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# Seventy SIX

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Summer  
1988



# Stegemeier Elected CEO



*Fred L. Hartley*

Unocal Chairman Fred L. Hartley has chosen to resign as chief executive officer after 24 years of dynamic and visionary leadership. At Hartley's recommendation, President and Chief Operating Officer Richard J. Stegemeier was named to the chief executive post on July 1. Hartley will continue as chairman of the board of directors.

In making the announcement of Hartley's retirement, Stegemeier said, "Fred Hartley has been a distinguished leader who maintained the highest moral standards. During his tenure, Unocal has grown from a regional oil company to its present position as a worldwide natural resources company. He now leaves Unocal with a solid foundation for future growth."

Hartley became president and chief executive officer of Unocal in 1964. In 1965, he presided over the merger with Pure Oil Company, which greatly increased the new Unocal's marketing strength and asset base. He was elected chairman of the board in 1974.

During Hartley's years at the helm, Unocal expanded its petroleum operations to Alaska, Indonesia, Thailand, the Middle East and the North Sea. The company also became a leader in developing alternative energy resources. Today, Unocal is the world's largest producer of geothermal energy, and the company's shale oil project in Colorado is the first commercial-scale venture of its kind in the nation.

In 1985, Hartley made national news as he led the company's successful defense against a hostile takeover attempt, launched by T. Boone Pickens and his Mesa partnership.

Richard J. Stegemeier joined Unocal in 1951 as a research engineer at the company's research center in Brea, California after completing a master's degree in petroleum engineering at Texas A & M University. He had received his undergraduate degree in petroleum engineering in 1950 from the University of Missouri, Rolla.

During his early career, Stegemeier was awarded nine patents for improved oil production methods. In 1961, he was promoted to lead engineer in the company's natural gas department, where for four years he was deeply involved in a joint-effort by Unocal and Marathon Oil to develop the first large liquefied natural gas project in the country.

After spending two years in Tokyo acting as engineering adviser to the Tokyo Gas Company, he was transferred to Coalinga, California as area superintendent in 1966. The following year he became manager of production in Sydney, Australia. A short time later, he went to Indonesia to negotiate one of the first production-sharing contracts with that country. Under Stegemeier's leadership, the company found and developed a number of oil and gas fields in Indonesia, including the giant Attaka field.

In 1975, Stegemeier became vice president and resident manager of Unocal's Southeast Asia operations, based in Singapore. Two years later, he moved back to California and in 1979 was named president of Unocal's Science & Technology Division, responsible for all of the company's research activities.

Stegemeier was elected to Unocal's board of directors and named senior vice president, Corporate Development in 1980. In addition to Science & Technology, his responsibilities included overseeing Energy Mining, Corporate Engineering & Construction, and strategic planning. In 1985, Stegemeier became Unocal's president and chief operating officer, positions he has held until his most recent appointment. 76



*Richard J. Stegemeier*

# TURNING ON THE POWER

**A**fter the steel door swings open, a strong current of air tugs at Unocal engineer Paul Tish as he stands in the doorway. His hardhat jiggles while he tries to steady himself against the room's forceful suction.

"This is the inlet air filter!" Tish shouts above the constant hum of an engine. "It's filtering out contaminants." And the contaminants can be anything from gnats to pollen. The structure is drawing in air from outdoors at a rate of 20 million cubic feet per hour.

Tish is conducting a tour of the Los Angeles refinery's cogeneration plant which, like the company's plant in the San Francisco refinery, generates steam and electricity for refinery use. Drawing in air is the first step in the plant's operation.

"Now, we can make our own electricity, which is much less expensive than buying it from the utility," says Los Angeles refinery manager George Walker. And at the same time, the plant can produce steam more efficiently and cleanly than the two boilers it replaces.

Steam is vital to refinery operations, and the cogeneration plant supplies as much steam to the refinery as the remaining five boilers. In addition to being used for heating, steam is used in distillation towers during separation processes. Moreover, steam turbines drive many of the refinery pumps.

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*New cogeneration plants at the company's San Francisco and Los Angeles refineries reduce utility costs and help the facilities comply with new emissions standards. At right, a portion of the cogeneration plant at LAR, in full operation since May.*





The cogeneration plant and another generator in the refinery can produce more electricity than the refinery needs. Under an agreement with the Los Angeles Department of Water and Power (DWP), the refinery will receive credit for the surplus, which other company facilities can redeem. “We should be able to supply the refinery’s needs and, in most cases, supply all of Unocal’s electrical demands in the city of Los Angeles,” Walker says.

The cogeneration plant’s generator is synchronized with DWP’s electrical grid, meaning the two systems share the same frequency. This synchronization permits the refinery to access power transmission lines, enabling Unocal to import as well as export power. Thus, the refinery can rely on DWP’s power backup during maintenance periods when the cogeneration plant is shut down.

So why is DWP helping the Los Angeles refinery to virtually eliminate its electricity bill? In 1978, Congress passed the Public Utility Regulatory Policies Act, which mandated that utilities provide power backup to qualifying cogeneration plants and buy any surplus power from these plants. The act was aimed at conserving energy by tapping the power generating potential of industries that have a use for both electricity and steam.

After the Supreme Court upheld the law in 1983, cogeneration—the sequential production of electrical energy and thermal energy from the same fuel—was firmly established as an option for industries burdened with steep utility bills. The subsequent wave of new cogeneration plants included one at Unocal Chemicals’ coke calcining facility in northern California’s Contra Costa County.

**A**lthough the number of industries turning to cogeneration has increased substantially in recent years, the process is hardly new. In fact, its use in the United States can be traced back to the late 1880s. And long before cogeneration came to Unocal, the company was well acquainted with the basics of this technology.

“Modern cogeneration uses a gas turbine, the same type of engine that jet airliners have,” explains engineer Mike Braun, who helped coordinate construction of the Los Angeles refinery’s plant. “Our Pipeline and Chemicals Divisions have used gas turbines to drive compressors for many years. And, of course, we have a lot of experience with boilers. But using the two of these together to create both electricity and steam was all new to our refinery.”

During operation, the cogeneration plant’s gas turbine first draws ambient air through a filter house and into an air compressor, where the air is compressed to 200 pounds per square inch. As a result, the air’s temperature rises to about 700 degrees Fahrenheit.

Then, the compressed air is routed to combustors, where burning fuel gas heats the air to about 2,000 degrees Fahrenheit. The resulting combustion gas pushes the blades of the turbine that turns the turbine shaft, providing 63,000 net horsepower for the generator to produce 44 megawatts of electricity.





*The cogeneration plants enable both refineries to produce their own electricity and steam. They also can keep the refineries operating in the event of a power outage. Pictured here is the San Francisco refinery's cogeneration plant.*

Next, exhaust gas exits the turbine at a temperature of 950 degrees Fahrenheit and passes through supplementary duct burners that further heat the gas. After entering the boiler, this gas heats water in boiler tubes and produces 300,000 pounds of steam per hour.

"The same heat that's used to produce the electricity is used again to make steam, which is very efficient," says Paul Tish, who recommended the project in 1984. "And with the cogeneration plant, we can comply with new emission restrictions without the expense of retrofitting two old boilers."

The plant, which covers a quarter of a city block, has been in full operation since May. The fuel piped in to fire the gas turbine is a mixture of natural gas and refinery gas that is a byproduct of other refinery processes.

Operators can oversee cogeneration plant functions from a remote control room. The plant is also equipped with a computerized control system with video display terminals and keyboards. Operating conditions, such as the gas turbine's exhaust temperature and level of vibration, are monitored closely. Also monitored are the plant's seven electrical substations, which employ circuit breakers and transformers to convert the produced electricity to required voltage levels.

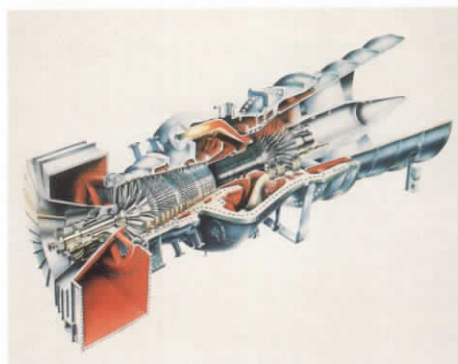
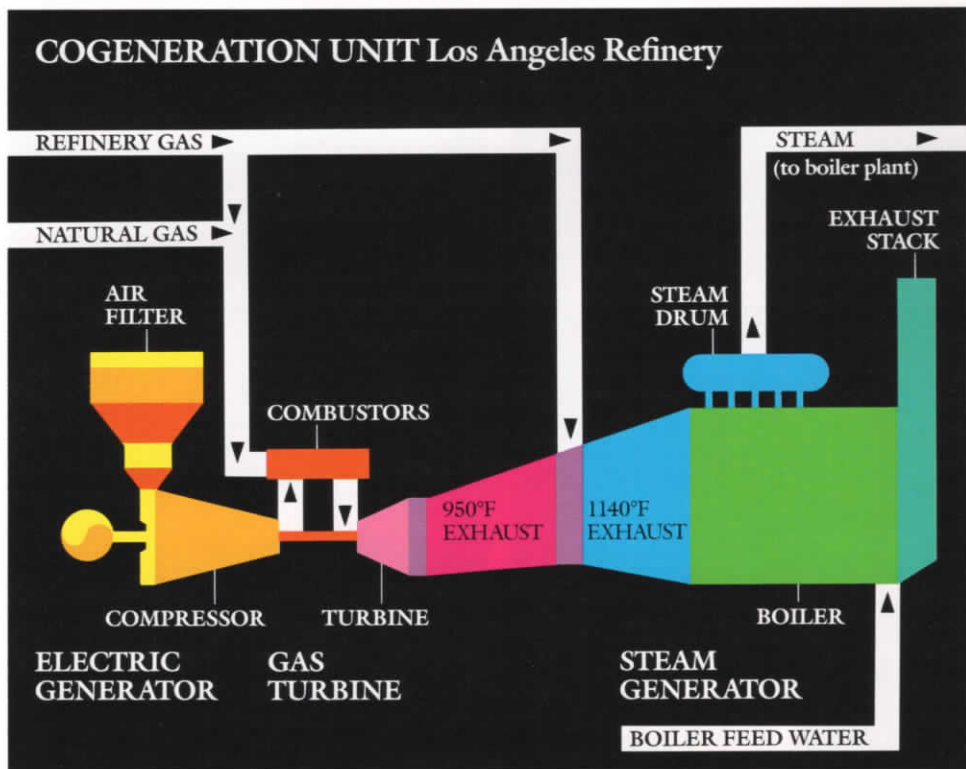
"The automation of the system is impressive," says Mike Hawkins, the refinery's cogeneration project manager. "The gas turbine design is particularly outstanding. The turbine and generator have started up and synchronized automatically every time."

The 49-megawatt cogeneration plant at Unocal's San Francisco refinery has enjoyed equal success after more than a year of operation, says Richard Walloch, who oversaw the project's development. This plant's construction was carried out under a more urgent time frame, however, because the refinery was faced with the loss of its existing steam supply.

In 1984, Pacific Gas & Electric announced plans to shut down a power plant it owned that had supplied steam to the San Francisco refinery for nearly 50 years. Because of its age, the power plant needed extensive upgrading and repair work. But PG&E decided to close down the obsolete facility. Since steam is integral to a refinery's operation, Unocal had to quickly develop another source.

"A refinery can't operate without a strong steam supply," says Rand Swenson, the refinery's superintendent of hydrotreating. "In fact, steam failure is the worst kind of failure we can have. It's even worse than electricity failure. If we lose steam, we can't keep some units circulating in a hot mode, so they can't be started back up quickly."

Because cogeneration could provide both steam and electricity — as well as drastically reduce the refinery's utility bills and create a salable surplus of electricity — the San Francisco refinery opted to construct a cogeneration plant. But deciding on cogeneration was only the first step in the new project. Unocal had to find qualified engineering contractors to aid in the plant's design. Potential equipment suppliers also had to be selected.



Above, a diagram of the gas turbine used in the Los Angeles refinery's cogeneration plant. Right and opposite page, a maze of piping snakes through the San Francisco refinery's cogeneration unit.







Then, construction hinged on a succession of approvals from authorities at local, state and federal levels—including the Environmental Protection Agency and the Bay Area Air Quality Management District. Within two-and-one-half years after launching the cogeneration project, however, the new plant was on-line and the San Francisco refinery no longer depended on anyone else for its steam supply. In contrast, design and construction of the Los Angeles refinery's cogeneration plant took three years.

Unlike the Los Angeles refinery, the San Francisco refinery didn't already operate its own boiler plant. As a result, the Bay Area plant required three gas turbines, rather than one.

"Any two turbines can fill all the refinery's steam demand," Swenson says. "That allows one turbine to be shut down for maintenance without shutting down the whole refinery. But we need all three turbines to meet our electricity requirements." If all three turbines aren't functioning, however, the refinery can continue to operate by importing power from PG&E.

With the arrival of the new cogeneration plant, the refinery essentially replaced a 50-year-old cogeneration facility with a state-of-the-art plant. The PG&E facility also used the refinery's byproduct fuel gas to generate electricity during steam production. But this electricity was integrated into PG&E's grid and distributed to the utility's customers without Unocal receiving any credit for contributing the fuel gas.

**W**hile both plants were designed to generate electricity and steam, their methods are entirely different. For example, the PG&E plant operated with a steam turbine that used waste heat to generate steam. The new plant, on the other hand, employs a gas turbine that uses exhaust gas to produce steam. And cogeneration technology has made marked strides in emissions control over the past 50 years.

“The difference between our cogeneration plant and PG&E’s old facility is like the difference between a Model T Ford and a brand new car,” says Dennis Shigeno, the refinery’s supervisor of energy conservation. Modern cogeneration technology is not only more efficient, it’s environmentally safer.

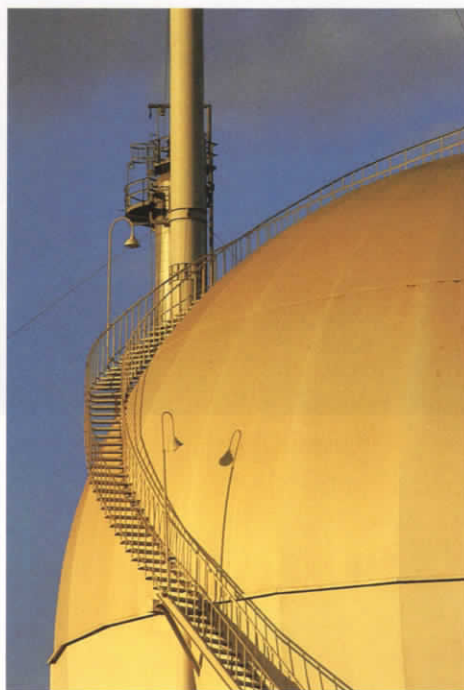
While the gas is in the cogeneration plant’s boiler, emissions control technology removes most of the carbon monoxide and nitrogen oxide. As a result, the plant’s emissions contain fewer pollutants. These environmental safeguards have ensured that the refinery can meet new emissions standards enacted by the Bay Area Air Quality Management District. Similarly, cogeneration has enabled the Los Angeles refinery to comply with new emissions limits imposed by the South Coast Air Quality Management District.

