and Pure Oil brands proved to be a difficult, emotionally charged task. Both brands had long histories and loyal customer bases. After lengthy debate, Union decided to eliminate Pure's Firebird gasoline brand and also do away with Union's Minute Man service theme. Gradually, Pure Oil stations would be converted into Union 76 stations.

"We 'feathered' the change into the Union Oil family as part of the normal station maintenance cycle," Brinegar said. "We did it this way so that Pure customers could get used to our name gradually, and we could spread the cost over a period of time."

The post-merger Union Oil Company had a greatly expanded refining and marketing presence in the U.S. The company operated nine refineries in six states, and had 10,000 miles of pipelines and 18,500 retail outlets. It was now the ninth largest oil company in the United States.

In 1968, Brinegar was named president of the newly formed Union 76 Division, which encompassed the merged refining and marketing operations of Union and Pure. The new division was split into two regions. The Eastern Region (formerly the Pure Oil Division), headquartered in Schaumburg, Illinois, was under the direction of Bill McConnor, whose career had been with Pure. The Western Region, headquartered in Los Angeles, was headed by Ted Rathbone.

As the consolidation progressed, Union decided to close down three small Pure refineries—two in Ohio and one in Lemont, Illinois, just south of Chicago. To replace them, the company would build a new, 140,000-barrel refinery on the Lemont site. The state-of-the-art Chicago refinery was completed in 1970 at a cost of $220 million. Another facility inherited from Pure, the Smith's Bluff refinery on the Texas Gulf Coast, was renamed the Beaumont refinery.

The company also expanded its pipeline network to accommodate the enlarged refining system. In 1967, Union and seven other oil companies began construction of a new, 40-inch crude oil pipeline — named the Capline — from Louisiana to Illinois. The line would link Union's growing production in Louisiana to its new midwest refinery system. Eventually, Capline — which became the nation's largest-diameter common-carrier crude oil pipeline — would move more than 1 million barrels a day.

The oil was needed by a growing nation. Between 1965 and 1972 — the first seven years after the Union-Pure merger — the nation's demand for gasoline rose by nearly 40 percent. At the same time, the airlines' need for high-grade jet fuel doubled. Union, like other domestic oil companies, had to turn increasingly to imported oil to fill the burgeoning demand for product.

Above, left to right: a view of the company's Beaumont refinery, acquired in the 1965 Pure Oil merger; checking gauge readings on the Capline (top); Pure Oil's Firebird gasoline logo, retired after the merger; the state-of-the art Chicago refinery, opened in 1970; a banner announces the arrival of Low-lead Regular 76 gasoline, introduced by Union the same year.

Starting in the late 1960s, a growing environmental movement helped to usher in an era of increasing government involvement in the energy industry. In January 1970, President Richard Nixon signed the National Environmental Policy Act, which created the Environmental Protection Agency (EPA) and resulted in an avalanche of new government regulations setting stricter anti-pollution standards. These particularly affected the oil and automobile industries.

Union had long been active in tailoring its manufacturing operations to achieve minimal environmental impact. As early as the 1950s, the company had installed a $1.8-million plant to recover 90 to 95 percent of the sulfur in emissions from the Los Angeles refinery. Union also developed or shared in the development of several other refining processes that removed sulfur and other contaminants from petroleum and petroleum feedstocks as they were processed.

Union's experience in environmental control systems was incorporated in the design of the new Chicago refinery. When it opened in 1970, the facility more than met strict new government requirements on air and water pollution. In all, about $37 million of the $220 million price tag for the Chicago refinery was spent on processes to ensure air and water quality.

The public was becoming increasingly aware of the fact that automobiles were the prime source of air pollution. Union's cleaner-burning gasolines helped tackle this problem. Nevertheless, lead in gasoline — useful as an octane enhancer — was now identified as a factor in air pollution. It was also an impairment to the new catalytic converters being developed by automobile manufacturers to reduce emissions of nitrous oxides and other smog-forming pollutants from exhaust pipes.

Anticipating the eventual shift to unleaded gasoline, Union was one of the first companies to offer a "low-lead" regular gasoline at its service stations. Introduced in 1970, Low-lead Regular 76, which replaced the company's regular-grade gasoline, contained just .5 gram of lead per gallon — 80 percent less than conventional regular-grade products.

The EPA announced that on July 1, 1974, unleaded gasoline must be available at 60 percent of a company's service stations pumping more than 200,000 gallons a year. Union far exceeded that requirement with the release of its Unleaded Regular 76 that same year — becoming the first company to replace all of its leaded regular with an unleaded product in the west.

Petroleum On The Move

In addition to the environmental movement, other events of the early 1970s impacted Union's refining and marketing operations. In 1973, Claude Brinegar accepted an appointment as U.S. Secretary of Transportation. (Bill McConnor replaced Brinegar as president of the Union 76 Division.) Two years earlier, in the face of soaring inflation, the Nixon administration's Cost of Living Council had clamped price controls on dealers' margins and gasoline pump prices.

In October 1973, Egyptian troops attacked Israeli positions across the Suez Canal, igniting the Yom Kippur War. Six Arab states instituted an oil embargo against pro-Israeli countries, triggering a major energy shortage in the United States. American consumers were forced to wait in long lines at the nation's gas stations. A concurrent hike in oil prices by the OPEC nations wreaked havoc on what had been, for years, a relatively stable world oil market. By the beginning of 1974, oil prices had quadrupled over those in effect a year earlier—and gasoline prices had shot up as well.

Although the oil embargo ended, government price controls did not. Caught in a squeeze that severely eroded profit margins in the retailing sector, Union was forced to curtail its service station building program. Meanwhile, new laws and government regulations continued to spew forth. Each one seemed to spawn another designed to correct the inequities of the previous one.

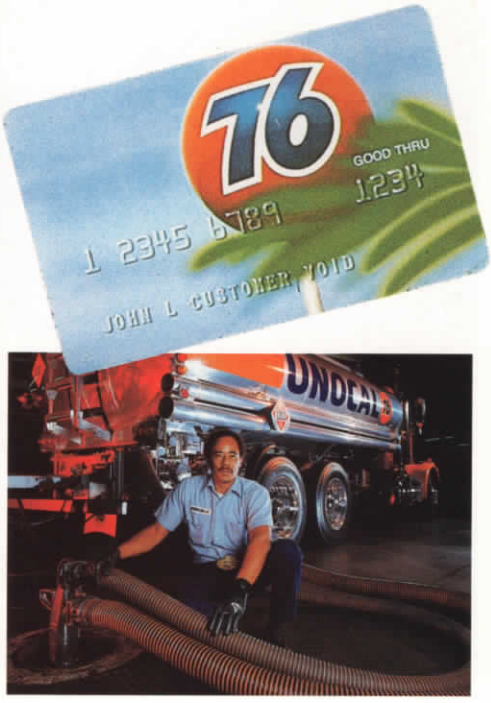
For example, because controls kept prices on domestic oil substantially lower than the market price of foreign crude, the federal government created the Entitlements Program in 1974. The objective was to ensure that oil was evenly priced and distributed among all U.S. refiners, large and small.

The effect of the program was to penalize refiners—such as Union—that supplied their refineries largely with price-controlled domestic oil. Under the program, Union was obligated to pay "entitlements fees" to other refiners. By the time the Entitlements Program was terminated in 1980, Union had paid out approximately $700 million.

As the emphasis on energy conservation heightened, Union concentrated on finding ways to improve efficiency at the company's own high-energy consumption facilities—the refineries. The first opportunity came with installation of coke calciners, which generated high heat to purify coke residues. The calcined coke was used in the metals industry, particularly in the manufacture of aluminum.

At the Santa Maria refinery, the calciner's excess heat produced steam for use in the refinery, saving the equivalent of 140,000 barrels of fuel oil a year. At the Chicago refinery, a similar operation saved the equivalent of 195,000 barrels. With the help of other conservation methods, Union's refineries reduced energy use by more than 20 percent between 1972 and 1979. The effort expanded in the 1980s, when cogeneration plants were completed at the Los Angeles and San Francisco (formerly named Oleum) refineries. The plants use gas turbines to generate electricity, and produce steam for refining processes from the hot turbine exhaust gases.

Above, left: By the early 1980s, Union shipped crude and products via an extensive network of proprietary, jointly-owned and common-carrier pipelines. Right, the San Francisco refinery's cogeneration unit.



In 1979, the Iranian revolution triggered a new round of OPEC price increases. Panic buying in the U.S. led to lines at the gasoline pumps once again. The web of government regulations exacerbated the situation by distorting the industry's distribution system, preventing gasoline from reaching some localities where it was needed most.

In June of 1979, the government finally began to phase out price controls, and in 1981 the regulation of oil prices ended. Gasoline prices rose as a result, but then leveled off as supply began to outstrip demand. The forces of the marketplace finally convinced Americans to reduce their energy consumption.

In the west, many gasoline retailers, caught between rising costs and lower profit margins, turned to "no-frills" operations, eliminating most of the traditional services to customers. Union saw a void developing in the marketplace and chose to fill it.

"The company had a long history of being a service-oriented marketer in the west, and this new environment provided an opportunity for us," said Clay Warnock, Union's vice president of western marketing. "As our competitors were closing service bays and eliminating credit, we decided to buck the trend—to redouble our commitment to full service."

As part of the effort to enhance its service orientation, in 1981 the company introduced Protech, an automotive service and repair program with a money-back guarantee. Protech mechanics were carefully trained and certified—in fact, the Protech standards were considerably higher than those required for a regular mechanic's license. Within five years, more than 40 percent of Union's full-service stations in the west were Protech outlets.

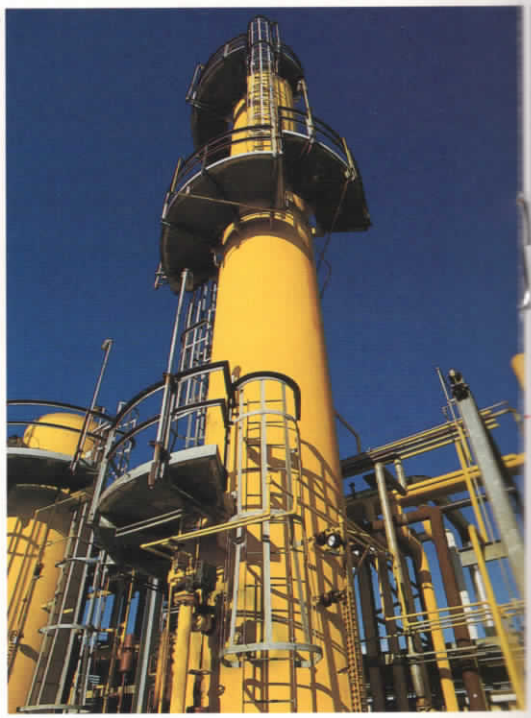
Union also retained its no-fee credit card, and relied on quality to differentiate its products from those offered by competitors. Union 76 stations offered an unleaded regular which was formulated at 89 octane, two points higher than most competing brands. Union also offered a leaded premium grade for older cars—a market segment virtually abandoned by other companies.

In 1986, the company replaced its leaded premium with new Super 76 Unleaded Premium, becoming the first oil company in the west to sell only unleaded gasoline. The new premium gasoline, which had a 91 octane rating (92 in California) was an instant success. Two years later, with the introduction of an 87-octane unleaded, the company became the first gasoline retailer in the west to offer its customers three grades of unleaded product.

In the east, marketing took a different direction. There, Union sold most of its products through independent marketers who operated their own chains of stations. To serve a more evenly distributed population, many marketers transformed their stations into high-volume, self-serve outlets. A growing number also began to operate convenience stores selling groceries, fast food and other items in addition to gasoline and automotive products.

In the 1970s and 1980s, Union's downstream operations suffered a pair of tragic accidents. The first, in December 1976, was the explosion of the tanker *Sansinena* while docked at Los Angeles Harbor. A spark set off explosive vapors collected in the ship's tanks, killing seven members of the crew and a dockside security guard. Within days, Union announced plans to equip company tankers with inert gas systems to prevent a repeat of the tragedy.

Above, Unocal's Protech guaranteed automotive service program and no-fee credit card are key elements of the company's service-oriented marketing philosophy. The high quality of Unocal products is also emphasized.



Late Sports

Los Angeles Times

Morning Final

Tuesday, May 21, 1985

Unocal Defeats Takeover Bid

Private Firms *On Patrol:*

Pickens May Lose Money on Attempt

In July 1984, a high-pressure tower at the Chicago refinery ruptured, resulting in a series of explosions and a major fire. Fifteen employees and two security guards were killed and many others were injured. The tragedy was a heavy blow to the company and the surrounding community, and the damage to the facility was severe.

To assure adequate product supply in the midwest, Union stepped up production at its Beaumont refinery and purchased product where needed. At the same time, the company began to rebuild the Chicago facility. Nine months after the shutdown, the refinery began to process crude oil once again.

In 1986, Bill McConnor retired. Union, now doing business as Unocal, named Roger Beach (formerly vice president, crude oil supply) the new president of what was now the Refining & Marketing Division. Beach took over in the midst of a tumultuous period for the oil industry.

This page, clockwise from upper left: By the mid-1980s, Unocal's auto/truckstop network encompassed more than 300 outlets; current views of the San Francisco and Los Angeles refineries; a headline proclaims Unocal's victory in the 1985 takeover battle.

Between December 1985 and April 1986, the price of crude oil plummeted from $28 a barrel to just $10—a 60-percent drop. Within a few months, prices had edged back up to about $14 a barrel. But the price collapse had an enormous impact on Unocal, which was already burdened by a crippling debt taken on in the successful battle to fend off corporate raider T. Boone Pickens.

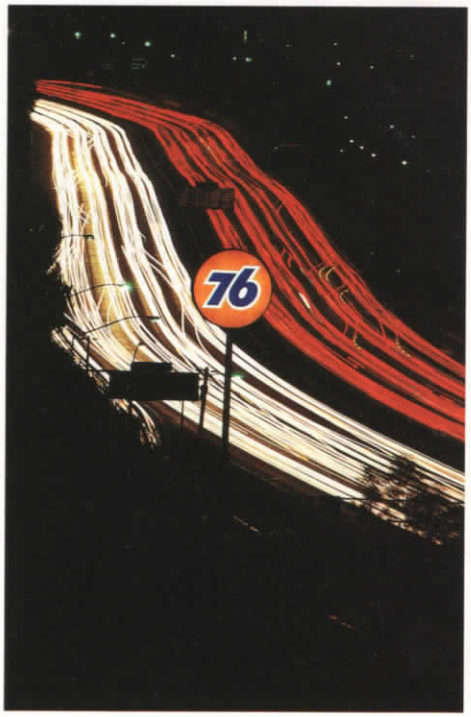
Since the refineries were able to pay less for crude, their profit margins actually improved for a time. However, it was not enough to make up for the losses experienced by the rest of the company. Unocal was forced to undertake drastic belt-tightening measures. As part of the company-wide effort to improve efficiency, Beach initiated a major restructuring of the Refining & Marketing Division. Administration of refining, auto/truckstops, crude supply and transportation was streamlined, and each was consolidated into a single national organization.

