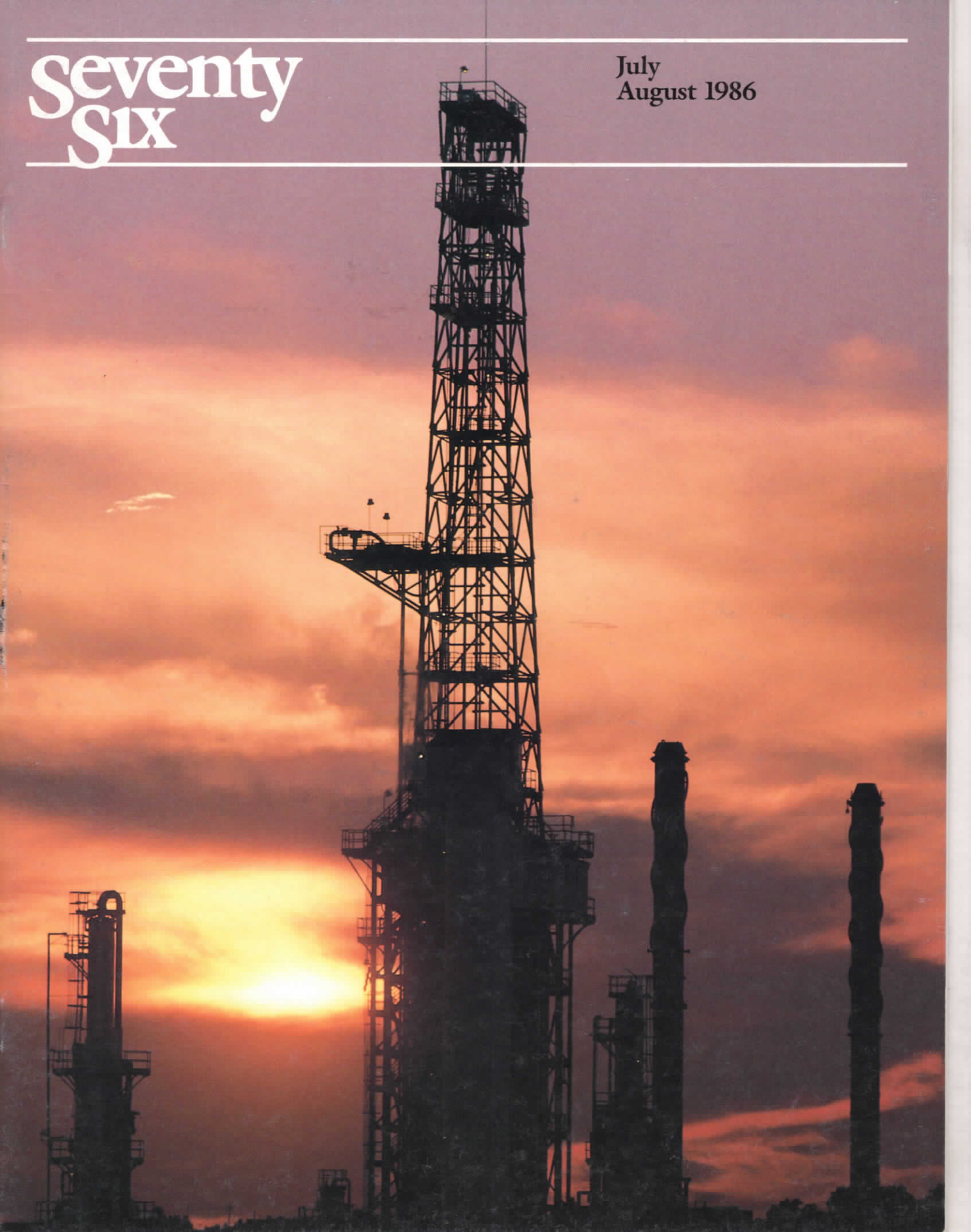

Seventy SIX

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A TRIUMPH OF TECHNOLOGY AND TEAMWORK

During the Middle Ages, alchemists attempted—and failed—to turn lead into gold through magic. Today, through science, Unocal is succeeding in a similar endeavor—turning low-value heavy oil into a premium specialty chemical: needle coke.

In a refinery, a coker is used to make light hydrocarbons from heavy crude oil or the residues of other refining processes. Under severe thermal cracking in a coker, these heavy oils release lighter liquid and gaseous hydrocarbons, leaving a solid, coal-like by-product whose porous appearance has earned it the name “sponge” coke. Basically a low-value fuel, it brings relatively low prices.

But “needle coke,” a specialized product developed over the years from sponge-coking technology, commands much higher prices. The “needle” in the name describes the appearance of the coke’s crystalline structure under the microscope. It has several properties that make it a superior product for certain industrial uses.

There are about a dozen producers of needle coke in the world. Of these, only a few—including Unocal Corporation—make top grade, premium needle coke. This premium product has only one use: as the raw material in graphite electrodes that are used in electric arc furnaces to melt down scrap steel. These furnaces, which use less energy and emit much lower levels of air pollutants than traditional blast furnaces, represent a growing segment of the worldwide steel industry.

“When we say electrode, we have to qualify it as an ultra high power, or UHP, electrode,” explains Dave Barth, vice president, carbon marketing, Unocal Chemicals. “Our coke finds its way into that market exclusively.”

There are about eight UHP electrode producers in the free world. With so few raw material suppliers, these eight needle coke buyers are always interested in another source. “That’s why we have caught their interest,” says Barth. “Now, it’s up to us to convince them that our product performs. Actually, they take samples of the product, test them and convince themselves.”

So far, electrodes made from Unocal needle coke have been tested in steel mills in the U.S., Canada and Europe. The feedback has been excellent. “It’s too early to do a lot of bragging, but it looks very positive,” says Barth.

In 1981, when the decision was made to go ahead with the needle coke project, the market was vigorous. However, during the period of construction of Unocal’s needle coking facilities, steel making fell off. In today’s market, it is imperative that Unocal’s product quality be high enough to compete with the best—and it is.

“From all signs so far, there will be a very strong demand for our needle coke,” says Doug Slife, manager, economics & development, Unocal Chemicals. “I base that strictly on the performance of this product. We’ve gotten an excellent reception from our customers. I think we’ll sell everything we can produce.”

Cloyd Reeg, president of the Science & Technology Division, agrees: “We are only a year into this business and we are in the position of producing the best, or one of the best, needle cokes in the world. It represents a tremendous technological success.”

It is not only a technological triumph, but also a triumph of coordination and cooperation among four company groups: Chemicals, Refining & Marketing, Science & Technology, and Engineering & Construction.

At about 275 feet, the coker towers above the other equipment in the needle coking complex at the Chicago refinery.



Doug Slife



Keith Openshaw



Dave Barth



The idea was born in the Chemicals Division. Science & Technology developed the process. Engineering & Construction was responsible for the design and construction of needle coking facilities. The Chemicals and Refining & Marketing divisions produce the needle coke as a joint venture.

Since the needle coker operates much like any sponge coker, the needle coking portion of the project was built at Unocal's Chicago refinery (located in Lemont, Illinois). The coke is conveyed from the refinery to the adjoining Chemicals carbon plant, where it is calcined—a process that burns off most of the volatile combustible matter left in the coke, so that the finished product is almost pure carbon. Chemicals' carbon marketing group is responsible for sales.

"Everyone has pulled together and worked hard," says Slife. "I don't think there is another project in the company that has involved so many different groups working so closely together."

Persistence has also played an important role. "In the late '60s, we became aware that there was a special type of coke that filled a certain need in the market, and that there weren't very many producers," says Dave Barth.

But the Chemicals Division's efforts to get into the needle coke business were stymied, more than once, by the problem of securing a long-term supply of a low-cost, low-sulfur feedstock to make this new coke, according to Keith Openshaw, senior vice president, Unocal Chemicals. (Sulfur causes major problems in the process of turning needle coke into graphite.)

After a time, there was only one obvious solution.

"We called the major graphite producers and told them that we were going to attempt a research program in which we would use the cheapest feedstocks possible," says Openshaw, "and that we would put conversion facilities into the process to remove the sulfur and make every feedstock ideal. They were interested."

So, Openshaw called John Duir, manager of process development at S&T (who has since become vice president of engineering & development). "I told Keith it would be difficult but a great challenge for S&T," says Duir.

Duir shared the challenge with Milan Skripek, supervisor of development operations. They developed a process scheme using existing technology. The idea was simple, but apparently untried by other needle coke producers. It formed the basis for Unocal's process.

A conventional desulfurization process could not be used because it would alter the molecular make-up of the feedstock, rendering it unsuitable for making needle coke. Unocal's process, protected by patent, is a unique scheme to desulfurize the feedstock in such a way that the essential molecular characteristics remain intact. Even though the basic processing concept is simple, it took almost two years to successfully work out the fine points.

"All things considered, that's not too long," says Duir. "The trick was to find processing conditions that would pull out sulfur atoms without adding hydrogen atoms. Since there are a lot of hydrogen atoms around (during desulfurization), you need to apply many chemical and engineering principles."

Before Openshaw made his proposal to the electrode manufacturers, S&T's chemicals research group had tested potential low-value, high-sulfur feedstocks (decant oils) produced by the fluid catalytic crackers at Unocal's Los Angeles, Chicago and Beaumont refineries.

"We found that we could make a decent needle coke—decent for that time—out of all of these decant oils and most of the other refiners' stocks we tested," says Mike Block, manager of chemicals research. "We were certainly highly encouraged."



Premium needle coke produced by Unocal is used to make ultra high power electrodes.

The feedstock for the needle coker—decant oil—is produced in the refinery's fluid catalytic cracker, seen here through a gas plant.

After Skripek's group began developing the desulfurization process, Block's group evaluated the treated feedstocks. Unocal's researchers had an enormous advantage at the S&T labs in Brea, California. Unlike most other companies' research labs, Unocal's facilities include both a bench-scale coker and a pilot plant coker.

Since the coker is an essential part of a refinery, Unocal had built these two experimental units to assist research on characterizing the liquid products coming out of the process. This capability proved invaluable when the emphasis shifted to the solid product of coking, since the pilot plant coker closely simulates the yields and quality of commercial-scale production. "Processes involving solids are particularly prone to changes when you try to scale-up," notes Skripek.

The bench-scale coker, which produces eight to ten pounds of coke on a given run, allowed rapid testing of many different feedstocks at relatively little expense. The pilot plant coker, which produces about 300 pounds of coke at a time, confirmed that high quality needle coke could be produced and provided the basis for the design of the commercial needle coker.

The production of needle coke is an exacting process. Even a slight variation in time or temperature can alter the quality of the coke—so Unocal's research team had to come up with just the right combination of processing conditions to make a premium product.

"We had to develop a new process to make a better material than other producers," says Slife. "As a result, I think we've ended up with a more versatile process and a unique product."

Needle coke was probably first produced in the 1950s as a high quality sponge coke with some attractive properties, according to Block. The specifications for needle coke then were primitive as compared to what they are today.

Today's premium needle coke is made from a narrowly specified feedstock under tightly controlled conditions. Low sulfur content is just one of many requirements for the product. Another important property of the needle coke, and of the graphite that is subsequently produced from it, is the coefficient of thermal expansion (CTE), a measure of how much the material expands when heated.

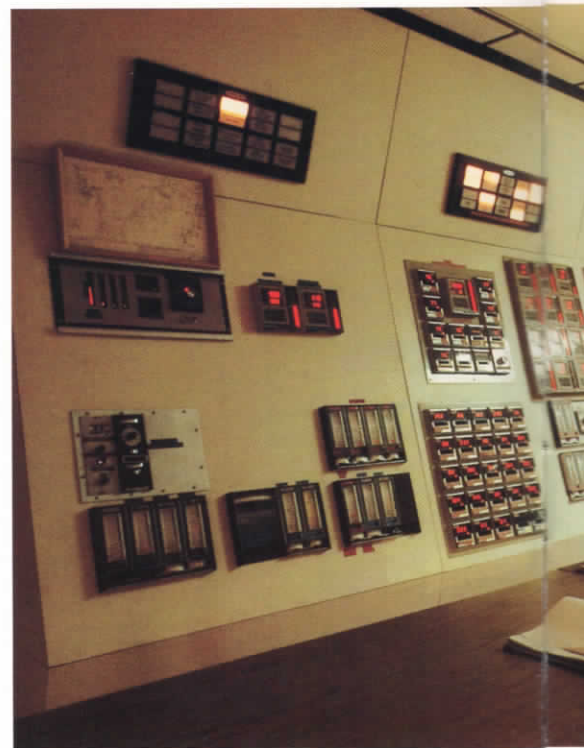
Graphite electrodes manufactured from Unocal's needle coke are 20 to 28 inches in diameter and 24 feet long, assembled in three eight-foot sections. Each weighs about a ton. In the steel mill, a cluster of three electrodes is lowered into a furnace full of scrap steel. At the top of each electrode is a power cable and clamp. When the current is turned on, electric arcs jumping between the electrode tips and the steel create temperatures high enough to melt the scrap.

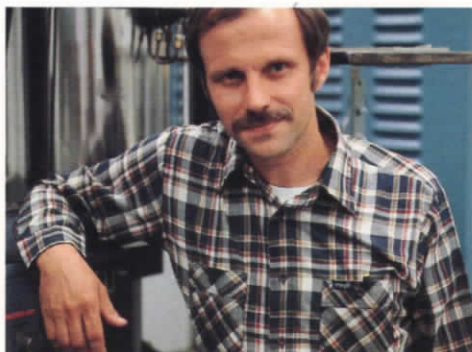
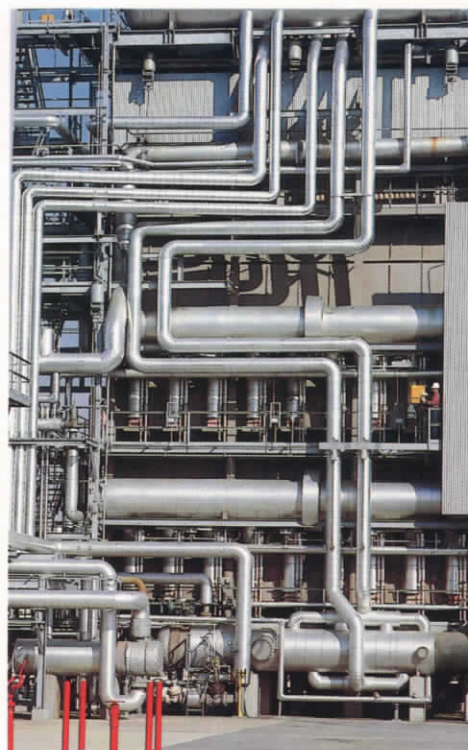
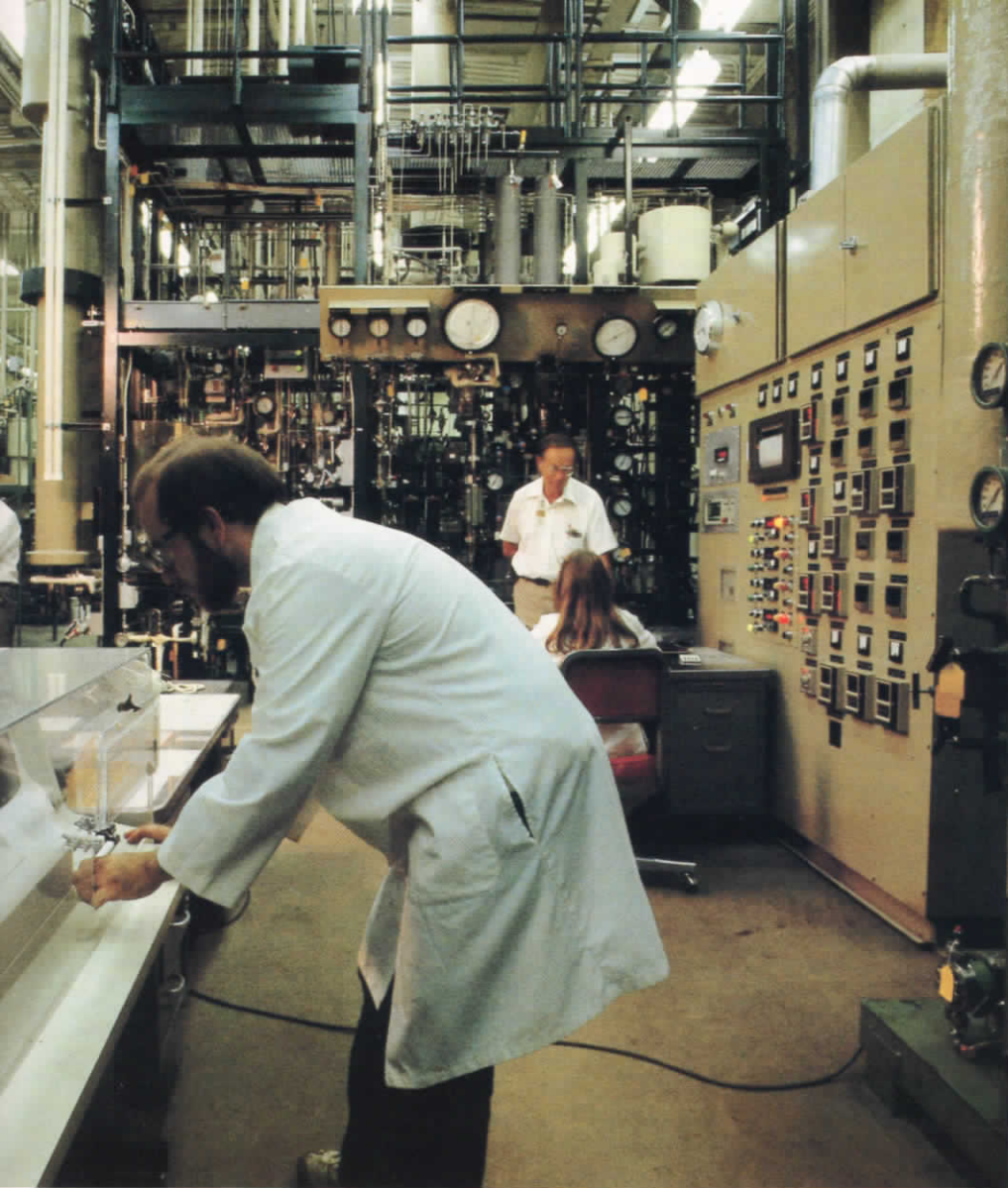
"It feels like there's a war starting when they turn on the current," says Slife. "The arc strikes between the electrodes and the steel, and it's very loud. Blue light and sparks fly everywhere. It gives you a lot of respect for what the graphite has to go through."