In both cogeneration plants, injected ammonia in the presence of a catalyst converts the nitrogen oxide to nitrogen and water. Another catalyst helps convert the carbon monoxide to carbon dioxide. The process works much like a catalytic converter in an automobile.



*“The cogeneration plants have made the Los Angeles and San Francisco refineries far less dependent on the utilities,” says Don Hanley, Unocal’s vice president of refining. “The economic advantages have been tremendous.”*





And on exceptionally smoggy days, the plants' emissions contain less carbon monoxide than the air being pumped in, says Rand Swenson.

In addition to the environmental benefits, the financial rewards have also made the investment successful for both refineries. "At our refinery, we're making steam for about the same cost that a new boiler plant would have," Swenson says. "But by cogenerating, we're getting power for one-third the cost we would have paid otherwise."

Now, the only time the San Francisco refinery buys electricity is when one of the turbines is shut down for maintenance. For nine months out of the year, the refinery has a surplus of electricity, which the utility buys.

And if a power failure darkened the Bay Area, the refinery would remain unaffected. "We could operate on our own," explains Walloch, who is now the San Francisco refinery's superintendent of maintenance. "Our switch gear could disconnect from the grid, and our own produced electricity would support the refinery." The Los Angeles refinery's cogeneration plant shares this capability.

"The cogeneration plants have made the Los Angeles and San Francisco refineries far less dependent on the utilities," says Don Hanley, vice president of refining. "The economic advantages have been tremendous, and similar systems are under serious consideration for the company's other refineries."

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# Alcohol Fuels: A CAUTIOUS APPROACH

Back in 1970, the same year that the Environmental Protection Agency (EPA) was established, Congress passed into law the Clean Air Act. A major purpose of the act was to formulate a national standard for air quality. The legislation, as amended in 1977, did this by charging the EPA with setting, monitoring and enforcing clean air standards for the nation's major metropolitan areas.

In the ensuing years, the nation's air quality has improved significantly. The development of fuel-efficient automobile engines, unleaded gasoline, industrial and vehicle emissions control technology, and energy conservation have all helped to curb air pollution. But there is still much progress to be made.

Indeed, some 70 metropolitan areas failed to comply with a December 31, 1987 deadline imposed by the EPA for meeting standards set for the two most troublesome air pollutants: carbon monoxide and ozone. These so-called "nonattainment areas," which span the nation, include such large urban centers as New York, Los Angeles, Chicago and Denver.

The Clean Air Act contains provisions for imposing sanctions against those areas which have failed to meet the standards. Among the penalties are moratoriums on new plant construction and the withholding of federal highway funds. Last December, however, Congress delayed the imposition of such sanctions for at least eight months. This action was taken in response to the widespread failure to meet the December deadline, and because of Congress' own inability to agree on new clean air legislation — something it has been unable to do for almost a decade.





*Above, morning traffic begins to build on a Los Angeles freeway interchange. To help reduce air pollution caused by vehicle emissions, some are calling for the mandated use of alcohol fuels as a gasoline alternative. Unocal advocates a more comprehensive approach to cleaning up our air.*

Legislation to amend the Clean Air Act is now pending in both houses of Congress. The goal is to formulate a coherent, workable and effective strategy for cleaning up the nation's air — as well as a more realistic timetable for doing so. But as it has for nearly two decades, the effort is proving difficult and controversial.

In the meantime, several states and localities are mounting their own efforts for more forceful air quality regulations. The actions range from slow-growth initiatives designed to limit industrial expansion, to more stringent emissions regulation. Some states are considering bills that would require localities to implement traffic management plans. Others would require service stations to install vapor-control nozzles on gasoline pumps — a law already in force in much of California.

But the most controversial effort being pursued is a growing movement to replace gasoline with what are known as "alcohol fuels."

Advocates of alcohol fuels — also called oxygenated fuels — maintain that because emissions from gasoline-powered internal combustion engines contribute a large share of the ozone and carbon monoxide emitted into the atmosphere, the nation could reduce the levels of these pollutants cheaply, easily and safely by replacing gasoline with alcohol fuels.

Not necessarily, say others, including Unocal.

"Unocal has consistently supported more effective clean air legislation," says Pat O'Toole, Unocal's manager of legislative and regulatory issues. "We agree that increased attention should be paid to vehicle emissions, as opposed to emissions from stationary sources. But the company position on alcohol fuels is one of caution."

Unocal is interested in exploring alcohol fuels, because there is evidence their use may produce some air quality benefits, O'Toole says. But the benefits are far from clear. More importantly, there are serious environmental and safety concerns that need to be explored.

"There are also a lot of troubling economic and logistical questions associated with alcohol fuels," O'Toole explains. "What would these fuels cost? Where would they be produced, and from what feedstocks? How would they be distributed? All of these issues need to be addressed."

The two alcohol fuels most widely considered as gasoline alternatives are methanol and ethanol. Neither one is new. Ethanol — which can be produced from a variety of feedstocks including petroleum, coal and grain — has been fueling motor vehicles in the U.S. and South America for more than a decade. Ethanol is usually blended with gasoline to form "gasohol," which most automobiles can use without the need for extensive engine or fuel system alterations.

Methanol, produced from natural gas or coal, has been used as a vehicle fuel even longer. In fact, Henry Ford originally designed his Model T to run on methanol. But the abundance and low price of gasoline — a byproduct of kerosene production at the time — led the early automakers to choose gasoline as the fuel for their vehicles. Today, methanol accounts for less than one percent of total motor fuel production in the U.S. Its major use as a motor fuel is in some types of professional race cars.

Because ethanol has been shown to reduce vehicle emissions of carbon monoxide, its use is now being advocated — and in some cases, required — in some states. Colorado recently mandated the use of an ethanol-gasoline blend in certain parts of the state (including the city of Denver) during the winter months, when carbon monoxide levels in the atmosphere are often higher than normal due to climatic conditions. Use of another oxygenated fuel, an ether-based compound known as MTBE, is also allowed under Colorado's mandate.

Initiated last winter, the Colorado program was the first mandatory alternative fuels program in the nation. New Mexico and Arizona recently enacted similar mandates. In California, where ozone is a more severe air pollution problem, methanol is being advocated by some as a potential alternative motor fuel. This is because emissions from methanol-fueled vehicles are said to contribute less to ozone formation than emissions from gasoline-powered vehicles.

While the emissions benefits of alcohol fuel use seem appealing on the surface, the full story is more complex. Use of ethanol can reduce vehicle emissions of carbon monoxide, especially in older cars. But ethanol's effect on ozone remains uncertain — as does that of methanol. This is because, unlike carbon monoxide, ozone is not emitted by vehicles or stationary sources. Rather, it is formed when sunlight causes chemical reactions between organic molecules and nitrogen oxides in the atmosphere.

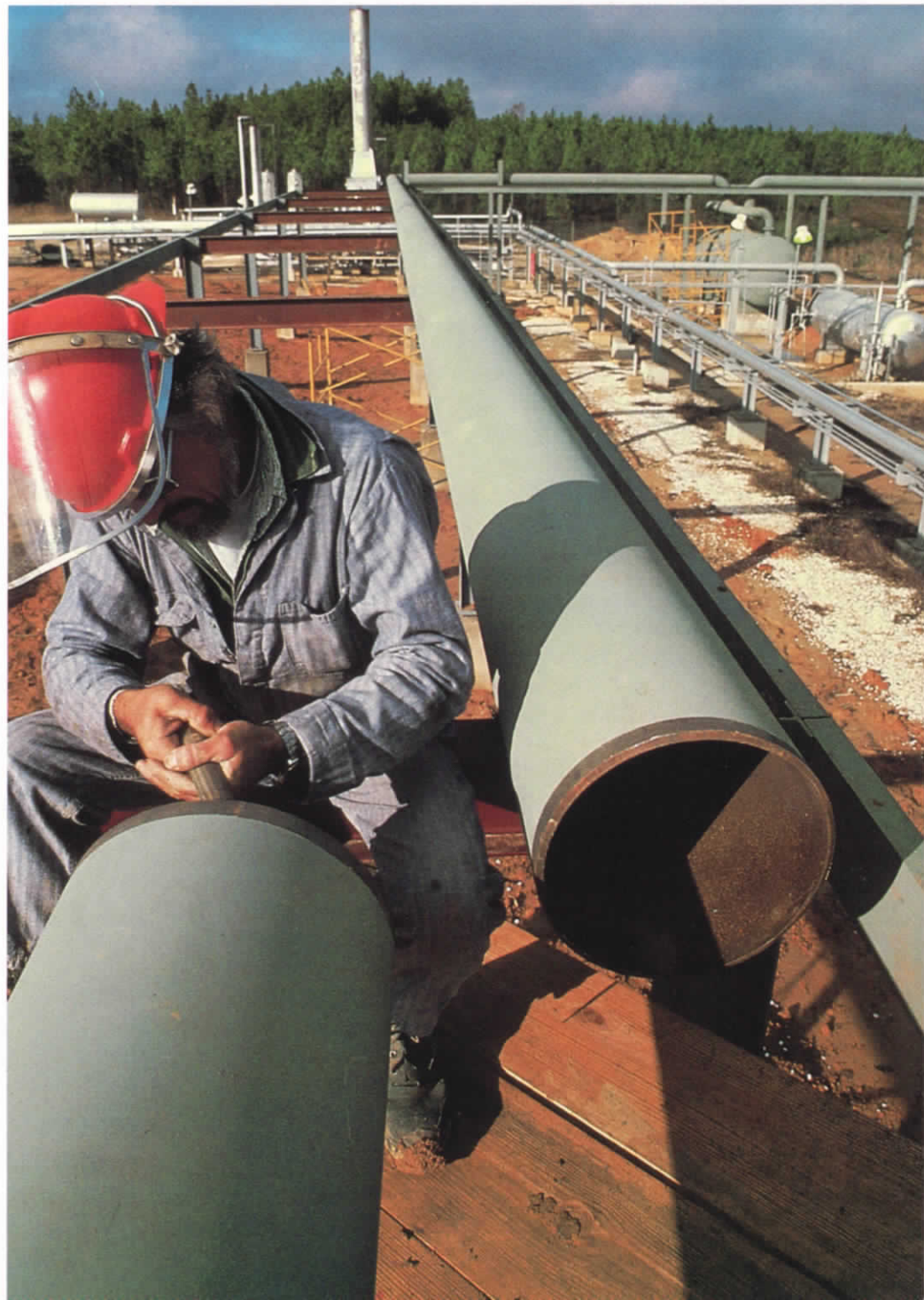
Because these ozone-forming pollutants — called ozone precursors — come from various sources, ozone is difficult to track. In fact, both ethanol and methanol are ozone precursors themselves — and, in turn, they produce other precursors when used as fuels.

"The overall air quality benefits derived from the use of oxygenated fuels are highly uncertain," says Carleton B. Scott, director of Unocal's Environmental Sciences Department. "The issue is further muddled because scientific air modeling studies based on the use of these fuels have not yet been completed."

Aside from questions about their effectiveness in improving air quality, there are other good reasons for taking a cautious approach to expanded use of alcohol fuels. One concerns their properties as transportation fuels. While both methanol and ethanol have higher octane ratings than most gasolines, they each have several disadvantages.



*Left, the city of Denver is one of some 70 metropolitan areas that failed to comply with an EPA deadline for meeting air pollution standards. In an effort to reduce carbon monoxide emissions from vehicles, Colorado recently mandated the use of alcohol fuel blends during the winter months. Below, a worker installs a products distribution pipeline. Replacing gasoline with alcohol fuels on a large scale would necessitate construction of additional storage and distribution facilities.*



Neither can approach gasoline in terms of fuel efficiency by volume. One gallon of ethanol yields about two-thirds the energy of a gallon of gasoline, while a gallon of methanol yields just slightly more than half. Thus, it takes 20 gallons of methanol to get an automobile as far as 10 gallons of gasoline can. An ethanol-fueled car would need half again as many fill-ups as a gasoline-powered vehicle.

There are also engine performance problems associated with alcohol fuels. Methanol-fueled vehicles do not start readily in cold weather, for one. Engine lubrication and fuel-filtering problems have also been reported. Both fuels are also highly corrosive to certain materials. Methanol will affect solder, aluminum, rubber and other substances normally found in standard gasoline engines. While less damaging, ethanol is also more corrosive than gasoline. Thus, many of the materials now used in standard production vehicles — and in fuel storage and distribution systems — would have to be changed if alcohol fuels were to replace gasoline on a large-scale basis.

The supply and production of alcohol fuels are also thorny issues — from both a logistical and an economic standpoint. According to the Department of Energy, existing methanol-producing capacity in the U.S. could supply under one percent of the energy consumption of the nation's transportation sector. Thus, a very large increase in production capacity would be required for methanol to serve a major portion of U.S. demand for highway transportation fuel.

Creating this new capacity would be an expensive proposition, since oil refineries cannot simply be retrofitted to produce methanol. Adequate feedstocks — most likely natural gas — would also have to be made available.

The outlook is similar for ethanol production, which is economically viable today only because of federal subsidies to producers who use agricultural products as the feedstock.

The upshot: unless government were to provide economic incentives for the construction and operation of alcohol fuels plants, as well as the production of feedstocks, the nation couldn't produce large volumes economically in competition with foreign sources.

The only alternative — importing one or both of the fuels — would further erode the nation's energy security at a time when imports are already at a dangerously high level. It seems likely, for example, that any significant long-term supply of methanol would have to come from foreign countries with large reserves of natural gas. So the U.S. would simply be switching its dependence from foreign crude oil to foreign methanol. Importing alcohol fuels or feedstocks would also severely impact the nation's balance of trade — while leaving the power to set prices in the hands of foreign suppliers.

Distribution of alcohol fuels would create still another set of difficulties. Since much larger volumes would be needed to supply the nation's vehicles (as compared to gasoline), additional storage tank, pipeline and delivery capacity would be necessary.

Obviously, all of this new production and distribution hardware — as well as any needed changes in automobile components — would carry an enormous economic price tag. Not surprisingly, alcohol fuels would also be expensive at the pump. According to estimates from the Western Oil and Gas Association, motorists would have to spend up to twice as much — on an energy-equivalent basis — for methanol as opposed to gasoline. The price of ethanol would be similarly high.

