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Seventy  
SIX

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Summer  
1987



# BUCKING THE TREND

**W**est Texas, which prospered during the oil booms of the 1940s and early '80s, has gone through some rough times of late. The oil price collapse of 1986 hit this region like a high plains twister—and the aftermath is still being felt.

Thousands of oil field workers are unemployed. Independent producers and oil field service companies have gone under. Banks have failed. And most of the major oil companies doing business here have cut their staffs and scaled back operations.

Compounding this bleak picture is what some would call a less than promising outlook. In some circles, the entire oil-producing region from Texas up through the mountain and central states is considered to be on the decline. Most of the major oil strikes here were made decades ago, these detractors say. The fields are drilled up, production is steadily declining, and future prospects are dim.

Given all this, you might be a bit apprehensive about visiting Unocal's Central Region headquarters in Midland, Texas. But if gloom and doom are what you expect to find here, you're in for a surprise. For not only are the company's Midland offices decidedly upbeat; they're downright bustling.

In fact, Unocal's activity level throughout the Central Region is at an all-time high. Oil production from Unocal-operated fields is on the rise, several development projects are in progress, and the employees are enthusiastic and positive. If the phrase "bucking the trend" comes to mind, that suits Central Region operations manager Marty Miller just fine.

"We're definitely bucking the trend here, and that surprises a lot of people," Miller says. "There's no question that we've been operating in a difficult environment for the last couple of years. But through hard work and a team effort, we've managed to turn the situation to our advantage. By lowering our costs, we've been able to develop projects with solid economics despite the lower oil price. As a result we're prospering, and we're busier than ever."

"The Central Region is regarded by some as rather static—an old, tired area that has no future," says former Central Region Vice President H.D. Maxwell. "The truth is, there are lots of opportunities here—opportunities that don't require massive outlays of capital or a high degree of risk. Rather than retrenching as some companies have, we've chosen to pursue these opportunities."

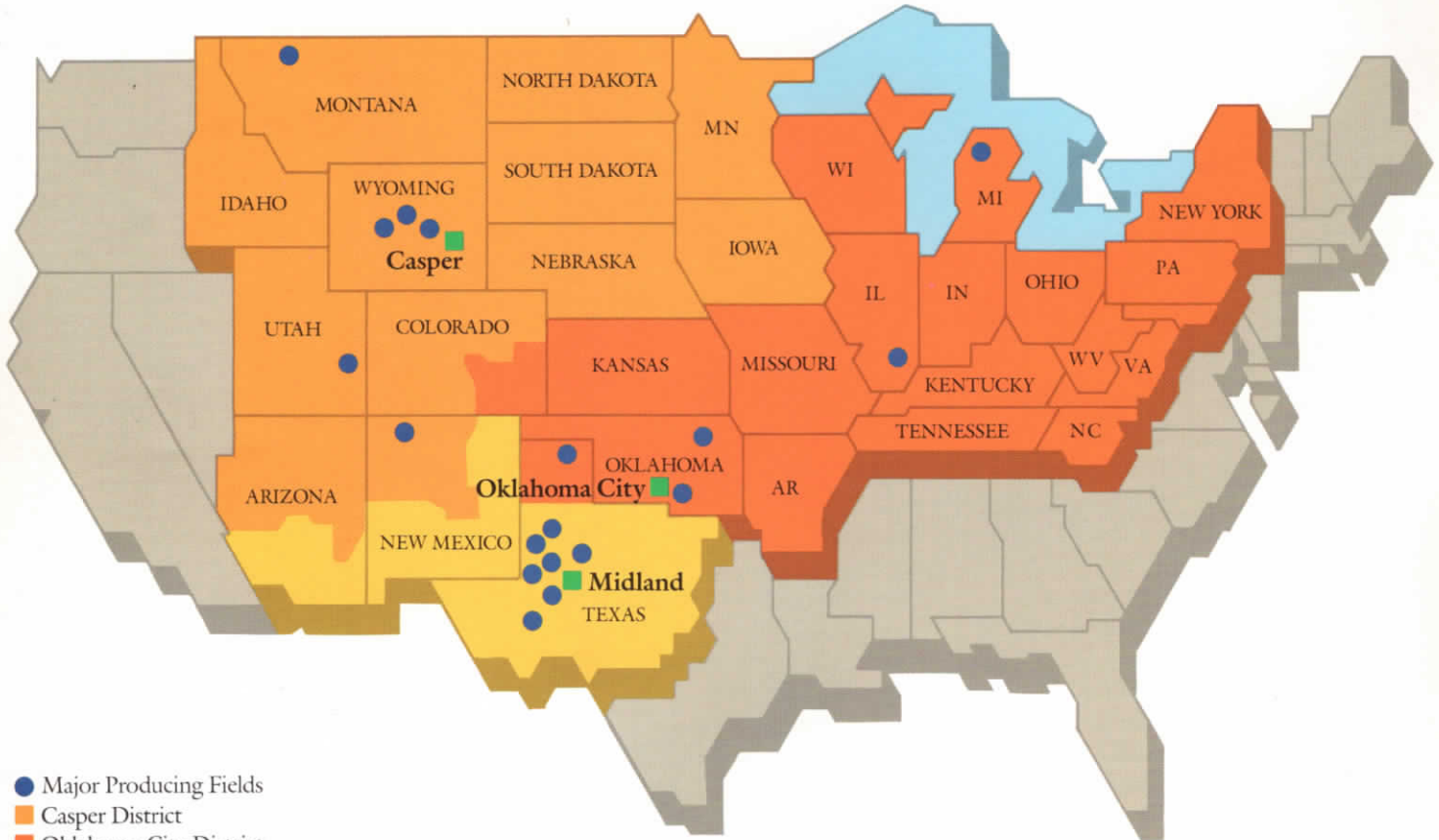
Unocal's Central Region operations are by no means confined to West Texas. Sprawling over 29 states (10 of which have significant oil production), the region is divided into three districts—Midland, Oklahoma City and Casper—named for the cities where the district offices are located.

There are 660 employees region-wide, and 3,340 active oil wells that currently produce a total of 38,000 barrels of oil a day (gross company-operated production). In addition, there are 850 water injection wells that handle 500,000 barrels of water a day.



*Despite the economic downturn besetting the oil industry, several development projects are underway in Unocal's Central Region. In the Midland District, an aggressive drilling program has helped boost oil production in fields such as Dollarhide, pictured here.*

## Oil & Gas Division—Central Region



- Major Producing Fields
- Casper District
- Oklahoma City District
- Midland District

### Casper District

*Operations Manager:* Lon Pardue  
*Employees:* 110

*Project Highlights:* expansion of a waterflood program in the Cut Bank field (Montana), steam injection in the South Casper Creek field (Wyoming), gas injection in the Worland field (Wyoming), infill drilling in the San Juan Basin gas field (New Mexico), acquisition of properties with turn-around potential.

### Oklahoma City District

*Operations Manager:* Robert Shurtleff  
*Employees:* 185

*Project Highlights:* expansion of a waterflood program and new development drilling in the Healdton field (Oklahoma), acquisition of properties with turnaround potential.

### Midland District

*Operations Manager:* Wylie Barrow  
*Employees:* 131

*Project Highlights:* development drilling in the North Riley and Dollarhide fields (Texas), CO<sub>2</sub> injection in the Dollarhide field, new primary production in the Parker and Deep Rock fields (Texas), expansion of waterflood projects, acquisition of properties with turn-around potential.

“Most of our production is from stripper wells,” says John Merritt, Central Region engineering manager. “We don’t have any flashy, big-ticket projects anywhere. What we do have are a lot of ‘little things’ that add up.”

An example is the Cabin Creek oil field in West Virginia, discovered back in 1914. The 40,000-acre lease has 66 producing wells, which produce a total of 10 barrels of oil and less than 1 million cubic feet of gas per day. But fields like this one are still profitable because Unocal’s operating personnel have kept costs extremely low.

“Maintaining—and improving on—this kind of efficient production is the backbone of our operating philosophy here in the Central Region,” says Paul West, region production manager.

Indeed, ongoing efforts to reduce costs and improve efficiency have helped the region prosper in these difficult times. Since 1983, average lifting costs in Unocal-operated fields of the Central Region have declined by more than 30 percent.

The savings have been largely achieved through efficient use of manpower and resources. “Our success at keeping costs down stems from good management at all levels,” Miller says. “We have made an all-out effort to implement performance management. Our focus is on doing more with less, and it’s paying off.”

Success has also taken another form: rising oil production. Overall production in the Central Region, which had dipped below 30,000 barrels per day in recent years, rebounded to 38,000 barrels per day by mid-1987. And the output continues its upward trend.

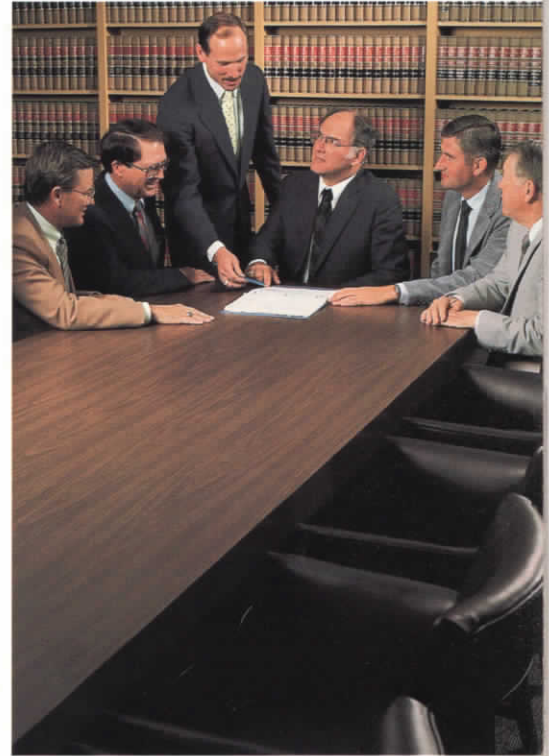
Most of this new production has been added through an aggressive program of development drilling. In recent years, the number of wells drilled annually in the region has increased markedly, from 70 in 1983 to 170 planned for this year—an all-time high.

Why all the activity during a period of economic downturn for the industry? “There are several good reasons for us to be active now,” says Dick Cook, Central Region drilling manager. “For one thing, our development program is low-risk because most of it is taking place in proven fields.”

Reduced drilling costs and faster completions are also factors, Cook explains. “No large front-end capital outlays are required, since none of the drilling is offshore or in other difficult environments. And improved completion techniques enable us to put new wells on production much faster than in the past, with better oil recovery.”

Because the drilling is being done in producing fields, Cook adds, treating and gathering facilities are already in place in most cases. This saves additional time and money. And the prices Unocal is charged by contract drilling crews have also come down due to reduced demand industry-wide.

The upshot: Unocal is able to develop new reserves in many Central Region locations at very low cost. And since the projects can be completed quickly, they make good economic sense even in tight times.



*Central Region executives, from left to right: Marty Miller, operations manager; Keith Spradlin, safety and environmental protection manager; John Merritt, engineering manager; H.D. Maxwell, vice president (see footnote, page 9); Paul West, production manager; and Dick Cook, drilling manager.*

*During the last six years, Unocal has drilled nearly 300 infill wells in 21 Central Region fields. Over 25 percent of the region's total oil production comes from these new wells.*



Three types of development drilling are currently being pursued in the region: deepenings and other recompletions on existing wells, field extensions into new producing zones, and infill drilling projects.

Infill drilling—the placement of new, more closely spaced production wells within a field—comprises the lion's share of this activity, and is responsible for most of the region's production gain. In the last six years, Unocal has drilled nearly 300 infill wells in 21 Central Region fields. Currently, over 25 percent of the region's total oil production comes from these new wells. More than 100 additional infill wells are planned this year in 16 fields.

The success of this strategy is quite evident—the region's production gain has been accompanied by a steady increase in net oil reserves. Development drilling this year alone will add at least 11.7 million barrels of new reserves.

"In 1986, we replaced 125 percent of production in the Central Region," says John Merritt. "We expect to match or exceed that recovery rate in 1987."

The most extensive development projects are being pursued in the Midland District, which encompasses an oil-producing region known as the Permian basin. A high-plains region that extends from West Texas into Eastern New Mexico, the basin is historic oil country. Its sprawling range land and vast cotton fields are dotted with thousands of pump jacks.

Unocal operates seven major oil fields (and several smaller ones) in the Midland District. Since most of these fields were discovered back in the 1940s or earlier, many have undergone a natural decline in production over the years.

Secondary recovery techniques such as waterflooding, begun in the 1960s and '70s, boosted production for a time. But the steady decline resumed in the 1980s. Production from Unocal operated fields in the district gradually fell—from over 23,000 barrels per day at the beginning of the decade to under 16,000 at the end of 1983.

By then, however, new development drilling was underway—and the effort soon began to bear fruit. By early 1984 production in the district was rebounding quickly. It has now climbed back up to over 20,000 barrels per day, and the upward trend continues.

**W**e've maintained a very active development program over the past five years," says Midland District operations manager Wylie Barrow. "While other companies operating here have cut back, we've completed more than 200 new wells, most of them infill. And we plan to keep up the pace."

"Development in the district has gone very smoothly and economically," adds Midland District production superintendent Jim Buckingham. "We've seen excellent results, especially with our infill wells."

To understand why the district's infill work has been so successful, some background on the nature of Permian basin oil reservoirs might prove helpful. Unlike Gulf Coast oil deposits, most of which are found in clastic sedimentary rock called sandstones, most Permian basin reservoirs exist in chemically formed sedimentary rocks known as carbonates.

"Permian basin carbonates are a unique rock type," says Steve Benedetti, district exploration geologist. "Their porosity and permeability vary greatly, so the reservoirs tend to lack continuity. You get a lot of small, unconnected oil pay zones rather than the large, connected pay zones characteristic of Gulf Coast fields."

Because of the lack of continuity, only about 15 percent of the oil in place can be recovered from most Permian basin fields by primary production methods. (Primary wells lift oil through natural reservoir pressure, and with mechanical pumping units.)



*At left, production technician Randy Dutton and production foreman Bobby Cloud confer at a North Riley wellsite. Below left, Midland District executives (left to right) Jim Buckingham, production superintendent; Wayne Strong, land manager; Jim Hughes, drilling superintendent; and George Covington, exploration manager. Below right, field foreman Dave Wilkerson and roustabout Mike Phillips check production readouts in the Dollarhide field, where CO<sub>2</sub> injection is boosting oil recovery.*



Waterflooding, employed widely in the basin over the past 25 years, is used to recover additional oil through the injection of water into producing formations. The technique successfully recovers another 10 to 15 percent of the oil. But this still leaves a lot of untapped potential—and that's where infill drilling comes in.

"When we waterflood a field, we place injection wells in geometric patterns to flood the formations evenly between producing wells," explains Midland District engineer David Watkins. "But the water can't flush out oil that's trapped in isolated, unconnected zones. This oil is the target of our infill drilling."

The district's most ambitious infill project is taking place in the North Riley oil field, located about 60 miles northwest of Midland. Discovered in 1947, North Riley has produced 22 million barrels of oil to date. But production had steadily declined over the years, tailing off to only 700 barrels a day by 1977. A waterflood program initiated that year increased the output to 1,000 barrels a day. Then in 1984, an aggressive infill project was begun.

The impact of the new drilling has been substantial. By the end of 1986, with 70 infill wells completed, production in North Riley had quadrupled to over 4,000 barrels per day.

Achieving that kind of payoff so quickly takes a lot more than just punching new holes in the ground. It requires speed and efficiency in the field, use of advanced drilling and completion techniques, and a good measure of detailed groundwork by geologists and engineers.

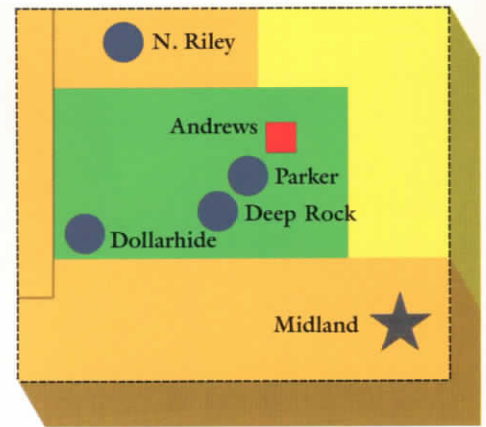
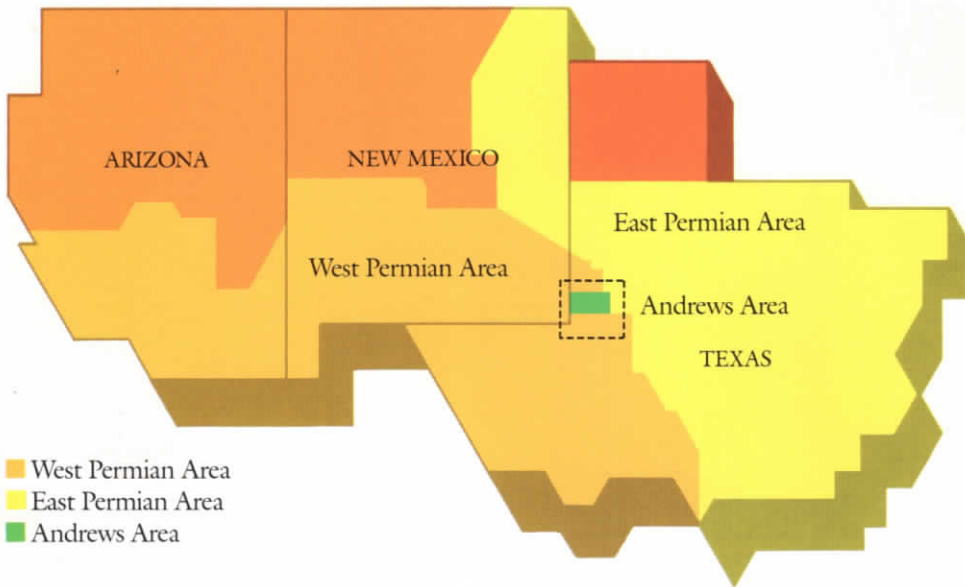


"We examine porosities well by well and interval by interval," says project engineer Ted Paul, whose Midland District office overflows with North Riley maps and well logs. "Every bit of information helps us better understand the field."