Arc temperatures in the furnace are estimated to reach as high as 10,000°F, while the upper ends of the electrodes remain at room temperature. Such stress would shatter most materials. But graphite with a low enough CTE can withstand the extreme variation in temperature, maintaining its shape and strength.

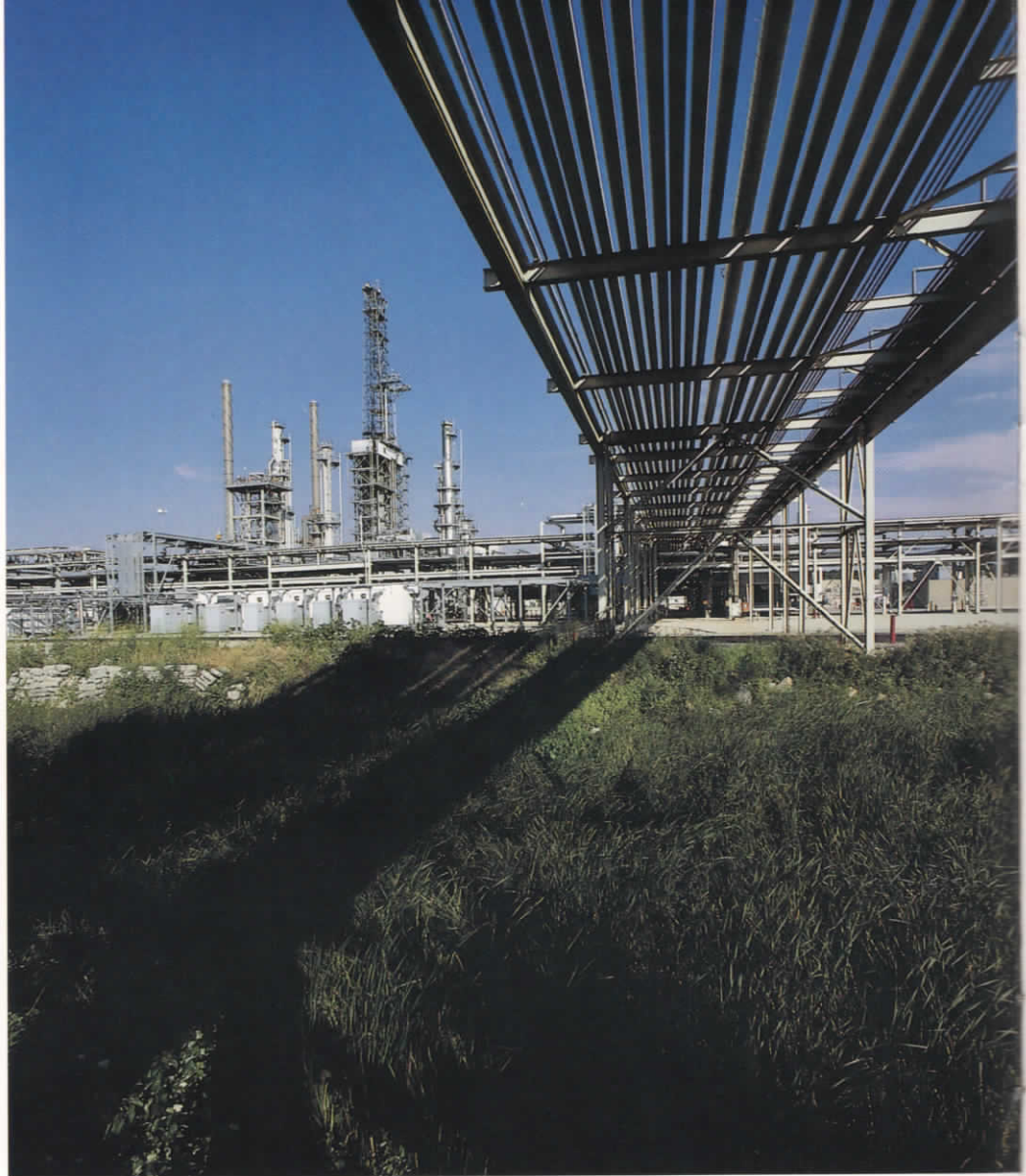
Although Unocal's process was designed to produce low-sulfur, low-CTE needle coke, the required levels dropped even lower while Unocal was still constructing its facilities. "Product quality has been a moving target since we began," says Skripek, "and the specifications continue to get more stringent."

The technique to desulfurize decant oil to provide a suitable needle coke feedstock was developed in the pilot plant (right and above) at the Fred L. Hartley Research Lab in Brea, California.





*Top, Mike Block.
Above, the hydrogen plant reformer in the
needle coking complex.
Above left, Milan Skripek.
Left, S&T's Bob Miller, senior engineering
associate, continues to play a key role in the
development and operation of the needle coking
and calcining facilities.*



Top, Tom Carter keeps a close watch on the control board at the needle coker (top right). Above, entrance to the Chicago refinery. Right, Al Eliskalns (top) and John Bassett have headed the refinery's efforts in the project, with Gary Ephraim and Jim Ganzman (not pictured) serving as needle coke project coordinators.



When Unocal's project started in 1977, sulfur content was targeted at 0.7 percent or less. Because of improvements in electrode manufacturing, that requirement dropped to 0.5 percent by the time actual plant design began, and it now looks like it will go lower still. "These may sound like very small differences to the layperson," says Skripek, "but they are very difficult targets to meet."

The CTE requirement for needle coke has also been dropping, as steel-making technology advances. The more power the steel maker can put through the electrodes, the hotter and more efficiently the arc furnace operates. But this puts greater stress on the electrodes and requires a very low CTE.

Needle coke has to have other very specific physical and chemical properties in order to be used in UHP electrodes. Testing how well all of these product specifications have been met is complicated by the long lag between the time the needle coke is manufactured and the time the UHP electrode is jolted into action in the steel mill.

"It's almost six months after we make the coke before we find out how good it really is," says Slife.

After the needle coke is made in the Chicago refinery and calcined at the neighboring Unocal Chemicals carbon plant, it is loaded onto trains or barges for shipment to electrode manufacturers, who may be as far away as Europe. Electrode manufacturing takes about three months. The finished UHP electrodes are shipped to steel mills all over the world.

Because of the time lag, Unocal must keep detailed records of the feedstock and the processing variables of every batch of needle coke. "The refinery and the carbon plant both have excellent computer data gathering systems," says Skripek. "So whether we've made a mistake or a good material, we know how we did it."

Above left, black UHP electrodes glow from the intense heat produced in an electric arc furnace in a steel mill (photo courtesy of Union Carbide).

Left, a microscopic view shows why it's called "needle coke."

Chicago was selected as the location for the needle coke project for two major reasons. The refinery could supply most of the decant oil used as feedstock, and the location was ideal for shipping the product. Domestic electrode makers are located in the East and Midwest, and shipments to European manufacturers can be barged down the Mississippi to ocean-going freighters.

Design and construction of the needle coking facilities took four years. Four or five different engineering firms were reviewed to find the one that could provide the optimum design for the refinery's needle coking complex. The complex consists of four units: the coker itself and three units used in treating the feedstock.

The first drum of needle coke was produced in June of 1985. Then began the process of adjusting the operation to turn out needle coke that was better than the design specifications had called for only four years earlier.

"We have to tip our hats to S&T for helping to train our operators," says Al Eliskalns, Chicago refinery manager. "They were here around the clock when we were starting up, and they still spend a lot of time reviewing our status and giving us hints to make the operation better."

Eight process engineers from S&T were involved during the five-month start-up. Four are still working to help fine tune the operation.

The Chicago refinery is Unocal's largest and newest. It employs 700 people, including 30 who run the needle coking complex. Training was very important because of the degree of control required in the needle coking process, according to Eliskalns. And the training program has been effective, as reflected in the start-up. "It was very smooth, very well done," says John Bassett, general superintendent of operations at the Chicago refinery.



In the Chicago carbon plant's quality control lab, Mary Kay Miko prepares to test the CTE of a graphite rod made from needle coke.



For the refinery staff, the needle coker presents a reversal of sorts. In the usual coking operation, coke is the by-product and the operation is geared toward getting a high volume of lighter hydrocarbons. "With the needle coker, coke is the key product and everything else is the by-product," Bassett explains.

Coking is a cyclic operation. Since coke is a solid, there is no continuous flow of product. Instead, the coke builds up inside a coke drum during processing. When one drum is full, its twin is brought on stream.

"In that sense, the needle coker runs no differently than a sponge coker," says Bassett. "It fits right into the operation of the refinery."

The difference comes in the operational window, or set of processing conditions, which must be maintained to get consistent high quality in the coke. "The controls are much tighter in the needle coker, with narrower tolerances for variation," explains Joe Wrobel, supervisor, needle coking complex.

Each steel-and-molybdenum needle coke drum has a capacity of 400 tons. When one drum is full, the top and bottom heads are removed and the coke is cut out with a stream of water under very high pressure. After the coke has drained for several hours, it is crushed and loaded onto an elevated conveyor belt which takes it half a mile to the Chemicals Division carbon plant. The conveyor is covered and heated to protect the coke.

"Unocal Chemicals is responsible for the coke as soon as it's put on the conveyor belt at the refinery," says Ron Lee, manager of the carbon plant.

As it arrives from the refinery, the coke—called "green" coke before calcining—is stored in silos to drain out additional water. In calcining, the green coke travels first through a pre-heater, then tumbles slowly down the length of a rotating kiln.

The times and temperatures of the needle coke calcining process are critical—much more so than in the calcining of sponge coke. In fact, the needle coke project has resulted in the first installation of computerized controls in a Unocal carbon plant. The pre-heater alone has more than 700 control points.

In addition to increased process control, the Chicago carbon plant has had to develop a much more elaborate quality assurance testing program. "The analytical part of my job has increased six to eight times what it was when we were producing only sponge coke," says lab supervisor Frank Williams.

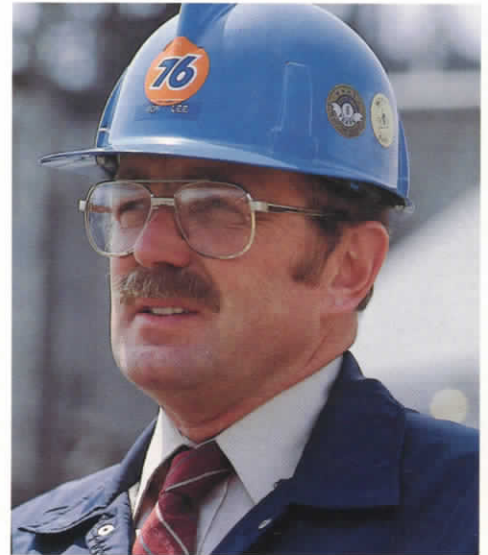
The CTE test, for example, takes about two and a half days. When the project was in the initial research stage, each CTE test on a new batch of needle coke took over a week.

"Over the years we've managed to shorten the time, but you've basically got to go through the same steps that the people who buy needle coke and make it into electrodes go through," says S&T's Mike Block. "And you've got to do everything right in order to have an accurate evaluation of the needle coke. What you're doing is making a miniature graphite electrode."

Research and development by all the participating divisions continue in order to improve yields and solve other problems involved in starting up a whole new process to make essentially a whole new product. Specifications for this premium product will continue to get tighter, and Unocal intends to produce the highest quality needle coke.

The quality of the needle coke has already given Unocal a competitive edge, even in a depressed market. But the market will grow, albeit slowly, as the steel industry continues its shift to the construction of the more efficient "mini-mill" operations using electric arc furnaces and UHP electrodes.

"We'll get our share no matter," says Keith Openshaw. "We've proven that our needle coke is as good as any needle coke in the world, or maybe better." 76



*Above, Ron Lee and Joe Wrobel.
Above left, the Chicago carbon plant's
needle coke facilities.
Left, needle coking and calcining are
24-hour operations.*

Professional Car Care— Guaranteed.

Today's automobile is more sophisticated than ever, with computerized engine, suspension and other vital systems. It takes expert care to keep these cars in top condition. But finding even a minimally qualified mechanic can be tough these days, as more service stations are converting to self-serve.

Unocal has consistently bucked this trend, choosing to enhance the automotive services offered to customers. That full-service commitment has kept pace with the growing complexity of today's cars, and with the changing needs of the motoring public. In 1980, after months of research and development, the company's Refining & Marketing Division introduced 76 PROTECH in the Western Region. Many view the program as the industry prototype for auto repair service.

PROTECH—short for Professional Technicians—extends throughout California, Nevada, Arizona, Washington, Oregon, Alaska and Hawaii. The program provides high-quality training and certification for service station dealers and their employees. Dealers who successfully complete the program and become certified are eligible to operate their own PROTECH franchises.

What does PROTECH offer motorists? Specialty services for brakes, tune-ups, air conditioning and wheel alignments—and an iron-clad guarantee that backs the work 100 percent. If PROTECH services aren't performed right the first time, customers can take their cars to any PROTECH station and get the work redone—free of charge.

"If you get your brakes fixed in Anaheim but they start squealing when you're in Seattle, any Seattle PROTECH station will fix your brakes for free," says Bruce Knight, PROTECH's manager of automotive services. The guarantee reflects the emphasis the program's creators placed on customer satisfaction.

"We didn't want to put our customers through a lot of loops to have problems corrected," says Clay Warnock, vice president of marketing, Western Region.

"Our guarantee was an absolute first in the industry," observes Bruce Plantz, who helped pioneer the program during the late '70s. "It really gives PROTECH strength."

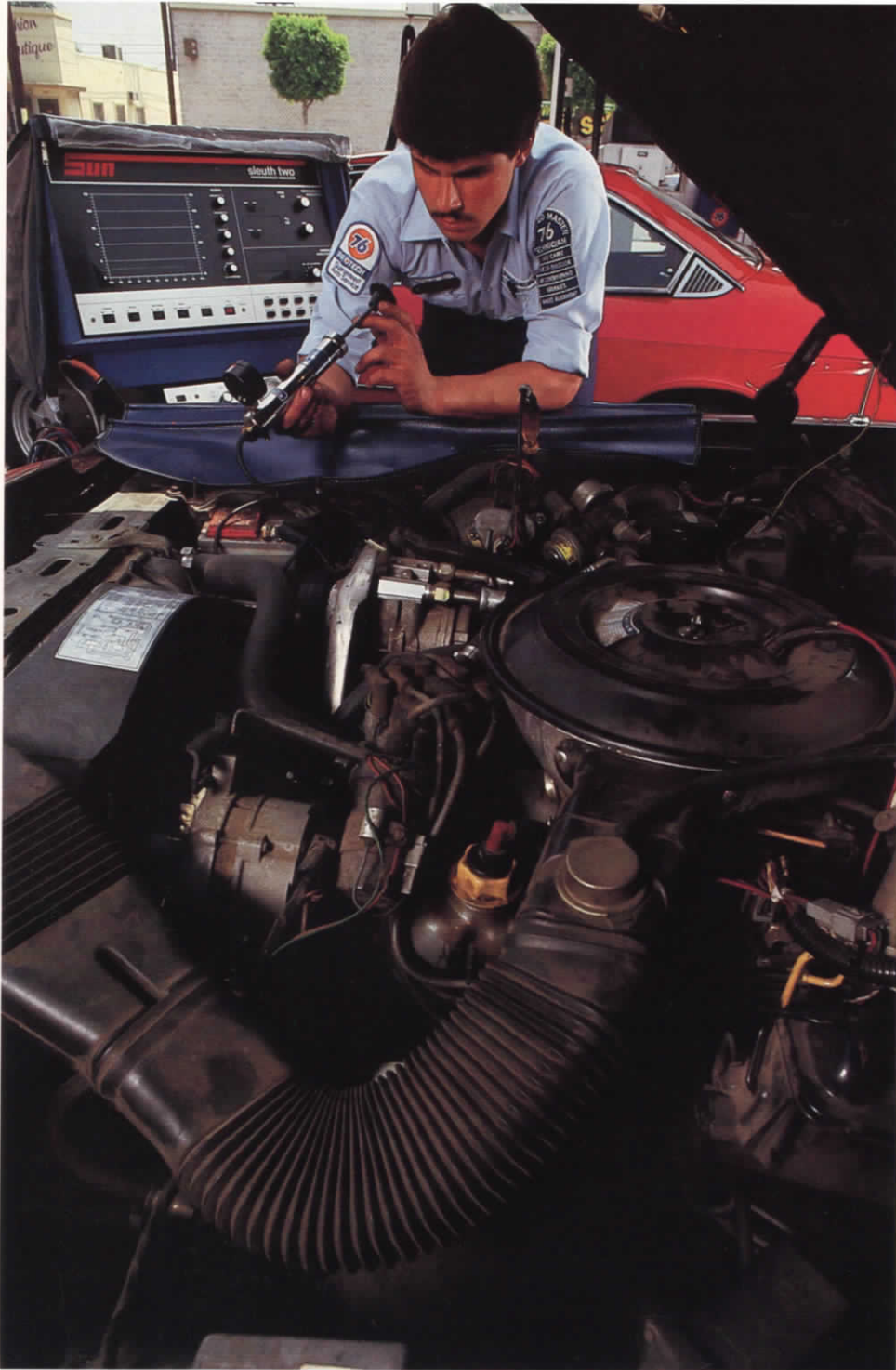
Knight, who started with the company in 1976 as a retail sales representative, was selected as the first instructor of a PROTECH class.