Finally — and most importantly — widespread use of alcohol fuels would pose a far greater risk to public health and safety than gasoline.

"Methanol is acutely toxic," Scott explains. "Ingesting even small quantities can cause blindness or even death. Compounding the danger is an important characteristic: unlike gasoline, methanol is completely water-soluble. If leakage occurs and methanol enters the water supply, you've got a real problem. It can't be skimmed off like oil or gasoline." While less toxic than methanol, ethanol also mixes freely with water.

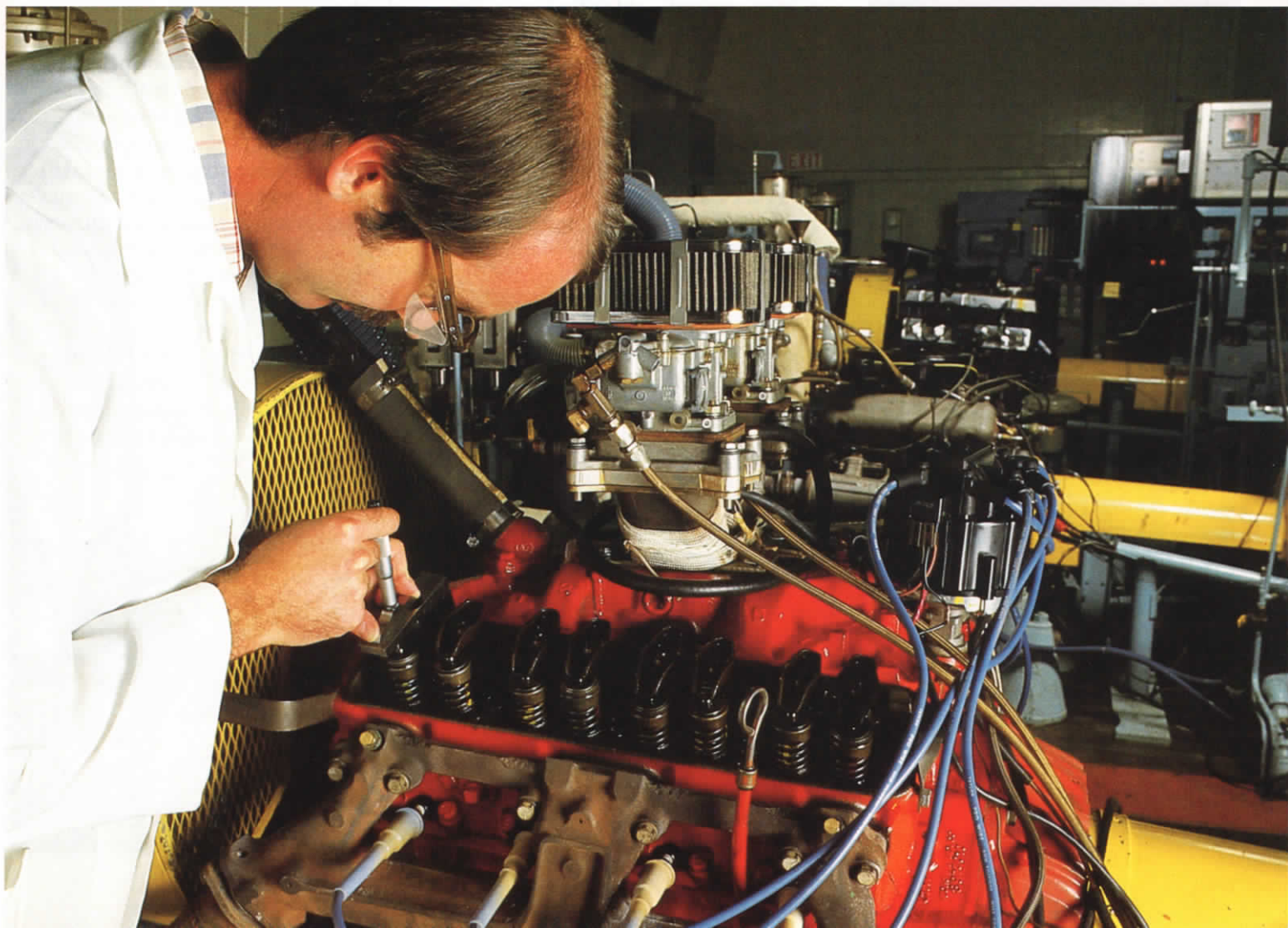
Another quality unique to pure methanol is that it burns without a visible flame — making fire detection and firefighting extremely difficult and dangerous.



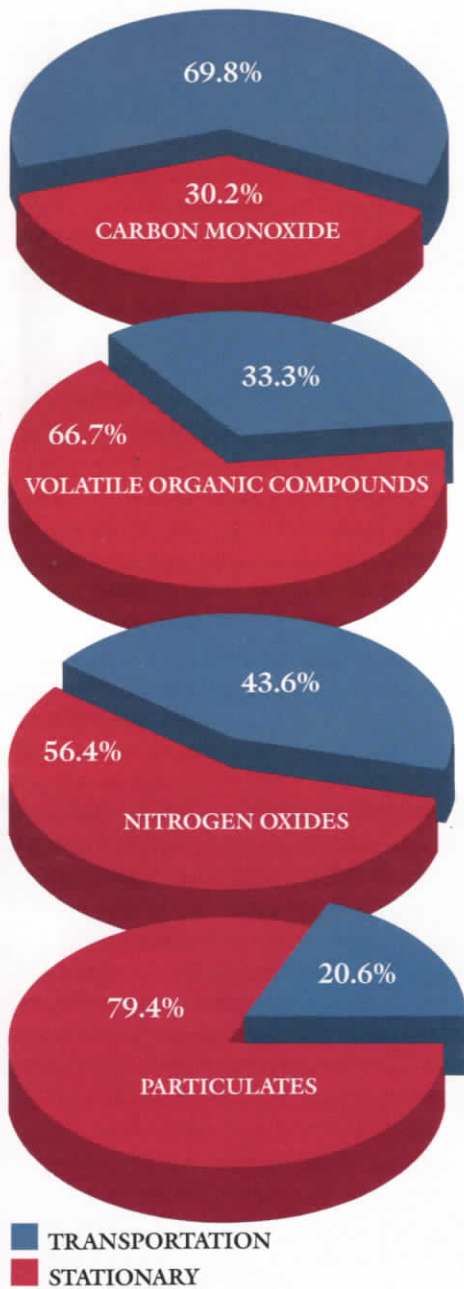




*Right, exhaust emissions tests are performed by scientists using a chassis dynamometer at the company's Fred L. Hartley Research Center in Brea, California. Below, a research scientist monitors fuel performance in a test engine. At left, a car altered to run on a methanol-gasoline blend is checked by Unocal technicians after undergoing a road test. Performance evaluations of methanol-powered test vehicles are being conducted by the company's Science & Technology Division, working in conjunction with the California Air Resources Board.*



## 1986 Man-Made Emissions Nationwide



Source: EPA estimates.

*Vehicle emissions — particularly carbon monoxide, and ozone “precursors” such as nitrogen oxides and volatile organic compounds — contribute heavily to smog formation. “Unocal agrees that increased attention should be paid to controlling vehicle emissions,” says Pat O’Toole, Unocal’s manager of legislative and regulatory issues. “But the company position on alcohol fuels is one of caution.”*

All of these uncertainties — environmental, technical, economic and safety-related — call for thorough study, as well as a careful weighing of the risks and benefits to be derived from a shift to alcohol fuels.

“The danger,” says Scott, “lies in viewing alcohol fuels as a panacea, and in rushing into ill-conceived crash programs with no scientific basis.”

Some alternative fuel studies are currently moving forward. The Department of Energy has initiated a project to assess the supply, production and transportation problems that would be involved in a large-scale shift to the use of alternative transportation fuels. And air modeling studies of ethanol and methanol emissions are being supported by various government regulatory agencies.

Unocal is also doing its part in studying alcohol fuels. Working in conjunction with the California Air Resources Board, scientists at the company’s research center in Brea, California are monitoring the performance of several test vehicles altered to run on a methanol-gasoline blend.

“Only through careful and systematic studies will the positive and negative factors regarding methanol as a motor fuel evolve and be understood,” says Dr. J. Wayne Miller, Unocal’s manager of product research. “Unocal is using the methanol test cars to help advance this understanding so that accurate technical and economic decisions can be made.”

What studies like these will ultimately reveal is not yet known. But one thing is already clear. Even if alcohol fuels were shown to have no negatives whatsoever, they could not meet the challenge of improving our nation’s air quality alone.

“There certainly may be a place for alcohol fuels in the effort to achieve cleaner air,” says O’Toole. “But we think the approach needs to be much more comprehensive.”

In Unocal’s view, the following four-point program would be a good start:

- *Take a regional view.* The air quality problem is not the same in different cities and regions. Air quality deadlines and measures imposed under differing circumstances should not be identical either.

- *Analyze the full impact of air quality improvement measures.* The goal should be to reduce the amount of air pollution to which people are actually exposed, rather than merely to reduce air emissions without regard for cost or health benefits.

- *Control all sources of emissions.* Items like fireplaces, water heaters and leaf blowers should be subject to control as well as cars, power plants and refineries. Small businesses such as dry cleaners and bakeries should also be controlled. This approach is particularly needed in those areas where the total emissions from a multitude of smaller sources clearly impact air quality.

- *Focus on high-payoff measures.* All proposed regulations and controls should be ranked and selected on the basis of cost per unit of air quality improvement achieved. Strict vehicle inspection and maintenance programs, for example, could produce significant air quality improvements at relatively little cost. So could ride-sharing and improved traffic management programs.

The point, emphasizes Pat O’Toole, is that there are no magic, quick-fix solutions to the challenge of cleaning up our nation’s air. “Ultimately, this is a task that’s going to require a careful, logical and — above all — a comprehensive approach.” 76

# An Oil Boom Remembered

When Pure Oil Company began seeking the leasing rights to property in Richland County, Illinois, competing oil companies dismissed the county as land suited for planting and plowing, not drilling. But Pure's interest, supported by extensive geological study, sparked a regional oil boom that helped lift the community out of the throes of the Great Depression.

In July, Richland County residents celebrated the golden anniversary of that oil boom, paying tribute to the efforts of Pure Oil and Unocal, which merged in 1965. Held in the town of Olney, the anniversary ceremony included a picnic dinner and a performance from a local orchestra. More than 300 Richland County residents attended the festivities.

"With the advent of the oil industry, the economy in southern Illinois began to turn around," said Graydon H. Laughbaum, Jr., the Oil & Gas Division's Central Region vice president, speaking at the ceremony. "Some of the oil field jobs paid as much as \$400 to \$500 per month. That was a king's ransom in those grim days — three or four times the average wage in the county during the Depression."

The roots of Olney's oil boom can actually be traced to an oil discovery in 1927, Laughbaum told the gathering. A discovery in Michigan that year spurred Pure's chief geologist, Theron Wasson, to explore the Illinois Basin for prospects.

For six years, Pure's geology staff researched the area's oil history, studying reports on old wells and dry holes and compiling data from the office of the state geological survey. Subsequent studies, including seismic surveys, all supported Wasson's hunch that the basin's oil resources were plentiful. Previous explorationists, who originally discovered oil in the basin in 1886, hadn't even approached tapping the area's potential. The reason was they simply hadn't drilled deep enough.

In 1936, Pure Oil singled out a 40-mile-long stretch of the basin that showed the most promise — the Clay City anticline. Once this land was targeted, the company began quietly organizing a land leasing coup. As the only oil company that recognized the basin's potential, Pure Oil was intent on playing the leading role in the imminent oil boom.

*Below, Pure Oil employees load up building materials at the Olney area fields in Illinois in 1945. Today, the area remains a steady oil producer for Unocal.*



“The Pure land department did its job with military efficiency,” Laughbaum said. “In three days, Pure’s land men leased 180,000 acres. A scout from a rival company finally showed up a few days later, but by then it was too late. Land owners were standing in line to sign leases with Pure.”

The efforts of the land men resulted in the ultimate lease of 250,000 acres to Pure Oil. When Pure drilled the first two wells — one near Cisne and the other near Clay City — each produced more than 100 barrels per day. Six months later, in May of 1937, the company spudded a well on farm property near Olney. The well produced 2,643 barrels of oil in its first 24 hours.

By the end of February 1938, the company had completed 130 wells in the area. In the first three years following the initial discovery, Pure averaged a new well every other day in the Olney area fields, which extend approximately 40 miles on a northeastern to southwesterly direction and cover a width of about 10 miles.

Production in the Olney area began to decline after 1941, the year wells pumped more than 11 million barrels of oil at rates of 30,000 barrels a day. But the introduction of waterflooding arrested the slide in the 1950s, and for more than a decade production was maintained at about 10,000 barrels per day. The production fell again in 1977, when the area averaged only 3,000 barrels per day.

This decline, however, didn’t foreshadow the end of Olney’s oil producing days. “To paraphrase Mark Twain, rumors of the death of the Olney area oil fields were exaggerated,” Laughbaum said. “New drilling techniques that employ fracturing agents have given the fields new vitality.”

Unocal’s commitment to Richland County and belief in its longevity as an oil producer remain intact today. The crowd assembled for the anniversary ceremony wasn’t restricted to celebrating past glory days alone. The county remains a steady oil producer today.

Unocal now operates 103 wells in Richland County, which produce 800 barrels of oil per day. All together, Unocal operates 432 wells in all of the Clay City anticline, which produce 2,700 barrels a day. The anticline lies within Richland, Clay, Jasper and Edwards counties.



*For more than 50 years, oil production has boosted the Richland County economy. The current drought underscores the value of the oil industry to the region.*

In the past three years, Unocal has drilled 75 new wells in the basin and has renovated or recompleted 66 more. The current drought has accentuated the oil industry's economic value to this part of America's bread basket.

Unocal's annual payroll for the area is \$2.2 million, and each year the company invests about \$5 million into local operations. "Obviously, this region remains firmly in Unocal's plans," Laughbaum assured the audience. "We plan to drill 14 new wells this year."

Despite the long-time oil production, Richland County still looks more like part of the vast midwest farm belt than oil country. The presence of the oil industry is apparent only in the relatively few pumping units scattered throughout the county. This low-profile approach is no accident.

To retain the county's rural nature, characterized by lush corn fields and weathered barns, Unocal has adhered to a policy of keeping as much distance as possible between wells. "This foresight has allowed agriculture and oil production to co-exist peacefully for half a century, to the betterment of the region," Laughbaum noted.