Computer modeling is used to generate "zone maps" of the field, which aid in determining optimum placement of infill wells. The data are also used to identify candidates for recompletions—deepenings and reperforations of existing wells which can increase production by tapping previously overlooked pay zones.



## Midland District



With 25 infill wells planned in North Riley this year, and as many recompletions, activity in the field is brisk. “We don’t have much slack time out here,” says drilling engineer Jeff Tokarsky. “But we get faster and more efficient with every well we drill. Our average infill well now takes only 23 days from spud through completion.”

The pace will be maintained in the future: another 25 infill wells are planned for North Riley next year. A project to expand water injection in the field will soon get underway as well.

“We’ve been very busy this year, and it looks like we’ll stay that way for a while,” says Herman Penaluna, West Permian Area production superintendent. “If this is a bust, I’d hate to see a boom.”

At the nearby Dollarhide field, another kind of development project is underway. Carbon dioxide injection—a tertiary recovery process pioneered by researchers at Unocal’s Science & Technology Division—is boosting oil production from one of the field’s five producing horizons.

Discovered in 1945, Dollarhide’s Devonian unit is located at a depth of between 7,800 and 8,200 feet. Primary recovery and waterflooding have lifted more than 58 million barrels of oil from the unit. But although production had declined in recent years, geologists felt there was still a good deal of untapped potential in the Devonian pay zones.

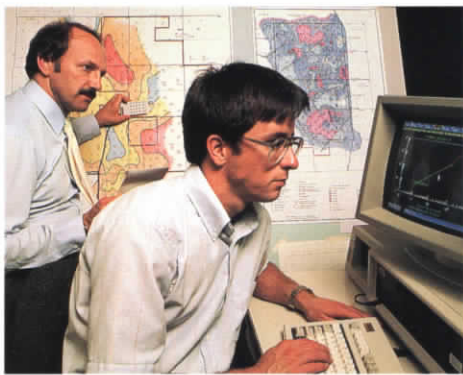
“Waterflooding here has been very effective, but a lot of oil has been left behind,” says project engineer Ed Poole. “This residual oil is the target of our CO<sub>2</sub> injection project.”

Why can carbon dioxide succeed where water has failed? “Water and oil don’t mix, so there’s a limit to how effective a waterflood can be,” explains project geologist Donna Van Horn. “Since CO<sub>2</sub> mixes with both oil and water, it can flush additional oil out of reservoir pore spaces.”

The process is more complex than it sounds. The CO<sub>2</sub> must be injected at a very high pressure for it to mix effectively with the oil and water. It also needs to be placed in precise locations at just the right volumes.

“This is Unocal’s first full-scale CO<sub>2</sub> injection project,” says Poole. “Since we can’t compare it to previous jobs, we’ve had to work very closely with the Science & Technology Division to do extensive lab testing and computer modeling. We’re learning more every day.”





In the field, the project involves the drilling of new production wells and the conversion of some existing wells into CO<sub>2</sub> injectors. Other necessary field facilities—such as pumps and tanks for handling the tertiary production, and a distribution system for the carbon dioxide—also must be installed.

The work is being done in five phases. In January of 1986, Phase I was completed and full-scale injection into the first 19 wells began. The injectors currently are flooding a section of the Dollarhide Devonian formation at a combined rate of nearly 15 million cubic feet of CO<sub>2</sub> per day.

While it's still too soon to evaluate results, early performance is highly encouraging. One production well alone has responded with over an 80-percent production gain. The fact that the bulk of the CO<sub>2</sub> is still working its way through the formation bodes well for the future.

"There has been very little 'breakthrough' of CO<sub>2</sub> so far, and that's very favorable," explains Poole. "In general, the longer breakthrough takes, the stronger the oil recovery response will ultimately be."

Despite the complexities and the "first time" nature of the project, Phase I went from drawing board to completion in just two years. "All of our construction has gone even better than we'd hoped," says Craig Van Horn, a facilities engineer who has worked on the CO<sub>2</sub> project from its inception. "One of our goals has been to work to solve problems as they come up, rather than live with them. I think we've succeeded very well in doing that."

One problem solved early on involved a small amount of CO<sub>2</sub> leakage from tubing in the CO<sub>2</sub> injection wells. "A lot of companies might have simply let it go," recalls production engineer Tom Collier, who monitors CO<sub>2</sub> injection at Dollarhide from the Andrews Area production office. "But now we are testing all our tubing with helium to pinpoint leaks. This has virtually eliminated the problem."

Unocal is currently moving forward with plans to expand the CO<sub>2</sub> project to the remainder of the Dollarhide Devonian unit, with Phase II scheduled to begin in July of next year.

"We hope to recover an additional 26.2 million barrels of oil from the unit through CO<sub>2</sub> injection," Midland District engineer David Watkins says. "And the technique holds potential for more of our fields."

Development activity in the Midland District is not limited to producing more oil from existing reservoirs. New primary production is also being pursued at the district's Deep Rock and Parker fields, where aggressive field extension projects are underway.

"New logging techniques and careful analysis have helped us learn more about the formations here," says project geologist Keith McKeel. "We've uncovered a lot of potential in deeper zones, and that's what we're going after now."

New development drilling in the two fields began in 1985. Initial production from the deeper zones came on stream in 1986, and results have been excellent. Out of 14 wells drilled by mid-year, 13 met the top allowable production rates (set by the state of Texas) of 150 to 200 barrels per day. Nine more wells are planned for this year.



*Above left, geologist Keith McKeel and project engineer Tom Powell perform a computerized log analysis. Detailed groundwork and ongoing efforts to reduce costs and improve efficiency have helped the Central Region prosper in difficult times.*

*Clockwise from right: Drilling engineer Kelly Crosley monitors a well stimulation procedure in the North Riley field; detail of a dynamometer; a portable computer used to analyze pumping unit behavior; drilling engineer Jeff Tokarsky and development geologist Jeff Glossa check rock cuttings at a North Riley drillsite; production engineers Connie Cheney and Tom Collier use a computer to design a rod string.*



“Just 18 months ago, total production from Parker and Deep Rock was only 40 barrels a day,” says project engineer Tom Powell. “Today it is almost 2,000 barrels a day.”

“The fact that this is all new primary production has really excited everyone,” says production foreman Bobby Cloud. Adds Andrews Area production superintendent Johnny Parker: “We’ve already produced more here than was ever thought possible back when these fields were first developed.”

The results at Parker and Deep Rock are all the more impressive given the fact that competitors operating on adjacent leases have not been able to match Unocal’s performance.

“Our success stems from detailed groundwork and very precise completions on our wells,” says production engineer Connie Cheney. “I think we’re also successful because good communications are maintained between reservoir, production and geological staffs.”

“Management plays a big role as well,” Powell adds. “They challenge us and encourage us to aggressively pursue projects like these. That kind of support is appreciated by everyone involved.”

In the Central Region, such talk about teamwork, communication and good management breeding success is often heard. But as Deep Rock and other recent success stories demonstrate, the talk isn’t idle.

“It sounds like a cliché, but teamwork really does make things work here,” says Midland District drilling superintendent Jim Hughes. “Despite the occasional squabbles we have, there’s a firm feeling that we’re all pulling in the same direction.”

Marty Miller agrees. “More than anything else, I think our people are behind the success we’ve had in the Central Region. We have talented, creative and enthusiastic employees who work well together and respond to a challenge. Given that base, our management role is very clear. We need to be facilitators, and we need to create the type of environment that allows our people to best use their skills.”

“In a region like this, which is so spread out, it’s vital that our employees work together effectively at the operating level,” adds H.D. Maxwell. “That’s why we concentrate on maintaining good communications across all lines.”



*"We're definitely bucking the trend here, and that surprises people," says Marty Miller. "Our activity level throughout the Central Region is at an all-time high."*

Given the high morale and string of recent successes, it's not surprising that optimism pervades the Central Region offices in Midland. The positive attitude is reflected in the region's goals and strategies for the future: a continued focus on reducing costs, further infill and development drilling in proven fields, expansion of enhanced recovery projects, increasing the company's interest in Unocal-operated fields, and acquisition of new properties with turnaround potential.

It's a full agenda, to be sure. But it's one that no doubt will be vigorously pursued.

"The economic downturn has forced us to take a good, long look at our operations in the Central Region," says Maxwell. "Unocal prides itself on being a highly capable and efficient operator here. We keep costs down and production up. We have a very high return on investment. And our development success shows that we still have a lot of unrealized potential.

"We're very excited about the future here. I think the Central Region will continue to be an important part of Unocal for years to come." T.S. 76

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*Note: On June 1, H.D. Maxwell left Midland to become Unocal's Western Region Vice President. He replaces Tom Stoy, who has retired after 37 years of service with the company. Taking over as Central Region Vice President is Graydon H. Laughbaum Jr., formerly Resident Manager, Unocal Netherlands, Inc.*

# Year of the Sphere

This year marks the 25th anniversary of one of America's most familiar commercial trademarks—the Unocal “76” sphere.

Today's version of the globe debuted at the 1962 World's Fair in Seattle, Washington. Blue and orange 76 spheres, marking the entrance to the popular Sky Ride, revolved and glowed in the night sky—something we take for granted today, but quite a technological achievement in 1962.

In the 1940s and '50s, the most prominent 76 signs displayed at Union Oil service stations were circular, flat-sided “lollipops.” The concept of a revolving, internally lighted sphere was not developed until the early '60s in anticipation of Union Oil Company of California's sponsorship of the Sky Ride at the 1962 World's Fair.

This popular attraction carried passengers on a 1,400-foot journey 60 feet above the fair grounds. The company also supplied lubricating grease for the Space Needle, still a distinctive landmark on Seattle's skyline.

The task of developing striking signage to identify the company at the fair fell to Jerry Luboviski, the company's advertising and merchandising manager at the time, Lowell Morrill, then buyer for signs and station equipment, and Seattle Division Manager Bill Martin (now deceased). They found a Seattle firm, Electrical Products Consolidated, to produce a plastic sphere that could glow with internal lighting as well as rotate.

The early spheres had problems. The rotation machinery contained inside was unreliable, bulky and showed through when the translucent globes were lit. The seam line, which joined the two hemispheres into a single globe, was also visible.

The globes were made out of clear sheets of acrylic, which had to be painted before being formed into hemispheres. “The silk-screening process was tricky in the beginning,” says Luboviski, who retired as vice president in charge of Corporate Communications in 1982. (Morrill retired as manager of special projects in the same department in 1985.)



“Applying the 76 on the acrylic sheet was something like drawing on a balloon before inflating it,” Luboviski explains. The shapes in the logo had to be distorted when applied to the flat surface so that they would stretch out into their proper appearance when the acrylic was formed into hemispheres.

Despite the problems, the effect of the spheres was dramatic—and soon there were calls for more. Unocal Chairman Fred L. Hartley, then senior vice president in charge of refining and marketing, decided that the spheres should be the standard symbol for all 76 service stations.

A California firm, Pacific Adpac Company, found ways to take the bugs out of the early models of the illuminated 76 sphere. Adpac designers improved the rotation mechanism and reduced its size. They also developed a new method to join the hemispheres of the globes that rendered the seam virtually invisible.

In 1968, the National Electric Sign Association recognized the 76 sphere as an outstanding achievement in the engineering field. More importantly, the globe met with commercial success.

“Marketing studies have shown that Unocal's sphere is one of the best-known corporate symbols in the nation,” says Luboviski.

Much of that success is due, of course, to the company's logo itself—the blue 76 on an orange background. The 76 brand was established in 1932, when Unocal introduced a new leaded gasoline which had the highest octane rating achievable at the time. The company wanted a fitting name for its product and adopted “76” as a tribute to the spirit of the nation's beginnings.

At first, the blue and orange 76 logo appeared on a Union Oil shield. This was an adaptation of an earlier Union shield, which had been colored a patriotic red, white and blue. A rectangular format appeared in the late 30s, and the 76 in a circle became standard after World War II.

The first sphere modeled after the fair's prototypes was installed at a new marine station in Southern California's Marina Del Rey. Hundreds of other stations followed suit.

In the intervening years, the globe has undergone a few changes. In 1967, the word “Union,” which appeared below the 76, was removed from the globe. The numbers were also redesigned for a snappier, more contemporary look. More recently, the materials have been updated. Today's spheres are made of polycarbonate, which is 30 times stronger than acrylic.

But the meaning of the 76 sphere is one thing that hasn't changed. Glowing and turning in the night sky, the blue and orange globe stands as a symbol of the best in automotive products and service for motorists across the nation. 76



*Today's "76" sphere (facing page) still stands for superb automotive service. Left, Bob Knoll shows Jerry Luboviski how comfortably he fits inside one half of an eight-foot-wide sphere. Knoll, a 1982 Unocal retiree, provided Seventy Six with memorabilia from the Seattle World's Fair.*



Fred L. Hartley

## Unocal Looks Ahead

“We think 1987 is the year to look ahead—to again find new ways to make the company grow.” Unocal Chairman & Chief Executive Officer Fred L. Hartley had a positive message for shareholders at the corporation’s 97th annual meeting, held May 4 in Los Angeles.

The company has successfully met formidable challenges in the past two years: a hostile takeover attempt in 1985 and the collapse of crude oil prices in 1986. The focus in 1987 is on the future. Oil prices are still low but greatly improved over what they were. Long-term debt, while still burdensome, is down almost 20 percent (see sidebar). And, as a footnote to the failure of the hostile takeover attempt, Mesa Partners II sold the last of its Unocal stock in the summer of 1986 at a substantial loss.

While all company activities during 1986 were dominated by the adverse impacts of the collapse of world crude oil prices, Mr. Hartley predicted continuing improvements in 1987. “We expect crude oil prices to rise slowly as OPEC gradually regains control of the world market,” he said. “Growing world oil demand, combined with growing OPEC power, make this result seem inevitable.”

He also noted that natural gas prices should rise in the 1990s as gas supplies tighten. The so-called “natural gas bubble,” which can be defined as the difference between the industry’s productive capacity and its actual production, is shrinking and should disappear entirely in the next few years.

To take advantage of probable price increases, Unocal plans to build on its core business: finding, producing and marketing energy resources.

“In particular, we will seek to acquire prospective acreage at reasonable cost,” Mr. Hartley said. “Also, we will selectively invest in new petroleum exploration and development projects, especially in the Gulf Region, the West Coast, Canada and overseas.”

He noted that in 1987 capital expenditures have been increased to about \$930 million, some 8 percent over 1986. “About 76 percent of this total is slated for the exploration and development of energy resources,” he said.

Mr. Hartley explained that this capital budget is based on the assumption that oil prices will hold in the range of \$18 per barrel, a price that is still too low to sustain U.S. production levels and reserves over the long term. It is, however, high enough so that Unocal can produce profitable operations and step up its exploration and production efforts.

It is critical that finding and development costs be kept as low as possible, particularly in a mature oil province like the United States. Unocal expects that the successful application of new exploration technologies will be one of the keys to this effort.

“That is a major reason why we established a new data processing center in our Science & Technology Division,” Mr. Hartley said. “Here, company researchers are able to use high-speed computers and new software programs to develop sophisticated geologic models, interactive reservoir simulations, and other advanced exploration and development tools.”

In addition, Unocal will focus more attention on foreign exploration and development projects during the next few years. The emphasis will be on overseas areas that offer attractive financial environments and have high potential for major new oil and gas discoveries.

The company also expects to strengthen its position as the world's leading producer of geothermal energy. One focus will be on California's Salton Sea, where Unocal will significantly increase capital spending as it continues to develop one of the largest hot water fields in the world.

"Of course, if there is one thing we have learned since the energy crises of 1973-74 and 1979-80, it is that we are operating in a highly volatile and unpredictable world," Mr. Hartley said. "Thus, a key to Unocal's future is to retain flexibility, so that the company will always be ready and able to adjust its planning, capital spending, and operations as required by sudden changes in our business environment."

Mr. Hartley also emphasized the need to bring more stability to domestic oil markets, stressing that oil is a strategic commodity. "Without it, our economy cannot prosper and our military cannot defend us," he said. "And without a strong domestic petroleum industry, our country will soon become dangerously dependent on foreign sources of supply."

To underline the urgency of the dilemma faced by the domestic oil industry today, Mr. Hartley outlined the industry record for 1986.

The average number of drilling rigs in operation in the U.S. was down more than 50 percent from 1985 to 1986—from 1,980 to 964. For comparison, the rig count at its peak exceeded 4,500 late in 1981.

"There is one truth we must live by in our industry: If we don't drill, we don't find any new oil and gas. It's that simple," Mr. Hartley said.



All other indicators of industry activity— seismic crews in the field, well permits issued, total footage drilled, capital spending—were down 40 to 50 percent in 1986 as compared to 1985.

Consequently, U.S. crude oil and condensate production fell by over 8 percent from 1985 to 1986, to about 8 million barrels per day—a decline of almost 800,000 barrels per day. Preliminary estimates indicated that the nation's proved reserves of recoverable crude oil fell by 12 percent or more, the most significant downturn since the 1970s.

While Unocal was able to hold its crude oil and condensate production and reserves steady in 1986 despite sharply lower investment spending, the overall results for the nation were much less favorable. At the same time, low prices pushed up U.S. demand for petroleum by 3 percent.

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*The launch complex at Vandenberg Air Force Base on the Central California coastline is visible in this view of Unocal's Platform Irene. Production from Irene, which began in April 1987, is expected to peak at about 20,000 barrels per day.*

To fill the widening gap between domestic production and demand, imports flooded in, surging up 22 percent from 4.9 million barrels per day in 1985 to 6 million in 1986. Most studies of the situation conducted in the last year by government, business and academia agree that within five years the United States could be importing 50 percent of its petroleum supplies—by far the highest level in our history.

And that would leave the U.S. open to price shocks and supply disruptions that would have destructive effects on the economy, national security and foreign policy. OPEC had enough leverage to double and redouble oil prices in the 1970s when U.S. import levels were 40 percent or lower.