"I wanted to reduce redundancy and have the entire division working as a single team," Beach said in explaining the reorganization. "The goal was to be organized by function rather than geography." The division's marketing arm was also streamlined, although it retained an east-west distinction to better serve the unique requirements of each region.

One successful nationwide marketing operation was Unocal's National Auto/TruckStop network, which by the mid-1980s encompassed more than 300 outlets in 43 states. One hundred and fifty of them were located on U.S. interstate highways, mostly in the midwestern and eastern states. Over the years, Unocal had updated, modernized and expanded the auto/truckstop system, which was acquired in the Pure Oil merger of 1965.

Each outlet generally included a restaurant, telephone center and store, in addition to lounges, showers and laundry facilities for truckers. In 1988, the company's auto/truckstop network introduced Access 76—a computerized telecommunications, credit, cash disbursement and invoice system designed to meet the needs of truck fleet operators and their drivers.

"The system not only keeps track of service and credit records at Unocal truckstops, it also provides a communications link between fleet managers and their drivers," said Tom Matthews, vice president of eastern marketing and national auto/truckstops.



By 1986, Unocal's five refineries had a total combined capacity of 497,000 barrels of crude oil a day. The three California refineries — Santa Maria, San Francisco and Los Angeles — worked closely together to process the typically heavy crudes of the west and Alaska. The three were closely linked by pipelines and marine terminals to take advantage of the unique capabilities of each one. "In the west we operate almost as though we're running a 450-mile-long refinery," said Don Hanley, then vice president of refining.

The Chicago and Beaumont refineries, serving eastern markets, operated independently. By 1988, Beaumont — which had been designed specifically to process more expensive light crudes — was no longer operating profitably. Unocal, in the process of taking a hard look at the performance of all company assets, took action to try to turn things around. Production of petroleum fuels at Beaumont was halted, and operations were limited to the manufacture of lube oils, solvents and petrochemicals. The refinery continued to lose money, however, and Unocal reluctantly announced its closure in 1989. Plans were put in motion to develop the site as a terminal.

Also in 1989, ownership of the Chicago refinery and certain related midwest marketing assets were transferred to a new organization named The UNO-VEN Company. This joint venture between Unocal and Petroleos de Venezuela S.A., the national petroleum company of Venezuela, freed up capital for Unocal and at the same time assured a long-term supply of crude for the refinery. Each partner holds a 50-percent interest in the new venture.

Over the years, Unocal's refineries and Science & Technology Division researchers had worked together with great success to develop ever more sophisticated products and technologies. The record of success continued in the 1980s, as Unocal inventors were granted dozens of new patents. Unocal's Technology Sales force continued to bring in substantial revenues by licensing company-developed refining technologies to facilities around the world. By the end of the '80s, a new set of technological challenges was on the horizon.

By the end of its first century, Unocal produced more than 600 quality products — and the "Sign of the 76" had become one of the most well-known marketing symbols in the nation.

"We're facing a revolution on the refining side in the coming decade," Roger Beach said. "The environmental restrictions being placed on refineries continue to become more demanding. And to help reduce vehicle emissions, a new generation of motor fuels must be formulated and produced. Unocal plans to be in the forefront of both efforts."

As the decade of the 1990s — and Unocal's second century — got under way, the company's downstream operations had come a long way from Lyman Stewart's tiny kerosene-and-fuel-oil operation in Santa Paula, and John Baker's one-man marketing show. Unocal now operated three major west coast refineries, and was partner in a fourth (Chicago). Those facilities turned out more than 600 quality petroleum products. The orange-and-blue 76 sphere was visible at 10,792 retail outlets in 44 states, and had become one of the most familiar gasoline marketing symbols in the nation.

"We think a lot of that 76 ball," said Roger Beach. "There's truly nothing like it. It has a lot of meaning, both to Unocal and to our customers. It represents quality and service, and it communicates our spirit."

A CHALLENGING FUTURE

A conversation with
Roger Beach
Senior Vice President, Unocal
President, Refining & Marketing

Unocal recently transferred the Chicago refinery and related assets to a new joint-venture partnership, The UNO-VEN Company. Why was this transaction undertaken, and what benefits does it bring to Unocal?

We had three major objectives in pursuing a joint-venture partner, and each of these was met by the UNO-VEN transaction.

The first was to find a secure, long-term source of crude oil for the Chicago refinery. Before UNO-VEN, Unocal's own production was providing only about 60 percent of the oil needed to fill the company's total refining demand. We wanted to bring the system into better balance, and the UNO-VEN transaction helped us do that. The Chicago refinery now has a long-term supply of 135,000 barrels of crude a day from Venezuela.

Another objective was part of Unocal's overall effort to identify ways of redeploying invested capital. The UNO-VEN transaction did that very effectively. Unocal received approximately $500 million from the transaction, which we can use to reduce debt and reinvest in other projects.

The third goal was to ensure the long-term profitability of the Chicago refinery and our midwest marketing operations. Under the terms of the partnership, a Unocal subsidiary, Midwest 76, Inc., owns half of the refinery and marketing assets in a 12-state area of the midwest. The UNO-VEN arrangement will smooth out the earnings of those assets, and keep them at a level that's very attractive and stable.

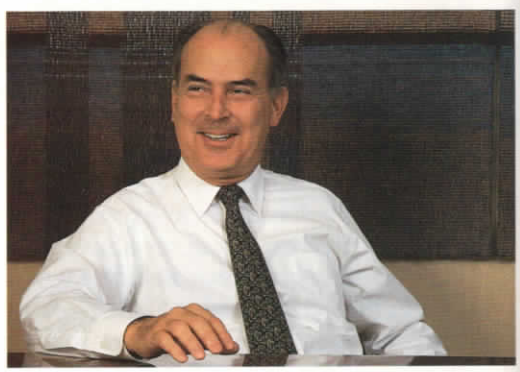
How does Unocal interface with UNO-VEN structurally?

UNO-VEN is a stand-alone company that operates as a separate entity from Unocal. The new company has an operating committee made up of three individuals from a subsidiary of Petroleos de Venezuela, S.A. and three from Midwest 76, Inc. The chief executive officer of UNO-VEN, Mr. DiCorcia, reports to that committee. The committee members from Midwest 76, Inc.—Al Eliskalns, Tom Matthews and Ed Scott—report to me.

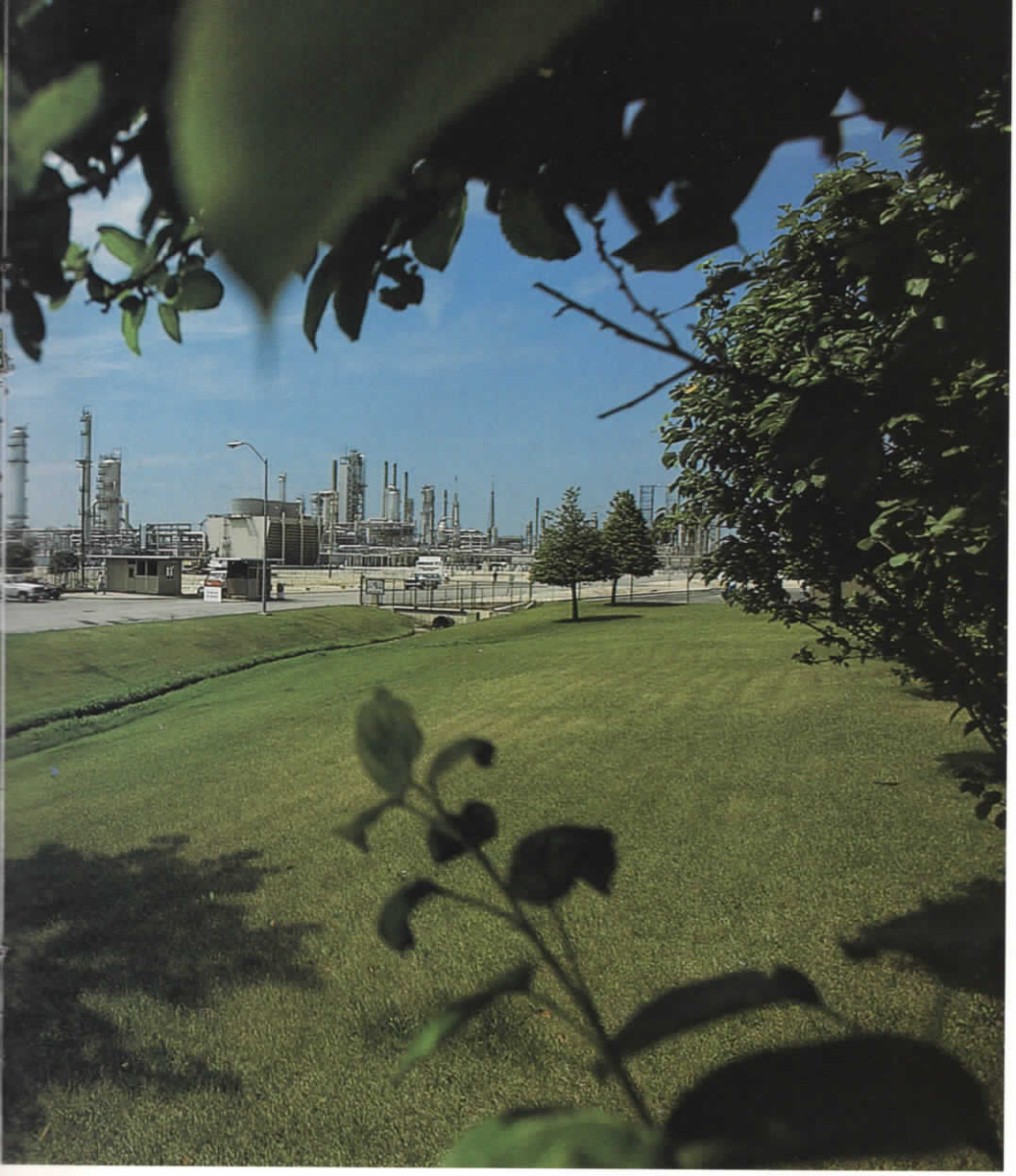
There are a number of support agreements between Unocal and UNO-VEN. Under these agreements, we provide UNO-VEN with support in the areas of product quality, accounting, advertising, health services, environmental and safety programs, among others—all at a cost. As time goes by and UNO-VEN becomes more organized and established, some of these support agreements will be phased out.

In the east, Unocal has long relied on a network of independent marketers to distribute and sell our products. How have they reacted to the UNO-VEN transaction?

Although Unocal is no longer involved with them directly—except in the southeast, which was not part of the UNO-VEN transaction—the marketers will not perceive much change. In most cases they are working with the same people who served them in the past. The level of service and support provided to the marketers has not diminished. The quality Unocal products haven't changed, and the products are still sold under the Unocal trademark because Unocal has licensed UNO-VEN to use it. The marketers are also pleased with the fact that the Chicago refinery, which produces those products, now has a secure, long-term supply of crude oil.



Above, the Chicago refinery, now operated by The UNO-VEN Company, a joint-venture partnership between Unocal and Petroleos de Venezuela, S.A. Right, Unocal's Los Angeles refinery. "There's a lot of pressure on the downstream sector of the industry to keep improving profitability and operating efficiency," says Beach.



There seems to be a growing trend of oil-exporting countries – particularly OPEC nations – getting into the downstream end of the business by forming partnerships or alliances with integrated oil companies. Do you think this will continue?

Yes. There are still some producing countries that would like to integrate downstream, although not exclusively in the United States. I think it's a positive trend. It helps the security of supply for the oil-importing nations, and it modifies the political position of the exporting countries. When they move into the downstream side, they are no longer solely producers. They are directly linked to the consuming nations, and that makes for more stability in the world oil marketplace.

Although oil prices have stabilized, they remain substantially lower than they were in the early 1980s. Does this continue to put pressure on refining and marketing to maximize profitability?

Definitely. There's a lot of pressure on the downstream sector of the industry to keep improving profitability and operating efficiency. Many U.S. companies have gotten out of marginally profitable markets to concentrate in areas where they have a significant market share and are making a reasonable profit. I think this type of strategic realignment will continue for the foreseeable future.

Some of the moves Unocal has made are in line with this strategy. As I discussed, the UNO-VEN transaction was a major step forward in securing the long-term profitability of the assets involved. We have sold off part of our marketing operations in the northwest, an area that has not been all that profitable for us. We've done some exchanges of marketing assets with other companies to concentrate our efforts in markets that are more profitable. And our decision to shut down the Beaumont refinery has helped improve the overall economics of our refining system.

Was the decision to close the Beaumont refinery a difficult one?

It was an extremely difficult decision, and a painful one. It's never easy to shut down a major facility—especially one like Beaumont, which had a lot of excellent employees trying their best to make a go of it. As you know, we tried to keep Beaumont operating as a petrochemical, lube oils and solvent plant. Even though we cut the facility's losses by doing that, it still was not an economically viable operation. It became imperative that we take further action, and the only option left was to shut the refinery down.

We are, however, planning to develop the site as a terminal. Beaumont has tremendous capabilities in that regard. The facility has abundant crude oil and product tankage, as well as petrochemical storage capacity. Product can be brought in by pipeline, barge or ship, and the facility has excellent tank-car and truck-loading racks. There's a high level of interest from a lot of different companies in using Beaumont as a terminal. I think it will be an exciting business opportunity for us.

What's ahead for Unocal's refining system in the 1990s?

We're in for a revolution on the refining side, not only for Unocal but industrywide. This will come about for two major reasons. One is that the environmental restrictions being placed on refineries—particularly in California, where our three refineries are located—continue to become more demanding. Meeting these requirements will be challenging and expensive. It's going to require an intensive effort on our part to develop and install new cost-effective environmental control systems.

The second cause of the coming revolution is also environmentally related. That is the task of formulating and producing a new generation of motor fuels that help reduce vehicle emissions. This will also take a research and investment effort on the part of refiners.

To underscore why these tasks constitute a revolution, let me inject some perspective. In the 1980s, the refining business was very stable. Product specifications didn't change that much, except for the phase-down of lead in gasoline. Although advances were made, the refining processes themselves did not change greatly either. But these things will have to change substantially in the 1990s.

For Unocal, this means our refineries will need to work very closely with the Science & Technology Division in the years ahead—both to meet the environmental demands we're faced with, and to develop the next generation of motor fuels.

Overall, I think the companies that can accomplish these tasks by "working smartest" will be the industry leaders by the end of the decade.