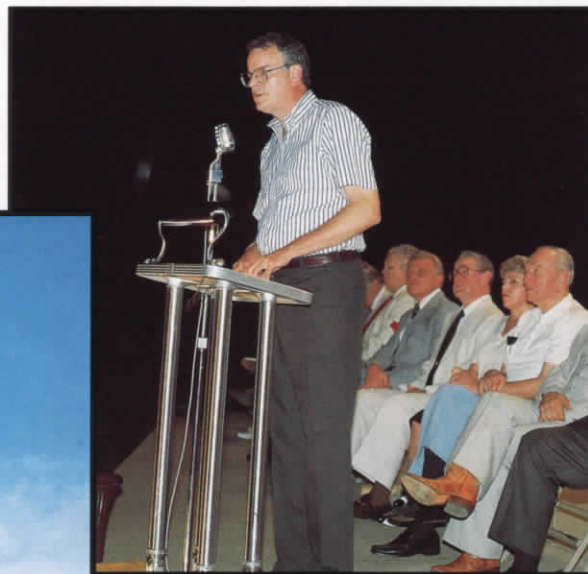
During a tour of the Olney area fields, Laughbaum expressed enthusiasm for what he saw. "This patch is very much alive," he said after viewing more than a dozen pumping units. "And that's encouraging because these fields are a very important part of the Central Region. Their daily production represents about 7 percent of the whole region's output."

The continued success of the fields can be attributed in part to infill drilling, says Merle Steckel, district engineer. "We've found some new deeper reservoirs, and in the process we've discovered oil that was bypassed in shallower zones," he explains.

Development work is likely to continue prolonging the fields' prominent role in the Central Region. "We've got a significant number of areas under lease, and there may be room for still more infill and step-out wells," says Robert Shurtleff, district operations manager. Moreover, drilling and completion costs have dropped, so investing in Olney's new prospects will yield an even higher return.

"Now we can produce oil here for a little over \$5 a barrel," Shurtleff says. "And we've got a team of experienced, dedicated and hard-working employees in the field to help us take full advantage of this."

Clearly, the oil industry has become an established presence here in Richland County. "As an institution, we may not be entrenched quite as firmly as the white squirrels for which Olney is famous," Laughbaum told the gathering. "But we've been here a long time, and we expect to be here for a good many years to come." 76



*Above, Unocal's Graydon H. Laughbaum, Jr. greets more than 300 Richland County residents gathered to celebrate the golden anniversary of the area's oil boom.*

# Giving Something Back

Before the novelty of his retirement had time to wear off, former Unocal executive Bill Barber resolved to research a subject he had never given much thought — gerontology. Intent on learning about the problems confronting the elderly, Barber, then 63, spoke with gerontology experts and pored over results of a survey administered to local seniors.

But Barber's status as a retiree hadn't stirred this sudden curiosity about life in the twilight years. In fact, the former Unocal manager of management resources and development was doing homework for a new career — volunteer consulting for the Executive Service Corps of Southern California (ESC). Barber hoped that by learning more about gerontology, he could better serve one of ESC's clients — the Pasadena Senior Center.

ESC volunteers are retired executives from middle or upper management who act as business consultants to nonprofit organizations in Southern California's Los Angeles, Ventura and Orange counties. Currently, Unocal is represented in ESC by 14 retirees, more than any other company. The ESC roster includes 225 consultants.

"ESC provides an opportunity for retirees to continue working in a field they like and to continue having some regimen in their life," says Barber, who now assists in ESC's recruiting efforts. "It's a way of keeping from feeling cut off, from feeling that our usefulness to society is over because we're retired." Barber retired in December 1985 after 37 years with Unocal.

The beneficiaries of ESC's pool of talent and experience are involved in either social services, cultural affairs, the arts, health or education. The nominal one-time fee ESC charges for its services can vary from \$100 to \$1500, depending on the resources available to the client organization. Since 1981, ESC has helped more than 125 nonprofit organizations in Southern California. ESC, itself a nonprofit group, is patterned after the International Executive Service Corps, which for over 20 years has placed retired executives in more than 10,000 projects in 84 countries.

The Pasadena Senior Center enlisted ESC's aid in 1986, after an expansion of services brought the center's organizational shortcomings to the surface. The center offers educational, recreational and social services to adults over 50.

"We needed some direction and outside, objective views," explains Betty Barnett, the center's executive director.

After probing into the center's operation, Barber and his partner made several recommendations. Among them: the board of directors needed to set long-range goals, formulate a long-term budget, improve communications with Barnett and the city of Pasadena, and hire accounting consultants.

Implementing these recommendations has substantially improved operations at the Senior Center. "Communication between the board and me is much clearer now," Barnett says. "And we now have a more active and unified board of directors."

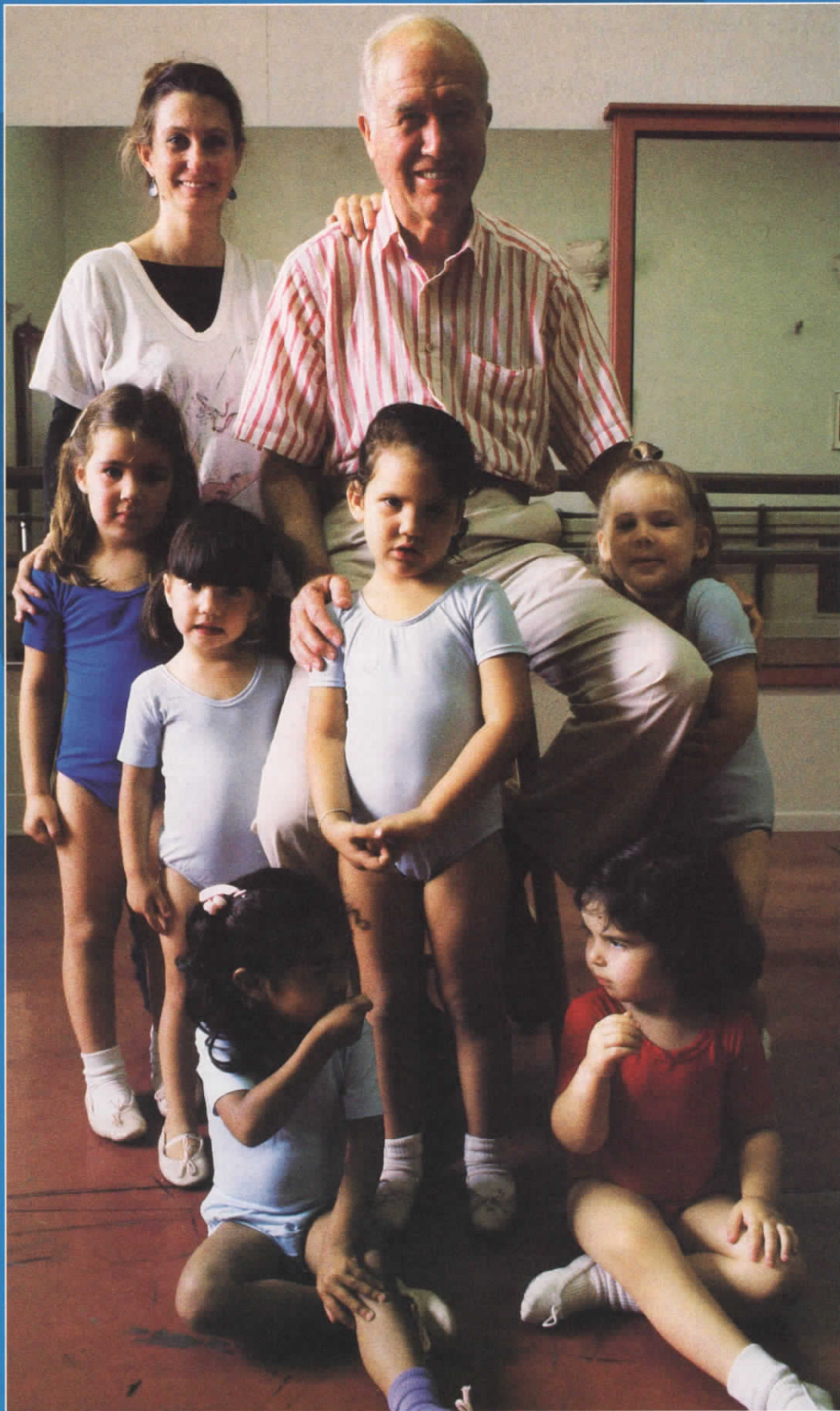
The organizational problems that beset the Pasadena Senior Center are not unique in the world of nonprofit organizations. Such problems often can be attributed in part to a lack of business management skills among professionals in these organizations, Barber says.

But, he acknowledges, managers in nonprofit organizations often face a challenge that's foreign to the business world — how to draw the best performance out of volunteer workers.

"There's no pay involved, so the carrot dangling from the stick doesn't work," he says. "The chief motivation must be the challenge and the social aspects of the job."

*Below, aspiring educators at Pasadena's Pacific Oaks College discuss teaching methods. The college has enlisted retiree Robert Lamb's help with its finances. Right, retired advertising manager Dick Davis, whose advice helped the Pasadena Civic Ballet broaden its community interest, is shown with dance students.*





Another characteristic common to managers of nonprofit groups is inadequate concern for budgeting and planning, says ESC volunteer Al Totten. "I wish the term *nonprofit* could be removed from our vocabulary," says Totten, a former Unocal corporate manager of industrial relations. "The term tends to precondition certain attitudes. As a result, many vital management tools—such as annual budgeting, strategic planning, outlining measurable goals and conducting year-end evaluations—are dismissed by directors of these organizations as unnecessary."

Totten retired two years ago after 36 years with Unocal. He recently completed his fifth ESC assignment—evaluating the employee relations at the Chinatown Service Center in Los Angeles, a social services agency aimed primarily for Asian immigrants and refugees. Totten wasted no time getting involved in ESC after leaving Unocal. In fact, he started work on his first ESC project the same day his retirement became effective.

"I looked at ESC's objectives and decided it would be a good way for me to use my experience and keep busy," Totten says. "Yet, ESC projects aren't a day-to-day demand on time. We do the job at our own leisure." Totten devotes an average of six hours a week to each project, with a typical assignment spanning six months.

Totten acknowledges that while still working at Unocal, he viewed his approaching retirement with a hint of apprehension. "My role as manager of industrial relations was extremely active," he explains. "The question was whether I could shut the activity valve off abruptly. I felt that I needed an outlet." Totten learned about ESC from Barber, a long-time associate.

Totten adds that ESC also has its social rewards, because the consultants always work in pairs. "I enjoy the team approach," he says. "Not only does it bring together more skills, it brings together people who haven't known each other before." Volunteer consultants come from a variety of management backgrounds—general management, finance, marketing, public relations, personnel and law, to name a few.

Because of the diversity of expertise available, the consulting work can be highly specialized. When the Pasadena Civic Ballet Company turned to ESC for help in broadening its community support, the organization assigned Dick Davis—Unocal's former manager of advertising and sales promotion—to the case.

In spite of costly newspaper advertising, local interest in the dancers had been lagging. And spurring community interest was essential to stimulating funding. The dance company needed to cover the expense of costumes, scholarships, dance instruction and special projects—such as a trip the members made to China as part of a cultural exchange program.

Davis advised the company to rely on direct mail for self-promotion, rather than advertising. "A lot of people think that if you advertise an event, people will come," Davis explains. "But advertising isn't always the answer. It can be more effective to zero in on current supporters and, using a demographic study, develop a direct mail campaign."

Davis and his partner also concluded that expanding the board of directors and involving local youth and service groups could boost performance attendance and fund raising.

"The Executive Service Corps gave us some direction for finding new avenues to raise money," says Elly Charlotte Van Dijk, the company's artistic director. "It's a fantastic idea to have retirees helping nonprofit organizations. We don't have the funds to hire other consultants."

Normally, an ESC consultant's involvement with the client organization ends with the delivery of a final report. Sometimes, however, board members will ask a consultant to help implement the recommendations. Such was the case with Robert Lamb who, after six months of probing and making recommendations, developed a personal interest in his client—the Pacific Oaks College and Children's School in Pasadena. The former Unocal manager of accounting research is now serving a three-year term on the finance committee of the college's board of trustees. The college specializes in training teachers and also operates a children's school on campus.

When Lamb began consulting for Pacific Oaks last year, it was in the middle of a general restructuring prompted by the threat of losing accreditation. In 1985, an accreditation team had placed the college on probation because of a lack of academic rigor and faculty development—weaknesses that stemmed from inadequate management.

Before delivering their final report, Lamb and his partner spent five months interviewing students, board members, faculty and even disgruntled former employees. "We were given a totally free hand," says Lamb, who worked at Unocal 37 years.

What resulted were more clearly defined personnel and management procedures, and tighter financial controls. Lamb also assisted Pacific Oaks in hiring a qualified controller and computerizing the bookkeeping. "We were delighted with the Executive Service Corps' work and their recommendations," says Katherine Gabel, current president of the college.







*Above, School Board President Robert Creek, a former Refining & Marketing Division vice president, visits a campus in Illinois' Palatine-Schaumburg High School District 211. Right, retired manager Al Totten and administrators at the Chinatown Service Center in Los Angeles drop in on a map reading class for Asian immigrants. Facing page, an art student adds finishing touches to a project at the Pasadena Senior Center, where retiree Bill Barber helped improve budget and management procedures.*





While ESC is using the experience of retired executives to help nonprofit groups sharpen their management skills, another organization is doing the same for small businesses — the Service Corps of Retired Executives (SCORE). And since half of all small businesses fail within their first three years, sound business management often means the difference between a thriving enterprise and the loss of someone's life savings. A national organization, SCORE is sponsored by the Small Business Administration.

During Forrest Elleman's most recent SCORE case, the former Schaumburg-based general manager of distribution and product supply consulted for a business owner who made a costly error in management — she failed to budget for her own salary. Instead, she had assumed that she could derive her wages from earnings left over after meeting payroll and paying all the bills.

Consequently, the five employees of the woman's shop, which specializes in skin care and electrolysis, outearned their boss. "She didn't understand that business owners must pay themselves, because they too have a market value," says Elleman, who retired after 33 years with Pure Oil and Unocal.

But after Elleman's assistance, the 35-year-old owner, who had poured her life savings into the shop, regained control of her business. Not only did she draw up a budget and five-year plan that provided for her own salary, she raised production by writing formal job descriptions and implementing production quotas for her employees.

Although the shop's troubles were rather easily resolved using basic business principles, the situation called for an outsider's fresh perspective. "Most small business owners are unbelievably hard working," Elleman says. "You wouldn't believe the number of hours they put in. But they get so busy, they're too involved to see things objectively."