But even without price shocks, unstable energy prices undermine the financial system, frustrate long-term planning and depress capital spending.

"For these reasons, last year's collapse in crude oil prices is not just an industry problem," Mr. Hartley told shareholders. "It is a national problem, and it requires a national solution. . . . The most important step we can take is to establish a comprehensive and effective national energy policy."



Unocal supports a policy that would repeal the Windfall Profit Tax, remove price and end-use controls on natural gas, improve industry access to government lands, and discourage excessive environmental regulations that serve only to hamstring industry while providing no significant benefit to the environment.

In addition to these long-range measures, Unocal supports immediate relief to the industry and the nation in the form of a flexible oil import fee on all imported crude oil, refined products and petroleum-based chemicals.

The amount of the fee would vary, equaling the difference between the price of the imports and a base price of about \$25 per barrel. While that price is not high enough to sustain the nation's proven petroleum reserves over the long term, it would effectively stabilize oil prices, stimulate production and reserve replacement, and limit the growth of petroleum imports.

*Modifications to the existing coker at the Santa Maria Refinery in California enable Unocal to refine crude oils with higher sulfur content, while complying with environmental regulations.*

"I am convinced that if the nation does nothing to bolster domestic petroleum supplies and limit imports, disaster will strike," said Mr. Hartley. He expressed disappointment that the government has so far done nothing about the problem, except commission a study which has proved overly optimistic in its assessment of the situation (see story, page 20).

He also faulted national policies as much as international politics. "The United States still has vast, untapped energy resources—petroleum, oil shale, coal, geothermal power, and others," he said. "What we lack is the will—and the wisdom—to develop these resources in an efficient and orderly fashion."

In closing, Mr. Hartley thanked shareholders for their support and included a plea for action. "We at Unocal have stated our concerns about America's energy future many times," he said. "I hope all of you share this concern and will let your senators and congressmen know how you feel.

"Let me assure you," he added, "that when the time comes—and provided that the proper federal steps have been taken—Unocal will be ready to do its share to help provide the nation with the energy resources it needs to keep oil imports at a reasonable level." 76



## Long-term Debt Reduced By \$1 Billion

Unocal's financial strategy for the year 1986 met two important goals, Mr. Hartley told shareholders at the company's annual meeting in May. Both the size of the long-term debt and exposure of the debt to potentially costly rises in interest rates were reduced significantly.

"At current oil price levels, we think we can prudently devote about \$350 million to \$400 million a year of the company's total cash flow to the reduction of our long-term debt," Mr. Hartley said. "I'm pleased to report that through cost cutting and sharply lower capital expenditures, we surpassed this goal in 1986—debt was reduced by \$430 million."

In the first four months of 1987, the debt was further reduced by almost \$500 million. More reductions are planned for later this year.

Unocal incurred high levels of debt in 1985 resulting from its defeat of a hostile takeover attempt launched in April of that year by Mesa Partners II. The debt peaked at \$5.8 billion in October 1985 and had been reduced to \$4.7 billion by March 1986—a reduction of more than \$1 billion in just 18 months.





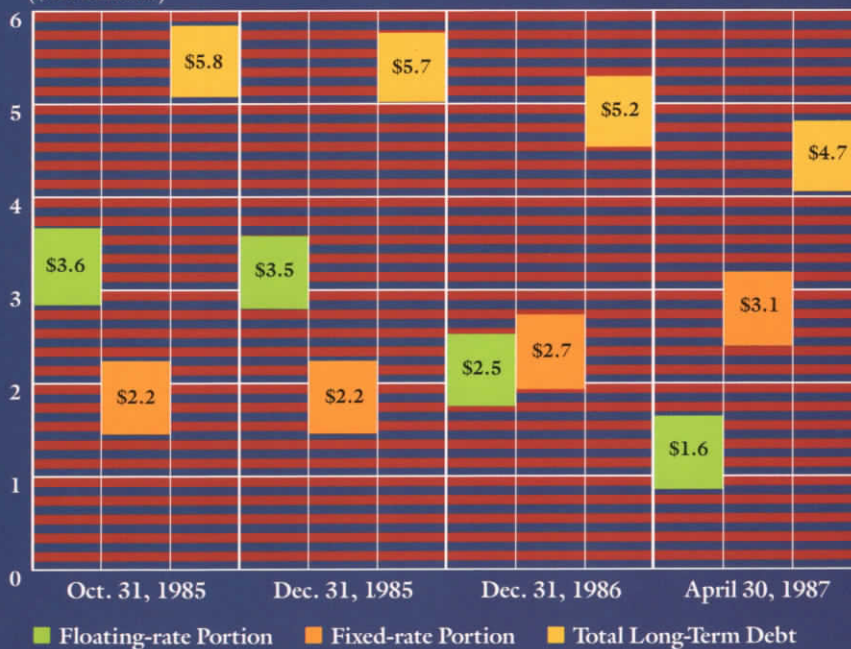
"We have made these reductions without resorting to major asset sales or to shrinking this company by selling profitable operating divisions," Mr. Hartley noted, in reference to measures other companies have taken in similar situations.

A second important aspect of managing the long-term debt has involved converting floating-rate debt to more favorable fixed-rate loans. This conversion means that a larger proportion of the debt is charged interest at fixed rates. It is not subject to potentially high increases in floating, or variable interest rates.

"Through a series of financial transactions over the past 18 months—transactions that involve capital markets both in Europe and the United States—we have converted on favorable terms more than \$1.1 billion of our floating-rate debt into long-term, fixed-rate debt," Mr. Hartley said.

The proportion of floating-rate debt to fixed-rate debt has been reduced from two-thirds to one-third of the total long-term debt.

Long-Term Debt Structure  
(\$ In Billions)



Mr. Hartley cited an example of debt conversion. On Monday, March 23, Unocal made a public offering of \$450 million in long-term, fixed-rate notes, an offering that was completely sold out in a few hours. The proceeds were used to reduce the floating-rate bank debt.

Fortunately, Unocal was able to make this offering at a time when company strategists expected interest rates to rise. As it turned out, the rates did rise sharply only one week later and have since increased by more than a full percentage point.

"Because of these successful efforts to reduce our debt and improve its structure, the company now enjoys improved investment capabilities and refinancing opportunities," Mr. Hartley said.

## The True Shareholder's Friend

To begin the annual meeting, Mr. Hartley described the benefits to loyal shareholders who supported the company's management in the takeover battle waged in 1985.

He demonstrated that the total shareholder value of some \$6 billion prior to the takeover attempt has risen to \$9 billion, considering the value to shareholders of the debenture exchange and the \$36 to \$40 per-share market value of Unocal stock in early May.

"This is nearly \$51 per share on the original 174 million [shares]," he said, "a 45-percent gain over the starting price."

Additional benefits to shareholders include favorable capital gains tax treatment on the shares that were repurchased, high-interest income while the notes were outstanding, annual dividends that have continued at the \$1-per-share rate, and a continuing stake in a company with excellent growth prospects.

"It is abundantly clear to me that the long-term Unocal shareholder is now significantly better off as a result of his support of Unocal's management," Mr. Hartley said. "In fact, at this point I think it's appropriate to offer a vote of thanks to the individuals whose courage, strength and foresight made this victory possible. . . . Unocal's Board of Directors, the true 'shareholder's friend.'"



Richard J. Stegemeier

## Quick Reaction To A Difficult Situation

In his address to shareholders, President and Chief Operating Officer Richard J. Stegemeier reviewed Unocal operations for 1986.

"The company reacted quickly and effectively to the drop in energy prices," he said. "Unocal has adjusted to this new and more difficult environment, and continues to be a productive and innovative earth resources company."

Included in the company's many successful efforts to cut costs in 1986 was a systematic review of all its producing fields to identify potentially non-economic production.

As a result, a total of 566 wells in the U.S. have been shut in. Most are in California's San Joaquin Valley, where a number of ongoing enhanced oil recovery projects have been curtailed until energy prices improve. In addition, operating costs in many of the company's California fields were cut by switching to interruptible power contracts with local utility companies.

Nationwide, Unocal's workforce was reduced by about 11 percent through attrition and a voluntary early retirement program.

Production at the company's molybdenum mine near Questa, New Mexico was shut down in response to very low molybdenum prices. The molybdenum sulfide ore roasting plant in Pennsylvania was also shut down.

On the financial side, Mr. Stegemeier noted that last December the company received net proceeds of \$36 million from the Government of Iran in settlement for properties expropriated in 1980.

"Unocal's operations are diverse and strong," Mr. Stegemeier said. During his review, he discussed an impressive list of accomplishments in all the company's business areas, leading off with production and exploration activities.

While cutting costs in a difficult operating environment, Unocal succeeded in keeping its U.S. oil production steady in 1986. Net crude oil and condensate production averaged 248,200 barrels per day, virtually maintaining 1985 production levels. At the same time, Mr. Stegemeier noted, the nation's oil production dropped more than 8 percent.

Net natural gas production averaged 976 million cubic feet per day, down 10 percent from 1985, in response to declining U.S. demand. Geothermal energy production equaled about 36,000 barrels of oil per day. Total energy production (oil, gas and geothermal) nearly equaled 1985 levels, despite the collapse in crude oil prices.



Net crude oil and condensate reserves rose slightly to 752 million barrels at the end of 1986, marking the third consecutive year Unocal replaced all of its oil production with new reserves. On the other hand, worldwide natural gas reserves were down, reflecting generally lower levels of drilling. Geothermal reserves also registered a small decline.

In domestic petroleum operations, the company increased its emphasis on more efficient production from existing properties. For example, an aggressive drilling program at the Van field in East Texas has increased production there by more than 50 percent since 1984. Daily production is now 9,000 barrels of oil per day.

In 1986, after 57 years of production, Van joined the ranks of 45 other "super giants" in the United States by producing its 500 millionth barrel of oil, Mr. Stegemeier noted.

Unocal is also participating in several significant projects offshore Alaska and California and—through Union Exploration Partners (UXP), its master limited partnership—in the Gulf of Mexico.

*Unocal has made significant progress in its long-term effort to develop the nation's first commercial oil shale project. Pictured is an overview of the retorting complex at the project, which is located near Parachute, Colorado.*



Production from Platform Irene, offshore California, began in April 1987 and is expected to reach 20,000 barrels per day. Production from Platforms Cerveza and Cerveza Ligera in the Gulf of Mexico, which started up in March 1987 and August 1986 respectively, is about 7,000 barrels of oil and 15 million cubic feet of gas per day.

Also in 1986, UXP made several new discoveries, and spudded a deep exploration well in the highly prospective Mobile Bay area, offshore Alabama, as a follow-up to the 1985 natural gas discovery in an offsetting block.

"In 1986, Unocal's foreign exploration and production activities were highlighted by new oil discoveries in Indonesia, Zaire and Canada," Mr. Stegemeier said. "We also completed significant development work in Thailand, the North Sea, Indonesia and Canada."

In Norway, Unocal is serving as a technical advisor to Statoil, that country's national oil company. Unocal's expertise will help design a lightweight platform and floating production system to develop the Veslefrikk field, in which Unocal currently holds about a 20-percent interest.

On the other side of the world, Unocal signed an agreement with the People's Republic of China to conduct petroleum exploration in the Pearl River Mouth Basin of the South China Sea.

Canadian crude oil and condensate production rose for the fifth consecutive year. Last year's production of 16,000 barrels per day was up 9 percent from 1985. Because of government policy changes that improve economic incentives for petroleum investment, Unocal plans to increase its capital spending in Canada this year by 38 percent.

In 1986, Unocal Canada signed an agreement with Sherritt Gordon Mines, Ltd., to acquire a 50-percent interest in Sherritt Fertilizer Company, a partnership that owns and operates an ammonia and urea complex at Fort Saskatchewan, Alberta. In exchange, Sherritt Gordon received rights to certain of Unocal's natural gas reserves and has contracted with Unocal to develop these reserves as feedstock for fertilizer production.

In addition to its operations involving conventional petroleum resources, Unocal is a leader in developing energy alternatives—notably, geothermal energy and shale oil.

*The company introduced several new products in 1986, including 92-octane Super 76 Unleaded premium gasoline in California, Nevada and Hawaii.*

Unocal is the world's largest producer of geothermal energy. In 1986, despite lower energy prices, earnings from Unocal's geothermal operations remained steady through improved efficiency and reduced operating expense, Mr. Stegemeier reported. Geothermal energy production averaged 23.8 million kilowatt-hours per day—just slightly below 1985's record high.

In late 1986, Desert Power Company—a wholly owned subsidiary—began construction work on a 475-megawatt electrical generating plant in California's Imperial Valley. This will be the first venture into the electrical generation side of the geothermal energy business by a Unocal subsidiary.

Unocal's long-term effort to develop the nation's first commercial oil shale mining and retorting facility made substantial progress in 1986. Last summer certain problems with the shaft cooler that had hampered operations were solved. In December, high-quality synthetic crude oil was shipped by truck to Lisbon, Utah, and then sent by pipeline to the Chicago Refinery.

"This morning, I'm happy to report that during the last two weeks in April, the plant produced more than 4,000 barrels of syncrude per day," Mr. Stegemeier said. "Unocal's fee lands alone contain more than 3 billion barrels of potential synthetic crude oil."



Unocal Refining & Marketing Division recorded higher sales volumes and earnings in 1986. Net earnings rose 14 percent, petroleum product sales were up 5 percent, and gasoline sales were up 7 percent—more than twice the national average.

These higher sales volumes improved the utilization of the company's refinery and terminal systems. Refineries operated at 85 percent capacity in 1986, up from 76 percent the year before. Several projects to upgrade Unocal refineries were completed.

In keeping with company-wide efforts for greater efficiency, the Refining & Marketing Division streamlined its organizational structure in 1986—"a move that has improved management control, reduced operating costs, and shortened lines of communication within the division," Mr. Stegemeier noted.

In the west, the company began marketing a 92-octane unleaded premium gasoline and phased out its leaded premium gasoline. It also began marketing a new lead substitute called "Valve Saver," a gasoline additive.

East of the Rockies, Unocal—through its marketer network—converted over 700 additional retail outlets to the Unocal brand. Gasoline sales in the east rose more than 17 percent in 1986, compared with an industry-wide average of about 2 percent in the same area.

"The Chemicals Division manufactures about 600 different products—everything from herbicides to metals for high technology," Mr. Stegemeier said.

The new needle coker at the Chicago Refinery completed its first full year of operation in 1986, and the company is now studying ways to increase output while maintaining quality.

Polymers enjoyed improved sales volumes and earnings in 1986 as the expansion of key markets continued and several new products were introduced.

Important new products include an ecologically safe nematicide called Purge, currently undergoing field tests, and Glassmate, a trademarked material used in handling hot glass. Sales of the company's Unipure technology, a patented process for removing heavy metals from industrial waste water, more than doubled in 1986.

Unocal's Molycorp subsidiary is the world's largest producer of lanthanides—a group of elements that are essential to today's industry and tomorrow's technology. Through a partnership with a Canadian company, Molycorp is also a leading producer of yttrium.

*In 1986, the Van oil field in East Texas (left) became a "super giant" by producing its 500 millionth barrel. A development well (right) is indicative of Unocal's growing geothermal operations in the Imperial Valley.*

Mr. Stegemeier pointed out that these metals have uses in several growing high-tech applications, including high-energy lasers, advanced engineering ceramics, and as an ingredient in the revolutionary new superconductive materials currently being tested. (See story, page 21.)

"We have long believed that research and innovation are the keys to continued growth," Mr. Stegemeier said.

At the Fred L. Hartley Research Center, the company's research efforts are directed toward developing new technologies for finding, producing and using earth resources. The Science & Technology Division has been highly successful in the development of new products and processes, including Unipure, Purge and Glassmate.

"As this review suggests, Unocal is more than just a successful petroleum company," Mr. Stegemeier concluded. "Our refining and marketing operation is modern and efficient, our geothermal division is a strong performer with excellent long-term potential, our chemicals business is well-positioned in a variety of markets, and our research group is one of the industry's most creative.

"In closing," he added, "I'd like to extend my personal thanks to all of our employees for their dedication and hard work during a most challenging year." 76

## Ending On A Refreshing Note

The day of the annual meeting at Unocal Center was clear and sunny, appropriately suited to the meeting's upbeat reports and perfect for the "ice cream social" which followed. Shareholders were treated to ice cream and invited to view exhibits picturing company operations worldwide.

In the lobby, the Geothermal Exhibit that was the centerpiece of the award-winning California Pavilion at Expo '86 in Vancouver, Canada, drew lots of attention. The multimedia display explains geothermal energy—starting with its origins underground and end-

ing with a working model of a San Francisco Cable Car to show how the energy is used. The exhibit features a video sequence showing how steam is captured at The Geysers field in Northern California and used to power turbines for the generation of electricity.

The Geysers, operated by Unocal, is the world's largest geothermal energy production project. This highly successful enterprise demonstrates Unocal's commitment to innovation, technological expertise and a bright energy future.

*After the meeting, Fred L. Hartley (top left) shared ice cream and conversation with shareholders on the plaza in front of Unocal Center. Many viewed the Geothermal Exhibit, originally created for Expo 86 in Vancouver, Canada.*



# Energy Security Report Misreads The Situation

*In his speech to shareholders, Unocal Chairman Fred L. Hartley made reference to a U.S. government study of the current energy situation. He stated that the study was overly optimistic, and the following article, which summarizes a Unocal analysis of the report, tells why.*

Last fall, the President ordered a comprehensive study of the U.S. energy situation. In March 1987, the Energy Security Report to the President was published by the Department of Energy.

The report forecasts rapidly shrinking domestic production, rising demand and burgeoning U.S. imports of Middle East oil—but sees no problem for U.S. national security before the mid-1990s.

While the report clearly states that an oil import fee would be the most effective policy in terms of increasing U.S. oil production and reducing demand and imports, it dismisses the fee as too costly to the nation.

Unocal's Government Relations Department has examined the Energy Security Report and found that it overstates an import fee's costs to the U.S. economy and understates its benefits.

For example, the report is based on data that it received from the Energy Information Administration last fall—before those data were revised to reflect the full effects of last year's plunge in oil prices. Consequently, this report—which forms the basis of administration energy policy—miscalculates both the magnitude and timing of the growing threat of an oil crisis in the United States.

