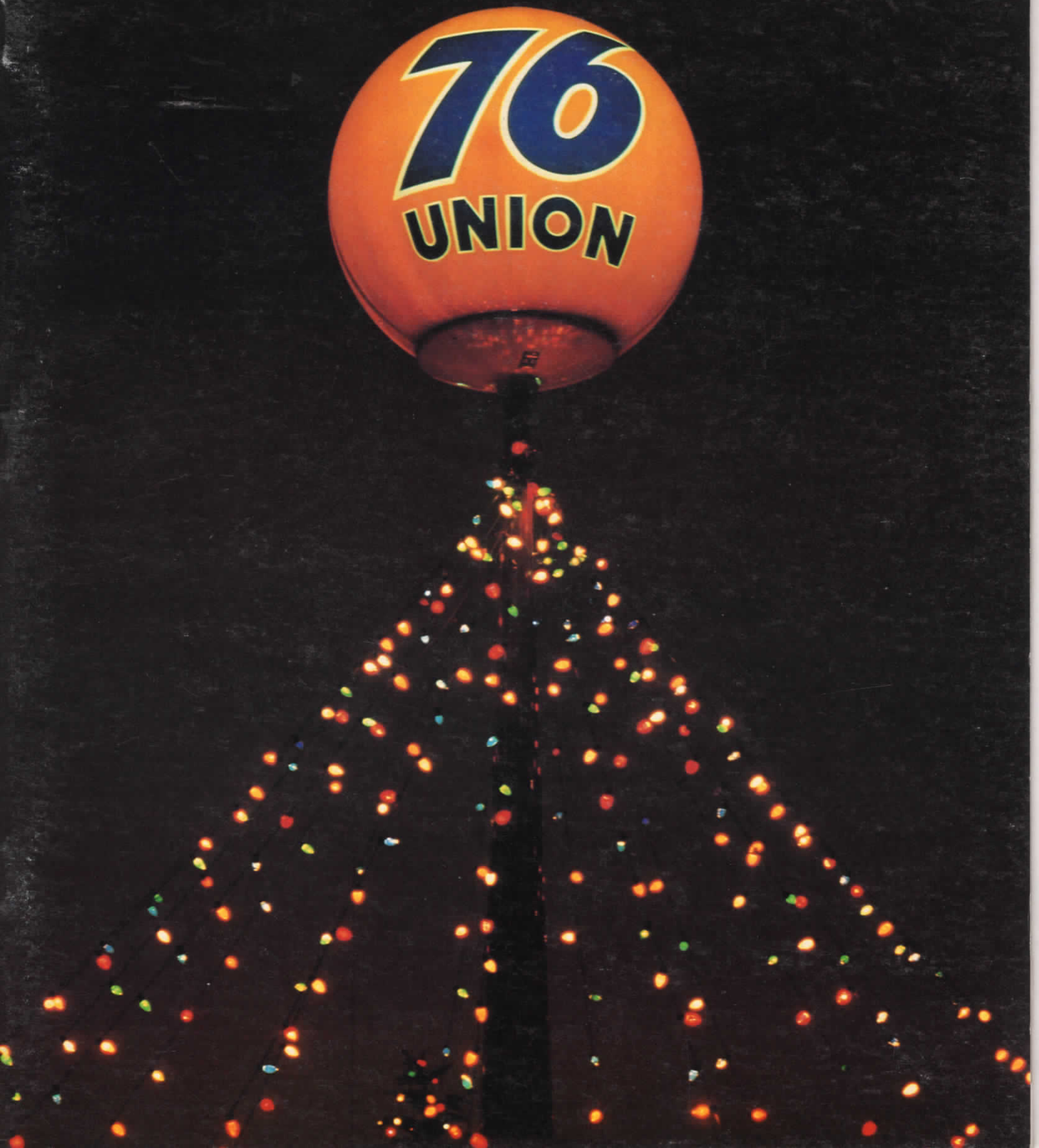
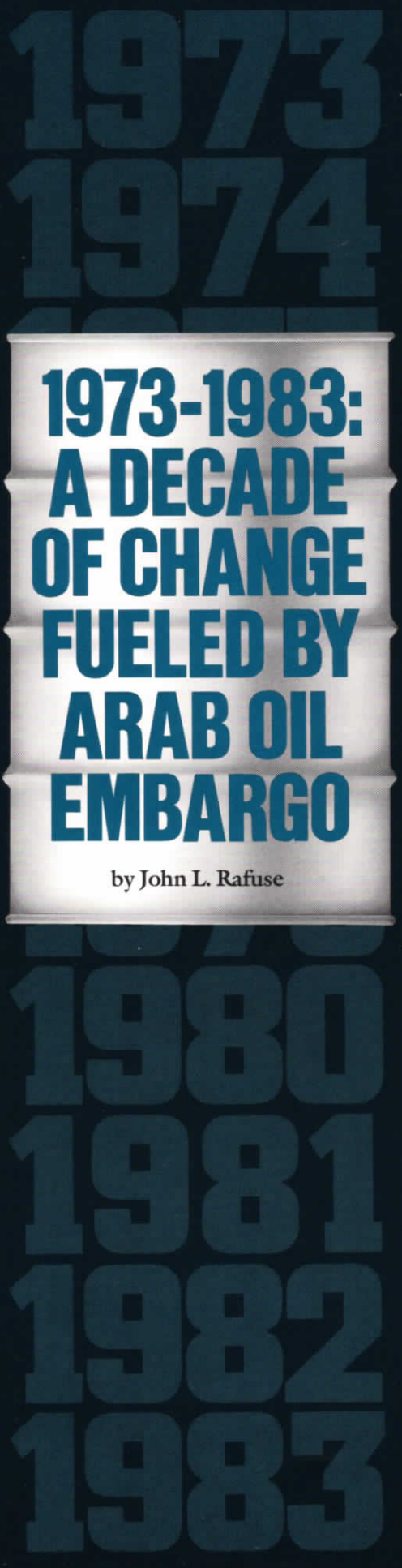
Seventy Six

November
December 1983





1973-1983: A DECADE OF CHANGE FUELED BY ARAB OIL EMBARGO

by John L. Rafuse

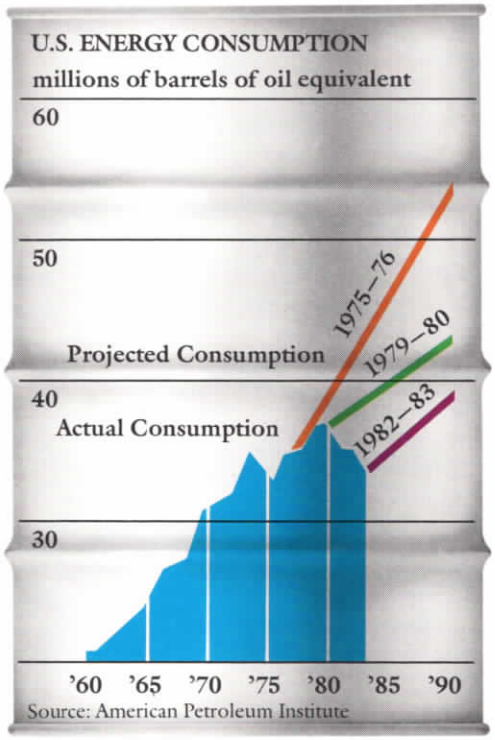
It has been said that each decade makes its own special waves in history. In the 1940s, World War II provided the surge of change. In the 1960s, assassinations, civil rights and the Vietnam War came together to generate tremendous forces that further changed America.

In the 1970s, another wave was generated on October 19, 1973, when the Arab oil embargo began. The embargo, and the "energy crisis" it spawned, represent a major turning point in postwar history. As one author said:

> "The energy crisis encompassed many of the decade's main events and symbols: war in the Mideast, the Arab oil embargo, interminable gas lines, the quadrupling of crude oil prices in three months, revolution in Iran, a second upswing in oil prices, depressed economic growth, and rampant inflation. Amidst these unsettling occurrences was the persistent hint of a possible villain: OPEC —the Organization of Petroleum Exporting Countries."[1]

The embargo drastically altered the pace and progress of the world's economy and introduced powerful new considerations and forces into international politics. But today almost no American recalls who actually instituted the embargo, why, how and when it began, or even what difference it has made.

Though the embargo was the shock that forced energy and oil onto front pages and into everyday conversation in the United States, the problem had been building for years. In fact, though few outside the oil industry had noticed, the U.S. and the rest of



the industrialized world had become dependent on the cheap Middle East oil that fueled postwar economic expansion. Prices were low because the actual cost of pumping crude oil from Middle Eastern wells was low—perhaps 10 to 20 cents per barrel—and consumption doubled in the 1950s and again in the 1960s.

By the early 1970s, U.S. production had peaked and the nation no longer had idle capacity upon which to rely in case of emergency. The nation depended on imports for nearly 30 percent of its oil supply, and Arab oil producers supplied 37 percent of the oil consumed in the non-Communist world. The time was ripe for the transfer of oil power.

An organization was already in place to take advantage of the opportunity. OPEC had been created in 1960 almost as a desperation measure. Venezuela, Iran, Saudi Arabia, Iraq and Kuwait (two non-Arab and three Arab states) had banded together in hopes that, united, they might be more successful in resisting price cuts for their crude such as had been imposed by the major international companies. The organization had grown to 13 members (including five non-Arab states) when opportunity knocked.

On October 6, 1973, Egyptian troops attacked Israeli positions across the Suez Canal, and the Yom Kippur War was on. Ten days later ministers from six Arab states met in Kuwait and decided to raise crude oil prices by about 75 percent (from roughly $2.90 per barrel to over $5). The following day those ministers agreed to cut oil exports by five percent and recommended an embargo against "unfriendly" countries. On October 19, King Faisal of Saudi Arabia reacted to the news that the U.S. still intended to ship $2.5 billion in arms to Israel by ordering a 25 percent production cut in Saudi oil output and an embargo against the United States. The "oil weapon" was put to use.

Before the end of the year, representatives of the OPEC nations (not only the Arab oil ministers) met in Tehran. With their determination reinforced by the price and production actions the Arabs had taken, and by the fact that some "spot" crude had sold at auction for more than $20, the OPEC ministers raised the official price of crude to $11.65 per barrel—a 300 percent increase over the price three months earlier.

Such price increases were more a

reflection of panic than of the actual shortage. In fact, the embargo created a far smaller shortage in the U.S. than King Faisal intended—and a far smaller shortage than most people realized. Most analysts agree that the shortage was less than five percent, certainly less than either of two previous supply interruptions that had gone almost unnoticed: the 1956 Suez Canal crisis and the Six-Day War in 1967. In those earlier instances, ships had been rerouted or other measures taken that prevented incidents from mushrooming into crises.

Why was 1973 so different? The *New York Times* says that:

"It seems likely...that the continuation of controls on crude oil prices and on profit margins of refiners, first imposed as part of President Nixon's 1971 wage-price freeze, played some role.

"Those who believe this was a crucial element point to the fact that the United States was the only major country in which gasoline lines appeared, although several nations beside the United States and the Netherlands felt the pinch of the embargo."[2]

The controls were retained until the end of the decade.

Five months after it began, the embargo was over, but the new pattern had been set—OPEC had taken control of the world energy market. Since that time OPEC has met periodically to review and raise or freeze the price of crude oil. The 1973-74 price shocks were followed, after several years of apparent stability, by still another price doubling (from $17 to $34 per barrel) after the 1978-79 Iranian revolution. That level held until March 1983 when OPEC, forced to respond to world market conditions, took the unprecedented step of cutting prices by $5 per barrel.

OPEC's pricing policies over the intervening 10 years had made production from a great number of other sources practical, while serving to reduce demand to such an extent that its own market share kept shrinking. After 10 years, OPEC was caught by the free market and the oil weapon had been visibly dulled.

But energy and OPEC are now part of the national consciousness. The 10 years following the embargo did make differences in many aspects of American life. For example:

The U.S. Government: Washington's first reaction to energy related problems was to "do something," which usually led to an increased federal role in the oil business. Within months after the embargo began, roughly 3,000 energy related bills had been introduced into Congress, and Senate and House Committee hearings were so frequent that some government officials made two or even three separate appearances in a single day. Energy became—and remained—a major legislative interest with more than a dozen major laws passed between 1973 and 1980.

Also in 1973, President Nixon ended the wage and price controls that had been implemented in 1971—except for controls on oil. During the next several years the U.S. government set the prices for domestic crude oil, gasoline and other petroleum products; it decided which wholesale customers could get how much of their supply from which refiner; it introduced and persistently expanded regulatory schemes to reallocate petroleum or dollars throughout the oil industry and the nation.

In carrying out these programs, the federal government encouraged consumption, subsidized high-priced imports as well as new and inefficient refining facilities, and discouraged oil exploration and production—all in the name of consumer protection. Domestic oil production slipped by one million barrels per day between 1973 and 1977, while U.S. imports increased to make up the loss.

The *New York Times* says, "The Government response to the five-month embargo..., it is now widely agreed even among those who designed the response, was largely counterproductive."[3]

But the results were not totally negative. Out of the spate of laws and regulations came a few positive actions as well.

- A Strategic Petroleum Reserve (SPR) has been created with a 1991 goal of 750 million barrels of crude oil in storage and available for drawdown (in a supply emergency) at a rate of more than four million barrels per day. The SPR currently has more than 350 million barrels in place with systems capable of a drawdown rate of more than one million barrels per day.
- A Synthetic Fuels Corporation (SFC) with the mission of funding and fostering the establishment of new, alternative energy technology. The SFC is the agency overseeing Union's oil shale production/product sale agreement with the government.