*Left, retiree Carl Bowden gathers up donated food to be distributed to the needy in California's Orange County. Right, a student enjoys a break from the classroom at the school run by Pacific Oaks College.*

ESC and SCORE are merely two examples of how nonprofit groups are tapping the talents of Unocal alumni. The rewards of volunteerism are often as close as the neighborhood hospital or youth center, and the needs of these groups are as diverse as the skills Unocal retirees can offer.

When Robert Creek retired in 1986, there was never any question about how he would fill the extra hours. The former Refining & Marketing Division vice president of administration would simply have more time to devote to his other administrative role — school board president. For 19 years, Creek has been president of the school board for Illinois' Palatine-Schaumburg High School District 211.

In 1986 and '87, President Reagan hosted Rose Garden receptions to recognize the achievements of one of the five district schools, which routinely earn high marks from the federal Department of Education. "I've coined a motto for our school board," Creek says. "Expect more, get more."

And these higher expectations have translated into more stringent academic standards. Under Creek's leadership, the board has raised graduation requirements for English, math, science and foreign language. The payoff has been substantial. At one of the high schools, 90 percent of the graduates proceed on to college. Moreover, the district dropout rate is very low, Creek says.

As board president, Creek's concerns include approving district budgets, negotiating contracts with the teachers' union and keeping curriculum current. He also occasionally travels to Springfield, Illinois to meet with state legislators to discuss public education issues.

But Creek's involvement in education doesn't end with his public office. In addition to recruiting students for his alma mater, the Massachusetts Institute of Technology, he is a volunteer treasurer for the Clearbrook Center, a community center for physically and mentally handicapped children and young adults. "My volunteer work has provided a good way for me to get to know my community," Creek says. "I've really enjoyed it."

Many Unocal retirees view the end of their careers as an opportunity to make a deeper commitment to their communities. A life of leisure alone can have its drawbacks.

"When I was working full-time, I set aside the weekends for recreation," explains Carl Bowden, a former manager of recruitment and college relations. "But after I retired, playing golf, traveling and reading weren't enough for me. I wanted to be more productive."

Bowden, who retired in 1984 after 44 years with Unocal, now volunteers for Share Our Selves (SOS), a relief agency that provides food, medical care, clothing and financial assistance to the needy in California's Orange County. Based at the Rea Community Center in Costa Mesa, SOS helps an average of 20,000 people per month. The 18-year-old organization is staffed entirely by volunteers and operates primarily on private donations.

"After you work here just two or three days, you really understand the big picture," Bowden says. "By helping to provide for the immediate needs of the underprivileged, we can give them a better chance to become productive citizens."

Because government subsidies for relief programs have fallen victim to fiscal belt tightening, the need for volunteers continues to climb. Not surprisingly, Bowden — the retired recruiter — has persuaded some friends to lend their support.

"I think there's a special need for all of us to do what we can for our communities," Bowden says. "I get a lot of personal satisfaction from my volunteer work. And I enjoy the social aspect, too. We're helping people who are truly in need, and we're doing it with a sense of comraderie." C.S. 76





## RESTORING A LANDMARK

Nine oil pioneers were seated in an office on the second floor of a brand new brick and sandstone building in the rural town of Santa Paula, California. The room had a large oriel window which offered them a spectacular view of oil-rich South Mountain. The year was 1890, and this two-story building located on Main Street must have impressed the town's 1,000 residents. Back then, the only other buildings on the unpaved street were wooden, western-style shacks — the type that were hurriedly and inexpensively built.

These ambitious men, however, had bigger plans for their structure. As representatives of three independent oil companies, they were about to sign incorporation papers to form the Union Oil Company of California, now Unocal Corporation — the twelfth largest oil company in the nation. And this modern building, which housed a hardware store and a post office on its first floor, was to serve as Unocal's home for the company's first decade.

*At top, fine detailing embellishes the Santa Paula building's interior. Right, the century-old structure as viewed today from across Main Street.*

Although the growing enterprise moved its headquarters to Los Angeles in 1900, Unocal never forgot its roots in the town of Santa Paula. In fact, the building — which has continued to house Unocal offices through the ensuing years — will be the centerpiece of the company's centennial celebrations in October of 1990. Unocal is completely renovating the structure in time for the festivities. The project includes an upgrade of the oil museum currently located on the first floor, and a restoration of the second floor's offices to their original turn-of-the-century appearance. Further, construction of a new building to enlarge the museum's exhibition area is under way.

Unocal Chairman Fred L. Hartley announced the refurbishing plans at a kick-off ceremony held in Santa Paula this spring. Among the guests were President and Chief Executive Officer Richard J. Stegemeier, Executive Vice President of Energy Resources Ray Burke, and Refining & Marketing President Roger Beach. Also present were representatives of the Santa Paula Historical Society, several county and local officials, and Oil & Gas Division employees who are based in Santa Paula.

"We at Unocal are very excited about this project," Hartley told the gathering. "The restoration is an appropriate way to commemorate the long and successful relationship our company has shared with Santa Paula."

Santa Paula Mayor Carl Barringer expressed his gratitude in a proclamation that commended Unocal for preserving a piece of Santa Paula's history. "I'm thrilled with the idea," Barringer said. "Unocal's plans tie right in with the city's current downtown preservation goals."







**V**entura County Supervisor Maggie Erickson praised Unocal for its devotion to the project. “The enthusiasm of those involved in the restoration is very impressive,” she said. “The refurbishing of a historic landmark is an incredible gift to Ventura County.”

Addressing the audience, Santa Paula historian Mary Alice Henderson chronicled Unocal’s influence on the town’s early economic growth. “With the formation of Union Oil Company, Santa Paula began to thrive. The population nearly doubled between 1890 to 1900, increasing from 1,000 to 2,000 residents,” Henderson said. “Over those 10 years, Union Oil lent the town pride and optimism.”

Although Ventura County was the earliest oil-producing region in California, oil didn’t become a truly profitable business there until the late 1800s. Wildcatters discovered oil in the region as early as the 1850s, but many left in frustration when the wells they drilled produced only small quantities. Unocal’s co-founders, Lyman Stewart and Wallace Hardison, toughed it out during the lean years and eventually drilled producing wells in 1884. By 1887, they had built their first refinery in Santa Paula. The small plant produced 14,000 barrels of petroleum products per year.

“As more fields were developed (by Unocal), a variety of jobs opened up,” Henderson noted. “People literally poured into town.” Henderson has a special interest in Unocal’s history because her grandfather, William Orcutt, was one of the company’s earliest employees.

A Santa Paula native, Orcutt became the oil industry’s first professional petroleum geologist. Throughout the industry, he is commonly referred to as the “father of modern oil geology.” Orcutt had an engineering and surveying office on the second floor of the Santa Paula building.

Since Orcutt’s time, the building has been occupied continuously by Unocal employees and currently houses the Ventura area production office. During the restoration, employees will be relocated to Ventura.

“Once the refurbishing is completed, the Main Street building will house a small operational office for Unocal’s Oil & Gas Division,” says Ray Burke. “It’s rare for any 100-year-old company to continue to own and maintain a working office in its original headquarters. We’re very pleased we have the opportunity to do so.”

In 1986, the National Register of Historic Places recognized the Santa Paula structure as a historic landmark. The designation was achieved largely through the efforts of area production superintendent Roger Dombrowski, who recently transferred to Moab, Utah.

“I became fascinated with the building’s history when I moved to Santa Paula seven years ago,” says Dombrowski, whose office was in the Main Street building. “Working in the same surroundings as our founding fathers is really special. I feel as if I’m carrying on our company’s history.”

“I love the feel of this building,” adds Walker Kozar, area production technician. “I’m a country boy and this place has that comfortable country feeling. It creaks and groans a little, but these noises remind you of all the history that took place here. It’s magical.”

An impressive relic of the late Victorian era, the building is Ventura County’s finest commercial example of Queen Anne architecture — a style characterized by exquisite detailing and stone work.

The structure features a cantilevered tower and four bay windows, each with ornately designed arched entryways. The second-floor offices have 12-foot ceilings and eight-foot doors, complete with elaborate cast iron hinges and doorknobs. The woodwork is all solid oak and was shipped around Cape Horn in the late 1880s from the Eastern seaboard.

Each office is furnished with its own working fireplace adorned with beveled mirrors and delicate Italian tiles depicting princesses, frogs and sparrows. Hand-carved hearths made from the imported oak also embellish each fireplace.

Downstairs is the California Oil Museum, recently renamed the Unocal Oil Museum. Since its opening in 1950, the museum has offered visitors a chance to view the early days of California’s oil industry. A sampling of hand-forged equipment, old photographs, letters and oil products are among the exhibits. During the past four decades, the museum has enjoyed a long-standing popularity, attracting thousands of visitors each year.

“At the time we opened the museum, we had no idea it would interest so many people,” says Bob Daries, retired chief draftsman for Unocal’s Western Region. A Santa Paula native, Daries was instrumental in collecting artifacts from abandoned well sites and designing the museum’s murals. Former area production superintendent Clarence Froome had the original idea to preserve Unocal’s history in a museum. “Clarence wanted it completed by our sixtieth anniversary in 1950,” says Daries.



*At top (from left to right), Unocal President and Chief Executive Officer Richard J. Stegemeier, Ventura County Supervisor Maggie Erickson, Santa Paula historian Mary Alice Henderson, Unocal Chairman Fred L. Hartley, designer Al Fiori and Mayor Carl Barringer. Above, the building's stairwell invites visitors to view the top floor. Right, an oriel window graces the historic office where Unocal's incorporation papers were signed.*



*At top, highlights of the structure's exterior. Above, a rendering of the building and museum addition as they will look when the renovation project is complete. Work is scheduled to be finished in time for Unocal's 100th anniversary in 1990.*





“A few days before the anniversary celebration, Clarence pointed to the museum’s east wall and said, ‘Bobby, draw a picture,’” Daries recalls. “I asked him what kind of a picture, and he said, ‘Something about the old days.’ So I painted a scene with horses carrying an old drill pipe towards the mountains. The paint was still wet when the museum opened.”

In preparation for another anniversary, the museum is once again a focal point. Probably the most significant aspect of the refurbishing plans is the museum’s expansion. With the new structure, Unocal will more than double the exhibit space from about 2,600 square feet to 5,600 square feet. The building will be added to house the museum’s prize exhibit, a wooden cable-tool drilling rig, which currently takes up a good portion of the floor space. The giant rig, one of the few remaining intact from the nineteenth century, is 65-feet long, 15-feet high and 12-feet wide.

“The structure we’re building for the rig will resemble an old pump house and will be adjacent to the existing museum,” says Al Fiori, principal designer for the restoration project. Fiori, a partner in the Los Angeles design firm Fiori & Panas, adds that parts of the drilling rig will move electrically to offer visitors a visual idea of how this early equipment worked.

Unocal also plans to modernize the museum as part of the renovation. The existing exhibits will be encased in new displays offering greater accessibility. The company will also install a number of video terminals with recorded information about oil exploration and production. “We would like to make the museum a hands-on experience for visitors,” says Fiori.

**I**n addition, Unocal plans to convert the parking area next to the museum into a small, landscaped park for museum visitors. Surrounded by a wrought iron fence, the park will have a fountain, benches, trees and a lawn.

Once the renovation work on the building is complete, visitors will be able to tour the second floor — which will be furnished with antique desks, chairs and lighting fixtures.

“Entering this building will be like stepping back 100 years,” says Engineering & Construction project manager Joe Jenkins. “Everything that represents the twentieth century — such as air conditioners and electrical wiring — will be removed from view. We’ll take out anything that isn’t part of the original structure and replace items that were lost or changed over the years. By the time we’re finished, the building will be an authentic, century-old structure inside and out.”

Walker Kozar looks forward to giving his children a tour of the refurbished building. “My two girls enjoy coming here already; they love the fireplaces and the stairs. They’ll have a great time once it’s completed.”

The restoration of the Santa Paula building is a considerable undertaking, but the company views the project as a worthwhile endeavor.

“We feel that restoring this historic building is in line with our philosophy of taking the long-term view,” says Stegemeier. “By preserving this building, we are preserving our company’s heritage and that of California’s oil industry. In the future, the Main Street building will always serve as a link to Unocal’s past.” *H.S.* 76



# 48 HOURS ON PIT ROAD

Friday May 27, 1 p.m.

The sleek black Chevrolet Monte Carlo zooms down the speedway's backstretch and wheels into a turn, its wide tires hugging the steeply banked track. Coming out of the curve, the car accelerates past the huge grandstand of Charlotte Motor Speedway, trailed by half a dozen other cars that whiz by in a multicolored blur. The roar of powerful V-8 engines cuts through the air like a swarm of angry hornets.

Perched on a small tower that sits above his racing team's trailer, Richard Childress watches intently as driver Dale Earnhardt takes the shiny black bullet through its paces.

"Thirty-two seconds on that lap," Childress says, checking his stopwatch. "We're looking pretty good."

Mechanic Kirk Shelmerdine nods in agreement, jotting down a few notes on a clipboard. The two men continue to exchange words, all the while keeping their eyes glued to the track.

There are few sets of eyes in the world of professional stock car racing more practiced. Childress, in his early 40s, has been involved in the sport all his life — first as a mechanic and driver, now as owner of his own highly successful racing team. Shelmerdine, the team's chief mechanic at age 31, is regarded as one of the best in the business.

Their talents, combined with those of driver Dale Earnhardt and the rest of the Childress racing crew, have borne a lot of fruit in recent years. Indeed, the team has walked away with stock car racing's ultimate plum — the Winston Cup Championship — each of the past two seasons.

When Earnhardt slows and steers the car toward the track's infield garage area, Shelmerdine climbs down from the tower and heads off to meet him. Consisting of some 40 adjacent stalls set up in two rows, the garage area is a beehive of activity on this afternoon. Race cars in various states of wholeness — some ready to roll, others almost completely torn down — are tended by teams of uniformed mechanics. The blur of motion is accompanied by the din of gunning engines, clanging tools, whirring air guns, shouts and laughter. The heat coming off the engines and tires intensifies what is already a sweltering afternoon here in North Carolina.

As Earnhardt pulls into his stall, six mechanics instantly converge on the car. By the time the driver has pulled off his helmet and gloves, the car's hood has already been removed and one side jacked up for a tire change. Shelmerdine squats down to talk with Earnhardt about the car's handling and steering response.

The Childress team and the other competing crews have only two more days to prepare for Sunday's big event at the Charlotte Speedway: the Coca-Cola 600, a grueling endurance test which is the longest race on the National Association of Stock Car Racing (NASCAR) Winston Cup circuit. A 29-race series which runs from February through November, the Winston Cup is the premier circuit of professional stock car racing. Points are compiled based on a team's finish in each race, with the season-ending point winner crowned as champion.