According to Unocal's study, the report also misuses economic and computer models. The report bases many calculations on models that deal with externally imposed price shocks, such as the OPEC price hikes of the 1970s.

Proceeds from external price shocks leave the U.S. economy. The effects of these price shocks, then, are very different from the effects of an import fee, which the government would collect from our trading partners and pump into the domestic economy.

In the former case, the economy loses money. In the latter case, involving an import fee, the economy would gain money and the effect would be large and positive.

The rise in domestic crude oil prices that would result from an oil import fee would benefit the U.S. economy in three ways: boosting domestic drilling and production; cutting dependence on imported oil; and reducing OPEC's ability to jack up oil prices and thereby impose major shocks on the U.S. economy.

The Energy Security Report states that these benefits would be overshadowed by damage to the economy. For example, it forecasts that higher oil prices created by an import fee would create 100,000 oil field jobs but eliminate 380,000 jobs in other sectors of the economy.

However, the report considers only direct oil sector benefits, failing to see the broader picture. Creditable studies have shown that \$1 million spent on oil drilling creates \$3.9 million in economic activity; and every oil field job creates the need for nearly seven more jobs in other industries.

Therefore, the report has neglected to consider that 100,000 oil field jobs would create an additional 650,000 jobs in other industries. An import fee, then, would produce a net gain in employment of 370,000 jobs, not a loss of 280,000.

The report also forecasts a negative effect from an import fee on the gross national product, estimating \$200 billion in total reductions from 1988 through 1995. That number is only four-tenths of a percent of the more than \$45 trillion total GNP for those years. Even so, it is too high because of the misuse of economic models, as discussed earlier. In fact, a fee would probably result in a net benefit to GNP as in the case of employment.

The report has other flaws. It states that an import fee, by increasing the price of oil, would weaken U.S. international trade competitiveness. But this ignores the fact that the governments of our major trading partners have long-standing tax and energy policies that set the price of oil and oil products higher in their countries than they are in the U.S.

The report also states that the effect of an import fee on the petrochemicals industry would be disastrous. However, a comparison of 1985 and 1986 figures on product prices for international petrochemical companies shows little change—while profits shot up in 1986.

Unocal's study of the Energy Security Report concludes:

*If competitiveness is a problem, increasing our dependence on unreliable sources of oil by keeping prices down is no solution. If we need industrial policy to cope with changing world economic order and declining manufacturing in the U.S. economy, we should pursue an industrial policy directly, rather than go at it round-about by effectively subsidizing imported oil.*

*The Energy Security Report misread the situation it set out to analyze, and was sanguine in its conclusions. As a result, the administration still fails to recognize a major national security problem and thus refuses to take steps to solve it. 76*

# THE TEMPERATURE'S RISING

## Superconductor Research Holds Promise for Molycorp

Trains would rocket along on a cushion of air at 300 miles per hour. Computers would gain power and capacity while shrinking even further in size. Power companies would transmit more electricity for less money. Perhaps they could even generate current before it was needed, then store it for use when demand was highest.

These are but a few of the wonders that await mankind if the apostles of the dawning era of superconductors see the future as clearly as they profess to.

Today, much of the electricity generated each year, perhaps 20 percent, is lost because of resistance in the wires that transmit it. But superconductors can conduct electricity with no loss of energy—and this makes for exciting possibilities not only in energy transmission but also in the creation of electro-magnetic fields.

Almost weekly, headlines announce another gain in the international race to bring superconductors into commercial development by an army of scientists working so feverishly that some of them are even sleeping in their laboratories.

If they are successful, Unocal can expect to be a major contributor to the new market. Through its wholly owned subsidiary, Molycorp, Inc., the company produces certain compounds containing yttrium or one of several lanthanides that are being used in the preparation of superconductors.

Molycorp's mine at Mountain Pass, California, harbors an immense supply of lanthanides—and is the only resource developed solely for the production of these elements in North America. Through a partnership with a Canadian company, Molycorp is also a leading producer of yttrium.

*Microelectronics applications might be the first to benefit from superconductors' ability to carry current without heat-producing resistance.*



Chuck O'Rear/West Light

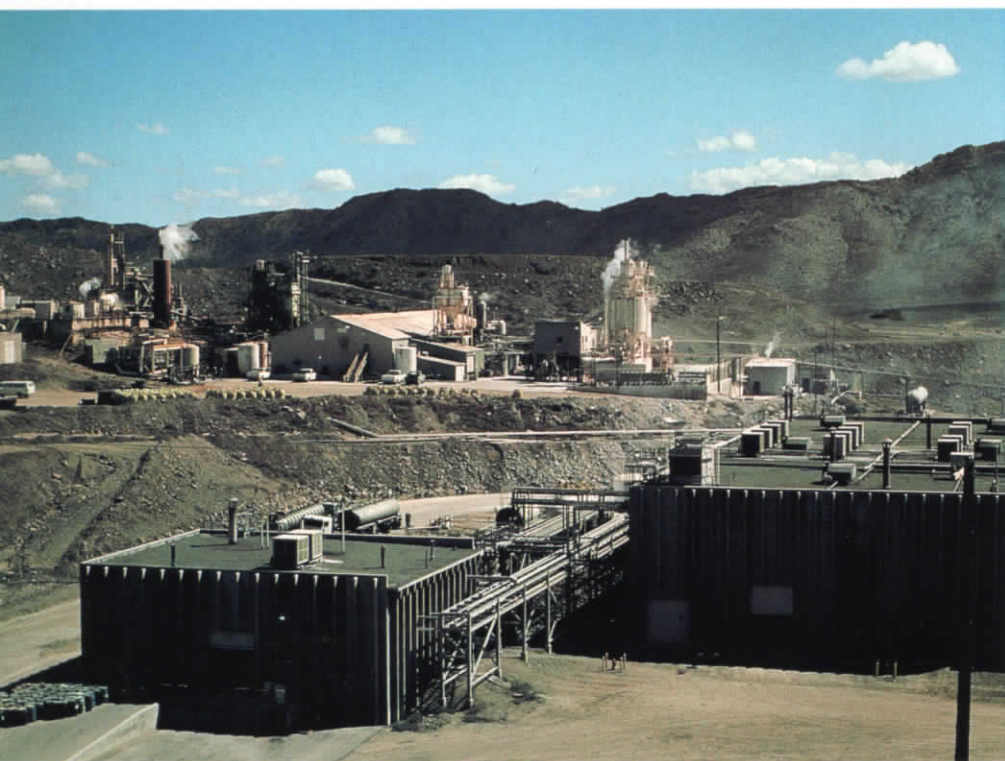
Like most players in the rapidly expanding superconductor game, Molycorp's view of its prospects is one of cautious optimism. "Because of our strong position in lanthanides, we hope the superconductor boom, when it happens, will expand opportunities at Mountain Pass many fold," says Tom Wilson, senior vice president of the subsidiary.

Unocal's position is not entirely one of wait-and-see, however. At the Fred L. Hartley Research Center in Brea, California, the Science & Technology Division has begun research aimed at finding a way for the company to supply more than the raw material of superconductors.

Unocal scientists, working in cooperation with Molycorp, hope to learn how to make superconducting ceramic compounds from yttrium and lanthanum, and perhaps other lanthanides as well. Molycorp would then sell the compounds to manufacturers.

"Because our products are already being used, we are learning as much as we can about superconductors so we will be able to work better with our clients," explains Dr. Mohammad Ghandehari, a Unocal scientist involved in the research.

Superconductors are not new. Dutch physicist Heike Kamerlingh Onnes discovered superconductivity in 1911. But until the recent series of breakthroughs, there was only one way to achieve it: by cooling superconducting substances (certain metallic alloys) with liquid helium, one of the coldest substances known. This was necessary because superconductivity does not occur at high temperatures. For many years, the magic number remained an incredibly frigid  $-418$  degrees Fahrenheit, or  $23$  degrees on the Kelvin scale. (Zero degrees K, or 'absolute zero,' is the theoretical point at which matter has no thermal energy—that is, the coldest temperature possible.)



*At Mountain Pass, California, Molycorp operates a mine (right) and processing facilities (left). Molycorp is the world's largest producer of lanthanides, and the resource at Mountain Pass is the only one in North America developed solely for the production of these elements.*



Liquid helium is so expensive that, until recently, the practical application of superconductors was extremely limited. A few giant particle accelerators employed them, as did magnetic resonance imaging machines used for medical diagnosis, but that was about the extent of their usefulness.

Then, in late 1985, physicists made a major breakthrough by achieving superconductivity in a ceramic compound at  $35^{\circ}\text{K}$  ( $-396^{\circ}\text{F}$ ). In little more than a year, that breakthrough led to the development of ceramic compounds that become superconductors at a temperature as high as  $98^{\circ}\text{K}$  ( $-283^{\circ}\text{F}$ ). That temperature can be attained using liquid nitrogen, which is cheaper by the quart than milk. With the need for costly liquid helium eliminated, practical applications for superconductivity are much closer to reality.

Oxides of yttrium-barium-copper and lanthanum-barium-copper are such superconducting ceramic compounds. Scientists now believe that these compounds may be able to generate even more powerful magnetic fields than metallic superconducting alloys such as niobium-titanium, the substance of choice for many years.

Scientists continue to look for superconductors that are effective at still higher temperatures, the ultimate goal being the development of a "room temperature" superconductor that needs no cooling at all. And some physicists have already reported effects related to superconductivity at temperatures as high as  $280^{\circ}\text{K}$ , or  $45^{\circ}\text{F}$ .

Meanwhile, scientists are at work in two other areas. They must find ways to turn superconducting ceramic material into wire flexible enough for practical use. And they must determine whether there is a limit to the current-carrying capacity of a ceramic superconductor.

Progress is occurring on both fronts at a startling pace. Researchers at Argonne National Laboratory near Chicago have made wire as thin as thread from a ceramic superconductor. This wire is brittle and breaks easily if not handled delicately, but the accomplishment represents an important stride.



William James Warren/West Light



Still another stride was taken in early May. IBM scientists announced they had demonstrated the expansion by 100-fold of the capacity of a superconductor to carry current. "It should be noted that they made this measurement on a single-crystal film," says Unocal's Dr. Steve Brass. "By its nature, such a single-crystal film is limited to use in micro-electronic applications."

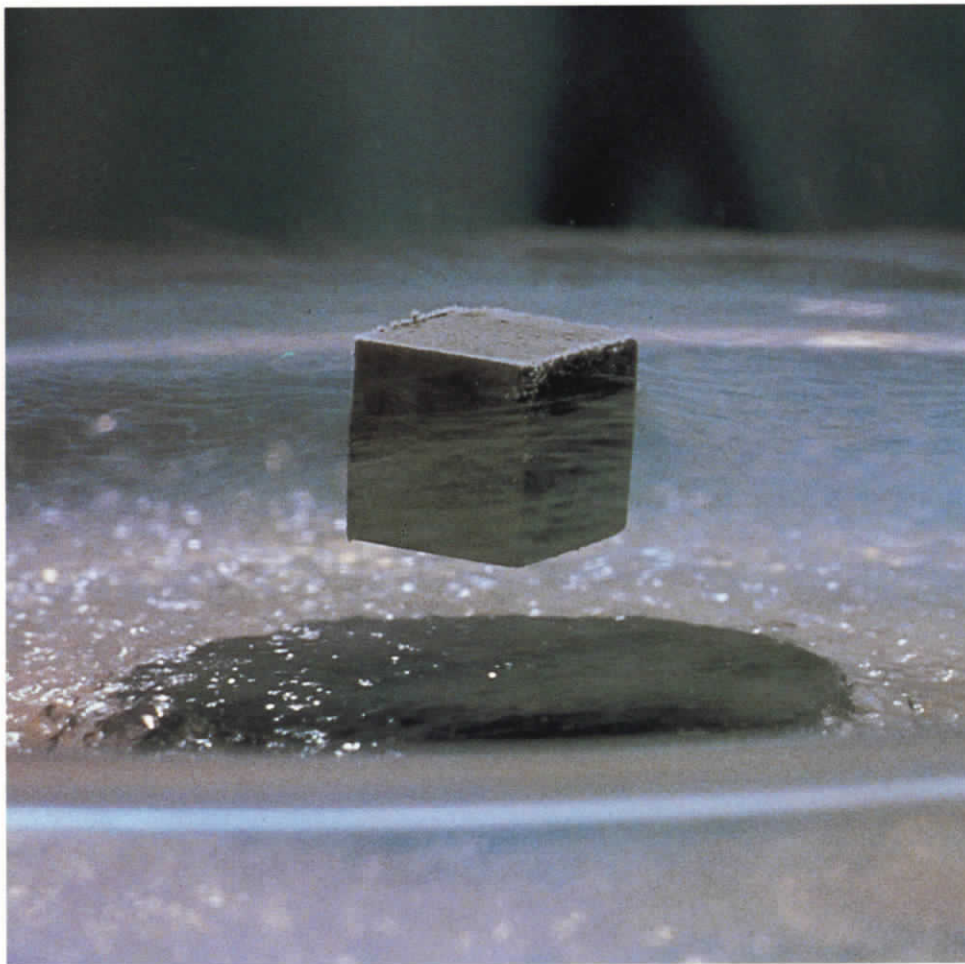
There remains the much larger problem of achieving this current-carrying capacity in larger, more complex, polycrystalline structures which would be required for use in magnets and power-transmission cables. But IBM's achievement is notable for what it reveals about superconductors, according to Ghandehari. "The IBM discovery gives us hope of producing polycrystalline materials with higher current-carrying capacity," he says.

One technological advance made possible by superconductors would be improved power transmission. Using superconductors, no electricity would be lost during transmission, so it could be carried over much greater distances from the generating source than it is today. Cities could be supplied by power plants in remote locales.

Not only would transmission be more efficient, but electricity could be stored. Theoretically, superconductors would allow the creation of enormously powerful magnetic fields that could contain electrical energy. Utility companies could generate energy on a steady schedule, storing the excess for use during periods of peak demand.

Superconductors could also usher in a new computer boom. Computer designers may have already reached the ultimate barrier to improving their hardware much further. The tightly packed circuits of today's computers threaten to melt themselves because they generate so much waste heat. If much of that circuitry could be replaced by superconductors, the tendency to overheat would be eliminated. Computers could be smaller and more powerful.

One of the more futuristic applications of superconductors would create trains that literally fly. Superconducting magnets mounted on the bottom of a train moving along a metal track would cause the train to levitate, or rise into the air, and float on the magnetic field.



*Left, the counter-magnetic force between a magnet and a disk of superconducting ceramic material makes the magnet levitate.*

*Right, the Japanese prototype maglev train has reached a speed of 321 miles per hour. Magnets in the track repel superconducting magnets in the train, causing it to levitate. By rapidly alternating the polarity in the magnets located both below and beside the train, the train is propelled forward and kept on course.*

Bill Pierce/Time Magazine

The technology has already been proven experimentally. In 1979, the Japan Railways Group built a prototype maglev (or magnetically levitated) train. Carrying no passengers, it reached a speed of 321 miles per hour on a test track. Earlier this year, a three-passenger version hit 249 miles per hour, a full 100 miles per hour faster than that country's bullet train. It is also substantially quicker than the French *Train à Grande Vitesse (TGV)* which, with speeds up to 186 miles per hour, offers the world's swiftest scheduled rail service.

Hopes are high for superconductors, although some recent reports are sounding a note of caution. The research still has a long way to go, and not all the advantages provided by superconductors would necessarily prove better or more economical than other solutions.

In medical scanners, where the cost of cooling the superconductor is a major expense, the new high-temperature superconductors do provide a definite advantage. But in other areas, the cooling factor may not be the most significant.

For example, in energy transmission, the superconductor advantage applies to direct current only, while power companies supply alternating current. This means that considerable expense would have to go toward converting AC to DC for transmission, then back to AC for distribution. Use of high-temperature superconductors also raises new technical problems in microelectronic applications, and while potentially cutting costs in certain maglev trains, does not solve other design problems.

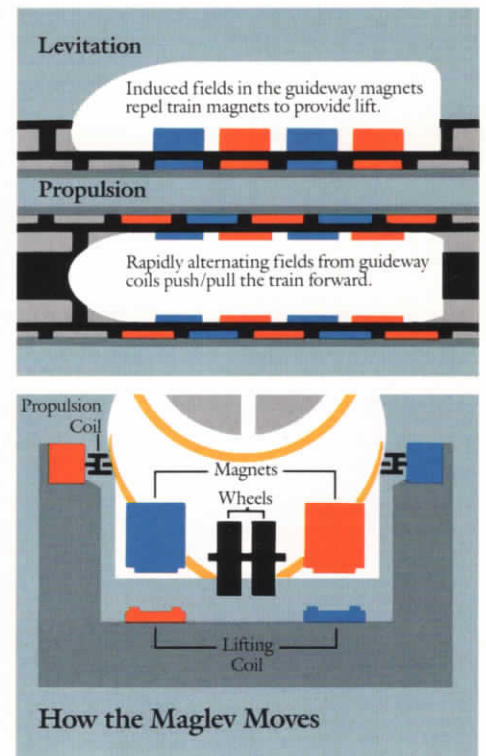
Nevertheless, the new developments are promising. "A great deal more attention and research dollars are now focusing on lanthanides and yttrium," notes Gene Dewey, president of Molycorp. "The experts still aren't sure why these elements work in superconductors. As they learn more, they may find other applications which we can't predict."

"If superconductors do take off in the future, Molycorp—as the prime supplier—will be ready to provide any of the lanthanides and yttrium in greater quantities," says Tom Wilson. "Right now, we're working closely with most of the players. While the sales volume for laboratory samples is small, potential sales in the long run could be substantial." ⑥

*Story by Art Bentley, Unocal public relations representative*



Graig Davis/Sygnma



# Parkway Paves the Way to Development

The new William S. McConnor Parkway is the highway to the future for the property surrounding Unocal's Refining & Marketing Division office in Schaumburg, Illinois.