Larry Lee/West Light

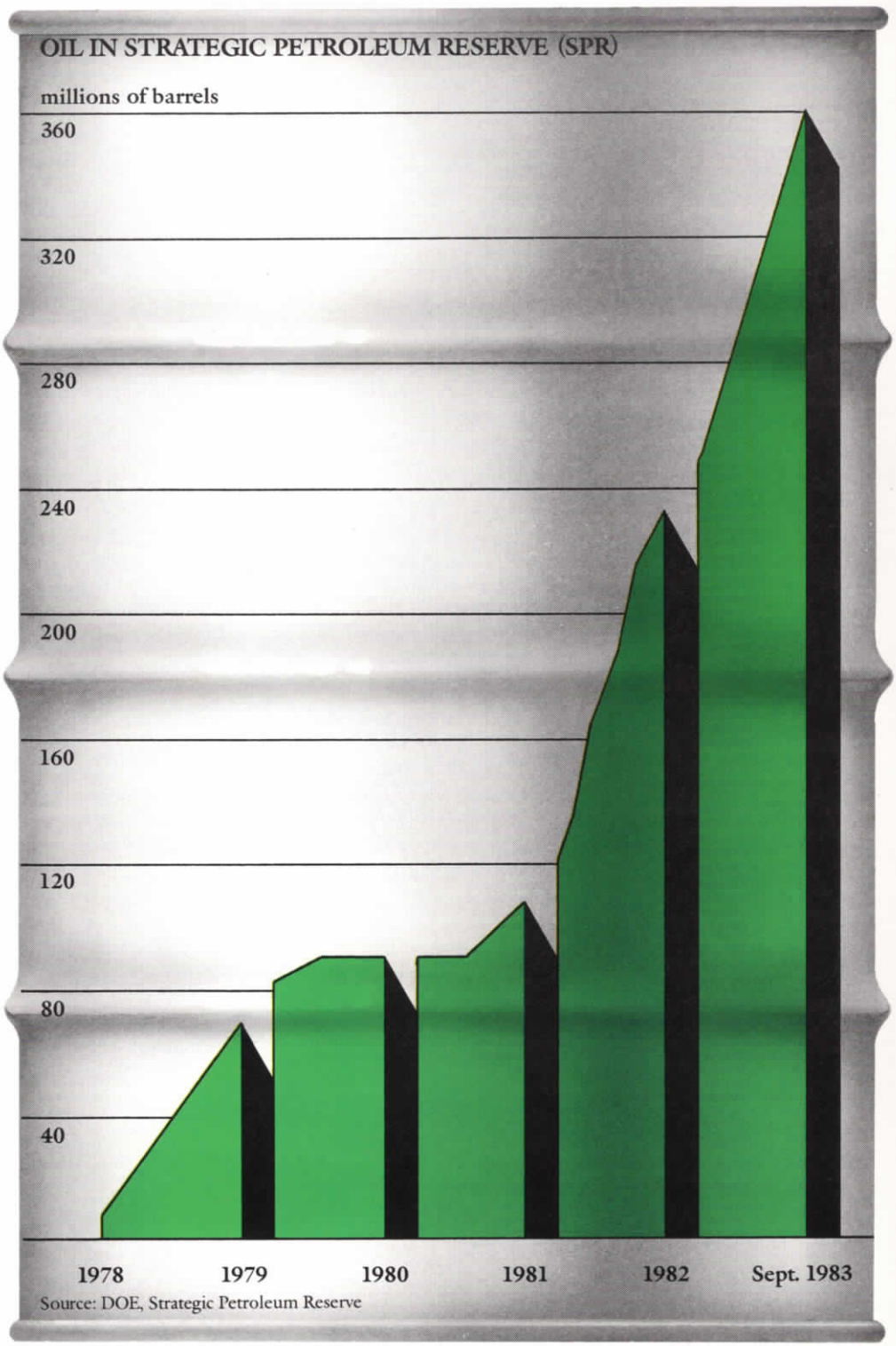
■ The International Energy Agency was initiated by the U.S. and created and staffed by industrial consumer nations. The IEA in turn has created an emergency oil-sharing mechanism for future contingencies.

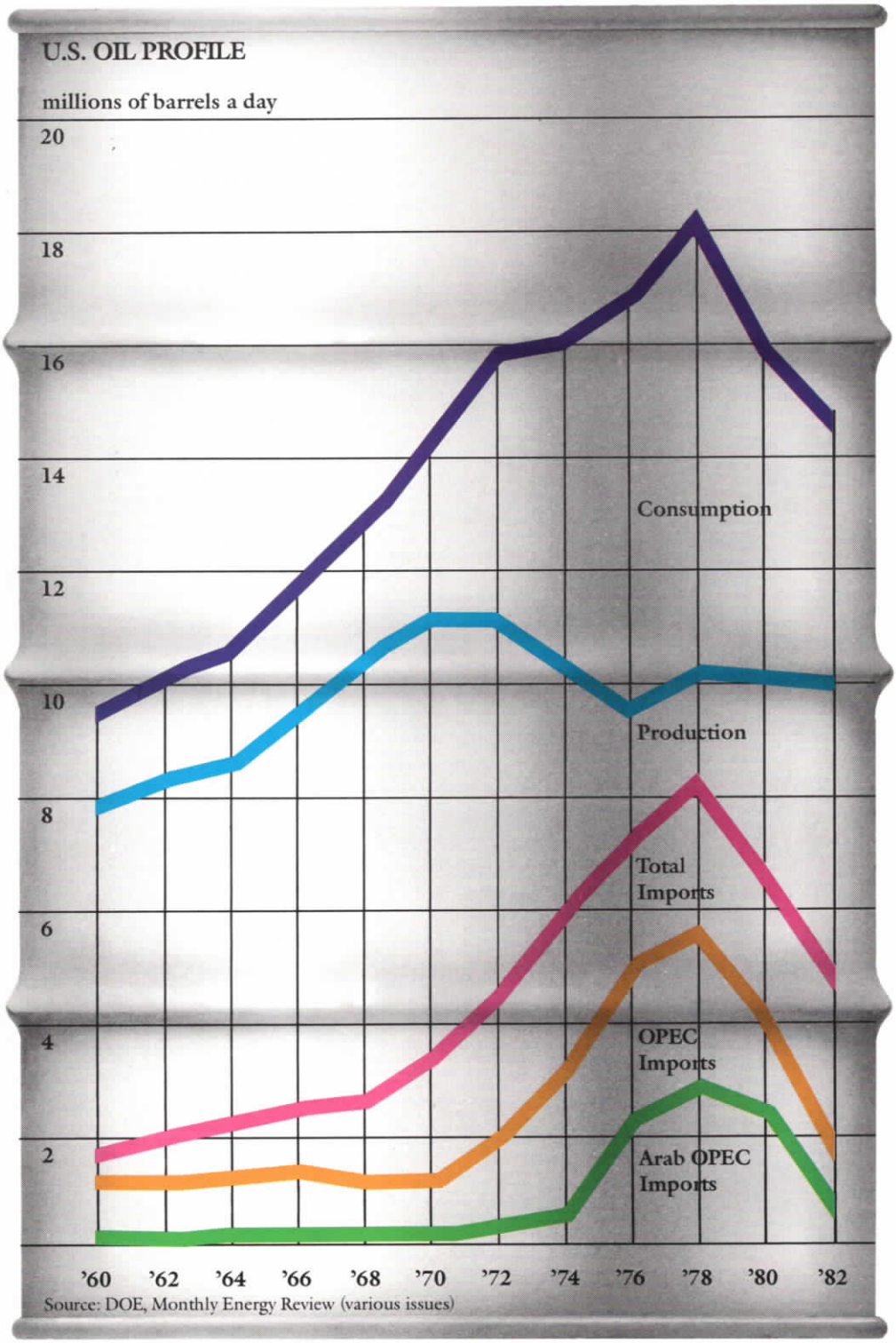
■ Other U.S. laws imposed a 55-mile-per-hour speed limit that has saved fuel (and thousands of lives) over the years, as well as other energy efficiency standards for automobiles, appliances and buildings. Because of this type of legislation and the higher costs, energy conservation is now the concern of all American consumers.

In the end, however, the most important positive action took place when the government began to remove itself from the industry regulation process. In 1979, President Carter took steps to phase out controls on domestic oil prices to return the United States to the world oil market. In 1981, President Reagan finished the decontrol job one week after taking office.

Energy Consumers: From the first moments of the embargo, the most widespread public reaction was one of anger and blame-fixing. One villain was OPEC, but as far as most Americans were concerned the oil industry was a handier scapegoat. There were repeated stories about tankers waiting offshore for prices to go up and gasoline being dumped in the desert to make shortages worse. The government dutifully checked them out and found that none were true.

But a second, more important reaction was the growing awareness and the acceptance of energy conservation for individual and industrial consumers. People turned off lights, turned down thermostats and slowed down vehicles. Advertising campaigns





reminded everyone to carpool, add insulation and be more energy efficient. The results were significant:

- The average U.S. home today uses 20 percent less energy than in 1973.
- The U.S. automobile fleet averaged 13.1 miles per gallon in 1973, and averages 15.1 today. The average 1983 auto gets 25 miles per gallon, compared with the 1973 model's 13.
- The average car is driven nearly 10 percent fewer miles per year now than was the case in 1973.
- From 1973 to 1975, the sale of small cars moved from 45 percent of all sales to 53 percent. And the size of all cars is smaller today than the comparable models in 1973.
- Residential natural gas demand in 1983 is two percent lower than in 1973, although there are over four million more homes using gas.
- Residential fuel oil demand is down by more than 40 percent over the same period.
- Homeowners claimed $600 million in tax credits for energy saving devices in 1978, the first year of the tax credit program.

Industrial conservation has been equally impressive:

- U.S. real gross national product has risen nearly 25 percent since 1972, while energy use is almost unchanged. U.S. industry has improved its energy efficiency by about 33 percent.
- Today, it takes 10 percent less energy to produce a ton of steel, 19 percent less for a ton of cement, and 23 percent less for a gallon of gasoline than in 1973.
- Total U.S. energy use grew at a rate of four percent per year from 1960 to 1973; the projected rate is almost half that from now until the year 2000.

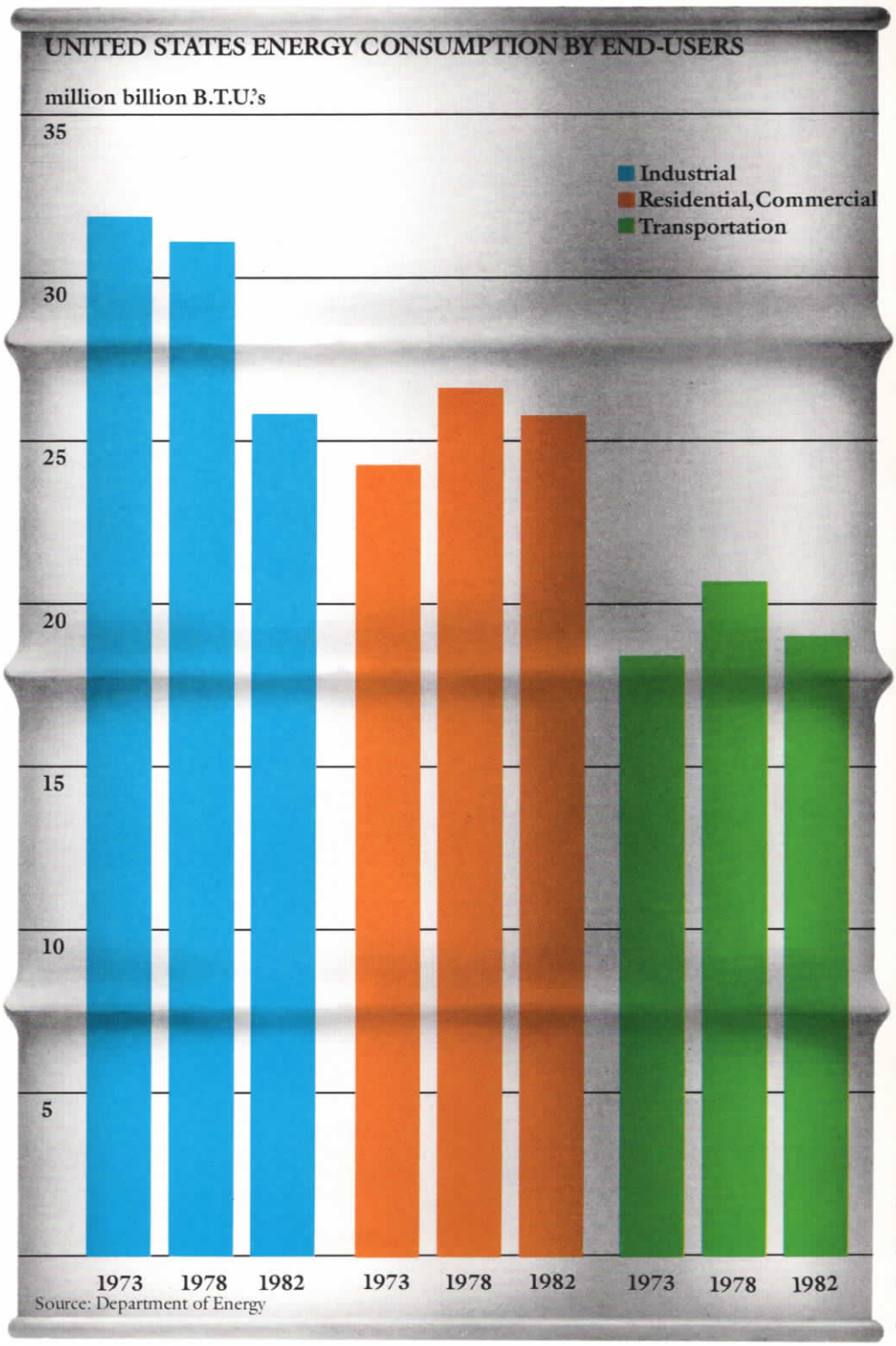
Everywhere, firms have taken steps to save energy. Insulation, steam leak prevention, "waste" heat recycling, and fuel-switching have all worked, as have various capital expenses.

In the case of Union Oil, waste heat from one refinery coke calciner is now powering a turbine to provide 27,000 kilowatts of electricity. Sold to a local utility, this is enough to meet the annual needs of 27,000 people. Other smaller items (re-lamping for energy efficiency, changing maintenance schedules, increasing insulation and altering air conditioners and heaters) have saved the company at least 10 billion kilowatt hours since the embargo. These and other measures reflect a nationwide changed attitude. Energy conservation is here to stay.

Energy Producers: A key assumption that underpinned U.S. governmental behavior during and for years after the embargo was that the law of supply and demand did not apply to oil. For some reason, oil was viewed as "price inelastic"—demand was not expected to respond to price. So for several years all policy and regulation were aimed at keeping prices down.

The result was less and less domestic production, more and more imports and, still, gradually increasing prices. Finally, after natural gas shortages in 1976-77 and the Iranian revolution with its attendant gasoline lines and redoubled prices, the Carter Administration decided to move away from regulation.

In 1979, President Carter initiated the phased decontrol of domestic oil prices and thereby helped to break OPEC's grip on the world oil market. U.S. oil production increased 45,000 barrels per day in 1980. It dropped in 1981 but still remained 20,000 barrels



Larry Lee/West Light


LAST CUSTOMER
TO BE SERVED

Wide World Photos

per day above 1979 levels. This new direction for U.S. policy accelerated the change that was already taking place in the global petroleum structure. Since the embargo and price increases of the 1970s, oil exploration and development have spread all around the world. Britain, Mexico and Norway have moved from the ranks of energy importers, to self-sufficient nations, to major oil exporters.

As non-OPEC oil production increased, the demand for OPEC oil dropped. Our nation, which relied on imports for more than half our oil in 1977, is down to 31 percent of a smaller demand base.

Further, our imports include only 10 percent OPEC oil, down from over 30 percent only four years ago. In that same short time, OPEC production has shrunk from nearly 30 million barrels per day (49 percent of total world oil output) to about 15 million barrels per day (34 percent of a smaller total world output).

Overall, we have made considerable progress since the embargo, but we cannot be complacent. Both the strategic importance and the volatility of the Middle East remain unchanged. Arabs and Israelis still disagree on territorial rights; Iraq and Iran continue their bitter war; American and European troops remain to try to restore stability in Lebanon. We still rely heavily on the Middle East for oil, yet any spark could ignite that political powder keg and disrupt the flow. Thus, we must maintain the proper perspective.

We have learned much from the embargo and its aftermath. Among the lessons, in the words of one author:

"The crisis of the seventies...was more one of policy than of energy. The energy problems that filled the news for much of the period were due largely to a mismatch of government actions with physical and economic circumstances. There was an incongruity between regulations and conditions, a disparity between policy and fact. These inconsistencies were more important than any energy shortage."[4]

We must bear those lessons in mind so that we continue our progress as a nation toward a secure and prosperous future. (76)

[1]Martin Greenberger, *Caught Unawares: The Energy Decade in Retrospect*, Cambridge, Massachusetts (Ballinger Publishing Company) 1983, Pg. 8

[2]*NYT*, September 25, 1983, Pg. 20

[3]*NYT*, September 25, 1983, Pg. 20

[4]Greenberger, *op. cit.*, Pg. 6

Major oil legislation since 1973.