"A lot of mechanics have survived until now by working with knowledge obtained on their own. But they can't do that as employees of a PROTECH franchise," he explains. "Since Unocal stands behind each person's work, we want to make sure that person is highly trained and performing the job to our specifications."

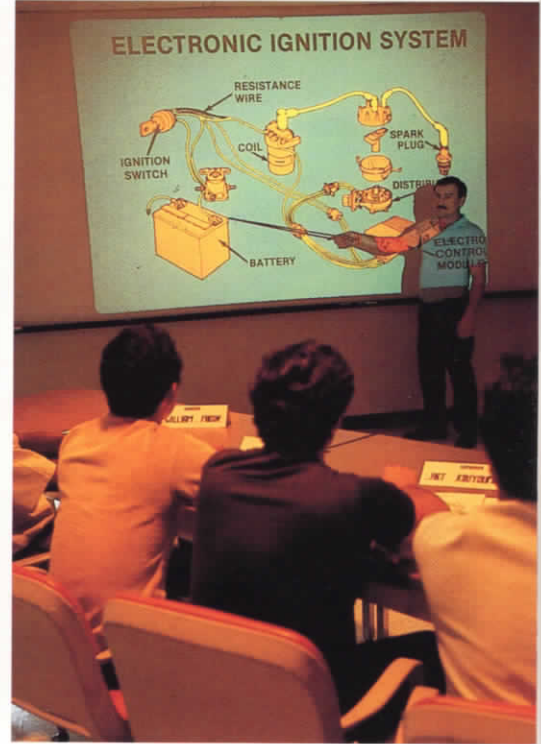
Bill Burrows, a Unocal dealer for 31 years, sent employee-son Rob through PROTECH training and feels quite pleased with the results. "The program built his confidence in doing business with customers and enabled him to perform better," Burrows says.

PROTECH training courses are conducted through the Automotive Services Training Department, which operates learning centers in Pasadena, San Diego and Hayward, California; Seattle and Honolulu. The centers offer fast-paced, performance-oriented courses for 76 station dealers and employees at both intermediate and advanced levels.

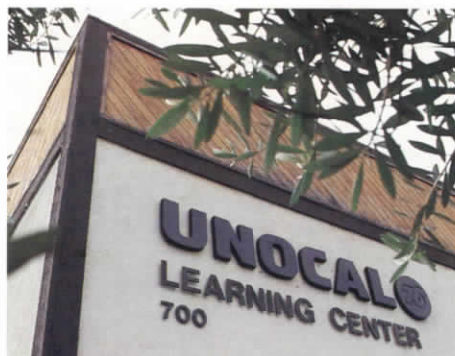
One to five instructors teach at each learning center, where class sizes are limited to assure that each trainee gets personal attention. Dealers pay their employees' course fees. All trainees are reimbursed for mileage and lodging.



“There’s more than just technical information going through here. It’s an attitude and an approach to the industry that we’re trying to change.”



At the Unocal Learning Center in Pasadena, California, instructors like Al Schioppi (above) prepare trainees to tackle complex automotive work as PROTECH technicians (left).





Dealer Jim Dawson holds his station's PROTECH certification award. The station has also earned Unocal's Five-Star rating for being topnotch. PROTECH technicians use an "engine oscilloscope" to diagnose engine problems.



At the intermediate level, trainees review the basics of shop safety and automobile functions. Advanced courses—those required for PROTECH certification—are offered in brakes, tune-ups, air-conditioning and wheel alignment.

The courses, from four to eight days long, involve both classroom learning and hands-on training in the centers' service bays. "We have created several ways to teach trainees," says Knight. "What they learn from videos in class is reinforced by actual work on cars. They get the opportunity to use state-of-the-art equipment."

The most difficult segment for trainees is usually automotive electronics. "When we review our tune-up test scores by subject areas, electrically related tasks such as battery charging and ignition-system work are the weakest areas," explains Knight. "The principle concepts of ohms, amps and volts are basic but abstract, and quite hard to learn. They need to be continually reinforced."

"In the last three years we've redesigned the entire curriculum to emphasize tune-up work, where electrical concepts are used the most," he continues. "We've since seen a dramatic increase in the certification exam scores."

Mechanics who are already highly skilled can qualify for PROTECH certification without taking the training classes. They must take "the challenge"—a test which assesses their knowledge of the four major service areas. Applicants who score high enough on this test may then take the certification examination. The exam is difficult, requiring high scores on both a written portion and on a timed-repair exercise.

"The training is tough, the tests are tough, and dealers are making a substantial investment in time and money," notes Clay Warnock. "That shows us they're really serious about PROTECH. And our customers get the benefit."

Dealer Jim Dawson from Burbank, California, points to a turnaround in his employees' attitudes after his station became a PROTECH franchise: "They really take more pride in their jobs. And it shows, too—our station's a lot cleaner."

Once dealers obtain PROTECH franchises, they must remain in compliance with the program's standards. Each station must have all four of the program's specialty areas covered by at least one certified technician. Accreditation lasts only two years, after which time employees must pass another test to renew their status. "Industry technology changes too fast to let it go longer than that," says Knight.

Dawson, who attended the Pasadena Learning Center's first class in 1982, praises PROTECH for emphasizing current trends. "Automobiles are quickly changing," he says. "If you don't learn the skills, you can't do the job."

Instructors visit PROTECH stations twice yearly to make sure each dealer maintains certified technicians and automotive equipment (such as computerized diagnostic engine analyzers and alignment machines) necessary to conduct all PROTECH services.

The program's guarantee policy is also carefully monitored. When customers return their cars to stations other than the original repair site, the second dealer is reimbursed by Unocal. The learning center then notifies the first dealer that additional repair work was needed.

"If we get five claims against a station for, say, tune-up work within a two-month period, that's a red flag that there might be a problem," Knight explains.

The dealers put the "real teeth" into PROTECH.



Bruce Knight, who is given credit for much of PROTECH's success, has worked with countless trainees, instructors and dealers to maintain the program's high standards.

In such instances, PROTECH instructors meet with dealers to discuss the situation. Dealers who continue to draw customer complaints may risk losing their franchises.

But the increasing number of 76 PROTECH stations suggests dealers feel satisfied with the program. Since the first learning center opened in 1980, 41 percent of the 1,479 Unocal 76 service stations in the Western Region have been certified to offer PROTECH services.

When Bruce Plantz helped develop the program, he knew it would have to reflect the dealers' goals to earn their support. So, in 1978, Plantz invited several San Diego dealers to participate in the planning.

"The company wanted a program for dealers developed in part by the dealers themselves," he explains. "We talked—sometimes argued—about what should and shouldn't be a part of the program. As a result, dealers helped form the tough standards, and put the real teeth into PROTECH."

PROTECH's forerunner was Unocal's Certified Services, begun in 1962. At that time, it was the only automotive training program in the industry to offer certification. Unlike PROTECH, the program had no formal training centers. There was also little uniformity among classes. About 20 instructors traveled to hotels and service stations throughout the west, each presenting his own personalized mini-seminar.

"When I started as an automotive instructor under the old program, I was given a station wagon, a box of slides, and maps of Nevada, Arizona and San Diego County," Knight recalls.

When PROTECH debuted, it instituted changes—some of them quite drastic. Dealers, who used to get free eight-hour tune-up courses, were now paying for eight-day courses. "But they found it well worth their investment," Knight says. "We'd established a training center stocked with equipment and tools, and could provide concentrated, effective training."

Knight continues to build on PROTECH's success. "Losing touch with market demands for service can happen rather quickly—especially with cars changing all the time. We update the training program to stay on top of what's happening."

Jim Nowling, manager of marketing training and automotive services, plans to keep PROTECH's training current. He will be adding specialized high-tech courses to the advanced curriculum, including a two-day advanced fuel injection module and a computer module.

"There's more than just technical information going through these learning centers. It's an attitude and an approach to the industry that we're trying to change," says Nowling.

Knight agrees, adding: "PROTECH is doing what's needed in the industry—giving firm customer guarantees, and providing ongoing training, certification and recognition for service station employees." A. B. 76

Just before this issue went to press, Bruce Knight was transferred from Pasadena to Orange, California, as a retail area sales manager. His new duties include overseeing PROTECH programs at 76 service stations in his area.

Take it from a Pro.

Meet Denise McCluggage—former top-ranked auto racing star, senior editor of *Autoweek* and most recently, the first woman to receive the Ken W. Purdy Award for excellence in automotive journalism. When McCluggage talks about cars, people listen—which is one reason Unocal chose her to be PROTECH's spokesperson.

Since February, McCluggage has conducted publicity campaigns for PROTECH, an automotive service program based in the Refining & Marketing Division's Western Region. She has given television, radio and newspaper interviews in nearly a dozen major cities including Los Angeles, Seattle and Honolulu. Her message is simple: PROTECH offers a valuable service to motorists.

Denise McCluggage, former race driver, travels throughout PROTECH's seven-state area to promote the program.



“Some drivers put off regular maintenance of their cars, and that’s dangerous,” she says. “You’ve got to check your car’s vital parts on a regular basis—and that’s where PROTECH comes in. PROTECH is designed for effective, well-rounded car care. I wouldn’t be promoting the program if I didn’t think it was marvelous.”

With so many stations being converted into self-serve outlets, motorists may have a harder time finding car care. “But when you go to a PROTECH dealer,” says McCluggage, “you find someone oriented to full service.”

She notes that people are concerned about finding reliable auto mechanics, since many have had the unhappy experience of paying for substandard or unnecessary repairs.

“With PROTECH, you get certified technicians, written estimates and written guarantees,” she says. “PROTECH stations have specialized diagnostic equipment that provides accurate and efficient help for hard-to-solve problems. And with guarantees honored at every PROTECH dealer—no matter where the original work was done—customers get a lot of flexibility and peace of mind.”

McCluggage has been racing and writing about cars for over 30 years. She began her newspaper career with the *San Francisco Chronicle* in the early ’50s. Women reporters were rare then. But the predicaments she sometimes faced breaking into a male-dominated field never discouraged her, McCluggage says. And she soon gained the respect and support of her peers.

McCluggage broke new ground when she became a sports reporter for the *New York Herald Tribune*. Then, women sports reporters were not always welcome in sections reserved for the press. She gained admittance to the press box to cover the Indianapolis 500 only because a reporter from the *New York Times* intervened.

“He told them that if I didn’t get in, the race could do without his paper’s coverage, too,” McCluggage recalls, laughing. “I got in.”

She soon went from writing about cars to racing them—sporting her talent in Porsches, Maseratis, Jaguars, Ferraris and other top autos. Dubbed the “Velvet Hammer,” McCluggage competed for 10 years, gaining worldwide recognition for her many victories.

As a race driver, McCluggage learned how to accept risks. As a journalist, she has continued to take them. Once, while doing a story on sports parachuting in the late ’50s, McCluggage jumped from an airplane after only 15 minutes of instruction.

“I use fear for energy,” she explains. “There’s nothing like a good dose of it to clear the cobwebs and organize your directions. Risk-taking gives the moment a special vitality.”

But she’s been in the automotive business long enough to know that some risks aren’t worth taking—including those that can be avoided through regular car maintenance. “The more you know about your car’s condition, the more likely you are to be a better driver,” McCluggage says.

Unocal’s PROTECH program provides motorists with a dependable way to keep their cars in top condition. “PROTECH’s services are a real value,” adds McCluggage. “Of that I’m convinced.” 76



A POWER- FUL ATTRAC- TION





Dr. Mohammad Ghandehari (right), a senior research chemist at the Fred L. Hartley Research Center in Brea, and technician Kenneth McNutt measure the resistance of a neodymium magnet. At left, a view of Molycorp's solvent extraction plant at Mountain Pass, California, where neodymium and other lanthanides are separated from mined bastnasite ore.

When most people think of magnets, they think of something that picks up paper clips or holds messages to a refrigerator door. Such trifling uses of magnets could hardly be expected to draw the interest of a multibillion-dollar energy company. Unless, perhaps, the magnets were made of the most powerful permanently magnetic alloy known to man.

That alloy consists of iron, boron and a lesser-known element called neodymium. Neodymium is one of the lanthanide metals, sometimes called "rare earths" despite their relative abundance in the earth's crust.

Worldwide lanthanide reserves exceed 40 million tons. The minerals' largest source in the United States is a lanthanide mine operated by Molycorp, a Unocal subsidiary. Located at Mountain Pass, California, the mine is an otherwise undistinguished speck in the high desert country off Interstate 15, about 60 miles west of Las Vegas.

In industry, permanent magnets are not used to attract paper clips or hold messages. Mounted on drive shafts and spinning in electric fields, they are the central part of most electric motors. Produced in varying sizes, these motors are used in countless products, from stereos to appliances to automobiles.

Magnets in electric motors cause motion by creating a magnetic field. An electric current transmitted through the field imparts a mechanical force—and this force provides the fundamental power of motion in electric motors. Through magnetism, comparatively small machines can generate powerful forces easily controlled by adjusting the strength of the electric current.

Industrial use of magnets is not limited to motors, however. Magnets can also raise or lower voltage in transformers and store data processing information. (Molycorp supplies neodymium to manufacturers for use in making disk drive systems for the personal computer industry.) In medicine, through a process called magnetic resonance imaging, magnets are used to photograph bone and tissue without causing the harmful effects that may accompany X-rays.

The chief virtue of the neodymium magnet is that its power can be packed into about half the space required by the more conventional ferrite or aluminum-nickel-cobalt magnets, which have been in use since the 1950s. Neodymium magnets can also replace such devices as the copper coil, which conducts electricity to an automobile's starter motor. This greatly increases efficiency by reducing the motor's size and weight.

The starter-motor application of neodymium may make its first appearance in the near future in selected domestic cars and light trucks. Other potential automobile applications include electric motors that run windshield wipers, power windows, air conditioners and stereo systems.



Molycorp's Mountain Pass mine is the world's largest source of lanthanide metals.

Despite its rapid rise to prominence, neodymium is no lanthanide-come-lately. The mineral was discovered more than a century ago, and has found varied applications in glass products, decorative tableware and color television screens. But the magnetic properties of the neodymium-iron-boron alloy were only learned of three years ago, in research conducted mainly by General Motors and Sumitomo Specialty Metals Co., a Japanese firm. Their efforts caused something of an awakening through a broad spectrum of industries.

That awakening has not been lost on Molycorp, which lays claim to a huge deposit of neodymium at Mountain Pass. "The neodymium is contained in bastnasite, which has an abundant supply," says R. Gene Dewey, president of Molycorp. "Technology for processing the ore has been developed over the past 20 years. In addition to Molycorp, other suppliers around the world are equipped to convert neodymium-containing ores into useful metals and alloys. In the future, production can be expanded to meet market demands."

Molycorp intends to be well-positioned to meet those growing demands. In Washington, Pennsylvania, the company's processing facilities produce neodymium of 96-percent purity. In addition to supplying neodymium metal and chemical compounds, the company has also begun to produce alloys. And at Unocal's Science & Technology Division in Brea, California, scientists conduct ongoing research to aid development of advanced lanthanide magnets.

"The basic thrust of our research is to find ways of making lanthanide magnets more economical," says Dr. Mohammad Ghandehari, senior research chemist at the Fred L. Hartley Research Center in Brea.

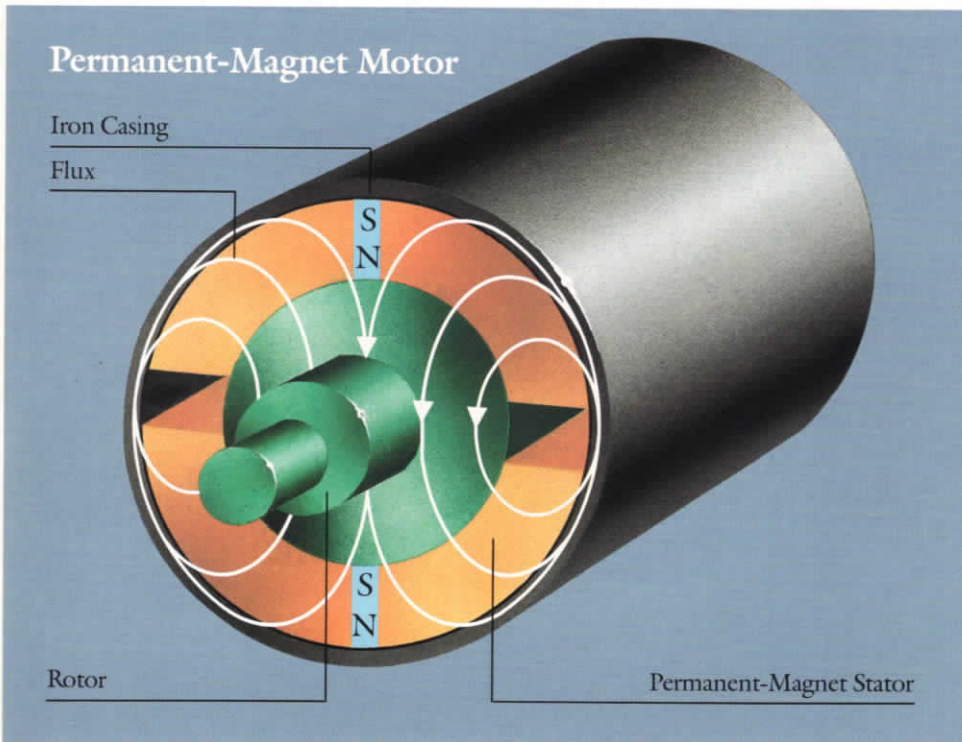
Ghandehari and his associates are approaching this task from two directions: working to find more cost-efficient methods of manufacturing the magnets, and exploring new ways to further improve their performance. Current research is focusing on the addition of dysprosium, another lanthanide found at Mountain Pass, which appears able to boost the magnetic properties of neodymium alloys.

Experts in the electric motor industry foresee an expanding range of uses for the neodymium magnet. Prospective applications include use in power tools, home appliances, electric generators, stereos, computers and robotics.

