Seventy Six

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THE NETHERLANDS OFFSHORE

a long time coming and worth the wait

In 1979, Union Oil made the first discovery of oil offshore the Netherlands. When this was followed by a second discovery in 1980, commercial production became a possibility—but only if the costs of development could be tightly controlled.

The target date for production of first oil was set for October 1982. Computer projections rated the chances for such rapid completion of development very low, but this was to be no ordinary development process. Working in close cooperation with its joint-venture partner Nedlloyd, the Dutch government and Dutch contractors, Union beat the odds.

First oil was produced in September 1982 from the Helm and Helder fields, slightly ahead of schedule. The Hoorn field began producing in August 1983, more than a month ahead of a very ambitious schedule.

Union's 23 producing wells on three platforms are now running above projections, averaging 32,000 barrels a day.

"Recently, the 10 millionth barrel was produced, a significant milestone," says Graydon H. Laughbaum, vice president and general manager of Union Oil Company of the Netherlands. "This has more than doubled the total crude oil production from the Netherlands, where onshore production is 27,000 barrels a day."

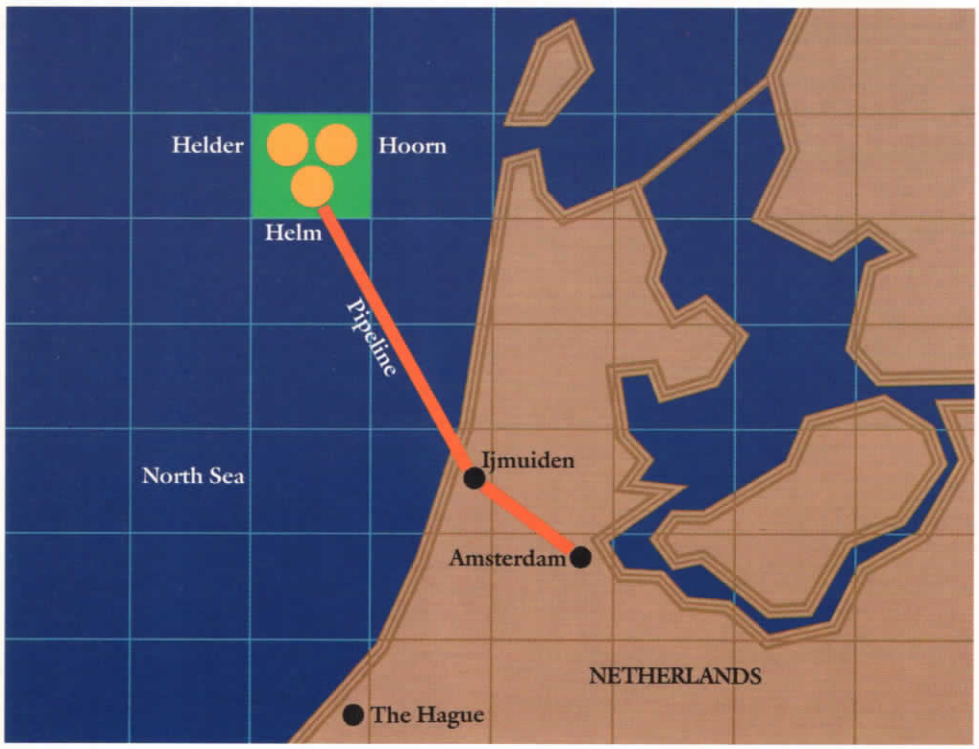
The Helm field, the first discovered, is now producing from five wells with a sixth nearing completion. The Helder field produces from 12 wells. And the Hoorn field, discovered in 1982, produces from six wells. Costs incurred so far in the development of the Q/1 fields are in excess of one billion guilders, according to Laughbaum. (The exchange rate averages almost three guilders to one U.S. dollar.)

The fields are all on the Q/1 block, where Union has an 80 percent interest. The block covers about 75,000 acres and still has potential for new discoveries, according to H. D. Maxwell, Union's regional vice president headquartered in London.

"Since 1967 Union and Nedlloyd have acquired over 15,000 kilometers (9,300 miles) of proprietary seismic data and drilled 35 exploratory and appraisal wells," Laughbaum says. "These activities have incurred an expenditure of 300 million guilders through 1983, substantially in excess of the work obligations we must fulfill in order to hold our interest."

In early 1984, the joint venture partners made their initial entry into the onshore area with seismic surveys. "It is expected that this work will lead to an application for a drilling permit," Laughbaum adds.

And, in 1985 gas production is scheduled to begin from the Union operated L/11b gas field, located some 45 miles north of the oil fields. Development costs are estimated to be in excess of 125 million guilders. The company also has an interest in another oil and gas field which should be producing by 1987. It is operated by NAM, a Shell-Esso company.



Only 28 months elapsed between the decision to proceed with development of the offshore fields and production of first oil in September 1982. In this remarkably short time frame, the organization was created, plans were made, clearances were obtained, and platforms, pipeline and terminal were designed, built and brought into operation.

Union's involvement offshore the Netherlands began in 1968 just two years after the International Division was formed for the purpose of concentrating on exploration and production activities outside the U.S.

In 1967 Ray Burke, senior vice president of Energy Resources who was then newly assigned as president of the International Oil Division, and Sam Snyder, associate legal counsel, traveled to the Netherlands to interview potential partners. "We chose Nedlloyd, then the Nederlanden Steamship Company, because we believed their long and successful history in the shipping business reflected an understanding of risk and a willingness to take risk. We wanted a compatible partner. When contacted, they were interested and joined us in the risky business of exploring for oil and gas in the Netherlands offshore. It has been a good combination," Burke says.

"In our very first well offshore we found some gas, although not in commercial quantities. But that did give us some encouragement right from the beginning," says William Sax, vice president of exploration for the International Division. "And we needed the encouragement. The first commercial discovery was 11 years away.

"Through it all, Nedlloyd has been an uncomplaining partner," Sax says. "We in the oil business understand that it can take 10 or 15 years of looking to meet with success. But Nedlloyd is a transportation company involved in shipping, trucking—if it moves, Nedlloyd probably has an interest. Despite the early disappointments, our joint-venture partners have displayed trust in us, and we both have stayed with the effort to find oil and gas.

Amerikahaven, an industrial section of Amsterdam's harbor, is the site of Union's oil treating and storage facilities (above and top of opposite page).

"We had several reasons for staying," Sax recalls. "We knew there were prospects with potential, because we kept getting shows of oil and gas. We knew we were working in a geologically complex area, in which there were a large number of different types of possibilities. A few wells would not begin to exhaust the possibilities. And we could proceed knowing that the Dutch government would not change their terms on existing agreements."

"Union drilled a gas well which turned out not to be successful," Maxwell recalls. "But a couple of our people had done some investigative work and identified a setting for oil similar to producing onshore fields."

That turned out to be the key to success. Union took the lead in innovative exploration thinking, developing ideas about looking for oil in a Cretaceous geologic zone. "No one else had really pursued these zones, even though NAM had found oil in similar structures," says John Baines, exploration manager. "But the structures are offset at different geological horizons—that is, they don't line up one on top of another—so you have to drill for a specific target. I think we've probably drilled more wells than anyone else here, except NAM.

"Now, as a result of our success, everybody is chasing these Cretaceous structures," he continues. "Conoco, Mobil and Amoco have all found oil. If Conoco stays on schedule, it will be producing by the end of 1984—through the Union/Nedlloyd pipeline."

This pipeline carries the crude from the offshore Q/1 producing areas to a terminal in the Amerikahaven, one of several industrial sections with "continental" names in the Port of Amsterdam, according to Arun Metre, manager of Union Oil Transportation B.V. "The pipeline was deliberately oversized, so that it could accommodate more production than that anticipated from Union's discoveries," he says. "This has provided a vital infrastructure that makes production of smaller finds in these waters economically feasible."

But, in the beginning, Union had only two small fields. The decision to proceed, taken in May 1980, was a daring one. The key to success would be in cost control and tight construction scheduling. To make the proposition of offshore Dutch oil work required careful planning, persistence in pursuit of a goal, and a phenomenal cooperative effort.

"If there is a single reason why the project progressed so quickly, it was because there was a desire on everyone's part to expedite it," Maxwell says. "The Dutch recognized that indigenous oil production would be very important to the country's future, and there were very few dissenters to that point of view in the Netherlands."

Union opened its offices in The Hague, Holland's third largest city, because it is the seat of government and most of the ministries are headquartered there. The government is a parliamentary democracy. The Dutch monarchy agreed to constitutional rule in 1814.

In The Hague, headquarters city of Union Oil Company of the Netherlands, the government buildings overlook the water—the element the Dutch have fought for their land, as well as the "highway" that has made the country a major shipper.

The Helder platform (left) *is identical to the Helm and Hoorn platforms, a fact that allowed the unusually rapid construction of all three.*

"We were very direct and open with the Dutch," says John Imle, president of the International Oil Division, who was the local manager during the 1980 start-up of Union Oil Company of the Netherlands. "We told them what we wanted to do and that we wanted to do it correctly. They said it would take years. We said that to make it feasible we needed to do it in months, not years. And we got them on our side."

As with all such projects, development schedules for the Netherlands offshore fields were based on feasibility studies and took into account projected production, construction costs and hundreds of other factors. Development must be carefully managed, since the return on investment (including the long period of exploration) does not begin until production of the first oil.

But the Netherlands Q/1 block offered one special circumstance that might allow unusually rapid development. The same platform design could be used for all three fields, allowing considerable savings in time, materials and fabrication. So, with the cooperation of the host country, Union was able to proceed.

High on the fledgling company's agenda was the development of an oil spill contingency plan. Both Union and the Dutch government wanted to ensure proper environmental safeguards. Second was how to get the oil ashore—either by ship or pipeline. This question was compounded by a protest lodged by a leading environmental group, the *Werkgroep Noordzee*, against the granting of Union's production license.

"The reason for the protest was offshore loading," Imle says. "So we met with the environmentalists, who said they would support a pipeline. What we needed was a place to cross the beach. They said they would not complain if we would land the pipeline between certain points, so we picked a spot in the middle at Ijmuiden."

"I remember that John and Tim McMahon (then manager of services in The Hague) went on a weekend bicycle tour with some of the environmentalists to try to reach a better mutual understanding in a non-emotive atmosphere," Maxwell says.

"I had arranged a trip for four members of the *Werkgroep Noordzee* to visit the Heather platform offshore the Shetland Islands in the U.K.," McMahon recalls. "People often have preconceived notions about what we—an oil company—are like. I was very proud when we got to the platform. It sparkled like a jewel. The day was perfect. The cooks prepared a gourmet meal. Everything was orderly, businesslike and clean, not the chaotic mess that I think some people expect. Anyway, I was very impressed, and I think our guests were, too.

"Later, as guests of the *Werkgroep*, John and I were invited to Terschelling, one of the Wadden Islands. There is a nature reserve on the island, and they gave us a naturalist's tour of the dunes and shoreline to show us what they wanted to protect," says McMahon, who is now a purchasing agent for International in Los Angeles.

"We rode bicycles some 10 miles into the wind off the North Sea, and this was in December. Even so, we enjoyed the experience and the people."

Once the landfall for the pipeline was established, an onshore storage terminal had to be planned. The question was where to build it, and the most obvious answer was in Ijmuiden. Union at first gained the support of the municipality but ran into opposition from the local fishing industry. The alternative was to extend the pipeline to the port in Amsterdam. However, it seemed a formidable task to get pipeline construction clearances from the many municipalities that lie between Ijmuiden and Amsterdam, which is 15 miles to the southeast.

"Nedlloyd was a valuable partner, especially at the local level. They often sent a representative with us to meetings. Although we played the leading role, they gave us good advice on how to approach things," recalls Imle, who also received good advice at almost every step from Union's legal counsel, Ian Johnson, now headquartered in London. As it turned out, clearances for the pipeline were quickly granted. Then, Union contracted with an oil terminalling firm to build treating and storage facilities in Amsterdam.

Given Union's time frame, the Dutch government streamlined some of its procedures in order to grant the permits and clearances necessary to allow planning and construction. Coordination was handled by the Ministry of Economic Affairs, whose approach was to get all the concerned parties in one room, ask and answer all questions, and render decisions. This approach worked very well for rerouting the sea lanes that were near the Union discoveries.

The Hoorn platform jacket awaits construction of the decks and process equipment, while development wells are drilled from the jack-up rig in the background. The Helm platform (opposite) *shows the completed drilling deck connected by a bridge to the processing decks and living quarters.*

The North Sea is one of the world's busiest oceans, a critical link for European trading nations, both with each other and with the rest of the world. The Netherlands is the gateway for much of this trade, with its harbors serving the Rhine, Maas and Scheldt rivers, all major routes into northern Europe. Amsterdam has been a major port since the 14th century.

The Union discoveries lay just 25 miles off the coast. Prior to development, these fields were in the path of sea lanes through which some 160 ships passed daily. Union conducted a risk analysis study, sharing its findings with the Dutch authorities. Assuming a 15-year life of the producing fields, there seemed to be little risk of any ship colliding with a platform. However, to further reduce the possibility, the shipping lanes were rerouted around the center of drilling activity in the Q/1 Block, and the Intergovernmental Maritime Consultative Organization, an agency of the United Nations, was quick to grant approval.

As of 1983, there were some 64 permanent drilling platforms in the North Sea, and the number grows every year as new discoveries are made and developed. Offshore platforms can serve as navigational aids to ships at sea, providing stationary reference points on the liquid landscape. For protection, each of Union's Block Q/1 platforms has its own automated radar system. Every hour of every day, such a system sweeps the surrounding ocean, sounding an automatic alarm if any vessel approaches too closely.

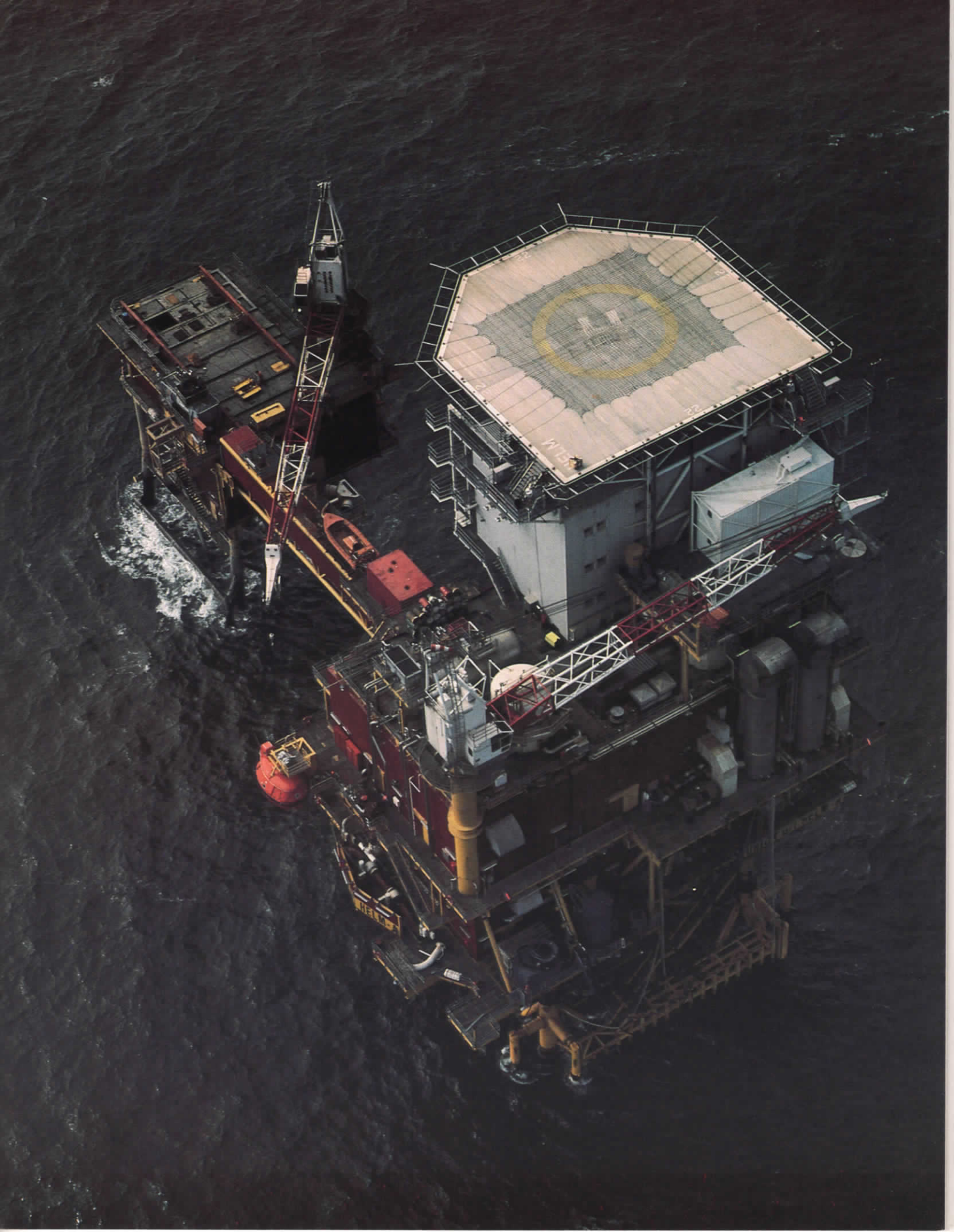
The area offshore the Netherlands is relatively shallow, averaging 75 feet in water depth. While this means that it doesn't get the 100-foot seas of deeper areas, this often stormy ocean is still no place for the easily discouraged.