1973
Trans-Alaska Pipeline Authority Act: facilitated Alaska pipeline construction by barring court challenges and relaxing limitations.

1973
Emergency Petroleum Allocation Act: authorized comprehensive allocation and price controls.

1974
Energy Conservation and Production Act: mandated coal use to replace crude oil and refined petroleum products.

1974
Energy Reorganization Act: created the Energy Research and Development Administration and the Nuclear Regulatory Commission.

1975
Energy Policy and Conservation Act: established standby authority for energy emergencies, created the Strategic Petroleum Reserve, mandated fuel efficiency standards for automobiles, and continued oil price controls.

1977
Department of Energy Enabling Act: created the Cabinet level Department of Energy.

1977
Surface Mining Control and Reclamation Act: set environmental standards for surface mining coal.

1978
Public Utility Regulatory Policies Act: promoted energy conservation by electric utilities and fostered "marginal cost" rate structures.

1978
Energy Tax Act: allowed tax credits for solar, geothermal, and energy-saving equipment.

1978
National Energy Conservation Policy Act: required utilities to promote energy conservation, mandated efficiency standards, and authorized conservation grants.

1978
Powerplant and Industrial Fuel Use Act: prohibited coal use by new utility plants (and existing plants after 1990).

1978
Natural Gas Policy Act: expanded price controls for natural gas and set phased decontrol of some gas prices by 1985.

1980
Windfall Profits Tax Act: instituted an excise tax on decontrolled domestic crude oil.

1980
Energy Security Act: created a Synthetic Fuels Corporation to stimulate production of synfuels.

SHOOTING DOWN CYBER-PHOBIA

Polymer Production Computerized at Charlotte

by Wayne Reuter

A small group gathers around the video screen watching as William Foggie, with his hands on the control panel and eyes intently fixed on the screen, takes his turn at the new Lunar Landing game. Carefully he maneuvers his space shuttle, dodging meteor showers and swerving around planets as the points add up. Wham! his rocket is destroyed, game over.

This is the scene at the new control room at the Union Chemicals Division (UCD) Polymer Plant on Orr Road in Charlotte, North Carolina, where line operators were recently "immunized" against cyberphobia—fear of computers.

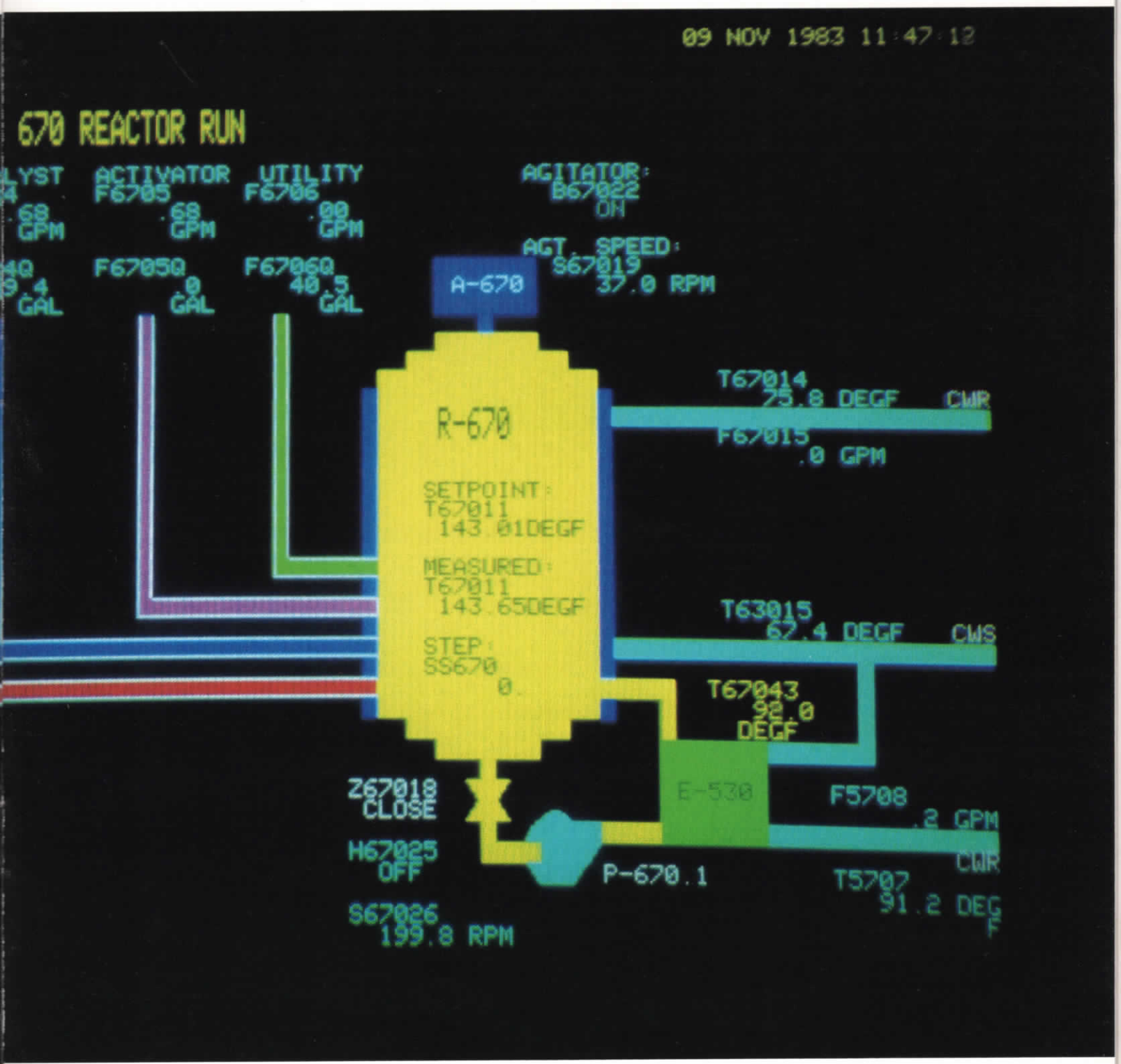
The plant, which produces polymer emulsions for a number of uses, has been computerized to enhance the uniformity of processing various batches to strict customer standards.

"Variability is the headache," said Herb Pomerantz, manager of manufacturing for UCD's Petrochemical Group. "The key to success in this business is providing products of a consistent quality. Our concern for consistency, and our customers' concern, is increasing as we find more critical applications for our products."

Polymer emulsions are used as adhesives, as coatings for paper and textiles, and in the manufacture of upholstery fabrics, carpeting and latex paint. Usually milky white in color, the emulsions range in consistency from thin and watery to thick and sticky depending on the intended use.

"Our customers have their equipment or formulations developed for product with specific physical properties. If our product fails to meet these specifications, both we and our customer have a problem. We view quality as a source of profit and growth," Pomerantz added.

The computer provides a graphic display of information gathered by field instruments installed in the actual polymer emulsion production equipment.



Don Smith, general foreman, says that monomers, the raw materials of polymer emulsions, are stored in five new tanks ranging in capacity from 8,000 to 60,000 gallons.

Producing polymer emulsions is not simple. Each product is made to order, one batch at a time. Each batch requires a specific formulation of components, which must be precisely measured and combined in the right order at the correct times. At different stages and temperatures during the process, as many as a dozen assorted chemicals are introduced into a reaction vessel (a large pressure cooker and blender combined).

Temperature affects the particle size in a batch, which affects the viscosity of the final product. Fluctuations of a few degrees can create a product that is too thick or too thin. In addition to temperature, a variance in timing or measurement can create a completely different product. Controlling this process is what makes a consistent product, batch after batch.

Computerized control of processing assures greater uniformity. So, representatives of petrochemical engineering and Union's Science and Technology Division teamed up with the Orr Road plant management and employees to integrate a computer system in the polymer emulsion production process.

The system was implemented by a special team, headed by Dan Reuben, manager of project engineering for petrochemicals. "Coordinating the efforts of the equipment manufacturer, the engineering company and our people within the time frame we were given was quite a challenge," he said. "We had to work around production schedules and were limited to making final tie-ins during a one week plant shut-down."

"Selecting the proper computer was only part of the project," said Tom Senee, Orr Road plant superintendent. "The most time-consuming task was determining the necessary field instrumentation—temperature transmitters, valve activators, flow meters, and other equipment that had to be installed with the computer."

Wayne Caston, plant engineer at Orr Road, coordinated the construction. "Soliciting vendors for the field instruments, getting the highest quality products at the lowest prices and on time was a strenuous task given the schedule we were assigned."

Another member of the special project team was Ed Skarbeck, staff process engineer. He was responsible for software development, which ultimately would tell the computer how to run the various processes.

Dana Sherrill, plant process engineer, was put in charge of familiarizing the line operators with the system. His first step in the training program took place weeks before any equipment arrived. "I put up pictures of the computer. By the time it actually arrived everyone was visually familiar with it, sort of like having a pen pal and then finally meeting him."

The next step was to insert a game, "Lunar Landing," so that employees could get a feel for the control board. The game's object was to take a rocket full of passengers to the moon without running out of fuel, getting destroyed by a meteor, or crashing.

Computer games can be compelling and, within a few days, the game turned into a contest. Employees even came in on their own time to try to set new records. David Isaac, senior operator, was the champion.

David Isaac follows the computerized production process on bar graphs on two of the system's three CRT displays (Top), *while William Foggie reviews the back-up control panel* (Above).

Loading and unloading facilities for monomers and polymers are located at the rail spur opposite the new tank farm (Left).


UNION

The next step was to set up a "batch simulation" game. Theoretical situations were programmed into the computer so that operators could practice using realistic simulations of a polymer emulsion process.

By September 1, 1983, the field instrumentation was connected so that the plant could be operated from the control room—either by computer or by an operator. For the first couple of weeks Sherrill chose to operate the manual back-up system. Each operator had a chance to flip switches and turn dials which controlled valves, pumps, temperatures and feed rates.

"We did this so everyone could understand exactly what the computer would be doing. The back-up system can also be used if the computer goes down or we need to make a special batch," Sherrill said.

Today the operation is fully computerized. Not only has the quality and consistency between batches improved, but the average yield of finished polymer from raw material has increased. Increases in process productivity are also expected.

"An added feature of the computer is its use as a sales and marketing tool," said Steve Gagel, operations manager for both the Orr Road plant and the nearby Mallard Creek plant. "One of our major customers recently toured both this plant and the new Technical Service Center in Charlotte. Our new computerized processing demonstrated to them our commitment to their business."

Pat Crouch (left) and Boyce Gibson take inventory of drums of finished product.

The Orr Road plant needed modernizing when Union Oil Company acquired it in 1980. Prior to Union's purchase, the plant's ownership had changed five times in 34 years.

The first major step was a new tank farm for bulk raw material storage to accommodate the projected business growth and to replace existing underground tanks.

Plant efficiency needed improvement, too, so an "Idea of the Month" contest was set up. Each month for 18 months, employees were invited to submit ideas to improve productivity, reduce losses and cut costs. The employee who presented the greatest dollar-saving idea in each month received a prize. The program was a success. Productivity has increased 30 percent since Union Chemicals Division purchased the plant.

Computerization was the next logical step in improving the plant's operation, especially given the increasing importance of maintaining a high level of consistency between batches.

Even with all the advantages, the computer can make people nervous. When they heard rumors of a computer, many employees thought they would not be able to adjust to this new technology.

"I worked here for seven years doing things the old way," said William Foggie. "The instruction manual was hard at first—the reading that had to be done. But, after a few times of working with the computer and our training program, it became simple."

Jesse Aldrich, supervisor of quality control, has been at this plant 36 years. "I was thrilled to find out that the computer was being installed here because my heart and life have been at this plant. I was told that the computer was going to improve quality. Well, in just a few weeks I've already seen improvements."

Plans are now being prepared to provide similar automation at the Petrochemical Group's five other polymer plants. The decision was a major step forward, a move that demonstrates Union Oil Company of California's commitment to maintaining a position of technological leadership in the polymer emulsion industry. 76

Leonard Witherspoon (left) and Butch Hammett prepare to transfer finished product into a rail tank car for shipping.

CORPORATE E&C TURNS PLANS INTO PROGRESS

When you are spending $150 million to build a highly specialized new plant, such as Union Oil Company's needle coker now under construction at the Chicago Refinery, you want to get your money's worth. That is the basic assignment of the Corporate Engineering and Construction Department headquartered in Los Angeles.

Twenty-eight engineering and construction professionals, each with more than 20 years of wide-ranging Union Oil experience, are currently involved in the management of construction projects and feasibility studies with a combined value of some $1 billion. This includes the oil shale project in Parachute, Colorado which, at $640 million, is the largest single project the department, not to mention the company, has yet undertaken.

"Our projects average between $30 and $70 million," says George Snyder, who has been vice president in charge of the department since 1974. "We handle all of the company's major construction projects, excepting those for the International and Oil and Gas divisions, and service stations. Our projects have ranged from all the surface work at Molycorp's new mill and underground mine in Questa, New Mexico, to the office and lab buildings at the Fred L. Hartley Research Center in Brea, California."

"The way we work is to match a project manager to each assignment that we receive from one of the company's operating divisions," explains Denny Elliott, administrative manager for the department.

"We give a project manager a great deal of responsibility, and he has to be a very special individual," he continues. "Depending on the location of the project, and the location of the engineering and construction firms selected to work on the project, the project manager will spend much of his life living out of a suitcase during the two- to four-year period it can take for project completion."

Norm Pedersen, project manager for the needle coker in Chicago, logged 135,000 air miles during the last 12 months.

"This is the greatest job in the world," Norm says. "I have a lot of responsibility, and a lot of pride in the projects I have taken from design through construction and start-up."

When Pedersen joined the department in 1967 his first assignment as a project manager was the construction of the sponge coker at the Chicago Refinery. Norm had been superintendent of operations at the Santa Maria Refinery during the start-up of that plant's coker in the late 1950s.

"Coking is my first love when it comes to this business," Norm says. "Coke is tricky to handle. You have to build a plant that keeps the coke in the right place during processing or the flow will get blocked."

The needle coker in Chicago is Union's first. It is a very special piece of equipment, developed from a process design that was several years in the making by Union's Science and Technology Division. It will produce a very high grade of low-sulfur needle coke which is in demand by the steel industry for use in electrodes. The Chemicals Division is eager to receive the production and begin marketing.

For the company, any new project means an expansion of operations or development of a new area of operations. Naturally, there is an eagerness to get from the planning stages to production and marketing quickly. It is up to the project managers to make this transition efficiently.

"We work with all the major first-class contractors in the country," Snyder says. "We select them on the basis of their capabilities as they specifically relate to each of our projects, and the availability of their staff."