The neodymium magnet's power, light weight and versatility are not the only attributes industry finds appealing, however. Because of the relative abundance of neodymium, iron and boron, the new magnets are more economical to produce than their predecessors. In the years to come, that advantage may prove to be the most powerful attraction of the highly promising neodymium magnets. 78



Neodymium magnets are lighter, more powerful and more versatile than conventional magnets. At bottom, a representation of a permanent-magnet motor. Such motors may find uses in a broad range of consumer products.



Bidding Farewell

In this edition of *Seventy Six*, the retirements of more than 900 Unocal employees are announced. This unusually high total—more than 10 times the normal number of retirements reported in an issue of the magazine—was due to special circumstances: the bulk of these employees chose to accept an enhanced early retirement package offered by the company.

Eligible for the offer were employees with at least 10 years of service who were 55 years of age or older as of June 30, excluding senior management. (Employees age 65 and over did not need to meet the 10-year service requirement.) Those who accepted the package had three years added to their ages and length of service for purposes of retirement benefits calculations.

Out of 1,672 employees eligible for the plan, 1,070 decided to accept. Most of these employees left the company on July 1, although some retired as early as last April and others will delay their departures until next year.

As a group, these retirees have accrued more than 32,000 years of service to the company. For this reason, and because of the special circumstances involved, retiring employees were given a series of farewell and appreciation parties in June at company locations around the nation.

Some of the largest were held at Unocal Center in Los Angeles, where 129 departing employees were honored during the week of June 23. Hosted by senior management, the after-work affairs were filled with fellowship, reminiscences, goodbyes, thank yous, laughter and some tears.

“Reducing our workforce wasn’t an easy decision for the company to make,” President and Chief Operating Officer Richard J. Stegemeier told the first evening’s gathering. “We recognize that we’re losing a great deal of experience, and there is sadness in knowing we won’t be seeing some of you as often. But there is happiness in knowing that each of you is entering a new and exciting phase of life.”

Executive Vice President and Chief Financial Officer Claude Brinegar expressed similar sentiments the following evening. “Some of you have been with Unocal 40 years and more,” he said. “You’ve seen us grow from a small regional oil company into one that spans the world. We’ve been through a lot together in that time. Unocal can face the future in part because of the resources all of you have given the company.”

The unique circumstances surrounding this current group of retiring employees warranted special treatment in *Seventy Six*. Here we present the retirements section, accompanied by some moments captured on film from parties across the country.

CORPORATE

Errol L. Anderson, January 1, 1958
Donald G. Andrews, May 25, 1942
John W. Barrett, August 4, 1953
Roy M. Barnes, August 16, 1948
Gerald L. Bearden, November 3, 1947
John A. Blanche, March 16, 1954
Jack Carrington, February 8, 1967
Clarine Clampitt, October 22, 1973
Mary Cook, January 10, 1967
Marjorie L. Coon, June 27, 1955
Edmund Coony, September 10, 1947
Charles G. Corley, July 1, 1957
David E. Cox Jr., May 25, 1954
Margaret Deshko, November 26, 1957
Ronald Y. Dewa, March 1, 1960
Edmond Doone, May 1, 1951
Clifford W. Dunham, August 3, 1951
Byron S. Estes, September 8, 1953
Oscar C. Eubank, December 15, 1952
Betty M. Ewing, January 2, 1973
John A. Farquhar, July 21, 1969
Ray N. Fleck, December 3, 1947
Donald C. Gearhart, March 19, 1962
Francis J. Giblin, May 14, 1979
Phillip J. Hammer, September 7, 1967
Jack Houghton, January 23, 1950
George C. Houston, December 7, 1966
Bettysue C. Hulette, June 5, 1964
Joseph Johnson, August 23, 1968
James R. Joy, June 14, 1954
Sumie Kanno, October 21, 1963
Donald J. Keller, December 2, 1963
John E. Koines, June 23, 1949
Boris A. Koneff, April 26, 1955
Robert A. Lamb, January 1, 1949
Howard N. La Pierre, July 22, 1949
Katherine M. Lawhon, Feb. 15, 1965
Gloryn McKee, April 16, 1956
Constance N. Nelson, April 25, 1969
Mary Nevis, March 6, 1952



Elaine L. Novak, September 5, 1967
 Mildred E. Oman, June 1, 1948
 Oren V. Owen, November 13, 1952
 Bill A. Owens, January 16, 1967
 John W. Park, October 21, 1951
 Allan W. Percy, January 1, 1950
 Norma A. Pond, October 25, 1976
 John M. Reid, December 27, 1955
 Frank J. Rickman, March 23, 1953
 Mary T. Sasaki, August 20, 1962
 Muriel J. Seyffer, May 2, 1951
 Donald E. Smedley, January 7, 1954
 Wilma L. Smith, January 4, 1960
 Otis L. Tobey, May 13, 1947
 Jerry J. Wasicek, September 11, 1950
 William C. Weldon, December 10, 1950
 Robert F. Woehrmann, March 19, 1968
 Delmar L. Wulf, April 25, 1969
 Margaret I. Young, July 28, 1952

ENERGY MINING

Georgia F. Capell, May 22, 1954
 William C. Flynn, October 3, 1956
 Jean M. Harnasch, May 13, 1955
 Downs McCloskey Jr., March 20, 1955
 Ward E. Stennett Jr., November 12, 1951
 Bob J. Taylor, January 30, 1951

SCIENCE & TECHNOLOGY

Robert F. Buhl, November 12, 1945
 Chih Shan Chen, January 20, 1964
 Wayne A. Chisholm, February 1, 1958
 Jay G. Claypool, September 1, 1948
 Kenneth L. Collins, April 10, 1953
 Edward C. Copelin, February 20, 1958
 Louis M. Dvoracek, January 4, 1954
 Max M. Ellis, June 6, 1946

Devere C. Erb, June 30, 1952
 Mabel E. Ewing, September 4, 1956
 E. Reinold Fett, July 14, 1955
 Mildred Florence, September 23, 1967
 Raymond L. Fogg, January 24, 1952
 Julius Gallus, March 1, 1965
 Elihu Goldish, June 17, 1960
 Milton J. Gorham, January 9, 1967
 Richard E. Goudie, August 31, 1970
 E. Glenn Greder, May 4, 1953
 Russell T. Harris, May 18, 1970
 S. Hashimoto, June 1, 1965
 Robert H. Hass, August 20, 1954
 Robert G. Hawthorne, May 5, 1952
 John E. Hines Jr., April 29, 1948
 Leroy W. Holm, July 22, 1946
 Ward W. Howland, December 27, 1943
 Glenn E. Irish, January 14, 1957
 Omer Johnson, December 3, 1951
 James A. Klotz, December 19, 1960
 Norman D. Koch, February 19, 1951
 Thomas L. Kowalski, May 18, 1946
 Roland F. Krueger, January 19, 1948
 James L. Lafferty, September 30, 1944
 G. Robert Love, August 7, 1969
 Glenn A. Marsh, June 28, 1948
 Herbert Metcalfe, February 22, 1948
 Clarence J. Moderow, Nov. 21, 1959
 Gordon E. Moores, November 7, 1948
 Larry L. Muzzall, January 27, 1953
 Ujinobu Niwa, November 2, 1948
 Leo J. O'Brien, April 1, 1949
 Jo Ann Odeski, February 7, 1972
 H. Donald Outmans, January 17, 1957
 Gordon B. Pouchers, October 27, 1952
 Robert C. Ransom, April 1, 1969
 William D. Schaeffer, November 1, 1951
 Edward Schaschl, November 2, 1948
 Eugene C. Schluter, July 9, 1946
 Leslie L. Sharar, May 11, 1953
 Lee C. Vogel, June 5, 1951
 Edwin Walker Jr., February 18, 1952

Carlyle G. Wight, July 2, 1951
 Heinrich D. Woebken, January 19, 1953
 Howard R. Woods, March 7, 1960
 Dean A. Young, March 4, 1948

OIL & GAS

James R. Adams, August 20, 1964
 James A. Allen, November 8, 1955
 Robert J. Allen, January 22, 1951
 Alvin A. Almgren, February 4, 1959
 Martha H. Anders, July 1, 1958
 Leonard J. Anderson, August 2, 1954
 Thurman L. Archer, April 21, 1952
 Richard A. Armstrong, January 15, 1951
 J. C. Ayers, May 6, 1957
 Theodore C. Bangs, June 26, 1952
 Milton W. Barry, October 26, 1945
 Donald C. Bates, March 4, 1953
 Margaret J. Bennett, January 7, 1949
 Charles J. Bergeron, September 5, 1948
 Robert G. Bickel, October 8, 1951
 Ralph L. Black, May 20, 1954
 Emma L. Bland, June 1, 1964
 William F. Bolding, November 1, 1948
 Robert N. Bongard, June 11, 1951
 Jack F. Bonham, November 20, 1962
 Juanita H. Boyd, March 5, 1954
 William L. Bradford, September 2, 1952
 Nelson C. Breaux, November 6, 1946
 Elvis W. Bridges, December 1, 1952
 Walter S. Bridges, August 20, 1964
 Grosvenor C. Brown, December 3, 1951
 Charles W. Browning, June 15, 1959
 Marolee B. Buettner, July 19, 1976
 Tommie L. Burger, June 7, 1950
 James W. Burnside, March 19, 1951
 Carl R. Carlson, June 1, 1951
 Fred L. Carvalho, January 1, 1967



C. Don Case, April 4, 1947.
 Ronald J. Cernik, December 15, 1955
 Joel W. Chappell Jr., June 15, 1953
 Lavada Chappell, January 3, 1956
 George R. Cheyney, July 7, 1952
 Raymond Choate, August 13, 1951
 William R. Choate Jr., January 16, 1974
 Donald R. Clark, April 16, 1950
 N. E. Clark Jr., January 10, 1945
 Edward C. Clay, June 12, 1949
 Hollis W. Clifton, February 3, 1964
 Charles R. Collins, August 19, 1946
 Anita J. Connel, January 26, 1967
 Gale Conner, March 18, 1947
 Richard E. Cook, September 6, 1950
 Claude D. Cramer, March 22, 1954
 Daniel R. Crawford, September 25, 1951
 Robert R. Culver, June 13, 1960
 Alfred R. D'Adamo, July 6, 1971
 Willard L. Daniels, September 16, 1948
 Doris R. Davis, August 3, 1960
 Edgar Davis, March 16, 1954
 Floyd G. Delahoussaye, Jan. 15, 1970
 John E. Delahoussaye, April 8, 1957
 Gordon W. Deverick, June 15, 1953
 Edward A. DeZonia, August 1, 1955
 Ernest S. Dietrich, May 28, 1951
 Clark B. Done, January 28, 1974
 Carl A. Dooley, August 21, 1946
 Robert S. Doughty, August 15, 1955
 William L. Duhon, January 27, 1954
 Allen V. Du Pont, August 1, 1950
 Marvin P. Dupuy, August 1, 1958
 Gloria L. Dyess, February 8, 1956
 John D. Dyess, September 30, 1947
 Audell L. Eaves, December 9, 1946
 Harvey T. Elder, January 8, 1951
 Edwin W. Elliott, March 19, 1969
 George W. Elliott Jr., February 3, 1950
 William T. Elliott, February 18, 1957
 Emmet R. Embody, May 18, 1959
 Elias H. Emiliano, November 1, 1951
 Milton E. Epperson, December 16, 1947

Max A. Ervin, August 15, 1949
 Joseph Farrell, November 28, 1951
 Leland B. Feather, May 20, 1957
 Arlington Fessler, February 6, 1956
 George E. Fish, February 1, 1952
 Leslie J. Ford, October 10, 1950
 Kenneth S. Fox, August 1, 1965
 Rayward J. Frederick, Sept. 18, 1961
 Billy L. Freeman, November 22, 1965
 Robert W. Gardner, May 4, 1951
 William R. Gardner, April 1, 1952
 Moses E. Garrett, January 17, 1951
 William L. Geissert, August 29, 1948
 Robert E. Glaze, July 19, 1951
 Richard A. Goddard, June 21, 1948
 James E. Goode Jr., May 2, 1949
 William C. Goth, May 29, 1956
 Philip R. Goudeau, December 3, 1962
 Frederick H. Govreau, Sept. 5, 1952
 Loalee C. Gratehouse, July 1, 1957
 Everett W. Green, March 28, 1949
 Huey C. Green, July 22, 1968
 Joy Greene, June 26, 1950
 Ora B. Grimes, September 15, 1969
 Richard K. Gross, April 1, 1954
 Raymond G. Hale, February 1, 1957
 Edward A. Hall, October 8, 1945
 Gerald E. Hall, August 1, 1949
 Gail H. Halverson, January 3, 1956
 Benjamin F. Hanly Jr., May 29, 1967
 Charles R. Harris, January 29, 1951
 Dellar B. Harris, June 24, 1963
 Rosie Lee Hart, March 20, 1952
 Imogene M. Heltzel, May 19, 1969
 Marion R. Hensley Jr., February 18, 1952
 Frank W. Hinson, January 1, 1964
 John S. Hoffmann, May 23, 1955
 Raymond F. Holsch, April 1, 1974
 Cleo J. Holubec, February 6, 1956

James R. Hooper, November 3, 1941
 David Horn Jr., May 1, 1947
 Ralph A. Houdyshell, June 16, 1946
 Wayne M. Hunt, April 13, 1947
 Clarence G. Hutcherson, August 9, 1951
 Hale B. Ingram, August 29, 1950
 Yayeko Iwasa, September 24, 1952
 Lillie M. James, January 6, 1953
 Bette R. Jensen, November 1, 1951
 Robert T. Jesson, September 13, 1948
 Zel L. Johnson Jr., June 3, 1954
 Mavis W. Jones, March 4, 1955
 Roy A. Kendrick, April 1, 1951
 Eugene D. King, December 1, 1971
 Kenneth L. Kohal, April 12, 1948
 Sophie M. Krauze, August 15, 1955
 Roy E. Kreps, November 29, 1960
 Edith S. La Coste, February 2, 1961
 Walter C. Lam, January 11, 1954
 Beulah L. Landry, June 26, 1961
 Roy H. Lane, December 22, 1952
 Joseph A. Lanko, September 22, 1955
 William E. LeBlanc, August 6, 1955
 Kerragen C. Ledet, September 3, 1946
 Lawrence R. Leek Jr., April 23, 1951
 Robert J. Levine, April 24, 1967
 Arthur V. Lewis Jr., October 6, 1948
 Julius N. Lewis, May 12, 1953
 Robert R. Locke, June 30, 1953
 Joseph W. Luckett Jr., June 16, 1948
 Lelen C. Maddux, April 14, 1967
 Emile C. Madere, June 29, 1952
 Robert C. Maguire, June 21, 1949
 Raymond E. Malloy, November 1, 1971
 Harry Mandeville, October 30, 1940
 Robert Martens, September 6, 1949
 Roy W. Martens, June 8, 1948
 Floyd A. Martin, December 17, 1951
 William D. Massa, November 25, 1963
 Edward R. Mathews, February 19, 1968
 Buford E. McBride, April 16, 1947
 Mary E. McCarty, September 12, 1960
 Miles McJohnson, April 7, 1954
 Norma J. McKelvie, November 25, 1957



Leroy A. Medeiros, July 14, 1953
 Mary L. Meena, March 1, 1972
 Alton J. Menard, February 4, 1952
 Jack A. Menefee, September 20, 1955
 Robert D. Merrill, December 7, 1953
 Edmund A. Merten Jr., June 10, 1957
 Richard B. Messer, October 23, 1953
 Myron C. Metz, September 25, 1957
 Vernon J. Michael, September 16, 1963
 Ibra Miller, July 18, 1951
 Daniel J. Mitchell, January 18, 1950
 Bob J. Moffett, September 23, 1963
 Robert J. Morton, November 10, 1952
 Alva G. Mosbaugh, February 27, 1951
 Bill O. Murch, June 1, 1964
 Eleanor L. Murphy, May 17, 1943
 James Murphy, March 17, 1948
 Harold Muscio, April 8, 1947
 Fred Nanini, November 2, 1945
 Beverly L. Neeley, January 19, 1973
 Bob R. Nelson, April 15, 1968
 Ernest A. Newell Jr., July 6, 1965
 Carl E. Newgreen, August 22, 1949
 Donald B. Newton, March 26, 1946
 James C. Newton, February 7, 1953
 Barbara F. Nicholson, October 30, 1959
 Dale W. Noble, April 1, 1947
 Alvin E. Ochs, January 1, 1951
 John H. Ojala, December 14, 1953
 Jay Openshaw, October 22, 1962
 Dorothy M. Osborne, March 1, 1948
 Gordon E. Otto, October 16, 1950
 Harlin Oxford, May 9, 1945
 Kenneth G. Oxford, September 10, 1963
 George Penny, October 21, 1947
 William T. Peregrin, August 3, 1953
 Charles G. Perryman, January 1, 1967
 Francis L. Petty, December 26, 1951
 Marilyn J. Peverley, February 1, 1972
 Robert J. Peverley, November 3, 1951
 George B. Pichel, January 2, 1952
 Shirley M. Pizzo, June 14, 1976
 Manuel Plocheck, July 1, 1955
 Robert W. Plumb, October 6, 1950

Raphael A. Pourciau, April 1, 1966
 Archer S. Pratt, April 20, 1953
 Edward J. Price, March 25, 1957
 Kelly J. Proctor, May 13, 1955
 Clinton C. Putnam, September 14, 1948
 Stockton M. Quirey, April 17, 1943
 Tom W. Redin, March 28, 1955
 Paul D. Renfro, November 26, 1951
 Bernal D. Reynolds Jr., Dec. 4, 1950
 Philip A. Rich, November 19, 1951
 John M. Richart, June 24, 1957
 Robert G. Roberson, August 2, 1951
 Juanita W. Robinson, April 22, 1974
 Maryvon T. Robinson, October 24, 1951
 Alton R. Roome, April 10, 1945
 Earl O. Roussel, August 21, 1949
 William C. Roux, September 13, 1954
 Jo Ann Russo, August 6, 1957
 Howard S. Samsel, January 1, 1951
 Robin A. Saunders, July 28, 1952
 James G. Schaeffer, May 17, 1954
 Audrey G. Scott, March 2, 1967
 Murray W. Scott, October 4, 1967
 Irvin E. Settoon, February 12, 1957
 Wilma C. Shiner, June 26, 1961
 Elton L. Shrode, May 9, 1966
 Alexander Sisson, August 19, 1966
 Jack L. Slater, September 2, 1954
 Eugene D. Smith, May 5, 1954
 Mable A. Smith, August 8, 1951
 Seigler K. Smith, June 10, 1974
 Ulin S. Smith, September 10, 1951
 Willie E. Smith, October 16, 1949
 Phillip A. Smithberg, December 8, 1953
 Rita I. Sork, October 4, 1945
 Julio Soto, June 10, 1966
 Billy G. Spradlin, November 7, 1951
 Everett C. Stangle, April 16, 1962
 William E. Sullivan, February 13, 1953
 Carole O. Swanson, July 26, 1956
 Lonnie B. Tackett Jr., Nov. 29, 1948
 Clifton A. Tannahill, June 1, 1956

