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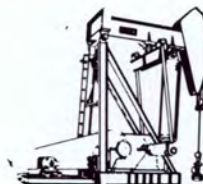
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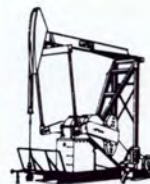
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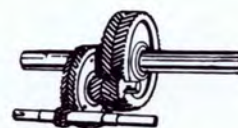


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NORTHEASTERN DIVISION ISSUE

Michigan's Copper Country—Sue Callaway	4
LUFKIN Installations	8
From Garbage to Steam to Electricity	10
Snapshots by LUFKIN Cameramen	12

COVER: Eaton Canyon in the San Gabriel Mountains
near Altadena, California
Transparency by Robert F. Campbell
Concord, California

OPPOSITE: Transparency by Phil Roddey
Bloomington, Illinois



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Victoria, a copper boom town, left now to nature



"Mighty Mac," seen past Fort Michilimackinac, links the two peninsulas of Michigan and stretches five miles from Mackinaw City to St. Ignace

Fort Wilkins, originally built to protect copper miners from Indians, ended up protecting the miners from each other

MICHIGAN'S COPPER COUNTRY

By Sue Callaway

Michigan is a land of many moods. Heavy industrial areas are balanced by tracts of ancient wilderness; green pastures contradict barren sand dunes; and yesterday melds dramatically with today and tomorrow.

Travelers soon learn to expect the contrasts. Nevertheless, they are usually somewhat astonished by their first journey into the Copper Country of Michigan's upper peninsula.

The four counties that form the region (Ontonagon, Baraga, Houghton and Keweenaw) encompass grand forests populated by deer, bear and various other species of wildlife. There are historic landmarks, picturesque waterfalls, hundreds of inland lakes and thousands of miles of streams bordered by the unpredictable waters of Lake Superior.

At the southern edge of the area, the Porcupine Mountains rise to 2000 feet at their highest point. They, too, seem somewhat contradictory to the rolling flatlands characteristic of midwestern states. The base of the "Porkies" is formed by rocks considered to be among the oldest in the world with a geologic age of more than one billion years.

The most scenic route to the Copper Country is from Michigan's lower peninsula, across the majestic Mackinac Bridge, then west across the upper peninsula.

Highway M-64 winds north to White Pine, a resurrected copper mining town built in 1952. The colorful history of the White Pine Mine, however, extends over more than a century. The Nonsuch

Shale, which contains the White Pine orebody, was officially discovered in 1865 by Frank Cadotte. Mr. Cadotte later sold his interests for a barrel of pork, a barrel of flour and some other grocery items.

Porcupine Mountains State Park, northwest of White Pine, is composed of 58,000 acres of primitive forests, secluded lakes and miracles of nature. In the summer, the park attracts campers, hikers, nature lovers and those simply seeking a quiet retreat. In winter, it becomes one of the state's most popular skiing meccas and winter playgrounds.

Fifteen miles north of the park is historic Ontonagon. Here, in the 1700s, French missionaries reported the existence of a 3000-pound boulder of pure native copper. The Ontonagon "nug-



A backpacker enjoys a portion of the Porcupine Mountains that overlook just a section of Michigan's 36,000 miles of rivers and streams



Sable Falls is just one of many beautiful, natural scenes in the upper peninsula

get," as it is called, is now displayed by the Smithsonian Institution in Washington, D.C.

South of Ontonagon is the ghost town of Victoria. A relic of the copper boom, Victoria is now being claimed by the surrounding forest.

The Michigan Mine, another ghost of the copper era, is also in this area. Originally the Minesota Mine — spelled with one "n" — it was reorganized and its name changed in 1872. It was at the

Minesota Mine that the largest single piece of mass copper ever known was discovered in 1856. It weighed 527 tons and required the labors of 20 men, using long handled chisels, 15 months to separate it from its position.

The old Adventure Mine at Greenland in Ontonagon County offers true adventure to today's Copper Country travelers. Visitors can follow long, devious paths and explore caves and caverns left by the early day miners.

Deposits of the reddish-brown ore are visible along the walls and ceilings of the mine. Geologists say the Adventure's veins still contain more copper than was removed.

North, the Portage Lake Bridge connects Houghton with the Keweenaw Peninsula across the Portage Canal. This structure is the largest of its kind in America with a vertical lift center span that raises the roadway to a height of 100 feet to allow Great Lakes ore carriers to pass beneath.