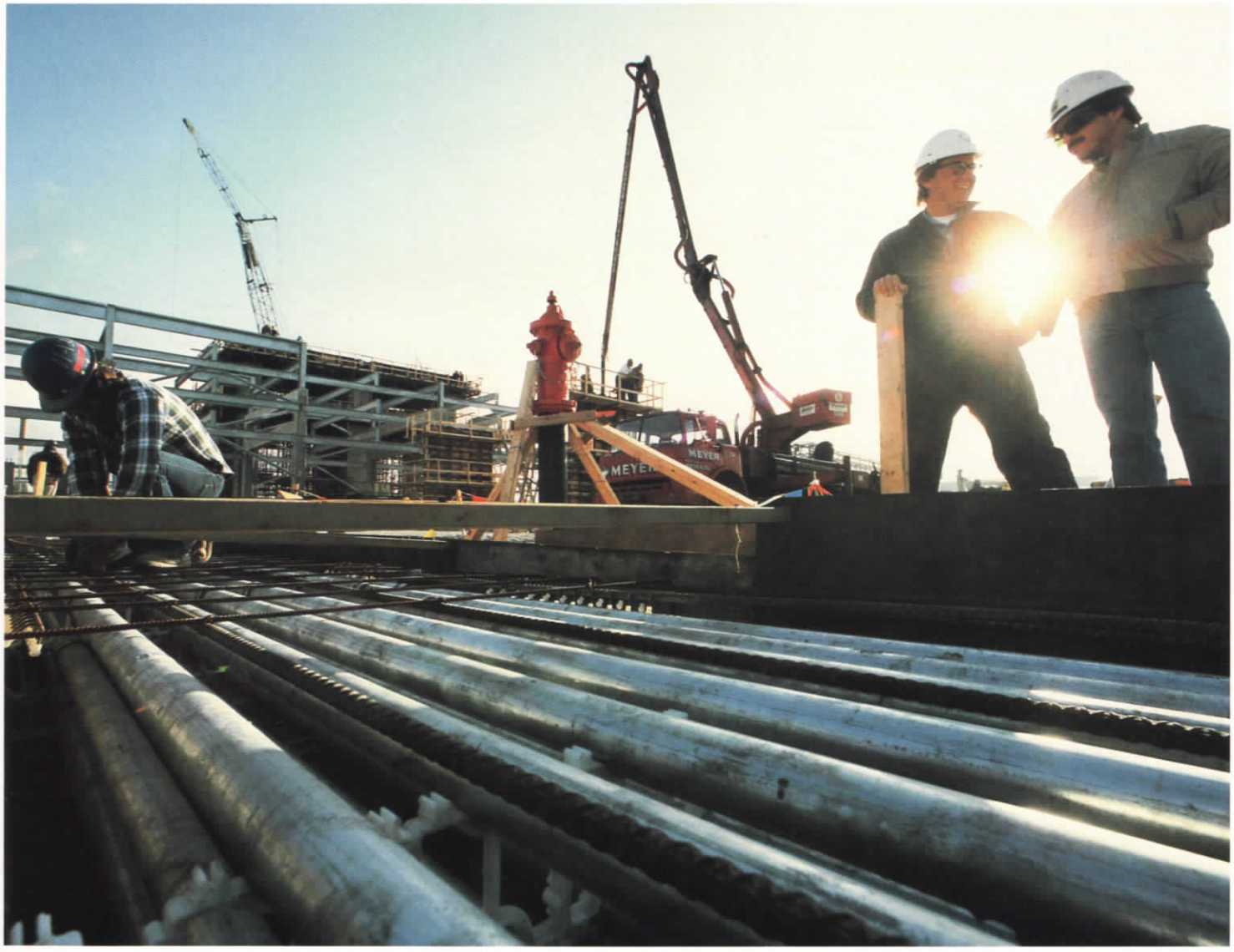
Foster-Wheeler in Livingston, New Jersey, was chosen to design and construct the Chicago needle coker because of the firm's experience in building cokers. A secondary project, the design and construction of a preheater for the coke, was assigned to Midland-Ross in Toledo, Ohio.

The needle coker is, as of November, 80 percent complete in engineering. Its construction has begun at the Chicago Refinery and stands at about 15 percent complete with the majority of the foundations poured and most of the underground piping installed.

Norm Pedersen is the man in the middle, but he is supported by many members of a team. He reports to Jack Heller, his program manager in Los Angeles. Program managers in the Corporate Engineering and Construction Department oversee a number of projects or, in the case of a large enough project such as the oil shale construction, concern themselves with one major project.

Pedersen also reports to Heller on the expansion of the coke drums at the Chicago Refinery, a second project which he has been assigned that is under construction about a mile from the new needle coker installation.

Emil Bereczky, Norm Pedersen and Roy Barnes (from left) are involved in the design and construction of Union's first needle coker, now about 15 percent complete at the Chicago Refinery with most of the underground piping laid (Top) *and the upper coke deck formed* (Lower Right).



Completion of the Chicago needle coker is scheduled for the end of 1984 (Right).

The new fractionating tower, part of E&C's recently completed revamp at the Los Angeles Refinery, will provide higher recovery of propylenes (Below).

Bound data books, containing vital information for revamping or construction of similar facilities, are kept for as long as Union owns a project, according to Denny Elliott (Above).

Two other project managers, Roy Barnes and Mukesh Gandhi, are assigned full time on the needle coker, each reporting to Pedersen on separate aspects of the work. The department's staff includes specialists, who lend their expertise when needed. Bob McKean, manager of process engineering, Ron Jackson, manager of electrical engineering, and Emil Bereczky and Dave Graves, both materials engineers, have all assisted in the needle coker project. In addition, the Chemicals Division has appointed Doug Slife as project coordinator to work with Norm. Gary Ephraim is the liaison with the Chicago Refinery.

The organization of the project team is flexible, allowing the company to get the best available in-house expertise so that design, engineering, construction and start-up of each project move ahead smoothly.

Pedersen received the needle coker assignment in March 1981. He began by giving Foster-Wheeler's engineers a description of the process requirements, including the characteristics of the feedstock, yields and operating conditions. From this, Foster-Wheeler engineered the equipment, including the critically important piping and instrumentation schemes, that would transform Union's research into a full-scale manufacturing process.

Throughout these stages, Pedersen reviewed progress. If further involvement of the Science and Technology people was needed, Pedersen arranged it. If he identified a problem, he flagged it and assembled a team to solve it.

Bill Daniels (left), resident construction manager for E&C, confers with George Snyder at the Los Angeles Refinery's fluid catalytic cracker (Left). *Among the benefits of the department's recent revamp are the reduction of sulfur oxides and nitrogen oxides emissions and the generation of 8 to 10 megawatts of power.*

As the design took shape, budgets were better defined and schedules created specifying times and manpower requirements for each phase of construction. Plot plans were developed to site the needle coker where it would best fit into the Chicago Refinery's existing layout, assuring proper access for operation and maintenance. All aspects were managed so that no one part of the work would hold up progress in another area.

As the needle coker project now shifts from being mostly in design to being mostly in construction, Pedersen's geographical attention will shift from New Jersey and Ohio to the Chicago Refinery. Gerald Dohm is the full-time resident construction manager for the project. He works closely with the construction company to monitor progress and keep Pedersen informed of schedule changes, manpower changes and other factors.

Pedersen has been involved in the management of eight projects in his 16 years with the department. In addition to his current assignments and the original coker and sulfur plants in Chicago, these have included water treatment facilities at the San Francisco and Santa Maria refineries and sulfur programs at the Los Angeles and San Francisco refineries. One of his favorite projects was the uranium mill in Sweetwater, Wyoming, which has since been mothballed. Snyder remembers that project, too, noting that:

"Every project is a little different. Often, we have to get used to new technologies. In the case of the uranium mill, we visited similar installations across the country to help us decide on the best engineering and construction firm for the project.

"From time to time, we are also asked to conduct feasibility studies to help us stay ahead of the changes in our business," Snyder says. Fluor Corporation is currently conducting such a study at the Santa Maria Refinery that will identify the construction and costs that would be necessary to accommodate a different crude base.

One of the project manager's major responsibilities is to conform as closely as possible to budget projections. Construction costs in 1983 are four times what they were in 1972, Snyder explains. Today, contracts are generally not negotiated on a fee basis but on a cost-plus basis, which makes firm and watchful project management a critical factor in bringing projects to completion within budget.

Snyder, who will wrap up 45 years with Union Oil when he retires in 1984, has seen many changes in the engineering and construction business. "Computer-aided design, which has become more of a factor in the last five years, has given us better designs. Bigger cranes, better scheduling, improved materials and training have combined to help offset the inflationary rise of wages and costs, and the added costs caused by more complex permit processes. But inflation is still our biggest budget problem. When we are trying to forecast costs years in advance, we can only guess at what the inflation rate might be in order to make our projections."

The department's projects may be small or large, but each is an adventure as the project management team coordinates the myriad details that must come together correctly—on time and on budget.


PHIL
E.J. REDDISH

GOING THE EXTRA MILE:

A 30-YEAR TRADITION FOR UNION 76 AUTO/TRUCKSTOPS

With some 150 Auto/TruckStops on major interstate highways and more than 450 smaller TruckStops, fuel stops and credit associates on other routes, Union Oil has pulled away as the world leader in this vital business segment.

"Our operations began in 1953 with 27 outlets," remarked Bob Robbins, vice president, national marketing for the Union 76 Division. Those first units would be considered crude and inadequate by today's standards but they were the start of a network that today, on the 30th anniversary of Union 76 Auto/TruckStops, stretches coast-to-coast and border-to-border.

The early TruckStops were simply service stations that welcomed truckers. Some enterprising dealers enlarged their parking lots to accommodate more trucks, and later added restaurants and truck servicing facilities. Often, the TruckStops were located near a hotel or motel.

The goal is to provide consistently high quality services from TruckStop to TruckStop.

The interstate highway system expanded in the 1950s and 1960s, expediting travel between cities. People found superhighways more convenient, less expensive and often faster than travel or shipping by rail. The result was that traffic patterns shifted, the role of the trucking industry grew in importance, and the need for way stations along these new interstates became more pronounced.

"Over the last 30 years, we've learned a lot by listening to truckers, our main customers. In responding to their needs, we have professionalized our approach to building and operating TruckStops. A key to Union's success is that customers, whether they're driving 18-wheelers or four-wheelers, know what to expect when they pull into a Union 76 Auto/TruckStop," Robbins said.

Union 76 Auto/TruckStops today are modern, well-equipped operations with the welcome mat out 24 hours a day, 365 days a year. They pump millions of gallons of diesel fuel and gasoline annually. Their restaurants seat some 24,000 people and serve about 150,000 meals daily, making this one of the largest chains in the country in sales per unit.

The old adage says, "If you want to eat well, eat where the truckers do." It really applies to Union 76 Auto/TruckStops. The combination of quality control, company training and the diligence of the TruckStop operators themselves ensures that each facility's cooking will leave a good taste in your mouth. The operators even compete against each other to determine who can provide his or her customers with the best menu.

The placements of these large facilities are carefully considered. An Auto/TruckStop costs $3 to $4 million to site, build and stock. Extensive demographic studies covering traffic patterns, the community and a host of other factors are conducted before a new location is selected.

After a new facility is built, it is leased to an independent operator. In the early days, an operator would have been an experienced garage or service station worker. Today's Union Truck-Stop operations appeal to a wider group whose former careers range from dentist to airline pilot.

Once in place, a new TruckStop has an extremely positive economic impact on its community. Often the TruckStop will be the largest taxpayer and employer in its area. On average, it will pay $2 million annually in local, state and federal taxes.

"The typical Union interstate Auto/TruckStop has a staff of over 100, almost all of whom are hired locally. This would equate to an average annual payroll of about $1 million," Robbins explained. With each payroll dollar turning over an average of at least two times before leaving the area, an Auto/TruckStop is clearly a major contributor to the economy of its home community. In addition, the facility most often will purchase goods and services locally, further benefiting the area's economy.

Auto/TruckStop operators on the whole are very community-minded businessmen. They've proved this through their efforts in local organizations, fund raising and charitable causes. Many TruckStop operators have become involved in helping runaway children get in touch with home after the lure of the open road has worn off. And truckers, many with their own families, help out, too.

Sometimes a TruckStop can be a lifesaver for a different reason. Several times during winter snowstorms in the Midwest, TruckStop operators have cared for stranded motorists. In the record breaking winter of 1979, the LaSalle-Peru TruckStop on Highway 80 in Illinois "hosted" over 200 truckers and untold motorists for several days when 12-foot snowdrifts clogged the roads and the wind chill factor was nearly 80 degrees below zero.

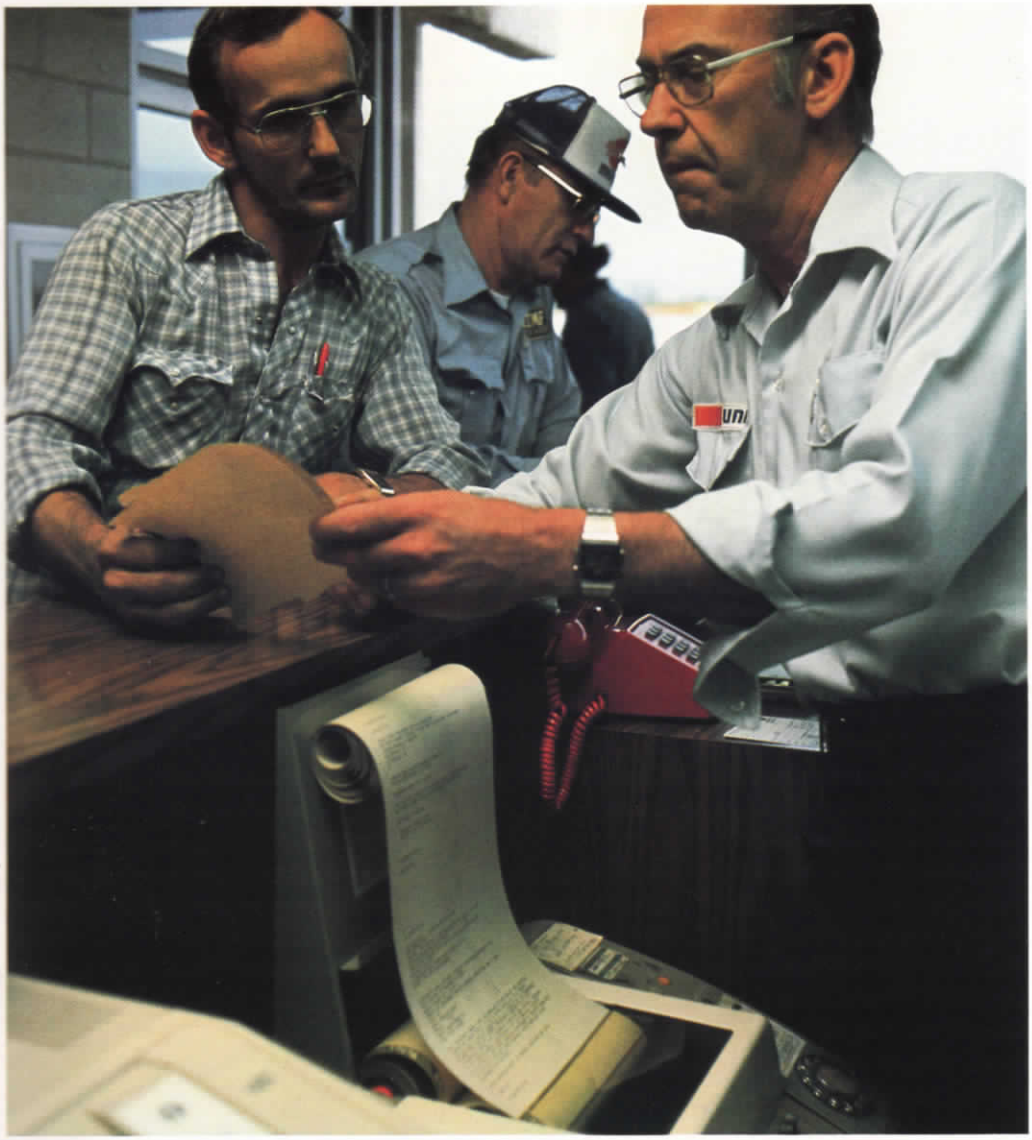
Behind the Auto/TruckStop system is the Union 76 marketing organization. Its aim is to assure the quality and professionalism of these independently-run operations. Although each unit is operated separately from the others, all are very dependent on the other Auto/TruckStops in the system. If one TruckStop performs well, it is likely that the user will try another. But if its operation doesn't please the customer, it will reflect on that customer's perception of the entire network. Early on, strict standards were established to assure uniform quality from TruckStop to TruckStop.