Bernice A. Taylor, April 4, 1949
 Claudia M. Taylor, October 9, 1968
 Etha M. Taylor, October 16, 1969
 Jessie G. Taylor, May 18, 1972
 Charles Teague, December 1, 1971
 Samuel C. Terry, January 4, 1951
 Darrell S. Tetrick, November 4, 1946
 Richard K. Thomas, July 1, 1948
 Glenn D. Thompson, April 29, 1946
 Lloyd E. Thompson, October 31, 1952
 James E. Tippit, May 10, 1939
 Joseph C. Touns, June 9, 1954
 Paul R. Tracyk, June 8, 1970
 Batson R. Trahan, June 8, 1959
 Louis B. Trimble, November 27, 1950
 Kenneth Tucker, May 9, 1946
 Dean H. Upchurch, August 6, 1954
 Mary K. Valencia, March 20, 1961
 Arturo J. Valenzuela, May 13, 1965
 John A. Van Auken, June 16, 1955
 George W. Varnum, November 19, 1971
 Clifford Vaughan, November 14, 1950
 Kelly R. Vaughan, October 9, 1956
 Sidney J. Vial, April 22, 1947
 Richard A. Vidal, May 2, 1950
 Margaret E. Vincze, February 22, 1954
 Stanley Waggoner Jr., December 6, 1961
 Warren A. Waguespack, Dec. 4, 1958
 Raymond H. Walker, April 13, 1953
 William W. Walker, December 2, 1963
 Delbert E. Walrath, December 29, 1952
 Charles R. Wells, April 6, 1940
 Robert T. Wheeler, January 30, 1948
 Alfred E. White, April 30, 1952
 Julian L. White, September 10, 1962
 Melvin E. Whiteday, May 9, 1955
 Edward A. Wilson, August 31, 1964
 Thurston Wilson, August 25, 1963
 Robert S. Wilton, July 2, 1957
 Kenneth Winch, January 13, 1953
 James M. Workman, May 4, 1956
 Neely T. Wright Jr., August 19, 1946
 Margot M. Ziller, June 30, 1969
 Edward Zinser, June 19, 1944
 Ernest R. Zoeter, November 21, 1950



INTERNATIONAL OIL & GAS

Robert B. Bellamy, March 5, 1962
Norman B. Clark Jr., January 10, 1944
John D. Evans, May 1, 1976
George F. Fisher, April 1, 1969
Murray G. Greenwood, May 29, 1972
Robert O. Harlow, May 1, 1961
Fred R. Higgins, February 19, 1951
Carl F. Hills, July 24, 1974
Bernard W. Holub, May 14, 1956
Martha Kawa, September 16, 1957
Arnie C. Kittelson, November 20, 1973
William K. Lewright, October 1, 1955
Edward Marks, October 26, 1955
Rita E. Marrs, May 12, 1971
Donald L. Olson, November 22, 1954
Weldin R. Read Jr., July 16, 1951
Edwin C. Robinson, November 1, 1962
Allyn T. Sayre Jr., April 1, 1952
Raymond M. Shannon, Nov. 16, 1973
William L. Shumate, August 4, 1952
Jimmy D. Skiles, March 8, 1965
Jan Sobczyk, May 29, 1963
Jorge R. Souverbielle, Nov. 17, 1958
John N. Turk, September 3, 1957
Harry C. Wells, August 16, 1950

GEO THERMAL

James E. Allison, October 9, 1972
Grant E. Kelso, November 29, 1954
Betty Lou Kinney, April 9, 1952
Jim L. Kuhn, August 13, 1963
Frank L. Lemmon, June 20, 1951
Patrick A. Nicholson, December 1, 1974
Delbert E. Pyle, October 27, 1950
Robert W. Rardin, October 6, 1966
William E. Thompson, October 17, 1973
Donald R. Walker, June 1, 1976

REFINING & MARKETING

Paul S. Adams, August 15, 1966
Clay Albright, October 23, 1940
Eddie S. Anderson, March 26, 1951
Harry L. Anderson, July 1, 1954
Frederick J. Andrews, June 22, 1942
Russell D. Andrews, September 19, 1949
Forrest E. Armstrong, July 1, 1951
Robert A. Armstrong, Sept. 24, 1951
Hugh P. Bain, March 8, 1967
Ulysses F. Baird, March 16, 1953
Glen R. Baker, February 14, 1952
Gerald L. Baldwin, March 17, 1953
Richard E. Barker, January 25, 1954
E. P. "Barney" Barnett, May 6, 1946
Kenneth L. Barry, September 11, 1962
Hebert G. Beal, November 5, 1946
Billy G. Bennett, June 13, 1960
Gordon D. Bergreen, June 7, 1954
Elsa A. Bianchin, November 4, 1946
Bruce R. Bigland, September 15, 1958
Raymond F. Billburg, February 16, 1955
Joseph M. Billecci, August 16, 1943
Farrar C. Bird, June 1, 1974
Norma A. Bird, October 1, 1973
Alban L. Birdwell Jr., June 16, 1947
Jordon R. Bledshoe, March 30, 1948
Burton R. Bley, May 3, 1954
Ruth L. Boehm, November 4, 1971
James E. Bohac, April 27, 1953
George G. Bottin, February 4, 1951
Max A. Bradberry, July 5, 1949
Jack B. Bragg, January 21, 1963
Robert W. Brandes, August 3, 1953
Dennis Brannigan, April 3, 1967
Robert H. Braun, April 9, 1951
Frederick F. Braz, October 31, 1945
Heber S. Broderick, January 30, 1960
Doris L. Brolio, June 27, 1949
Ethel M. Brown, June 8, 1953
Leslie W. Brown, June 23, 1952
Thomas L. Bruce, January 16, 1955
Lyle F. Bruhn, February 27, 1956

Lillian T. Brunner, October 23, 1973
Floyd K. Bryan, October 2, 1952
Raymond L. Bucholz, Nov. 14, 1954
Harry F. Buerger Jr., November 16, 1952
Barbara A. Burdett, August 1, 1955
Gene W. Burkett, November 24, 1964
Rita J. Buritz, September 6, 1967
Donald A. Campbell, July 7, 1952
Albert M. Cargo, March 29, 1946
Harold V. Casebolt, November 1, 1948
Roy T. Chalfont, September 16, 1957
Randie C. Y. Chang, August 1, 1966
Helga Chapman, September 18, 1952
Victor R. Chase Jr., September 1, 1946
Wilfred Y. S. Chung, March 18, 1959
John W. Clark, November 8, 1948
Jerry Cline, August 19, 1948
Robert H. Congelliere, April 27, 1954
Eugene L. Connor, November 7, 1954
Tobias B. Cooper, November 12, 1951
Patricia E. Cornett, July 3, 1974
Forrest B. Crites, September 20, 1950
Francis A. Curran, February 1, 1952
Margaret A. Corbin, January 20, 1971
Robert N. Creek, October 7, 1953
Richard Crucknol, May 1, 1971
Kenneth V. Dake, June 23, 1958
John D. Danforth, June 23, 1952
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Howard G. Davis, March 24, 1949
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Shelby F. Deaderick, December 17, 1940
Bobby L. Deal, September 19, 1952
Edith D. Debbs, May 19, 1969
Margaret W. DeBerry, August 29, 1960
Terry W. Dedrick, December 30, 1957
Louise A. Dellert, May 2, 1967
Maurice Denton, April 21, 1969
Norman L. Denton, July 16, 1951
Kenneth G. Dickerson, Jan. 30, 1959
Paul A. Dodge, May 11, 1948
Paul D. Dougharty, June 28, 1949



John T. Dowden, July 6, 1948
 Marshall F. Doyle, June 16, 1952
 John A. Drysel, June 7, 1954
 Frank A. Duesing, July 15, 1946
 Wilson D. Dysart, August 16, 1957
 Grant K. Edgar, May 20, 1958
 Duane F. Ehrlich, March 1, 1965
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 Charley L. Ellis, October 19, 1960
 Wilfred L. Emery, December 5, 1949
 Joseph F. Englander, September 13, 1946
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 Mary L. Faehnrich, November 24, 1952
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 James P. Gabbard, January 2, 1960
 Norma F. Gavette, November 1, 1947
 David N. Geiger, November 28, 1952
 Wayne L. Gerdon, April 1, 1963
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 Virginia R. Gipson, August 16, 1973
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 Marguerite R. Godzicki, Nov. 4, 1970
 Lourae E. Gorich, January 16, 1947
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 Eva H. Hall, July 29, 1946

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 Calvin Harrington, February 23, 1954
 Roger H. Hay, August 28, 1950
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 Daniel L. Hintze, October 1, 1954
 Rosemary S. Hoerl, March 2, 1959
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 Franklin K. Hull, May 19, 1947
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 Marvin E. Kaiser, June 6, 1960
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 Mae McAlister, July 29, 1957
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 Marion R. Medley, September 9, 1959
 Lewis J. Mehl, August 17, 1942
 Richard W. Mertes, June 30, 1941



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 Paul P. Michaleto, November 14, 1966
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 Rosa Papp, July 20, 1972
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 Margaret A. Pemberton, April 13, 1964
 John L. Peno, January 5, 1949
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 Ornie R. Perdue Jr., June 20, 1949
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 Samuel Pew, July 24, 1966
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 Theodore S. Pizio, October 15, 1946
 William H. Poag Jr., August 23, 1948
 Albert C. Porduchny, January 1, 1963
 Clay W. Powell, April 14, 1949
 Mary Pribela, March 4, 1968
 Larry Ransdell, July 28, 1952
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 Jimmy T. Rawls, January 1, 1953
 Lewis J. Reams Jr., June 10, 1958
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 Charles W. Reed, April 11, 1966
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 Robert E. Robbins, June 16, 1950
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 Donald E. Silva, March 28, 1955
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 Dorothy M. Skibicki, June 25, 1952
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 Yoshiro Soma, August 18, 1958
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 James I. Southard, February 7, 1949
 Frank Souza Jr., May 11, 1961
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 Ethel L. Spiniolas, August 1, 1961
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 Carol M. Streetz, August 31, 1970
 Olive R. Struebing, September 22, 1941
 Dola J. Styczykowski, March 9, 1964
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 L. J. Torkelson, August 5, 1955
 Waymond E. Townsend, Sept. 11, 1947
 Wilda M. Turner, August 7, 1961
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 Wilma L. Webb, January 16, 1964
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 William F. Welch, May 10, 1951
 Doris J. Wensel, March 15, 1954
 Bernice K. Wetle, August 13, 1951
 William D. Wheeler, December 24, 1948
 Ruth Widmark, February 10, 1975
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 Roger R. Wright, June 16, 1953
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 Andrew A. Zywickie, April 1, 1961

CHEMICALS

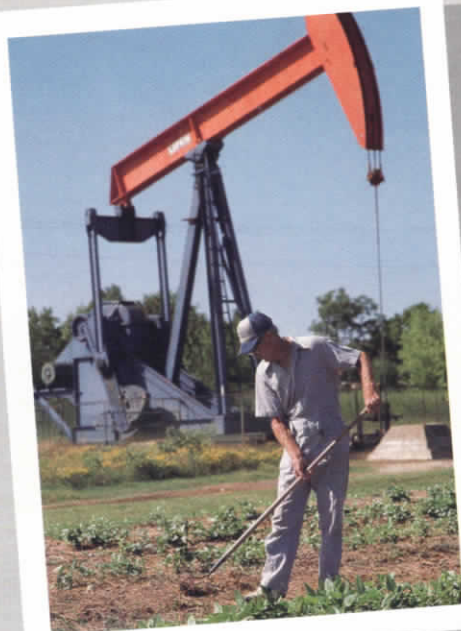
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 David C. Fitton, August 18, 1958
 Perry A. Friday, April 1, 1966
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 Emily J. Helm, August 16, 1954
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 Billy Hobbs, May 29, 1948
 Ernest Hoglund, January 16, 1946
 Douglas H. Holmes, June 6, 1960
 Samuel L. Jackson, September 13, 1948
 John H. Jones, April 14, 1966
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 Floyd K. McGahan, March 16, 1976
 Wesley E. Morrison, October 13, 1948
 Daniel Mullins, April 3, 1963
 Mildred B. Murphy, October 3, 1960
 Helen M. Palamara, August 5, 1970
 Jean W. Parsons, June 6, 1955
 Frances Piccolo, September 29, 1958

John W. Rhines, September 3, 1968
 Helen J. Schenck, November 2, 1971
 Louis Schoonover, May 3, 1967
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 Maurits Vlaanderen, May 19, 1969
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 Donald F. Washburn, June 30, 1959
 Donald J. Wright, March 5, 1968
 Lukas J. Zuvich, May 2, 1973

MOLYCORP

Leon B. Abraham, September 12, 1952
 John Brager Jr., September 21, 1948
 James C. Brown, August 10, 1964
 John A. Burson, January 1, 1956
 Joseph G. Cannon, May 17, 1965
 Elias R. Chavez, December 3, 1965
 George H. Duker, April 6, 1964
 Anna L. Ferralli, November 1, 1964
 Marilyn N. Eakland, September 25, 1952
 Robert L. Hurd, June 18, 1972
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 Larry E. Ling, February 7, 1973
 Nicholas J. Maselli, May 15, 1961
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 David L. Reineman, April 5, 1954
 Robert C. Sacrison, November 30, 1973
 Robert R. Schaller, July 18, 1974
 R. Dean Smith, April 14, 1969
 Robert R. Tiffany, December 20, 1954
 Carter Trimble, June 1, 1965
 Ruhama R. Ullman, June 12, 1978
 Albert M. Vanderhoof, January 12, 1965





*From its early boom years (top),
 to its more sedate present (left),
 Van has thrived.
 Above (from left): Cleone Tunnell,
 Van resident Dorothy Barnes, Tom Stoy,
 Stacey Anderson, and Allen Jackson
 gather in front of the discovery well.*

A Gem of an Oil Field

On the morning of Saturday, June 14, a scorching hot sun rose up in the blue skies of East Texas. By 10 a.m., the temperature had already cracked 90 degrees. But the heat didn't seem to bother the folks in Van, a small town located about 70 miles east of Dallas. This was a day of celebration here.

A large yard near the town's high school was quickly filling with Unocal employees and their families. At one end of the yard a small stage and podium were set up. Among those seated on the platform were Tom Stoy, vice president of Unocal's Oil & Gas Division, Gulf Region; Allen Jackson, manager of the Van oil field; and Cleone Tunnell, a retired Unocal employee who spent 42 years working in the Van field.

Directly behind the stage was a small oil pump, freshly painted but idle, its working days over. But this was not some old forgotten pump jack, spruced up merely for show. This was the site of Jarman No. 1—the discovery well for the Van, Texas oil field, drilled back in 1929.

The day's activities—a few short speeches, followed by a huge barbecue at the city park—were taking place to mark the dedication of Jarman No. 1 as a state historic site. There was also another small matter on the agenda: commemorating the Van field's 500-millionth barrel of production, a milestone reached last March.

"It's hard to conceive of just how much oil 500 million barrels is," Allen Jackson told the gathering as things got underway. "So let me give you some perspective. If you stacked 500 million barrels of oil end-on-end, they would reach the moon and extend 30,000 miles beyond. That's the kind of production we're talking about in Van. It all began right here at this site. And the Van field isn't finished yet."

It was a fitting introduction, for this day's activities were more than just a nod to the past. They were also being held to celebrate a promising future.

The town of Van itself was little more than a wide place in the road when oil men first came to evaluate the area in the late 1920s. The settlement consisted of a general store, a two-room schoolhouse and a few scattered clusters of homes. The surrounding country was typical of East Texas: sandy-soiled, rolling hills interspersed with small farms and cotton fields.

On the basis of a surface geological survey and seismic tests, Pure Oil Company (which merged with Unocal in 1965) leased 17,000 acres of land in the Van area in 1927. Exploration drilling began the following year. On October 14, 1929, oil was struck at a depth of 2,710 feet in a pasture of the W.T. Jarman farm.

News of the oil strike at the Jarman No. 1 well had an immediate and dramatic impact on the Van community. As Cleone Tunnell—who grew up in Van and was 14 years old when the discovery well hit—puts it, the Jarman strike "changed the face and fortune" of the town forever.

"After the Jarman No. 1 well came in, people literally poured into Van," Tunnell told those gathered at the well site. "Almost overnight, Van went from being a sleepy little hamlet of barely 200 to a bustling boom town of over 2,000. The roads were clogged with horses, carriages and Model T Fords. Tents and shacks were thrown up everywhere. Stores, food stands and drilling supply offices opened. It was an exciting time around here."

At the dawn of Van's oil age, Tunnell, now 71, was a boy who spent his after-school hours working in the cotton fields. When school opened in 1930, Tunnell recalled, there were over 700 children enrolled from 22 states. "The school was not equipped to handle all these kids, so Pure built a new school building and brought in extra teachers. The company also built homes for the oil field workers, planted trees and improved roads."

Unruffled through all this feverish activity was Mrs. W.T. Jarman, the widowed mother of nine grown children who owned the land where the discovery well came in. Questioned about her plans by newspaper reporters shortly after the oil strike, Mrs. Jarman said she wanted to stay on her farm and take care of her chickens and pigs.