The parkway, which Unocal built at a cost of \$2.6 million, was opened to traffic on June 4. William S. McConnor, member of Unocal's board of directors and retired president of the Refining & Marketing Division, was on hand to perform the ribbon-cutting ceremony for the parkway which bears his name.

"It gives me great pleasure to concede and dedicate this property to the Village of Schaumburg," McConnor said. "We have great faith in the growth of the village, and will always be proud to be a part of this community."

For Schaumburg, the new parkway means some relief for traffic congestion

on nearby roads. It is also an important segment of a planned route to make access easier to the community's present and future corporate, office and retail developments.

For Unocal, the parkway adds value to the vacant land around the company's office building. "It provides immediate access to an additional 75 acres," says Bill Huston, vice president, property and administration, Unocal Real Estate Division. "Our proposed concept is that development north of McConnor Parkway would be primarily office, south would be primarily residential and retail."

Unocal plans that the balance of its land in Schaumburg be developed within 10 years as the market for commercial space improves. Huston explains that today's trend is for major office users to leave urban areas for the less congested, less expensive suburbs.

Schaumburg, located 30 miles northwest of downtown Chicago and 12 miles from O'Hare Airport, offers convenient access to downtown business centers, while providing attractive retail and residential areas. One of Chicago's fastest growing suburbs, it is expected to reach a population of 200,000 by the end of the century. In the last 25 years, the population has grown more than tenfold to reach today's total of about 64,000.

Unocal's property, located at the



intersection of two major highways, consisted of some 250 acres of soybean and corn fields when it was purchased in 1958, according to Huston. It was bought for construction of Pure Oil headquarters, which became Unocal's Refining & Marketing Division eastern office after the two companies merged in 1965.

Since 1980, two office buildings and a Hyatt Regency Hotel have been constructed on the land. (Unocal holds half interest in the hotel.) The most recent additions are McConnor Parkway and a new Cajun-style seafood restaurant called Baystreet, which opened on May 1, 1987.

The four-lane McConnor Parkway is almost a mile long and is divided by a lighted, landscaped median strip. Unocal's construction included an adjoining bike path and utilities for future developments, such as sewers, storm drains, gas lines, and underground telephone and electrical lines.

The dedication ceremony was held near the intersection of McConnor Parkway and Meacham Road. Bill McConnor and Schaumburg Mayor Al Larson cut the ribbon. Then the two men took the first ride on the parkway



*Bill McConnor, left, and Al Larson cut the ribbon to open the new parkway.*



in an elegant 1929 Cadillac. The route took them behind the Unocal office building to Hartley Road and the main entrance to the Woodfield Hyatt Regency.

During lunch at the hotel, McConnor was presented with proclamations from both houses of the Illinois legislature. These commended his accomplishments for both Unocal and the State of Illinois, during a career that has spanned more than 45 years. 76



*Top, aerial view looking east over the Schaumburg property shows four-lane McConnor Parkway on the left and the low-rise Unocal building in the center. Plan view, above, shows potential development sites. Left, Bill McConnor and Al Larson are driven the length of the parkway in great style in a 1929 Cadillac.*

# The Spirit's Drive To Win



And the first-place winner is...

Ron Willett and his co-workers from Unocal's Los Angeles Terminal looked around the huge stadium, feeling a little nervous. More than 1,200 of the nation's finest trucks were assembled at the 1987 World's Greatest Working Truck Show in Anaheim, California. The leviathan tankers, haulers and other giants that lined the stadium field, their steel frames glinting in the sun like armor, were here to do battle.

Unocal Refining & Marketing Division truck-and-trailer rig, "The Spirit," was one of nearly 100 tankers competing for the first-place title of "Best Working Truck." And it was almost time for the judges' decision.

Sponsored by the Crippled Children's Society, the show helps raise money for the organization and is a nationally recognized event in the trucking industry. The first-place title is the trucker's version of an Academy Award. For the past three years, LAT's tank trucks had come up short of winning first place—and the competition this year was just as stiff.

"People can get real competitive with their trucks, but that's only natural," says Willett, who has driven the Spirit since it was delivered new to LAT by Peterbilt in 1981. "We all have a lot of pride in our trucks, and work hard to keep them in top condition."

The contest judges determined the quality of that condition by using a detailed grading system. They considered various factors, including the truck's age, mileage, cleanliness and decorative design. "And believe me," says Willett, "those judges didn't miss a thing."

The judges donned white gloves before evaluating the Spirit. As one judge ran his hands along the truck's underside, checking for hidden dirt and grime, another checked treads on each of the Spirit's 18 tires for uniform wear. Three other judges focused on different parts of the truck, making sure that all of the lights worked, and that the tanks, muffler, glass, hub caps and other fixtures were shiny and spotless.

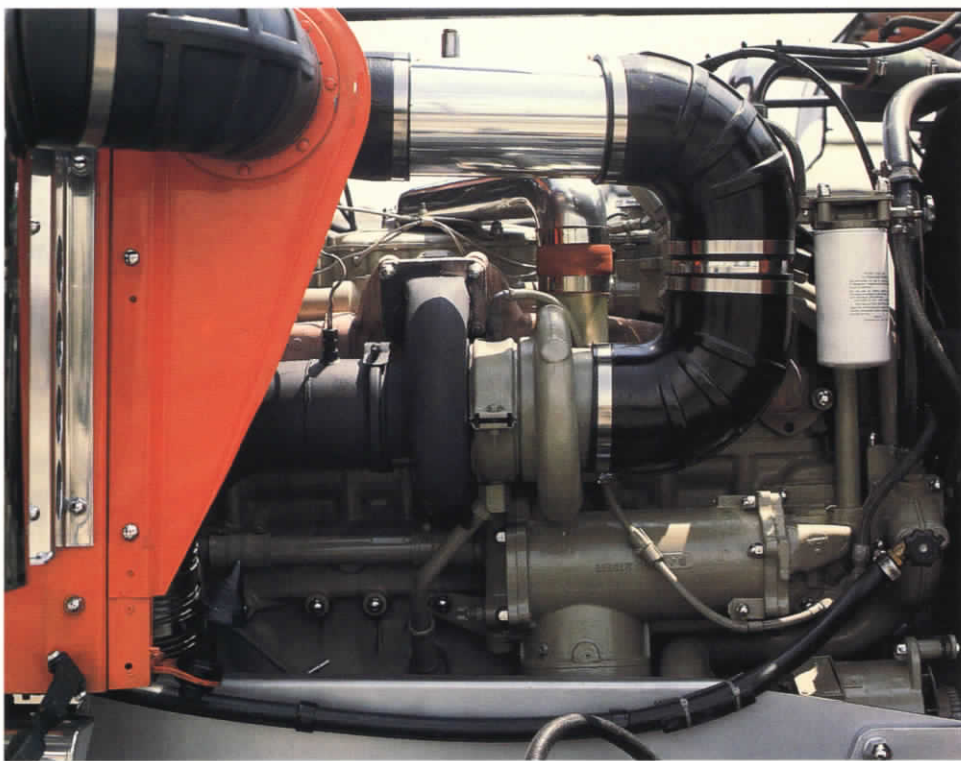
"They inspected almost every inch of the Spirit, from top to bottom and front to back," recalls Tyrone Vickers, who also drives the Spirit.

"We held our breath the whole time," adds Willett.

He and Vickers spent a restless afternoon waiting while the judges graded the other entries and met to deliberate. In the meantime, spectators enjoyed the truck show's live musical entertainment and appearances by celebrity guests. Later, the judges reconvened in front of the crowd to announce the winners. The first-place award for working truck of the year went to...the Spirit.

"It was great! We were real pleased," says Willett. "In last year's contest, the Spirit won a perfect score for beauty but she didn't have as much mileage as the tanker that won. The judges figure the more miles a truck has, the harder it is to keep it looking great. So they give points based on the amount of mileage on the tanker. This year, the Spirit had beauty—and 110,000 more miles."





“We were confident we’d win this year,” says Vickers, then smiles. “The Spirit was the best-looking tank truck there.”

Apparently, some of the losing companies thought so, too. Wayne Lough, LAT’s delivery supervisor, remembers a phone call he received a few days after the contest. “This guy practically declared war,” remembers Lough, laughing. “He told me he wasn’t used to his company coming in second place—and that from now on, he’d be striving to beat us.”

Eight months before, that same competitive spirit brought together 15 LAT mechanics, drivers and bulk operators who wanted to win the show’s first-place working truck award. They put in a lot of off-duty hours to prepare the Spirit for this year’s contest.

“We spent time making the Spirit unique because we knew we’d be up against heavy competition at the show,” says Willett. “We wanted to create details that no one else would have—so we all added our own personal touches.”

*Top left: It’s not hard to see why Unocal’s tank truck, The Spirit, won a first-place award in a national competition. Middle right: Spirit drivers Ron Willett and Tyrone Vickers (with vest) are surrounded by the handiwork for which they and their 13 LAT co-workers earned first-rate recognition.*



LAT driver Nancy Malm made plush blue and orange “76” covers for the Spirit’s driver and passenger seats. Bulk operator Bruce Bailey painted the mirror behind the seats with “Unocal 76,” and etched the truck’s name in one triangular side-glass window. Willett cut and installed beveled-glass inserts in the door. Others helped to polish the truck’s 65-foot-long body, engrave “76” on valve dust covers, and affix shiny silver “acorns,” or bolt covers, to more than 300 bolts along the truck’s body.

“We think the details helped impress the judges this time,” says Willett. “That—and the 610,000 miles on the Spirit’s odometer.”

Willett, Vickers and John Eneboe, who drive the tank truck daily, know how easily those miles can accumulate. LAT services an 8,000-square-mile area, from Goleta (near Santa Barbara) in the north to San Clemente in the south. The Spirit’s two tanks can hold up to 8,600 gallons of fuel per trip—enough to fill about 570 mid-size automobiles. The tank truck weighs about 40 tons when full.

With these capabilities, the Spirit represents modern trucking at its best. The tanker marks a startling contrast to its oil-transporting predecessor of the 1800s—which, on special occasions, can still be seen on the roads around the company’s birthplace of Santa Paula, California.



This antique tanker, known as Union Oil Tank Wagon No. 1, is located at the Oil & Gas Division’s Bridge Production Office in Santa Paula. Built at the turn of the century, the wagon today appears regularly in local parades and festivals.

But when first constructed, Tank Wagon No. 1 was far from being a pretty showpiece. The mule-powered, iron-wheeled wagon was used daily to transport petroleum products to customers from Santa Paula through Camarillo and Oxnard to Simi Valley, about a 16-mile journey. The iron tank had three compartments to store and separate its cargo: 80 gallons of fuel oil, 100 gallons of stove oil and 150 gallons of gasoline. The distance the wagon covered in a day depended upon such factors as the roads, weather—and the mules’ dispositions.

In 1910 Union put its first motorized truck into service in Los Angeles. In 1911 O&G in Santa Paula followed suit, and purchased a truck to speed up travel time along the winding, dusty roads. But the tank wagon’s teamster didn’t trust the motorized contraption. He continued to drive the mule team to transport oil until he retired. As a result, Santa Paula’s first truck did not come into use until 1913.

In 1922, Union’s fleet grew to more than 750 trucks. Purchases that year included the company’s first White truck, a popular model of the day. It boasted a four-cylinder, 30-horsepower engine, solid rubber tires, and a crank starter. This truck, No. 742, has been well-maintained through the years, and is located today at LAT. It won antique awards at the World’s Greatest Truck Show this year and in 1986.





After trucks became the established oil-transportation vehicle, the mule-powered Tank Wagon No. 1 went into storage at Santa Paula's Bridge Production Office. It eventually fell into disrepair. But Unocal's Alan Peck took an interest in Tank Wagon No. 1 and helped restore it. Peck, an automotive mechanic, works at the Bridge Production Office.

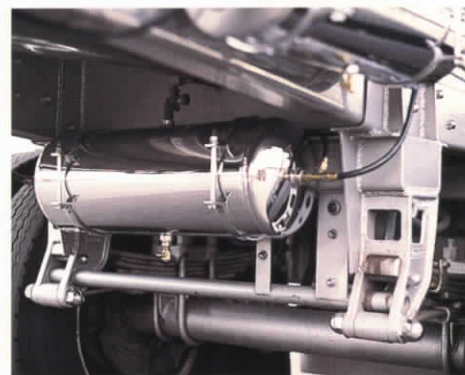
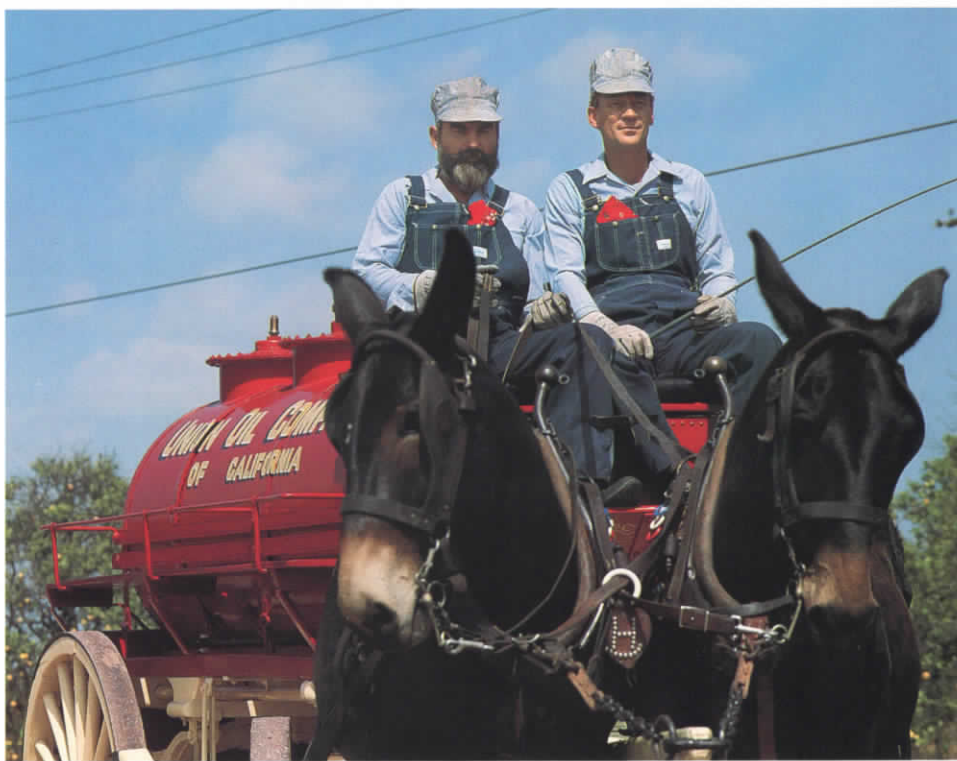
Peck rebuilt the wagon's wheels in 1968, shortly before the tanker was shipped to the Los Angeles Terminal. Then it went to the Tucson Terminal in Arizona (now closed) for use in local parades. In 1983, the wagon was returned to Santa Paula, where Peck and Jeff Parker helped renovate it. Parker is a utility man working out of O&G's Torrey Production Office in Piru, 16 miles from Santa Paula.

"We stripped down the wagon, then sandblasted and repainted it," says Peck. "Now No. 1 looks almost brand new."

Since the wagon's return to Santa Paula, Peck has entered it in numerous local parades and festivals. He and Parker ride atop the wagon, which is pulled by Peck's mild-mannered mules Kate and Charley.

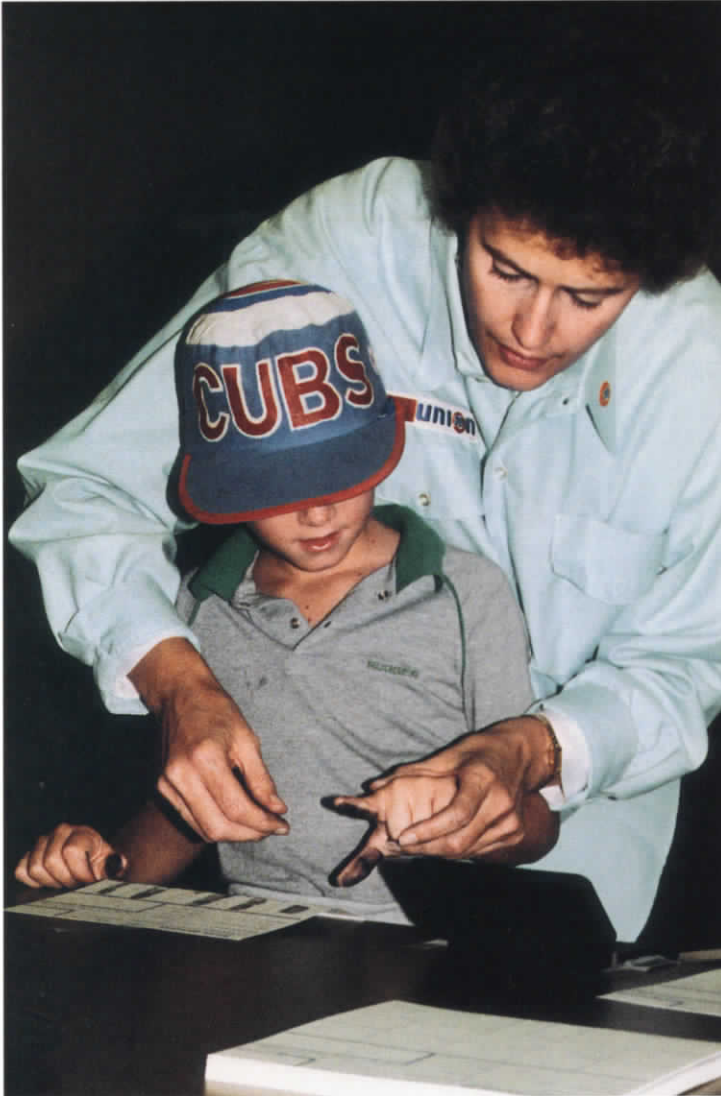
Santa Paulans are as proud of Tank Wagon No. 1 as the LAT crew is of the Spirit. Both tankers show that the Spirit of 76 is as strong today as it was in the 1800s, thanks to people who take pride in their work and in Unocal's history.