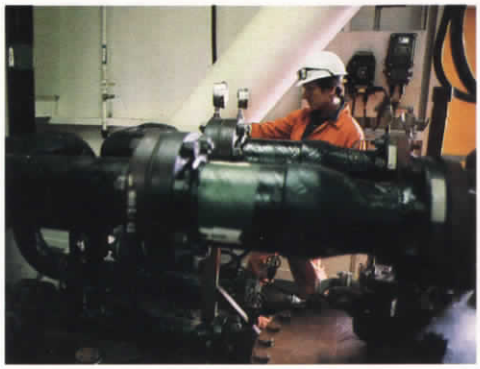
"On the worst days you can't do anything," says David St. John, manager of operations in The Hague. "The winds will be 80 to 90 miles an hour, and the seas will be 25 or 30 feet. You can't offload boats. You can't drill because of the wind resistance to the pipe in the derrick. On a good day, the winds will be about 20 miles per hour and the seas three to five feet."

The Dutch have long contended with the tempestuous ocean. The entire western half of the country is below sea level, as much as 22 feet in places, protected by dikes which have been built over the centuries to extend the land. Perhaps that fact of Dutch life contributes to the pragmatism of the people, which has characterized the relationship between Union and its Dutch hosts. When a dike breaks and the North Sea flows in, there is little time for debate. Action must be quick and effective. And so it was with the first offshore development of oil.

Construction contracts were put out to bid as soon as the necessary permits had been obtained. On the free market, Dutch contractors won some 80 percent of the work. Unlike some governments, the Dutch offer no subsidies to local contractors to guarantee their selection if their prices are not competitive.

Over 70 percent of purchases for activities in the Netherlands during 1982 and 1983 were of Dutch origin. "It is clearly Union's policy to give qualified Dutch contractors a full and fair opportunity to provide goods and services required," notes Ian Wilton, accounting manager.





Dutch contractors won some 80 percent of the construction work on the offshore platforms. More than 70 percent of the material purchases were of Dutch origin.

"The performance of every one of our Dutch contractors was excellent," Imle says. "That achievement is even more remarkable considering the time constraints they worked under."

"Normally, when you give someone a construction assignment you can offer some lead time and some 'float' time to allow for contingencies, at least for the critical parts of a job which must be completed before other work can begin," explains St. John.

"However, for Helm and Helder we had to reduce the lead time and take away the float," he continues. "By the time we got our permits, we had only 12 months to meet our target date in October 1982. We had zero float time for a thousand critical tasks. Our project teams, the rest of the Union staff and every one of our contractors came through. The Hoorn project went even better mainly because it was a repeat exercise and we beat our own ambitious schedule by 37 days."

Union could not have achieved so much so quickly without the magnificent cooperation of the Dutch. And the effort has now helped the Dutch significantly increase their domestic energy reserves. Current production and exploration activities should soon result in the Dutch supplying some 20 percent of their oil needs from indigenous sources. This is particularly important in light of Dutch expectations that they will have to rely more and more on oil as an energy resource as their gas supplies are depleted.

Oil has long played a major role in the Dutch economy because of Rotterdam's importance as a refining and supply center. Union's production, a sweet crude that is low in sulfur and not waxy, moves easily through the pipeline and provides a good feedstock for Dutch refineries, according to Maxwell.

"There is great potential offshore Holland," Maxwell says. "And, Holland has a realistic tax structure that encourages private investment. The government also has a history of avoiding retroactive legislation that can have adverse affects on operations like ours."

"We are looking forward to expanding our activity in the area," Laughbaum adds, noting that the company has grown to number 127 in its workforce from very modest beginnings during the start-up in 1980. "These persons are employed by Union Oil Company of the Netherlands and its affiliate, Union Oil Transportation B.V. They assure the smooth and efficient operation of our three fields offshore, the Amsterdam terminal, the supply base in Ijmuiden, and our offices in The Hague," he says.

"Our success so far has encouraged us to undertake a strong effort in respect to applications for new blocks on the Netherlands continental shelf. The competition will be high, but we hope to do quite well in the next offering of offshore exploration licenses later in 1984."

On March 1, 1984, Union Oil Company of the Netherlands won a two-star International Safety Rating Award for the Helm, Helder and Hoorn offshore platforms. This ISR award, presented by the International Loss Control Institute of Benelux, confirms the commitment of Union's employees and management, as well as contractors, to the safe and professional conduct of operations.

The ISR system is becoming the international barometer of excellence in safety and loss control. Unlike most industrial safety audit systems which focus on hardware and symptoms of trouble, ISR concentrates on the underlying organizational methods which affect safe operations. This approach aims to eliminate the source of problems and so prevent their occurrence.

Ben van Amelsvoort, fire and safety supervisor, introduced the system to Union because he had prior experience with it. Management was quick to see the system's advantages. Union earned the two-star rating in the first year of using the ISR system and everyone is shooting for three stars by the end of 1984.

NEW ENERGY FROM AN ELECTRIFYING OLD IDEA

All of the plant's new cogeneration equipment is painted tan—like the surface condenser for the boiler and the heat exchanger for the boiler feed water (right).
Since December, some of the electricity for utility customers in northern California has been generated by Union Chemicals' Contra Costa plant (below).

Cogeneration is an old idea, even an obvious idea—but only recently has it once more become a practical idea. Union Chemicals' coke calcining plant in northern California's Contra Costa County is part of a new wave of U.S. businesses that are generating electrical energy as a byproduct of industrial processes. Cogeneration involves the use of waste heat to produce electricity, usually by means of steam generators.

In a coke calcining operation, green coke is roasted at temperatures reaching up to 2700 degrees Fahrenheit. (Coke is the solid residue left from petroleum coking, a refining process.) Calcining burns off all but the pure carbon, leaving crystallites that are indispensable to certain industrial processes—notably as anodes in the production of aluminum.

The waste heat from Union's Contra Costa plant used to escape out the stacks. Now, these hot gases pass through boilers to produce steam, which in turn drives a turbine to produce electricity. The electricity is sold to Pacific Gas & Electric Company for distribution to its customers. The Contra Costa plant produces 27,500 kilowatts, enough to serve a community of 27,500 persons.

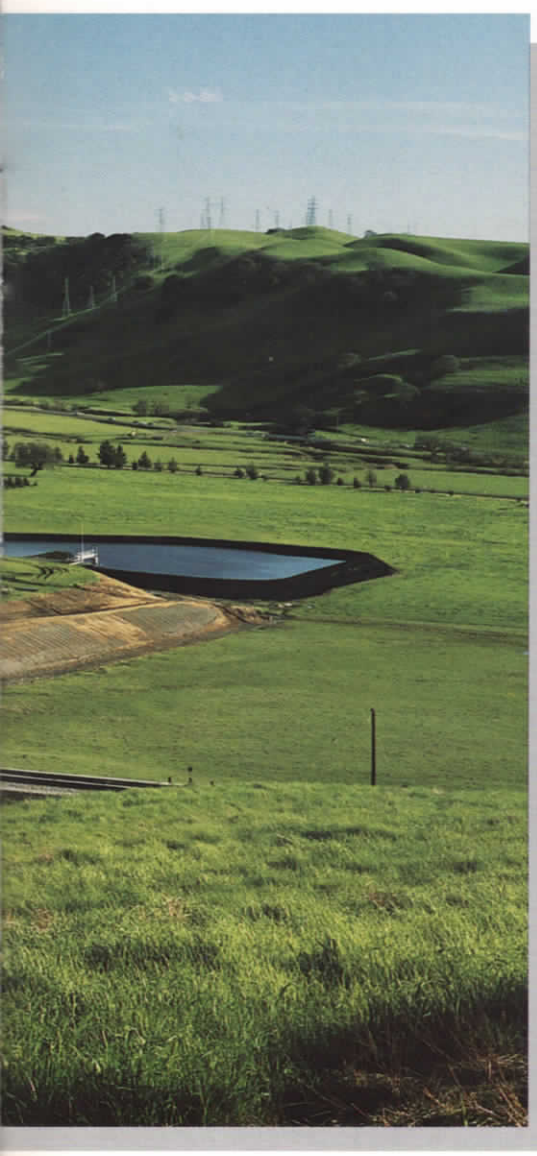
In the early 1900s, half of the electricity used by American industry was created from waste process heat. However, the rise of large utility companies made it unnecessary for industries to support the construction and maintenance of their own on-site power generation systems. Hydroelectric sources and fossil fuels provided abundant low-cost energy.

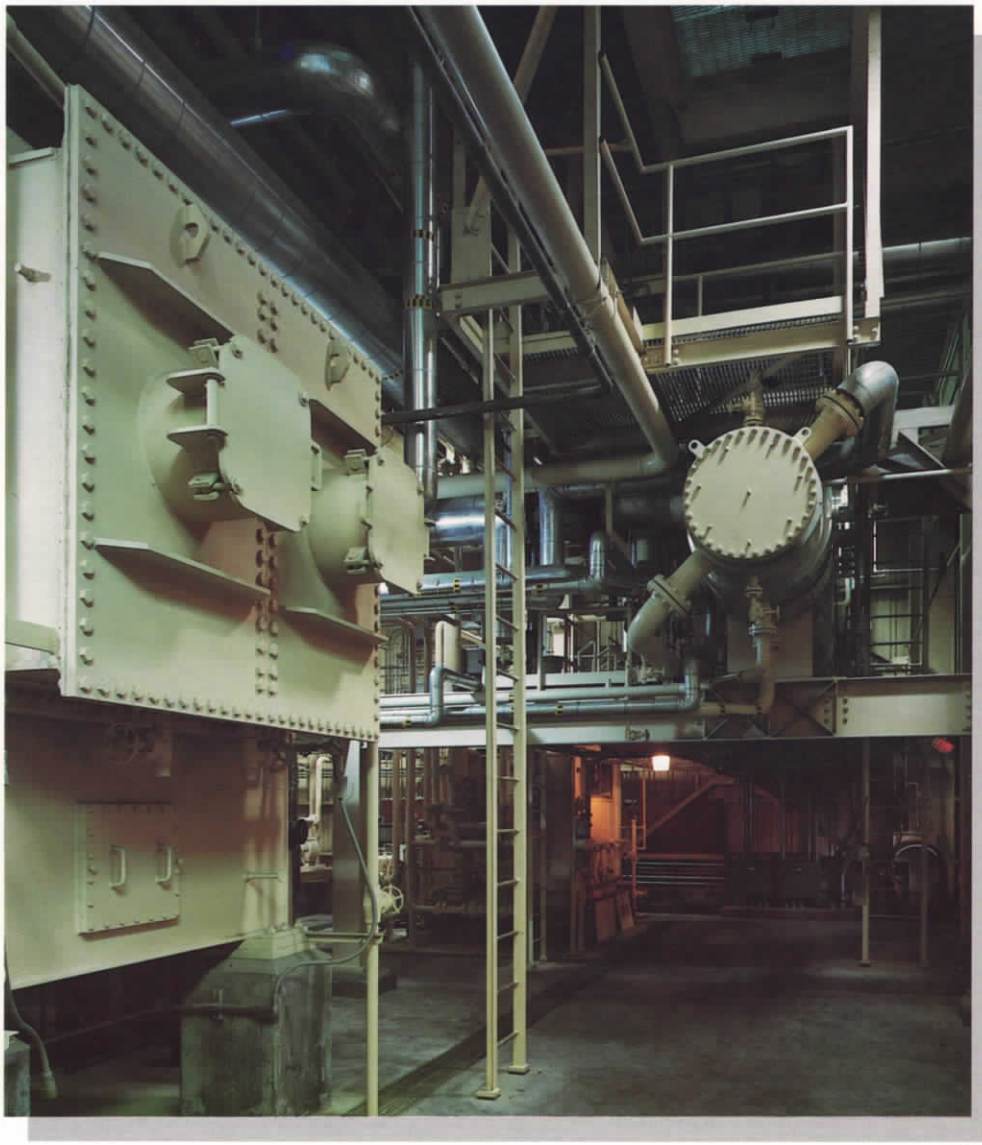
By the end of 1980, only three percent of the nation's electric power was produced through cogeneration, and most of the cogeneration systems were 30 to 60 years old. However, in 1980 the Federal Energy Regulatory Commission (FERC) received 39 applications for permits to sell electricity produced through cogeneration. By 1983, that number was up to 224.

Why the sudden growth? Fuel costs have gone up, and environmental concerns have slowed the construction of new power plants. Cogeneration is once more a practical idea.

"When we first looked at producing power at the Contra Costa plant, the offers from the utility companies were unattractive. We could not get enough return on our investment to make it worthwhile," says Keith Openshaw, senior vice president, Union Chemicals Division, Carbon Group.

But then came the Public Utilities Regulatory Policy Act (PURPA) of 1978, which set pricing guidelines for





alternative energy, including cogenerated power. The intent was to encourage the use of domestic energy sources and so lessen the nation's dependence on foreign supplies. FERC had the authority to enforce the act, and that authority was upheld in a U.S. Supreme Court decision in May 1983.

"Our agreement with Pacific Gas & Electric Company is a standard contract approved by the California Public Utilities Commission," Openshaw says. "The price the utility pays for our electricity is based on its 'avoided cost'—that is, the cost it avoids by not building new power generation facilities. By determining the price this way, we get a fair return on our investment in cogeneration. The utility and its customers get a reliable power supply at minimum cost."

Built at a cost of $43 million, the Contra Costa cogeneration plant

Fiberglass filters in the bag house remove dust particles from the waste gases before they are released to the atmosphere (left). *New construction for the plant includes the deaerator for the steam system* (below).
Right: *Before installation of the cogeneration system, hot waste gases were released through the plant's hot stacks* (right). *These have now been capped and the gases diverted to produce electricity prior to being vented through the taller cold stacks* (left).

began producing electricity on December 16, 1983. Hallanger Engineers Division of Davy McKee Construction and the General Electric Company did the engineering and contruction, under the direction of Union Chemicals' project manager, Robert L. Hall.

It takes at least 24 hours to heat up a cold calcining kiln, so the Contra Costa plant normally operates 24 hours every day of the week. PG&E is obligated to take the power for all but 600 hours (25 days) during the year. That provision provides a safety valve for the utility to prevent overload.

In a high-water year, for example, PG&E might choose to take hydroelectric power rather than cogenerated power at certain times. However, waste heat going into the atmosphere is as irretrievable as water over a dam in terms of lost potential power generation. Unlike fossil or nuclear fuels, waste heat cannot be stored for future use. So the Contra Costa plant is high on the utility's priority list of power sources.

Union Chemicals was the first coke calciner in the nation to practice waste heat recovery, according to Openshaw. The first waste heat boiler came on line to provide steam power for the Chicago refinery in 1976. "We were installing pollution controls to remove coke particles from the tail gases, so we took the opportunity to investigate the feasibility of waste heat recovery," Openshaw explains.

"We took the hot tail gases—about 1900 degrees Fahrenheit—and generated steam for the refinery, saving the cost of fuel for the boilers. We did the same thing for the Santa Maria refinery in California, then followed up with a second plant in Chicago."

The Contra Costa operation, however, had a special problem. The coke calcining plant is located some five miles inland from the San Francisco refinery, which is in the town of Rodeo on the edge of San Pablo Bay. The distance was too great for piping steam from the coke plant to the refinery, so another option was employed: using the steam to produce electricity at the coke plant site itself.

Coke is a hard substance that is hydraulically drilled out of the coke drums at the refinery by water under extreme pressure—1,800 to 3,000 pounds per square inch. This "green" coke is trucked to the calcining plant, arriving in chunks up to six inches in size. Between 250,000 and 280,000 tons per year are shipped from the San Francisco refinery to Contra Costa for processing. This will increase in mid-1985 when the 30 percent expan-

sion of the refinery's coker capacity will be completed.

The Contra Costa plant has two identical rotary kilns, each 160 feet long by nine feet in diameter, installed side by side at a slight incline. The green coke is loaded into the high end of each kiln and rolls slowly down the rotating tube during the roasting process. The process takes about an hour, during which the coke is constantly turned so it is thoroughly heated on all sides. The bulk of the coke is reduced by about 20 percent as the VCM (volatile combustible matter) burns off. When the coke emerges in chunks one inch and under in size, it is water-cooled and loaded into railcars and trucks for shipping.

"The San Francisco refinery produces a high quality coke from very sweet crude," says Ron Lee, supervisor of the Contra Costa plant. "The result-

Hot gases are injected into the rotating, tubular kilns to promote the calcining process, then move into the pyroscubbers (building in center right) *where carbon particulates are burned off.*
Right: *The new steam generator at the Contra Costa plant produces 27,500 kilowatts, enough to serve the needs of an equal number of people at the rate of one kilowatt per person.*

ing carbon has few trace metals. The coke from this plant is in demand by aluminum manufacturers, who use it as anodes in their smelting processes."