No motorized vehicles are allowed on Mackinac Island. Travel is by horseback, horse and carriage, bicycle or "Shank's Mare"

Farther north is the centenarian Calumet and Hecla mines, whose shafts burrowed more than a mile into the earth. Once the monarch of the area, the shaft houses now stand silent and rusting, as does the village of Calumet, once the thriving and sophisticated cultural center of the Copper Country.

The Calumet Theatre has been restored to its former elegance when its stage was graced by the greatest of stars. Immortals such as Lillian Russell, Sarah Bernhardt, Maude Adams,

Caruso and Douglas Fairbanks appeared here, as did John Philip Sousa and his band.

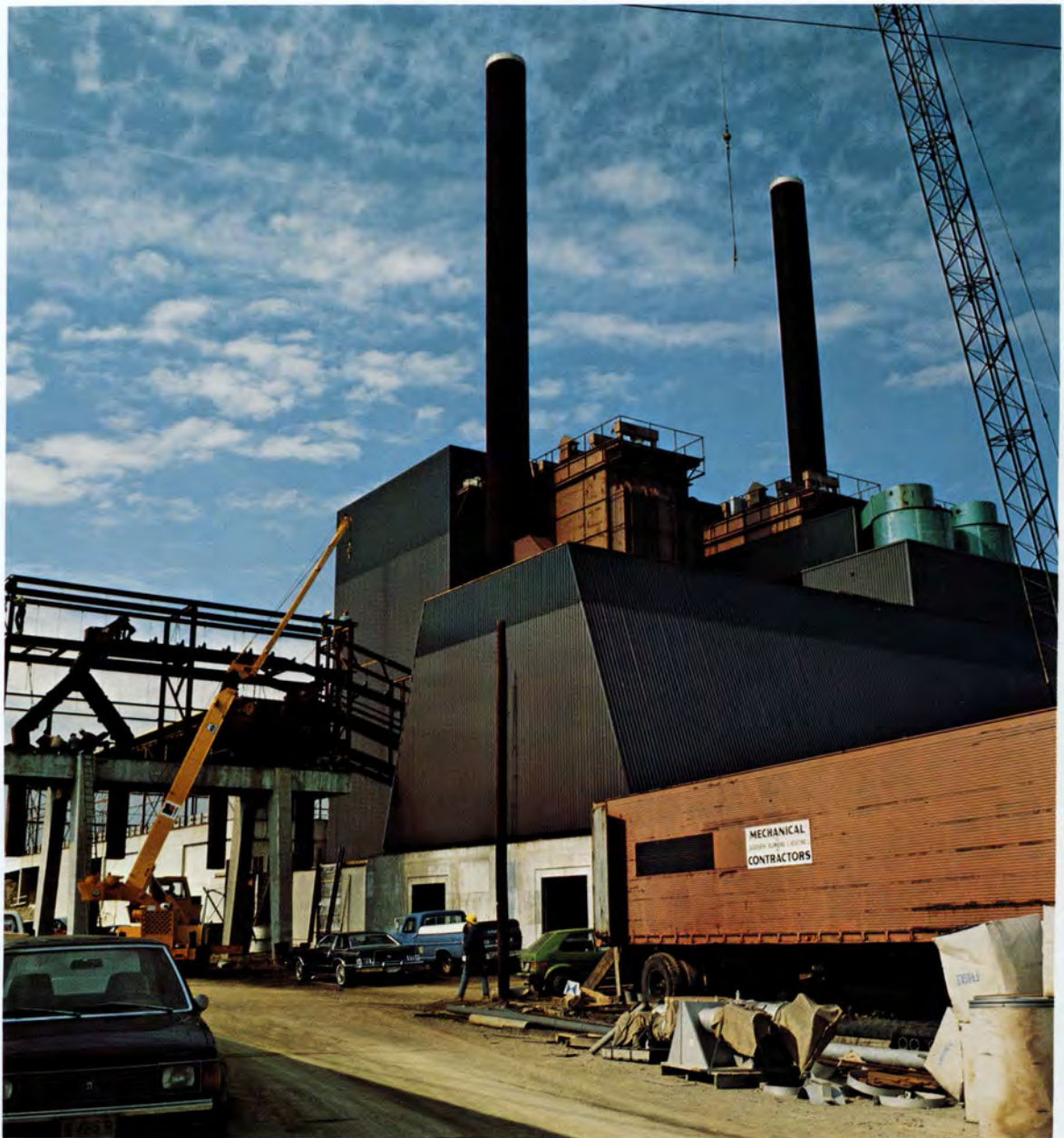
Past Calumet, town markers identify Ahmeek, Mohawk, Helltown and Cliff, mute and aging witnesses to a flourishing, bustling time past.