A. B. 76



*Top, opposite page: Unocal acquired this award-winning antique truck in 1922. The motorized truck replaced the company's mule-drawn Tank Wagon No. 1, built nearly a century ago (top right). Unocal's Alan Peck (with beard) and Jeff Parker refurbished the wagon in Santa Paula. The crew members whose work made The Spirit a winner are, from bottom left: Andy White, Tom Yonamine, Robert Prophete, Ed Harris, Gerald Cruse, Ron Willett, Jeff Bowen, Dave Turner, Nancy Mahn, Tyrone Vickers, Michael Peery, Bruce Bailey and Isaac Alvarez. At right, more examples of The Spirit's unique, polished details.*

# Community Work Builds Leaders



*Sandy Prichard, a 76 Service Association volunteer, fingerprints a young baseball fan as part of the organization's program that assists searches for missing children. The prints were applied on police-recommended information cards, which the volunteers distributed to parents.*

Gertrude Hausner had not spoken with her sister Frieda in over a year. The two were separated by the more than 500 miles between their homes in Illinois and New York—and by long-distance telephone rates they could not afford.

But last Christmas, Hausner called her sister—as well as an aunt in Wisconsin and a cousin in Florida—free of charge at Unocal's offices in Schaumburg, Illinois. As part of the "Senior Phones" project, about 60 residents from the Village Grove Apartments for Senior Citizens used Unocal's phones to call friends and relatives.

Senior Phones is just one of many special programs sponsored by Unocal's 76 Service Association, a group of employee volunteers at the Schaumburg office. The concept for this organization dates back to 1940. In that year, 10 Pure Oil employees got together to plan employee events. After Pure Oil moved to Schaumburg from downtown Chicago in 1960, the volunteers extended their attention to the larger community by working through the Schaumburg Jaycees. Within a few years of the Pure-Union merger of 1965, the group became the 76 Service Association.

"Our programs are still designed to benefit Unocal employees and enhance the local community," says marketing planner Gary Steele, chairman of the association. "There are about 1,000 employees here at the Schaumburg office. We try to keep them involved and interested in the company. And we want to show local residents we support the community, too."

*Right: Lenore Andel catches up on the latest news with a free phone call to long-distance relatives as part of the 76 Service Association's Senior Phones project. Below, Emilie Shorer shares good news from California with volunteers Gale Gangi and Gary Steele. Bottom: At the Schaumburg office, Unocal's Alvin Boyd gears up for a vigorous ride as a participant in the volunteers' bike-a-thon fund-raiser.*



“People really appreciate it when a large local company takes the time to help,” adds Gale Gangi, a marketing coordinator who led the Senior Phones project. “Unocal’s involvement meant a lot to Gertrude Hausner and her neighbors.”

The volunteers’ efforts are also appreciated by the company’s management. “The association provides worthwhile community services,” says Tom Matthews, Unocal’s vice president of eastern marketing. “It also helps employees gain diversified knowledge of the company. And, as volunteers, they take on leadership roles. That’s why we give the association our full support.”

Unocal backing includes the use of company facilities and equipment, and an annual budget. The money supports several events each year for employees, their families and other members of the community. The programs range from blood drives to bike-a-thon fund-raisers, and assist schools, local hospitals, charities and other community institutions.

In last March’s blood drive, more than 200 Unocal employees donated 172 pints of blood to a local hospital. Volunteers sponsor the event twice a year at the Schaumburg office. “People here really get involved in blood drives,” says Linda Golec, a systems analyst and 1987 coordinator for the event. “We expect the drive scheduled for September to be successful as well.”

In another association program, volunteers help to safeguard youngsters by fingerprinting them. “Having this information on hand will aid a police investigation if children are missing,” says Steele.



Twenty-five children of Unocal employees and neighbors inked their prints on cards, which volunteers then distributed to parents.

Young people also formed the focus of the association’s Junior Achievement program, in which high school students learn how to operate a business.

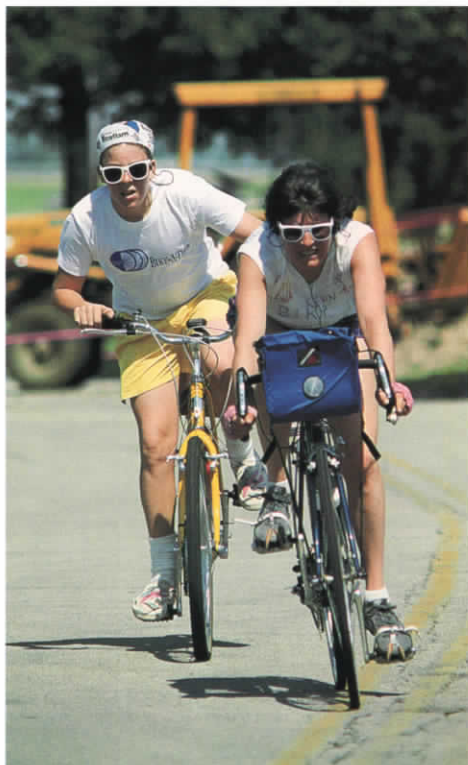
“This past semester seven kids from an area school raised money, bought materials, and sold glass candy jars—just like a regular business,” says Steele, who coordinated the event. “They went through officer training and other exercises, then sold \$700 worth of their wares here on Unocal Sale Day.”





*Top: Unocal's Kay Bellew helps volunteers Linda Quiroz and Gary Steele organize participants and answer questions at the Cancer Society Bike-a-Thon. Above: The 34 cyclists fared impressively—their miles around the Schaumburg complex nearly equaled the distance between Chicago and Billings, Montana! Right: Jeff Smith, son of Unocal's Jeff Smith Sr., and Schaumburg employee Colleen Benson rack up some of the group's 1,216 miles for the day.*

*"Our programs help raise morale," says volunteer Sue Kothera. "We bring employees together in relaxed settings where they can be involved in fun events. It makes for a closer group of employees—and a better work environment."*



The results of this entrepreneurial adventure? "The students began thinking on a broader scale," he says. "By running their own business, the kids learned more about the value of money and what it takes to succeed in business."

"The Junior Achievement program is one of our most visible and important projects," Matthews says. "It's amazing to see how much youngsters learn from making and selling their own products."

Another project, an annual Bike-A-Thon for the Cancer Society, achieves impressive results as well. Programmer Linda Quiroz chaired this year's event. Thirty-four employees became bike-riding fund-raisers for a day, earning sponsored dollars for each mile pedaled around the Schaumburg complex. Total net: 1,216 miles, more than \$6,550 for the Cancer Society—and a pizza party afterwards for the weary cyclists.

The volunteer organization's biggest event of the year is the Crusade of Mercy/United Way campaign, which usually lasts from October to December. This year, volunteers will work under coordinator Roger Petroff to help solicit employee donations to local and national charities. With the Unocal Foundation matching employee gifts on a one-to-one basis, last year the Schaumburg contribution to the Crusade of Mercy was more than \$145,000.

"This is the project on which we spend the most time and effort," says Petroff, a data administrator. "We give out information to employees, select speakers and organize the hundreds of donation forms sent in by employees. Conducting the campaign is quite a task, but it's manageable because we tackle it as a team."

*Right: Volunteer Linda Golec chats with John Kirkland, one of the group's four advisers, at the 76 Service Association's monthly luncheon meeting at Unocal's Schaumburg office. Below, Association members include, from left: Sue Kothera, Larry Spears, Gail Bordy, Kathi McBride, Gary Steele, John Fabing, Gale Gangi, Linda Golec, Paul Russo and Linda Quiroz.*



To maintain the continuity of the association's programs, each chairperson maintains a complete reference file on every project. Volunteers meet monthly to trade progress reports, suggestions and proposals for new events.

The association has four advisers—Rich Estlin, Jim Bray, John Kirkland and John Maher—who make sure the group's plans coincide with company policy. These Unocal employees are managers experienced in coordinating employee and community-service programs.

The Cancer Society Bike-A-Thon is a good example of association programs that benefit both the community and Unocal employees. "While employees were raising money for a good cause, they also brought along their families and had a good time," says Sue Kothera, the association's vice chairman and secretary.

Through their work for others, the volunteers gain valuable learning experiences. "The association nudges people into leadership roles," says Kothera. "By working on these projects, people develop management, communication and other important skills. They become more adept at interacting with Unocal executives and community representatives."

Although the volunteer work is worthwhile, it can get pretty demanding at times. Says Kothera: "You have to be willing to dedicate a lot of extra hours."



One of the reasons the work can be so time-consuming is that there are often more projects than volunteers. Traditionally, membership in the association is limited to 15 employees to ensure everyone gets the benefit of full participation. The association's members come from differing backgrounds and professions.

"You don't need any elaborate qualifications to become a member," says Steele. "We look at a person's work history and length of service at Unocal, as well as any past volunteer or community work. When current members resign or their five-year terms are up, we usually nominate new members from various departments in the company. But we've also welcomed people who come to our events and express an interest in joining.

"Our basic aim is to get energetic people who want to help," Steele explains. "The projects often require intensive work. That means each person takes on a job from the beginning and follows it through to the end. We can't afford to have people who don't participate."

Paul Russo, an accountant who joined the service association last year, agrees. "We do a lot of work, but it's worth it. We're giving something back to the community by helping kids, raising money for charities and putting on other programs. That's what I like best about being in the 76 Service Association—knowing that we're doing good things for people." *A.B.* 76

April 10, 1962 was opening day of the Dodgers' fifth baseball season in Los Angeles. Although the game didn't have the hoped-for result (the Dodgers were 6-3 losers to the Cincinnati Reds), the fans who attended undoubtedly remember it well. For this was not just any opening day. It was a landmark event for the team, the fans, and the city of Los Angeles—the grand opening of Dodger Stadium, widely acclaimed as the most beautiful and comfortable major league ballpark in the nation.

It's hard to believe, but the 1987 season marks the 25th anniversary of Dodger Stadium. During that quarter century, more than 64 million fans have streamed through the turnstiles. They have witnessed a lot of thrills and baseball history along the way, including seven National League pennants and three World Series championships won by Dodger teams.

## A BASEBALL PALACE TURNS 25

Unocal also shares in the club's history and success—not only as a long-time sponsor, but as a partner in making the late Walter O'Malley's vision of a "baseball palace" for Los Angeles a reality.

O'Malley, who purchased the Dodgers in 1950 (his son Peter has run the team since 1970), was no stranger to big dreams. He took a calculated risk in 1958, when he moved what was a very established and successful Brooklyn Dodger team west to Los Angeles. But the city immediately supported the new arrivals, giving major league baseball a solid foothold on the west coast.

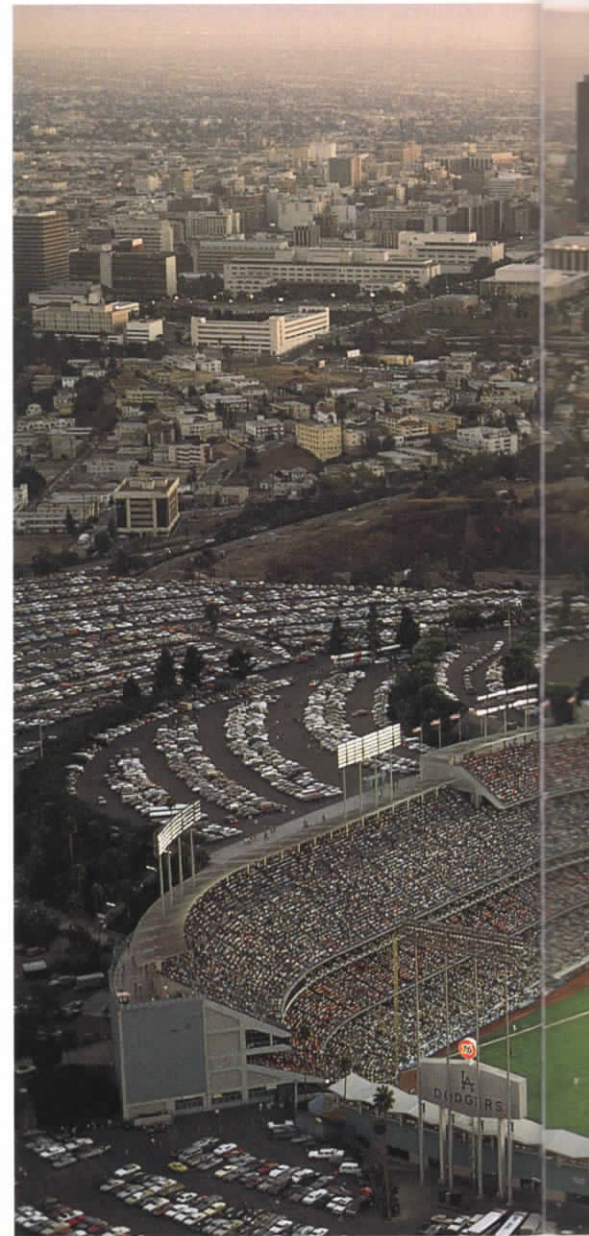
During their first four seasons in Los Angeles, the Dodgers played home games at the Memorial Coliseum. While a fine facility in its own right, the Coliseum was designed primarily for football and track meets. To define the boundaries of a baseball field, a chain link fence was erected as an outfield wall. This legendary "screen"—less than 300 feet from home plate in left field—was loved by the hitters, but scorned by every pitcher and outfielder in the National League. Relief was on the way, however. O'Malley and city officials wanted a brand new baseball stadium for Los Angeles, and plans for it had been set in motion even before the Dodgers moved west.

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*Located just north of downtown Los Angeles, Dodger Stadium consistently leads major league ballparks in attendance.*

The site chosen for the stadium was a 300-acre tract of land near downtown L.A. known as Chavez Ravine. Though well-situated, it was far from an ideal construction site. The terrain, a network of steep hills and gullies, was rugged and uneven. More than 8 million cubic yards of earth had to be moved to reshape the area before construction could begin.

Designed by Emil Praeger, the stadium itself was a marvel of engineering and architectural beauty. Seating for 56,000 fans was designed to give every spectator an unobstructed view of the playing field. Twenty-one terraced parking lots were laid out around the park's perimeter, providing space for 16,000 cars. Landscaping was designed to be both functional and visually pleasing.



The project also required use of advanced construction techniques. Some 21,000 precast concrete units, weighing up to 32 tons each, were lifted by crane into the stadium's structural framework. The cantilevered decks did not require a single column for support.

Even more remarkable was the fact that this mammoth construction project was privately financed. Unocal, which began sponsoring the Dodgers in 1959, played a role in the stadium's financing.

"Reese Taylor, then chairman of Unocal, was a big baseball fan and friend of Walter O'Malley," recalls Jerry Luboviski, former vice president of corporate communications for Unocal. "He took a personal hand in bringing major league baseball to Los Angeles by helping line up the stadium financing."

Part of the arrangement involved the display of 76 signs at the new stadium. "Neither Taylor nor O'Malley envisioned a stadium plastered with advertising," says Luboviski. "Instead, a deal was worked out that gave Unocal the exclusive right to have in-stadium signs."

The result was the illuminated 76 discs that sit atop the stadium scoreboard and message board today. (Two additional signs are part of the smaller baseline scoreboards.) The 12-foot diameter signs remain the only advertising visible in Dodger Stadium.

"The 76 symbol is one of the few trademarks that can stand alone," says Luboviski. "The signs are tastefully displayed and require no words, which fits with the stadium concept of simplicity and good taste. There's no question the signs are very valuable for Unocal. After 25 years, they are stadium fixtures."

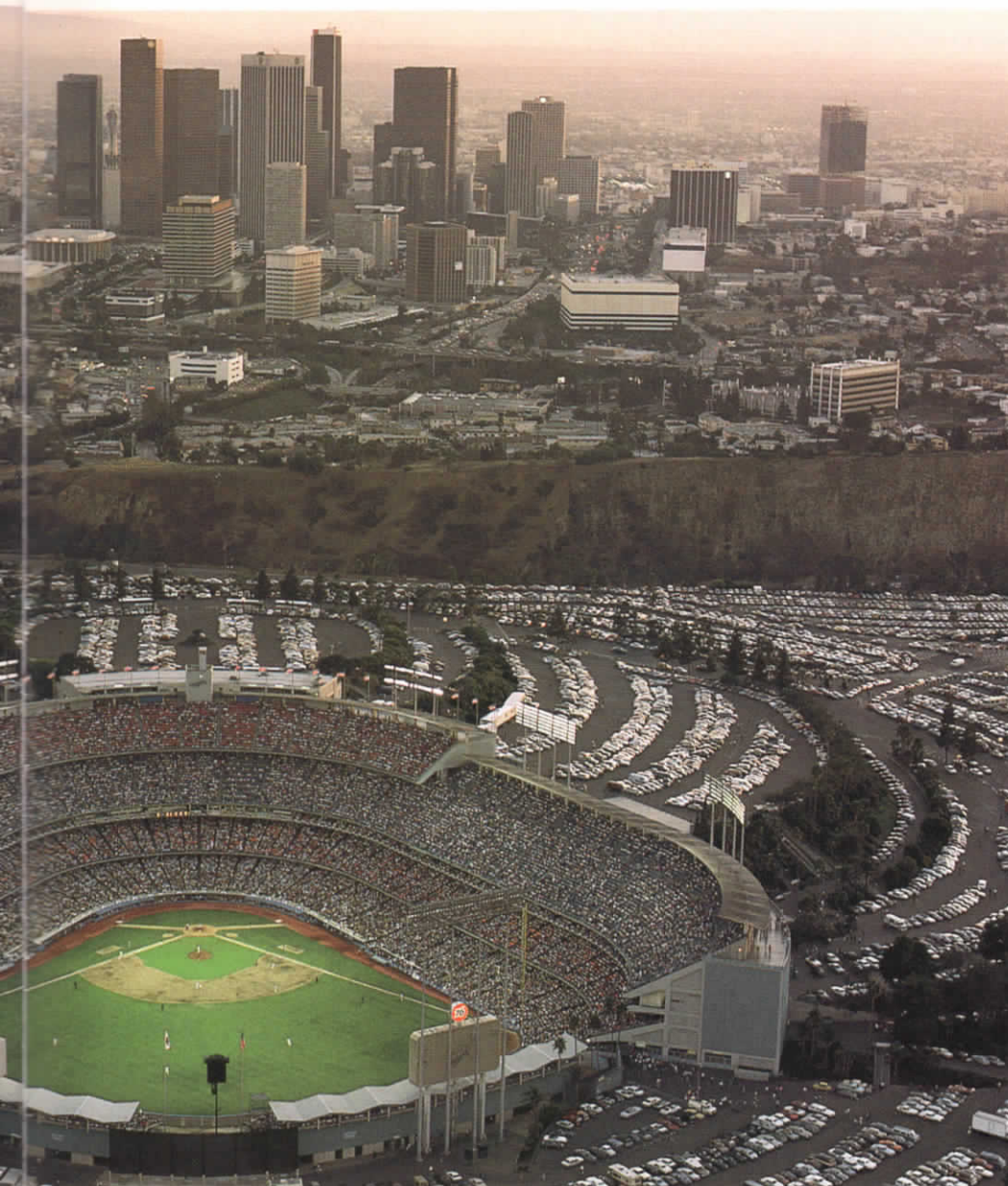
Another stadium fixture is the full-service Unocal 76 station located in the parking lot behind center field. Here, fans can fill up their cars and have them serviced before, during, or after Dodger games. The station is also used for filming Unocal television commercials during the off-season.