Sunday's race in Charlotte comes at a critical point in the 1988 season. It's the second event of a seven-week period known as "the stretch" — an arduous series of races that takes competitors to tracks across the nation. By the end of the stretch, the season will be more than half over — and only four or five teams will still be in serious contention for the championship.

This brings a large measure of importance to the upcoming race — and the Childress team faces added pressure. Not only have they won the Winston Cup for the past two years, the crew is leading the pack in the 1988 point standings. But their lead is slim — and a lot of hungry drivers and teams are nipping at their heels. A poor finish in this race could knock the team out of first place. Come Sunday, over 175,000 avid stock car racing fans will be on hand to view the showdown.

3:30 p.m.

As the day's practice runs begin to wind down, Unocal's Dick Dolan and Bill Brodrick stroll across the infield toward the Unocal 76 station that sits adjacent to pit road. Here, all competing cars will be weighed and inspected just before the race, and their fuel tanks filled with Unocal racing gasoline.

Unocal's involvement with stock car racing dates back to the early 1950s, when Pure Oil (which merged with Unocal in 1965) began supplying fuel and lubricants to drivers at Daytona and other stock car race tracks. Since then, the company's link with racing has endured and expanded. Today, Unocal is the official fuel supplier for most of NASCAR's major events. Unocal's high performance motor oils, gear lubes and greases are also used by many of the top Winston Cup racers, including the Childress team.

"The exposure Unocal receives through our involvement in motor sports is tremendous," says Brodrick, Unocal's supervisor of automotive public relations. "When spectators see the 76 symbol on a car, a driver or at the track, it tells them that these professionals are depending on our products to help make them winners. That identification with champions carries over to every Unocal sales outlet."



*Clockwise from top right: Tire pressures are checked prior to the race, team owner Richard Childress (right) reviews lap times, chief mechanic Kirk Shelmerdine (center) and driver Dale Earnhardt (right) oversee engine adjustments, the race gets under way.*




Unocal's manager of automotive events and public relations Dick Dolan agrees. "Being the exclusive NASCAR gasoline supplier is very valuable for us in terms of name recognition," says Dolan. "The use of Unocal lubricants by many of the top racing teams is also a ringing endorsement of our products. 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."

The name identification takes on added importance because the racing products themselves are available to the general public. The same Unocal 20W-50 high performance motor oil used by NASCAR racing teams is sold to customers at Unocal service stations. The company also recently began marketing high-octane racing gasoline — both leaded and unleaded — to the motor-ing public in the south and midwest.

In the small office adjacent to the Unocal gasoline pumps, Dolan and Brodrick are met by Bill Joyner, the company's supervisor of automotive events and public relations. The three are well-known figures on the stock car racing circuit. They attend virtually every NASCAR Winston Cup race, dealing with the media and working behind the scenes to ensure that thousands of gallons of Unocal racing gasoline and hundreds of cases of motor oil and lubricants are on hand.

The trio also coordinates Unocal's promotional involvement with NASCAR. This includes staging special events such as the annual Unocal 76 Pit Crew Competition. Sponsored by the company since 1967, the competition — which is held near the end of each season — is open to all Winston Cup racing teams.

"It's a timed race in which the pit crews must perform a four-tire change and completely refuel their race car," explains Brodrick. "The event is always very popular with the pit crews and the fans." Last year, the Childress crew won the competition for the third straight time, setting a new record of 23.83 seconds.



After checking the weather forecast (which calls for continued sunshine and blistering heat) Dolan, Brodrick and Joyner spend some time discussing the upcoming race. Despite their constant exposure to the sport, the three are still excited by it. "The competition is very keen, and no two races are ever the same," explains Brodrick. "To me, that's excitement."

The consensus for Sunday's race: While Dale Earnhardt and the Childress crew are the ones to beat, several other teams and drivers are overdue for a win. "It's going to be tough out there in this heat," Dolan says. "It should be a heck of a race."

**Saturday, 9 a.m.**

In the garage, Kirk Shelmerdine and his team of mechanics are hard at work. Moving around the race car with quiet intensity, they resemble a team of expert surgeons — exchanging tools, trading comments and grabbing bites of sandwiches as they tinker away. Beside the car stands a huge tool chest that would be the envy of any backyard mechanic. A truck trailer filled with spare parts sits nearby.

Although each mechanic has a thorough understanding of all aspects of the race car, every man has a specialized role. This morning, two are hovered over the Monte Carlo's massive 358-cubic-inch engine, adjusting valves. Another mechanic is busy draining the radiator, while someone else replaces a set of brake pads. Still another crew member is hidden underneath the car, working on the transmission.

Viewed up close, the sleek vehicle with its huge V-8 engine looks awesomely powerful compared to the standard passenger car. And the engine is not the only thing different about this automobile. The car's interior is completely stripped down. There is only a seat for the driver, who reclines within a protective steel cage. The car also has no doors — the driver must climb in through the side window opening.

Perhaps the most obvious difference is in the tires. Large and bald, they are designed to lay down a coat of rubber and adhere tightly to the track. "The tires are extremely important," Shelmerdine says. "Each one has a specific width and thickness, and each must be inflated to a very precise pressure. Any variance can cost you speed and affect your steering."

Shelmerdine is a bit concerned about the tires. With temperatures on race day expected to crack 95 degrees, the track surface will be sizzling hot. That can make tire temperatures soar, causing blistering and blowouts. The danger will be magnified in a 600-mile race — 100 miles longer than a normal Winston Cup event.

"Six hundred miles is a long way to the checkered flag," Shelmerdine says. "Straighten those miles out and you could drive from Charlotte to Detroit. That kind of distance is tough on the equipment as well as the driver."

"It's tough on us, too," puts in mechanic David Smith. "I lost about 10 pounds in the pits here last year."

**11 a.m.**

Inside the team's trailer, Richard Childress is seated on a counter looking over the lineup sheet for Sunday's race. Qualifying for the race — in which each driver runs timed laps to determine his starting position — was completed earlier in the week. Dale Earnhardt turned in the seventh fastest lap — just over 171 miles per hour — out of 41 entrants. That will put him in the fourth row for the start.

"Starting position doesn't really mean that much," Childress says. "Not when you've got a driver of Dale's caliber."

Important as he is, the driver is only one component of the Childress racing team. Nearly two dozen people work full time on the crew, the core of which has been together for over six years. They're a cohesive bunch, who thoroughly enjoy the racing life. They are also committed to winning — and are serious and professional when it comes to pursuing that goal.

The team's headquarters, located just outside Charlotte, is a 31,000-square-foot complex that includes two machine shops, racks of spare parts, offices and a conference area. It's an enviable set-up, built on a record of success. But it didn't come easily. Childress founded his team nearly 20 years ago, serving as both driver and mechanic. He struggled for 12 years before the hard work began to pay off in winning races. The wins brought money and sponsorships — which led to more success.

"Sometimes I have to pinch myself to make sure all this is real," Childress says. "No one on our team has forgotten the tough times we had climbing the ladder. And remembering where we were keeps us hungry to win."

**3:30 p.m.**


Back in the garage, the pace is becoming more feverish as the final hour of practice begins. Earnhardt repeatedly takes the car out on the track, then returns for more adjustments. Childress is on the scene, observing and occasionally pitching in with a wrench or fetching a needed tool. But the show here is run by Kirk Shelmerdine, the team's boyish crew chief.

A life-long "engine jock," Shelmerdine knows race cars intimately. Seven years experience as the Childress team's top mechanic have given him the ability to stay cool and analytical under pressure. And the pressure involves more than simply making a race car run at top speed.

"NASCAR has very exacting specifications we have to adhere to," Shelmerdine says. "We also have to stay on the lookout for new techniques and concepts — anything that can give us an edge. If you stop innovating, you're going to get passed by."

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*Facing page, from top: The Childress car awaits the green flag in the starting lane, Shelmerdine confers with Earnhardt, fellow driver Sterling Marlin (left) wishes Earnhardt luck in the race.*



Toward that end, the team is continually testing new design and engine concepts — no matter how insignificant they may seem. “Any small gain you can come up with is important,” Shelmerdine says. “Winning in this game can hinge on tenths of a second.”

**Sunday, 7 a.m.**

Race day morning finds the crew giving the car its final pre-race going over. Engine builder Lou LaRosa is on hand, making a final check of the valve adjustments done the previous day.

LaRosa and his assistants have a crucial responsibility — they must build an entirely new engine for each race. Given the punishment they take, the engines simply can't be reused.

“In a typical race, an engine will turn at up to 8,000 r.p.m.,” LaRosa says. “Every moving part is pushed to its limit, and sometimes beyond.”

This means, of course, that lubrication is critical. “We use Unocal lubricants because they're simply the best,” LaRosa says. “We aren't going to use anything in our car that doesn't work and work well.”

**9 a.m.**

It's just over three hours to race time when Dale Earnhardt arrives at the team's trailer, surrounded by a knot of fans and autograph seekers. Although quiet and reserved by nature, Earnhardt has learned to cope with the constant attention that comes with being a champion race car driver. This morning he appears relaxed, and after huddling briefly with Childress he quickly dons his racing uniform.

A Carolina native, Earnhardt, 36, is at the pinnacle of his profession. Over the past five years he has won more Winston Cup races than any other driver. In 1987 he won 11 of the 29 Winston Cup events, finishing in the top five 21 times. He also took home over \$2 million in prize money, becoming only the second NASCAR driver in history to do so.

The 1988 Winston Cup season has begun just as auspiciously. Earnhardt has won two of the nine races held thus far, and once again sits atop the point standings.

“Some people think this has all come easily,” he says, “but it's very difficult to win consistently. There are so many good cars, teams and drivers out there. It takes real commitment, and fortunately everyone on our team has that.”

As the driver, Earnhardt is the most visible member of the team. It's a job that requires much more than mere driving skill. It takes physical and mental toughness, good instincts, superb reflexes and a lot of raw nerve.

“Driving at top speed for three or four hours is incredibly taxing,” explains Unocal's Bill Brodrick. “And remember, these guys are racing, often just inches apart. They have to be mentally alert all the time. Driving is also physically punishing. The temperature inside the car can get up around 130 degrees, so it's like sitting inside an oven. Three or four hours of that is an incredible strain — and often a race will come down to one critical maneuver at the very end.”

Earnhardt prefers not to dwell on the hardships. “I'm always itching to get out on the track,” he says, heading off to check the car. “I love it when the pressure is on, with one lap to go and everything on the line. That's where the fun is — especially when you win.”

**10 a.m.**

As the fans begin streaming into the grandstand, the Childress crew is busy setting up shop on pit road. Each team is allotted an area behind a metal railing — called “the wall” — where tools, spare parts, extra tires and fuel tanks can be laid out.

The most common reason for making a pit stop is to change tires and refuel. Minor repairs or adjustments can also be performed in the pits, but more involved work requires returning to the garage area — something all teams hope to avoid during a race.

Only six men per team are allowed over the wall during pit stops. Their movements must be well coordinated, and they must work fast: a four-tire change and refuel should take under 25 seconds. Expending just a few seconds more on a single pit stop can cost a team the race.

At the NASCAR trailer next to the Unocal station, several cars are undergoing pre-race inspections. After passing muster, the cars are pushed up to the pumps for fueling. The crews also fill up 11-gallon tanks for use in the pits. Each team is allotted three of the tanks, which are continually refilled at the pumps during the race.

At 10:30, the Childress team's car is pushed to the inspection area. Twenty minutes later it's out on the track, sitting in starting row number four. Childress, Shelmerdine and Earnhardt give the car a last going over, then drape it with a black nylon cover.

**12:30 p.m.**

“Gentlemen, start your engines”!

It's hard to tell what's louder — the angry roar of 41 powerful automobiles, or the crowd's enthusiastic response. The rumble can even be felt through the ground. Moments later the cars are in motion, snaking behind the pace car in restrained fury. After three agonizingly slow laps, the green flag is waved and the cars tear off in an explosion of sound, speed and color. The race is under way.

In pits, Childress and crew watch the first few laps intently, recording the times of each on a clipboard. Childress and Shelmerdine wear radio headphones for direct communication with Earnhardt. The talk is all business, focusing on the car's performance, racing strategy, problems or pit stop plans.

"We don't really talk much," Shelmerdine says. "Dale is so intent on driving that it's hard to get his attention."

After several laps, pole sitter Davey Allison opens up a slight lead. But Earnhardt is keeping pace, and has already passed two cars to move into fifth — right behind a pair of longtime rivals, Bill Elliott and Darrell Waltrip.

On the 20th lap, the first yellow "caution" flag of the day is waved after a car blows a tire. Under the yellow flag — displayed whenever debris of any kind is on the track — the cars must slow and remain in order behind the pace car. Most teams will use the opportunity to make a pit stop. Cars soon begin streaming into pit road, and Earnhardt's is among them.

The pit crew instantly springs into action, leaping over the wall like cats. One crew member mans the jack, while two change tires and two more handle refueling. In seconds Earnhardt is back on the track, roaring around to rejoin the cluster of cars.

The race stays tight through the first 50 laps, with Earnhardt nipping at the leaders' heels. But 10 laps later, disaster strikes. In the first of several wrecks that will mar today's race, five cars tangle up in the backstretch — and Earnhardt's is one of them. Miraculously, he escapes virtually unscathed. But the NASCAR officials rule that Earnhardt bumped another car, and penalize him five laps.

*Clockwise from top: The pit crew uses radio headphones to communicate with driver Earnhardt, gasoline tanks await filling at the Unocal station, the Childress pit crew in action, race fans fill the speedway's infield.*



In the pits, the crew members throw down their baseball caps in frustration. The penalty will effectively kill the team's chance to win the race. But they quickly shake the disappointment off. Now the task is to finish the race, and place as highly as possible to collect the most points.

"These things happen in racing," mutters Childress. "If we can finish intact I'll be satisfied."

2 p.m.

It soon becomes evident that a lot of cars won't be completing today's race intact — if at all. As feared, the intense heat is taking a toll on the tires. Barely a third of the way through the race, 16 cars have been knocked out in wrecks caused by blowouts.

By driving conservatively, Earnhardt has thus far avoided further trouble. The car is performing well, and the pit stops have gone flawlessly. "If only we hadn't gotten nailed with that penalty," Shelmerdine says with a shrug.

4:30 p.m.

Four hours into the race, the contest has become a struggle for survival. Tires have continued to fail, and several engines have blown as drivers push their cars too hard in the blistering heat. The garage area looks like a demolition derby show, as mechanics struggle to make the disabled cars driveable. The victims thus far have included Davey Allison, Kyle Petty and Bill Elliott. But Earnhardt continues to hang in, driving steadily. Largely through attrition, he has moved up to 20th place.