"But I may make a trip into Tyler," she added. "I need to get a new set of teeth."

Geologically, the Van oil field is a structural trap with petroleum-bearing sands sitting above a large salt dome formation. While this was not a unique structure for an oil field, it was quite unusual in another respect. Wells drilled in similar formations had produced from sand layers up to 60 feet thick. But in the Van field, the major oil-bearing zone (known as the Woodbine Sands) was more than 700 feet in thickness. In addition, Van's oil was of a paraffin base—a far higher quality crude than the sulphur-base oils typical of West Texas fields.

Aside from the volume and quality of its crude, the Van field is notable for another important reason: it was the first large oil field in the U.S. on privately owned land to be successfully developed under a "unitization" plan.

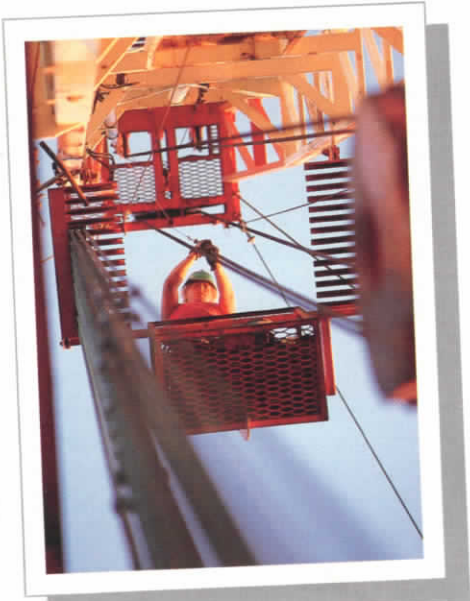
Previously, oil field production in the United States had been governed by what was known as the "rule of capture." Whoever lifted the oil legally owned it. The result was often a chaotic free-for-all, with competing leaseholders drilling wells as fast as possible.

The effect of this unchecked overdrilling was to reduce reservoir pressure so quickly that production from a field often played out when only 10 to 20 percent of the oil in place had been recovered. The natural reservoir pressures were lost forever, leaving millions of barrels of oil in the ground that might otherwise have been recoverable.

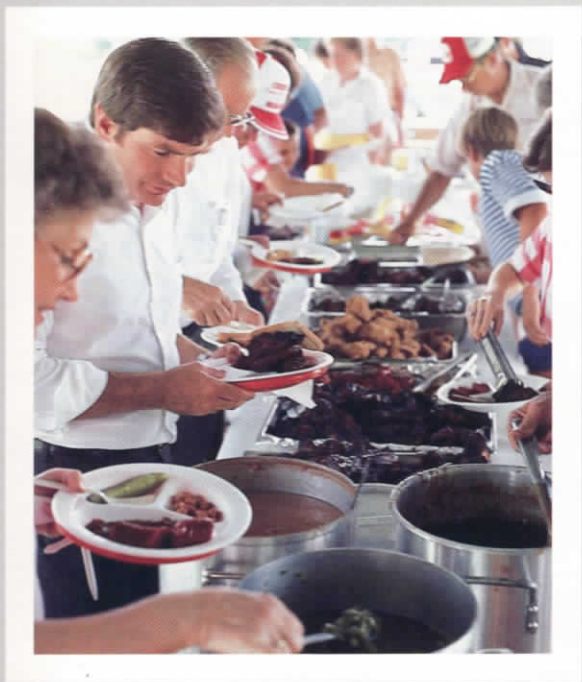
In Van, however, Pure was fortunate to have leased nearly 80 percent of the acreage above the field. Because of this, the company was in a position to prevent the wasteful boom-and-bust syndrome that had long plagued the oil industry. Pure management contacted the other companies with holdings in the area, suggesting that the field be "unitized"—that one company alone handle development, with the others receiving shares of the production in proportion to their lease holdings.

In November of 1929, a unitization agreement was signed for the Van field with Pure designated as operator. The agreement quickly became a model for the industry, assuring orderly, efficient field development and maximum oil recovery and conservation.

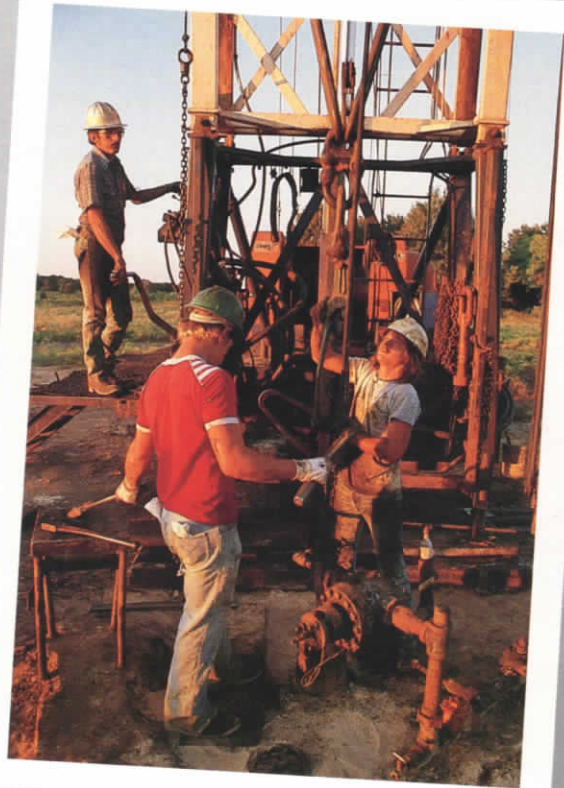
This kind of unitization arrangement is now standard procedure in the oil business. But it was a new and radical approach at the time, and it immediately bore fruit. By the end of the first year of development, the Van field had 180 completed wells, all of which were good producers drilled in optimal locations. Over the years, unitized development has increased Van's production five or six times over what it might have been otherwise. And the orderly development has helped ensure the field's continued longevity.



Drilling activity in Van has increased over the past two years.



Top, a pump jack atop one of Van's 400 producing wells nods away. Bottom, celebrants enjoy a barbeque after the ceremonies.



Top, Tom Stoy addresses the Van gathering, with Jarman No. 1 providing the backdrop. "Unocal is here to stay."

Today, the Van field has 400 producing wells which lift a total of about 9,200 barrels of oil per day. (Peak production of the field was 50,000 barrels a day.) The wells produce anywhere from a few barrels per day up into the hundreds.

Most residents of Van, which now has a stable population of just under 1,900, depend on the oil field for their livelihoods either directly or indirectly. Driving around town, one gets a true sense of the bond between the community and its oil industry. In back yards, church yards and school yards, oil pumps quietly nod away as they have for more than 50 years.

Some of these wells are secondary recovery wells which use waterflooding to lift the oil. There is also some tertiary production in the Van field, utilizing polymer injection to enhance recovery. But most of the oil is still brought up using primary recovery techniques.

"The majority of the reservoirs here are water-drive reservoirs with very high recovery rates," says Allen Jackson, who works out of Unocal's East Texas Area office in Van along with about 50 other company employees. "These wells all have very low lifting costs, so none have been shut in despite the recent drop in oil prices.

"Van is really an ideal oil field in a number of ways," Jackson adds. "The petroleum here is light and sweet. The field has a relatively shallow (2,500-foot) production interval. A field like Van is truly one in a million."

"Development here in Van is very low risk, with a high rate of return and a quick payout," adds Earl Champagne, area production engineer. "That's the name of the game in times like these, and that's why our activity level here is up rather than down."

Indeed, drilling activity in the Van field has been stepped up over the last couple of years. Around 20 new wells have been completed, without a single dry hole. Combined with enhanced recovery techniques being applied to older wells, the new production has boosted the field's daily output by more than 50 percent. Six more wells are scheduled to be drilled during the remainder of this year. Most of these will be development wells into smaller oil traps.

"Many smaller intervals of the Woodbine Sands were ignored in the past simply because the main Woodbine interval was so prolific," Champagne explains. "Now we're going back and taking a look at some of these areas, and they're proving to be good producers."

Although Van has yielded over 500 million barrels of crude, many more millions of barrels are present in the form of residual oil that may be producible by enhanced recovery methods. In addition, oil deposits have recently been discovered at a new interval above the Woodbine Sands called the Austin Chalk.

"We drilled a well in mid-May of this year which came in at 150 barrels per day," Jackson says. "This was the first well drilled specifically into the Austin Chalk formation. It's a very encouraging success because it may open up a whole new horizon of development for the Van field."

In Van, such promising new horizons spring from the solid foundation of past accomplishments. No single success in the field's long history is more noteworthy than the Jarman No. 1 discovery well, which started everything back in 1929.

Stacy Anderson, a recent Van High School graduate, was one of those given special recognition at the June 14 festivities held at the Jarman well site. During her after-school hours as a student, Anderson had undertaken the project of having the Jarman well designated a state historic site. Over a period of two years, she researched the well's history, talked with veterans of the Van field's early days, and conducted a painstaking title search on the land.

As a result of Anderson's efforts, designation of the Jarman No. 1 well as a state historic site was approved by the Texas Historical Commission. A permanent marker will be erected at the well site later this year.

"Jarman No. 1 had a tremendous impact on our community," Anderson told the gathering in Van as she recounted her project. "It is my hope that the marker to stand on this site will remind generations to come of that monumental event on October 14, 1929."

Unocal's Tom Stoy closed the morning's activities with a word of thanks to the Van community.

"I'd like to thank everyone for what you've done for us and continue to do for us here in Van," he said. "This field is one of our most prolific areas, and always has been. I can assure you that Unocal is here to stay." T.S. 76



Toasting a Landmark



When Lyman Stewart and Wallace Hardison consolidated their interests to found Union Oil Company (now Unocal Corporation) in Santa Paula, California in 1890, they probably had no idea that its first modest corporate headquarters building would someday be a historic landmark. The two-story building, which had been completed in 1889 according to early accounts, had 12 offices on the second floor, a hardware store and a post office on the first floor.

But on a warm afternoon in July this year, Santa Paula residents, public officials and Unocal Oil & Gas employees gathered in front of the Union Oil Building for the unveiling of a plaque commemorating the building's history and landmark status. Eleanor Crouch, a member of Ventura County's Cultural Heritage Board, made the presentation to Unocal's Chuck Schwartz on behalf

of Ventura County. Schwartz is vice president of the company's Oil & Gas Division, Western Region.

At the presentation ceremony, Santa Paula Mayor John Melton expressed his appreciation for Unocal's long association with the community. It was a sentiment shared by many in the crowd, including residents Bill Orcutt and Mary Alice Henderson. Their grandfather was William W. Orcutt—a Santa Paula native and Union Oil employee who became the oil industry's first professional petroleum geologist. His highly successful approach to oil exploration earned him the appellation of "father of modern oil geology." (The nearby town of Orcutt and the still-producing Orcutt oil field were named after him.)

"People in Santa Paula are well aware that Union Oil was born here," says Ray



Barnds, manager of Unocal Oil & Gas operations in the Western Region. "They've really adopted the building. It's a great source of civic pride."

The building, which serves as headquarters for the Ventura area production office, became an official county landmark in 1977. Recently, the county's Cultural Heritage Board began issuing plaques to denote historic sites, and the Union Oil Building was among the first to receive this special acknowledgment.

"The plaque will make more people aware that the building is an actual landmark," notes Barbara Mayfield, a general clerk in Unocal's office. "The Santa Paula community is really thrilled that Unocal received this recognition."

Wider recognition may soon be forthcoming. Efforts to get the building included on the National Register of

Historic Places have been encouraged by the State Historical Resources Commission's recent approval of the application. Final approval from Register officials in Washington D.C. is now pending. (The building's historical value has already been recognized by both the City of Santa Paula and the Santa Paula Historical Society.)

The National Register, which lists structures such as the Ventura County Courthouse and Los Angeles City Hall, recognizes buildings for their architectural and historical value. "The Union Oil Building has a tremendous amount of both attributes," says Judy Triem, who has authored a book on Ventura County history. "It's the only structure in Santa Paula that's remained largely unchanged since the 1800s. The building has quite a rare style."

To many people, the building sym-

bolizes past and present ties linking the company with the community. It was built at a time when architecture was decorative as well as functional. The second-floor rooms, for instance, retain the flavor of the old days. Each of the dozen, high-ceilinged offices where Stewart, Hardison and other company pioneers once conducted business has a fireplace—for heat, not show—richly adorned in the style of the day with imported relief tiles and carved wooden panels. Cast iron hinges and doorknobs grace the dark oak doors. Cupola windows, jutting out toward the street, accent some of the offices.

Of course, time hasn't stood completely still. Today's employees work with electric typewriters, computers and other equipment quite unimaginable to 19th-century oil men.

Perhaps the building's best-known



The Union Oil Building in Santa Paula, California (left) attracts thousands of visitors every year. Above, Unocal employees and other members of the community attend a ceremony to honor the landmark.



feature is the California Oil Museum on the first floor. Opened in 1950, the museum was created by veteran employees who wanted to preserve the company's past. They dug through old files and even old oil fields to find and restore dozens of items, including tools, photographs and other artifacts.

Once inside the museum, most visitors are first attracted to the huge wooden cable-tool drilling rig, predecessor to today's high-powered rotary rigs. Curator Ben Potts, a Santa Paula resident for 51 of his 84 years, greets visitors and points out other items of interest. In addition, there is a recorded tour which describes the museum's artifacts and captures the spirit of daily life in the oil patch in the old days.

The building's first floor also houses a re-creation of a 1933 Union Oil station. Two antique gasoline pumps set

against a painted background are visible through a large window. The scene also depicts the station's office, where an attendant's blue 76 cap rests on a wooden radio. Old-time auto products and accessories, such as Edison Mazda lights, Union Oil Motorese oil and Neverleak tire fluid, are included in the display. For those who wish to make a detailed comparison of past and present, a modern 76 station is located conveniently next door to the museum.

The oil museum, open from 10 a.m. to 4 p.m., Wednesday through Sunday, provides an important source of oil history. More than 30,000 people visit the site each year, many of them schoolchildren and tourists.

"The oil museum is vital because there's a limited number of such displays," explains Barnds. "It allows people to see how things were during the indus-

try's early boom days. It's a real wonder—comparing those crude tools with the sophisticated technology of today."

How does it feel to work in such a historic setting? "I love it," says Roger Dombrowski, area production superintendent. "Working here at the Santa Paula office really makes the company's history come to life." 76

Clockwise from left: a reception followed the award ceremonies; an office cupola window invites nostalgia; Chuck Schwartz and Bill Orcutt in the building's California Oil Museum; Eleanor Crouch and Mayor John Melton display the plaque.



UNOCAL

CORPORATE

July 1986

30 YEARS Jeanne E. Brady, Unocal Center
Rufus P. Van Zandt, Unocal Center

15 YEARS Carole K. Lawing, Unocal Center
Reynold T. Schmidt M.D.,
Unocal Center

10 YEARS John M. Westrup, Unocal Center

5 YEARS Tanasue Armstrong,
Washington, D.C.
Steven R. Holt, Richmond, Ca.
Harvey H. Klee, Unocal Center
Teresa A. Pinkney, Unocal Center
Lizabeth Schlemmer, Unocal Center
Peter E. Slack, Los Angeles, Ca.

August 1986

10 YEARS Maria T. Arangure, Unocal Center
Becki Benavidez, Unocal Center

5 YEARS Justine P. Bell, Unocal Center
Leticia O. Castillo, Unocal Center
George S. Griffiths, Unocal Center
Gary L. Heath, Bremer, Ca.
Julie A. Kazmierczak,
Schaumburg, Il.
Rosalind Morton, Unocal Center
Jennie A. Ruiz, Unocal Center
Richard J. Vroom, Schaumburg, Il.

ENERGY MINING

July 1986

15 YEARS William D. Pasma, Parachute, Co.

5 YEARS Thomas J. Bassetti, Parachute, Co.
Rodney W. Prow, Parachute, Co.
Daniel R. Roybal, Rawlins, Wy.

August 1986

5 YEARS Jennifer C. Stettner, Parachute, Co.

SCIENCE & TECHNOLOGY

July 1986

40 YEARS Leroy W. Holm, Brea, Ca.
Eugene C. Schluter Jr., Brea, Ca.

35 YEARS Dean Sandford, Brea, Ca.
Carlyle G. Wight, Brea, Ca.

30 YEARS Juanita B. Shedrick, Brea, Ca.

20 YEARS Gary W. Sjogren, Brea, Ca.
Carl E. Snider, Brea, Ca.

15 YEARS Donald E. Babcock, Brea, Ca.

10 YEARS Allan W. Perry, Brea, Ca.
Mark D. Steinmeyer, Brea, Ca.

5 YEARS Harold W. Alcorn, Brea, Ca.
June M. Bostich, Brea, Ca.
William R. Coyle, Brea, Ca.
Donald K. Drummond, Brea, Ca.
Darlene R. Gossick, Brea, Ca.
Chau M. Ha, Brea, Ca.
Phillman N. Ho, Brea, Ca.
Jeff J. Jetter, Brea, Ca.
Garry D. Jones, Brea, Ca.
Marcelo C. Maurin, Brea, Ca.
Gary D. McDonald, Brea, Ca.
Sandra H. Minner, Brea, Ca.
Anthony J. Nadratowski, Brea, Ca.
William M. Neill, Brea, Ca.
Marie A. Nixon, Brea, Ca.
Thomas R. Ralston, Brea, Ca.
Donald C. Van Slyke, Brea, Ca.
Arthur F. Walden III, Brea, Ca.
Jeff Y. Wu, Brea, Ca.

August 1986

20 YEARS Harlan G. Gray, Brea, Ca.

15 YEARS Douglas E. McCorkell, Brea, Ca.

5 YEARS Suheil F. Abdo, Brea, Ca.
Edward F. Arnoneit, Brea, Ca.
Patricia J. Arrijoja, Brea, Ca.
Stacy E. Cabral, Brea, Ca.
Patricia A. Herrera, Brea, Ca.
David C. Jacobs, Brea, Ca.
Thor A. Johnson, Brea, Ca.
Harry P. On, Brea, Ca.
Alice Tang, Brea, Ca.
Ramon D. Vera, Brea, Ca.