The 1990s are already being touted as the "decade of the environment." Is there a danger that increasingly stringent environmental regulations could cripple the domestic refining industry?

The challenges are substantial, but they are not insurmountable. I have no doubt we can develop the technologies we need. Doing it in a cost-effective way is the other half of that challenge. By example, let's look at the South Coast Air Quality Management District (SCAQMD) plan for the Los Angeles basin. The plan, which was approved last year, is a far-reaching blueprint for improving air quality in the basin. It has three phases, or "tiers," the last of which is targeted for completion by the year 2007.

The first phase, Tier I, has a compliance deadline of 1993. When we first looked at what it would cost Unocal to meet the Tier I requirements for the Los Angeles refinery, the number was staggering. But as we've studied ways of meeting those requirements, evaluated the technologies and developed new equipment, the cost estimates have come down substantially.

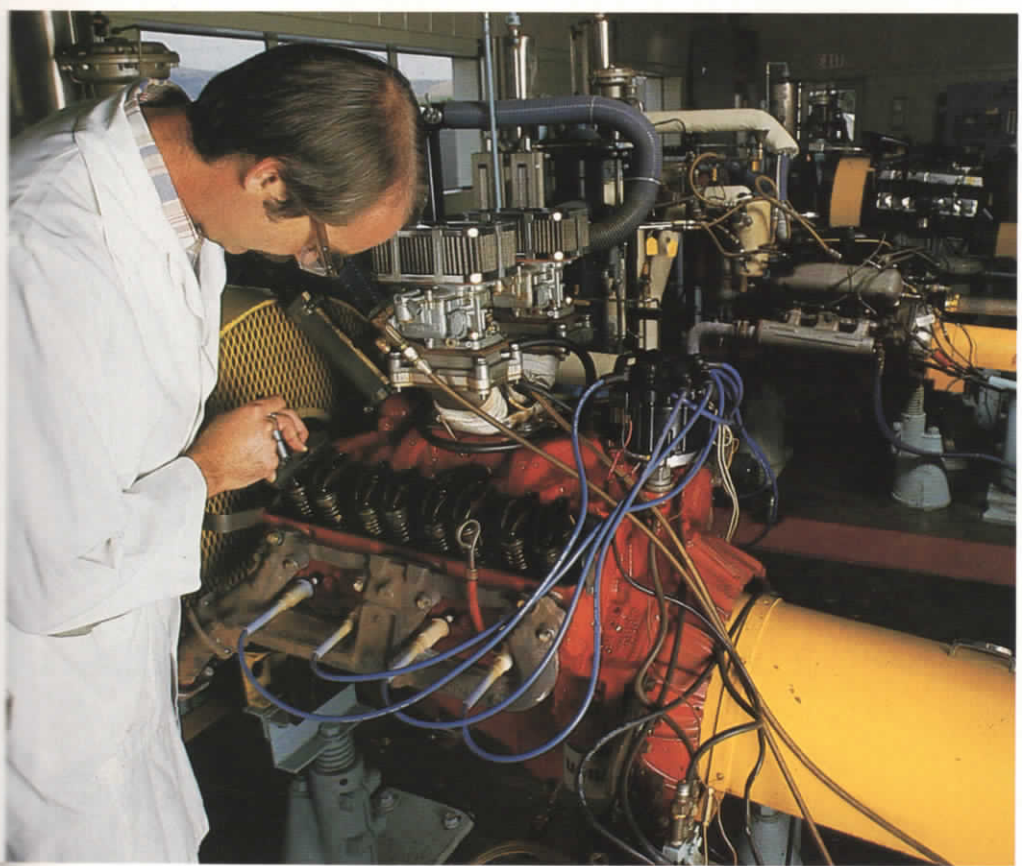
Refining & Marketing Division senior executives, clockwise from top left: Bob Schlax, comptroller; John Rossiter, general manager, international supply and trading; Fielding Walker, vice president, planning and services; Art Felderman, vice president, refining; Barlow Thompson, general manager, human resources; Ed Scott, vice president, crude supply and transportation; Clay Warnock, vice president, western marketing; Roger Beach, president; Tom Matthews, vice president, eastern marketing and national auto/truckstops.

Right, fuels research under way at the Science & Technology Division research center in Brea. "Our refineries will need to work very closely with S&T in the years ahead," says Beach.

The second and third tiers of the SCAQMD plan as they now stand are extremely onerous. Meeting their requirements might mean shutting down all the refineries in Los Angeles, for example, or entirely phasing out gasoline-powered vehicles in the basin. But I can't imagine that any state or region would put itself in the position of being so economically and socially disrupted. I think that revisions to the plan, as well as advances in technology, will ensure the continued existence of refineries in the basin for the foreseeable future.

In the area of reducing auto emissions, there is now a joint research effort under way between the auto manufacturers and several oil companies. Is Unocal involved in that effort?

Yes. We are one of 14 oil companies that have joined forces with the three major domestic car manufacturers in a combined research effort. The goal is to coordinate development of the next generation of automobiles and fuels to achieve lower emissions. This is the first coordinated effort to study the entire system—engine, fuel and emission control technology—as a single package. I think it's a long-overdue approach, and I think we'll see some good things come out of it.



Several metropolitan areas are now mandating the use of oxygenates and advocating other alternatives to gasoline in an effort to reduce vehicle emissions. Is this trend going to intensify?

There's no doubt that alternative transportation fuels are going to play an increasing role in the years ahead. But I think such fuels—methanol, ethanol, compressed natural gas, liquid propane and others—will fill specialized niches in the marketplace. I don't think we'll see a massive shift to replace gasoline. For one thing, the entire infrastructure by which we supply transportation fuels in this country would have to be changed. That would be extremely difficult and costly. In addition, some of the proposed alternative fuels have safety concerns that would have to be addressed.

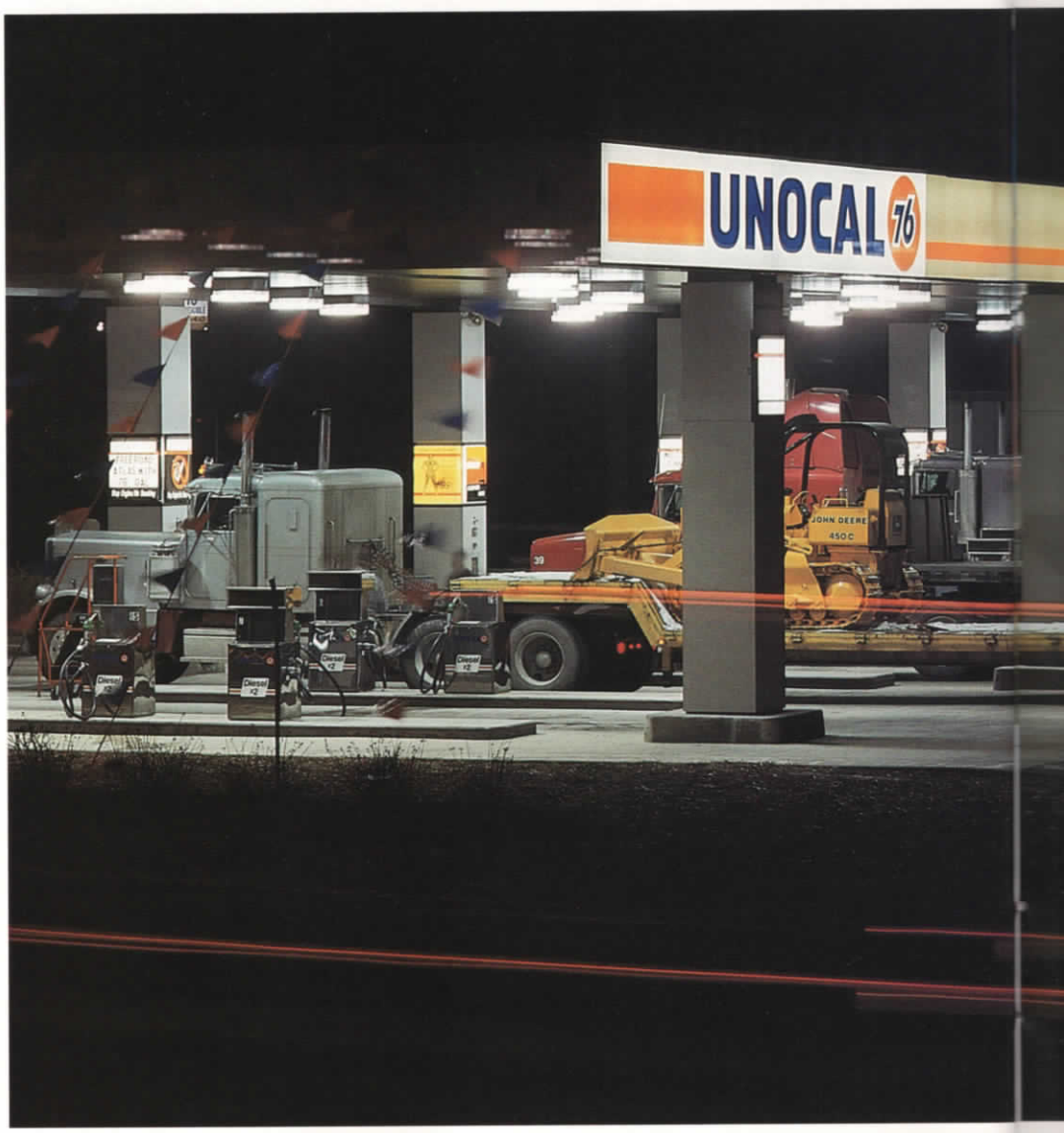
For these reasons, I believe that gasoline will remain the nation's primary transportation fuel in the foreseeable future. Our industry's challenge is to come up with a new generation of gasolines and diesel fuels that are environmentally acceptable. That's where we plan to concentrate our research at Unocal.

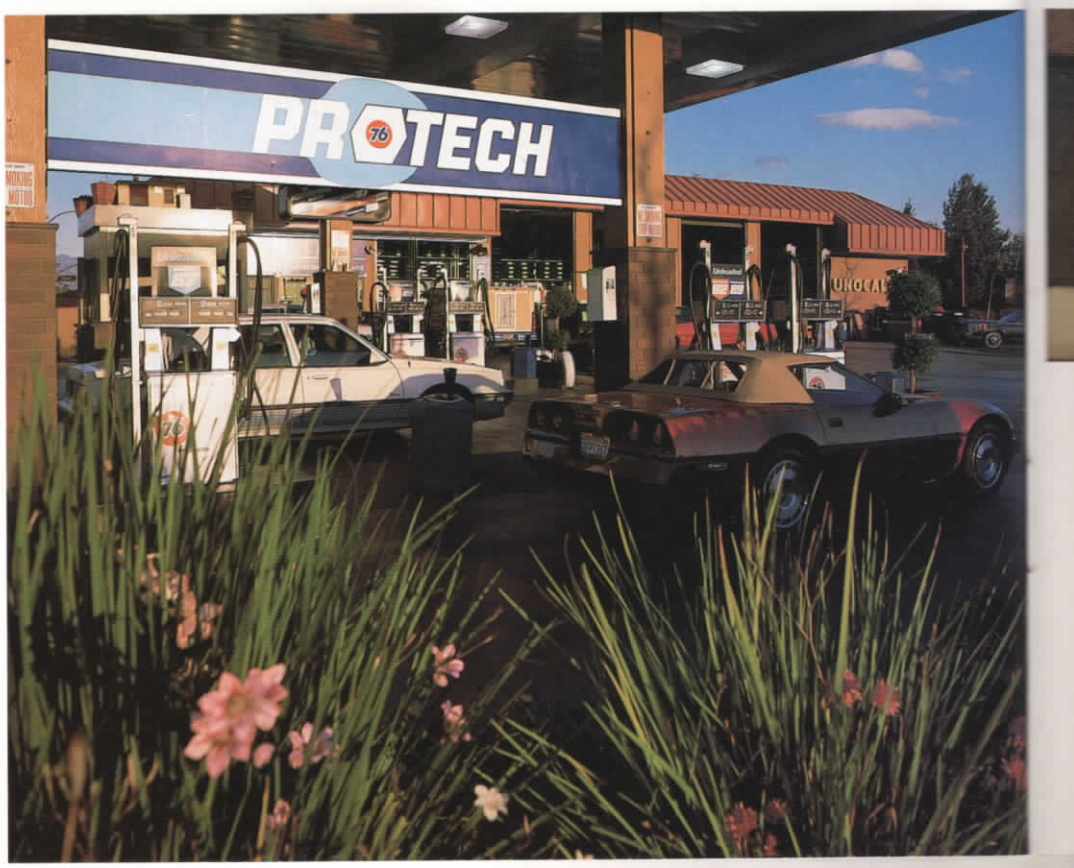
The effort to reduce vehicle emissions can also be pursued in other ways. In the Los Angeles basin, for example, Unocal will soon begin offering a free smog inspection and low-emission tune-up program for pre-1975 cars. There are over one million of these cars—which are the worst polluters—in the South Coast Air Quality Management District alone. We're going to work with our Protech dealers to implement the program, and we may expand it to other metropolitan areas later on.

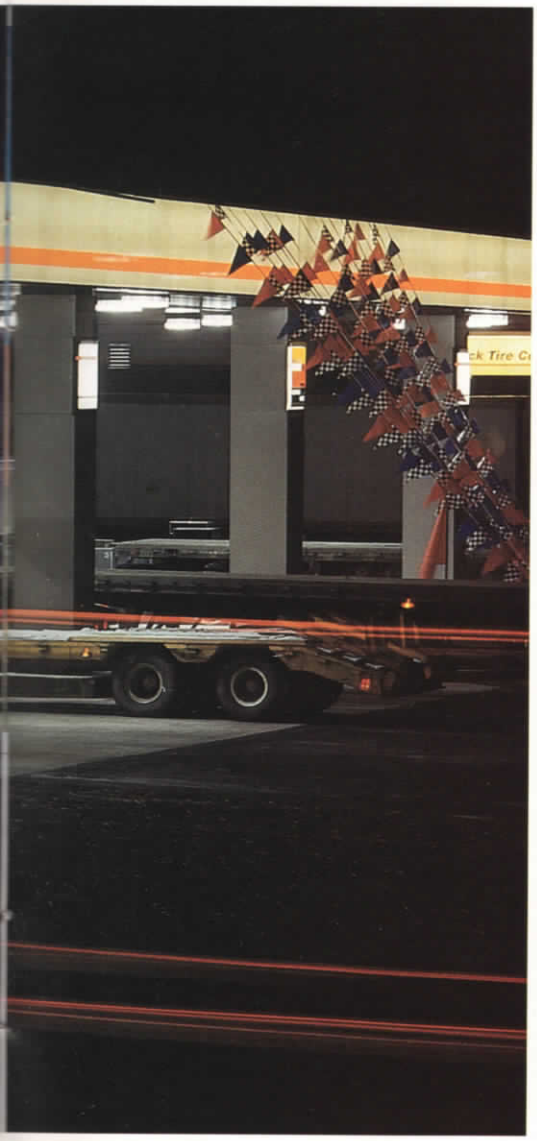
Competition among petroleum marketers has intensified in recent years. What can Unocal do to succeed in such a highly competitive environment?