The heat generated in the calcining process is the fuel for Contra Costa's cogeneration plant. At the low end of each kiln, natural gas is injected to promote the coke roasting process. Combustion of the VCM and air injection help maintain temperatures up to 2700 degrees as the hot gas moves up the kiln and into the pyroscrubbers. Here, any carbon particulates in the gas are burned off. This helps to reduce atmospheric pollutants.

The gas is routed to the boilers, entering at a temperature of about 1700 degrees to create the steam which powers the electrical generator. The gas then goes to the bag house, where it passes through woven fiberglass to filter any remaining dust particles. Finally, the gas is released to the atmosphere at a temperature of about 400 degrees. The steam used to power the turbine is condensed and recycled to the boilers.

The old stacks that were used to vent tail gases directly from the pyroscrubbers prior to the installation of the cogeneration system are kept heated to about 800 degrees. This is to prevent damaging them in the event that the turbine must be shut down and the hot gases diverted.

Temperature control is critical at all stages in the plant's operation to remain within equipment and material limitations. For example, the fiberglass in the bag house can be damaged if subjected to temperatures of 550 degrees Fahrenheit or higher.

Of the 27,500 kilowatts of power delivered to PG&E, 2,500 kilowatts are returned to the Contra Costa plant to supply its electrical needs.

It's been nearly a century since Thomas Edison designed one of the nation's first cogeneration systems for the famous Hotel del Coronado in San Diego. From such beginnings, despite a lull of several decades, the U.S. Department of Energy estimates that upwards of 42 million kilowatts of cogenerated electrical power may be produced in this country by the year 2000. By today's standards that would provide for the electrical needs of 42 million persons, or 16 percent of the 268 million population projected for the nation in the year 2000 by the U.S. Census Bureau.

Efforts such as Union's Contra Costa cogeneration plant are helping turn what was once wasted hot gas into a valuable and significant domestic energy resource. 76

LANTHANIDES

the future is now

by Tim Smight

It was a bright spring morning back in 1949, and Las Vegas, a new city then, was humming. The brightly lit casinos were filled with raucous gamblers, all hoping to hit the big score. Sixty miles to the west, just across the California state line, Herbert Woodward was seeking a different kind of payoff. Tramping over the hot, silent desert hills, he was hunting for the "gold" of the time: uranium ore. And on this day, Woodward found something. It was a small vein associated with an ore body—a huge one, as it turned out. But not uranium. The deposit was bastnasite, an ore rich in the lanthanide metals, also known as "rare earths."

For Woodward, the discovery must have been a bittersweet success. At the time there were only two known commercial applications for lanthanides: as lighter flints and glass polishes. Not much of a payoff, Woodward thought. But time would prove him wrong. As it turned out, Woodward had stumbled onto a treasure trove whose value would dwarf the jackpots dispensed by the Vegas casinos.

The last two decades have seen a virtual explosion in lanthanide uses and applications. The glass, iron and steel, automotive, electronics and oil industries—to name just a few—all make ever-widening use of the elements. Everything from color TVs and Walkman headphones to oil refinery catalysts and simulated diamonds use lanthanides in their components or manufacturing processes. The applications even extend to false teeth.

"The amazing thing is, we've only scratched the surface," says Tom Wilson, vice president of marketing for Molycorp, Union's wholly-owned minerals subsidiary. "The future will bring applications we haven't even dreamed of now."

Since 1951, Molycorp has been sole owner and developer of the lanthanide ore body discovered by Woodward. (Woodward himself later joined the company as a metallurgist.) Located at Mountain Pass, California, the deposit is the world's largest, containing over 40 million tons of bastnasite—enough to last for decades. Molycorp's operations at the site have grown along with the burgeoning market for lanthanides. According to Tom Sleeman, president of Molycorp, the mine and processing facilities at Mountain Pass supply half the world's demand for lanthanide products.

"Mountain Pass is the only facility in the world whose exclusive products are lanthanides," Sleeman says. "Demand for these products—in the last 15 years, especially—has grown at a phenomenal rate. But we've managed to keep pace with it."

If all of this is catching you at a loss,

Molycorp's mine and processing facilities at Mountain Pass (above and right) *fill half the world's demand for lanthanide products.*

that's not unusual. For most of its 80-plus year history, the lanthanide industry has been mired in obscurity and saddled with misconceptions. The original name for the metals—rare earths—had much to do with that. In fact, the lanthanides are neither "rare" nor "earths". A group of 15 elements (numbers 57 to 71 on the periodic table), the lanthanides (plus yttrium, element 39) are usually found together in deposits. As a group, they are more abundant in the earth's crust than nickel or copper.

Although each metal has its own distinct properties, for years the lanthanides were thought to be virtually alike—and not highly useful at that. It wasn't until the iron and steel industry "discovered" them in the '50s that the lanthanide business really sparked to life. Metallurgists found that adding lanthanide compounds to iron and steels could produce stronger and more flexible metals that would retain their qualities under stress and temperature variations.

In the mid-'60s, two new large markets for lanthanides developed. Television manufacturers found that the lanthanide europium produced a much more vivid red in color TV picture tubes. (Today, every color set on the market uses europium and yttrium.) And a major breakthrough in oil refining technology, development of the fluid catalytic cracker (FCC), brought forth another important lanthanide application. The FCC, which increases gasoline yields in the refining process, uses a lanthanide concentrate (lanthanum) in its catalyst.

"Today, lanthanum concentrate is used in all the FCC catalyst produced in the world," says Sleeman. "Despite the drop in gasoline consumption, the demand for cracking catalysts is growing. Most of today's crude oil is heavier, with a higher sulfur content, and refiners use more FCC catalyst to squeeze gasoline out of it."

In the last decade, the catalyst market has become the number one consumer of lanthanides. (Television and lighting are number two; iron and steel third.) In addition to refining, lanthanides are also used in auto exhaust catalytic systems. And lanthanide-derived catalysts are integral to a host of divergent industrial processes now in the research phase, from the manufacture of plastic products to pharmaceutical production.

Of the 15 lanthanide minerals, nine have significant commercial applications today. Of these, the eight "light" lanthanides are used most widely. These lights (cerium, lanthanum, neodymium, praseodymium, europium, samarium, gadolinium and yttrium) make up 99.8 percent of the lanthanide content of bastnasite ore. All of the lanthanide metals have a high affinity for combining with other materials. This affinity allows for the creation of compounds that exhibit new physical and chemical characteristics. These in turn can lead to product innovations that are weight, size, energy and cost efficient.

Molycorp supplies lanthanide products to users in a multitude of forms—as oxides, alloys, metals of various purities, and in numerous chemical compounds. "We try to work as closely as possible with our customers," Wilson explains. "Molycorp's sales and development force is largely technically trained. That makes it easier for us to tailor our products to the specific needs of users."

Production of the lanthanide compounds is a complex operation. Molycorp's main production facilities are located at the mine site in Mountain Pass. (Molycorp's plants at Louviers,

Vivitar Corporation

Dentsply International

Light-collecting properties of glass camera lenses (above) *have been improved through use of lanthanum oxide. The lanthanide europium helps give iridescence to dentures* (left).

Colorado, and Washington and York, Pennsylvania also do specialized lanthanide processing.) At Mountain Pass, crushed bastnasite ore is treated in a Molycorp-developed flotation plant to produce bastnasite concentrate, in which all the lanthanide elements coexist in a natural mixture.

The separation process, also pioneered by Molycorp, is a solvent extraction (SX) procedure in which a series of ion exchange cells separate the specific lanthanide elements. They are then prepared for packaging and shipped to customers, or to the other Molycorp plants for further processing. Approximately 45,000 tons of crushed ore are now processed at Mountain Pass each month into 3,500 tons of concentrates.

Advancement of processing technology is an on-going effort for Molycorp. The Louviers and Washington plants both have processing development labs, and work is also done by Union's Science and Technology Division in Brea, California. "We're always looking for more efficiency in processing," Sleeman says. "And production of newer and purer lanthanide compounds can lead to new applications."

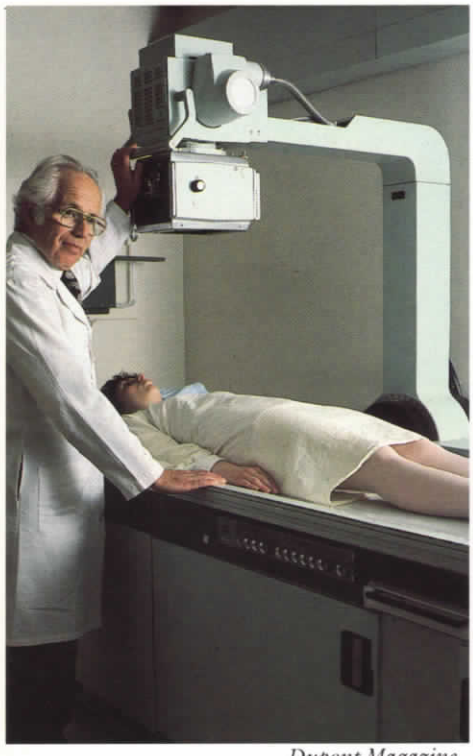
The last several years have seen a marked expansion in both the number and diversity of lanthanide applications. The vast majority come about through concerted research efforts, with each new development building on previous discoveries. Cerium, for example, has been used for years in glass polishes. In the early 1970s, Molycorp-sponsored research developed a glass decolorizing process using cerium. The process is now used by glass container and tableware manufacturers. Europium, the color TV lanthanide, is now used to give iridescence to false teeth. And lanthanum oxide is used to improve the light-collecting properties of high quality glass camera lenses.

Another major lanthanide application was spearheaded by the U.S. Air Force: development of the samarium-cobalt magnet, the most powerful permanent magnet ever made. Industry took the ball and ran with it; the magnets, which are used mostly in miniaturized electric motors, have found their way into a wide array of new products. One of the biggest markets has been the audio equipment industry. The drive motors for tape cassette players and the earphone speakers for the Sony Walkman both use samarium-cobalt magnets.

Similarly, lanthanide phosphors used in fluorescent lighting have found new applications through research. Today's x-ray systems are safer because the phosphors intensify images, cutting the required patient exposure time in half. "In all, six different lanthanides—cerium, europium, gadolinium, yttrium, lanthanum and terbium—are used in phosphors for different applications," says Gordon Barlow, Molycorp's sales manager for lanthanides.

Most research in new lanthanide applications is done by the users. But Molycorp and Union's Science and Technology division are active in several areas, notably catalysts. The company also backs applications studies by making its technical files on lanthanides available to researchers.

"Researchers often write us with inquiries," says Wilson. "And we support several basic research programs at colleges and universities." Among them: metallurgical research at the University of Pittsburgh, research in catalysts and ceramics at Texas A&M and Iowa State, and work in agricultural applications at the University of Illinois.



Dupont Magazine

Image intensification through use of lanthanide phosphors makes for safer x rays by cutting required patient exposure time in half (above).

Bethlehem Steel Corporation

Lanthanides help produce stronger and more flexible iron and steel products (right).

In the near future, the major growth area for lanthanide use will continue to be the catalytic field—especially in refining and auto exhaust emissions control, which is just beginning in Europe. Lighting will also be a growth area, as lanthanide phosphor-based fluorescent systems gain wider acceptance in the home and office. Fluorescent lights are much brighter, longer lasting and more energy efficient than conventional incandescent lamps, and lanthanides make it possible for fluorescents to match the color rendition of incandescents.

The ceramics industry will see a mushrooming of lanthanide applications as well. Lanthanide-treated ceramic machine parts and cutting tools are already in use in some industries. Tougher, lighter and stronger than metal ones, the new ceramic parts give longer wear and exhibit improved thermal characteristics.

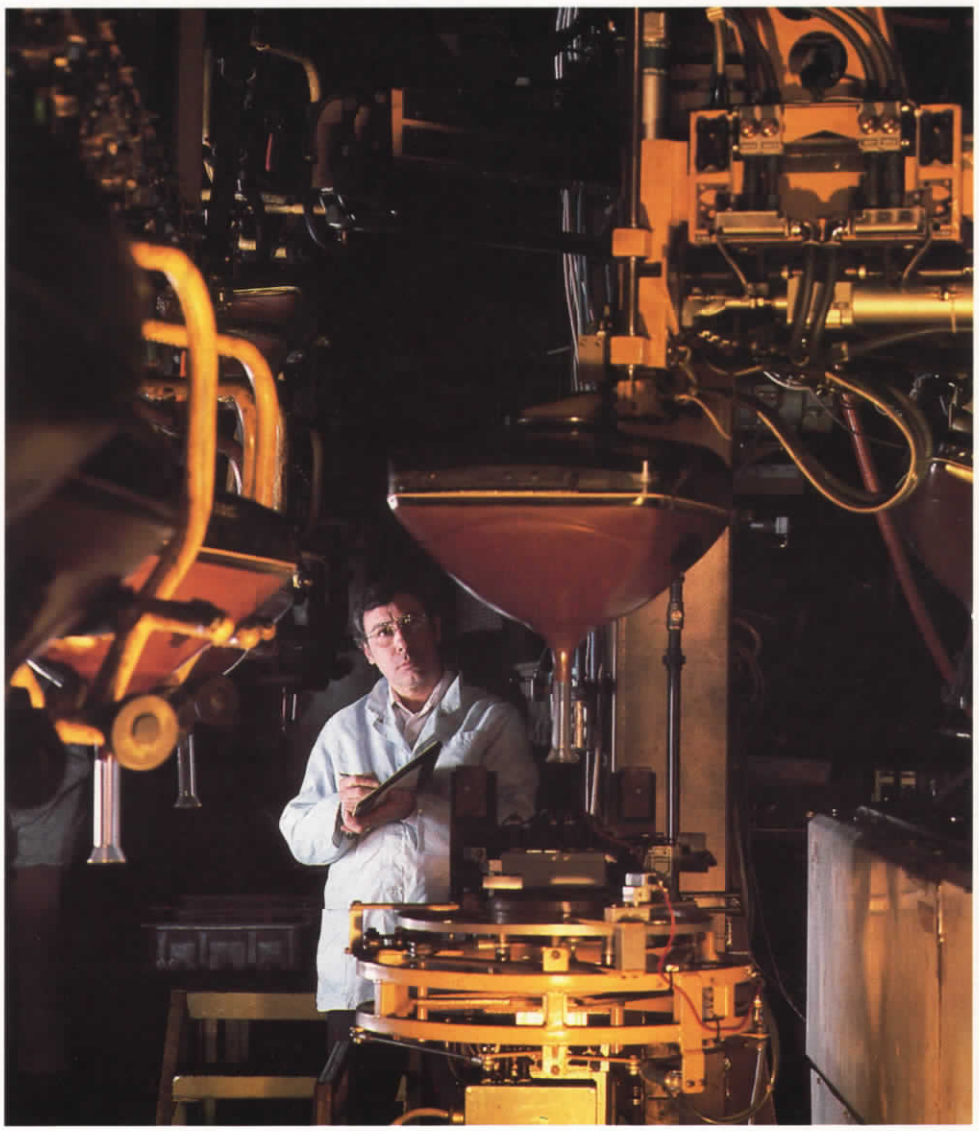
In the longer term, lanthanides will play a growing role in the realm of advanced technology. Aluminum alloys, magnetic bubble memories for computers, hydrogen storage systems, lasers and fiber optics are just some of the areas where lanthanide applications show great promise. Perhaps the most exciting prospect is of a new generation of lanthanide-based magnetic alloys. General Motors is currently testing a new neodymium-iron-boron magnet in automobile starter motors. The new magnet will allow for a weight and size reduction of almost 50 percent over traditional copper wire coil motors. GM plans to have the magnets in the starter motors of its 1986 model year passenger cars and light trucks.

"The neodymium-iron magnet has the whole world excited," says Wilson. "It could lead to a whole family of lanthanide permanent magnets that will be used in watches, appliances, robotics—you name it. I think the field will be blown wide open."

As they have in the past, new and as yet unimagined lanthanide applications will undoubtedly spring from those presently in development. "I'm sure you'll see many surprises in the future," says Sleeman. "With processing advances making a wider variety of lanthanide mixtures and purities available, there's just no telling what's down the road."

One thing is certain, though. With its research involvement, processing technology, and the richest known lanthanide ore deposit in the world at Mountain Pass, Molycorp will continue to be on the cutting edge as the future unfolds.

It seems that Herbert Woodward was dealt quite a hand after all.



The fluid catalytic cracker (above) *uses lanthanide-derived catalysts to squeeze more gasoline out of heavy crude. Every color TV on the market uses lanthanides in its picture tube* (right).