A number of departments within the Union 76 Division develop the plans and programs that make the TruckStop operations successful.

Site acquisition, development, and leasing...training of new operators and counselling them on sound financial management procedures...developing better methods to sell Union products through Auto/TruckStops. These are key functions the marketers perform.

The professional approach to TruckStop operations continues with TruckStop workers' training. Control counter cashiers, travel store personnel, food servers, pump island fuelers, mechanics, and others undergo extensive employee development programs on their jobs. A series of individualized videotape courses for Auto/TruckStop operators are available for use on-site. The underlying message of these programs is that customer service is the primary goal.

Knowledgeable marketing personnel, familiar with professional driver needs, call on the trucking industry frequently to share information about Union's programs and to gather comments and suggestions on improvements that can be made.



Through its years of catering to professional drivers, Union 76 has developed a close bond with the trucking industry. And because it is geared to fill the shifting needs of this industry—from large fleets to owner-operated rigs—the Union 76 staff has developed a number of credit plans that can be tailored to customer needs. Of course, TruckStops also accept the familiar Union 76 credit card.

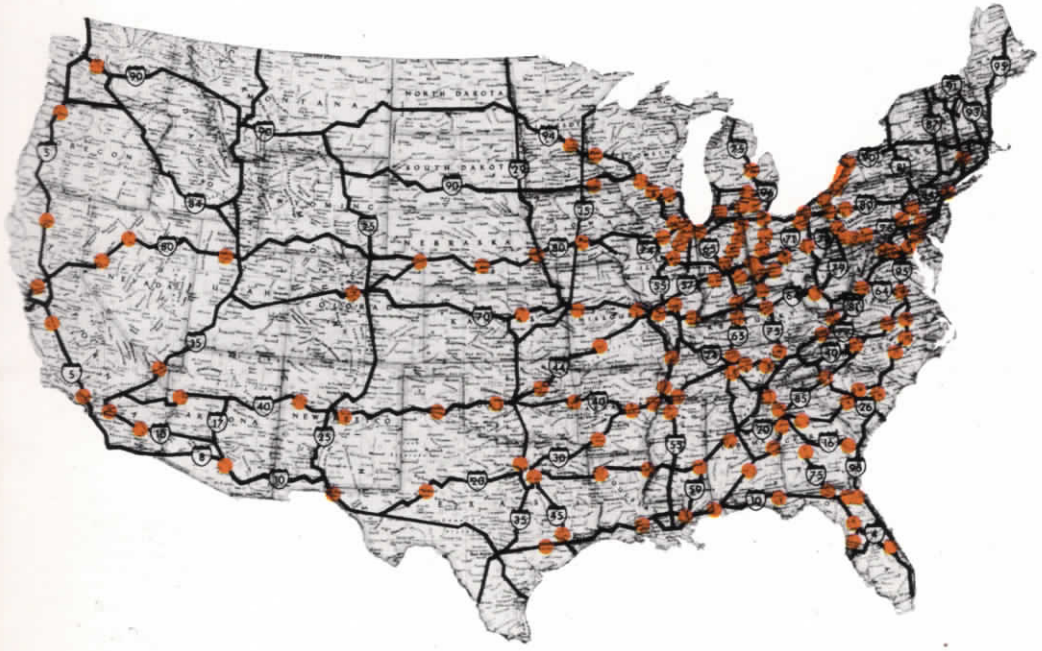
Advertising and merchandising programs and promotions, targeted specifically at the trucking industry, are designed to bring the Auto/TruckStops new business. Direct mailers, billboards, and point-of-sale material carry the Auto/TruckStop message.

Union's popular *Road King* magazine (exclusively for truckers) and its *National TruckStop Directory* highlight the features that the system offers.

Proving that it is more than an over-the-road supplier, Union has acted to promote and improve the industry. Its active membership in such organizations as the National Association of TruckStop Operators, National Defense Transportation Association, American Trucking Association, National Agricultural Transportation League and Private Truck Council of America keeps the company aware of industry needs and also has earned Union 76 numerous industry awards.

"To be truthful, we entered the TruckStop business in order to sell more fuel," Bob Robbins said. "We had no sophistication in our operations back then. As we improved our TruckStops, we had to learn other businesses—the operation of restaurants, hotels and retail stores, for example. We've done that and, the record shows, quite successfully."


3M



Beneath the distinctive orange and blue "76," the typical Auto/TruckStop offers: separate truck and passenger car pump islands with both full- and self-service fueling; an air-conditioned restaurant serving expertly prepared meals around the clock; emergency road and tire service; a travel store that stocks everything from toothbrushes to TVs; and parking for up to 100 trucks and 75 passenger cars.

Several additional services are geared exclusively for professional drivers: air-conditioned sleeping rooms, TV lounge, laundromat, wet and dry icing facilities, and Western Union and other information and money transmission wire services. Truck lubrication and repair facilities, truck-tested products (such as tires, batteries, and lube oils), scales, and LP gas are other offerings to truckers.

Our thanks to Jerry Lindley and Fred Stanley, operators of the Union 76 Auto/TruckStops at Elgin, Illinois and Wytheville, Virginia, respectively, where most of the photographs on these pages were taken.

Filling the growing needs of the west

by Saundra Woodruff

Agriculture has been called the world's only essential industry. As the single largest industry in the United States, agriculture employs four percent of the labor force and generates five to six percent of the gross national product.

The U.S. produces food grains for about 22 percent of the world's needs. Some nine percent of the U.S. farms produce 60 percent of the domestic food and fiber. Throughout the world, population pressures are making it critical to increase the yield per acre for all crops. Fertilizers help do that, and that is the business of Union Chemicals Division's Nitrogen Group.

T. Craig Henderson, president of the Chemicals Division, says, "Union Chemicals Division is the largest manufacturer of nitrogen-based fertilizers on the West Coast, and a major marketer to the Pacific Basin."

The division's Kenai, Alaska plants are built to world-class scale, and produce both ammonia, a primary ingredient for many fertilizers, and its derivative, urea. These plants have a production capability of 1.1 million tons of ammonia and one million tons of urea annually.

In addition, the division's plant in Brea, California produces about 20 different nitrogen products, and has a capacity for 250,000 tons of ammonia and 120,000 tons of urea annually.

In summary, the Kenai and Brea plants represent about seven percent of total U.S. ammonia production.

The division's Sacramento terminal produces a fertilizer called UAN 32 from ammonia and urea from the Kenai plants. A new nitric acid plant was added to the Sacramento facility last year, so that it could produce its own ammonium nitrate required for the production of UAN 32. Thus, the division has two California sources of UAN 32, one at Brea and one at Sacra-

A mountain of urea in the warehouse at the Sacramento terminal (Left) *was produced at the urea plant at Kenai* (Above).

Walt Weiss, process engineer, checks the control board at Union Chemicals' ammonia plant in Brea, California (Right).


EMERGENCY
SYN GAS SHUTDOWN
800
900
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1200

mento to service the northern California area more efficiently.

Union Chemicals Division (UCD) markets its ammonia products and fertilizers through some 250 independent retailers located in seven western states.

UCD also markets a significant portion of its products through its wholly owned subsidiary, PureGro. PureGro is headquartered in Sacramento just a few miles from the Sacramento terminal. PureGro is a full service retail organization handling both pesticides and fertilizers for western farmers.

For growers in the West and in the Pacific Basin, Union Oil is a dependable supplier of ammonia, urea, and a host of ammonia-derived fertilizers and chemicals. These nitrogen-bearing fertilizers play a vital role in expanding the world's food supply. Over 90 percent of the Nitrogen Group's product goes into fertilizers, with the balance going to a range of other uses.

However, in spite of the essential nature of the agricultural industry and fertilizer's importance to it, ammonia producers in the United States have faced difficult times in recent years, including the closure of plants across the country. The Union Chemicals Division's Brea plant itself was very close to permanent closure.

The difficulty stems from natural gas prices, which under current law range from 50 cents to $3 plus per therm in the Gulf Coast region, to about $7 in some western states, to as high as $8 in some New England states.

So what, you think? The link is important—natural gas is the feedstock for ammonia plants, providing the hydrogen (H_2) in the chemical compound that is ammonia (NH_3). In California, for example, the cost of natural gas accounts for about 80 percent of the cost of ammonia production.

Ammonia, quite simply, is natural gas plus steam plus air. Actually, it's more complicated than it sounds, and most of the detail can be seen in the chart that accompanies this story.

Foreign imports have also taken their toll on the U.S. ammonia industry. High domestic natural gas prices and lower-priced foreign imports of ammonia have combined to cause the economic difficulties and closures ammonia producers have faced. Here's how those two facts are related.

Water is purified to remove all ions, and is heated to produce 1500 psi **[A]** (pounds per square inch) pure steam.

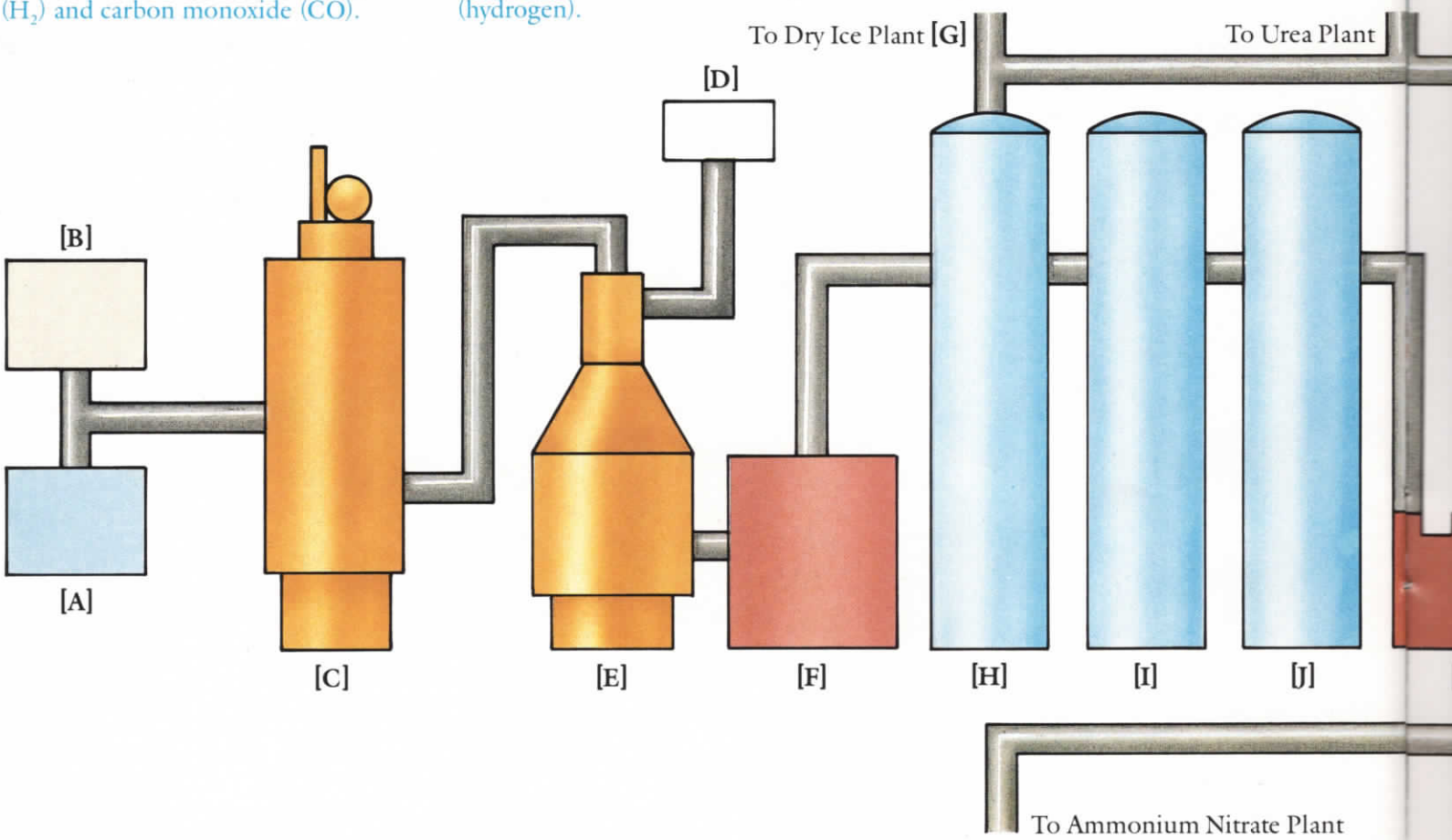
That steam is combined with natural gas (methane, CH_4) **[B]** in the **[C]** primary reformer to produce hydrogen (H_2) and carbon monoxide (CO).

Nitrogen from the air **[D]** (N_2) is added in the secondary reformer **[E]** where the oxygen (O_2) is burned off.

The shift converter **[F]** changes CO (carbon monoxide) and H_2O (water) to CO_2 (carbon dioxide) and H_2 (hydrogen).

The CO_2 **[G]** is diverted for use in the dry ice plant and the urea plant from the CO_2 absorber. **[H]**

The methanator **[I]** gets out all the oxygen-containing gases by converting CO_2 and CO back to methane.



According to Lee S. Pierson, vice president of the Nitrogen Group, "Plants have shut down because their production costs, for the time being, are higher than costs of imported materials. Sufficient domestic supplies of ammonia are essential. In the absence of domestic supplies, a very limited number of foreign suppliers, including the U.S.S.R., Mexico, Venezuela, or the Middle East countries, could control the domestic market.

"Should a supply not be available during the critical growing season, then the farmer would have to plant without fertilizer and his yields would suffer greatly. Ammonia and its derivatives are an essential and irreplaceable fertilizer to maintain U.S. food and fiber production leadership."

Pierson further suggests, "If natural gas prices were decontrolled, there would be more production and consumption of natural gas. In our view, deregulation will lead to a free market with more competitive and lower-cost gas. Thus, more of our efficient ammonia plants could continue on stream. Until deregulation occurs, several states—Oklahoma, Idaho, Ohio and California—have adopted legislation to provide lower-cost gas to vitally-required ammonia producers and avoid further closures."

According to Bob Ustick, president of PureGro, "It seems apparent that without a source of local ammonia production, PureGro would have to obtain its product from other sources, including foreign sources, and prices to consumers throughout the west would increase."

Let's examine this import and natural gas price picture in more detail.

U.S. farm exports, one of the indicators of world nitrogen demand, have grown substantially in recent years, from $3 billion in the mid-50s, to $7 billion in 1970, to $44 billion in 1981. The long-term trend seems firmly established. In addition, nitrogen demand has risen rapidly as more and more of the world's population seek a higher standard of living through improved agricultural production. World nitrogen consumption is projected to total over 150 million tons by 1990. Nitrogen supply has generally kept up with demand with occasional periods of tight supply.

U.S. and world consumption of ammonia has increased in recent years. From the 1960s until the early

The cryogenic purifier **[J]** removes the methane and liquefies part of the N_2. This produces a 3:1 ratio of H_2 to N_2.