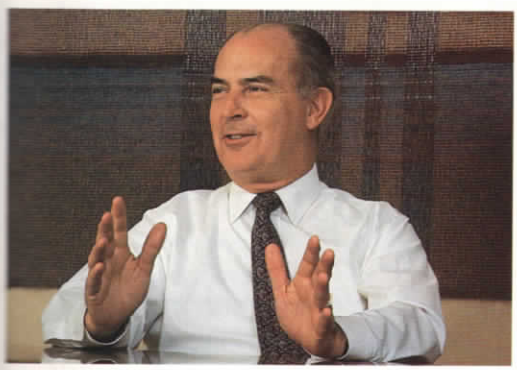
The key for success in petroleum marketing is to identify the customer you want to target, and provide him the added value that he wants. Our strategy is clearly defined: We emphasize full service and a slate of quality products. The full-service customer is one that many companies have abandoned in recent years, and it's a market segment I believe will continue to expand.

Unocal has done an excellent job of identifying and catering to the full-service customer. Our product sales volumes have increased in each of the last six years, and our customer base continues to grow. In order to maintain that growth, our challenge in the coming years will be to execute our strategy even better than we have in the past—to improve the way we project our full-service image to the motoring public.









"The key for success in petroleum marketing is to identify the customer you want to target, and provide him the added value that he wants," says Beach. "Our strategy is clearly defined—we emphasize full service and a slate of quality products."

What are some of the specific ways we can do that?

One important element of our marketing effort is the Protech guaranteed auto repair program. The number of Protech outlets continues to increase, and we are encouraging more of our dealers to move in that direction. We've also had a very good response to the Protech Patrol, an on-the-road driver assistance program currently under way in Sacramento, Fresno and San Diego. We plan to expand that program to the Los Angeles area later this year. It's an excellent way for Unocal and our dealers to show the public that we care about them, and to underscore our service orientation.

Another important element of our full-service strategy is the no-fee credit card. More than 50 percent of our gasoline sales in the west are credit card sales, so it's clearly a service that our customers want and find valuable. The credit card also gives us the advantage of having a very loyal customer base.

Could you give us a status report on our National Auto/TruckStop system?

The auto/truckstop network is a very exciting part of our business. Overall, the system continues to expand. We now have over 300 facilities in 43 states, 150 of which are located on major interstate highways. We've also been making a concerted effort to upgrade the system and respond more directly to our customers' needs and desires. That effort has been highly successful.

On the driver side, we have a more consistent offering across the country now as far as cleanliness, appearance, driver amenities and restaurant offerings are concerned. The level of service has also improved. On the fleet side, we've initiated Access 76, a computerized telecommunications system which provides the fleet owner with the information and communications capability he needs to compete in his marketplace. So, by addressing the needs of both sets of customers, we've been able to improve our position relative to the competition.

Is there further growth potential for the auto/truckstop system?

Yes. This past year, we brought 24 marketer-operated auto/truckstops into the system. We're also adding new facilities due to changes in traffic patterns. For example, new bypasses around metropolitan areas are providing opportunities for additional sites. We're also exploring the possibility of expanding the system into Canada. There aren't many truckstops in Canada relative to the U.S., and those that do exist are not as sophisticated as ours. With the new trade agreement opening up commerce between Canada and the U.S., there is a lot of potential for growth in the truckstop business.

Does the Refining & Marketing Division have any other opportunities for expansion into the international arena?

Because Unocal has a long-standing presence in the Pacific Rim and the Far East, the potential for expanding our downstream activities into that part of the world has always been attractive. For the past year or so, we've been developing several entrepreneurial business ventures.

For example, we're building a lube oil plant in Singapore, and we intend to market that product in the Far East—specifically in Thailand, Indonesia and the Philippines, where the Unocal name is already well known. We've also signed a crude oil processing agreement with the Chinese company Sinopec. Under this agreement, we will provide Sinopec with a specified amount of crude oil. In return, they will give us products that we can market in the Far East.

We hope to pursue other downstream opportunities that make sense for Unocal in years ahead. We want to be a part of the tremendous growth that's going on in the Pacific Rim, and I think we're well positioned as an integrated energy resources company to do that. ⑯

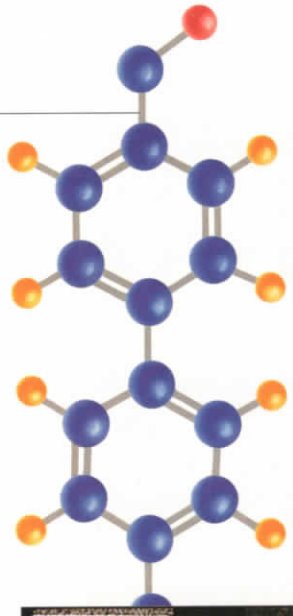
REFINING GLOSSARY

Alkylation

Conversion process which chemically combines light crude oil components to produce higher-grade feedstocks. Alkylation increases the octane of hydrocarbon molecules — a key element in the manufacture of unleaded gasolines.

Aromatics

A class of compounds with molecules formed in ring structures. Aromatics are used as petrochemical feedstocks and in production of high-octane gasoline.



Asphalt

Petroleum-based refining product used most often in road paving. Asphalt is made from heavy residual oils.

Blending

The final step in the refining process, in which various refined stocks are blended into finished products.

Catalyst

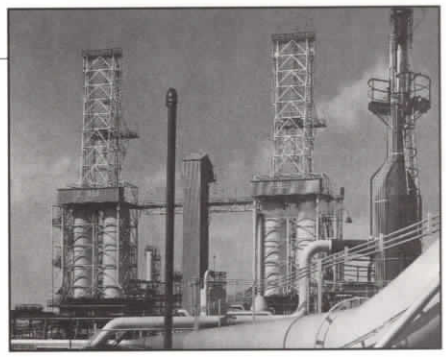
A substance that hastens or retards a chemical reaction without undergoing a chemical change itself. Catalysts are used in a variety of refining processes.

Catalytic cracking

Conversion process in which heavy crude oil components (yielded by distillation) are chemically converted into lighter components through the application of heat and catalysts. The process greatly increases gasoline yield from crude oil.

Coking

Thermal conversion process for producing light hydrocarbons from heavy residual oils. Also yields petroleum coke as a byproduct.



Conversion

A step of the petroleum refining process in which crude oil components are structurally altered through applications of heat, pressure and catalysts. Conversion allows crude oil to yield a higher percentage of gasoline and other desired products than it would through distillation alone.

Diesel fuel

Made from mid-barrel distillates, diesel fuel is heavier than gasoline. Used primarily to power large engines, where it is ignited by the heat of compression rather than a spark plug.

Distillation

Process whereby hydrocarbons are heated, vaporized and then condensed to separate them into various components. The first step in the petroleum refining process, distillation takes place in a refinery's distillation unit, also known as the crude unit or fractionation tower.

Feedstocks

Crude oil or semi-refined crude oil components that are processed by a refinery.

Fluid catalytic cracker

One type of conversion unit in which catalytic cracking takes place. Also referred to as an FCC.

Fractionation

See distillation

Fuel oils

Petroleum products made from mid-barrel distillates or residual oils. Lighter distillate fuel oils are used for home heating, water heating and cooking. Residual fuel oils are used by ships, utilities, industries, and for heating larger commercial buildings.

Gasoline

Principal product of the refining process, it is blended from light crude oil and conversion unit components. Used primarily as a transportation fuel.

Gravity

Short for API gravity, the relative measure of the weight or density of a gallon of oil under the American Petroleum Institute's recommended measurement system. Low gravity means the oil is heavy (more weight per gallon); high gravity means the oil is light (less weight per gallon).

Heavy crude

Thick, low-gravity crude oils characteristic of California oil fields.

Hydrocracking

Advanced conversion process which employs hydrogen and catalysts to convert heavy crude oil components into high-grade fuels and petrochemical feedstocks. Unicracking is a hydrocracking process.

Hydrotreating

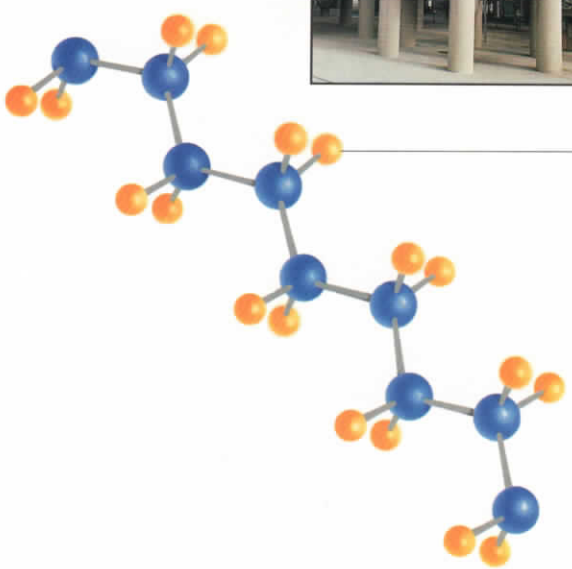
Catalytic refining process for removing sulfur and other contaminants from a variety of petroleum products. Unionfining is a hydrotreating process.

Isomerization

Conversion process which converts low-octane natural gasoline into high-octane gasoline blending components.

Jet fuel

Low-volatility fuel made from a blend of kerosene and naphthas.



Kerosene

A low-volatility, mid-barrel distillate petroleum product. Used for cooking and lighting, and in cleaners and paints; blended with naphthas to produce jet fuel.

Light crude

Fluid, high-gravity crude oils characteristic of East Texas and Middle Eastern oil fields.

Liquefied petroleum gas (LPG)

Gases which are extracted from light crude oil components. LPG—primarily propane and butane—is used as a fuel and as a petrochemical feedstock.

Low-grade distillates

See residual oils

Lube oils

Petroleum products made from heavy crude oil components that are used to lubricate machinery and engine parts.

Mid-barrel distillates

Mid-range crude oil components separated during distillation that are commonly processed into diesel fuel and jet fuel.

Naphthas

Light crude oil components which condense at the top of the distillation unit. After reforming, naphthas become a basic gasoline feedstock.

Olefins

Light crude oil components that form the basis of some organic chemicals. Used as petrochemical feedstocks, olefins differ from aromatics in that their carbon molecules are linked in a chain rather than a ring structure.

Petrochemicals

Petroleum-derived chemicals whose feedstocks are produced by refining processes such as hydrocracking. Used in the manufacture of a variety of plastics, polymers, solvents, adhesives, varnishes and synthetic rubber products.

Petroleum coke

Solid, coal-like byproduct of the coking process, marketed for use in electrodes employed by the steel and aluminum industries.

Rated capacity

Quantity of material which can be processed by a refinery unit in a 24-hour period.

Refining

Method by which crude oils are transformed into marketable products through a variety of processes including separation, conversion, treating and blending.

Reforming

Catalytic conversion process which converts naphthas into high-octane gasoline components.

Residual oils

Thick, high-gravity crude oil components left as residue after the distillation process. Also known as "bottoms" or "heavy ends."

Separation

See distillation

Solvents

Petroleum-derived liquids capable of absorbing other liquids, gases or solids to form a homogeneous mixture. Used to dilute or thin a solution.

Sour crude

Crude oil that has a high content of sulfur and other impurities. Most California crudes are sour crudes.

Sweet crude

Crude oil that has a low content of sulfur and other impurities.

Treating

The removal of sulfur and other contaminants from crude oil components and products.

Utilization rate

The amount of crude oil run through a refinery unit in a 24-hour period. Usually expressed as a percentage of rated capacity.

Volatility

Rate of evaporation. Light crude oil components have a high volatility; heavier components have a low volatility.

UNOCAL MATERIALS PROCESSING TECHNOLOGY

Unionfining

Uses hydrogen and catalysts to remove sulfur, nitrogen and other contaminants from a variety of petroleum products.

Unicracking

Uses hydrogen and catalysts to convert heavy crude oil components into clean, high-grade fuels and petrochemical feedstocks.

Unicracking/HDS

Removes sulfur and metallic contaminants from heavy residual oils.

Unisar

Improves the quality of jet fuels and solvents by removing aromatics.

BSRP, BSR/Selectox, Unisulf and Selectox

Gas treatment processes which remove sulfur compounds from a variety of refinery gases, natural gas and geothermal steam.

Refineries:	Los Angeles	Santa Maria	San Francisco
Location:	Wilmington, California	Santa Maria, California	Rodeo, California
Size:	424 acres	120 acres	475 acres
Year opened:	1917	1955	1896
Rated crude oil capacity:	109,000 barrels per day	43,000 barrels per day	80,000 barrels per day
Crude types processed:	all types	heavy sour	all types
Products:	transportation fuels, heating and fuel oils	semi-refined products (feedstocks for San Francisco refinery), petroleum coke	transportation fuels, lube oils, waxes, greases, heating and fuel oils, petroleum coke
Market area:	west	—	west
Number of employees:	600	120	550

Dateline

April became a notable month in Unocal's history when the company announced a series of programs designed to reduce air pollution and protect the environment in the Los Angeles Basin. The first four articles in this section discuss these important events.

Unocal Recycles Autos To Fight Pollution

In an effort to help clean up the air in the Los Angeles Basin, Unocal has introduced an innovative new "automobile recycling" program.

Under the South Coast Recycled Auto Program (SCRAP), Unocal will pay $700 each for 7,000 pre-1971 cars, which will then be recycled as scrap metal. According to estimates from the California Air Resources Board, removing these cars from the road could reduce smog-forming auto emissions in the Los Angeles Basin by about 6 million pounds per year.

"Unocal is initiating this novel step to demonstrate that alternative pollution-control solutions can make a significant contribution to air quality in Los Angeles, which has the nation's worst smog problem," says Unocal Chairman, President and Chief Executive Officer Richard J. Stegemeier. "We want to demonstrate ways of reducing smog that are effective and cost-efficient. With SCRAP, we're taking the heaviest polluters off the road and handing them to a scrap yard that will crush them and recycle the metal."

To qualify for the SCRAP program, drivers must own a pre-1971 car registered for the last six months within the boundaries regulated by the South Coast Air Quality Management District (SCAQMD), which covers portions of Los Angeles, Orange, and San Bernardino and Riverside counties. A toll-free telephone bank has been set up so car owners may make appointments to bring their vehicles in for recycling.