Zenith Radio Corporation


SPEEDWAY
DAYTONA
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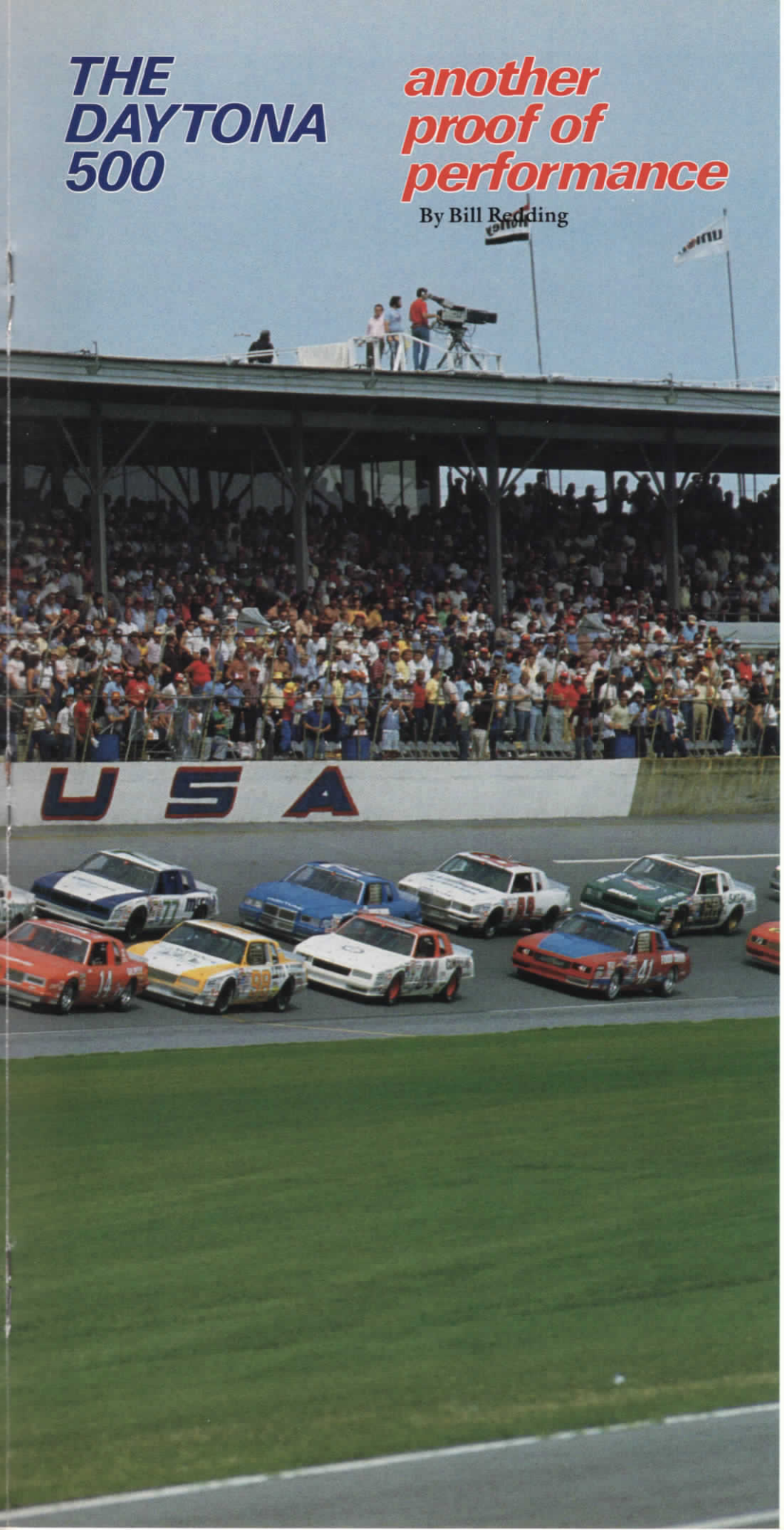
THE DAYTONA 500

another proof of performance

By Bill Redding



As the National Anthem blared out over the packed stands of Daytona International Speedway, you could feel the anticipation in the air. It was just past noon on Sunday, February 19, 1984. Bright Florida sunshine glinted off the polished bodies of the 42 race cars lined up at their starting positions on the track. The drivers stood by impatiently, their adrenaline already pumping.

For the past two weeks, they and their machines had run countless practice and qualifying laps on Daytona's high-banked, tri-oval 2.5-mile track. The crews had worked long hours getting the cars—all current-year, American-built stock cars—in prime condition. All of it was leading up to today's event—the "Superbowl" of stock car racing, the Daytona 500.

At precisely 12:19 p.m., attention shifted to the speakers' platform in front of the speedway grandstand. William S. "Bill" McConnor, senior vice president of Union Oil Company of California and Grand Marshal of the race, spoke into a telephone connected with the White House. "Good afternoon, Mr. President. Welcome to the Daytona 500."

President Reagan extended greetings to racing fans throughout the nation and expressed his wishes for the safety of the drivers. Then he gave the traditional charge: "Gentlemen, start your engines!"

The cheers of 130,000 fans—largest crowd ever for a Daytona 500—accompanied the din of all 42 engines roaring to life. As the cars moved slowly out along the track behind the pace car, one had to wonder what was in store. Could Cale Yarborough repeat his stunning, last-lap victory in the '83 Daytona 500? Would Bobby Allison, Richard Petty, or Darrell Waltrip beat him out? Or would a lesser known driver take the checkered flag? How many cars would finish this grueling, 200-lap race where speeds exceed 200 m.p.h. at times, and temperatures inside the cars can crack 100 degrees?

The 1984 Daytona 500 gets underway as a record-breaking crowd cheers the drivers on.

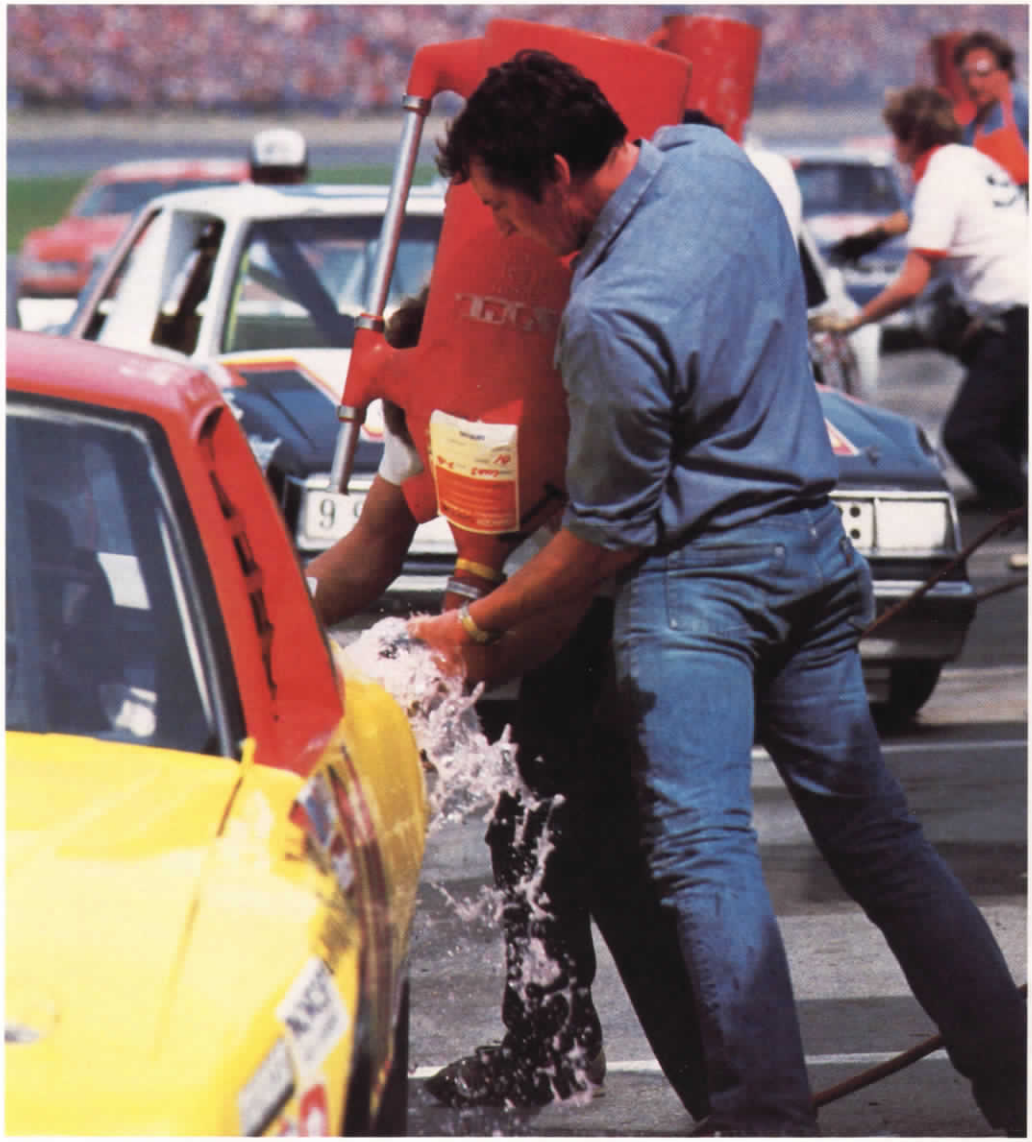
At 12:26, the green flag whirled downward, and the racers roared off from their tight formation. The 26th Annual Daytona 500 was underway.

As the race wore on, millions of viewers followed the action on television. Every turn and straightaway was covered by the CBS camera crew, from every conceivable vantage point. The Goodyear blimp offered a panoramic aerial view, and three of the cars carried on-board cameras, which made for spectacular coverage.

Almost every shot showed a bright orange and blue Union 76 logo. The company's 32-year association with Daytona and stock car racing is much in evidence at the International Speedway. There are hundreds of Union 76 flags and pennants, two standard 76 spheres, four observation tower 76 spheres and a corporate logo sign.

Behind pit row stands the Union 76 Service Station which serves as the track's fueling area. At Daytona, and at all of the other 500-mile races in the NASCAR/Winston Cup Grand National stock car series, Union supplies the fuel used by all of the race cars. And 32 of the 42 cars on the track at Daytona this year used Union motor oils and lubricants. This kind of visibility serves as a terrific endorsement of Union's products by the auto racing establishment, whose fans comprise the largest group of sports enthusiasts in the world.

"We believe racing exposes our products in an exciting and interesting way," says Dick Dolan, Union's manager of automotive events and public relations. Dick first came to Daytona in 1952 as a representative of Pure Oil, which merged with Union in 1965. "We looked at racing back then much as we view it today," Dolan says. "We don't experiment with racers; we know Union products will do the job. But we want our customers to be convinced, too. And racing is the proof of the pudding."



Clockwise from above: *A pit crew refuels a thirsty car; Bill McConnor talks with President Reagan; mechanics fine tune an engine; Union's Racing Director Dick Dolan* (on right in photo) *chats with NASCAR Flagman Harold Kinder.*

"The exposure Union receives through our involvement in motor sports is tremendous," says Bill Brodrick, supervisor of automotive public relations. "When a picture of the race winner wearing our Union 76 patch on his driving suit appears in newspapers across the country, or when a TV camera picks up Union identificaton on a driver, a car, or at the track, it tells the world that these professionals are depending on Union products to help make them winners. That identification with champions carries over to every Union sales outlet. Knowing they have a part in making winners can also be a source of pride for every Union employee."

"Races like Daytona allow us to analyze our products under the most severe conditions," adds Tim Wusz, engineering associate for Union's Science and Technology Division, who was also on the scene at this year's 500. "Combined with our year-round testing efforts, racing is very valuable. We're always looking for ways to improve our products."

Bill Joyner and Scott Hollander are Union's men who work behind the scenes to make the company's racing operations function smoothly. The myriad of details and problems that must be dealt with at Daytona—and at other races in what is now nearly a year-round season—are aptly handled by these men. Not only must a work crew of six to 10 be assembled for each event, but thousands of gallons of racing gasoline and hundreds of cases of oil and lubricants must be on hand at each race. Add to that the record keeping, constant contact with racing personnel, and office work between events, and you can see why Union's racing involvement is a full-time job for Joyner and Hollander.

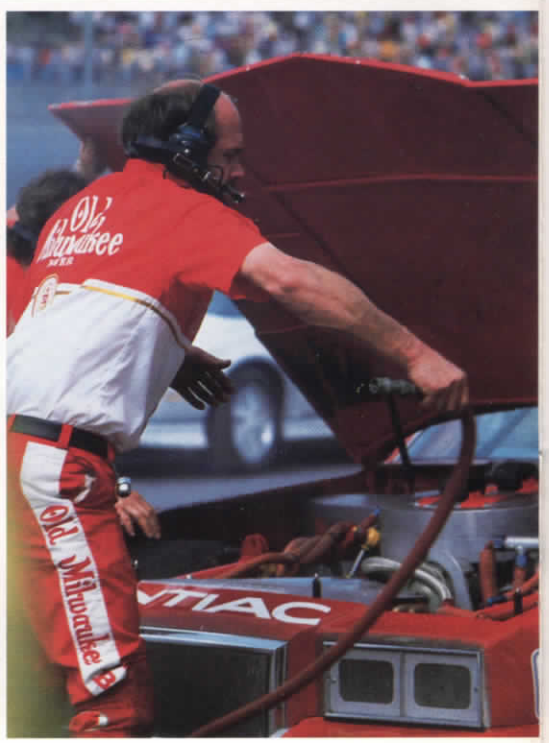
Because the events at the Daytona Speedway are major activities, Union Oil's area sales representative in Daytona Beach, Merritt Collier, has his office located at the speedway across the street from the headquarters of NASCAR (National Association for Stock Car Auto Racing). During the races at Daytona, Collier's assistance to the racing team and Union's customers is invaluable.

The Daytona 500 itself, which kicks off each year's 30-race NASCAR/Winston Cup Grand National series, is NASCAR's richest and most prestigious stock car race. (The purse this year was a record $1.17 million.) But by no means is the racing—or the work—at Daytona confined solely to the day of the 500. Indeed, two solid weeks of racing and qualifying (known as "Speedweeks" in NASCAR lingo) precede the big event each year. Well before Speedweeks '84 got underway, Union's racing team was on hand to tackle the necessary chores and details.

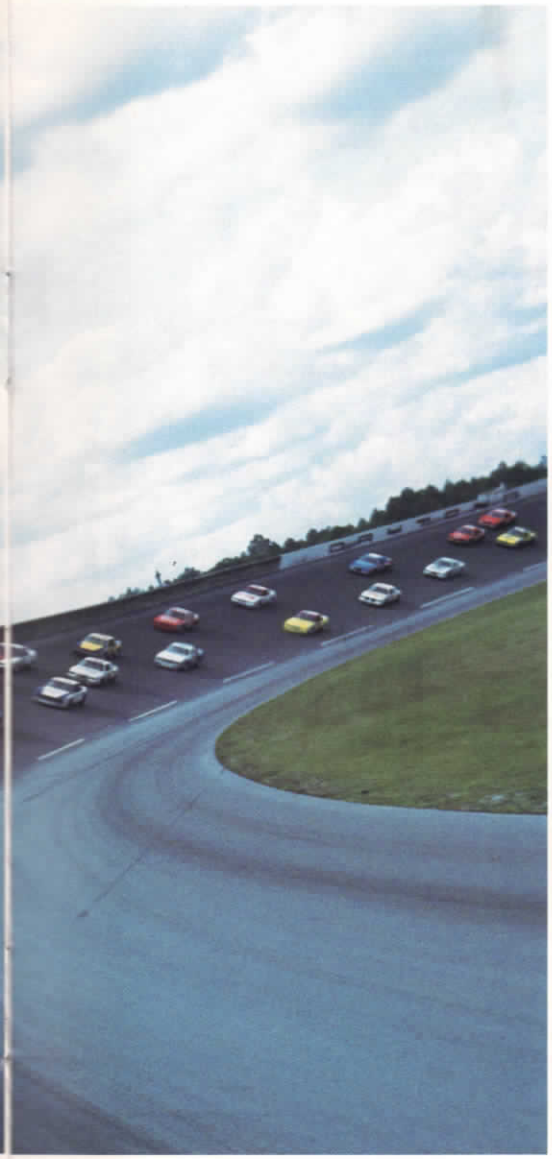
The racing activity kicked off this year on February 4 with the grueling "24 Hours of Daytona," a Camel GT Grand Prix of Endurance Championship Race. Among the other races held during the following days were the ARCA (Automobile Racing Club of America) 200 Talladega Super Car Series Race, and the Busch Clash of '84, a 20-lap sprint race for pole winners from the '83 NASCAR/Winston Cup series. The Busch Clash is the richest race per mile in the world with a purse of $175,000, $50,000 of which goes to the winner. CBS carried the 50-mile sprint nationwide, and the Union 76 sign was seen at every turn.