On pit road, the crews are sweat-soaked, sunburned and physically drained. Shelmerdine pulls off his headset and dunks his head in a cooler of ice. There is still one-fourth of the race yet to go — almost 100 laps.

"You can imagine how the drivers are feeling," crew member Ed Miller says as he carries an empty tank back to the Unocal station. "On days like this, I wonder why I'm out here."

5:30 p.m.

As the race — now five hours old — moves into its final 10 laps, the crowd stands and begins cheering. Darrell Waltrip has forged into the lead, with Rusty Wallace nipping at his heels. Earnhardt follows not far back; if not for the penalty he would be in the thick of the battle.

Finally, the cars begin the last lap. Wheeling into the final turn, Wallace tries to cut inside and pass, but Waltrip veers left and shuts the door on him. Moments later he takes the checkered flag as the winner of the 1988 Coca-Cola 600. Dale Earnhardt crosses the line a respectable 13th — a finish that will net him enough points to retain his hold on first place.

In the pits, the Childress crew shake hands and congratulate each other on running a good race. Their car was one of the few that finished the race with no major problems. Twenty-one of the 41 cars entered didn't finish at all.

"We didn't run as hard as we might have after the penalty," Childress says. "But finishing the race was more important. The car performed beautifully, and we didn't pop a single tire."

As the crew begins to pack up, a few gaze wistfully at the winner's circle, where Darrell Waltrip and his teammates are whooping it up. Shelmerdine is asked if it hurts to lose.

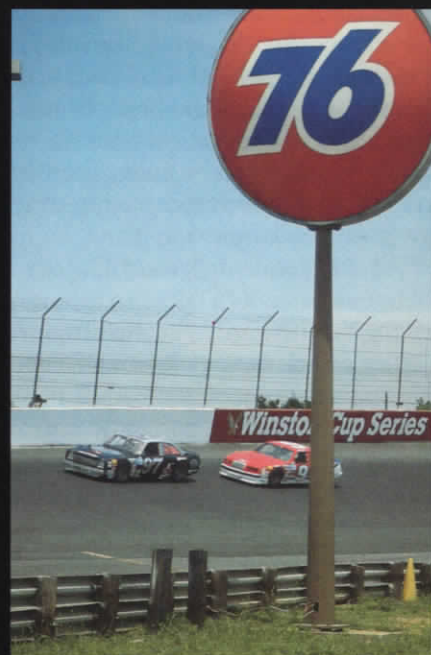
"Always," he says. "But the hurt never lasts very long. You load up the truck and move on to the next race. We'll be back at work 8 o'clock tomorrow morning."

Minutes later, Earnhardt and Childress come by to thank the crew. The two men look at each other and shrug.

"Tough break," Childress says, patting Earnhardt on the back.

"Heck," Earnhardt replies, managing a smile. "That's racing." T.S. 76

*"Racing is a very visible and effective product demonstration forum," says Tom Matthews, vice president, eastern marketing and national auto/truckstops. "When consumers see how well Unocal products perform in such a tough, competitive arena, it makes our name stand out." At right, race winner Darrell Waltrip.*





# UNOCAL 76

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- 35 YEARS Edwin H. Powell, Jr., Unocal Center
- 30 YEARS Herbert W. Klawitter, Unocal Center
- 20 YEARS Adelina L. Ayala, Unocal Center  
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Dena L. Bond, Unocal Center  
Mary K. Brown, Unocal Center  
Catalina Castro, Unocal Center  
Maureen M. Chappellie, Unocal Center  
Charles S. McDowell, Unocal Center  
Margaret A. Ritter, Unocal Center  
Peter C. Schaller, Unocal Center  
Neal E. Schmale, Unocal Center  
Doreen M. Taylor, Unocal Center  
Erik N. Thede, Unocal Center
- 15 YEARS Ann L. Best, Unocal Center  
Lynda C. Carnahan, Unocal Center  
Mukesh P. Gandhi, Unocal Center  
Nikolas R. Peacock, Schaumburg, Ill.  
William M. Richardson, Unocal Center  
Michael J. Russell, Unocal Center  
Dora L. Sibley, Unocal Center  
Steven A. Treese, Unocal Center
- 10 YEARS Hylajeane Barnett, Unocal Center  
William C. Bender, Burbank, Ca.  
Daniel A. Franchi, Unocal Center  
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## SCIENCE & TECHNOLOGY

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Alex Miller, Brea, Ca.  
Dennis L. Saunders, Brea, Ca.
- 15 YEARS Donald D. Gish, Brea, Ca.  
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- 10 YEARS David M. Dalesandro, Brea, Ca.  
Michele R. Dunham, Brea, Ca.  
Mary Barnum Eberhardt, Brea, Ca.  
Cathy A. Harlan, Brea, Ca.  
Wen-Ching Hsieh, Brea, Ca.  
Pamela K. Jones, Brea, Ca.  
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David C. Nichols, Brea, Ca.  
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- 30 YEARS George C. Allen, Jr., Houston, Tx.  
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Harriett M. Lutt, Pasadena, Ca.

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James L. Hart, Compton, Ca.  
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Charles W. King, Casper, Wy.  
John C. Lackie, Taft, Ca.  
Archibald M. Laurie, Carpenteria, Ca.  
Linval J. Magee, Hominy, Ok.  
Donald P. Monniere, Moab, Ut.  
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William M. Pollock, Worland, Wy.  
Donald R. Powers, Andrews, Tx.  
Robert G. Wheeler, Taft, Ca.

- 20 YEARS Patrick Boyd, Lafayette, La.  
Gary E. Carlson, Houma, La.  
Carbett J. Duhon, Jr., Houston, Tx.  
Nola Fox, Midland, Tx.  
Alan E. Freiberg, Mobile, Al.  
James E. Gagneaux, Jr., Houston, Tx.  
David J. Kinzelman, Houston, Tx.  
Oniel McGilbery, Houston, Tx.  
Errol P. Pierron, Houma, La.  
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William E. Pyle, Van, Tx.  
Craig K. White, Anchorage, Ak.

- 15 YEARS Timothy L. Barnes, Placentia, Ca.  
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Michael J. Broussard, Abbeville, La.  
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Colleen S. Burum, Ventura, Ca.  
Kenneth R. Ellett, Snyder, Tx.  
Sidney Madise, Sr., Mobile, Al.  
Refugio J. Marquez, Bakersfield, Ca.  
Timothy J. McMahon, Pasadena, Ca.  
Christopher D. Pettis, Placentia, Ca.  
Harold W. Piland, Port Hueneme, Ca.  
Albert P. Selph, III, Oklahoma City, Ok.  
Arthur C. Theriot, Houma, La.  
Maurene T. Thurman, Midland, Tx.

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John K. Andrus, Abbeville, La.  
Gerald C. Arceneaux, Lafayette, La.  
Deborah L. Bruce, Houma, La.  
Michael R. Brunet, Houma, La.  
Warren Call, Anchorage, Ak.  
Nelson L. Emery, Lafayette, La.  
James H. Etherton, Snyder, Tx.  
Lynn D. Gray, Anchorage, Ak.  
Stanley Y. Hanaoka, Unocal Center  
Hal L. Heitman, Ventura, Ca.  
Gemey H. Isenhower, Houston, Tx.  
Dwayne G. Jammal, Houston, Tx.  
Alexander Johnson, Jr., Houma, La.  
Tony Jones, Placentia, Ca.  
Randy J. Koliba, Van, Tx.  
James R. Leleux, Sr., Abbeville, La.

- Rodney D. Manz, Orcutt, Ca.  
Richard D. McCann, Cisne, Ill.  
Magdalena Morales, Pasadena, Ca.  
Ronald J. Morin, Bakersfield, Ca.  
Bruce A. Poret, Mobile, Al.  
Raymond J. Scheliga, Houma, La.  
Sam D. Sheets, Jackson, Ms.  
Darrell L. Smith, Hominy, Ok.  
Ronald C. Smith, Orcutt, Ca.  
George Stadnick, Anchorage, Ak.  
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Linda L. Thomas, Placentia, Ca.  
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- 25 YEARS John F. Imle, Unocal Center
- 20 YEARS James W. Abbott, Unocal Center
- 15 YEARS Carol A. Dezotell, Unocal Center
- 10 YEARS Randall D. Cooper, The Hague, Netherlands  
L. Wayne Krug, Unocal Center  
Robert E. Mortimer, Unocal Center  
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Soekarno Sumitro  
Suprijadi Suroso  
Kamrul Effendi  
Benyamin Minto Juwono  
Jantje Kamagi  
Sunarjo Kusuma  
Robby Lembong  
Mohamad Asyikin Noor  
Tom Partomo  
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Johanis Robert Suatan  
Roy Sumendap  
Herman Uda
- 10 YEARS Arief Rachmad  
Rusmin Sinang  
Sumardi Yusuf Abdullah  
Usman Bakri  
Ruslie Baktiar  
Anang Imansyah  
Tiro Kanto  
Muslimin A. Maning  
Achmad Ramli  
Simon Payung  
Markus Sampe  
Sumilan Setiawan  
Agus Suhadi  
Agus Susetyo

## Unocal U.K., Ltd.

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Pauline Stoten, London, England

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- 20 YEARS Walter C. Brietzke, Calgary, Alta.  
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Dale R. Pollock, Calgary, Alta.

10 YEARS Darrell Hicke, Calgary, Alta.  
William N. Ritchie, Calgary, Alta.

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10 YEARS Gregory A. Gritters, Imperial Valley, Ca.  
Thomas S. Powell, Philippines  
Michael T. Vaughan, Santa Rosa, Ca.  
Robert Wynhamer, Santa Rosa, Ca.

### Philippine Geothermal, Inc.

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Pablo B. Baroma, Jr.  
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Danilo V. Lucana  
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Arthur G. Likar, Chicago Refinery  
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Joseph B. Stucker, Schaumburg, Il.  
Edwin L. Wilkes, Beaumont Refinery

35 YEARS Donna J. Anderson, Columbus, Oh.  
Earl L. Ehresman, Chicago Refinery  
Milton R. Fulton, Portland, Or.  
Gene E. Hebrard, Portland, Or.  
Perryman G. McFarland, Beaumont Refinery  
Bert D. Moore, Beaumont Refinery  
James W. Sikes, Beaumont Refinery  
Jimmie E. Smith, Beaumont Refinery  
Billy G. Sturrock, Beaumont Refinery  
Charles E. Wells, Greensboro, N.C.

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Joseph W. Pourciau, Gueydan, La.  
George Wright, Jr., Walnut Creek, Ca.

25 YEARS Patricia R. Adams, Cincinnati, Oh.  
Bruce H. Anderson, Portland, Or.  
Luc J. Barrette, Romulus, Mi.  
James R. Bass, Atlanta, Ga.  
Harry D. Conner, Beaumont Refinery  
Melvin L. Dubois, Beaumont Refinery  
Raymond A. Franco, Portland, Or.  
Billy W. Gallander, Beaumont Refinery  
Ralph M. Gilbert, Schaumburg, Il.  
Howard K. Hoffman, Schaumburg, Il.  
James A. Jones, Beaumont Refinery  
John P. Nelms, Memphis, Tn.  
Walter S. Tazelaar Southfield, Mi.  
Ronald E. Thompson, Beaumont Refinery  
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Linda J. Travers, San Francisco Refinery  
Larry D. Williams, Dayton, Oh.

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Frank B. Anderson, Beaumont Refinery  
Gary N. Appel, Schaumburg, Il.  
Gloria L. Balderrama, Los Angeles, Ca.  
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Herman Baskett, Cincinnati, Oh.  
George A. Bobo, Los Angeles Refinery  
Raymond M. Braghetta, Schaumburg, Il.  
Robert L. Burson, San Jose, Ca.  
Stanley B. Coleman, Beaumont Refinery  
Francis R. Enbysk, Portland, Or.  
Darwin P. Gambrell, Beaumont Refinery  
Donaldo P. Gonzalez, Richmond, Ca.  
Nelson J. Hebert, San Francisco Refinery  
David H. Heil, Los Angeles, Ca.  
Robert E. Helton, Chicago Refinery  
Barbara B. Huffine, Schaumburg, Il.  
Frances L. Johnson, Van, Tx.  
Elizabeth B. Kang, San Francisco, Ca.  
Allen K. Kepaa, Honolulu, Hi.  
I. Deanne Kershall, Los Angeles, Ca.  
Donald W. Kole, Chicago Refinery  
Benjamin J. Luther, San Luis Obispo, Ca.  
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Floyd R. McMurray, Cincinnati, Oh.  
Charles J. Mooney, Los Angeles, Ca.  
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Elbert E. Payton, Los Angeles, Ca.  
Jimmy D. Perkins, Beaumont Refinery  
Kenneth A. Peters, Schaumburg, Il.  
Keith S. Powell, San Jose, Ca.  
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Lloyd H. Toda, Jr., Los Angeles, Ca.  
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15 YEARS Janice K. Andersen, Schaumburg, Il.  
Edward P. Anderson, Chicago Refinery  
Remedios B. Barnes, San Francisco, Ca.  
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Fred W. Bollinger, Los Angeles Refinery  
Jeffrey L. Bowen, Los Angeles, Ca.  
Kenneth W. Carlfield, Schaumburg, Il.  
Robert L. Cheary, San Francisco Refinery  
Curtis L. Craft, San Jose, Ca.  
Beatrice J. De La Roza, San Diego, Ca.  
Diane A. Diel, Schaumburg, Il.  
Gilbert V. Espinoza, San Francisco Refinery  
Leroy M. Ferreira, Honolulu, Hi.  
Ingrid K. Gallagher, San Francisco, Ca.  
Frances M. Golec, Schaumburg, Il.  
Connie M. Grigg, San Francisco Refinery  
Annie R. Henry, San Francisco, Ca.  
Harry R. Hermeling, Cincinnati, Oh.  
Randolph L. Howard, Chicago Refinery  
Jimmy D. Huff, Los Angeles, Ca.  
Jerry H. Johnson, Schaumburg, Il.  
Betty N. Koch, Schaumburg, Il.  
Montgomery E. Learn, Schaumburg, Il.  
Richard A. Lenzen, Sr., Chicago Refinery  
David Maier, Los Angeles Refinery  
Daniel J. McGlone, Schaumburg, Il.  
Roger W. Morris, Monticello, Il.  
Earl M. Moser, Schaumburg, Il.  
Lewis C. Pickens, Jr., Chicago Refinery  
Stephen Plesh, Beaumont Refinery  
Sandra L. Prichard, Los Angeles, Ca.  
Gregory G. Rassi, Chicago Refinery  
Robert A. Ross, Schaumburg, Il.  
Rudolfo T. Rumbaoa, San Francisco, Ca.  
Donn A. Setterquist, Los Angeles Refinery  
Emma L. Simmons, Richmond, Ca.  
JoAnn L. Squeo, Schaumburg, Il.  
Ira L. Smith, Chicago Refinery  
Kenneth A. Smith, Beaumont Refinery

Loismae M. Strachan, Schaumburg, Il.  
Ricky M. Tanaka, Richmond, Ca.  
Dennis A. Treat, Santa Maria Refinery  
Tyrone J. Vickers, Los Angeles, Ca.  
Roger D. Villalobos, Los Angeles, Ca.  
Thomas Walsh, Schaumburg, Il.  
Robert L. White, Wildwood, Fl.  
Timothy C. Winfrey, Chicago Refinery  
Belus Youkhannh, Schaumburg, Il.