Still farther north, the traveler has a choice of scenic routes around the Keweenaw Peninsula. One follows the twisting, rocky shoreline and the other—Brockway Mountain Drive—runs along the sheer cliff edge of the Keweenaw

Fault, rising some 740 feet above the waters of Lake Superior.

The highways terminate at Fort Wilkins State Park. The Fort has been restored to appear as it did when it was built and garrisoned in 1844.

Remnants of the nation's early history, the color of a booming mining era, a profusion of ancient pines, white birches and wild thimbleberries combine to produce Michigan's Copper Country, a perfect place to discover an unforgettable vacation.



Exterior of the Akron Recycle Energy System Plant which will process up to 2000 tons daily of municipal waste, turning it into salable steam

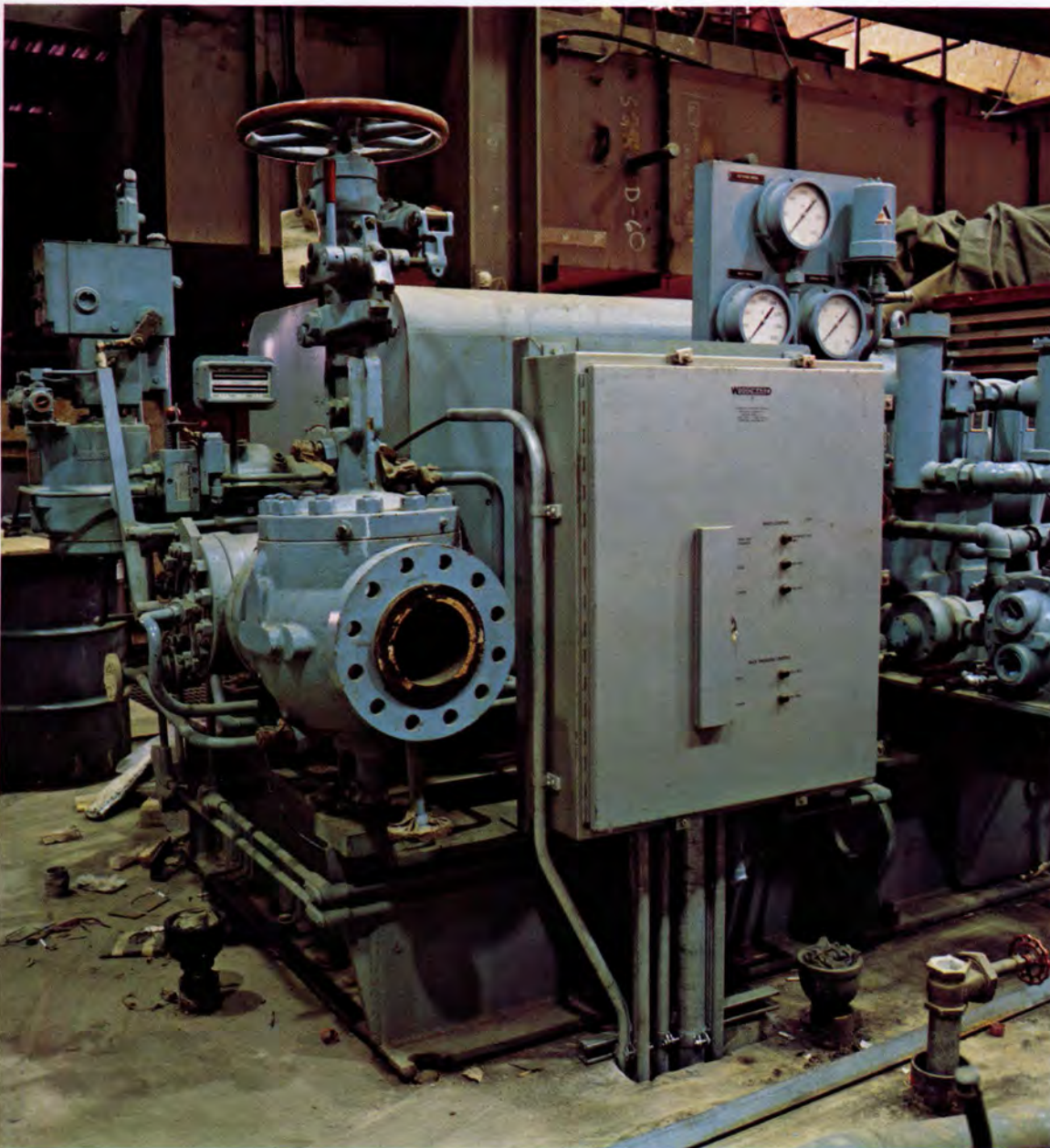
From Garbage to Steam to Electricity

Alternate energy sources are not only becoming more and more desirable, but new energy research is becoming economically imperative.

Akron, Ohio, has joined a growing list of American cities moving away from oil dependency and moving toward self-sufficiency with an energy source renewable daily. The energy source? Akron's daily production of garbage and trash.

Officially titled the Akron Recycle Energy System, the Recycle Energy Plant will make steam by burning municipal waste consisting of trash and garbage and will then sell the steam to local users.