On that historic opening day back in April of 1962, a capacity crowd was on hand to christen the Dodgers' new home. Among them was longtime Dodger broadcaster Vin Scully, whose first impressions of the stadium were vivid.

"I thought it was just magnificent," Scully recalls. "Ebbetts Field (home of the Brooklyn Dodgers) was quaint, but Dodger Stadium was a palace. And we knew it was only going to get better. Today the stadium is more beautiful than ever."

Judging by fan response, both Dodger Stadium and the team it showcases are more popular than ever as well. Since the ballpark opened its doors, the Dodgers have led the major leagues in attendance 18 times. In 1978, they became the first team to draw more than 3 millions fans in a season—a feat they have now accomplished seven times. Dodger Stadium also achieved international recognition when it hosted the baseball competition of the 1984 Olympic Games.

"Unocal is proud to be a part of Dodger Stadium's history," says Clay Warnock, the company's vice president of western marketing. "We're now in our 28th season as a team sponsor. Over that time, we've become indelibly linked. The Dodgers are a first-class organization, and that makes a perfect fit for Unocal. It's an enduring relationship that carries great value for both parties." T.S. 76



# UNOCAL 76

## CORPORATE

- 40 YEARS Grace M. Brubaker, Unocal Center
- 30 YEARS Richard M. Woody, Unocal Center
- 25 YEARS Lawrence R. McKelvie, Unocal Center
- 20 YEARS Raymond A. Carson, Bakersfield, Ca.  
Michael Deming, Orcutt, Ca.  
Robert A. Faught, Los Angeles, Ca.  
Charles D. Henderson, Schaumburg, Il.  
Schyl J. Hinrichs, San Francisco, Ca.  
Janet L. Moon, Unocal Center  
Phillip D. More, Unocal Center  
William N. Scruggs, Ventura, Ca.  
John B. Wickman, Unocal Center
- 15 YEARS William R. Evans, Unocal Center  
Theresa M. Holman, Unocal Center  
Francine M. Nieves, Unocal Center  
John D. Rebhan, Unocal Center  
Ronald Ricchio, Unocal Center  
Gary W. Sproule, Unocal Center
- 10 YEARS Ian D. Gass, Unocal Center  
Kimberly C. Kelley, Unocal Center  
Susan K. Malone, Unocal Center  
John D. Marble, Unocal Center  
W. Anett Vasels, Schaumburg, Il.  
Stanley L. Zwicker, Unocal Center

## ENERGY MINING

- 10 YEARS Neal E. Kimble, Parachute, Co.  
Jack A. Marshall, Parachute, Co.

## SCIENCE & TECHNOLOGY

- 40 YEARS Gerald W. Simmons, Brea, Ca.
- 35 YEARS Billy J. Young, Brea, Ca.
- 30 YEARS Paul F. Helfrey, Brea, Ca.
- 25 YEARS Frank B. Booth, Brea, Ca.
- 20 YEARS Alex E. M. Barloewen, Brea, Ca.  
Donald T. Clark, Brea, Ca.  
Carol S. Flohr, Brea, Ca.  
Gary K. Hackett, Brea, Ca.  
Douglas E. Nelson, Brea, Ca.
- 15 YEARS Ross A. Clark, Brea, Ca.  
Gerald F. Lyddon, Brea, Ca.  
Carl D. McAulay, Brea, Ca.

- 10 YEARS Charles B. Hamilton, Brea, Ca.  
Richard A. Holstedt, Brea, Ca.  
Shelley M. Prior, Brea, Ca.  
Renee M. Robertson, Brea, Ca.

## ENERGY RESOURCES

### OIL & GAS

- 35 YEARS Fred H. Kirby, Houston, Tx.  
James E. Robertson, Woodward, Tx.
- 30 YEARS Robert T. Anderson, Anchorage, Ak.  
Lucien J. Cormier, Lafayette, La.  
Donald N. Forster, Unocal Center  
Raymond P. Hebert, Houma, La.  
Ben M. Mayfield, Lafayette, La.  
Raymond J. Noel, Van, Tx.  
Darwin E. Sainz, Orcutt, Ca.  
Richard M. Steadman, Pasadena, Ca.  
William E. Tanner, Houston, Tx.  
John H. Van Amringe, Pasadena, Ca.
- 25 YEARS Glen C. Berry, Andrews Tx.  
Daniel J. Madigan, Placentia, Ca.  
James R. Page, Midland, Tx.  
S. W. Roberdeau, Mobile, Al.  
Bobby M. Sewell, Orcutt, Ca.  
Gary A. Starek, Midland, Tx.
- 20 YEARS Richard J. Ashenfelter, Unocal Center  
Walter R. Bailey, Coalinga, Ca.  
Wanda J. Cooper, Oklahoma City, Ok.  
John C. Forbes, Jackson, Ms.  
Donald E. Gluyas, Orcutt, Ca.  
Jimmie D. Grimes, Ventura, Ca.  
Jack L. Howes, Orcutt, Ca.  
James C. Jones, Placentia, Ca.  
Johnnie N. Parker, Andrews, Tx.  
Raul J. Serna, Placentia, Ca.  
Rochelle R. Stone, Houston, Tx.
- 15 YEARS Harvey D. Batt, Worland, Wy.  
Roy A. Boudreaux Jr., Houma, La.  
John M. Branch, Lafayette, La.  
James R. Buckingham, Midland, Tx.  
Chester J. Carter Jr., Houma, La.  
Herbert L. Davis, Lafayette, La.  
John R. Dixon, Van, Tx.  
Bobby M. Franklin, Houston, Tx.  
John E. Graupman Jr., Taft, Ca.  
Johnny L. Jewett, Carpinteria, Ca.  
Larry E. McAllister, Ventura, Ca.  
Danny E. McKee, Van, Tx.  
Walter B. Monkhouse, Houma, La.  
Bennie C. Peavey, Van, Tx.  
Walter Pinkston Jr., Houston, Tx.  
Eugene Reed, Houma, La.  
Erich C. Thomas, Ventura, Ca.  
Robert P. Verret Sr., Lafayette, La.
- 10 YEARS Richard R. Bertrand, Lafayette, La.  
Richard J. Boyle, Orcutt, Ca.  
Michael J. Cerino Jr., Santa Paula, Ca.  
Mark A. Depuy, Pasadena, Ca.  
Francine K. Dicosimo, Houston, Tx.  
Mary B. Dodge, Lafayette, La.  
Larry M. Greve, Coalinga, Ca.  
Earl J. Guidry Jr., Houma, La.  
Jeffrey A. Holm, Orcutt, Ca.  
Stephen L. Holstein, Anchorage, Ak.  
Eldridge L. Huntsberry, Lafayette, La.  
Melissa S. Kane, Houston, Tx.  
Paul J. Kilchrist, Lafayette, La.  
Lawrence Milton, Lafayette, La.  
David J. O'Connor, Oklahoma City, Ok.  
Jose Olazabal, Orcutt, Ca.  
Craig D. Schneider, Worland, Wy.  
Gary C. Shrode, La Habra, Ca.  
Donald E. Sikes, Jackson, Ms.  
William A. Spears, Lafayette, La.  
Margarette L. Stagg, Van, Tx.  
Jerold L. Sweet, Coalinga, Ca.  
Marvin W. Terill, Santa Fe Springs, Ca.  
James V. Van Zitteren, La Habra, Ca.  
Mickey L. Winchester, West Liberty, Il.  
John E. Wing, Mobile, Al.  
Robert A. Young, Santa Fe Springs, Ca.

## INTERNATIONAL OIL & GAS

- 25 YEARS Jimmie L. Johns, The Hague, Netherlands
- 15 YEARS John A. Packard Jr., Unocal Center
- 10 YEARS Susan Shykun, Unocal Center  
Nancy Stillinger, Unocal Center

## Unocal Indonesia, Inc.

- 15 YEARS Dwiharti  
Salman  
Soenjoto  
Ephenetus Barus  
Chris Mangowal  
Willy Pinontoan  
Maritje Rompies  
Wahidin Sabran  
Jans Slamet Soerip  
Ignatius Soewarno  
Slamet Soewito  
Rachmad Sudiarto  
Djoko Sukartono  
Rully Tahier  
Charles Tanzil  
Gusti Uster  
Benny Widjaya



10 YEARS Djimo  
Wachid  
Widayanto  
J. H. Abast  
Kusyairi Anwar  
Irwan Askuri  
Sri Hastuti  
Agustinus Iskandar  
Djaswadi M.  
Adi W. Mestoko  
Alex Pangalila  
Burhanudin Saleh  
Lenny Sumarauw

#### Unocal Limited (Singapore)

10 YEARS Zulkeflyn bin Md Silah

#### Unocal Norge

10 YEARS Kirsten H. Amundsen, Sandnes, Norway

#### Unocal U.K. Limited

10 YEARS Jean Jeeves, London, England  
Fiona Morrison, Aberdeen, Scotland

#### UNOCAL CANADA LIMITED

20 YEARS Robert W. Goldie, Calgary, Alta.

15 YEARS William D. Pearson, Slave Lake, Alta.  
Garry W. T. Roseneau, Fort St. John, B.C.

10 YEARS Dale R. Brand, Calgary, Alta.  
Garry W. Kevoil, Calgary, Alta.  
Eric P. Key, Slave Lake, Alta.  
Rae O. Page, Slave Lake, Alta.

#### UNOCAL THAILAND, INC.

35 YEARS Harold M. Lian

20 YEARS Robert A. Nordquist

15 YEARS Eng L. Looi

10 YEARS Doug E. Wilbourn

#### GEOTHERMAL

20 YEARS James D. Cope, Manila, Philippines  
John K. Simecek, Unocal Center

15 YEARS Michael L. Barnes, Imperial Valley, Ca.  
John D. Bush, Imperial Valley, Ca.  
Patsy R. Collins, Unocal Center  
Mohinder Gulati, Santa Rosa, Ca.

10 YEARS George B. Crimm, Imperial Valley, Ca.  
Ernie W. King, Imperial Valley, Ca.  
Clifford G. Neve, Manila, Philippines  
William M. Rickard, Imperial Valley, Ca.  
Rebecca A. Toso, Santa Rosa, Ca.

#### Philippine Geothermal, Inc.

10 YEARS Eduardo B. Alamares  
Oscar B. Borlagdan  
Nimfa B. Briones  
Lordelino M. Cambaya  
Vicente C. Cope  
Salvador S. Cortezano  
Oscar A. Thomas  
Godofredo A. Victoria

#### REFINING & MARKETING

45 YEARS Boyd G. Lyon, Atlanta, Ga.

40 YEARS James R. Cassingham, Pasadena, Ca.  
James A. Fracaro, Chicago Refinery  
William A. Spence, Romulus, Mi.

35 YEARS John H. Bercovitz, Los Angeles, Ca.  
Franklin S. Boccia, Los Angeles Refinery  
Charles L. Burk, Columbus, Oh.  
Thomas E. Butler, Beaumont Refinery  
David L. Dimmick, Chicago Refinery  
Wayne G. Irvin, Chicago Refinery  
Elmer M. Johnson, Los Angeles Refinery  
Howard A. Johnson, Schaumburg, Il.  
Roy D. Lint, Sacramento, Ca.  
Richard A. Longhini, Chicago Refinery  
Joseph M. Peterson, Chicago Refinery  
James S. Quigg, Schaumburg, Il.

30 YEARS Mary Battaglia, San Francisco, Ca.  
David R. Cook, Atlanta, Ga.  
Richard L. Day, Los Angeles, Ca.  
Eric J. Falken, Los Angeles, Ca.  
Robert T. Mays, Los Angeles, Ca.  
Jack L. McLaughlin, Beaumont Refinery  
David J. McWhorter, Schaumburg, Il.  
John H. Orr, Schaumburg, Il.  
Wesley Rubidoux, San Diego, Ca.  
Marilyn G. Welch, Santa Maria Refinery

25 YEARS James A. Achilles, Chicago Refinery  
Kelly Arena, Beaumont Refinery  
Mitchell Darkins, Beaumont Refinery  
J. A. Dingeldine, Phoenix, Az.  
Leonard J. Heeg, Chicago Refinery  
Thomas L. House, Chicago Refinery  
Kenneth J. Kittell, Beaumont Refinery  
Harry S. Luten Jr., Atlanta, Ga.  
Edward P. Madsen, Schaumburg, Il.  
Nelson McCain, Chicago Refinery  
Carmen M. Negron, San Francisco, Ca.  
Joseph J. Ressler, Chicago Refinery  
Donald R. Roseberry, Cincinnati, Oh.  
William D. Sealy, Chicago Refinery  
Roger A. Winship, San Francisco Refinery  
James B. Wright, Van, Tx.

20 YEARS Leon F. Adams, Los Angeles Refinery  
Raymond E. Adams, Santa Maria Refinery  
Donna J. Ball, Schaumburg, Il.  
Leonora A. Basilio, San Francisco, Ca.  
Paul C. Battersby, San Francisco Refinery  
Betty H. Bauguess, Charlotte, N.C.  
Dennis D. Bonny, Portland, Or.  
Forrest R. Bottomley, San Francisco Refinery  
Richard A. Brown, Los Angeles Refinery  
Anthony Brown-Silva, Santa Maria Refinery  
Larry P. Champagne, Beaumont Refinery  
Walter W. Coleman, San Luis Obispo, Ca.  
Gordon Cunningham Jr., Atlanta, Ga.  
William W. Duren, Beaumont Refinery  
James H. Eagleton, Patoka, Il.  
Aldis J. Eliskalns, Los Angeles, Ca.  
John E. Fabing, Schaumburg, Il.  
Lynne Fuenty, Schaumburg, Il.  
Dell E. Gipson, Van, Tx.  
Theodore J. Hickel, Portland, Or.  
Vicki L. Hollomon, Beaumont Refinery  
Andrew E. Jakubczyk, Schaumburg, Il.  
Spencer L. Jayne, Richmond, Ca.  
Randall E. Johnson, Schaumburg, Il.  
Richard W. Jones Jr., Birmingham, Al.  
Abraham K. Kaniho, Honolulu, Hi.  
Clarence L. Kirk, Beaumont Refinery  
George W. Knox III, Schaumburg, Il.  
Donald E. Koob, Los Angeles Refinery  
Billy J. Lambert, Columbus, Oh.  
Alsaiah Lemons, Beaumont Refinery  
Charles W. Lennon, Schaumburg, Il.  
Edward F. Lopeman, Atlanta, Ga.  
Ronald A. Lubbers, Cincinnati, Oh.  
Walter A. Manzanares, Los Angeles Refinery  
Dale R. Mason, San Francisco Refinery  
James A. Moller, Los Angeles, Ca.  
Larry N. Molyneux, Atlanta, Ga.  
Wayne E. Moores, Beaumont Refinery  
John J. Pfister, San Francisco Refinery  
David P. Robinet, San Diego, Ca.  
Kathleen Schmidt, San Francisco, Ca.

## SERVICE AWARDS



Theodore R. Seden, Los Angeles, Ca.  
Ronald E. Smith, Los Angeles, Ca.  
H. J. Stephenson, Chicago Refinery  
Ronald H. Strand, Chicago Refinery  
Carol L. Tate, Walnut Creek, Ca.  
Leon Teasley, San Francisco Refinery  
William L. Thacker, Los Angeles, Ca.  
Karen L. Trace, Los Angeles, Ca.  
Clifford Vogtsberger, Los Angeles, Ca.  
Robert A. Wilkinson Jr., Chicago Refinery  
Thomas B. Williams, Los Angeles Refinery

15 YEARS Arnulfo J. Alcala, Avenal, Ca.  
Frank L. Balin, Colton, Ca.  
Nena M. Bitanga, San Francisco, Ca.  
Earl J. Blanchard, Los Angeles, Ca.  
A. D. Bowen, San Francisco Refinery  
David A. Bratt, Schaumburg, Il.  
Edwin P. Brooks, Schaumburg, Il.  
Bernadette B. Brown, Beaumont Refinery  
Richard A. Budler, San Francisco Refinery  
Sandra E. Colbert, Beaumont Refinery  
Harold R. Cook, Los Angeles Refinery  
Gary D. Ephraim, Chicago Refinery  
Clarence Forsh, Schaumburg, Il.  
Shawn B. Gilfillan, Tukwila, Wa.  
Lois L. Hague, Schaumburg, Il.  
James L. Heist, Cincinnati, Oh.  
Karen L. Huppenthal, Schaumburg, Il.  
Karl W. Keaton, Los Angeles, Ca.  
Richard J. Kocaja, Schaumburg, Il.  
Garfield J. Lee, Beaumont Refinery  
Shirley A. Madison, San Francisco, Ca.  
Ken B. Malkin, San Luis Obispo, Ca.  
Andrew Martinez, San Francisco Refinery  
Earl S. Mealins, Los Angeles, Ca.  
Faye M. Miles, San Francisco, Ca.  
Jacqueline M. Mobley, San Francisco, Ca.  
Freddy Morales, Avenal, Ca.  
James I. Mullenix, Los Angeles Refinery  
James M. Nelson, Beaumont Refinery  
Richard H. Ochoa, Santa Maria, Ca.  
Charlotte A. Potter, San Francisco, Ca.  
Willie L. Rhodes, Schaumburg, Il.  
Eleanor E. Roble, San Francisco, Ca.  
Marcia A. Rutz, Schaumburg, Il.  
Randall O. Schmidt, Schaumburg, Il.  
Hollistene Scott, Walnut Creek, Ca.  
William R. Shumate, Los Angeles, Ca.  
James D. Simpson Jr., Los Angeles Refinery  
Linda S. Sinila, Los Angeles, Ca.  
Daniel M. Sobieski, Los Angeles, Ca.  
Darrell D. Thompson, Los Angeles Refinery  
Daniel J. Tucker, Los Angeles Refinery  
David E. Turner, Los Angeles, Ca.  
Cheryl Tye, San Francisco, Ca.  
Teresita Villavicencio, San Francisco, Ca.  
Richard P. Wells, Los Angeles Refinery  
Herbert Williams, Atlanta, Ga.  
Dalisy B. Yemat, San Francisco, Ca.