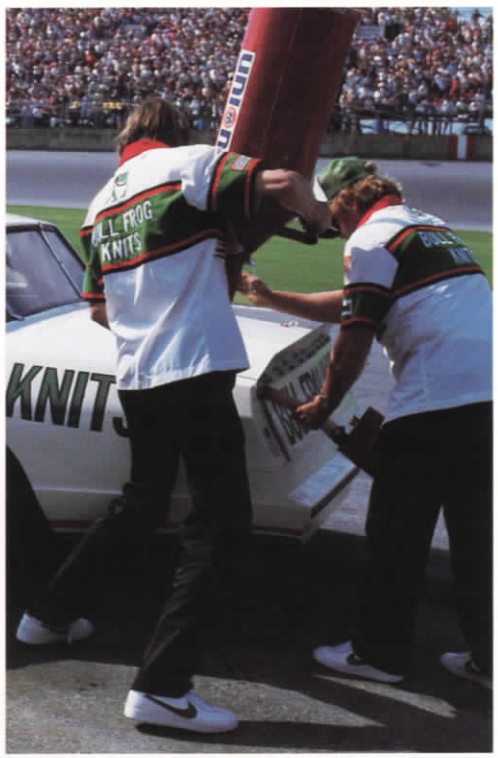
The second week of Speedweeks featured more qualifying, practicing and racing. Among others, a 75-mile consolation race was run for the many participants not able to qualify for the 500. (Over 80 entrants vied for the 42 berths.)

Daytona Beach itself has been predominant in automobile racing since 1903. The roar of engines is almost as familiar as the pounding of the surf. For the first 55 years, the 14-mile stretch of sand—hard-packed and straight—served as the site for racing. Vanderbilt, Olds, Oldfield, Ford, Seagrave and Campbell were among the many drivers who established records on the beach at speeds ranging from 50 to over 300 miles per hour.



The speedway's high-banked turns allow stock car drivers to achieve Indy car speeds.





In 1936, Bill France, Sr. introduced road races to the beach. Attendance grew every year and speeds became prohibitive. France looked forward to the day when he could hold races without dependence on tides, wind and surf. He also dreamed of a track where stock cars could race full-out. The dream was realized in February 1959, when the gates of the brand new Daytona International Speedway opened for the inaugural Speedweeks, featuring the running of the 500.

The new speedway boasted two unique and innovative features: a tri-oval design allowing for better spectator viewing from the grandstand, and extra-high banked turns (31 degrees) to help boost speeds.

"I wanted our stock cars to be as fast as the Indianapolis cars," France recalls. "With the high banking, that seemed possible."

A little-known aspect of the Daytona Speedway is that the track is never really quiet. In between the major racing events there is constant use of the facility. Throughout the year the track is used by automobile manufacturers, governmental bodies, tire companies and many others (including Union) for testing purposes.

Union Oil has been a partner over the many years of the speedway's development. In 1952, Union (then Pure) began supplying fuel and prizes for the beach races. In 1958 the company supplied contractors with fuel for the building of the speedway. Today, four of the 16 members of the International Speedway Corporation's Board of Directors are Union people: Fred L. Hartley, Union's chairman and president; Bill McConnor; Dick Dolan and Leo Spanuello (who retired in 1971 as assistant to the president of the Union 76 Division).

Middle: *Race driver Richard Petty* (left in photo) *talks with Bill Joyner of the 76 Racing Division.*

Bill France, Sr. was also a founding member of NASCAR, formed in 1947 to resolve matters of ethics, rules, scheduling, awards and safety on the stock car racing circuit. Today NASCAR is the premier organization in racing circles, sanctioning the most races on the largest number of tracks in the nation. After 25 years, France, Sr. stepped down and sons Bill France, Jr. and James France took over the reins. The traditional quality of France leadership helps keep NASCAR at the top. Union Oil's Dick Dolan has been and still is a leading figure in the organization.

For the city of Daytona Beach, the benefits of the speedway are significant. A local economist estimates that Daytona International Speedway brings some $270 million a year to the local economy. It is estimated that some $120 million dollars were generated for Daytona's economy during Speedweeks '84 alone.

Racing is big business and very successful in Daytona Beach, and this year's Daytona 500 was no exception. The 2-1/2 hour race proceeded under perfect conditions, and the record-breaking crowd was treated to another thrilling, down-to-the-wire finish. The race's final lap found Darrell Waltrip in the lead with Cale Yarborough right on his tail. Both were driving Chevrolet Monte Carlo SS's. On the final turn, Yarborough used the now famous "slingshot maneuver" to power his car past Waltrip. (In the slingshot, a stock car racing specialty, the driver of the trailing car whips out of the slipstream and rockets ahead of the leader in one move. This tricky, lightning-quick maneuver is possible because the trailing car has a "horsepower reserve" from running in the draft.)

A lot of long hours, teamwork, skill, luck and grit go into making a winning effort at the Daytona 500. With the grueling race behind him and trophy in hand, Cale Yarborough (above, center) *celebrates his victory in the winner's circle.*

Moments later, Yarborough roared across the finish line to take the checkered flag and the winner's share of the $1.17 million purse ($160,000) for his team.

Of course, there was much more at stake in the race than one winner. Performance was also on trial in the Daytona 500. Would the pit crews be able to handle the 20- to 25-second stops? How would the different makes of cars perform out on the track? How would the racing tires hold up in the heat? Which engines would prove to be the most durable? Which make of car would emerge victorious? This year it was Cale Yarborough's Chevy Monte Carlo SS. But every year, Union's racing gasoline comes in first.

It was nearly sundown when Cale Yarborough answered the final question from the press, "Do you ever think about the possibility that the guys behind you might catch you at the line?"

"As Yogi Berra says," Cale replied, "it ain't over 'til it's over."

No one knows the truth of that statement better than the Union Oil crew. For the racing team, Daytona is just the first stop of a long season. The following week they moved on to Richmond, Virginia for another race. Then it was on to Rockingham, North Carolina; Atlanta, Georgia; and many more events across the country before returning to Daytona for the Firecracker 400 over the July 4th holiday. The team will then move on to Nashville for the beginning of the second half of the season. It's weekend and holiday work, and it's tough.

"We're all on the road 20 to 35 weekends a year," says Brodrick. But the proof of performance of both products and people makes it all worthwhile and very rewarding for those involved. 76

Thinking small boosts sales of chemicals

by Wayne Reuter

If you were a small independent paint company, where would you go to find one 55-gallon drum of mineral spirits? Straight to the nearest Union Chemicals Distribution Center.

In 24 centers across the nation, Union has facilities for blending, packaging and shipping industrial chemicals.

"The market for chemicals in smaller quantities is continuing to grow, and we plan to grow with it," says Austin Byers, market manager, who makes his headquarters in Schaumburg, Illinois, for Union Chemicals Division.

"In the last two years, our distribution center network has moved up from sixth to fifth place in terms of revenues," Byers continues. "This is out of a field of six national distributors, and we expect to continue climbing. There are some 5,000 chemical distributors in the nation if you include the regional and local operations. The distribution network currently makes up 37 percent of the total revenues of Union's Petrochemicals Group.

"We bring chemicals into our distribution centers by truck and railcar, up to 30,000 gallons at a time, and deliver them to local customers in quantities ranging from 7,500-gallon truck loads all the way down to five-gallon pails, depending on our customers' requests," Byers adds. "Many users of chemicals do not need to purchase railcar quantities, especially at today's cost of borrowing money. The major national manufacturers find it uneconomical to sell in less than railcar-load quantities, so we have identified a solid marketing position for ourselves."

All manufacturers appreciate the importance of keeping their investments in inventories as low as possible. Union's network of distribution centers provides the opportunity to the manufacturer to run a tighter operation and still be assured of efficient service and the highest quality industrial chemicals.

Almost nine miles of piping transports various chemicals in and out of the Union Chemicals Distribution Center in Dallas (opposite).
Distribution centers provide chemicals in quantities ranging from five-gallon buckets to 55-gallon drums to 7,500-gallon truck loads (below).


Satin Flat
Satin Flat
Satin Flat

Union Chemicals Distribution Centers sell proprietary products, primarily hydrocarbon solvents, that are manufactured by Union's refineries.

They also carry resale chemicals supplied by more than 150 other chemical manufacturers. Major product groups include alcohols, ketones, chlorinated hydrocarbons, plasticizers, silicones and surfactants. These and other chemicals find application in the same industries that use Union's hydrocarbon solvents.

"Because we carry resale chemicals in addition to our proprietary products, we are able to offer a full line. We're sort of a one-stop shopping center," Byers says.

Union Chemicals Division has built or remodeled eight distribution centers in the past four years. The one located in Dallas, Texas, is typical. Built in 1981, it covers 8½ acres and has a tank farm with 600,000 gallons of bulk storage capacity and almost nine miles of piping for transferring chemicals. There are additional pads and piping to provide room for expansion. The 18,000-square-foot warehouse accommodates bulk and drum commodity storage and a quality control lab.

"We check all of the chemicals we receive from other manufacturers, and the solvents we receive from Union refineries, to make sure they meet our specifications. We also check the products we send to customers to assure they receive exactly what they ordered," says Paul Stewart, plant manager at Dallas. "Chemical compositions must be precise if the product is to do what it is intended to do."

The quality control lab performs a number of tests—most frequently for odor, gravity and color.

The odor test provides a quick and easy check of the chemical's identity. The gravity test measures the product's purity. Most of the products Union receives are in liquid form and should be clear and colorless (called "water-white"), so it can also be useful to visually check for cloudiness or yellowing. If the purity of the chemical is in doubt, more complex tests are conducted before a shipment is accepted.

Opposite: *John Wood and Mike Gardner* (center) *discuss a new formulation with Philip Benes* (left) *and Jerry Davis of DeSoto, Inc.'s chemical coatings division. The tank farm at the Dallas distribution center has a bulk storage capacity of 600,000 gallons.*

Each of the distribution centers has a blending tank, a valuable aspect of service to the customer. Instead of the customer ordering five or six different chemicals and storing them in separate tanks, Union can supply one specialty blend. This service frees up customers' tanks, keeps their inventories lower, and saves them the time and cost of blending. An infinite number of blends are available.

"Our distribution centers are state-of-the-art, the best in the industry," says John Wood, area manager at Dallas, "but the real asset is the people involved. We have 13 people here—sales reps, drivers, plant and office personnel. Because our group is small, we have gotten to know each other and we work together very well—all for the benefit of our customers."

"Marylou Yoakum and Donna Bailey work with our customers daily on the phones," says Randy Wilson, customer service manager. "They receive an average of a hundred orders a week, handle credit, and see to it that the orders are processed."

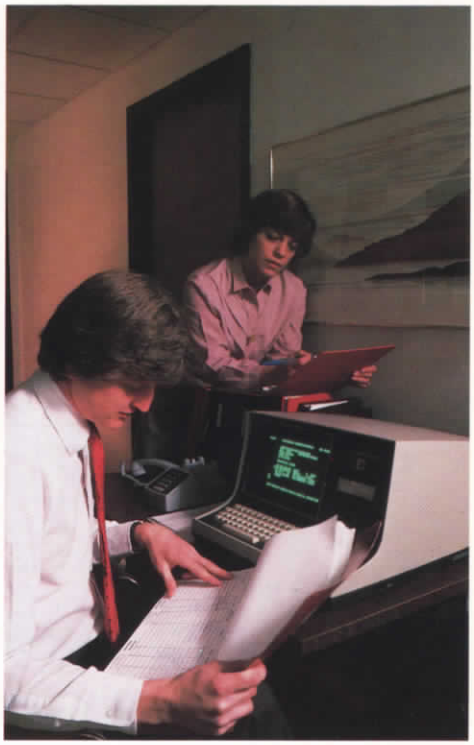
"Charlie Fuller and Joe Paras unload the incoming products, blend products, fill drums and load trucks," adds Stewart. "Our drivers, Al Gonzalez and Jerry Stabler, are out at our customers' doorsteps everyday. Since our customers keep small inventories, it's important that we respond quickly to their orders. We can usually deliver within two days of receiving an order."

Meanwhile, sales people like John Kacinski and Tim Waters are busy knocking on customers' doors.

"It's exciting to go out and call on new accounts," says Jim Chaldekas, also a sales representative. "We have a broad product line and the best facilities in town. We are able to service any size account, large or small, a one-drum account or an 8,000-gallon account."

"Selling is just part of the job," according to Mike Gardner, senior account manager. "We function as consultants to our customers, evaluating the applications and requirements of products and making suggestions that can reduce costs. Then, we work with our technical staff to develop and blend products that meet a customer's specific needs.

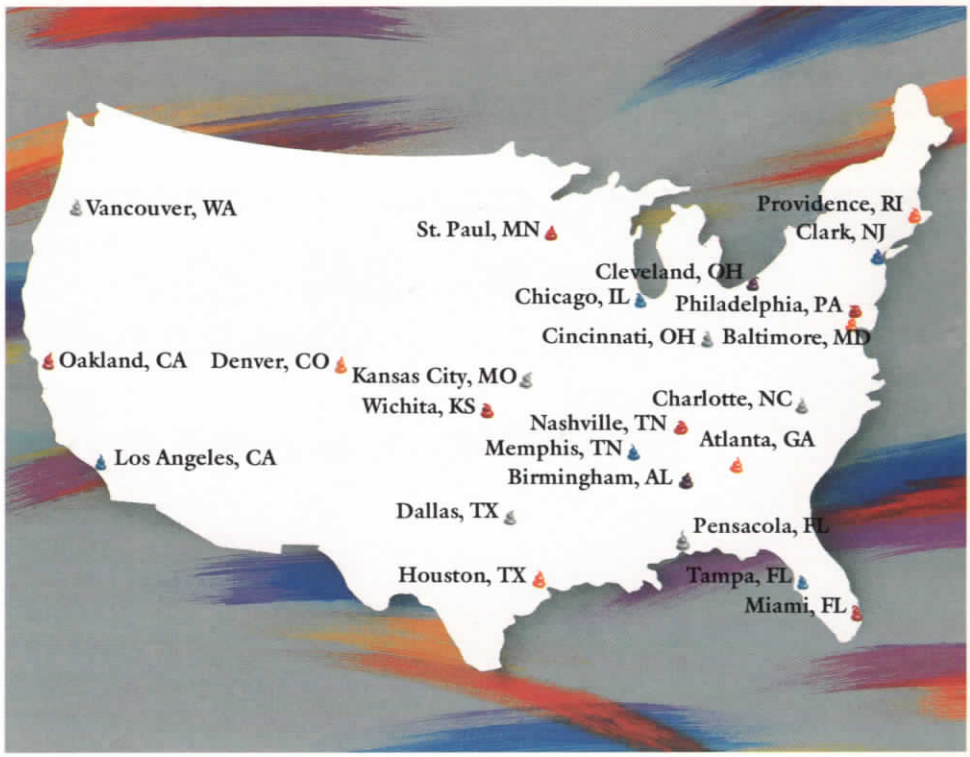
"When I was working out of the Mobile, Alabama, distribution center, I called on a man whose company made fiberglass camper tops," Byers recalls.



Jim Chaldekas and John Kacinski (top left) *keep in close touch with Union's customers, who place some 100 orders a week. Randy Wilson and Marylou Yoakum* (above) *process orders promptly assuring a two-day turnaround in most cases. A truck gets routine maintenance while loading. The 18,000-square-foot warehouse* (left) *accommodates bulk and drum commodity storage.*

"The solvents he was using to clean the resin off the molds were too expensive, I thought. The Atlanta region technical manager, Jack Reimer, and I worked together to come up with a product blend of acetone and methanol that could do the same job at a savings of 20 percent. The customer tried our new blend and we had a new account."

Whether it be lacquer thinner blend for the furniture industry, alcohols for the printing industry, ketones for industrial coatings or any other chemical, the people at the Union Chemicals Distribution Centers in Dallas and 23 other cities across the country can fill the order. (76)



Twenty-four distribution centers make up a nationwide network.

Service Awards

UNION 76

CORPORATE

March 1984

40 YEARS	**K. Byron Ljung,** Union Oil Center
35 YEARS	**William P. Barber,** Union Oil Center
30 YEARS	**John A. Blanche,** Union Oil Center
25 YEARS	**Helen E. Jones,** Union Oil Center **Daniel Stein,** Los Angeles, Ca.
20 YEARS	**Bernard W. Dorin,** Union Oil Center
15 YEARS	**Delbert L. Brown,** Union Oil Center
10 YEARS	**Danny M. Darst,** Schaumburg, Il. **Denver L. Durst,** Los Angeles, Ca. **William T. Nickerson III,** San Francisco, Ca. **Victoria A. Simonian,** Union Oil Center **Jimmie Venable,** San Luis Obispo, Ca.
5 YEARS	**Cozy M. Bennett,** Union Oil Center **Donald E. French,** Atlanta, Ga. **Roger W. Lipps,** Union Oil Center **William J. Quinn,** Union Oil Center

April 1984

15 YEARS	**Jean L. Moore,** Union Oil Center **Constance N. Nelson,** Union Oil Center
10 YEARS	**Glen E. Morgan, Jr.,** Schaumburg, Il. **Kimberly R. Sabott,** Union Oil Center
5 YEARS	**Richard F. Hall,** Washington, D.C. **Rosann M. Jaffe,** Schaumburg, Il. **Michael K. Morgan,** Santa Maria, Ca. **Van C. Nyman,** Union Oil Center **Elizabeth A. Steffey,** Union Oil Center

UNION SCIENCE AND TECHNOLOGY DIVISION

March 1984

30 YEARS	**Robert L. Hilliard,** Brea, Ca.
25 YEARS	**Ellen V. Cordry,** Brea, Ca.
20 YEARS	**David A. Gaudio,** Brea, Ca.
10 YEARS	**Nuel C. Henderson, Jr.,** Brea, Ca.
5 YEARS	**Alan D. Denniston,** Brea, Ca. **Timothy F. Freemen,** Brea, Ca. **Margaret N. Ingalls,** Brea, Ca. **Jay C. Selover,** Brea, Ca.