The plant is designed to handle 2000



LUFKIN N1404C gears combined with steam turbines provided by Westinghouse-Canada produce 60 per cent of the plant's electricity

tons of garbage per day, which leaves plenty of room for growth since Akron presently is dumping only around 1100 tons of municipal waste per day.

Each of the three boilers at the plant can produce 123,700 pounds of steam per hour. The nine-story tall boilers will provide steam to hospitals, schools, office buildings and a local tire manufacturing plant.

Simply stated, all burnable refuse will be used to fire the huge boilers to produce steam which will be sold. This revenue along with fees paid by local refuse haulers will be used to retire bonds sold to finance the project.

As the municipal waste is dumped, it will be fed into two 1500 h.p. shredders

which will reduce it to pieces no larger than two inches.

From the shredders the municipal waste will be moved to the sorters which will separate the combustible and non-combustible materials. Ferrous metals will be pulled out by magnets and reclaimed for resale. Non-ferrous metals, such as aluminum, as well as glass, rocks and dirt will be taken to a local landfill.

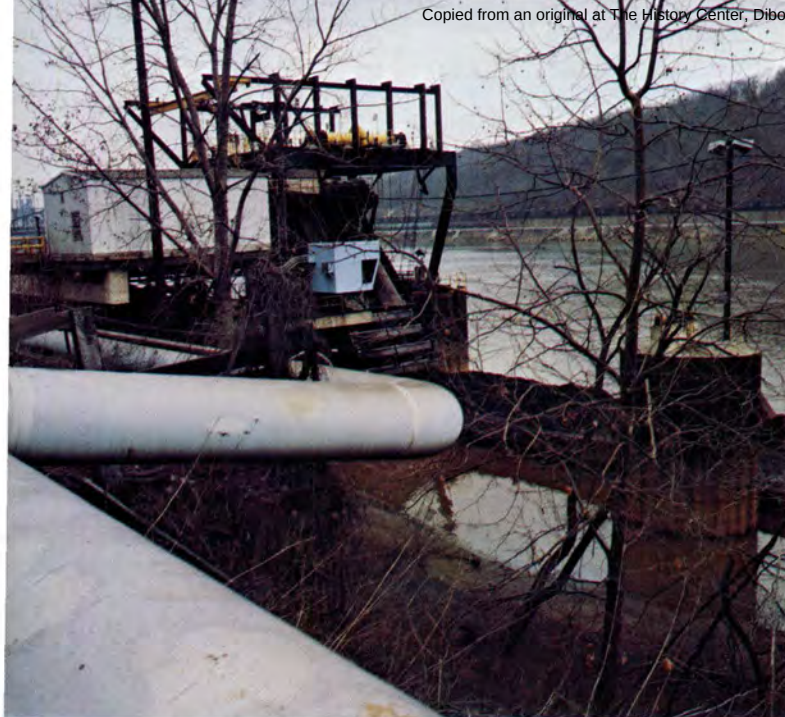
About 90 per cent of the municipal waste dumped will be used for refuse derived fuel. Part of the remaining 10 per cent will be sold as scrap while the remainder will be sent to the landfill.