ENERGY RESOURCES

OIL & GAS

July 1986

35 YEARS Robert E. Glaze, Casper, Wy.
Ibra Miller, Lafayette, La.
Loye G. Walker, Ardmore, Ok.

30 YEARS Lawrence B. Folks, Worland, Wy.
John A. Grimes, Santa Paula, Ca.
Phil Hyatt, Brea, Ca.
Ralph G. Ladd Jr., Casper, Wy.
Carole O. Swanson, Pasadena, Ca.

25 YEARS Auvie A. Bailey, Midland, Tx.
Raymond E. Criswell, Taft, Ca.

20 YEARS Duane E. Mesh, Mobile, Al.
Alan R. Peck, Santa Paula, Ca.
James D. Schlottach, Orcutt, Ca.
Dale R. Shawcroft, Houston, Tx.
Barry G. Wilson, Unocal Center

15 YEARS James W. Benson, W. Liberty, Il.
Charles D. Cooper, Kenai, Ak.
Alfred R. D'Adamo, Casper, Wy.
Richard B. Gomez, Lafayette, La.
Jerry J. Hough, Cisne, Il.
Susan M. Krause, Anchorage, Ak.

10 YEARS Marolee B. Buettner, Ventura, Ca.
Scott M. Bush, Taft, Ca.
Jacqueline L. Campbell,
Bakersfield, Ca.
Lee W. Carroll, Houston, Tx.
Richard L. Dunham, Orcutt, Ca.
Roy W. Fulwider, Ventura, Ca.
Cyrena P. Hellman, Pasadena, Ca.
Anidh W. Mautz, Ventura, Ca.
Ruben H. Perez, Coalinga, Ca.
John W. Schanck, Houston, Tx.
John R. Underhill, Ventura, Ca.

5 YEARS Gerard P. Bellaart, Carpinteria, Ca.
Charles D. Cavit, Ventura, Ca.
Herbert D. Chisum, Santa Paula, Ca.
Mary T. Contreras, Unocal Center
Jane D. Deblieux, Lafayette, La.
Terry P. Duhon, Lafayette, La.
Priscilla B. East, Lafayette, La.
Brenda L. Edwards,
Oklahoma City, Ok.
Matthew J. Evans, Pasadena, Ca.
James L. Finley, Ventura, Ca.
Jack W. Fulford, Snyder, Tx.
Thomas J. Harris, Lafayette, La.
Linda R. Naas, Lafayette, La.
Ralph A. Lilburn, Oklahoma, Ok.
Myron L. Nicholson Jr., Orcutt, Ca.
John R. Lutz, Casper, Wy.
John H. Noll, Casper, Wy.
Karen Owens, Pasadena, Ca.
Larry W. Patridge, Clay City, Ok.
David D. Phillips, Van, Tx.
Jeffrey S. Porter, Carpinteria, Ca.
Stanley F. Rusk, Carpinteria, Ca.
Terry J. Sheehy, Houston, Tx.
Jimmy Sheppard, Comfort, W.V.
Chamalie Singh, Houston, Tx.
James P. Sweeney, Carpinteria, Ca.
Jeffery J. Tokarsky, Midland, Tx.
Tania M. Torres, Pasadena, Ca.
Dale R. Troyer, Cisne, Il.
Zenis M. Walley Jr., Orcutt, Ca.
Albert C. Zilske Jr., Carpinteria, Ca.

August 1986

40 YEARS Charles R. Collins, Pasadena, Ca.
Carl A. Dooley, Houston, Tx.
Neely T. Wright Jr., Snyder, Tx.

35 YEARS	Raymond Choate, Lafayette, La. Clarence G. Hutcherson, Houston, Tx. Anna L. Lannin, Pasadena, Ca. Jack Perry, Van, Tx. Robert G. Roberson, Houston, Tx. Mabel A. Smith, Houston, Tx.
30 YEARS	Darrel A. Redfern, Orcutt, Ca. Glen E. Roberts, Santa Paula, Ca. Carl E. Waller, Orcutt, Ca.
25 YEARS	Edward L. Marker, Midland, Tx. Gloria A. Tekampe, Midland, Tx.
20 YEARS	Doreen H. Jung, Unocal Center Alexander Sisson, Anchorage, Ak. Jimmy D. Thompson, Orr, Ok. Dennis L. Vener, Placentia, Ca.
15 YEARS	Ernest D. Barbee, Cisne, Il. Elmus L. Brown, Beckenridge, Mi. Ronald D. Burt, W. Liberty, Il. William J. Cessnau Jr., Kenai, Ak. Arthur J. Guillotte, Mobile, Al. Tom Y. Joe, Oklahoma City, Ok. Mary Lou Meyer, Unocal Center Antoinette Ross, Bakersfield, Ca. Paul Ben Sellers Jr., Houston, Tx.
10 YEARS	Gregory H. Blake, Ventura, Ca. Alfred Chavez, Taft, Ca. Patrick R. Collins, Mobile, Al. Dwight E. Johnson, Kenai, Ak. Stephen C. Leaf, Taft, Ca. Daniel L. McDonald, Mobile, Al. Gary L. Smith, Taft, Ca. I. Kaye Sowell, Lafayette, La. Michael E. Spier, Orcutt, Ca. Jack M. Timmerman Jr., Kenai, Ak.
5 YEARS	Dixie A. Arrington, Midland, Tx. Edward Cantu, Carpenteria, Ca. Keith H. Carlton, Houston, Tx. Paul D. Close, Carpenteria, Ca. H. Ron Dennett, Carpenteria, Ca. E. H. Dever III, Snyder, Tx. Charles L. Drake, Bakersfield, Ca. Benny G. Duncan, Van, Tx. Janet L. Eisert, Casper, Wy. Ray E. Farmer, Carpenteria, Ca. Albert K. Frowiss, Carpenteria, Ca. Peter J. Gerend, Midland, Tx. Frank E. Gillespie, Casper, Wy. Roger K. Hamson, Casper, Wy. Terri M. Harrison, Midland, Tx. Michael S. Honaker, Anchorage, Ak. Owen M. Hubbard, Carpenteria, Ca. Raul Jimenez, Carpenteria, Ca. Jerry W. Johnson, Carpenteria, Ca. George D. Johnston, Anchorage, Ak. John W. Kaikainahaole IV, Huntington Beach, Ca. Joe R. Karstetter, Houston, Tx. Lesley J. Lege, Lafayette, La. Daniel D. Lim, Unocal Center Amy Jo Lynn, Midland, Tx. Lawrence Mancini, Carpenteria, Ca. George Y. Martinez, Snyder, Tx. Russell R. Peterson, Santa Paula, Ca. Robert A. Pettit, Carpenteria, Ca. Dwayne H. Robichaux, Houma, La. David M. Sager, Clay City, Il. John C. Sowell, Huntington Beach, Ca. Eldon L. Troyer, Cisne, Il. Coy E. Turner Jr., Mobile, Al. Ruth A. Vallon, Mobile, Al.

Service Awards



INTERNATIONAL OIL & GAS

July 1986	
35 YEARS	Weldin R. Read Jr., Unocal Center
30 YEARS	Robert J. Corsaro, Unocal Center
15 YEARS	Darrell D. Chessum, The Hague, Netherlands Clara G. Healy, Unocal Center
10 YEARS	Weldon B. Hatcher, Balikpapan, Indonesia
5 YEARS	Aubrey L. Freeman, Unocal Center Douglas B. Neal, Aberdeen, Scotland
August 1986	
5 YEARS	Cary C. Chen, Los Angeles, Ca. Easing C. Chen, Los Angeles, Ca. Trevor D. Gauld, London, England Karolen I. Paularena, Unocal Center

Unocal Indonesia, Inc.

July 1986	
15 YEARS	Sjamsiar Ilhard Badal
10 YEARS	Wandowo Suwarno Badrus Sukarno Dirman Zainal Mashuri Evie Rumampuk Fredy Sulawesiyanto Jefriet Johannis Tampi Hadi Arief Wijaya
5 YEARS	Iskandar Mahmud
August 1986	
10 YEARS	Kamaruddin Sarwanto Johnny Marthin Affidon Muh Alwi Ar Wellem Aru Firman AS M. Hairy Alexander Kabe Arsyad La Ressa Thamrin P Masdari Seman M. Sirajuddin Andi Bakri Sultan Ishak Bidang Tandilo Daud Toding Tiranda Baba Toding
5 YEARS	Zainul Arif Palmer Marbun Bambang Mudjiono Jusuf Pasereng

Unocal Suez

August 1986	
10 YEARS	Maher Gamal

Unocal U.K.

July 1986	
5 YEARS	Calum Cordiner, Aberdeen, Scotland William Moir, Aberdeen, Scotland Maureen Robertson, Aberdeen, Scotland
August 1986	
10 YEARS	James Annand, Aberdeen, Scotland Sheila Ewen, Aberdeen, Scotland

UNOCAL CANADA LIMITED

July 1986	
10 YEARS	James F. Allan, Calgary, Alta.
5 YEARS	Christopher S. Barton, Calgary, Alta. Florence A. Lanigan, Calgary, Alta.
August 1986	
5 YEARS	James F. Ressler, Calgary, Alta. Randy A. Woolston, Red Earth, Alta.

UNOCAL THAILAND, INC.

July 1986	
5 YEARS	Vera Kaewsonthi Phayao Klinboon Supaporn Kongthong Lamon Lumpupornprasith Verasak Prasertvattanakul Kenneth M. Sevinski
August 1986	
15 YEARS	Gerald L. Beebe
5 YEARS	Duangrat Bhumichitr Richard A. Leveque William T. McClung Jr. Rapeeporn Suksavang

GEO THERMAL

July 1986	
10 YEARS	Ross H. Denton, Santa Rosa, Ca. James V. Vantine, Santa Rosa, Ca.
5 YEARS	Douglas P. Bouche, Imperial Valley, Ca. Barry R. Carlson, Santa Rosa, Ca. Gary E. Gunderson, Santa Rosa, Ca. Larry W. Keyser, Santa Rosa, Ca. John F. Matthew, Santa Rosa, Ca. Stephen G. McCoy, Santa Rosa, Ca. Eric D. Steger, Santa Rosa, Ca. Bennie C. Walkup, Santa Rosa, Ca. Debra A. Wheeler, Santa Rosa, Ca. Richard M. Wilson, Imperial Valley, Ca.
August 1986	
10 YEARS	Michael W. Woodall, Santa Rosa, Ca.
5 YEARS	Charles D. Achee, Imperial Valley, Ca. Peter Cocova, Imperial Valley, Ca. Harrison R. Crecraft, Santa Rosa, Ca. Mark A. Magers, Unocal Center Gilbert R. Malcomb, Imperial Valley, Ca. Michael T. Moore, Imperial Valley, Ca.

Philippine Geothermal, Inc.

July 1986

10 YEARS Romeo O. Buenafior
Jose C. Ceriola
Gil C. Competente
Leonardo O. Policarpio
Job D. Salazar
Raquel C. Salazar

5 YEARS Ernesto A. Bingayen
Rodolfo R. Dorosan Jr.
Jessie C. Kallos

August 1986

10 YEARS Franco B. Cleofe
Antonio A. Jayme

5 YEARS Mario D. Bamba
Bienvenido B. Bron
Antonio C. Calmada
Felicisimo B. Cantes
Efren C. Cerio
David B. Claudio
Nepthalie C. Climacosa
Tito C. Consuelo
Oriol C. Credo
Reyes C. Deocareza
Salvador C. Deocareza
George M. Espinosa
Mary Flor G. Hernando
Arthur C. Jaromamay
Danilo A. Pablo
Felix C. Trinidad
Andres R. Victoria
Ma Fe L. Villadolid

REFINING & MARKETING

May 1986

15 YEARS Dorothea Mason, Schaumburg, Il.

July 1986

35 YEARS Kenneth R. Barton, Schaumburg, Il.
Richard D. Dolan, Schaumburg, Il.
Hayden H. Jones Jr.,
Los Angeles, Ca.

30 YEARS Maria E. Brown, Los Angeles, Ca.
Nyla J. Musterman, Los Angeles, Ca.
Sharon R. Rodriguez,
San Francisco, Ca.

25 YEARS John S. Rossiter, Los Angeles, Ca.

20 YEARS Carol J. Greenawalt,
Schaumburg, Ca.
Joel E. Witzman, Los Angeles, Ca.

15 YEARS John G. Chapman, Los Angeles, Ca.
Michael J. Dougherty,
Los Angeles, Ca.
Remedios B. Soriano,
San Francisco, Ca.

10 YEARS Graciela Contreras, San Francisco, Ca.
Delfina R. Moses, Schaumburg, Il.

5 YEARS Glenda H. Carter, Houston, Tx.
Margaret A. Pfeiffer, Schaumburg, Il.

August 1986

30 YEARS W. E. Branstrom, Los Angeles, Ca.

25 YEARS Janet G. Berghahn, Schaumburg, Il.
John L. Dealy, Fair Oaks, Ca.
Julius C. Herklotz, Garland, Tx.
Ethel L. Spiniolas, Schaumburg, Il.
Marian D. Tumpa, Schaumburg, Il.
Wilda M. Turner, Schaumburg, Il.

Service Awards



20 YEARS Randie C. Y. Chang,
San Francisco, Ca.

15 YEARS Sandra J. Hoedel, Schaumburg, Il.
Nancy McGlory, San Francisco, Ca.
John H. Meeker, Schaumburg, Il.
Larry E. Shafer, San Francisco, Ca.

10 YEARS Patricia A. Malanowski,
Schaumburg, Il.
Susan R. Ott, San Francisco, Ca.

5 YEARS Maritza S. Eyzaguirre,
San Francisco, Ca.
Lilianna Z. Jackowiak,
Schaumburg, Il.

EASTERN REGION

July 1986

45 YEARS John R. MacArthur, Schaumburg, Il.

40 YEARS Frank A. Duesing, Chicago Refinery

35 YEARS Forrest E. Armstrong,
Beaumont Refinery
Charles G. Campbell, Belton, S.C.
Herbert R. Dressler, Chicago Refinery
Robert F. Nootbaar, Schaumburg, Il.

30 YEARS Glenn E. Kline, Columbus, Oh.
Gene V. Wilson, Pure Trans. Co.,
Ft. Morgan, Co.

25 YEARS Louis E. Burge, Macon, Ga.
Alice M. Bussell, Cincinnati, Oh.
James R. Nelson, Superior, Wi.
Robert F. Stump, Charleston, W.V.

20 YEARS Wayne E. Kielma, Chicago Refinery
Samuel Pew, Wildwood, Fl.

15 YEARS William R. Piper, Chicago Refinery
David J. Spreutels, Chicago Refinery

10 YEARS Paul D. Kohler, Schaumburg, Il.
Wayne C. Reuter, Columbus, Oh.
Garry D. Rooney, Schaumburg, Il.

5 YEARS Paul R. Borth, Beaumont Refinery
Curtis C. Carter, Wildwood, Fl.
Thomas A. Dickman,
Schaumburg, Il.
Dorothy E. Holland, Schaumburg, Il.
Loran W. McKee, Memphis, Tn.

August 1986

40 YEARS Carl E. Larkin, Beaumont Refinery
William E. Lebold,
Pure Transportation Co., Mokena, Il.
John F. Steele, Beaumont Refinery

35 YEARS W. J. Burrell, Beaumont Refinery
Oscar A. Hutchinson, Tampa, Fl.
Bernice K. Wetle, Schaumburg, Il.

30 YEARS James P. Beggs,
Pure Transportation Co., Van, Tx.

25 YEARS Frank G. La Vieri, Schaumburg, Il.
Lessie L. McKinney, Columbus, Oh.
Jack E. Pelloat, Beaumont Refinery

20 YEARS Robert L. Clark, Schaumburg, Il.
John M. Izaj Jr., Pittsburg, Pa.
Clyde L. Oleson Jr.,
Beaumont Refinery
Louis J. Voltarel, Chicago Refinery

15 YEARS Ronald L. Abbott, Cincinnati, Oh.
Harry L. Clark, Cincinnati, Oh.
Dennis W. Denton, Chicago Refinery
Herman J. Granger,
Beaumont Refinery
Glenn P. Hayes, Beaumont Refinery
Brian A. Hopps, Schaumburg, Il.
Charlene Matson, Schaumburg, Il.
Henry L. McGrew, Schaumburg, Il.
Thomas M. Nelson,
Beaumont Refinery
Michael J. Peterson, Chicago Refinery
Robert J. Raggette,
Beaumont Refinery
Robert J. Romero,
Beaumont Refinery
Darrell S. Smith, Beaumont Refinery
Chester J. Witkowski,
Chicago Refinery

10 YEARS Edwin D. Bernhard, Chicago Refinery
Gerald F. Chesney, Dallas, Tx.
Jack L. Jernigan, Chicago Refinery
George P. Shields, Chicago Refinery

5 YEARS Robert J. Allemand,
Beaumont Refinery
Margol L. Bluiett,
Beaumont Refinery
Glen A. Bormet, Chicago Refinery
Patrick L. Brown, Beaumont Refinery
Robert L. Denewellis,
Chicago Refinery
Estella Figueroa, Chicago Refinery
John A. Frigo, Chicago Refinery
Frederick P. Glavan, Chicago Refinery
Rhom M. Hancock, Chicago Refinery
Clarence L. Holiday,
Chicago Refinery
Anita Sue Huckaby,
Beaumont Refinery
Floyd D. Kujama, Chicago Refinery
Sebastian Lopez, Beaumont Refinery
Theodore J. McSwine,
Chicago Refinery
Robert D. Melton,
Beaumont Refinery
Houston Rideaux Jr.,
Beaumont Refinery
Robert L. Rohder, Chicago Refinery
Billy R. Sterling, Beaumont Refinery

WESTERN REGION

July 1986

40 YEARS Eva H. Hall, Richmond Terminal

35 YEARS Signe E. A. Andersen,
San Francisco Refinery
Norman L. Denton, Los Angeles, Ca.
Thomas D. Pereira,
San Francisco Refinery