April 1984

35 YEARS	**Leo J. O'Brien,** Brea, Ca.
20 YEARS	**Hugh A. Harvey,** Brea, Ca.
15 YEARS	**Robert C. Ransom,** Brea, Ca.
10 YEARS	**Susan A. Bharvani,** Brea, Ca.
5 YEARS	**William E. Amend,** Brea, Ca. **Barbara K. Newsom,** Brea, Ca. **Margie A. Porter,** Brea, Ca. **Cathy M. Sadler,** Brea, Ca. **Jay A. Switzer,** Brea, Ca.

UNION REAL ESTATE DIVISION

March 1984

10 YEARS	**Richard K. Jemison,** Union Oil Center **Frances Jennings,** Union Oil Center

April 1984

15 YEARS	**Delmar L. Wulf,** Anaheim, Ca.

UNION 76 DIVISION

March 1984

40 YEARS	**John W. Groesch,** Schaumburg, Il.
35 YEARS	**George Bokan,** Chicago Refinery **Anthony J. Costenero,** Chicago Refinery **Howard G. Davis,** Chicago Refinery **Raymond W. Ferencik,** Chicago Refinery **Lyman Frugia, Jr.,** Beaumont Refinery **William M. Glad,** Chicago Refinery **Tony J. Goode,** Chicago Refinery **John C. Griffin,** Schaumburg, Il. **James L. Grimmett,** Birmingham, Al. **Donald P. Homerding,** Chicago Refinery **Lawrence F. Hurst,** Atlanta, Ga. **Elmer G. Johnson,** Chicago Refinery **Fred R. Lindner,** Chicago Refinery **Floyd R. Oliver,** Chicago Refinery **Donald J. Shepherd,** Chicago Refinery **Leon R. Shepherd,** Chicago Refinery **Joseph M. Wierschem,** Chicago Refinery **Robert C. Wilkinson,** Schaumburg, Il. **Chester E. Witkowski,** Chicago Refinery
30 YEARS	**Donald A. Ambler,** San Diego, Ca. **William L. Cochran,** Anchorage, Ak. **Richard A. Copelan,** San Francisco Refinery **Donald E. Dueck,** Richmond, Ca. **Raymond M. DuShane,** Schaumburg, Il. **Mike Fiorentino,** San Francisco Refinery **Paul E. Josif,** Tallmadge, Oh. **Dickson W. Logie,** Richmond, Ca. **Florian M. Plonka,** Chicago Refinery **Harold L. Reynolds,** Los Angeles Refinery **John M. Taylor,** Los Angeles Refinery **Doris J. Wensel,** Schaumburg, Il.
25 YEARS	**F. G. Carlson,** Los Angeles, Ca. **Wilfred Y. S. Chung,** Honolulu, Hi. **Paul J. Grasch,** Schaumburg, Il. **Agnes H. Hamous,** Schaumburg, Il. **Rosemarie S. Hoerl,** San Francisco, Ca. **Edward S. Llacuna,** Honolulu, Hi. **Thomas K. Millstead,** Los Angeles Refinery **Wesley S. Ng,** Honolulu, Hi. **Richard C. Uphoff,** Portland Terminal
20 YEARS	**Roy L. Bailey,** Beaumont Refinery **Thomas G. Bailey,** Los Angeles Refinery **Wade E. Blackburn,** Tallmadge, Oh. **Jim D. Burnett,** Richmond, Ca. **Preston J. Frederick,** Beaumont Refinery **James Giglio,** Southfield, Mi. **Michael D. Hickey,** San Francisco, Ca. **Sandy Labeaux,** San Francisco, Ca. **Deral F. Lemaire,** Beaumont Refinery **Lonnie R. McGowan,** Beaumont Refinery **Stanley F. Nebel,** Schaumburg, Il. **Joseph M. Pye,** Savannah, Ga. **Dola J. Styczykowski,** Schaumburg, Il. **Robert E. Theriot,** Beaumont Refinery **S. A. D. Underdown,** Los Angeles Refinery

15 YEARS
James R. Beale, Los Angeles Terminal
William J. Collins, Chicago Refinery
Jettie L. Cumberlander, Schaumburg, Il.
James Fountain, Beaumont Refinery
Jerry L. Harris, Birmingham, Al.
Stephen J. Hebert, Pure Transportation Co., Houma, La.
Joyce Hixson, Schaumburg, Il.
Richard A. Horrocks, Portland Terminal
Norman L. Huston, Los Angeles Refinery
John G. Kelly, Los Angeles Refinery
Carolyn A. Little, San Luis Obispo, Ca.
James R. Matthews, San Francisco, Ca.
Richard D. Payne, Los Angeles Refinery
Donald A. Qualls, Los Angeles Refinery
Alfred W. Richards, Pure Transportation Co., Van, Tx.
Marjorie J. Scensny, Schaumburg, Il.
Allan E. Simpson, Portland, Or.

10 YEARS
Linda J. Aalton, San Francisco, Ca.
Jeanne M. Akerlund, San Francisco, Ca.
Kirk C. Amspoker, San Francisco Refinery
Janice Behnke, Schaumburg, Il.
Margitta A. Breeding, Schaumburg, Il.
Dolores J. Camicia, San Francisco, Ca.
James M. Cherwin, Schaumburg, Il.
Jack A. Colwell, Anchorage, Ak.
Charlotte A. Johnson, Los Angeles, Ca.
Michael G. Lavieri, South Holland, Il.
Sharon D. Michalec, Schaumburg, Il.
David J. Pokladowski, Schaumburg, Il.
Rickey Woo, San Francisco Refinery

5 YEARS
Yvonne Lee Alston, Beaumont Refinery
James L. Barnick, Sr., Miami, Fl.
Timothy R. Barton, Beaumont Refinery
Terry G. Basham, Beaumont Refinery
Cesar Betancourt, Los Angeles, Ca.
Voorhees D. Bridges, Jr., Beaumont Refinery
Reta F. Burton, Beaumont Refinery
Kevin E. Carl, Beaumont Refinery
Steven N. Clark, San Francisco Refinery
Steven C. Clift, Edmonds Terminal
Joseph P. Connolly III, San Francisco Refinery
Gerald A. Decesare, San Francisco, Ca.
Donald M. Dickson, Beaumont Refinery
Dennis M. Doherty, San Pedro, Ca.
James D. Dreger, Chicago Refinery
Linda L. Dunn, Chicago Refinery
Wolfgang Ewert, San Francisco Refinery
Charles W. Gillson, Chicago Refinery
Michael K. Green, Beaumont Refinery
Pamela J. Habowski, Schaumburg, Il.
Joel J. Hernandez, Beaumont Refinery
Lucas Hernandez, Edmonds Terminal
Nick Herold, Los Angeles Refinery
Harold P. Hill, San Francisco Refinery
Pamela Hughes, Chicago Refinery
James C. Hurt, Chicago Refinery
Bradley A. Jacque, San Francisco Refinery
Seebert J. Jarreau, Jr., Beaumont Refinery
Melvin L. Jones, Los Angeles Refinery
Jeffery King, Chicago Refinery
Dennis D. Kuhn, Los Angeles Refinery
Rosemary B. Kuna, Chicago Refinery
Harrison Lamb, Jr., South Holland, Il.
Craig R. Lamont, Santa Paula, Ca.
Tommy R. Lee, Chicago Refinery
Roy S. Martinez, Beaumont Refinery
Feliciano R. Matheus, Chicago Refinery
Betty J. McIntoush, Beaumont Refinery
Eldon L. McKinley, Chicago Refinery
Terry A. McNulty, Sacramento, Ca.
Catherine A. Meehleib, San Francisco, Ca.
Charles R. Miller, Atlanta, Ga.
Lisa J. Jeffery-Mower, Los Angeles Refinery
Kurt A. Niederstadt, Beaumont Refinery
Edwin A. Olszta, Jr., Chicago Refinery
Jerry D. O'Shea, Beaumont Refinery
David J. Pelenis, Chicago Refinery
David F. Platter, San Luis Obispo, Ca.
Douglas E. Prieboy, Chicago Refinery
Glenn C. Rabinak, Schaumburg, Il.
Mohanlal Ramcharan, Los Angeles Refinery
Frederick A. Roach III, Beaumont Refinery
Joseph F. Scamardi, Chicago Refinery
David M. Squires, San Pedro, Ca.
Stephen P. Stafford, Beaumont Refinery
Vicki S. Steed, Schaumburg, Il.
Charlaine L. Stuhr, Chicago Refinery
Larry E. Truss, Beaumont Refinery
Joseph A. Velasquez, Chicago Refinery
Joseph E. Vranich, Chicago Refinery
Larry W. Webb, Beaumont Refinery

April 1984

40 YEARS
J. V. Bardin, Brea, Ca.
Byrl J. Harmon, Pure Transportation Co. Olney, Il.
Leona O. McGraw, Beaumont Refinery

35 YEARS
Donald L. Comegys, Portland, Or.
Everett G. Lain, Jr., Jacksonville, Fl.
Berthold J. Notheisen, Schaumburg, Il.
Antonio R. Petrella, Chicago Refinery
Clay W. Powell, Birmingham, Al.
Johnny G. Strawbridge, Atlanta, Ga.
Donald R. Turner, Chicago Refinery
Robert D. Wilson, Schaumburg, Il.
Leonard F. Zolecki, Chicago Refinery

30 YEARS
M. M. Ardizzone, San Jose, Ca.
Delbert T. Area, Portland, Or.
Andrew L. Barone, Seattle, Wa.
Billy W. Carter, Atlanta, Ga.
R. H. Congelliere, Los Angeles, Ca.
Thomas J. George, Beaumont, Tx.
Richard K. Gross, Phoenix, Az.
Thomas E. Guiney, Schaumburg, Il.
Eleanor M. Krebel, Cleveland, Oh.
Hugh A. Musslewhite, Schaumburg, Il.
Joseph R. White, Denver, Co.

25 YEARS
Leonard W. Bishop, Los Angeles, Ca.
Eugene F. Canote, Sacramento, Ca.
Phyllis D. Cross, Sacramento, Ca.
Anne L. Greenwood, Southfield, Mi.
Lucy J. Mitchell, San Francisco, Ca.
Jerry Perona, Cleveland, Oh.

20 YEARS
Leonard R Aldridge, Beaumont, Tx.
Michael E. Bowman, San Francisco Refinery
Russell P. Dangelo, Schaumburg, Il.
Donald C. Kuhl, Toledo, Oh.
Paul F. Lambach, Orange, Ca.
Margaret Pemberton, Schaumburg, Il.
Elaine F. Prokuski, Schaumburg, Il.
Dwayne J. Wilkinson, Los Angeles, Ca.

15 YEARS
William D. Ackerman, St. Paul, Mn.
Payton Anderson, San Francisco Refinery
Lloyd M. Berger, Pure Transportation Co. Olney, Il.
Maurice Denton, Pure Transportation Co. Olney, Il.
Gerald L. Dorband, Schaumburg, Il.
Armin E. Fette, Schaumburg, Il.
Alton R. Gill, Chicago Refinery
Ronald M. Kielma, Chicago Refinery
Nicholas T. Martinez, Los Angeles, Ca.
Walter J. McChaney, Los Angeles Refinery
William H. Whittaker, Los Angeles, Ca.

10 YEARS	**John A. Ambriz,** Brea, Ca. **Ronnie R. Belk,** Los Angeles Refinery **Joseph Chacko,** San Francisco Refinery **Kenneth W. Courter,** Schaumburg, Il. **Bill R. Crawford,** Phoenix, Az. **Ronald H. Hamada,** San Francisco Refinery **Elisabeth Hooks,** Schaumburg, Il. **Roland G. Huppenthal,** Schaumburg, Il. **Mark D. Lebeck,** Los Angeles Refinery **Robert E. Lowe,** Phoenix, Az. **Marina M. Madrigal,** Los Angeles Refinery **Benny T. McLemee,** Pure Transportation Co. Van, Tx. **Bernyce G. Mills,** Richmond, Ca. **Roy L. Neal,** San Francisco Refinery **Jonathan B. Smith,** Savannah, Ga. **Keith A. Upton,** Portland, Or. **Paython Veazie,** Los Angeles Terminal **John White,** Los Angeles, Ca. **Laurnell White,** Schaumburg, Il.
5 YEARS	**Richard D. Adams,** Beaumont Refinery **Londza Allen,** Chicago Refinery **David W. Bianchi,** Chicago Refinery **Michael J. Bodziak,** Los Angeles Refinery **Thomas J. Carter,** Chicago Refinery **Ricardo G. Castaneda,** Los Angeles, Ca. **Douglas L. Chance,** Portland, Or. **Leo P. Cleveland,** Chicago Refinery **Colleen B. Coulon,** Schaumburg, Il. **William H. Cowgill,** San Francisco Refinery **Sheila Crossman,** San Francisco Refinery **Rickey J. Delege,** San Francisco Refinery **George H. Fletcher,** San Francisco Refinery **Margaret K. Fryburger,** Cincinnati, Oh. **Virginia A. Henley,** Beaumont Refinery **Harold P. Hill,** San Francisco Refinery **Linda S. Hill,** Chicago Refinery **Willie J. Hudson,** Beaumont Refinery **Patti M. Hyneman,** Schaumburg, Il. **Kinya Iiyama,** Los Angeles Refinery **Garland A. Jones,** Los Angeles Refinery **Wilma N. Joseph,** Beaumont Refinery **Deborah K. Jowers,** Beaumont Refinery **Lawrence R. Kinzel,** Chicago Refinery **Bobby I. Landry, Jr.,** Chicago Refinery **Linda F. Larry,** Beaumont Refinery **Mario G. Lozano,** Chicago Refinery **John D. Lumbley,** Beaumont Refinery **Catherine A. Murphy,** San Francisco Refinery **Willie L. Nash,** Richmond, Ca. **Bruce E. Nesom,** Beaumont Refinery **Gregory K. Neufeld,** South Holland, Il. **Timothy C. Neville,** San Francisco Refinery **Than Nguyen,** Portland, Or. **George S. Olson,** Los Angeles, Ca. **Danny E. Oster,** San Luis Obispo, Ca. **Raphael Richardson,** Cincinnati, Oh. **Lewis T. Rogers,** San Francisco, Ca. **Daryl J. Schout,** Cincinnati, Oh. **Gregory J. Studer,** Chicago Refinery **Cheryl A. Taylor,** Los Angeles, Ca. **Evelyn A. Thompson,** Beaumont Refinery **Gilman E. Thompson,** San Francisco Refinery **Joe D. Thompson,** Ketchikan, Ak. **Norman L. Voth,** Los Angeles Refinery **Martin D. Williams,** Beaumont Refinery **Wayne W. Wisniewski,** Chicago Refinery

UNION OIL AND GAS DIVISION

March 1984

35 YEARS	**Wilbur E. Bonin,** Lafayette, La. **Jack I. Burger,** Santa Fe Springs, Ca. **Everett W. Green,** Houston, Tx. **Charles G. Newhouse,** Mobile, Al. **Henry J. Paulsen,** Coalinga, Ca.
30 YEARS	**Juanita H. Boyd,** Union Oil Center **Claude D. Cramer,** Coalinga, Ca. **Edgar Davis,** Odessa, Tx. **James M. Folse,** Houma, La. **Robert P. Howard,** Midland, Tx.
25 YEARS	**Jean P. Chauvel,** Ventura, Ca.
20 YEARS	**Wendell W. Anderson,** Orcutt, Ca. **Robert G. Arends,** Ventura, Ca. **Barbara J. Maxwell,** Bakersfield, Ca. **Bobby C. Neal,** Orcutt, Ca. **Clay P. Portier,** Houma, La.
15 YEARS	**Frank E. Boblett,** Santa Paula, Ca. **William Brower,** Kenai, Ak. **Willie Brown,** Andrews, Tx. **Edwin W. Elliott,** Santa Paula, Ca. **Alfred T. Morrison,** Ventura, Ca. **Louis P. Pitre,** Houma, La. **Billy G. Shearer,** Jackson, Ms. **Carol A. Veillon,** Lafayette, La. **James L. Wylie,** Kenai, Ak.
10 YEARS	**Sidney S. Abshier,** Lovington, N.M. **Leonciro G. Garza,** Andrews, Tx. **Catherine L. Gause,** Santa Fe Springs, Ca. **Richard A. Hernandez,** Orcutt, Ca. **Roger D. Lovette,** Van, Tx. **Margaret Mena,** Pasadena, Ca. **Michael A. Peek,** Santa Fe Springs, Ca. **Ralph R. Pflaum,** Clay City, Il. **Lee H. Price,** Houston, Tx. **Robert C. Ryan,** Orcutt, Ca. **Huey P. Thomas,** Lafayette, La.