Gas is compressed **[K]** up to 2000 psi.

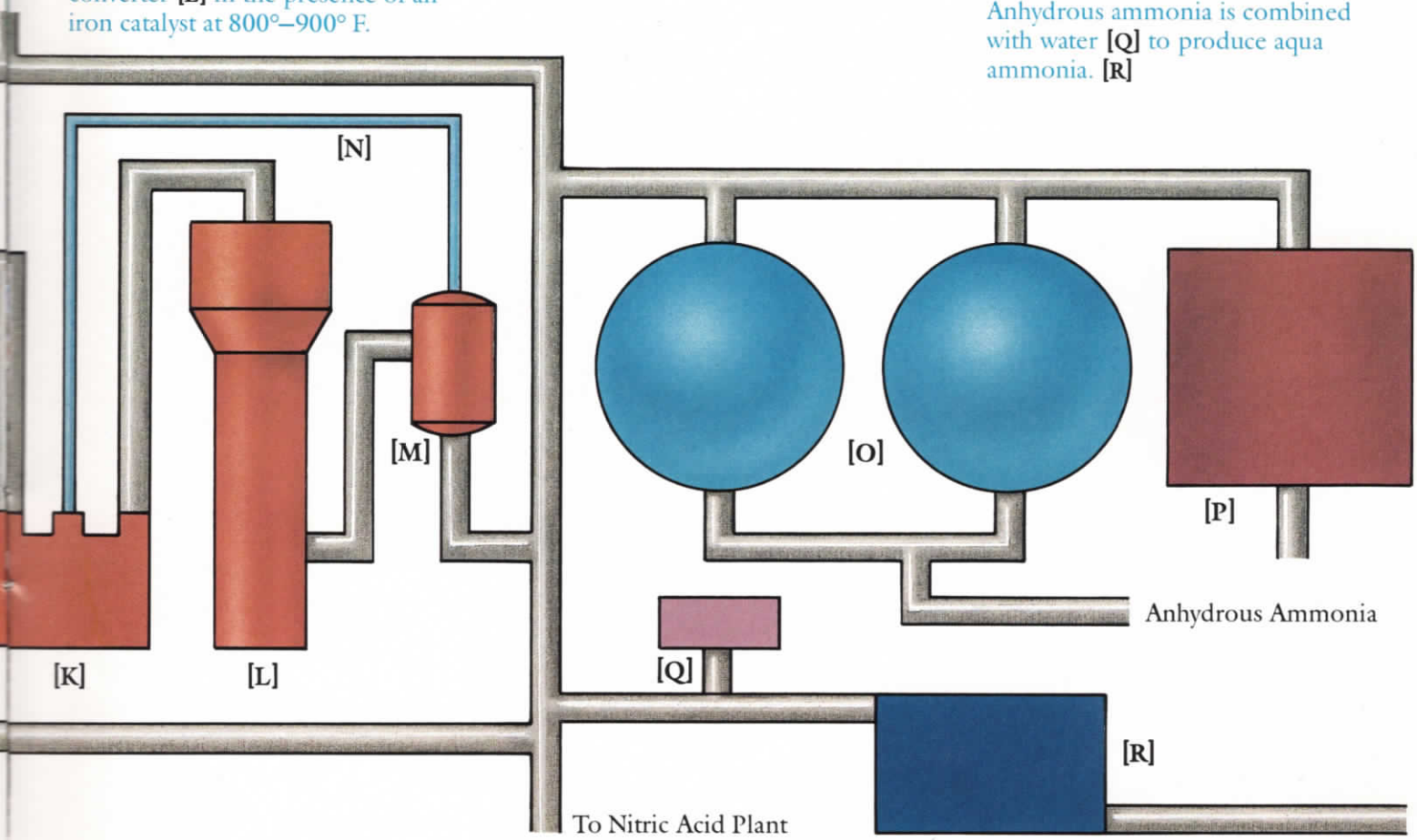
Ammonia is produced in the synthesis converter **[L]** in the presence of an iron catalyst at 800°–900° F.

12–14% of the gas **[M]** is reacted to ammonia. The unreacted gases (H_2 and N_2) are recirculated through the system. **[N]**

NH_3 becomes the feedstock for the rest of the plant.

Anhydrous ammonia is stored under 60 psi at 40°F. in pressure spheres **[O]** with a combined capacity of 2,500 tons. A long-term atmospheric-pressure storage tank **[P]** is refrigerated to −28°F. and holds 20,000 tons.

Anhydrous ammonia is combined with water **[Q]** to produce aqua ammonia. **[R]**



1970s, production in the U.S. kept in step with or ahead of demand. But because wage-price controls in the early 1970s deterred new construction of ammonia plants, the U.S. faced a supply pinch in 1974. By 1977-1978 imports had increased, and the less competitive, high-cost U.S. production was beginning to run at reduced rates or shut down.

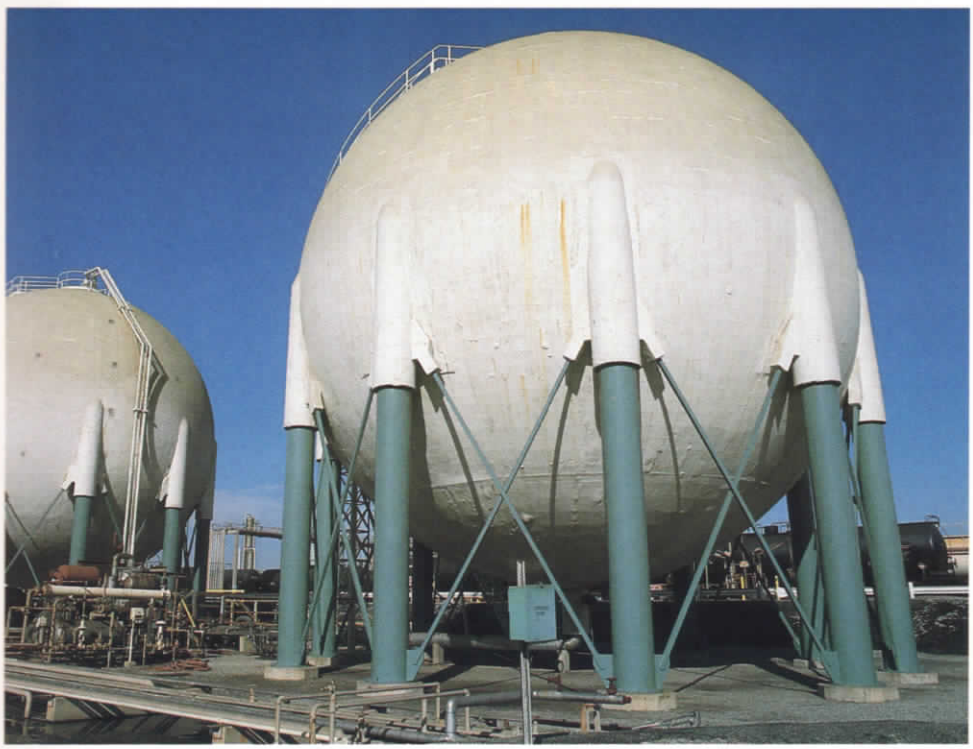
Imports grew from slightly more than a million tons in the mid-60s to more than three million tons in 1982. Cheaper imports have undercut domestic production. Currently, 25 to 30 percent of total U.S. production capacity is shut down—some permanently, some perhaps temporarily. In 1982, gross imports of ammonia amounted to 17 to 18 percent of U.S. demand.

In 1976, the ammonia produced in California and Arizona came from 10 operating plants, eight of which were in California. By 1983, there was only one plant left in the California-Arizona market area, the Union Chemicals Brea plant.

Again, sharply increased cost of natural gas feedstock without commensurate increase in the selling price of nitrogen products made locally has been responsible for the closures. In California, natural gas increased from 34 cents per million BTU in 1966, to a high of $4.70 by October 1982, and has dropped to about $4.50 in 1983. Ignoring all other costs, this change in gas costs from 1966 to 1983 equates to an increase in feedstock costs of about $170 per ton of ammonia, a tenfold increase in less than 20 years.

The operation of the Brea plant and the shipments of Alaskan ammonia and urea to Sacramento provide a significant portion of California and Arizona needs. However, this area has become more and more dependent on foreign supplies. The imports of ammonia from Mexico and the U.S.S.R. have grown since 1979. And with the closure of all local plants, except Brea, it is estimated that an additional 200,000 tons of ammonia equivalent will be needed in 1984 to meet local needs.

While foreign ammonia imports and U.S. natural gas prices are separate issues, they have nevertheless worked together to decrease ammonia production in the U.S. The currently regulated natural gas price structure has created a myriad of different prices



In these tall towers at the Brea plant, CO_2 is removed from the chemical process to free hydrogen and nitrogen to form ammonia in the synthesis converter in the foreground (Left). *Up to 2,500 tons of anhydrous ammonia can be stored short-term in pressurized twin spheres at Brea* (Above).

Natural gas accounts for about 80 percent of the cost of ammonia production.

throughout the nation.

Under today's controlled pricing, certain fertilizer manufacturers in the Gulf are able to obtain much less expensive gas than manufacturers in certain other parts of the U.S. For example, Gulf Coast plants can pay the cost of transportation of fertilizer (both foreign and domestic) from the Gulf to the West and still deliver ammonia at less than the Brea plant's manufacturing costs.

Recently, the California legislature passed a law which gives the California ammonia industry a price reduction through 1986 for the natural gas that it is required to buy from the Southern California Gas Company. This legislation was a short-term fix for an untenable situation. According to Dick Roerig, Brea plant manager, "At the high price of $4.50 per therm, the Brea plant was operating at a $500,000 loss each month. The gas price break was necessary simply to keep the plant operating and to save 200 jobs. Further, keeping Brea on stream provided significant tax revenues to state and local governments. In our view, if natural gas decontrol were in effect, or if we were able to transport natural gas using interstate as well as intrastate pipelines as common carriers, there would have been no need to legislate a reduced rate for the Brea plant."

Other feedstocks for ammonia plants (coke, for example) are being investigated and may become available in the near future. But until these technologies become available and are installed, natural gas deregulation is our best hope to keep our ammonia plants operating throughout the United States.

We in the United States are fortunate to have the fertile land, the water, the climate and technology not only to feed ourselves, but to provide for major exports, as well. We cannot continue our role as a supplier of food to other nations of the world if the means for producing high yields from our available farm land are removed.

As part of the only essential industry in the world, we believe it is critical to maintain domestic supplies of ammonia for farmers here in the United States, and to be competitive in the world market. Only then can we continue to meet the agricultural and food needs of our nation and much of the world.

The S.S. Cornucopia *transports up to 23,000 tons of liquid ammonia each trip from Kenai to terminals in Portland and Sacramento to serve the Northwest* (Above).

Fertilizers from PureGro, a wholly owned Union subsidiary, help western farmers increase their yield per acre—a critical function in a world where population pressures erode available farm land (Right).


PUREGRO

The World At Work

Fourth annual Seventy Six magazine photo contest

This year's theme will be people at work—on the job or at home, for money, love or both.

The contest will be limited to color photographs. Employees and retirees of Union Oil (its subsidiaries and divisions), and their spouses and children, are eligible. The seven award-winning photos will be published in the May/June issue of *Seventy Six*.

HOW TO ENTER:

Number of entries. There will be one category—color. You may submit up to three entries. For example, one color transparency and two color prints add up to three color entries.

Mounting and labeling. Full 8 x 10 prints can be submitted unmounted, 5 x 7 prints must be attached to 8 x 10 single-weight mounting boards. No framed prints will be accepted. For your protection, slides should be mailed in the boxes that come with developed film, glassine envelopes or plastic mounts. Fill out the entry form; then tape it to the back of each print. Do not write on the back of prints. Write your name and title of the entry on each slide mount. Each entry must be accompanied by a completed entry form or a facsimile of the form.

Mailing. Mail entries in Manila clasp envelopes, including your return address and entry forms. Include any cardboard necessary to protect photographs.

Liability. All entries are to be submitted with the understanding that neither Union Oil Company nor any of its employees will be responsible or liable for loss or damage. Entries may be held beyond the publication date of the contest, but we will attempt to return all entries.

Right to publish. Union Oil retains the right to publish or republish any photograph submitted in the contest. Entrants waive any claims for royalty payments or copyright infringement.

Model release. Contestants must be able to furnish a written "consent to use" statement upon request for recognizable people appearing in the photographs.

Judging. Three professional photographers from outside the company will judge the contest. Their decision will be final.

Deadline. All entries must be mailed by March 1, 1984.

Awards.

Grand Prize	$400
1st place	$200
2nd place	$100
3rd place	$ 50
Honorable Mention	$ 50
Honorable Mention	$ 50
Honorable Mention	$ 50

Entry Form

Send to: Editor, M-17
Union Oil Center
Los Angeles, CA 90051

Name: _____

Title or relationship to employee: _____

Division/Subsidiary: _____

Office Location: _____

Home Address: _____ Zip Code: _____

Phone: _____ (Network) _____

Title of Entry: _____ Print Slide

I have read and agree to the official rules of the contest.
Signature: _____ Date: _____

If under 18, signature of parent or guardian: _____

CORPORATE

November 1983

30 YEARS — **John H. Augustine,** Union Oil Center
Claude S. Brinegar, Union Oil Center

25 YEARS — **May Tsang,** Union Oil Center

20 YEARS — **Lloyd E. Erickson,** Pasadena, Ca.

15 YEARS — **Alfonso Tejada,** Union Oil Center
Olivia Wong, Union Oil Center

5 YEARS — **Linda J. Bell,** Union Oil Center
Dolores V. Brill, Union Oil Center
Billie S. Koch, Parachute, Co.

December 1983

35 YEARS — **Patricia J. Hohnsbeen,** Union Oil Center

30 YEARS — **Muriel A. Caves,** Union Oil Center

20 YEARS — **David E. Carpenter,** Schaumburg, Il.
Donald J. Keller, Union Oil Center
Jesse E. Murph, Union Oil Center
Ronald J. Schnell, Union Oil Center

15 YEARS — **Clyde W. Hines,** Union Oil Center
Sally A. King, Union Oil Center
John T. Rountree, Union Oil Center

10 YEARS — **Nora Lira,** Union Oil Center

5 YEARS — **Lupe Paniagua,** Union Oil Center
Marlene J. Rogge, Union Oil Center

UNION SCIENCE AND TECHNOLOGY DIVISION

November 1983

35 YEARS — **Gordon E. Moores,** Brea, Ca.
Ujinobu Niwa, Brea, Ca.
Robert Pavlovich, Brea, Ca.
Edward Schaschl, Brea, Ca.

30 YEARS — **Howard L. Jepson,** Brea, Ca.

20 YEARS — **Beverly J. Reinke,** Brea, Ca.
John W. Ward, Brea, Ca.

15 YEARS — **Michael J. Block,** Brea, Ca.

5 YEARS — **Scott R. Harvey,** Brea, Ca.
Ronald D. Ohls, Brea, Ca.
Mark S. Schilling, Brea, Ca.
William H. Schlegel, Brea, Ca.
Cleveland R. Williams, Brea, Ca.