After making an appointment, the registered owner must drive the car to a designated wrecking yard under its own power. Upon signing over title to the vehicle, that owner will then be presented with a check for $700 from Unocal. The company has arranged for a Los Angeles-area scrap yard to accept the cars for recycling. Unocal's toll-free phone banks began taking appointments in early May, with the actual recycling set to begin June 1.

Each car will undergo an emissions test before it is crushed, so that accurate data will be available to interested parties. The crushed automobiles will later be shredded into fist-sized pieces of metal for subsequent sale and eventual recycling.

Unocal is targeting vehicles manufactured prior to 1971 because studies have shown that these vehicles add 15 to 30 times more pollutants to the air than 1990 models. The program will continue until 7,000 of the cars have been purchased and scrapped.

"Unocal wants to undertake this project because we think it is a creative way to make a significant contribution to cleaning up the air," says Roger Beach, president of Unocal's Refining and Marketing Division. "The more companies that apply this kind of creativity to improving our environment, the bigger difference it will make."

Tuning Up For Cleaner Air

Beginning in July, many Los Angeles Basin motorists with pre-1975-model cars will qualify for free smog checks and low-emissions tune-ups from participating Unocal 76 Protech dealers. If every qualifying car owner takes advantage of the Unocal-sponsored program, Los Angeles-area auto emissions could be reduced by an estimated 17 million pounds per year.

Dubbed Smog-Fighter, the new program is aimed at curtailing harmful emissions from cars designed to operate on leaded gasoline. These cars produce an inordinate amount of Southern California's air pollution — about 10 times as much per mile as 1990 models.

According to the California Department of Motor Vehicles, there are about 1.1 million pre-1975 autos now operating in the Los Angeles Basin.

California state law requires automobile owners to subject their cars to a certified emissions test every two years. Legal registration is contingent on whether the car meets state emissions standards.

Motorists who own pre-1975 cars qualify for the free Protech test during the off-year, when a smog test isn't required for vehicle registration. Participants must also reside in the South Coast Air Quality Mangement District, which encompasses portions of Los Angeles, Orange, San Bernardino and Riverside counties.

If a car participating in the program fails the free smog test, Protech mechanics will make the proper adjustments to the vehicle's timing, idle speed and carburetor—also free of charge. If other work is necessary to bring the car into compliance, customers must decide whether to authorize the needed repairs, which they would pay for.

The low-emission tune-up adjustments will enable the checked cars to run more cleanly and get better gasoline mileage. Such tune-ups could annually reduce emissions by about 17 million pounds of pollutants (carbon monoxide, reactive organic gases and nitrogen oxides) if all eligible Los Angeles Basin motorists use the free service.

"This is quite an attractive offer for qualifying car owners," says Stu Taylor, general manager of Unocal's Refining & Marketing Division. "A smog check costs about $25, and low-emissions tune-ups may cost as much as $30." More than 150 Los Angeles-area Protech dealers will be offering the smog-test service.

"The Smog-Fighter program demonstrates Unocal's dedication toward cleaning up air pollution," Taylor adds. "We're confident that residents of the L.A. Basin will support our efforts."

Protech Patrol Aids Stranded Motorists

Unocal 76 Protech dealers in several California cities—Sacramento, San Diego, Fresno and soon Los Angeles—are fast becoming known as the Good Samaritans of the freeways.

The dealers have banded together to sponsor the Protech Patrol, a service in which specially equipped vans cruise local freeways and stop to assist stranded motorists. For example, travelers victimized by an empty gas tank are given a free gallon of fuel. Commuters sidelined by a flat tire will receive help in changing it, and those with dead batteries can get a jump-start.

Of course, the Protech Patrollers don't attempt major repairwork on the roadway. But they do allow drivers in distress use of a cellular phone to reach employers and family, and to summon a tow truck and ride. All services the Protech Patrol provides are free of charge.

"We've gained the full support of the California Highway Patrol for our effort," says Floyd Pearson, Unocal's merchandising supervisor in Fresno, who serves as a liaison between Unocal and the Fresno Protech dealers participating in the program.

The main objective of Protech Patrol is to get stalled vehicles off the freeway. "This not only aids stranded motorists, it also helps unsnarl rush-hour traffic," Pearson explains. "And keeping freeway traffic flowing smoothly helps reduce the volume of auto emissions."

Each Protech Patrol vehicle carries an assortment of equipment, including a cellular phone, a rooftop lightbar, tire jacks, battery cables, gasoline, water, coolant, flares, an air tank and a fire extinguisher. The vehicles are on patrol during commuter rush hours—weekday mornings and late afternoons.

Unocal marketing representatives meet regularly with sponsoring Protech dealers to discuss the project's progress. But company marketing management credits the dealers with the success of Protech Patrol. "The program is driven by the Protech dealers," says Ted Abeyta, Unocal's coordinator of sales promotion. "It's their success story. Unocal's role is to offer advertising support and to provide the vehicles."

The idea for the Protech Patrol originated with a group of Sacramento Unocal dealers in 1988. Teaming up with a local radio station and phone company, they put the first patrol vehicle on the road—then called the "Spirit"—which offered emergency roadside service to rush-hour commuters. Last year, the dealers assumed full sponsorship of the program.

Protech Patrol's success in Sacramento inspired Fresno dealers to implement the program last November. San Diego dealers followed suit one month later. Sacramento and San Diego each have two Protech Patrol vehicles, while Fresno has one.

Dateline

In July, Los Angeles-area Protech dealers will begin offering the service. A fleet of six vehicles will patrol the metropolitan area's freeway system, with up to four more being added later. By helping improve traffic flow and reduce the level of auto emissions, the program will be environmentally beneficial to Los Angeles, which has the nation's most severe smog problem.

"I think the feeling of goodwill that comes from Protech Patrol is worth a lot more than the money we spend to maintain the program," says Robert Beckett, a Protech Patrol participant who operates a Fresno Unocal 76 station. "I'm involved because I know how much the community appreciates our efforts."

"Protech Patrol highlights Unocal's commitment to customer service, and the efforts of the dealers have received tremendous public exposure," Pearson adds. "So the program is also a great way to attract new customers to Unocal 76 Protech stations."

Ray Leonard, a Protech dealer in Sacramento, agrees. "From the start, one of our goals has been to emphasize that Unocal dealers still repair cars," he says. "Because there are so many self-serve stations today, many people don't realize they can still have their cars serviced at a neighborhood station. We want to correct this misconception, and Protech Patrol is helping us do that."

LAR Helps Community Dispose Of Hazardous Wastes

The 20th anniversary of Earth Day was celebrated in late April, and to mark the occasion Unocal's Los Angeles refinery held a Household Hazardous Waste Roundup on April 21. The event marked the first time that industry and the City of Los Angeles have worked together to provide this service.

"Up until now, programs like this had always been sponsored solely by the city," says event coordinator John van Kooy. "Unocal was the first organization to approach the city for participation in such an endeavor."

Nearly 1,500 households took advantage of the Hazardous Waste Roundup. The surrounding communities of Lomita, San Pedro, and Wilmington were the primary participants. People arriving at the refinery were greeted by protectively clothed attendants who removed items such as old car batteries, cans of paint and used motor oils from the vehicles. A second team separated the items for disposal.

Unocal recruited a number of companies to help make the event a success. Standard Brands Paint, which agreed to accept all of the reusable water-based paints, will recycle the paint and donate it to a local anti-graffiti program. An area oil recycler and a battery company volunteered to dispose of used motor oil and car batteries. All other wastes were safely packed and transported to an approved hazardous waste disposal site.

"This was a chance for Unocal to demonstrate to the community our concern for the environmental problems that affect us all," says van Kooy, an environmental specialist at LAR.

Unocal and the other sponsors also provided each visitor with several souvenirs of the event. Among these were an Earth Day pin and a household hazardous waste guide, which provides advice on how to dispose of specified chemicals and suggests alternatives to using those chemicals.

After the event, Los Angeles city officials presented LAR with a commendation for holding the Hazardous Waste Roundup.

"There's been considerable time and effort put forth by all participants to coordinate this event," says van Kooy. "We've been really excited about it all along."

While trained personnel were used for the waste disposal itself, Unocal volunteers were on hand to pass out community awareness items and provide assistance. An area McDonald's supplied food for the workers. In addition, one of LAR's spherical tanks was painted to resemble Earth as a reminder of the inspiration behind the event.

Auto/ Truckstops Offer FASTEST Service

When you're driving an 18-wheeler cross-country, the last thing you want to do is spend a lot of time fueling up. With that in mind, Unocal set out to convince truckers that the company's auto/truckstops not only offer the best service, but the FASTEST.

The FASTEST competition—an acronym for "Fueling And Service Team Equals Satisfied Truckers"—was inaugurated by Unocal's National Auto/TruckStop system late last year as a means of encouraging rapid, friendly, and efficient service at the company's 158 auto/truckstops located on interstate highways across the nation.

"We listened to what the drivers said they wanted most, which was speed—the fastest service possible in regards to the actual fueling of their trucks," says Julie Jacques, who coordinated the 1989 competition. "We decided to create the FASTEST program as a fun way to motivate the truckstop employees to give fast service, and to enhance teamwork."

The FASTEST competition pitted two-person teams of fuelers and cashiers in tests of speed and performance. Fuelers were given performance points for tasks such as checking oil, washing windows, and offering a friendly greeting to drivers.

Cashiers were judged on a similar basis, with an emphasis on courtesy toward the customer. Both team members also were closely timed. Overall, performance accounted for 60 percent of the contest, with speed worth 40 percent.

Four phases of competition were held, beginning with time trials last October to determine the best two-person team at each participating truckstop. The top fueler and cashier were teamed up to compete against rivals from other truckstops, with winners advancing to one of three area-wide contests. The three area team finalists were then flown to Unocal's brand-new Knoxville, Tennessee auto/truckstop to compete in the national finals held last December. More was at stake than the title of FASTEST team: the grand prize included an engraved plaque, a watch, and $1,000 cash.

The competitors who qualified for the finals were from Unocal auto/truckstops in Toledo, Ohio; Mt. Vernon, Illinois; and El Paso, Texas. Fueler Joe Soto and cashier Mary Fernandez of Unocal's El Paso auto/truckstop posted a combined time of five minutes, 35 seconds to edge out the others for the grand prize.

"It was fun," says Fernandez, who was featured with her partner on two evening news broadcasts following their victory. "I was nervous at the area finals—I couldn't eat or sleep the night before—but in the nationals I knew what to expect."

The victory was especially rewarding for Soto and Fernandez, since the service standards which inspired the FASTEST contest were derived in part from those in effect at their El Paso auto/truckstop.

"We have always been a very service-oriented operation—not medium service, but full service," says El Paso truckstop operator Doy Gatlin. "It has helped us tremendously in terms of increasing our volume of customers, and I think Unocal recognizes that."

Because of its rousing success, Unocal has decided to hold the FASTEST competition again in 1990 as a means of continuing to encourage quick and efficient service standards. Last year's winning team may have been from El Paso—but the real winners will be the drivers who patronize Unocal's auto/truckstop facilities nationwide.

Upgrades Prepare Refineries For The Future

In the predawn hours, the glow of light surrounding Unocal's three refineries gives them a futuristic appearance. It is an appropriate visage, since the company is dedicated to outfitting them with state-of-the-art equipment to make them safe and efficient for years to come.

Some of the most ambitious efforts are being undertaken at Unocal's Los Angeles refinery (LAR), where engineers are turning to the latest technology to reduce nitrogen oxide (NO_x) emissions by 80 percent between now and 1995.

Dateline

NO_x is a gas which reacts with other pollutants to form ozone. Unocal has committed $40 million for the NO_x reduction project's first phase, which will involve improvements to 25 of LAR's 38 heaters.

Working in accordance with clean air regulations set by the South Coast Air Quality Management District (SCAQMD), LAR is equipping a Unicracker hydrogen reformer heater with a Selective Catalytic Reduction system (SCR), which operates similarly to an automobile's catalytic converter. The SCR uses a catalyst which seeks out the NO_x and converts it into nitrogen and water. A 44-megawatt cogeneration plant installed at LAR in 1988 is already equipped with an SCR and has registered positive results.

LAR also plans to install low-NO_x burners in its crude and gasoline reforming heaters as soon as they are proven to be effective. "We've converted one heater to low NO_x burners on an experimental basis, and that has been very successful," says John McCasland, manager of LAR's Large Projects Group. "We're hopeful that advances in the technology will continue to improve the performance of the burners in the near future."

Although the new burners do not yet eliminate enough NO_x to meet SCAQMD guidelines, more efficient designs have already been developed. If burner technology does not improve sufficiently, however, McCasland says the refinery will purchase additional SCRs.

Unocal's LAR improvements are designed to meet three compliance deadlines established under the SCAQMD plan. By September 1991, all heaters which fire between five and 40 million British Thermal Units (MMBTUs) per hour or less must be reduced to .05 pounds of NO_x per MMBTU. A separate rule governing larger heaters mandates that 36 percent of the units must meet a limit of .03 lbs of NO_x per MMBTU by the end of 1992, with the remaining units in compliance by December 31, 1995.

In a separate project, LAR is also replacing its six Unicracker reactors with three larger reactors. The three new Unicracker reactors—which convert heavy crude oil components into clean, high-grade fuels—are expected to improve efficiency by consolidating the operations of six reactors into three. The new reactors will be placed on stream in November.

Unocal's San Francisco refinery (SFR) is also intent on improving operations, having initiated a number of upgrades during the past five years. In 1985 the facility installed a new coking unit, which converts heavy residual oils into lighter feedstocks and high-quality petroleum coke. Two years later a 7,400 barrel-per-day isomerization unit was added, which uses heat and catalysts to improve the octane rating of gasolines.

Also in 1987, SFR installed a new crude distillation unit and a 49-megawatt cogeneration plant. (LAR brought a similar cogeneration unit on line in 1988.) Finally, the San Francisco refinery completed installation of a $64 million state-of-the-art water treatment facility last year.

"A major thrust for 1990 will be optimization of refinery operations and improvements in maintainance efficiency," says SFR manager John Dietzman. "We will continue to have a strong focus on emergency response, health, safety and environmental performance."

Unocal's Santa Maria refinery is preparing to kick off a series of improvements. Upgrades to the sulphur recovery units and process heaters are set to begin next year, with the goal of reducing refinery emissions. In addition, the company has committed to a plantwide instrumentation system upgrade which will also begin in 1991.

"Our refineries are getting more efficient every year," says Art Felderman, Unocal's vice president of refining. "The idea is to get the most out of what's already in operation, and continually strive for improvements. I think we've been able to do that very effectively."

Unocal 76 Racing Gasoline Delivers High Performance

When Derrike Cope shot past the leaders to win the Daytona 500 stock car race last February, he did it using the same Unocal fuel being pumped into high-performance vehicles throughout the United States.