5 YEARS	**Sandra M. Barber,** Houston, Tx. **David H. Billington,** Clay City, Il. **Roy D. Bricker,** Clay City, Il. **John M. Bruhl,** Mobile, Al. **Roberta K. Cameron,** Olney, Il. **James A. Campbell, Sr.,** Mobile, Al. **John D. Coles,** Lafayette, La. **Barbara A. Ditto,** Odessa, Tx. **Lonnie D. Dugas,** Lafayette, La. **Amador G. Echiribel,** Santa Fe Springs, Ca. **Robert E. Estill,** Houston, Tx. **James S. Garcia,** Ventura, Ca. **Michael Gelbs,** Bakersfield, Ca. **Robert L. Graves,** Santa Fe Springs, Ca. **Ronald E. Griffith,** Mobile, Al. **Ralph P. Hammack,** Kenai, Ak. **Dennis R. Herdes,** Clay City, Il. **Michael E. Hughey,** Mobile, Al. **Larry P. Leblanc,** Houma, La. **Kathleen A. Milone,** W. Liberty, Il. **Gregory W. Moon,** Orcutt, Ca. **Ronald J. Parro,** Houma, La. **Chris H. Peterson,** Casper, Wy. **Ted W. Renner,** Ganado, Tx. **Dave J. Schexnayder, Jr.,** Mobile, Al. **Sandra K. Schubert,** Houston, Tx. **William Sermon,** Houston, Tx. **Jerome W. Sherrod,** Mobile, Al. **Gary V. Sims,** Mobile, Al. **Bryce L. Tenold,** Santa Fe Springs, Ca. **Henry H. Valdez,** Ganado, Tx. **Adrienne M. Wilder,** Coalinga, Ca.

April 1984

35 YEARS	**Bernice A. Taylor,** Pasadena, Ca.
30 YEARS	**Donald R. Malone,** Santa Fe Springs, Ca. **Miles McJohnson, Jr.,** Lafayette, La.
25 YEARS	**J. J. Steigerwald,** Oklahoma City, Ok.
20 YEARS	**Jessie G. Price,** Snyder, Tx. **Robert K. Smalley,** Santa Fe Springs, Ca.
15 YEARS	**Mary A. Parker,** Houston, Tx. **John C. Stevenson, Jr.,** Cutbank, Mt. **Safwat F. Tadros,** Houston, Tx.
10 YEARS	**Jacqueline J. Cipolla,** Orcutt, Ca. **Raphael Fusilier,** Lafayette, La. **Catherine J. Hiebert,** Ventura, Ca. **Raymond F. Holsch,** Houston, Tx. **Joseph D. Meche,** Lafayette, La. **Eugene J. Ohms,** Olney, Il. **James W. Pitts III,** Santa Fe Springs, Ca. **Juanita W. Robinson,** Ventura, Ca. **Carl Sash, Jr.,** Van, Tx. **Dupree Torrence,** Houma, La.

5 YEARS	**Susan L. Allen,** Orcutt, Ca. **Richard C. Burnett,** Lafayette, La. **Paul B. Calcote,** Lafayette, La. **Benjamin F. Duff IV,** Ardmore, Ok. **Katherine C. Enloe,** Lafayette, La. **Glenn M. Kooly,** Kenai, Ak. **Vicky A. Ledford,** Houston, Tx. **Patricia I. Leiser,** Ventura, Ca. **James E. Mackey,** Santa Fe Springs, Ca. **Joseph B. Mouton,** Lafayette, La. **Forrest R. Price,** Van, Tx. **Keith J. Romero,** Lafayette, La. **Donna X. Russell,** Anchorage, Ak. **David W. Shiflett,** Bakersfield, Ca. **Michael A. Sroczynski,** Lafayette, La. **Edward A. Vohnout,** Taft, Ca. **Preston M. Walters,** Houston, Tx. **Brenda M. Young,** Mobile, Al.

UNION GEOTHERMAL DIVISION

March 1984

20 YEARS	**Richard F. Dondanville,** Santa Rosa, Ca.
15 YEARS	**Bruce W. Blaikie,** Imperial Valley, Ca. **Mae L. Wong,** Union Oil Center
10 YEARS	**Thomas L. Waggoner,** Imperial Valley, Ca.
5 YEARS	**Gail Elbert,** Santa Rosa, Ca. **Christopher D. Miller,** Big Geysers, Ca. **Robert F. Powell,** Big Geysers, Ca. **Susie T. Suarez,** Union Oil Center

April 1984

5 YEARS	**Dennis L. Hale,** Manila, Philippines

UNION CHEMICALS DIVISION

March 1984

30 YEARS	**S. P. Crockett,** Brea, Ca. **Harold Dowell,** Union Oil Center **Douglas Harris,** Brea, Ca. **Richard W. Letts,** Carteret, N.J. **Carl Littrell,** Kennewick, Wa. **Loyd Woodson,** Brea, Ca.
25 YEARS	**Maxwell Minar,** Brea, Ca. **Joseph C. Montagnino,** Bridgeview, Il.
15 YEARS	**James W. Caldwell,** Charlotte, N.C. **Sanford W. Davis,** Charlotte, N.C. **Kenneth A. Drake,** Charlotte, N.C. **Walter D. Gruskowski,** Carteret, N.J. **Walter J. Verhoef,** La Mirada, Ca. **Kenneth F. Welch,** Atlanta, Ga. **Charles Wilkins,** Kenai, Ak. **Larrie Woods,** Kenai, Ak.
10 YEARS	**Susan D. Croneberger,** Atlanta, Ga. **Christopher William,** Union Oil Center

5 YEARS	**Carol E. Bozeman,** Tampa, Fl. **Rickey Bradshaw,** Charlotte, N.C. **Doris M. Burdick,** Schaumburg, Il. **James Campbell,** Chicago, Il. **Andrew B. Cofer III,** Portland, Or. **Terry H. Creekmore,** Lemont, Il. **Langley P. Galarneaux, Jr.,** Sacramento, Ca. **John Hynek,** Bridgeview, Il. **Scott Lantz,** Sacramento, Ca. **William McManus,** Sacramento, Ca. **Steven Robinson,** Union Oil Center **Dale Stockton,** Kenai, Ak.

April 1984

30 YEARS	**Warren Hansen,** Brea, Ca. **David Reineman,** Brea, Ca.
20 YEARS	**Carl Sutton,** Brea, Ca.
10 YEARS	**Evelyn Barratt,** Brea, Ca. **Larry Mills,** Brea, Ca. **Rodney Reynolds,** Kenai, Ak. **Richard Warren,** Kenai, Ak.
5 YEARS	**Steven Lynch,** Kenai, Ak. **Jeffrey Stadheim,** Kenai, Ak.

UNION INTERNATIONAL OIL DIVISION

March 1984

10 YEARS	**William G. Gombar,** Los Angeles, Ca. **Stephen J. Schreiber,** Balikpapan, Indonesia **Harry J. Weatherspoon,** Balikpapan, Indonesia **Aue-Aree Yudiwat,** Thailand
5 YEARS	**James A. Campbell,** Thailand **John P. Short,** Scotland

April 1984

20 YEARS	**Larry R. McHodgkins,** Los Angeles, Ca. **Graydon H. Laughbaum, Jr.,** Netherlands
15 YEARS	**George F. Fisher,** Los Angeles, Ca.
10 YEARS	**Donald A. Bray,** Scotland **Leslie Crozier,** Thailand
5 YEARS	**Malcolm F. McCormack,** Balikpapan, Indonesia **Charles B. Weil,** Los Angeles, Ca.

UNION OIL CO. OF CANADA LTD.

March 1984

15 YEARS	**Dave Bruneau,** Calgary, Alberta
10 YEARS	**Lawna Robart,** Calgary, Alberta
5 YEARS	**Jim Jackins,** Calgary, Alberta **Anil Relan,** Calgary, Alberta **Werner Rutzer,** Calgary, Alberta

April 1984

20 YEARS	**George Petrie,** Fort St. John, British Columbia
15 YEARS	**Paulette Yaholnitsky,** Calgary, Alberta
10 YEARS	**Brenda Palm,** Calgary, Alberta **Lea Steeves,** Calgary, Alberta
5 YEARS	**Doug Boisvert,** Red Earth **Ron Senger,** Calgary, Alberta

UNION OIL OF GREAT BRITAIN

March 1984

5 YEARS	**P. W. Mills,** Scotland

April 1984

5 YEARS	**D. Bosher,** Scotland **A. G. Beaton,** Scotland **L. N. Donald,** Scotland

UNION OIL CO. OF INDONESIA

March 1984

10 YEARS	**Muchd Ali** **Amberi** **Benny B. Dictus** **Muhammad Djaini** **Sugeng H.S.** **Slamet Hartono** **Husein** **Tinneke M. Kambey** **Achmad Marzuki** **Parno** **Safrudin** **Muhamad Salim** **Handar Subiman** **Subiono** **Sudir** **Sugijono** **Thomas Tabalujan** **Muhammad Tahir** **Tohardjali** **Ellen Wasmana** **Benny Zunir**
5 YEARS	**Antonius C. Djentamat** **Hasyim Harsono** **Anton Khobnaylius** **Paulus Patulungan** **Syamsul Abdul Rachman** **Muhammad Tang** **Jafar Jaya Umar**

April 1984

10 YEARS **Jusup Iskandar**
Yusman Marzuki
Frans Bertus Soesman
P. T. Sunarjo
Suwardji
Willy Tapada
Wally Theodorus
Cornelius Toyang
Wardjito
Nico Winterstein

5 YEARS **Djaliansyah**
L. N. Donald
Bustam Abdul Ganie
Mustari Gultom
Sumanto Hartanto
Isnain
Bambang Kristiono
Hasanuddin Pane
Abdul Wachid
Geoffrey Ang Lay Yew

PHILIPPINE GEOTHERMAL, INC.

March 1984

5 YEARS **Saturnino C. Clavecillas,** Manila, Philippines
Wilson C. Clemente, Manila, Philippines
Eleodoro C. Dacir, Manila, Philippines
Rustico A. Daypo, Manila, Philippines
Jose G. Espinosa, Manila, Philippines
Adonis P. Templado, Manila, Philippines

April 1984

10 YEARS **Amado B. Buenconsejo,** Manila, Philippines

5 YEARS **Araceli B. Confiado,** Manila, Philippines
Leonardo A. Enaje, Manila, Philippines
Domingo B. Goncena, Manila, Philippines
Josephine P. Perez, Manila, Philippines
Resureccion S. Sarmiento, Manila, Philippines

UNION ENERGY MINING DIVISION

March 1984

10 YEARS **Robbie Roundtree,** Union Oil Center

5 YEARS **Arnold P. Acosta,** Parachute, Co.
Dane T. Ashley, Parachute, Co.
Jerome C. Conner, Rawlins, Wy.

April 1984

5 YEARS **Cliff L. Bennett,** Parachute, Co.
Ignacio D. Garcia, Rawlins, Wy.
Richard W. Harrison, Parachute, Co.
Bobby D. Jacobsen, Rawlins, Wy.
Donald E. Jones, Rawlins, Wy.
Larry R. Love, Parachute, Co.
James P. Sanders, Rawlins, Wy.

MOLYCORP, INC.

March 1984

25 YEARS **Michael Bieda,** Washington, Pa.
Homer Day, Washington, Pa.
Thomas Folkens, Washington, Pa.
Ernest Gaudette, Washington, Pa.
John Sanders, Washington, Pa.
Jerry Wilkinson, Washington, Pa.

20 YEARS **George Anderson,** Questa, N.M.
Abe Cardenas, Questa, N.M.
Arturo Gomez, Questa, N.M.
Jose Martinez, Questa, N.M.
Manuel Morgas, Questa, N.M.
Manuel Ortega, Questa, N.M.
Felimon Rael, Questa, N.M.
Luis Sena, Questa, N.M.
Gilbert Vargas, Questa, N.M.

15 YEARS **Clifford Bridges,** Mt. Pass, Ca.
Johnny Cisneros, Questa, N.M.
Richard Cisneros, Questa, N.M.
Fidel Martinez, Questa, N.M.
Jerry Montoya, Questa, N.M.
Jose Montoya, Questa, N.M.
Stephen Nye, Questa, N.M.
Santiago Ortega, Questa, N.M.
Henry Ortiz, Questa, N.M.
Ray Sharpe, Mt. Pass, Ca.
Virgilio Trujillo, Questa, N.M.
Gustavo Vallejos, Questa, N.M.
Fritz Vialpando, Questa, N.M.

10 YEARS **Juan Cisneros,** Questa, N.M.
Alan Eisenhard, York, Pa.
Filbert Vigil, Questa, N.M.

5 YEARS **Dean Archuleta,** Questa, N.M.
Jesse Devargas, Questa, N.M.
Tommy Fresquez, Questa, N.M.
Steve Garcia, Questa, N.M.
Jesus Gutierrez, Questa, N.M.
Gary Harris, Mt. Pass, Ca.
Richard Kuhn, Questa, N.M.
Armando Manzanares, Questa, N.M.
Manual Martinez, Questa, N.M.
Evaristo Rael, Questa, N.M.
Rudy Rodarte, Questa, N.M.
Catherine Romanovitch, White Plains, N.Y.
Gilbert Suazo, Questa, N.M.
Pacomio Trujillo, Questa, N.M.
Ben Valdez, Questa, N.M.
Margaret Vigil, Questa, N.M.

April 1984

20 YEARS **George Duker,** Mt. Pass, Ca.
Lorenzo Duran, Questa, N.M.
George Maestas, Questa, N.M.
Menard Martinez, Questa, N.M.
Levi Mondragon, Jr., Questa, N.M.
Jerry Murry, Questa, N.M.
Sofio Ortega, Questa, N.M.
Alex Quintana, Questa, N.M.
Maurelio Romero, Questa, N.M.
Norbert Vigil, Questa, N.M.
Robert Wilson, Questa, N.M.

15 YEARS **Joe Abeyta,** Questa, N.M.
Arsenio Brito, Questa, N.M.
Ralph Esquibel, Questa, N.M.
Cipriano Herrera, Questa, N.M.
Romolo Martinez, Questa, N.M.
Carlos Ortega, Questa, N.M.
Dean R. Smith, Questa, N.M.

10 YEARS **George Anderson,** Questa, N.M.
Gary Eisenbraun, Questa, N.M.
Albert Johnson, Louviers, Co.
Steven Loughridge, Louviers, Co.

5 YEARS **Jesse Archuleta,** Questa, N.M.
Felipe Casias Jr., Questa, N.M.
Bobby Cisneros, Questa, N.M.
Modesto Cisneros, Questa, N.M.
Raymond Cisneros, Questa, N.M.
Jose Espinoza, Questa, N.M.
Judy Espinoza, Questa, N.M.
Steven Flink, Mt. Pass, Ca.
Anthony Mondragon, Questa, N.M.
Felipe Ortega, III, Questa, N.M.
Max Ortega, Jr., Questa, N.M.
Jake Ortiz, Questa, N.M.
Veronica Valdez, Questa, N.M.
John Vialpando, Questa, N.M.
Stanley Zavatski, Washington, Pa.

POCO GRAPHITE INC.