December 1983

40 YEARS — **Ward W. Howland,** Brea, Ca.

15 YEARS — **Leonard F. Lucus,** Brea, Ca.

10 YEARS — **Gregory P. Ouellette,** Brea, Ca.
Jack P. Witte, Brea, Ca.

5 YEARS — **Michael J. K. Craig,** Brea, Ca.
Dennis M. Daniel, Brea, Ca.
Karen K. Keating, Brea, Ca.

UNION REAL ESTATE DIVISION

November 1983

5 YEARS — **Aurora N. Legaspi,** Union Oil Center

UNION 76 DIVISION

October 1983

5 YEARS — **Kristina Van Breda Kolff,** San Francisco Refinery

November 1983

40 YEARS — **Maurine H. Iles,** Beaumont Refinery

35 YEARS — **Ralph J. Apel,** Los Angeles Refinery
Stanley A. Arnold, Schaumburg, Il.
Neal E. Bottrell, San Francisco Refinery
H. V. Casebolt, San Francisco Refinery
John W. Clark, Schaumburg, Il.
Harry C. Engelhardt, Los Angeles Refinery
Joe D. Harris, Beaumont Refinery
Harold C. Hays, San Francisco Refinery
William F. Hines, Los Angeles Refinery
Harold E. McClatchey, Memphis, Tn.
C. D. McEwen, Los Angeles Refinery
Henry W. Minton, Beaumont Refinery
Edward J. Murphy, Tampa, Fl.
Robert Sheppard, Jr., Beaumont Refinery
Emil S. Uhlarik, Schaumburg, Il.
Oscar O. Wilson, Beaumont Refinery

30 YEARS — **Lawrence P. Bates,** Atlanta, Ga.
David L. Breitsprecher, Schaumburg, Il.
R. E. Colclasure, Los Angeles Refinery
Raymond J. Jirsa, Chicago Refinery
Frances M. McKee, Atlanta, Ga.
Frank Perkins, Los Angeles Refinery
Mac R. Steele, Columbus, Oh.
Robert J. Stoughton, Los Angeles Refinery

25 YEARS — **Jean H. Chung,** Los Angeles, Ca.
Anna A. Shishido, Los Angeles, Ca.

20 YEARS — **Homer L. Ballard,** Beaumont Refinery
William D. Carkhuff, Chicago Refinery
Portia M. Drawz, Schaumburg, Il.
Casimir C. Kucharski, Schaumburg, Il.
John W. McLelland, Detroit, Mi.
Kenneth R. Morgan, Beaumont Refinery

15 YEARS — **Earl W. Cagle,** Bakersfield, Ca.
Charles E. Carey, San Francisco, Ca.
Patrick J. Cleary, Jr., Schaumburg, Il.
John R. Deschutter, Bakersfield, Ca.
Joseph Digiovanni, San Francisco, Ca.
John M. Hunter, Los Angeles, Ca.
Richard H. Jefferson, Schaumburg, Il.
Hearl S. Johnson, Los Angeles Refinery
Elizabeth M. Krause, Schaumburg, Il.
Edilberto P. Mandani, San Francisco, Ca.
Rufus C. Nelson, Los Angeles Refinery
Ralph M. Parker, Miami, Fl.
Thomas J. Penners, Minneapolis, Mn.
George R. Quam, Bay City, Mi.
Frank R. Regeski, Atlanta, Ga.
Lucinda A. Rooney, Columbus, Oh.
Jimmy Y. Sabino, Los Angeles, Ca.
Arnold N. Schomer, Schaumburg, Il.

10 YEARS	**Karen L. Born,** Schaumburg, Il. **James L. Baldonado,** Los Angeles Refinery **Carol J. Bromund,** Schaumburg, Il. **Charles E. Clerkley,** San Francisco, Ca. **Barbara Coquillard,** Schaumburg, Il. **Nancy H. Heffernan,** Schaumburg, Il. **Patricia Mack,** Schaumburg, Il. **Jean McNece,** Schaumburg, Il. **Harriet C. Neier,** Schaumburg, Il. **Lorraine F. Ness,** Schaumburg, Il. **John G. Pena,** San Francisco, Ca. **Charlene J. Prentice,** Schaumburg, Il. **Michael L. Schroeder,** Schaumburg, Il. **Grace D. Smolen,** Schaumburg, Il. **Daniela Staniak,** Schaumburg, Il. **Dennis R. Totten,** Pure Transportation Co., Olney, Il. **David JKL Young,** Honolulu, Hi.
5 YEARS	**Beverly A. Andrews,** Schaumburg, Il. **Willis J. Body,** Los Angeles Refinery **Robert O. Duncan,** Orange, Ca. **Dennis T. Durbin,** Cincinnati, Oh. **Leo O. Escovedo,** Torrance, Ca. **Janet E. Farmer,** Schaumburg, Il. **Kenneth R. Fuller,** Santa Paula, Ca. **Mona D. Hebert,** Los Angeles, Ca. **Becky E. Higgins,** Schaumburg, Il. **Kevin T. Joy,** Hollywood, Ca. **Sandra L. Lemke,** Schaumburg, Il. **Lloyd K. Matsumoto,** Los Angeles Refinery **Carol A. Metroka,** Tampa, Fl. **Roger W. McGowne,** Coos Bay, Or. **David N. Price,** Los Angeles Refinery **Graydon B. Roberts,** Los Angeles Terminal **Edward P. Thibodeaux,** Pure Transportation Co., Houma, La. **Kenneth B. Walton,** Charlotte, N.C. **Scott A. Yost,** Honolulu, Hi.

December 1983

40 YEARS	**Grady M. Singleton, Jr.,** Birmingham, Al.
35 YEARS	**Leslie R. Bradshaw,** Beaumont Refinery **Robert W. Duke,** Beaumont Refinery **Horace Epperhart,** Beaumont Refinery **William A. Fontaine,** Beaumont Refinery **Aaron L. Murphy,** Beaumont Refinery **Raymond J. Richter,** Minneapolis, Mn. **William D. Wheeler,** Beaumont Refinery
30 YEARS	**Ferdinand A. Barrette,** Detroit, Mi. **John E. Frier,** San Francisco, Ca. **Briane T. Grisco,** Los Angeles, Ca. **Lionel J. LeClaire,** Schaumburg, Il. **Simeon J. Nixon, Jr.,** Richmond, Va.
25 YEARS	**William J. Cage,** Taft, Ca. **Robert C. Jones,** Charlotte, N.C. **Walter J. Laskowski,** Schaumburg, Il. **John R. Snowden,** Sacramento, Ca.
20 YEARS	**Willis Baine,** Pasadena, Ca. **John E. Boyle,** Taft, Ca. **Charles E. Lemmons,** Taft, Ca. **J. M. Sobolewski,** Portland, Or.
15 YEARS	**Charles E. Bragg,** Chicago Refinery **Harrison E. McNally,** Tampa, Fl. **Dennis T. Sasaki,** Los Angeles, Ca. **Harry T. Thorn,** Dallas, Tx. **Rodolfo P. Tidalgo,** Los Angeles, Ca. **Gilbert P. Walsh, Jr.,** Schaumburg, Il.
10 YEARS	**Marilyn K. Abbink,** Schaumburg, Il. **Carolyn A. Burdt,** San Francisco, Ca. **Ralph G. Covington,** Portland, Or. **James A. Lamb,** Richmond, Ca. **Iris L. Laudig,** San Francisco, Ca. **William J. Martinez,** Los Angeles Refinery **James J. Morley,** Chicago Refinery **John F. Ritter,** Cincinnati, Oh. **Nicholas M. Trotta,** Cincinnati, Oh.
5 YEARS	**Laurence D. Basler,** Toledo, Oh. **Ahmend D. Brooks,** Portland, Or. **Chester W. Cepress,** Los Angeles Refinery **Linda J. Dovenmuehle,** San Francisco, Ca. **Kerry J. Dugan,** Chicago Refinery **Alice F. Forner,** Wildwood, Fl. **Arturo Guzman,** Los Angeles Refinery **Ernest J. Harris,** Los Angeles Refinery **Donald L. Highsmith,** Pure Transportation Co., Olney, Il. **Michael A. Jones,** Los Angeles Refinery **Bennie S. Larsen,** Jacksonville, Fl. **Arline R. Moore,** Columbus, Oh. **Carol H. Paterson,** San Francisco, Ca. **William T. Rush,** Beaumont Refinery **Mark J. Shibe,** Schaumburg, Il. **Thomas M. Sisk,** San Diego, Ca. **Mitchell A. Webber,** Portland, Or. **Francisco J. Ybarra, Jr.,** Los Angeles Refinery

UNION OIL AND GAS DIVISION

March 1983

30 YEARS	**John F. Wollaston,** Ventura, Ca.

November 1983

35 YEARS	**William F. Bolding,** Houston, Tx. **L. B. Tackett, Jr.,** Union Oil Center
30 YEARS	**Grace R. Oakley,** Union Oil Center
25 YEARS	**Bobby J. Ragland,** Lovington, N.M.
20 YEARS	**Jay L. Axtell,** Moab, Ut. **Walter L. Barrett,** Clay City, Il. **Leonard C. Cervenka,** Houston, Tx. **Iris F. Douglas,** Santa Fe Springs, Ca. **Janice M. Locke,** Pasadena, Ca. **William D. Massa,** Orcutt, Ca.
15 YEARS	**John M. Crawford,** Hominy, Ok. **Suzanne M. Gilmore,** Ventura, Ca. **Danny A. Hairston,** Taft, Ca. **Donna S. Treadway,** Houma, La. **John E. Wickham,** Union Oil Center **Sammy D. Williams,** Ardmore, Ok.
10 YEARS	**Steven M. Harman,** Santa Fe Springs, Ca. **Larry D. Harper,** Andrews, Tx. **Jose S. Hernandez,** Santa Fe Springs, Ca. **Norris L. Laird,** Clay City, Il. **William E. Loper,** Union Oil Center **Steven M. Smith,** Lafayette, La. **Ralph E. Yates,** Clay City, Il.
5 YEARS	**Paul N. Allen,** Houston, Tx. **Jay Bowdler,** Houston, Tx. **Kenneth J. Cissell,** Anchorage, Ak. **Robert L. Ellis,** Coalinga, Ca. **Dan R. Tucker,** Orcutt, Ca. **Oscar Walker,** Lafayette, La.

December 1983

35 YEARS	**Robert D. Swick,** Midland, Tx.
30 YEARS	**Robert D. Merrill,** Ardmore, Ok. **John H. Ojala,** Pasadena, Ca. **P. A. Smithberg,** Pasadena, Ca.
25 YEARS	**Charles M. Cook,** Houma, La. **W. A. Waguespack,** Houma, La.
20 YEARS	**Paul R. Boroff, Jr.,** Taft, Ca. **Timothy M. Crewswell,** Lafayette, La. **Daniel Ferguson,** Brea, Ca. **Frank D. Malloch,** Santa Fe Springs, Ca. **Jimmie D. Patterson,** Clay City, Il. **Bernard G. Pottorff,** Olney, Il. **William W. Walker,** Clay City, Il. **William E. Weiler,** Clay City, Il. **Cleve W. Werner,** Coalinga, Ca.
15 YEARS	**John O. Edwards,** Houston, Tx. **James M. Tabet,** Moab, Ut.
10 YEARS	**Joseph D. Badon,** Lafayette, La. **Francis D. Faulk,** Lafayette, La. **Daniel R. Frederick,** Lafayette, La. **Edward H. Harris,** Ventura, Ca.
5 YEARS	**Charles D. Cox,** Oklahoma City, Ok. **Thomas W. Daniel, Jr.,** Jackson, Ms. **Richard K. Purcell,** W. Liberty, Il. **David A. Stangor,** Anchorage, Ak.

UNION GEOTHERMAL DIVISION

November 1983

30 YEARS — **Joseph L. Wilson,** Union Oil Center

20 YEARS — **Richard O. Engebretsen,** Jakarta, Indonesia

10 YEARS — **Beth E. Reddick,** Santa Rosa, Ca.
Dale L. Spelbring, Big Geysers, Ca.

December 1983

10 YEARS — **Gregory A. Griffey,** Union Oil Center

5 YEARS — **Perry P. Stroud, Jr.,** Santa Rosa, Ca.
John C. Ward, Big Geysers, Ca.

PHILIPPINE GEOTHERMAL, INC.

November 1983

5 YEARS — **Reynaldo T. Anoos,** Manila
Lovino T. Caancan, Manila
Doroteo C. Climacosa, Manila
Danilo C. Conde, Manila
Oscar A. Custodio, Manila
Reinfredo D. Frugal, Manila

December 1983

5 YEARS — **Eliseo S. Morales,** Manila

UNION CHEMICALS DIVISION

November 1983

20 YEARS — **Leandro Lewis,** Kenai, Ak.
Wilfred C. Mitchell, Providence, R.I.

15 YEARS — **Jane B. Armstrong,** Charlotte, N.C.
Don Driskill, Chicago, Il.
William T. Dwyer, Atlanta, Ga.
Frank J. Keleman, Carteret, N.J.
Ralph Key, Newark, Ca.
Charles Ross, Kenai, Ak.

10 YEARS — **Ernestine W. Allen,** Schaumburg, Il.
Robert Burkes, Brea, Ca.
Leonard Carter, Kenai, Ak.
Carl M. Davis, Charlotte, N.C.
Gregory A. Ehlinger, La Mirada, Ca.
Sally J. Hartnett, Clark, N.J.
Patricia A. Jervis, Clark, N.J.
Ronald J. Johnson, Birmingport, Al.
Lothar Mans, Rodeo, Ca.
Ted J. Nyman, La Mirada, Ca.
James Rodriguez, Arroyo Grande, Ca.
David R. Sloan, Charlotte, N.C.
Stanley Yost, Union Oil Center

5 YEARS — **Kenneth W. Baker,** Lemont, Il.
Charles H. Early, Jr., Clark, N.J.
Howard Jackson, Kenai, Ak.
Roger D. Massie, Schaumburg, Il.
Earl J. McConnell, Charlotte, N.C.
Glen R. Moses, Charlotte, N.C.
Londa Parks, Union Oil Center
Randall J. Yoeltz, La Mirada, Ca.

December 1983

30 YEARS — **Leon Quesnel,** Kenai, Ak.
Clayton Stephens, Arroyo Grande, Ca.
Dave Tyler, Bridgeview, Il.

25 YEARS — **Dallas Gipe,** Union Oil Center
Joe Woolbright, Union Oil Center

15 YEARS — **David Allred,** Kenai, Ak.

10 YEARS — **Shirley M. Bider,** Schaumburg, Il.
Tommy H. Burleyson, Charlotte, N.C.
Shelba Morgan, Brea, Ca.

5 YEARS — **Christine K. Brown,** Schaumburg, Il.
William Bunch, Kenai, Ak.
James B. Crosby, Charlotte, N.C.
Gregory D. Dawson, Clark, N.J.
Diana Heckethorn, Union Oil Center
Kenneth Newton, Kennewick, Wa.
Bruce Schenk, Brea, Ca.

UNION INTERNATIONAL OIL DIVISION

November 1983

25 YEARS — **J. R. Souverbielle,** Argentina

10 YEARS — **Raymond M. Shannon,** Indonesia

5 YEARS — **Michael G. Aitkenhead,** London, England
Jan M. Grzywacz, Norway
Steven D. Mitchel, Los Angeles, Ca.

December 1983

20 YEARS — **W. C. Bennett,** Los Angeles, Ca.

5 YEARS — **Betsy W. Hatch,** Los Angeles, Ca.
Debra M. Weiss, Los Angeles, Ca.

UNION OIL CO. OF CANADA LTD.