Two specially formulated racing gasolines produced by Unocal—108-octane leaded and 100-octane unleaded—have been available to the public at selected Unocal 76 stations since 1988.

Unocal 76 Leaded Racing Gasoline—for racing use only—is the official fuel of the National Association of Stock Car Auto Racing (NASCAR), the premier circuit of professional stock car racing. Unocal's leaded product is also designed for racing such vehicles as sports cars and powerboats.

Unocal 76 Unleaded Racing Gasoline was developed for use in high-performance automobiles, motorcycles and powerboats, as well as four-wheel-drive sport trucks. It is also used in races sponsored by the IMSA (International Motor Speed Association), and for "showroom stock car" racing.

"Offering both racing gasolines to the public has been very successful for the company," says Stuart Cannes, former manager of Unocal's racing gasoline program. "It's been good for our corporate image and for public awareness of the quality of Unocal 76-brand products."

In tests monitored by the National Hot Rod Association, three identically prepared Buick Grand Nationals demonstrated that using Unocal 76 Unleaded Racing Gasoline can increase top vehicle speed by four to five miles per hour compared to cars using 92-octane Premium Unleaded.

Specially formulated to deliver high performance, both racing gasolines contain ingredients which allow spark timing to be advanced and can lower engine operating temperatures. This may help reduce engine component wear, and helps improve speed and acceleration. The evidence of increased vehicle performance is what has made the product so appealing to the public.

"Horsepower is back in vogue now," says Cannes. "People are very passionate about their 'muscle cars' and what kind of fuel they use in them. Many engines may not require 100-octane fuel, but that's what owners of high-horsepower cars want."

Unocal racing gasolines are available at 450 Unocal service stations—mostly east of the Rocky Mountains—that are served by 100 distributors. The company has actually been in the racing gasoline business for more than 30 years, supplying fuel for NASCAR events. Unocal became the first American oil company to produce a high-octane racing gasoline in 1958, and since that time the product has powered the winners of over 3,000 major races. Two years ago, public demand convinced Unocal to make its racing gasoline available at retail outlets.

"The use of Unocal racing fuels is a ringing endorsement of our products," says Tom Matthews, Unocal's vice president of eastern marketing. "If we can demonstrate the quality of our products in a proving ground as demanding as stock car racing, it makes the Unocal name mean more to the consumer."

Unocal service stations retailing the unleaded racing product sell an average of about 2,000 gallons of the fuel monthly. "Unocal's racing gasolines are quality products with good reputations," says Jim Butler, vice president of sales for Michigan-based Mid-States Petroleum, Unocal's largest racing gasoline distributor. "We've had zero complaints since they went on sale."

Pipeline System Modifications Emphasize Safety

They lie beneath the earth, traverse thousands of miles and affect everyone's lives, yet go relatively unnoticed by the public. But despite their hidden nature, pipelines play a key role in moving the oil and petroleum products that help supply America's energy needs. To ensure the continued safety and efficiency of its pipeline operations, Unocal recently completed $5 million in upgrades to its pipeline control system in California.

Unocal has an interest in more than 15,000 miles of pipelines nationally. Every day, between 400,000 and 500,000 barrels of petroleum are transported between refineries, oil fields and shipping terminals through these lines.

Dateline

In California, Unocal uses proprietary pipelines, which the company operates exclusively for its own product. In other regions the company uses mostly common carrier pipelines, which move petroleum for several companies. Unocal has an interest in pipeline systems throughout California, Alaska, and the Gulf Coast states, along with pipelines extending as far east as Atlanta and New Jersey.

On February 1, Unocal's pipeline operations were consolidated from four divisions into three: the Northern California Division, Southern California Division, and the Eastern Division. Each oversees the pipelines in its region. Unocal's interests in common carrier systems operated by other companies are managed by joint-venture groups.

The principal feature of the recently completed upgrades is a brand-new, computerized control system placed on line late last year at Unocal's Southern California Pipeline Division sheadquarters in Santa Fe Springs. Called a Supervisory Control and Data Acquisition (SCADA) system, it provides operators with instantaneous data concerning the status of Unocal's entire California pipeline operation.

"The SCADA system allows us to continuously monitor our pipelines, even in remote locations," says Matt Krubski, superintendent of the Southern California Pipeline Division. SCADA can pinpoint a variety of conditions, such as pipeline temperature, pressure and flow rate of the products being transported.

Equally important, SCADA offers a leak detection system by comparing the product quantity entering pipelines with the amount exiting. Any deviations exceeding set parameters trigger an alarm.

In addition to putting the SCADA system in place for Unocal's California pipelines, the company has installed state-of-the-art metering and gauging equipment in many of its proprietary lines in California and other parts of the country. Older pipeline segments have also been replaced with new pipe. All of the upgrade work is designed to enhance the safety of the company's pipeline operations.

"I think the public at large is unaware of how extensive and reliable the nation's pipeline system is," says Northern California Pipeline Division Superintendent Ron James. "A safe pipeline system like ours is a combination of how you design it, maintain it, and operate it—and we don't take any shortcuts."

Unocal has long been among the leaders in pipeline safety. Periodically, all major company pipelines are given a hydrostatic pressure test to confirm their strength and integrity. The lines are purged with water and then tested to 125 percent of maximum operating pressure.

Under both state and federal laws, external pipeline surveys must also be conducted at least 26 times yearly. Unocal checks its pipelines up to four times as often.

Once a week, contract pilots fly at low altitude over pipeline routes to check for any evidence of leaks, damage, or signs of unusual activity. For pipelines of critical importance, aerial checks are conducted twice weekly.

The extra effort has been worth the trouble. Occasionally, contractors, excavators and land owners have been stopped from unknowingly burrowing into pipelines thanks to the aerial surveillance. "Third-party hits are a major source of pipeline leaks," says James. "The flyovers have prevented a number of potentially serious accidents." In the Los Angeles area, where air traffic regulations do not permit such low fly-overs, the company uses "line riders," who drive alongside the pipeline routes to inspect them.

Unocal is also a member of Underground Service Alert, a computerized warning system designed to help prevent third-party hits. Potential diggers are offered a toll-free number to call and state the location of their dig. Companies with pipelines in that location are notified so they can send an inspector to make sure no pipelines will be affected.

In addition to all of the routine checks, the company also conducts an ongoing pipeline renewal program. This year more than six miles of pipeline dating back to 1940 will be replaced with new pipe segments.

Despite the fact that they are largely invisible to the public, pipelines remain a critically important component of operations for Unocal and every other integrated oil company.

James points out that supplying Unocal's Santa Maria refinery alone with feedstock (about 44,000 barrels per day) would require deliveries by 250 double-tank trucks every day if there were no pipeline system.

Perhaps the fact that the pipeline system goes unnoticed is the largest tribute to the company's safety procedures. "Safety is the focus of everything we do," says Vern Grimshaw, Unocal's manager of pipeline operations. "We don't take a step without thinking about safety first."

Unocal Goes To Bat For Young Ballplayers

A roar of applause is the sign of a happy baseball crowd, but this summer it will be the roar of heavy equipment which will please officials from Unocal and San Pedro Baseball Inc. Unocal is a major sponsor of a five-diamond Little League baseball complex to be constructed near the company's Los Angeles refinery later this year.

Scheduled for completion in early 1991, the Joan Milke Flores Baseball Complex (named for the area's City Council representative) is destined to become one of Southern California's most attractive Little League baseball facilities, according to planners.

Known as the "Fields of Dreams" project—a reference to last summer's baseball-themed movie—the completed facility will feature four regulation-sized playing fields, a smaller T-ball field, and a parking lot. Unocal will sponsor the largest of the four baseball diamonds with a $300,000 donation. Each field will seat a minimum of 500 and include electronic scoreboards.

"Unocal's donation was very significant and important, because it shows the community that the company believes in this project," said Gary Miley, president of San Pedro Baseball Inc. and a former employee at Unocal's research center in Brea. "Unocal really gave a boost to our entire fund-raising effort."

San Pedro Baseball Inc. is composed of board members from the Eastview Little League, which offers more than 260 boys and girls on 20 teams an opportunity to play baseball on a year-round basis. Due to redevelopment plans at the site where the league currently holds its games, the Eastview Little League had been in danger of losing its playing fields. The new complex, located directly west of LAR, will not only give the league a new home but is expected to host high school and college games as well.

"I live here in the community, and we're all really happy that Unocal is supporting this project," said Manuel Gonzalez, senior engineering inspector at LAR and Unocal's representative on San Pedro Baseball Inc.'s Facilities Development Committee. "Not only will this help the kids, but it will really be a showpiece for the whole area."

Los Angeles Dodgers coach and San Pedro native Joe Amalfitano, another Committee member, is also pleased that the new center is being built in the community. "We didn't have an organized Little League when I grew up here, but the area is different now," he said at a groundbreaking ceremony held in February. "They really need this complex, because there has been an influx of kids. We as adults need to provide them with a good place to play ball."

Unocal and the Dodgers organization have traditionally shared an interest in promoting youth baseball as a community relations effort. Each winter, the Dodgers offer a series of free baseball clinics for kids in locations throughout the Los Angeles area. At the same time, Unocal dealers frequently sponsor Little League and high school baseball teams on an individual basis.

The $300,000 donation to San Pedro Baseball Inc. marks Unocal's first corporate investment in Little League baseball. "We're very happy to be a part of this project, which will be a great benefit to the community and offer the kids in the San Pedro area an outstanding facility," said Art Felderman, Unocal's vice president of refining, who attended the groundbreaking.

The complex will be constructed on 15 acres of surplus city land. San Pedro Baseball Inc. has a 15-year lease at $1 a year. After nearly a year of planning, the project's initiation has filled everyone involved with anticipation.

"It's really great that Unocal is so involved with the community," said Gonzalez. "You never know, some of the kids who get to play ball here may end up playing at Dodger Stadium some day."

SERVICE AWARDS

UNOCAL 76

CORPORATE

35 YEARS **Lucille M. Ingels,** Unocal Center

25 YEARS **Patricia A. Luna,** Unocal Center
Nancy C. Sciurba, Unocal Center
Judith A. Wilkie, Unocal Center

20 YEARS **Joseph F. Cornett,** Unocal Center
Erma L. Fields, San Francisco, Ca.
Stanley L. Hicom, Unocal Center
Robert J. King, Jr., Unocal Center
Richard L. Walton, Unocal Center

15 YEARS **Gilbert M. Martinez,** Unocal Center
William A. Noyes, Unocal Center
David K. Patterson, Burbank, Ca.
Walter J. Talley, Unocal Center

10 YEARS **Nina Azadian,** Unocal Center
Carl B. Bailey, Beaumont, Tx.
Dan E. Esberg, Unocal Center
Keith R. Forster, Los Angeles, Ca.
Jon S. Gibby, Unocal Center
Debbie L. Gilliam, Unocal Center
Beatrice Gros, Unocal Center
William E. Haupt, Unocal Center
Brenda Jue, Unocal Center
Eva Leong, Unocal Center
Lucila Martinez, Unocal Center
Joan Reddick, Unocal Center
Sandra B. Reyes, Unocal Center
Craig Ried, Unocal Center
S. Yvonne Scott, Schaumburg, Il.
Charles O. Strathman, Unocal Center
Larry A. Waage, Orcutt, Ca.
John B. Yep, Unocal Center

REAL ESTATE

30 YEARS **Dale L. Roehrkasse,** Unocal Center

ENERGY MINING

20 YEARS **Ronald K. Smith,** Parachute, Co.

10 YEARS **Duane L. Isakson,** Parachute, Co.
John T. McCarty, Parachute, Co.

SCIENCE & TECHNOLOGY

30 YEARS **Leland H. Ward,** Brea, Ca.
Ronald L. Wright, Brea, Ca.

25 YEARS **Gordon W. Rimmer,** Brea, Ca.
Paul J. Steinwand, Brea, Ca.

20 YEARS **James D. Allen,** Brea, Ca.
Michael W. Bell, Brea, Ca.
Terrill W. Holloway, Brea, Ca.
Johnny R. Nienhouse, Brea, Ca.
Emile R. Pallotta, Brea, Ca.
Mark E. Tway, Brea, Ca.

15 YEARS **Gary W. Larson,** Brea, Ca.

10 YEARS **Myna E. Dare,** Brea, Ca.
Richard A. Hayes, Brea, Ca.
Michael G. Hunter, Brea, Ca.
Kelly Northrup, Brea, Ca.
Sharon M. Pearson, Brea, Ca.
Barry L. Radowitch, Brea, Ca.
Gloria P. Rey-Medina, Brea, Ca.
Gary P. Ritz, Brea, Ca.
Alana M. Van Slyke, Brea, Ca.
Christopher K. Vonkahrs, Brea, Ca.

ENERGY RESOURCES

NORTH AMERICAN OIL & GAS

35 YEARS **Presley Choate,** Erath, La.
Allen R. Hauck, Pasadena, Ca.
Donald L. Heriford, Coalinga, Ca.
Norman L. Ross, Cutbank, Mt.

30 YEARS **Houston B. Badon,** Lafayette, La.
James H. Bonner, Jr., Houma, La.
Herman C. Burrough, Oklahoma City, Ok.
Dolly R. Fulsom, Houston, Tx.
Willis J. Henry, Jr., Houma, La.

25 YEARS **Clyde M. Cooper,** Orcutt, Ca.
Robert M. Gammel, Orcutt, Ca.
Larry L. Graham, Anchorage, Ak.
Michael L. Morris, Orcutt, Ca.
Connie R. Pugh, Jr., Van, Tx.
Pamela J. Rogers, Pasadena, Ca.
Franklin F. Simmons, Orcutt, Ca.
Ronald D. Stevens, Coalinga, Ca.

20 YEARS **Eugene L. Basinger,** Freeport, Tx.
Francis L. Bennie, Kenai, Ak.
Roy Calloway, Sr., Houma, La.
Kenneth R. Chaffee, Carpinteria, Ca.
James H. Dillard, Andrews, Tx.
Phillip E. Hosch, Orcutt, Ca.
Larry D. Keen, Kenai, Ak.
Bruce C. Longest, Orcutt, Ca.
Alan O. Maier, Lafayette, La.
Dennis K. Mishina, Anchorage, Ak.
P. E. Parfait, Houma, La.
Charles F. Partridge, Jr., Kenai, Ak.
Burton D. Porche, Sr., Amelia, La.
Gary K. Presley, Kenai, Ak.
Manuel L. Ramirez, Piru, Ca.
Johnny P. Rivas, Orcutt, Ca.
Dwayne J. Smith, Santa Paula, Ca.
Richard L. Stewart, Anchorage, Ak.
David E. Thompson, Houston, Tx.
Rexford L. Thompson, Grayling, Mi.
Donald R. Tyler, Andrews, Tx.
Claudelle M. Whitesell, Lafayette, La.
Marvin L. Woolridge, Carpinteria, Ca.