March 1984

5 YEARS **Jeffery Cleveland,** Decatur, Tx.
Rickie Tarpley, Decatur, Tx.

April 1984

10 YEARS **Edwin Kirschner,** Decatur, Tx.

JOBBERS AND DISTRIBUTORS

February 1984

5 YEARS **McCormix Corporation,** Santa Barbara, Ca.

April 1984

55 YEARS **Daughtridge Oil Company,** Rocky Mount, N.C.

30 YEARS **George O. Gullickson,** Ventura, Ca.

20 YEARS **Gallatin Oil Company, Inc.,** Gallatin, Tn.
W. E. Riley Oil Company, Petersburg, Va.

15 YEARS **Moore's Oil Company,** Batesville, Ms.

10 YEARS **Edison Oil Company,** Fort Myers, Fl.
Southwest Wisconsin Petroleum, Inc. Richland Ctr., Wi.

RETIREMENTS

December 1983

Peter J. Krol, Union 76 Division, Dolton, Il. December 4, 1967
Roland C. Simonsen, Union 76 Division, Santa Rosa, Ca. September 28, 1960

January 1984

Jack D. Alford, Union 76 Division, Beaumont, Tx. October 30, 1946
Gwindell F. Bagley, Union 76 Division, Atlanta, Ga. December 3, 1942
Margaret C. Bence, Union 76 Division, Memphis, Tn. October 1, 1942
Edwin Benedict, Union 76 Division, Dania, Fl. September 22, 1952
W. C. Bowie, Union 76 Division, Walnut Creek, Ca. March 11, 1947
Dorothea A. Brieschke, Union 76 Division, Roselle, Il. November 6, 1967
Dalton D. Broussard, Oil & Gas Division, Delcambre, La. November 28, 1950
James W. Buck, Union 76 Division, Garden Grove, Ca. June 26, 1953
James W. Byrum, Union 76 Division, Mercer Island, Wa. October 22, 1945
Porfirio A. Cisneros, Molycorp, Questa, N.M. November 13, 1968
Errol G. Compton, Union 76 Division, Snohomish, Wa. May 25, 1953
Robert F. Daum, Corporate, Columbus, Oh. May 1, 1967
Leroy D. Ellingson, Oil & Gas Division, Cut Bank, Mt. September 24, 1946
Hunter H. Ewing, Oil & Gas Division, So. Pasadena, Ca. February 15, 1947
Leon H. Frazier, Union 76 Division, Beaumont, Tx. December 30, 1946
Teddy L. Haines, International Division, Chandler, Tx. June 1, 1945
Bert C. Hamilton, Oil & Gas Division, Worland, Wy. May 16, 1951
Shirley K. Hanson, Union Chemicals Division, Schaumburg, Il. September 10, 1971
Vernon C. Herron, Science & Technology, Brea, Ca. April 21, 1938
August F. Hisman, Union 76 Division, Chicago, Il. October 25, 1956
James E. Howell, Union 76 Division, Nederland, Tx. October 27, 1947
Allen R. Inman, Union Geothermal Division, Cloverdale, Ca. November 1, 1972
Thomas R. Jones, Corporate, Lawndale, Ca. October 13, 1937
Raymond L. Jurek, Union 76 Division, Anoka, Mn. June 1, 1956
Leonarda M. Langner, Union 76 Division, Fullerton, Ca. August 23, 1976
Harold E. McClatchey, Union 76 Division, Memphis, Tn. November 1, 1948
Robert A. McKean, Corporate, Los Angeles, Ca. September 16, 1943
Floyd L. Mitchell, Jr., Union 76 Division, Beaumont, Tx. February 17, 1947
William Pappas, Union 76 Division, Oakland, Ca. October 1, 1945
Claude O. Piepkorn, Oil & Gas Division, Coalinga, Ca. March 25, 1947
Austin J. Pool, Union 76 Division, Nederland, Tx. February 19, 1951
Louis F. Searles, Union 76 Division, Long Beach, Ca. March 2, 1953
Martin J. Skuban, Union 76 Division, Crest Hill, Il. August 1, 1954
George B. Snyder, Corporate, Palos Verdes Peninsula, Ca. July 7, 1938
Jessie H. Tucker, Union 76 Division, Cotton Plant, Ar. February 13, 1966
Eugene C. Vaughan, Union 76 Division, Harbor City, Ca. March 10, 1942
Judd D. Weller, Union 76 Division, Hammond, In. June 12, 1972
Alvin G. Welter, Union 76 Division, Lockport, Il. June 23, 1952

February 1984

Willis J. Alford, Union 76 Division, Beaumont, Tx. August 2, 1946
Walter H. Anderson, Union Chemicals, Mt. Pass, Ca. August 26, 1965
Allen C. Barnes, Union 76 Division, Richmond, Ca. April 3, 1946
John L. Beima, Union 76 Division, Treasure Is., Fl. February 1, 1949
Royal S. Broberg, Corporate, Los Angeles, Ca. November 16, 1950
Ruben I. Ceballos, Union 76 Division, Crockett, Ca. January 31, 1946
Robin W. Chamness, Union 76 Division, East Bank, W.V. August 1, 1946
Charles A. Dow, Union Chemicals Division, Los Angeles, Ca. January 11, 1954
Robert W. Duke, Union 76 Division, Silsbee, Tx. December 12, 1948
Dwight A. Eberhart, Oil & Gas Division, Olney, Il. August 13, 1940
Robert C. Ellis, Union Chemicals, Carteret, N.J. December 6, 1946
Don E. Evert, Oil & Gas Division, Whittier, Ca. August 1, 1946
Ralph R. Goodman, Union 76 Division, Cuyahoga Falls, Oh. January 1, 1955
James W. Griffith, Union 76 Division, Smyrna, Ga. August 16, 1961
James L. Harris, Oil & Gas Division, Van, Tx. December 19, 1945
Douglas C. Hays, Union 76 Division, Glendale, Ca. January 14, 1952
Lynden A. Herbert, Oil & Gas Division, Manhattan Beach, Ca. November 10, 1954
William F. Hines, Jr., Union 76 Division, Garden Grove, Ca. November 2, 1948
Verner E. Hoaglund, Union 76 Division, Lemont, Il. August 1, 1954
Maurine H. Iles, Union 76 Division, Port Neches, Tx. November 9, 1943
Richard Kay, Union 76 Division, Ft. Lauderdale, Fl. February 14, 1953
Helen Kelley, Union 76 Division, Los Angeles, Ca. January 25, 1955
Wayne F. McWhorter, Union Chemicals Division, Wood Dale, Il. October 2, 1950
Maurice W. Morton, International Division, Gower, Mo. September 1, 1968
Lester J. Parsons, Union 76 Division, Beaumont, Tx. January 5 1948
Joseph C. Perry, Pure Transportation, Lake Charles, La. February 11, 1947
Albert H. Simpson, Union 76 Division, Schaumburg, Il. March 7, 1946
John E. Sirotiak, Union 76 Division, New Brighton, Mn. January 8, 1947
Antonio R. Villalobos, Union 76 Division, Rodeo, Ca. May 12, 1942
Clarence J. Warthen, Union 76 Division, Pensacola, Fl. July 1, 1951
George F. Webster, Union 76 Division, Downey, Ca. May 1, 1946

Service Awards

March 1984

Ralph J. Apel, Union 76 Division, Downey, Ca. November 14, 1948
Betty B. Badgley, Union Chemicals Division, Schaumburg, Il. July 2, 1942
Leonard W. Bishop, Union 76 Division, Lakewood, Ca. April 20, 1959
Helen M. Bossert, Union 76 Division, Toledo, Oh. January 2, 1945
Leo Burnett, Union 76 Division, Nederland, Tx. March 1, 1951
James W. Caldwell, Union Chemicals Division, Harrisburg, N.C. August 4, 1969
Stanley B. Clevenger, Oil & Gas Division, Santa Maria, Ca. December 22, 1941
Lorraine Cosner, Oil & Gas Division, Bakersfield, Ca. March 13, 1943
Emile DeSolminihac, Oil & Gas Division, Orcutt, Ca. February 11, 1948
Dallas E. Gipe, Union Chemicals Division, Reseda, Ca. December 1, 1958
Elease G. Grant, Union 76 Division, Atlanta, Ga. February 11, 1959
Henry D. Haas, Union 76 Division, Hinsdale, Il. June 1, 1939
Byrl J. Harmon, Pure Transportation, Olney, Il. April 29, 1944
Ray G. Henderson, Union 76 Division, Joliet, Il. April 30, 1951
Thurman L. Higdon, Union 76 Division, Arroyo Grande, Ca. August 25, 1950
Donald C. Hoberg, Union 76 Division, Torrance, Ca. July 10, 1946
George R. Hubbard, Science & Technology, Anaheim, Ca. June 13, 1945
Charles W. Jones, Jr., Union 76 Division, Port Neches, Tx. June 7, 1948
Alfred E. Krueger, Union 76 Division, Palatine, Il. February 23, 1961
Romaine L. Mallat, Union 76 Division, Vallejo, Ca. July 2, 1951
Ivan F. Nethers, Oil & Gas Division, Shepherd, Mi. May 19, 1941
Calvin L. Pickens, Oil & Gas Division, Woodward, Ok. October 16, 1946
Amador P. Rubio, Union 76 Division, Arroyo Grande, Ca. April 1, 1946
Lawrence R. Rowland, Union 76 Division, St. George, Ut. September 24, 1954
Kiyoto Segawa, Union 76 Division, Hilo, Hi. May 14, 1954
O. W. Silleman, Jr., Union 76 Division, Canyon Road Country, Ca. October 26, 1955
Herman F. Stanfill, Science & Technology, Brea, Ca. October 14, 1948
Edgar S. Stowe, International Division, So. Pasadena, Ca. June 20, 1946
Marvin L. Whitledge, Union 76 Division, Kalamazoo, Mi. August 21, 1950
Warren T. Zumwalt, Union 76 Division, Portland, Or. June 14, 1948

April 1984

Clifford E. Armstrong, Union Chemicals Division, Warwick, R.I. December 10, 1945
Benny R. Carruth, Union Chemicals Division, Brea, Ca. October 31, 1960
Ancil M. Collett, Oil & Gas Division, La Habra, Ca. December 12, 1966
Gordon M. Cross, Union 76 Division, Beaumont, Tx. November 6, 1950
Selma S. Doumani, Science & Technology, Fullerton, Ca. January 29, 1968
Ernest G. Fowler, Molycorp, Scenery Hill, Pa. March 24, 1948
Howard L. Jepson, Science & Technology, Diamond Bar, Ca. November 16, 1953
Philip D. Jontz, Union 76 Division, Pasadena, Ca. May 22, 1956
Odean Keeter, Oil & Gas Division, Alwahnee, Ca. March 2, 1956
Russell L. Larson, Union 76 Division, Austin, Tx. July 8, 1947
Henry T. Mozeley, Union 76 Division, Atlanta, Ga. October 15, 1945
Guy C. Neal, Union 76 Division, St. Albans, W.V. January 1, 1948
Harriet C. Neier, Union 76 Division, Hoffman Estates, Il. November 19, 1973
Richard L. Noland, Union 76 Division, Green Valley, Az. October 31, 1949
John M. Payne, Union 76 Division, Charleston, W.V. June 12, 1941
Wayne G. Reidey, Union Chemicals Division, Brea, Ca. October 24, 1960
Dorothy Robinson, Union 76 Division, Los Angeles, Ca. May 17, 1956
Sten H. Wadin, Union 76 Division, Carpentersville, Il. October 24, 1960
Alfred D. Weeks, Union 76 Division, Port Neches, Tx. February 20, 1948
Clarence E. Williams, Union 76 Division, Pinole, Ca. December 21, 1945

IN MEMORIAM

Employees

Eloy Abeyta, Molycorp, Ranchos De Taos, N.M. January 6, 1984
Johnny W. Cole, Energy Mining, Rifle, Co. December 6, 1983
Gregory T. Goobic, Union 76 Division, Concord, Ca. January 19, 1984
David H. Kauffman, Union 76 Division, Westminster, Ca. December 4, 1983
Ralph T. Pledger, Union 76 Division, Scappose, Or. February 14, 1984
Peter S. Rey, Union 76 Division, Huntington Beach, Ca. February 17, 1984
Rodger W. Robinson, Energy Mining, Grand Junction, Co. December 6, 1983
John F. Wollaston, Oil & Gas Division, Santa Barbara, Ca. January 30, 1984

Retirees

Guy John Anderson, Oil & Gas Division, Springdale, Ar. February 10, 1984
Theodore W. Anderson, Union 76 Division, Schaumburg, Il. January 26, 1984
William A. Barber, Union 76 Division, Pinellas Park, Fl. January 15, 1984
Frank H. Boetticher, Union 76 Division, Hudson, Fl. December 8, 1983
Coursey O. Boxwell, Union 76 Division, Redmond, Wa. February 17, 1984
Richard Bullard, Union 76 Division, Toledo, Oh. November 19, 1983
James C. Burtelson, Union 76 Division, Modesto, Ca. January 29, 1984
Berley Carroll, Oil & Gas Division, Madill, Ok. November 25, 1983
Manuel J. Costa, Oil & Gas Division, Santa Maria, Ca. January 8, 1984
James G. Curry, Union 76 Division, Starkville, Ms. February 28, 1984
Edgar J. Curtis, Union 76 Division, Jensen Beach, Fl. January 29, 1984
Ona D. Davenport, Union 76 Division, Downey, Ca. February 1, 1984
Manilla Delventhal, Union 76 Division, Napoleon, Oh. February 9, 1984
Ernest T. Dennis, Oil & Gas Division, Oblong, Il. January 26, 1984
David A. Dunn, Oil & Gas Division, Midland, Tx. January 28, 1984
A. Cameron Dystrup, Union 76 Division, Lockport, Il. January 9, 1984
Theodore Evans, Union 76 Division, Toledo, Oh. January 15, 1984
Kenneth L. Ferrel, Union 76 Division, Mayfield Hghts., Oh. December 11, 1983
James D. Fields, Union Chemicals, Wilmington, N.C. January 6, 1984
Robert H. Fleig, Union 76 Division, Shandon, Ca. February 19, 1984
William A. Gipson, Union 76 Division, Warrington, Fl. February 7, 1984
Howard A. Goddard, Union 76 Division, Heath, Oh. December 28, 1983
Charles E. Harris, Union 76 Division, Pensacola, Fl. January 18, 1984
Chuck E. Harris, Union 76 Division, Macomb, Il. December 14, 1983
Ferdie C. Heiserman, Union 76 Division, Toledo, Oh. November 6, 1983
Ted Hermann, Corporate, Los Angeles, Ca. January 12, 1984
Nelson G. Hinkle, Union 76 Division, Long Beach, Ca. January 14, 1984
Otis Hooks, Union 76 Division, Nederland, Tx. February 23, 1984
Richard Joiner, Union 76 Division, Macon, Ga. February 14, 1984
Glenn W. Keiser, Union 76 Division, Hemet, Ca. December 19, 1983
Elbert M. Kelley, Union 76 Division, Marietta, Ga. January 27, 1984
Matt Keneson, Union 76 Division, Beaumont, Tx. January 4, 1984
Helene H. Kipper, Union 76 Division, Los Angeles, Ca. December 2, 1983
John N. Koorenny, Union 76 Division, Good Hope, Il. January 28, 1984
Marvin Lamborn, Union 76 Division, Sacramento, Ca. December 30, 1983
Paul Lawrence, Pure Transportation, Pittsburgh, Tx. January 15, 1984
Rexford C. McClure, Oil & Gas Division, St. Louis, Mi. February 10, 1984
George R. Mertens, Union 76 Division, Orlando, Fl. December 6, 1983
Carl L. Mink, Union 76 Division, Carmel, In. January 8, 1984
William J. Monroe, Union 76 Division, San Francisco, Ca. December 17, 1983
Roy W. Muncy, Union 76 Division, Lancaster, Ca. February 26, 1984
Marvin O. Newcom, Oil & Gas Division, Coalinga, Ca. January 26, 1984
Aulsy E. Newman, Union 76 Division, Covington, La. April 24, 1983
Martha A. Olloman, Union 76 Division, East Palestine, Oh. January 21, 1984
Sam Olson, Union 76 Division, Akron Oh. January 15, 1984

Service Awards

Jose A. Paes, Union 76 Division, Rodeo, Ca. December 1, 1983
Lester P. Phillips, Molycorp, Washington, Pa. January 26, 1984
Mary H. Pickard, Oil & Gas Division, Anaheim, Ca. November 19, 1983
James W. Pulliam, Oil & Gas Division, Norris City, Il. February 28, 1984
Calvin B. Rascoe, Union 76 Division, Port Neches, Tx. December 5, 1983
Anthony J. Rock, Union 76 Division, Lockport, Il. December 10, 1983
Merle R. Ruedy, Union 76 Division, Glendale, Ca. January 13, 1984
Sylvester L. Ruettiger, Union 76 Division, Lockport, Il. November 25, 1983
Roy O. Schaeffer, Oil & Gas Division, Cut Bank, Mt. December 3, 1983
Arthur G. Schneider, Union 76 Division, Newark, Oh. February 16, 1984
John H. Seagler, Oil & Gas Division, Van, Tx. December 25, 1983
Everett S. Shasteen, Union 76 Division, Washington Crt. Hse., Oh. January 5, 1984
Thomas F. Sikorski, Oil & Gas Division, Lake Ann, Mi. January 15, 1984
Max Slutsky, Union 76 Division, Chicago, Il. February 8, 1984
Wilda M. Sposato, Union 76 Division, Arlington Heights, Il. December 8, 1983
Cameron C. Stewart, Oil & Gas Division, Bell, Ca. February 8, 1984
John J. Stockmaster, Union 76 Division, Toledo, Oh. December 2, 1983
Claude Taylor, Union 76 Division, Stockton, Ca. November 13, 1983
Earnest L. Thompson, Oil & Gas Division, Lake Charles, La. January 5, 1984
Esther Umstead, Corporate, Temple City, Ca. December 6, 1983
William G. Wade, Union 76 Division, Ray, Oh. February 22, 1984
Ethel J. Wagner, Union 76 Division, North Pole, Fl. February 8, 1984
Carroll S. Ware, Union 76 Division, Pulaski, Ms. December 29, 1983
Florence C. Warner, Union 76 Division, Holiday, Fl. February 9, 1984
Frank White, Oil & Gas Division, Whittier, Ca. December 1, 1983
Gertrude B. White, Union 76 Division, Fernwood, Ms. November 22, 1983
Paul Wilson, Oil & Gas Division, Orange, Ca. February 27, 1984
Benjamin A. Woodford, Union 76 Division, Glendale, Ca. January 25, 1984
Walter J. Yeary, Oil & Gas Division, Pauls Valley, Ok. November 17, 1983

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UNION OIL COMPANY OF CALIFORNIA

Seventy Six

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COVER: Union and its joint-venture partner Nedlloyd have discovered and are now developing the first commercial oil fields in the Dutch sector of the North Sea. **Story on page 1.**

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