Sixty per cent of the plant's electrical requirements will be furnished by turbine

generators equipped with LUFKIN N1404C gears. The gears are rated at 2000 KW from a steam turbine speed of 5000 r.p.m. to a generator speed of 1800 r.p.m. The gear units have a 1.6 AGMA SF.

A recent General Accounting Office report called this type plant "a valuable supplement to the nation's energy supply" and said they can "help to resolve material resource and solid waste problems."

This is the first recycle plant of its type in Ohio and is expected to be in full operation by September, 1979. In one bold project, Akron is working to solve two seemingly insoluble problems facing all urban areas: energy and waste removal.



LUFKIN D340C reducer powers the buckets unloading coal barges for the Union Railroad Company from a platform engineered and designed by Heyl & Patterson, Inc., Pittsburgh, Pennsylvania



LUFKIN DF660-1120C, Midland-Ross Corp., New Brunswick, New Jersey



LUFKIN T640, The Spalding Company, Chicopee, Massachusetts

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Installations

Photos Not Otherwise Credited by
David Freeze, LUFKIN Photographer



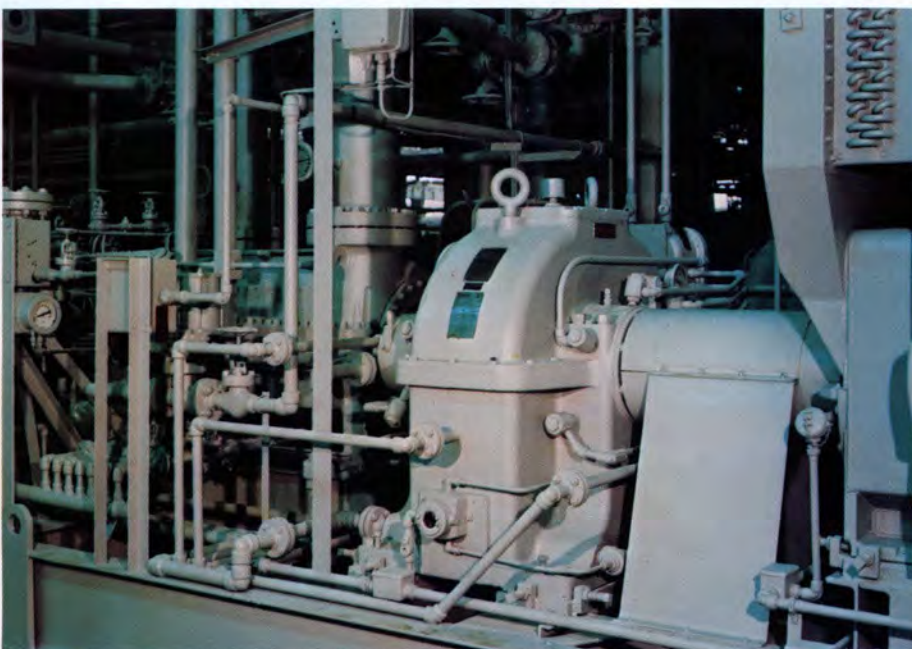
LUFKIN B-57D-109-48, Enterprise Gas & Oil Inc., Tolley #1, Guernsey County, Ohio

LUFKIN M-640D-305-168, Amoco Production Company, Manistee County, Michigan





LUFKIN M-456D-305-120 with LUFKIN 795 engine, Miller Brothers Oil Corp., Grand Traverse County, Michigan



LUFKIN N1807C increaser shipped to York Corp., Division of Borg-Warner for inclusion in a twin motor, gear and compressor package being sent to Iraq
—Photo furnished by York Corp.



LUFKIN M-320D-256-120, Mobil Oil Company, Smith-Bicknell Lease, Calhoun County, Michigan



LUFKIN M-228D-173-74, Dart Well & Gas Co., Tacoma 4-25 Lease, Marion, Michigan

LUFKIN D165-811C, Midland-Ross Corp., New Brunswick, New Jersey



Snapshots

By the
Lufkin Cameramen



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Pittsburgh, Pennsylvania



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Heyl & Patterson, Inc.
Pittsburgh, Pennsylvania



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Mason, Michigan



P.B. KAISER
Mobil Oil Corporation
Mason, Michigan



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Mason, Michigan



RICHARD STAUFFER
Dart Oil & Gas Corp.
Mason, Michigan



ANDY BALFOUR
Dart Oil & Gas Corp.
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Shell Oil Company
Kalkaska, Michigan