15 YEARS **George T. Armistead,** Houston, Tx.
Robert A. Ballog, Ventura, Ca.
Kenneth Carmon, Houston, Tx.
David O. Condon, Orcutt, Ca.
Adrian M. Deangelis, Ventura, Ca.
Ted S. Donaho, Houston, Tx.
Michael A. Espitia, Piru, Ca.
Harold J. Frederick, Kaplan, La.
Donald D. Goode, Van, Tx.
Julius J. Gregoire, Kaplan, La.
Calvin L. Guidry, Sr., Amelia, La.
Clyde D. Guillotte, Welsh, La.
Reedy D. Hall, Las Cienegas, Ca.
Ronald W. Hillis, Andrews, Tx.
Jeffrey H. Hudson, Worland, Wy.
Walker L. Kozar, Piru, Ca.
Steven A. Lambert, Anchorage, Ak.
Richard S. Landrum, Anchorage, Ak.
Harris E. Lewis, Jr., Abbeville, La.
Michael E. Lucero, Ventura, Ca.
Barry S. Lyons, Jr., Houma, La.
Ray R. Marroquin, Orcutt, Ca.
Eddie V. Martinez, Jal, N.M.
James M. Naquin, Sr., Houma, La.
Frank P. Nave, Jr., Seminole, Tx.
Johnny M. Northcutt, Levelland, Tx.
F. Elbert Repp, Jr., Abbeville, La.
Rodney C. Sagrera, Kaplan, La.
Edward P. Signor, Santa Fe Springs, Ca.
Lloyd J. Sigue, Jr., Lafayette, La.
William C. Simpson, Midland, Tx.
Danny E. Truvillion, Orcutt, Ca.
John J. Vecente, Orcutt, Ca.
James H. Weaver, Kenai, Ak.

10 YEARS **Leland D. Alba,** Moab, Ut.
Jerry T. Alexander, Midland, Tx.
Robert M. Altany, Midland, Tx.
George J. Aragon, Orcutt, Ca.
Stephen D. Baldwin, Walnut Grove, Ca.
Simon G. Barrientes, Andrews, Tx.
Charlotte A. Beeson, Midland, Tx.
John C. Berg, Lafayette, La.
Phillip A. Block, Cisne, Il.
John R. Bockelman, Houston, Tx.
Vicki L. Breaux, Houma, La.
Brenda A. Broussard, Lafayette, La.
Vernon H. Cash, Ventura, Ca.
James R. Chapman, Jr., Orcutt, Ca.
William O. Clift, Jal, N.M.
W. C. Colvin, Chunchula, Al.
Michael G. Comeau, Farmington, N.M.
Dennis D. Conley, Bakersfield, Ca.
Robert A. Cornelison, Chunchula, Al.
Dolores Corral, Pasadena, Ca.
John S. Crews, Orcutt, Ca.
Renee E. Crosby, Houston, Tx.
Joseph C. Danos, Lafayette, La.
Gary W. Davis, Sr., Chunchula, Al.
Dalton R. Decuir, Abbeville, La.
D. Henry Derouselle, Abbeville, La.
Jeffery J. Dolan, Anchorage, Ak.
Robert E. Duffy, Jr., Lafayette, La.
Francis R. Elliott, Clay City, Il.
Robert B. Gamble, Houston, Tx.
Dolores E. Garcia, Pasadena, Ca.
Richard F. Garcia, Bakersfield, Ca.
Sean P. Gaskin, Las Cienegas, Ca.
Evangelina L. Gonzalez, Los Angeles, Ca.
James B. Green, Houston, Tx.
Sammie L. Green, Houston, Tx.
Michael P. Gring, Ventura, Ca.
William E. Hardy, Huntington Beach, Ca.
Linda H. Hicks, Midland, Tx.
Dale A. Hoffman, Bakersfield, Ca.
Sharon D. Hopkins, Bakersfield, Ca.
Pamela D. Jackson, Houston, Tx.
Gary F. Kearns, Houston, Tx.
Mark R. Ketell, Huntington Beach, Ca.
Kirk D. Kiloh, Anchorage, Ak.
Gregory W. King, Taft, Ca.
Robert J. Kirby, Huntington Beach, Ca.
Earnest R. LeBlanc, Jr., Houston, Tx.
Michael A. Lell, Worland, Wy.
Cheryl D. Lynch, Houston, Tx.
Warren A. Mautz, Lafayette, La.
Lena H. Montgomery, Houston, Tx.
Gerald J. Naquin, Sr., Dulac, La.
Timothy J. Noack, Worland, Wy.
Mark W. Nulle, Gillette, Wy.
Joyce D. Parker, Seminole, Tx.
Tony M. Parker, Chunchula, Al.
Kurt E. Pizalate, Houston, Tx.
Trevlon J. Renard, Abbeville, Ca.
Maria A. Reyes, Los Angeles, Ca.
Ingus A. Richters, Ventura, Ca.

Roy D. Roberts, Anchorage, Ak.
William Ruddiman, III, Lansing, Mi.
Johnny T. Santiago, Kenai, Ak.
Lou E. Savoy, Lafayette, La.
Mark S. Schmiedeke, Kenai, Ak.
Gary D. Simmermaker, Orcutt, Ca.
Tejay M. Simpson, Midland, Tx.
Jennie S. Smith, Houston, Tx.
Luis A. Soto, II, Houston, Tx.
Jaime J. Valderrama, Houston, Tx.
Timothy J. Witherspoon, Sr., Chunchula, Al.
Michael E. Wortman, Piru, Ca.
James A. Young, Ventura, Ca.

Unocal Canada, Ltd.

25 YEARS **Maureen M. Bowlen,** Calgary, Alberta

20 YEARS **Cyril O. Ferguson,** Fort St. John, B.C.
Kenneth L. Shaw, Calgary, Alberta

10 YEARS **J. Warren Bosse,** Calgary, Alberta
Garry L. Flaman, Slave Lake, Alberta
Sandra L. Fry, Calgary, Alberta
Robert A. Key, Calgary, Alberta
Norman C. Parsons, Calgary, Alberta
Henry G. Petrie, Fort St. John, B.C.
Neil W. Stephenson, Calgary, Alberta
Martha A. Szonyi, Calgary, Alberta

INTERNATIONAL OIL & GAS

25 YEARS **Donald N. Kay,** Los Angeles, Ca.
Tina T. Mueller, Los Angeles, Ca.

20 YEARS **William G. Reay,** Los Angeles, Ca.
Anthony N. Stewart, Netherlands

15 YEARS **Johann R. Eckert,** Thailand
John C. Ellice-Flint, Sunbury, England
Stephen E. Foster, Syria

10 YEARS **Andrew R. Crossley,** Thailand
Jorge G. Delgado, Los Angeles, Ca.
Stephen C. Gabbert, Balikpapan
Brian R. Greenhalgh, Thailand
Darrell M. Kamm, Thailand
Michael J. Rickard, Thailand
Michael J. Sharples, Thailand
Thomas E. Stump, Los Angeles, Ca.

Unocal Norge A/S

10 YEARS **Ole G. Birkeland,** Norway
Geir K. Ytreland, Norway

Unocal Thailand, Ltd.

15 YEARS **Bamrung Malaimat**

10 YEARS **Puttikorn Charoenmitr**
Chariwal Kriangkrivanich
Nara Rongdechprateep
Phanithan Sangsee
Sirima Taveesat

Unocal Indonesia, Ltd.

15 YEARS **Djumadi**
Mansur
Pakihodin
Sudaryono
Sukarmen
Sumartono
Suparwan
Sutrisno
Tafrizi
Wardjono
Fitres Anthony
Horman Boengai
Whazir Chan
Eddy Dharmawan
Pudjo Hartono
W. K. Josef
Abd. Sanie K.
Yan Kodoati
Harto Kuntardi
Ingeten Sembiring Maha
Maxi Mandagi
Liliek Mudjito
Sujindro Mulyono
Salam Ngatimin
Petrus Oley
Victor Brutje Oroh
Rita Pangaribuan
Leo Latif Permana
Ruslansjah A.R.
Suyatno Rachmat
Wachidin Rifai
Dede Rivai
Rambat Riyadi
Bambang Budi Santoso
Budi Santoso
Matdjuri Budi Santoso
Slamet Budi Santoso
John Sabar Sinaga
Wilson Sinaga
Roy Djaidin Sirait
B. Wismar Situmorang
Utut Suhadi
Daddy Rusmiady Suhaemi
Vicentius Joseph Sunarjo
Willy Suratman
Agus Suwisno
Sumarlan Tegen
Dorotheus Tenda
Elvianus Wurangian

10 YEARS **Kamaruddin**
Mudjijo
Samsulistyo
Suhartanto
Yahman
Francois De Queljoe
Leo Hariono
Tutty Ismoyowati
Pius Delo Lay
Johny Marto Lintang
Sumar Mahadi
Syarifah Mulyani
Akib Noor
Selamat Pasaribu
Jimmy R. Ririhatuela
Abdul Rahim Saka
Ramson Sihaloho
R. Sularso
Soetarto Taroenawidaya
Achmad Gunawan Winterstein

Unocal U.K., Ltd.

15 YEARS **Peter Broadley,** Sunbury, England
Lynn Rouse, Sunbury, England

10 YEARS **Adrian Allan,** Aberdeen, Scotland
Derek Bambury, Aberdeen, Scotland
Douglas Bissett, Aberdeen, Scotland
Daniel Bradley, Aberdeen, Scotland
Andy Brewin, Aberdeen, Scotland
David Darroch, Aberdeen, Scotland
Alexander Davidson, Aberdeen, Scotland
Jim Duff, Aberdeen, Scotland
Douglas Farr, Aberdeen, Scotland
Maldwyn Jones, Aberdeen, Scotland
John Mair, Aberdeen, Scotland
Chris Platt, Sunbury, England
Kay Turner, Sunbury, England
Lewis Will, Aberdeen, Scotland

Unocal Singapore Limited

15 YEARS **Shirley A. Tavasee**

10 YEARS **Joseph Tan Thiang Hua**

GEOTHERMAL

25 YEARS **Walter Schroeter,** Santa Rosa, Ca.

15 YEARS **Ronald Chappell,** Santa Rosa, Ca.
John Farison, Santa Rosa, Ca.
Mike Shoaff, Santa Rosa, Ca.

10 YEARS **Philip Bean,** Santa Rosa, Ca.
Constance Henderson, Unocal Center
David Holligan, Philippines
Paul Holmes, Imperial Valley, Ca.
Daryl Honey, Santa Rosa, Ca.
Edward Keppel, Santa Rosa, Ca.
Dale McKean, Santa Rosa, Ca.
Cheryl Mizufuka, Unocal Center
David Newell, Imperial Valley, Ca.
Francis Noel, Santa Rosa, Ca.
Jens Pedersen, Santa Rosa, Ca.

SERVICE AWARDS

Philippine Geothermal, Inc.

15 YEARS **Justito C. Fernandez,** Makati
Vicente E. Roxas, Jr., Bulalo

10 YEARS **Joaquin Pablo C. Guarte,** Tiwi
Pedro R. Joson, Makati
Quirino S. Kolimlim, Makati
Eduardo A. Sanque, Bulalo
Teresita H. Viloria, Makati

REFINING & MARKETING

35 YEARS **Herman W. Abeloe, Jr.,** Santa Maria Refinery
Galina G. Armstrong, Brisbane, Ca.
Arthur A. Barrett, San Luis Obispo, Ca.
John R. Cardinal, Amlin, Oh.
Richard F. Daly, Cleveland, Oh.
Donald B. Fink, Seattle, Wa.
Harold E. Johnson, Schaumburg, Il.
Natalie P. Mead, Walnut Creek, Ca.
Billy J. Weeks, Jackson, Ms.

30 YEARS **Earl W. Chappell,** Santa Paula, Ca.
William F. Claflin, Portland, Or.
Richard R. Garcia, City of Industry, Ca.
Troy Guinn, Torrance, Ca.
Leroy J. Lodge, Schaumburg, Il.
Robert W. Nelson, Schaumburg, Il.
James E. Nowinski, Los Angeles, Ca.
Delores M. Temko, Schaumburg, Il.

25 YEARS **Duane D. Brimley,** Brea, Ca.
Martin K. Brown, Memphis, Tn.
James E. Dowell, Los Angeles, Ca.
Robert R. Frazer, San Francisco Refinery
Gilbert L. Gibson, San Francisco Refinery
Wayne W. Grimes, Bainbridge, Ga.
James L. Jarosch, San Francisco Refinery
Carmen C. Kapell, Schaumburg, Il.
Chester C. Kitchell, Jr., Los Angeles, Ca.
Robert N. Lee, Pensacola, Fl.
Lily Martinson, Sacramento, Ca.
John F. McCasland, Los Angeles Refinery
Donna E. Moore, Los Angeles, Ca.
William R. Morse, Richmond, Ca.
Thomas C. Openshaw, San Francisco Refinery
Jerry R. Oyler, City of Industry, Ca.
Robert W. Wager, San Francisco Refinery
Lawrence J. Walsh, San Luis Obispo, Ca.
Thomas M. Yonamine, Los Angeles, Ca.

20 YEARS **James Adair,** San Francisco Refinery
Leon G. Albarian, Los Angeles, Ca.
Michael Baer, Schaumburg, Il.
Lorhermy R. Branman, Los Angeles, Ca.
Clarisa A. Bunac, San Francisco, Ca.
Connie A. Cabardo, San Francisco, Ca.
Arnold Cross, Avila Beach, Ca.
Eduarda B. Deguzman, San Francisco, Ca.
Mercedes T. Domingo, San Francisco, Ca.
Gay P. Donovan, Savannah, Ga.
Betty Jo Dudgeon, San Francisco, Ca.
Melvin D. Duncan, San Francisco Refinery
Richard Ferneau, San Francisco Refinery
Conchita A. Fonseca, San Francisco, Ca.
Charles B. Franklin, Jr., Beaumont Refinery
Erlinda T. Galeon, San Francisco, Ca.
Lloyd L. Gardner, Los Angeles Refinery
Gary J. Garrison, San Francisco Refinery
Wayne B. Gevas, San Francisco Refinery
Clarence Grant, San Francisco Refinery

SERVICE AWARDS

Bertha M. Holloway, San Francisco, Ca.
Ivan C. Johnson, Jr., Schaumburg, Il.
John H. Kennard, Los Angeles Refinery
Consuelo I. Loville, San Francisco, Ca.
Lourdes S. Marcelo, San Francisco, Ca.
Bobby D. Mayhew, Richmond, Ca.
Stanley T. Nakamura, Honolulu, Hi.
Larry L. Neal, Sacramento, Ca.
Henry D. Procsal, North Hollywood, Ca.
Joyce B. Reed, Los Angeles Refinery
Luz M. Rivera, San Francisco, Ca.
Sandra S. Ritchie, San Francisco, Ca.
Ambrose Russo, Los Angeles Refinery
Michael L. Sanchez, Los Angeles, Ca.
David G. Shelton, Frankston, Tx.
Morton B. Sherin, Brisbane, Ca.
Ronald S. Shiroma, Honolulu, Hi.
Claude Smith, Jr., Nederland, Tx.
Jacob J. Stevens, Schaumburg, Il.
Milton O. Walden, Jr., Beaumont Refinery
Daniel R. Walwark, San Francisco, Ca.
Leroy Williams, Savannah, Ga.
Myrtrice A. Williams, San Francisco, Ca.
James H. Yarborough, Brisbane, Ca.