Service Awards



- 30 YEARS **Kenneth E. Burns**,
Los Angeles Refinery
Alice B. Sorrels,
San Francisco Refinery
Richard K. Stewart,
Los Angeles Terminal
- 25 YEARS **Roger H. Montoya**,
Bakersfield Terminal
Arthur K. Shozuya, Honolulu, Hi.
- 20 YEARS **Edward E. Bonds**, Walnut Creek, Ca.
Alexander L. Miller, Honolulu, Hi.
Jack W. Toomey,
San Francisco Refinery
Charles H. Werre,
Los Angeles Refinery
- 15 YEARS **Don L. Carlson**, Los Angeles Refinery
John A. Dennis, Taft, Ca.
Clarence Devault,
Los Angeles Refinery
Robert S. Guerra,
Los Angeles Refinery
Claudia J. Matheson,
Walnut Creek, Ca.
Ethelene S. Poston, Los Angeles, Ca.
David C. Schuhmann,
Los Angeles Refinery
Stephen J. Sorvetti,
San Francisco Refinery
Charles F. Sullivan,
San Francisco Refinery
Jerry D. Yagher, Los Angeles Refinery
- 10 YEARS **Betty L. Brooks**,
Los Angeles Terminal
Cody D. Browning, Tucson Terminal
Linda P. Deleau,
San Francisco Refinery
Eldo N. Evenson,
Los Angeles Terminal
Pam G. Holmes, Taft, Ca.
Charles Martin, Los Angeles Refinery
Christopher L. McKinney,
San Francisco Refinery
Daniel J. Ottem,
San Francisco Refinery
William V. Padillas,
Portland Terminal
Leslie E. Shirkey, Richmond, Ca.
Michael W. Stephens,
San Francisco Refinery
Hanne R. Torres, Seattle, Wa.
Antonio A. Ybarra,
Los Angeles Refinery

- 5 YEARS **Daniel E. Broguiere**,
Los Angeles Terminal
Michael W. Busby, Los Angeles, Ca.
Jose C. Catalasan,
Los Angeles Refinery
Donna J. Coble, Pasadena, Ca.
Bradford L. Craig,
Los Angeles Terminal
George H. Dunning,
San Francisco Refinery
Daniel B. Folk, Torrance, Ca.
Patricia L. Gough, Honolulu, Hi.
Russell G. Graham,
Santa Maria Refinery
Douglas E. Greene,
Los Angeles Refinery
Freddie L. Howard,
Los Angeles Refinery
Nash A. Jaramillo, Santa Paula, Ca.
Christopher R. Leuthold,
Santa Maria Refinery
Ted A. Panos, San Luis Obispo, Ca.
Joe Romero, Los Angeles Refinery
Gwendolyn E. Sea, Los Angeles, Ca.
Pawl M. Yamamoto, Richmond, Ca.

August 1986

- 35 YEARS **Bryan M. Harrah**,
San Francisco Refinery
- 30 YEARS **John E. Kaczmarek**,
Los Angeles Refinery
Donald E. Terry, Brisbane, Ca.
- 25 YEARS **Marilyn C. O'Connell**,
Los Angeles Terminal
- 20 YEARS **Paul S. Adams**, San Francisco Refinery
Terry L. Hopkins,
Los Angeles Terminal
Jimmy C. Meek, Los Angeles Refinery
Louis B. Nobbe,
San Francisco Refinery
Larry E. Prince, Los Angeles Terminal
- 15 YEARS **Herbert Arline**, Los Angeles Refinery
John W. Bair, Los Angeles Terminal
Norman J. Carrick,
Los Angeles Refinery
Vincent J. Carta,
Los Angeles Refinery
Paul M. Crossman,
Los Angeles Refinery
McKinley Gilliam Jr.,
Los Angeles Refinery
Raymond D. Iverson,
Los Angeles Refinery
Leonard S. Martinez,
Los Angeles Refinery
Robert J. Reinartz,
Los Angeles Refinery
Richard Whitman,
Los Angeles Refinery
Keith J. Wiljamaa,
Los Angeles Terminal
Thomas R. Winstrom, Hayward, Ca.
- 10 YEARS **Fred A. Brown**, San Luis Obispo, Ca.
Lorraine G. Gillund, Los Angeles, Ca.
Bruce T. Hamilton,
Los Angeles Refinery
Hans P. Herting,
Los Angeles Refinery
Albert S. Matsuda, Honolulu, Hi.
Charles E. Pfeifer,
Los Angeles Refinery
Don W. Rieschick, Colton, Ca.
John A. Weaver, Los Angeles Refinery
Virginia S. Woo,
San Francisco Refinery

- 5 YEARS **James M. Agee**, Los Angeles Refinery
Craig W. Andridge,
Los Angeles Refinery
Burnard V. Bell, Los Angeles Refinery
H. Brenton Brigham,
San Francisco Refinery
Thomas J. Carroll,
San Francisco Refinery
Terrie S. Clark, San Francisco Refinery
Christina V. Coyle,
Los Angeles Refinery
Karen L. Stevens Dronen,
Edmonds, Wa.
Michael J. Flores,
San Francisco Refinery
Howard V. Gardner, Unocal Center
Gerald W. Gulick,
San Francisco Refinery
Michael A. Havenga,
Santa Fe Springs, Ca.
Steven D. Holley,
Santa Fe Springs, Ca.
David J. Hoover, Richmond, Ca.
Clarence O. Jessie Jr.,
Santa Fe Springs, Ca.
George W. Johnson, Los Angeles, Ca.
Daniel P. Loewer, Nederland, Tx.
Darryl E. Matthews,
Los Angeles Terminal
Charles M. Peniche,
San Francisco Refinery
Javier G. Prado, Los Angeles Terminal
T. Michael Sechrist, Tucson, Az.
David E. Sparks,
San Francisco Refinery
Clyde J. Trombettas,
San Francisco Refinery
James M. Watkins,
Los Angeles Refinery
Gregory L. Wilkonson,
Los Angeles Refinery

MARKETERS & DISTRIBUTORS

July 1986

- 35 YEARS **Don Brettthauer**, Cornelius, Or.
- 25 YEARS **Combs Oil Company**, Naples, Fl.
Spruill Oil Co., Inc., Windsor, N.C.
- 15 YEARS **Carolina Oil of Orangeburg, Inc.**,
Orangeburg, S.C.

August 1986

- 30 YEARS **J. C. Lansdowne, Inc.**, Visalia, Ca.
- 25 YEARS **Elk River Oil Co.**, Elk River, Mn.
- 20 YEARS **R & L Oil, Inc.**, Clarksdale, Ms.
Union Products of Kona, Inc.,
Kailua-Kona, Hi.
- 15 YEARS **Appleton Oil Co.**, Appleton, Wi.
J & J Oil Co., Inc., Athens, Al.
J & J Oil Co., Inc., Decatur, Al.
Don S. Miller Distributor, Inc.,
Vicksburg, Ms.
- 10 YEARS **James H. Flournoy**, Calipatria, Ca.
- 5 YEARS **Davis Bros. Oil Co.**, Clarksville, In.
Home Oil Co. of New Richmond,
Inc., New Richmond, Wi.

CHEMICALS

July 1986

- 40 YEARS Eugene M. Deane, Middleburg Hts., Oh.
- 35 YEARS Louise H. Cronan, Atlanta, Ga.
- 30 YEARS James Dickens, Unocal Center
- 20 YEARS Kay H. Hendrix, Tucker, Ga.
Fred Snowball, Newark, Ca.
- 15 YEARS Franklyn M. Williams, Lemont, Il.
- 10 YEARS Gordon A. Althaus, Kenai, Ak.
Brian G. Cotman, Kenai, Ak.
Mark D. Esping, Brea, Ca.
David E. Freer, Arroyo Grande, Ca.
Robert L. Gardiner, Cincinnati, Oh.
Woodrow A. Heselius, Kenai, Ak.
Harry J. Kopp, Schaumburg, Il.
William C. Nancarrow, La Mirada, Ca.
George L. Spence, Kenai, Ak.
Robert D. Stamer, Kenai, Ak.
Glenn E. Trimmer, Kenai, Ak.
James W. Ziehler, Kenai, Ak.
Larry L. Zuelke, Rodeo, Ca.
- 5 YEARS Jane E. Faustyn, Schaumburg, Il.
Lisa N. Hanson, Rolling Meadows, Il.
Roy J. Lopez, Newark, Ca.
Michael J. McKenny, Memphis, Tn.
Ronald A. Miller, Baton Rouge, La.
Martin J. Stegmiller, Denver, Co.
Pamela S. Swanson, La Mirada, Ca.
Steven D. Tollison, Tucker, Ga.

August 1986

- 35 YEARS Robert A. Closser, Kansas City, Mo.
- 25 YEARS Byron L. Barclay, Unocal Center
Theodore E. King, Brea, Ca.
- 20 YEARS Luis Cervantes Jr., Unocal Center
Donald A. Kay, East Providence, R.I.
Daniel S. Marlatt, Baltimore, Md.
Robert E. Sedlak, Wilmington, Ca.
- 15 YEARS Stasha J. Gorzelnik, Unocal Center
Gregory D. Salo, Arroyo Grande, Ca.
Ronald L. Wilkinson, Lemont, Il.
- 10 YEARS Donald J. Bulian, Lemont, Il.
Boyd P. Crouch, Charlotte, N.C.
Gary W. Miller, Kenai, Ak.
Alan L. Pedersen, Lemont, Il.
Alice F. Walker, Bridgeview, Il.
- 5 YEARS Jonnie R. Berry, Brea, Ca.
Bruce K. Easterday, Yuma, Az.
Charles C. Edmondson, Schaumburg, Il.
Keith L. Gelman, Unocal Center
Ralph R. Johnston, Kenai, Ak.
Mark N. Orvick, St. Paul, Mn.
James R. Ward, Baltimore, Md.
James S. Watson, Charlotte, N.C.
Walter M. Weiss, Brea, Ca.
Ken W. Wilkins, Wilmington, Ca.

MOLYCORP, INC.

July 1986

- 15 YEARS Richard L. Sherer, Englewood, Co.
- 5 YEARS Stephen J. Frankovich, Mountain Pass, Ca.
Michelle Northcutt, Englewood, Co.
George E. O'Dell Jr., Mountain Pass, Ca.

August 1986

- 10 YEARS Herbert S. Jacobson, Mountain Pass, Ca.
Alice I. Ling, Mountain Pass, Ca.
- 5 YEARS Glen L. Bridges, Mountain Pass, Ca.
Maxine T. Chacon, Questa, N.M.
Russell A. Church, Questa, N.M.
Tina M. Evans, Questa, N.M.
Sherry L. Frankovich, Mountain Pass, Ca.
Charles F. Bagaldon, Questa, N.M.
Rumaldo F. Garcia, Questa, N.M.
Everett G. Glass, Questa, N.M.
Herbert D. Gonzales, Questa, N.M.
Eusebio Griego, Questa, N.M.
Fred V. Gutierrez, Questa, N.M.
Arley T. Iverson, Questa, N.M.
Gene A. Lopez, Questa, N.M.
John D. McElfresh, Mountain Pass, Ca.
Howard L. Medina, Questa, N.M.
Elias J. Miera, Questa, N.M.
John W. Ortega, Questa, N.M.
Gary Quintana, Questa, N.M.
David E. Trujillo, Questa, N.M.
Salomon Vasquez, Questa, N.M.
Henry F. Velarde, Questa, N.M.
Barbara J. Vella, Englewood, Co.
Steve L. Vigil, Questa, N.M.
William L. Waterman, Mountain Pass, Ca.

POCO GRAPHITE, INC.

July 1986

- 5 YEARS Evelio Zamora, Decatur, Tx.

August 1986

- 5 YEARS Elma Mayfield, Decatur, Tx.

IN MEMORIAM

Employees

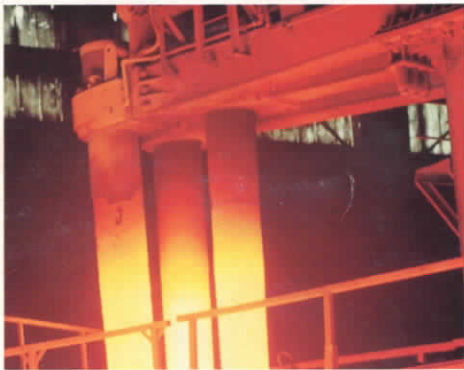
- Tomas H. Blanco Jr., International Oil & Gas, Villa Park, Ca., April 29, 1986
- Don L. Carlson, Refining & Marketing, San Pedro, Ca., June 19, 1986
- Helen G. Galanis, Refining & Marketing, Daly City, Ca., May 8, 1986
- Joseph Grundon, Oil & Gas, Noble, Il., May 3, 1986
- Bill Kemp, Refining & Marketing, Nederland, Tx., May 19, 1986
- Clyde O. Moen, Molycorp, McMurray, Pa., May 3, 1986
- Sylvia H. Moffett, Oil & Gas, Port Charlotte, Fl., May 23, 1986
- Lyle Rutherford, Corporate, La Habra Heights, Ca., June 15, 1986

Retirees

- Charles H. Allaire, Oil & Gas, Warren, Pa., April 12, 1986
- Frank H. Allen, Refining & Marketing, San Diego, Ca., June 12, 1986
- Clifford R. Austin, Oil & Gas, Ventura, Ca., May 29, 1986
- Herbert T. Bartleme, Refining & Marketing, St. Cloud, Mn., May 2, 1986
- Earl T. Bowes, Refining & Marketing, Rodeo, Ca., May 16, 1986
- Joseph H. Bruce, Refining & Marketing, Lakewood, Fl., May 9, 1986
- John R. Butt, Refining & Marketing, Newark, Oh., June 10, 1986
- Wilbur M. Carson, Refining & Marketing, Burbank, Ca., April 23, 1986
- William Chiarelli, Refining & Marketing, Perrysburg, Oh., June 21, 1986
- Edward L. Cox, Refining & Marketing, Greenville, S.C., May 1, 1986
- Lloyd V. Critton, Oil & Gas, Signal Hill, Ca., May 27, 1986
- Robert L. Crow, Refining & Marketing, Rodeo, Ca., May 31, 1986
- John M. Dalessi, Refining & Marketing, Richmond, Ca., June 13, 1986
- Raymond R. Edmondson, Refining & Marketing, Birmingham, Al., May 12, 1986
- Evan L. Glass, Refining & Marketing, Springfield, Oh., April 12, 1986
- Zelpha N. Goodson, Refining & Marketing, Livonia, Mi., June 16, 1986
- Harry E. Gregg, Refining & Marketing, Tampa, Fl., April 20, 1986
- Robert A. Hall, Oil & Gas, Wauseon, Oh., May 10, 1986
- Carl Howard, Oil & Gas, Alpine, Ca., June 9, 1986
- Frances T. Jacobson, Refining & Marketing, Lemont, Il., March 21, 1986
- William B. Johnson, Refining & Marketing, Woodville, Va., April 15, 1986
- Frank E. Jordan, Refining & Marketing, Biloxi, Ms., April 25, 1986
- William A. Karberg, Science & Technology, Las Vegas, Nv., May 24, 1986
- George E. Lemieux, Refining & Marketing, Hernando, Fl., May 11, 1986
- Earl R. McCloud, Refining & Marketing, Santa Paula, Ca., June 2, 1986
- Everett M. McCormack, Oil & Gas, Dawes, W.V., April 21, 1986
- James K. McKisic, Chemicals, Elk Grove Village, Il., April 24, 1986
- Robert J. McQuilkin, Refining & Marketing, Dearborn, Mi., May 17, 1986
- Hollis E. Meredith, Refining & Marketing, Seal Beach, Ca., June 4, 1986
- Ira Needham Jr., Oil & Gas, Denver, Co., June 23, 1986
- Gene C. O'Connor, Refining & Marketing, Arvada, Co., April 25, 1986
- Mosely P. Owens, Oil & Gas, Houston, Tx., June 2, 1986
- Pearl Peavler, Refining & Marketing, Flora, Il., June 6, 1986
- William W. Pillar, Refining & Marketing, Chesapeake, Va., April 26, 1986
- Alexander L. Putz, Refining & Marketing, Brookfield, Wi., May 4, 1986
- Atilano M. Razo, Oil & Gas, Santa Maria, Ca., April 25, 1986
- Joseph B. Riley, Refining & Marketing, Lockport, Il., May 21, 1986
- Ralph H. Robinson, Refining & Marketing, Naples, Fl., April 24, 1986
- Ivan M. Seal, Refining & Marketing, Vista, Ca., June 14, 1986
- John Simmons, Oil & Gas, Tulsa, Ok., May 19, 1986
- James W. Skiles, Refining & Marketing, Charleston, W.V., May 25, 1986
- Sibbald A. Sly, Refining & Marketing, Burbank, Ca., June 7, 1986
- Lawrence H. Tibbitts, Oil & Gas, Newhall, Ca., June 18, 1986
- Joseph A. Waymire, Oil & Gas, Madill, Ok., April 18, 1986
- John Thomas Williams, Refining & Marketing, Greenfield, In., April 28, 1986
- Edna J. Winner, Refining & Marketing, St. Louis, Mo., April 4, 1986
- Loren W. Wood, Refining & Marketing, Minneapolis, Mn., May 25, 1986

GARY L FOY
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VOLUME LXV, NUMBER 4
JULY/AUGUST 1986
CONTENTS

A Triumph Of Technology And Teamwork Unocal's needle coke project delivers a premium product.	Page 1
Professional Car Care—Guaranteed PROTECH dealers offer the best in automotive services.	Page 10
A Powerful Attraction Neodymium magnets hold promise for Molycorp.	Page 16
Bidding Farewell Employees elect early retirement under special offering.	Page 20
A Gem Of An Oil Field Historic Van field yields its 500-millionth barrel.	Page 28
Toasting A Landmark Company's Santa Paula office building is given historic recognition.	Page 34
Service Awards	Page 37

COVER: The needle coker at the Chicago refinery, completed in 1985, produces a premium specialty chemical that is getting great reviews from customers. Story on page 1. Photo by Larry Lee.

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