10 YEARS Gwendolyn R. Allen, Richmond, Ca.  
Jose I. Alvarez, Los Angeles, Ca.  
Charles S. Ayres, Beaumont Refinery  
Richard A. Belcher, Beaumont Refinery  
Gerald A. Bergen, Chicago Refinery  
Judy A. Bourgeois, Beaumont Refinery  
Roosevelt Bowie, Los Angeles Refinery  
Doris B. Breckenridge, Beaumont Refinery  
Paul A. Bruno, Schaumburg, Il.  
Leonard Cabrera, Schaumburg, Il.  
Frank M. Chang, Los Angeles Refinery  
Simon D. Chauvin, Beaumont Refinery  
Cheng-H Chen, Chicago Refinery  
Darril W. Clark, Portland, Or.  
Dean S. Craft, San Francisco Refinery  
Douglas N. Craig, Los Angeles Refinery  
Louise M. Davis, San Francisco Refinery  
Adrian L. Dungan, Beaumont Refinery  
Patrick J. Forsythe, Chicago Refinery  
Susan M. Gosell, Schaumburg, Il.  
John R. Gotaas, Schaumburg, Il.  
Adolph Granato, III, Beaumont Refinery  
Gordon E. Grant, Los Angeles Refinery  
Arthur Guerrero, Los Angeles, Ca.  
Dan R. Hendrix, Los Angeles, Ca.  
Santos J. Hernandez, Schaumburg, Il.  
Rodney K. Hogan, Santa Maria Refinery  
Larry J. Hunt, Chicago Refinery  
James T. Iles, Beaumont Refinery  
Bobby G. Jelley, Chicago Refinery  
Young-Mi Kim, Chicago Refinery  
Robert E. King, Chicago Refinery  
Eric N. Komplin, Beaumont Refinery  
Mark L. Kucera, Beaumont Refinery  
Maxwell B. Laidlaw, Jr., Abbeville, La.  
Douglas G. Lawrence, Pittsburgh, Pa.  
James A. Lesniewski, Chicago Refinery  
Thelma M. Marks, Beaumont Refinery  
Paul M. Marsh, Chicago Refinery  
Gregory V. Marshall, Richmond, Ca.  
Daniel J. McClure, Los Angeles, Ca.  
Robert A. McElroy, San Luis Obispo, Ca.  
Frank C. Meyer, Beaumont Refinery  
Paul H. Mitchell, Beaumont Refinery  
Dorothea M. Moore, Nederland, Tx.  
Peggy A. Moore, Beaumont Refinery  
Phillip R. Morrell, Chicago Refinery  
Steve H. Nelson, Portland, Or.  
Robert E. Niemi, Chicago Refinery  
Deborah L. Norris, Beaumont Refinery  
James H. Odum, Beaumont Refinery  
Michael G. Patton, Los Angeles Refinery  
Carmella Pierri, Schaumburg, Il.  
Thomas J. Reddington, Beaumont Refinery  
Roland C. Reed, Chicago Refinery  
Ricardo R. Reyes, Los Angeles, Ca.  
Richard C. Rice, Chicago Refinery  
Stanley M. Ruth, Beaumont Refinery  
Martin Salaiz, Santa Maria Refinery  
T. J. Slater, Monticello, Il.  
Steven G. Steach, Los Angeles Refinery  
Philip C. Stern, San Francisco Refinery  
Delores Stokes, Schaumburg, Il.  
Billy D. Thomas, Los Angeles Refinery  
Gary L. Tipp, Richmond, Ca.  
James D. Turner, III, Los Angeles Refinery  
Anthony J. Ungaro, Schaumburg, Il.  
Consuelo Villarreal, Chicago Refinery  
William P. Wells, Beaumont Refinery  
Bruce C. Werner, Eugene, Or.  
Kenneth H. White, Jr., Chicago Refinery  
Gary R. Williams, Pasadena, Ca.  
Simon Zalman, Beaumont Refinery

# SERVICE AWARDS



## MARKETERS & DISTRIBUTORS

- 40 YEARS Lawrence Renner, Eureka, Ca.  
35 YEARS Gene K. Shellenbarger, Johnstown, Oh.  
30 YEARS Tiel Oil Co., Inc., Reed City, Mi.  
A. C. Lawrence, St. Helens, Or.  
25 YEARS A. J. Agostini, Oakdale, Ca.  
Conan Fuel Service, Inc., Gig Harbor, Wa.  
Green Belt Fuel Del, Inc., Arcadia, Fl.  
Hays & Son Oil Co., Inc., Cullman, Al.  
Spruill Oil Co., Inc., Windsor, Nc.  
20 YEARS Appalachian Oil Co., Inc., Somerset, Ky.  
W. M. Barnes, San Joaquin, Ca.  
Samuel R. Privett, Wrangell, Ak.  
Taucher & Hutchings, Inc., Roseburg, Or.

## CHEMICALS

- 35 YEARS Mary Lou Deuchler, Schaumburg, Il.  
Thomas J. Houston, E. Providence, Rl.  
30 YEARS Stephen J. Connolly, E. Providence, Rl.  
25 YEARS John C. Maher, Schaumburg, Il.  
T. R. Rutledge, Brea, Ca.  
Donald R. Spencer, La Mirada, Ca.  
Jerry L. Williams, Nashville, Tn.  
20 YEARS James E. Bollinger, Schaumburg, Il.  
Billy J. Crump, Charlotte, Nc.  
Larry D. Goodman, Charlotte, Nc.  
James P. Harman, Kenai, Ak.  
James L. Hendershot, Portland, Or.  
Clifford A. Heus, Jr., Kenai, Ak.  
Nicholas E. Lynam, Schaumburg, Il.  
Paul D. Morrison, Kenai, Ak.  
William R. Switzer, Brea, Ca.  
Goyne R. Windle, St. Paul, Mn.  
Leonard C. Witherspoon, Charlotte, Nc.  
15 YEARS Roy C. Adkins, Kenai, Ak.  
Frank M. Boka, Schaumburg, Il.  
John W. Coon, Kenai, Ak.  
Donald D. Moerdyke, Unocal Center  
Jack D. Page, Kenai, Ak.  
Daniel W. Renouf, Kenai, Ak.  
Clinton Wiley, Bridgeview, Il.  
10 YEARS Vernon L. Bond, Brea, Ca.  
Teresa J. Cardinali, Nashville, Tn.  
Nathaniel Carter, Charlotte, Nc.  
Albert J. Castaneda, La Mirada, Ca.  
Randall B. Craig, Brea, Ca.  
Robert S. Haddock, Kenai, Ak.  
Leo V. Lampi, Wilmington, Ca.  
William F. Mercer, La Mirada, Ca.  
Everett D. Mullins, Lemont Trucking, Il.  
Christopher S. Norton, Atlanta, Ga.  
Lynne E. Olsen, Bridgeview, Il.  
Sherry L. Robbins, Wichita, Ks.  
Buford G. Seay, Tucker, Ga.  
Freddy H. Stapp, Arroyo Grande, Ca.  
Jerry A. Thompson, Kenai, Ak.  
Don P. Turner, Unocal Center  
Charles L. Vandenberg, Lemont Trucking, Il.

## MOLYCORP, INC.

- 35 YEARS James W. Keener, Washington, Pa.  
20 YEARS David L. Spencer, Washington, Pa.  
Jerald B. Tabor, Louviers, Co.  
15 YEARS Diane S. Jaros, Washington, Pa.  
Michael J. Montano, Louviers, Co.  
10 YEARS Christopher J. Lyle, Nipton, Ca.

## POCO GRAPHITE, INC.

- 10 YEARS Leslie R. Hale, Decatur, Tx.  
Dora E. Lara, Decatur, Tx.

## RETIREMENTS

### Corporate

- Joseph Byrne, September 14, 1953  
Fred L. Hartley, May 18, 1939

### Oil & Gas

- Helen F. Steck, August 14, 1945  
James W. Redding, October 18, 1955

### International Oil & Gas

- Dennis R. Mett, November 8, 1955

### Molycorp, Inc.

- Ernest E. Gaudette, March 25, 1959

### Chemicals

- Harry N. Cornell, February 22, 1971

### Refining & Marketing

- Payton Anderson, April 21, 1969  
George Ballew, March 6, 1951  
Richard D. Boulton, Jr., December 1, 1962  
Audrey T. Broussard, November 24, 1952  
Clyde K. Carrier, March 4, 1958  
Billy B. Carroll, October 15, 1952  
James R. Cassingham, May 5, 1947  
Myron Clark, April 22, 1947  
Nathaniel Foster, March 22, 1976  
Cecil R. Gallien, December 15, 1952  
Harold E. Granquist, April 6, 1953  
Joe D. Harris, November 17, 1948  
William J. Hoppers, September 16, 1948  
Carole J. Judkins, August 31, 1952  
Adrian C. Kuyper, January 22, 1968  
Nick B. Matisevich, June 28, 1946  
Norman Naylor, March 20, 1978  
Bruce H. Plantz, January 15, 1964  
Roy L. Streetman, February 10, 1955  
Joseph B. Stucker, May 17, 1958  
Louis N. Sylwester, January 23, 1956

## IN MEMORIAM

### EMPLOYEES

#### Corporate

- Jacqueline L. Cummings, May 5, 1988

#### Refining & Marketing

- Gene E. Hebrard, May 22, 1988  
Charles C. Montgomery, May 1, 1988  
Marilyn C. O'Connell, April 21, 1988

#### Geothermal

- Janice M. Peacha, May 4, 1988

#### Chemicals

- Thomas D. Simpson, May 13, 1988

## Oil & Gas

- Gordon Hockman, April 30, 1988  
Neal W. Canter, April 10, 1988

## RETIREES

### Science & Technology

- Jack Bailes, April 30, 1988  
Davis A. Skinner, May 12, 1988

### Refining & Marketing

- Helen M. Ackerman, March 29, 1988  
Everett M. Adams, April 24, 1988  
Benjamin R. Airey, April 20, 1988  
Robert J. Almroth, March 15, 1988  
Oscar E. Arneson, March 28, 1988  
Orin R. Baker, May 10, 1988  
Robert O. Barror, March 8, 1988  
Franklin W. Board, April 7, 1988  
Thomas G. Chestnut, April 27, 1988  
Allan Craddock, May 23, 1988  
Grace G. Deardurff, March 22, 1988  
Frank Z. Edmunds, May 8, 1988  
Helen M. Eliason, March 23, 1988  
Vernon B. Foster, January 5, 1988  
Asher B. Furby, Jr., May 21, 1988  
Louis A. Hajek, April 11, 1988  
John R. Hatcher, March 26, 1988  
Leonard G. Hatley, April 20, 1988  
Thurman L. Higdon, April 22, 1988  
Walter L. Holmgren, March 14, 1988  
Harry Hook, April 18, 1988  
Miriam M. Jacobs, December 9, 1987  
Raymond P. Jennings, May 5, 1988  
Gene C. Kinsler, May 25, 1988  
John M. Lawson, April 18, 1988  
Rex A. Luard, April 29, 1988  
Paul T. Lucas, April 26, 1988  
Charles O. Melling, May 14, 1988  
Irwin J. Monroe, January 24, 1988  
Edgar B. Moody, April 30, 1988  
Emory M. Payne, April 27, 1988  
Roberta Redmond, April 5, 1988  
Antone E. Rogers, April 30, 1988  
Gilbert J. Schmitt, January 22, 1988  
H. Ellis Sibley, April 11, 1988  
Rudolph E. Svazich, May 13, 1988  
Albert D. Talley, April 28, 1988  
Dewey Tyler, May 22, 1988  
Cornelius J. Van Leeuwen, April 10, 1988  
Walter F. Van Ornum, May 5, 1988  
Ronald R. Wright, May 17, 1988  
Sarah L. Wright, March 24, 1988  
Plynn R. Yeany, Jr., March 18, 1988

## Oil & Gas

- Lyle A. Bedord, March 23, 1988  
Richard Bruns, May 10, 1988  
Alfonso R. Chavez, May 10, 1988  
Morris W. Fulks, February 19, 1988  
Leander L. Haines, March 16, 1988  
Allen A. Hendry, May 8, 1988  
Louise C. Hooper, March 31, 1988  
Frank H. Martin, April 10, 1988  
Charles T. May, March 12, 1988  
Joseph R. Prosser, Jr., April 6, 1988  
Dale R. Shehorn, April 16, 1988  
Hugh N. Shuck, April 23, 1988  
Donald L. Steinke, April 18, 1988  
Charles E. Teacle, May 11, 1988

## Molycorp, Inc.

- Carl T. Miller, May 24, 1988  
Cipriano Quintana, April 2, 1988

GARY L FOY  
16823 LIGGETT STREET  
SEPULVEDA CA 91343

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**Turning On The Power** Page 2

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**Alcohol Fuels:** Page 10**A Cautious Approach**

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Unocal is renovating its historic Santa Paula office building — and expanding the museum it houses — for the company's 1990 centennial.

**48 Hours On Pit Road** Page 32

Unocal's involvement in professional stock car racing is long-standing. The company is the official supplier of fuel for most NASCAR events, and many of the top racing teams rely on Unocal lubricants. Here's a behind-the-scenes look at how one team prepares for a major race.



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**Cover:** The Los Angeles refinery's new cogeneration plant is supplying all of the facility's electricity and most of its steam. This plant, and a similar one at the company's San Francisco refinery, are significantly reducing energy costs. Story on page 2. Photo by Bob Witkowski.

*Seventy Six* is published by the CORPORATE COMMUNICATIONS DEPARTMENT, Unocal Corporation, Box 7600, Los Angeles, California 90051. **Karen Sikkema**, Vice President, Corporate Communications; **Tim Smight**, Acting Editor; **Cathy Stephens**, Assistant Editor; **Heidi Siegmund**, Editorial Assistant; **Ray Engle and Associates**, Art Directors.

*Editor Barbara Pederson has been temporarily assigned to a special corporate centennial project.*

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