15 YEARS **Gilbert A. Baez,** Santa Maria Refinery
Stephen J. Barrios, San Francisco Refinery
Charles D. Burris, San Francisco Refinery
Larry W. Catlett, Los Angeles, Ca.
Wayne L. Clayton, San Francisco Refinery
Margie J. Gibson, Memphis, Tn.
Barbara C. Huckaby, Beaumont Refinery
Kurt A. King, Los Angeles Refinery
Alexander Montgomery, Los Angeles Refinery
Paul M. Murphy, Los Angeles, Ca.
Russell J. Palmer, Los Angeles Refinery
Rodolfo U. Rivera, Los Angeles Refinery
Jeffrey D. Ruszler, San Francisco Refinery
Louis A. Serfes, Los Angeles Refinery
David R. Stannard, Los Angeles, Ca.
Rodney L. Starr, San Francisco Refinery
James W. Teske, Portland, Or.
Robert W. Vernon, Tacoma, Wa.
James K. Webber, Orange, Ca.
Thomas A. White, Los Angeles, Ca.

10 YEARS **Roy L. Adams,** Beaumont Refinery
Ricardo B. Albanese, Beaumont Refinery
Wendell P. Allen, Portland, Or.
Gary L. Andrews, Norwalk, Ca.
Roberto M. Araujo, City of Industry, Ca.
James N. Badger, North Hollywood, Ca.
James K. Baker, Schaumburg, Il.
Randy E. Barnes, San Francisco Refinery
William A. Barron, San Francisco, Ca.
William R. Batchelor, Beaumont Refinery
Rueben L. Bean, Beaumont Refinery
Anita U. Bose, Los Angeles, Ca.
Michael A. Boudreaux, Beaumont Refinery
Ronald D. Brereton, Tampa, Fl.
James A. Bush, Jr., Beaumont Refinery
Tijuana Carter, City of Industry, Ca.
Madeleine M. Chance, Portland, Or.
Michael L. Coats, San Francisco Refinery
Darrell W. Collier, Santa Maria Refinery
Roy E. Commins, Jr., Richmond, Ca.
Coleman W. Conroy, Nederland, Tx.
Michael J. Dailey, Portland, Or.
Paul S. Daniel, Beaumont Refinery
Richard A. Davis, Beaumont Refinery
Gerald A. Deering, San Francisco Refinery
Geraldine F. Deitch, San Francisco Refinery
Wilbert L. Dempsey, Edmonds, Wa.
Henry Dickey, Jr., City of Industry, Ca.
Dale D. Ebling, Los Angeles Refinery
Richard G. Eisen, San Francisco Refinery
Ian D. Emberson, Honolulu, Hi.
Austin Y. Fong, Pasadena, Ca.
Elbert J. Fontenot, Beaumont Refinery
Billy R. Foutz, Beaumont Refinery
James W. Frederickson, Tacoma, Wa.
Alton Gallentine, Beaumont Refinery
Denis P. Gallonio, City of Industry, Ca.
Sandra K. Getz, San Francisco Refinery
Mark K. Grzeskowiak, Schaumburg, Il.
Marvin K. Hood, Beaumont Refinery
Harry A. Hougesen, Beaumont Refinery
David A. James, Richmond, Ca.
George T. Johnson, Los Angeles Refinery
Daniel L. Jones, Los Angeles Refinery
Winston E. Layne, San Francisco Refinery
William Logan, Jr., San Francisco Refinery
William D. Mack, Los Angeles Refinery
Isabel M. Martin, Los Angeles Refinery
Peter F. Martinez, Beaumont Refinery
Joseph N. Mendoza, Brea, Ca.
Janet D. McCoy, Los Angeles Refinery
Lynda S. McCoy, Schaumburg, Il.
Eugene J. Moscato, Tampa, Fl.
Bryan W. Nappi, Sacramento, Ca.
David H. Newman, Beaumont Refinery
Jack Oliver, Beaumont Refinery
Rickey J. Patin, Beaumont Refinery
Richard Peabody, Schaumburg, Il.
Judith A. Peters, Schaumburg, Il.
Rosevelt F. Porter, San Francisco Refinery
William D. Price, San Francisco Refinery
Michael S. Russell, Santa Maria Refinery
Bobby J. Seagler, Beaumont Refinery
William K. Self, San Francisco, Ca.
Maria E. Selorio, San Francisco, Ca.
Charles D. Sivil, San Francisco Refinery
Sherry L. Sloan, Van, Tx.
Ruben R. Soriano, City of Industry, Ca.
Rebecca J. Staniewicz, San Francisco Refinery
Meyer I. Stansberry, Los Angeles, Ca.
Michael B. Strong, Wildwood, Fl.
William S. Thomas, Pasadena, Ca.
Elvira M. Tuazon, San Francisco, Ca.
Aurora S. Velarde, San Francisco, Ca.
Paul S. Wakagawa, Los Angeles Refinery
Nani C. M. L. Wedemeyer, Honolulu, Hi.
Blanche I. West, Schaumburg, Il.
Donald A. Williams, Phoenix, Az.

MARKETERS & DISTRIBUTORS

65 YEARS **Marlette Oil & Gas Co., Inc.,** Marlette, Mi.

50 YEARS **Brown Oil Co.,** Wilson, N.C.

35 YEARS **Gould Oil Co., Inc.** Hazel, Ky.
McElroy, Inc., Statesville, N.C.

30 YEARS **Nobbe Oil, Inc.,** Batesville, In.

25 YEARS **Horton Oil Co., Inc.,** Huntsville, Al.
C. Parker Oil Co., Asheville, N.C.
Stubbs Oil Co., Statesboro, Ga.

20 YEARS **Jim Hinton Oil Co., Inc.,** Live Oak, Fl.
McLeieer Oil, Inc., Kalamazoo, Mi.
New Paris Oil Co., Inc., New Paris, Oh.
L. S. Rankin & Sons, Gastonia, N.C.
Riggs Oil Co., Inc., Big Stone Gap, Va.
Shelby Service, Inc., Greenfield, In.

15 YEARS **Dyball Oil Co., Inc.,** Vincennes, In.
Lakeshore Oil & Tire Co., Inc., Two Rivers, Wi.
Service Oil of Monroe, Inc., Monroe, N.C.
Sheppard Oil Co., Inc., Laurel, Ms.

10 YEARS **Pago Petroleum Company,** Pago Pago, American Samoa
S&J Unocal 76, Charles City, Ia.
T. W. Shaw Oil Co., Inc., Milwaukee, Wi.

CHEMICALS

35 YEARS **Vincent J. Caldas,** Clark, N.J.
Walter H. Garza, Unocal Center
Robert Ustick, West Sacramento, Ca.

30 YEARS **Charles Merrill,** Unocal Center
F. L. Ullersberger, Carteret, N.J.
F. Dean Wagner, La Mirada, Ca.

25 YEARS **Harvey E. Coghlan,** Sacramento, Ca.
Ernest J. Dalton, Chico, Ca.
Nell R. Green, Schaumburg, Il.
Adrian L. Hale, Yakima, Wa.
Dewayne Korver, Unocal Center
Thomas E. Olsen, St. Paul, Mn.

20 YEARS **John R. Baxter,** Lemont, Il.
James W. Crase, Schaumburg, Il.
John P. Geerdes, Kansas City, Mo.
Joseph S. Kimball, Houston, Tx.
Gary A. Murphy, Unocal Center
Peter C. Schmid, Unocal Center

15 YEARS **Milan Balga,** Kankakee, Il.
Jerry Best, Brea, Ca.
Leroy J. Branton, Tucker, Ga.
Ronald D. Freston, La Mirada, Ca.
Phillip Gonzalez, Lemont, Il.
Joseph E. Harris, Kenai, Ak.
Clarence Johnson, Kenai, Ak.
James A. King, Kenai, Ak.
Stephen A. Morgan, Kenai, Ak.
Anthony Nahale, Wilmington, Ca.
Dennis R. Quilici, Rodeo, Ca.
Sharon L. Stephens, Schaumburg, Il.
William B. White, Kenai, Ak.

10 YEARS **Larry J. Barbee,** Charlotte, N.C.
Robert L. Bell, Kenai, Ak.
Stephen C. Cooper, Charlotte, N.C.
Wanda Dennis, Unocal Center
Jerry L. Fate, Kenai, Ak.
George F. Gamond, Wilmington, Ca.
Ronald B. Hansen, Kenai, Ak.
William L. Hawkins, Kenai, Ak.
Paul K. Helms, Jr., Charlotte, N.C.
Michael Holland, Kenai, Ak.
Charles Kahahauwila, Kenai, Ak.
Bruce Livingston, Lemont, Il.
Joseph C. Moles, Lemont, Il.
David A. Moore, Arroyo Grande, Ca.
Mark B. Moore, Kenai, Ak.
Gabriel G. Moreno, Brea, Ca.
George E. Reichardt, Lemont, Il.
Michael P. Riley, Brea, Ca.
James M. Singley, La Mirada, Ca.
Michaeline A. Verkon, Houston, Tx.
Librado O. Villado, La Mirada, Ca.
Gay L. Wescott, Schaumburg, Il.
Thaddeaus O. Wilson, Unocal Center

MOLYCORP, INC.

25 YEARS **Gordon D. Tripp,** Mountain Pass, Ca.

20 YEARS **Robert A. Martinez,** Questa, N.M.

10 YEARS **Charles L. Bates,** Louviers, Co.
Michael J. Hall, Louviers, Co.
David J. Hamwey, Louviers, Ca.
James E. Ladwig, Louviers, Co.
Thomas W. Gray, Mountain Pass, Ca.

POCO GRAPHITE, INC.

15 YEARS **Larry D. Fiel,** Decatur, Tx.

10 YEARS **Bobby L. Henson,** Decatur, Tx.
Gwynella Long, Decatur, Tx.
Carolyn Peterson, Decatur, Tx.
John G. Ronken, Decatur, Tx.
Charles C. Turner, Decatur, Tx.
Junko Vera, Decatur, Tx.

RETIREMENTS

Corporate

Catalina Castro, June 25, 1968
Norma G. Litton, February 29, 1972
George T. Ozaki, January 18, 1960
Nancy C. Sciurba, April 5, 1965
Daniel Stein, March 18, 1959
Robert S. Strobel, September 20, 1971
May Tsang, November 17, 1958
Esther Yee, June 1, 1969

North American Oil & Gas

Louis B. Evans, October 10, 1949
Lynwood Hill, January 27, 1977
Barbara J. Maxwell, March 2, 1964
A. B. McAdoo, November 1, 1960
Charles G. Newhouse, March 22, 1949
Mickey W. Renaud, March 8, 1957
Ernest L. Roberts, February 27, 1951
Norman L. Ross, March 3, 1955
Lawrence F. Sprague, October 15, 1952

Refining & Marketing

Stanley Arnold, November 18, 1948
John E. Barca, June 7, 1971
Ralph C. Becker, September 8, 1952
John H. Bercovitz, April 7, 1952
Geraldine P. Borawski, August 7, 1973
Noel C. Boretti, July 15, 1974
David L. Breitsprecher, November 19, 1953
Delbert H. Brinck, September 25, 1961
Benjamin D. Brown, September 27, 1974
Fred A. Brown, August 26, 1976
Robert L. Carroll, October 8, 1948
Audrey N. Choate, May 9, 1977
Barbara A. Christensen, September 27, 1966
Donald B. Christoffel, October 22, 1956
Harold L. Crossman, February 11, 1969
Robert L. Dalton, April 3, 1978
Eugene W. Dickey, Jr., September 18, 1946
Mary K. Doyle, June 7, 1971
William C. Draper, February 20, 1978
Frank F. Duffy, October 31, 1952
Inta Duks, May 16, 1975
Paul D. Ertley, February 1, 1961
Rheta Fabing, October 1, 1973
Lorraine L. Flentge, February 12, 1962
Joan H. Foley, December 22, 1969
Preston J. Frederick, March 2, 1964
Phillip Garcia, June 18, 1969
Junior L. Golden, April 20, 1971
Ronald G. Grady, January 2, 1957
John W. Groesch, March 10, 1944
Joan I. Haden, September 21, 1959
Donald H. Hermanson, August 13, 1963
Alvin B. Hess, June 22, 1956
James L. Hill, June 15, 1951
Lee Roy Hill, Jr., December 13, 1976
Charles J. Holland, September 29, 1955
Donald P. Homerding, March 31, 1949
John J. Horigan, January 27, 1967
Patricia L. Huebert, April 1, 1957
Robert H. Huebert, August 1, 1960
Jean E. Jenkins, May 13, 1974
Buddy L. Johnson, January 23, 1976
Harold E. Johnson, March 21, 1955
Jeanette D. Jones, April 10, 1951
James T. Jordan, May 15, 1956
William H. Kees, June 1, 1950
Franklin D. R. Kelly, March 18, 1977
James B. Knasel, March 1, 1966
Imants Krastins, October 15, 1956
Dolores A. Kretch, December 14, 1966
Antonio A. Landa, September 17, 1976
Louis F. Lucas, July 11, 1960
Boyd G. Lyon, May 20, 1942
Fred L. Maloney, November 14, 1977
Mary E. Mannion, August 28, 1963
Donald E. McKinney, May 25, 1976
John F. McNeely, September 25, 1967
Samuel Merker, September 13, 1954
Lloyd E. Messer, October 16, 1958
Dolores T. Nordsell, August 5, 1968
John E. Nunes, May 24, 1945
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Donald D. Opie, June 11, 1979
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James S. Quigg, June 12, 1952
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William C. Smiley, January 12, 1953
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Cover: Ever since the first one opened back in 1913, Unocal service stations have been known for quality products, superior service and spirited employees. This 1920s-era outlet, located in Los Angeles, was no exception. *Seventy Six* magazine's second centennial year issue focuses on Refining & Marketing.

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