KYLE VILLERE
Shell Oil Company
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STEPHEN ROONEY
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JOHN FERRALLO
Midland Ross Corp.
New Brunswick, New Jersey



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Syracuse, New York



ALAN WHITE
Hoffman Air & Filtration
Systems
Syracuse, New York



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Houston, Texas



S.T. AWTRY
Phillips Petroleum
Houston, Texas



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Syracuse, New York



ROGER SIMMONS
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Systems
Syracuse, New York



GARY D'ANTONI
Carrier Industrial Refrig.
Houston, Texas



TOM CABLE
Carrier Industrial Refrig.
Houston, Texas



JOHN ALEXANDER
Worthington Pump, Inc.
Houston, Texas



JOHN MANNA
Worthington Pump, Inc.
Harrison, New Jersey

More Snapshots



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John G. Ruhlin Const. Co.
Akron, Ohio



MARK AXFORD
Stewart & Stevenson
Houston, Texas



DICK DAVIS
Carrier Industrial Refrig.
Syracuse, New York



ED FORD
Carrier Industrial Refrig.
Houston, Texas



DON STOTTS, left, DENTON WHITE
both of Amerada Hess
Como, Texas



JACK HUNTER
Stubbs-Overbeck
Houston, Texas



J.J. HUNTER
Stubbs-Overbeck
Houston, Texas



FLOYD NEYHART
Carrier Industrial Refrig.
Syracuse, New York



GEORGE GIMBRONE
Worthington Compressors
Houston, Texas



RICHARD EVANS, left, A.S. HALEY,
both of Standard Oil Company (Indiana),
Chicago, Illinois



BILL MCFARLAND
Union Oil of California
Woodward, Oklahoma



LARRY MINYEN
Damson Oil Corp.
Houston, Texas



R.D. SCHROPP
Phillips Petroleum Co.
Bartlesville, Oklahoma



CLARENCE LITTLEFIELD
Gulf Oil Expl. & Prod.
Houston, Texas



G.G. NEUBERGER, left, York Div.,
Borg-Warner, Cerritos, California;
J.R. TACQUARD, York Div., Borg-Warner,
Houston, Texas



FRANK JONES
Shell Oil Company
New Orleans, Louisiana



JACK MARTIN
Mobil Oil Corporation
Houston, Texas



FRED GIPSON
Continental Oil Company
Houston, Texas



ED WELLS
Paul Cameron, Jr. Inc.
Houston, Texas



GORDON FLYE, left, B.C. HENDERSON,
both of Shell Oil Company,
Houston, Texas



DAVID ROBERTSON
Carrier Industrial Refrig.
Syracuse, New York



SERGIO MORA
EPN Ingenieria
Mexico City, Mexico



JOHN and DEB EBERHART,
Continental Oil Company,
Houston, Texas



(l-r) HENRY PRESLAR, BOB MITCHELL, JACK
BOUTOTTE, all of Sun Production Company,
Houston, Texas



MOISES SANCHEZ
EPN Ingenieria
Mexico City, Mexico



TOM EASTERDAY
Electro-Motive Div.
General Motors Corp.
New Orleans, Louisiana



FRANK RUFFER, left, GORDON BENEDICT,
both of Exxon Company, USA, Houston, Texas



JUDY CLICK, left, CURTIS EDWARDS, both of
Champlin Petroleum Co., Houston, Texas



ANDREW OLSAKOVSKY
Heyl & Patterson, Inc.
Pittsburgh, Pennsylvania



EDWIN WALTER
Phillips Petroleum Co.
Houston, Texas



JAMES CRITTENDON, left, REX ROUSE, both
of Marathon Oil Co., Bay City, Texas



DON BERQUIST, left, JEFF SEBUCK, both of
Electro-Motive Div., General Motors Corp.,
LaGrange, Illinois



PHIL HENDGES
Shell Oil Company
Traverse City, Michigan



JOE ELLIOTT, Electro-Motive
Div., General Motors Corp.,
New Orleans, Louisiana



(l-r) CESAR VASQUEZ, J. M. Huber Corp.,
Houston, Texas; STEVE FILLEMON, Central
Pipe & Supply, Houston, Texas; DAN McCUE,
J. M. Huber Corp., Houston, Texas; BILL HOOD,
J. M. Huber Corp., Houston, Texas



JOHN GRIFFIN, left, BILL OLSON, both of
Electro-Motive Div., General Motors Corp.,
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