# SERVICE AWARDS



10 YEARS Morris J. Allen, San Francisco Refinery  
Hubert W. Baker, Beaumont Refinery  
John M. Beath, Beaumont Refinery  
Gary G. Brashier, Avenal, Ca.  
Bob Y. Bryan, Beaumont Refinery  
Barbara A. Buckley, Schaumburg, Il.  
Larry G. Burton, San Francisco Refinery  
Bernard N. Carlson, Beaumont Refinery  
David E. Castagnetti, San Francisco Refinery  
Donald J. Chapman, Beaumont Refinery  
Audrey N. Choate, Schaumburg, Il.  
Paul R. Cimino, Chicago Refinery  
Morgan L. Clark, Los Angeles Refinery  
Donald P. Clausen, Portland, Or.  
David R. Coleman, San Francisco Refinery  
Richard E. Cosmer, Cerritos, Ca.  
Russell A. Crawford, Beaumont Refinery  
Ellen S. Delege, San Francisco Refinery  
Bethine V. DeLong, San Diego, Ca.  
Jackie H. Farmer, Olney, Il.  
William Fenton Jr., Los Angeles, Ca.  
Steve A. Flack, Fresno, Ca.  
James H. Glover, Richmond, Ca.  
Jacqueline M. Honer, Los Angeles Refinery  
Jacklene P. Hubbell, Schaumburg, Il.  
Patrick J. Iona, Edmonds, Wa.  
Ralph C. Isaacs, San Francisco Refinery  
Jessie Jackson, Schaumburg, Il.  
Darrell G. Jacob, Beaumont Refinery  
Christine G. Jasinski, Schaumburg, Il.  
Michael H. Johnson, San Francisco Refinery  
Loren M. Johnson, San Francisco Refinery  
Gary S. Johnson, Los Angeles Refinery  
Arthur Keyes, Fresno, Ca.  
Randolph G. Ladd, San Francisco Refinery  
Scott B. Lee, San Francisco Refinery  
James R. Lemons, Olney, Il.  
Janis A. Lindbeck, Beaumont Refinery  
Eugene F. Lowes, Los Angeles Refinery  
Steve D. Maher, San Francisco Refinery  
Adela Matanic, Schaumburg, Il.  
Wayne J. McDowell, Spokane, Wa.  
Joann R. Melicharek, Schaumburg, Il.  
Gene H. Michaud, San Francisco Refinery  
Denise C. Michelson, Los Angeles Refinery  
Harold W. Miller, Birmingham, Al.  
Freddie L. Montgomery III, Portland, Or.  
Manuel T. Morales, Pasadena, Ca.  
Richard D. Moreno, Stockton, Ca.  
Dexter O. Morrison, Portland, Or.  
Joseph S. Noreiko Jr., Chicago Refinery  
Craig E. Notter, San Francisco Refinery  
Roger G. Petroff Jr., Schaumburg, Il.  
John G. Plaughner, Los Angeles, Ca.  
Michael A. Pontious, Beaumont Refinery  
Gardner A. Potter, San Francisco Refinery  
James E. Prusener, San Francisco Refinery  
Gloria Quesada, Los Angeles, Ca.  
Rudy R. Ramirez, Los Angeles Refinery  
William G. Recob, San Francisco Refinery  
Caryn L. Reynolds, Sacramento, Ca.  
Michael I. Rigsby, Beaumont Refinery  
Daniel K. Salyers, Taft, Ca.

Michael J. Schendel, Schaumburg, Il.  
Vernon R. Schenfisch, North Hollywood, Ca.  
Jan L. Schwamb, Schaumburg, Il.  
Terry D. Shaw, Los Angeles Refinery  
C. Len Smith, Beaumont Refinery  
Darrell L. Stephens, Beaumont Refinery  
Bette J. Stewart, Los Angeles, Ca.  
Willie Taylor Jr., Los Angeles Refinery  
Christopher S. Telles, Los Angeles Refinery  
Mark L. Thomas, Los Angeles, Ca.  
Barbara F. Todd, Sacramento, Ca.  
Patrick J. Valente, Santa Maria Refinery  
Steven T. Wade, Fresno, Ca.  
James D. Walter, Bakersfield, Ca.  
Brian J. Ward, San Francisco Refinery  
Karen S. Wells, Beaumont Refinery  
John W. Wentworth, San Francisco Refinery  
Edmund A. Wojtanek, Schaumburg, Il.  
Becky L. Wyatt, North Hollywood, Ca.  
Lawrence M. Ziemba, Chicago Refinery

## MARKETERS & DISTRIBUTORS

55 YEARS Odom Oil Co., Spartanburg, S.C.  
50 YEARS Carl Brown's Petroleum, Taft, Ca.  
40 YEARS David M. Hitch, Ventura, Ca.  
35 YEARS W. D. Bickmore, LaGrande, Or.  
E. W. Kliever & Sons, Inc., Dixon, Ca.  
30 YEARS Nesmith Fuels, Inc., Oakridge, Or.  
25 YEARS William J. Welt, Inc., Cottage Grove, Or.  
20 YEARS Alaska Oil Sales, Inc., Soldotna, Ak.  
Marine Fuel Service, Inc.,  
Marina Del Rey, Ca.  
Michael L. Gray, Heppner, Or.  
Weible Petroleum Products,  
Wickenburg, Az.  
15 YEARS Chastain-Clark Oil Co., Thomasville, Ga.  
Don's Oil Co., Inc., Algona, Ia.  
Donald E. Fiedler, Newport, Wa.  
Lake Elmo Oil Inc., Lake Elmo, Mn.  
Julian W. Perkins, Inc., Elyria, Oh.  
San Juan Fuel Co., Inc., Roche Harbor, Wa.

10 YEARS Kenneth E. Stirckland, Inc., Coachella, Ca.

## CHEMICALS

30 YEARS Guy F. Davies, Schaumburg, Il.  
Roland C. Diehl, Portland, Or.  
James E. Poplin, Charlotte, N.C.  
John W. Warren, Charlotte, N.C.  
25 YEARS Albert M. Savage, Carteret, N.J.  
20 YEARS James W. Connors, Unocal Center  
Wayne E. Crawford, Unocal Center  
Wilhelm J. Menke, Lemont, Il.  
Cynthia A. Oskroba, Schaumburg, Il.  
James M. Peters, Unocal Center  
Robert D. Smith, Charlotte, N.C.  
Wilda E. Williams, La Mirada, Ca.  
15 YEARS Alfred Amaral, Providence, R.I.  
Terrance M. Hanson, St. Paul, Mn.  
James W. St. Clair, Schaumburg, Il.  
Daniel D. Williams, Bridgeview, Il.  
10 YEARS Raymond E. Baran, Lemont, Il.  
Steven D. Bjork, Brea, Ca.  
Jay K. Daugherty, Kenai, Ak.  
James J. Dean, Kenai, Ak.  
Ben T. Goto, Unocal Center  
Alvin W. Hampson, Kenai, Ak.  
Carl Holland Jr., Kenai, Ak.  
Ronald R. Inlow, Kenai, Ak.  
Betty A. Leigh, Clark, N.J.  
David M. Maki, Rodeo, Ca.  
Genevieve C. Mroz, Bridgeview, Il.  
Appleaney Norwood, Bridgeview, Il.  
Michael L. Nugent, Kenai, Ak.  
Van R. Pogue, Oakland, Ca.  
Herbert W. Roper, Tucker, Ga.  
Charles H. Ross, Kenai, Ak.  
Lawrence F. Staats, Kenai, Ak.  
Robert G. Szoldatits, Lemont, Il.  
Robert K. Westover, Kenai, Ak.  
Richard S. Wiggins Jr., Kenai, Ak.

## MOLYCORP, INC.

20 YEARS R. Gene Dewey, Unocal Center  
George L. Tilley, Louviers, Co.  
15 YEARS David J. Ventura, Washington, Pa.  
10 YEARS Jacqueline G. Canepa, Mountain Pass, Ca.  
Lorraine Cunningham, Mountain Pass, Ca.  
William Devine, Unocal Center

## POCO GRAPHITE, INC.

10 YEARS Randy D. McKelvain, Decatur, Tx.  
Charlotte S. White, Decatur, Tx.

## RETIREMENTS

### Corporate

Edmund D. Blum, June 15, 1953  
Kenneth V. Bone, January 2, 1973  
Grace M. Brubaker, July 10, 1947  
E. William Cole, June 15, 1968  
William A. Daniels, February 6, 1956  
Helga E. Deeke, July 27, 1959  
William G. Dickson, November 1, 1956  
Oscar C. Eubank, December 15, 1952  
Norma V. Ham, May 29, 1946  
Robert F. Koch, July 2, 1949  
Sheila B. Nagler, June 5, 1967  
Ludmyla Nimciv, January 27, 1955  
Stephen H. Nosler, June 11, 1951  
Donald A. Solberg, October 1, 1952  
Jean L. Tackels, January 28, 1974

### Energy Mining

John A. Abramo, January 16, 1977  
Downs McCloskey, March 20, 1955

### Oil & Gas

Richard S. Gillen, October 17, 1949  
Robert R. Locke, June 30, 1953  
Loye G. Walker, July 17, 1951

### Refining & Marketing

J. V. Bardin, April 20, 1944  
Robert A. Campbell, July 6, 1949  
James C. Carr, March 18, 1977  
Guy O. Dyke Jr., March 9, 1950  
Eric I. Fredholm, September 8, 1947  
Lourae E. Gorich, March 16, 1947  
Albert C. Green, May 5, 1953  
James L. Grimmer, March 30, 1949  
James L. Heist, May 10, 1972  
Howard A. Johnson, July 28, 1952  
Seymour J. Johnson, February 1, 1951  
James B. Kelly, October 30, 1947  
Everett G. Lain Jr., April 14, 1949  
Richard V. McDowell, June 16, 1955  
Dan McInnis Jr., September 18, 1950  
Thomas D. Pereira, July 4, 1951  
Harold L. Reed, July 15, 1949  
Robert Sheppard Jr., November 11, 1948  
Calvin D. Spell, January 13, 1953  
John F. Steele, August 29, 1946  
Richard E. Strauss, March 19, 1956  
Keith E. Walter, May 13, 1955  
William F. Young Jr., April 1, 1953  
Ralph N. Zimmer, August 21, 1962

### Chemicals

Charles E. Doolin, May 15, 1954

### Molycorp, Inc.

Lois L. Cunningham, May 1, 1977  
Clyde R. Johnson, January 7, 1963  
Alice I. Ling, August 5, 1976  
Alfred M. Romero, August 15, 1967

# SERVICE AWARDS



## IN MEMORIAM

### EMPLOYEES

#### Refining & Marketing

Edward S. Nosal, May 29, 1987

#### Chemicals

Charles M. Overton, April 19, 1987

### RETIREES

#### Corporate

Oliver M. Frinier, May 4, 1987  
Joyce A. Gordon, August 5, 1986  
Joseph P. Johnson, May 18, 1987  
Maxine W. Mitchum, August 18, 1986  
John S. Swanson, April 17, 1987

#### Science & Technology

Edward C. Dugan, September 7, 1986  
Robert R. Montgomery, April 1, 1987  
Francis A. Pate, April 20, 1987  
Kenneth R. Trader, April 21, 1987

#### Oil & Gas

Theodore M. Anderson, April 17, 1987  
Charles J. Bergeron, April 14, 1987  
Lee E. Copelin, August 23, 1986  
Sidney G. Corson, March 20, 1987  
Clement Demarets, August 17, 1986  
Charles M. Dobson, January 20, 1987  
Luther R. Ellis, April 12, 1987  
Theodore H. Everson, February 28, 1987  
Cecil A. Hamman, May 3, 1987  
Perry M. Hicks Jr., March 20, 1987  
Joseph Q. Hoback, April 20, 1987  
Alexander S. McGee Jr., August 18, 1986  
Andrew Okrusko, July 27, 1986  
Paul D. Renfro, May 8, 1987  
Lloyd F. Thompson, April 21, 1987  
Willie R. Thorpe, February 26, 1987  
Clifford W. Wood, August 22, 1986

#### Refining & Marketing

John Armour, March 26, 1987  
Leo M. Ashmore, April 17, 1987  
William S. Biggers, September 7, 1986  
Russell A. Boeve, April 2, 1986  
Raymond J. Boland, March 22, 1987  
T. R. Brackin, August 28, 1986  
David S. Bright, March 28, 1987  
John Brinson, March 27, 1987  
Arthur Clark, May 3, 1987  
Herman C. Cordes, February 24, 1987  
George C. Crabtree, August 1, 1986  
Wilbur M. Crane, April 17, 1987  
Arthur G. Crocker, August 25, 1986

Donald Cullen, March 23, 1987  
Frank L. Davis, February 21, 1987  
Wiley C. Day, April 23, 1987  
Harry W. Dennis, August 24, 1986  
Newman G. Dowdey, March 31, 1987  
Marjorie S. Dowdle, August 18, 1986  
Patrick D. Driscoll, September 13, 1986  
Orin L. Dyer, March 27, 1987  
Lewis A. Feldman, August 5, 1986  
Alvin T. Gammon, August 2, 1986  
John B. Glenn Jr., August 23, 1986  
Myrtle Grant, August 5, 1986  
Vernon W. Groves, August 7, 1986  
Bertha L. Hardee, February 14, 1987  
Clayton Harvill Sr., March 27, 1987  
Virginia Bernice Head, August 20, 1986  
Barkus Holmes, May 10, 1987  
Joseph Humm, April 15, 1987  
James L. Husnick, April 13, 1987  
Herbert Inlow, February 20, 1987  
William H. Jones, March 18, 1987  
Kermit E. Kaschke, February 25, 1987  
Frank Kilminster, March 26, 1987  
Arthur B. Kling, February 27, 1987  
Homer Fred Lambert, March 18, 1987  
Winston Larsen, February 27, 1987  
Mattie L. Lindemann, April 2, 1987  
Arvid C. Lundeen, March 5, 1987  
Allan Manteuffel, April 28, 1987  
Ralph W. Mauerhan, April 29, 1987  
Ralph E. McClelland, March 24, 1987  
Peter J. Pacin, April 27, 1987  
William Pappas, May 1, 1987  
Arthur W. Peterson, July 14, 1986  
Grace T. Phillips, April 3, 1987  
Clarence J. Pieterick, August 20, 1986  
Albin A. Plut, September 20, 1986  
Frank E. Posey, September 8, 1986  
Edward J. Quinn, April 22, 1987  
Eddie R. Ragan, April 3, 1987  
Wayne S. Rallings, February 28, 1987  
Walter E. Remter, August 14, 1986  
John E. Roberson, April 14, 1987  
Mabel Roussel, September 4, 1986  
Reuben A. Runyon, August 31, 1986  
Willie E. Sandlin, August 10, 1986  
Frank N. Schroeder, April 3, 1987  
Vernon L. Scott, May 12, 1987  
Sophia A. Segerdahl, September 10, 1986  
Thomas T. Shelby, August 12, 1986  
James E. Smith, March 25, 1987  
Richard D. Smith, February 22, 1987  
Joseph W. Spencer, March 11, 1987  
Jerry H. Spicer, April 12, 1987  
Joseph W. Stasel, March 26, 1987  
Hugo L. Stream, September 18, 1986  
Frank Stute, March 26, 1987  
Charles W. Thompson, August 21, 1986  
John R. Trubich, September 3, 1986  
Winifred Wheleham, July 12, 1986  
Robert L. Whitman, April 1, 1987  
William F. Wilfley, March 16, 1987  
Kenneth E. Wilkin, September 6, 1986  
James A. Wisdom, March 18, 1987

#### Chemicals

Robert L. Henderson, May 4, 1987  
James R. Martin, April 12, 1987

#### Molycorp, Inc.

John Kovacicek, March 2, 1987  
Theodore R. Poff, March 5, 1987  
James W. Rosson, March 28, 1987  
Luis Sena, April 16, 1987  
Fred J. Strankman, February 3, 1987  
Harry B. Taylor, April 29, 1987  
Walter Tober, April 19, 1987

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SEPULVEDA CA 91343

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A marvel of engineering and architectural beauty, Dodger Stadium marks its first quarter-century this season. The "sign of the 76" is indelibly linked with this Southern California landmark.**Service Awards** Page 38**Cover:** A pumping unit in Unocal's North Riley field presents a stark profile against the West Texas sky. Despite a depressed economy, development is accelerating in the company's Central Region. Story on page 1. Photo by Bob Thomason.*Seventy Six* is published by the CORPORATE COMMUNICATIONS DEPARTMENT, Unocal Corporation, Box 7600, Los Angeles, California 90051. Karen Sikkema, Director, Corporate Communications; Barbara Pederson, Editor; Tim Smight, Associate Editor; Adrienne Byers, Editorial Assistant; Ray Engle and Associates, Art Directors.**seventy SIX**  
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