September 1983

20 YEARS — **Don Gardiner,** Calgary, Alberta

November 1983

10 YEARS — **James Frederick Dunn,** Calgary, Alberta
Peter William Wangsness, Fort St. John, British Columbia

5 YEARS — **William Thomas Frew,** Calgary, Alberta
Alison Joy Gibson, Calgary, Alberta
Lynne Mary Punt, Calgary, Alberta

December 1983

5 YEARS — **Wendy Louise Findlay,** Calgary, Alberta
Timothy C. Presber, Calgary, Alberta
Albert John St. Martin, Red Earth, Alberta
Norman Eugene Seatter, Fairydell, Alberta
Brian Jacob Zacher, Calgary, Alberta

UNION OIL CO. OF GREAT BRITAIN

November 1983

5 YEARS — **L. Adamiak,** London, England
J. Aikman, London, England
R. Banks, London, England
J. Clark, London, England
P. Coutts, London, England
D. Cowie, London, England
J. Cranney, London, England
I. Denst, London, England
D. Dimbleby, London, England
M. England, London, England
J. Ewing, London, England
T. Finnerty, London, England
J. Gall, London, England
R. Gillespie, London, England
L. Gingell, London, England
G. Gray, London, England
J. Heatley, London, England
G. Joss, London, England
A. Junnier, London, England
R. Kirkcaldy, London, England
A. Kirtley, London, England
R. Kydd, London, England
W. McCrory, London, England
D. MacDonald, London, England
L. McElhone, London, England
K. MacIver, London, England
B. McKenzie, London, England
R. McLagan, London, England
J. McLaren, London, England
J. Mace, London, England
A. Mitchell, London, England
D. Moore, London, England
J. Munro, London, England
M. Nicoll, London, England
P. Oakley, London, England
R. O'Neill, London, England
W. Paisley, London, England
K. Percy, London, England
D. Raitt, London, England
R. Riddell, London, England
S. Robinson, London, England
B. Smith, London, England
R. Taviner, London, England
J. Tierney, London, England
R. Walsh, London, England
D. Watson, London, England
P. Watts, London, England

December 1983

5 YEARS — **C. Hewson-Smith,** London, England

UNION OIL CO. OF INDONESIA

November 1983

10 YEARS
Mochamad Bach
Yahaman Sinaga
Soemarsono
Susanto Soepirman
Tarik

5 YEARS
Rusdi Barthelemy
Syamsudin
S. H. Widyawan

December 1983

10 YEARS
Bardi Atmawidjaya
Darmansjah

5 YEARS
Ardi Anwar
Jabonggas Aritonang
Hendry Julius Dengah
Ansjah H. Durasid
Asnam Ibrahim
Jetro Thamrin Munthe
Abdul Rachman
Slamet Riyadi
Rusmadi
Marodjahan Silalahi
Ferry Binzar Sinaga
Muchtar Sinambela
Max Singal
Abdul Hamid Syarifuddin
Sudirman
Thomas Tarigan
Senang Wayan

UNION OIL CO. OF THAILAND

November 1983

10 YEARS
Arnie C. Kittelson, Bangkok, Thailand

December 1983

5 YEARS
Barry R. Bowman, Bangkok, Thailand

UNION ENERGY MINING DIVISION

November 1983

5 YEARS
Gere L. Loudon, Parachute, Co.
Samuel J. Rucker, V, Parachute, Co.
Dave A. Snapp, Parachute, Co.
Wesley N. Spurlock, Jr., Parachute, Co.

December 1983

15 YEARS
Toru Arisawa, Parachute, Co.

5 YEARS
Keith J. Andrews, Parachute, Co.

MOLYCORP, INC.

November 1983

20 YEARS
Manuel Martinez, Questa, N.M.

15 YEARS
Beneslado Chacon, Questa, N.M.
Porfirio Cisneros, Questa, N.M.
Filadelfio Vigil, Questa, N.M.
Delbert Westfall, Louviers, Co.

10 YEARS
Antonio Lavadie, Questa, N.M.
Robert C. Sacrison, Questa, N.M.

5 YEARS
Donald Dunmire, Mountain Pass, Ca.

December 1983

20 YEARS
Claudio Archuleta, Questa, N.M.
Marvin Archuleta, Questa, N.M.
Cornelio A. Cisneros, Jr., Questa, N.M.
Delfino A. Gonzales, Jr., Questa, N.M.
Frank Gonzales, Questa, N.M.
Alfonso Martinez, Questa, N.M.
Benjamin Martinez, Questa, N.M.
Gustavo Rael, Questa, N.M.

15 YEARS
Thomas Aguilar, Questa, N.M.
Salvador Archuleta, Questa, N.M.
Lionel Cisneros, Jr., Questa, N.M.
Ted Cisneros, Questa, N.M.
Teddy Criss, Mountain Pass, Ca.
Joe Gallegos, Questa, N.M.
Abel Gomez, Questa, N.M.
Joseph Lujan, Questa, N.M.
Fernando Martinez, Questa, N.M.
Jose Mascarenas, Questa, N.M.
Elias Miera, Questa, N.M.
Candido Mondragon, Questa, N.M.
Jake Ortega, Questa, N.M.
Jose Ortega, Questa, N.M.
Chris Quintana, Questa, N.M.
Frank Quintana, Questa, N.M.
Miguel Romero, Questa, N.M.

10 YEARS
Steve Rivera, Questa, N.M.

5 YEARS
Ellen Morton, Questa, N.M.
Thomas Ortega, Questa, N.M.

POCO GRAPHITE, INC.

November 1983

10 YEARS
Louis Bible, Decatur, Tx.

December 1983

10 YEARS
Ted Bradshaw, Decatur, Tx.

5 YEARS
Bobby Ward, Decatur, Tx.

JOBBERS AND DISTRIBUTORS

February 1983

35 YEARS
J. D. Hampton, Distributor, Hemet, Ca.

November 1983

35 YEARS
Leo G. Hance, W. Stayton, Or.
Kellerstrass Bros., Lube Oil Jobbers, Ogden, Ut.

30 YEARS
Mt. Hood Oil Company, Inc., Gresham, Or.
W. L. Thomson, Salinas, Ca.

20 YEARS
A. J. Carey Oil Co., Inc., Kinston, N.C.
GOCO, Inc., Charlottesville, Va.

December 1983

30 YEARS
W. E. Haynes, Prineville, Or.

25 YEARS
Lincoln Petroleum Co., Chicago, Il.

20 YEARS
Pete Ramaglia, Kodiak, Ak.
Suffolk Oil Co., Inc., Suffolk, Va.

10 YEARS
Eugene Jenne, Talkeetna, Ak.
Jack L. Ripp, Woodland, Wa.

5 YEARS
William A. Henry, Jr., Reedsport, Or.

RETIREMENTS

July 1983

Clayton M. Engstrom, Union 76 Division, Western Region, Petaluma, Ca. January 1, 1963

August 1983

Benson D. Lusher, Molycorp, Prosperity, Pa. July 1, 1948

September 1983

William A. Greenwalt, Jr., International Division, Corona Del Mar, Ca. September 1, 1943
Leland B. Hamilton, Chemicals Division, Glendora, Ca. July 1, 1971
James B. Pitcher, Union 76 Division, Eastern Region, Beaumont, Tx. February 24, 1947
Julia I. Stimson, Oil and Gas Division, Midland, Tx. January 7, 1953

October 1983

Thomas N. Abbott, Molycorp, Red River, N.M. September 9, 1963
James C. Abel, Oil and Gas Division, Kermit, Tx. April 15, 1951
Charles E. Atkins, Oil and Gas Division, Orcutt, Ca. January 4, 1951
LaWarren L. Barks, Union 76 Division, Western Region, Arroyo Grande, Ca. October 25, 1948
Lorenzo W. Burdett, Science and Technology Division, Anaheim, Ca. August 6, 1952
George H. Clark, Union 76 Division, Western Region, Orange, Ca. July 30, 1956
Robert G. Daries, Oil and Gas Division, Encino, Ca. August 28, 1946
Richard E. Nadeau, Union 76 Division, Eastern Region, Jacksonville, Fl. July 16, 1948
Jasper R. Parker, Union 76 Division, Western Region, Carson, Ca. April 16, 1945
Richard M. Rapoza, Union 76 Division, Western Region, Honolulu, Hi. April 6, 1947
Herbert P. Scharlow, Corporate, Buena Park, Ca. March 22, 1942
John A. Schultz, Union 76 Division, Eastern Region, Dorchester, Wi. March 15, 1965
Vernon E. Weltz, Union 76 Division, Western Region, Campbell, Ca. October 1, 1947

November 1983

Betty C. Clarke, Corporate, Los Angeles, Ca. May 19, 1969

Barbara M. Fehl, Union 76 Division, Eastern Region, Carpentersville, Il. May 1, 1965

Charles R. Fyfe, Union 76 Division, Eastern Region, Arlington Hgts., Il. April 1, 1948

Edward J. Gary, Union 76 Division, Eastern Region, Mt. Prospect, Il. July 10, 1950

Fred G. Mandes, Union 76 Division, Western Region, Santa Paula, Ca. April 16, 1946

Edward C. Melrose, Oil and Gas Division, Houston, Tx. November 16, 1937

John F. O'Toole, Union 76 Division, Western Region, Aptos, Ca. January 27, 1944

Helen V. Ramm, Union 76 Division, Eastern Region, Bellaire, Fl. November 16, 1960

Jerome K. Robinson, Union 76 Division, Eastern Region, Park Ridge, Il. October 1, 1953

John B. Todd, Union 76 Division, Eastern Region, Elgin, Il. June 14, 1948

Wm. A. Von Der Heide, Union 76 Division, Western Region, Rodeo, Ca. April 18, 1941

Robert C. Walker, Union 76 Division, Eastern Region, Nederland, Tx. March 8, 1948

IN MEMORIAM

Employees

Grace I. Carroll, Union 76 Division, Eastern Region, Birmingham, Al. August 9, 1983

Johnny C. Fontenot, Pure Transportation, Gray, La. September 1, 1983

Marvin D. Johnson, Union 76 Division, Western Region, Scappoose, Or. September 13, 1983

James W. Mann, Oil and Gas Division, Midland, Tx. September 13, 1983

George S. Peterson, Oil and Gas Division, Lafayette, La. September 28, 1983

Joseph F. Rossi, Oil and Gas Division, Ventura, Ca. August 27, 1983

Ben N. Siler, Oil and Gas Division, Buena Park, Ca. September 13, 1983

Louis Vas, Geothermal Division, Santa Rosa, Ca. July 31, 1983

Retirees

Harry E. Anderson, Union 76 Division, Western Region, Seattle, Wa. August 5, 1983

Vincent C. Banks, Union 76 Division, Eastern Region, Willow Springs, Il. September 15, 1983

Joseph V. Blake, Union 76 Division, Eastern Region, Ft. Lauderdale, Fl. June 24, 1983

Joseph Blum, Union 76 Division, Western Region, Ventura, Ca. July 30, 1983

Edward D. Connally, Union 76 Division, Eastern Region, Birmingham, Al. August 8, 1983

Ambrose S. Cox, Oil and Gas Division, Norwalk, Ca. September 19, 1983

Larry H. Denney, Union 76 Division, Western Region, Napa, Ca. August 7, 1983

Preston H. Duesler, Union 76 Division, Eastern Region, Toledo, Oh. June 28, 1983

John Erle Edwards, Union 76 Division, Eastern Region, Glen Ellyn, Il. August 9, 1983

Lloyd M. Foster, Union 76 Division, Western Region, Valinda, Ca. August 2, 1983

John V. Gerstenlauer, Union 76 Division, Eastern Region, Port Arthur, Tx. August 23, 1983

Sylvia Goff, Union Chemicals Division, Sun City West, Az. September 19, 1983

Earl R. Heaton, Oil and Gas Division, Long Beach, Ca. August 12, 1983

Clarence M. Henley, Union 76 Division, Eastern Region, Nederland, Tx. September 4, 1983

Ralph Highsmith, Oil and Gas Division, Olney, Il. August 7, 1983

Adrian P. Housley, Oil and Gas Division, Burneville, Ok. September 6, 1983

James E. Jett, Oil and Gas Division, Houston, Tx. September 19, 1983

Henry John, Oil and Gas Division, Houston, Tx. July 1, 1983

Gerald Johnson, Oil and Gas Division, Fullerton, Ca. August 14, 1983

John W. Johnson, Oil and Gas Division, Delaware, Ok. September 17, 1983

Clifford R. Jones, Union 76 Division, Eastern Region, Lemont, Il. July 19, 1983

Frederic H. Kellog, Union 76 Division, Western Region, San Mateo, Ca. September 23, 1983

George M. Knox, Molycorp, Washington, Pa. September 24, 1983

Kenneth D. Martin, Science and Technology Division, Fullerton, Ca. September 13, 1983

Archie J. McAfee, Oil and Gas Division, Rush Springs, Ok. August 30, 1983

Harold V. Pearson, Union Chemicals Division, Lake Park, Fl. August 11, 1983

Hiram E. Perry, Union 76 Division, Eastern Region, St. Petersburg, Fl. August 22, 1983

Dudley E. Petersen, Union 76 Division, Eastern Region, Beaumont, Tx. August 4, 1983

Leo Rembialkowski, Union 76 Division, Eastern Region, Chicago, Il. September 28, 1983

Ellen Robarge, Union 76 Division, Eastern Region, Toledo, Oh. August 21, 1983

Robert D. Russell, Oil and Gas Division, Brea, Ca. August 31, 1983

Theodore Rutkowski, Union 76 Division, Eastern Region, Maple Grove, Mn. September 12, 1983

Howard D. Sanderson, Union 76 Division, Eastern Region, Nederland, Tx. August 3, 1983

Frederick C. Shields, Union 76 Division, Eastern Region, Toledo, Oh. August 22, 1983

Hugh R. Smyth, Union 76 Division, Western Region, Kailua-Kona, Hi. September 27, 1983

Henry P. Stadther, Union 76 Division, Eastern Region, Mobile, Al. July 26, 1983

Bernice M. Tanner, Union 76 Division, Eastern Region, Tulsa, Ok. August 7, 1983

James C. Thormahlen, Union 76 Division, Eastern Region, Newton, Il. July 27, 1983

Joseph Vlcek, Union 76 Division, Eastern Region, Downers Grove, Il. September 23, 1983

Lawrence E. Wallace, Union 76 Division, Eastern Region, Albuquerque, N.M. August 3, 1983

Jonathan V. Webster, Geothermal Division, Creston, Ca. August 18, 1983

UNION OIL COMPANY OF CALIFORNIA
P.O. Box 7600
Los Angeles, California 90051

UNION OIL COMPANY OF CALIFORNIA

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VOLUME LXII, NUMBER 6
NOVEMBER/DECEMBER 1983

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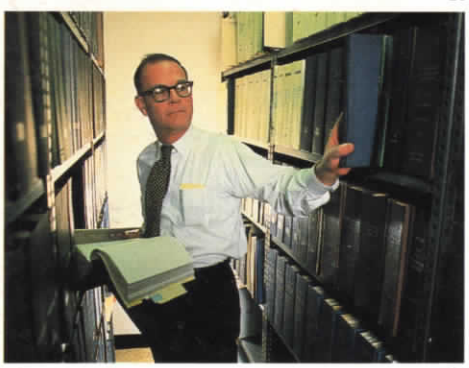

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COVER: The marine fuel dock serving Marina del Rey, Los Angeles, is decked out to rival the pleasure boats taking part in the annual Christmas "Parade of Lights." **Photo by Ray Engle.**

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