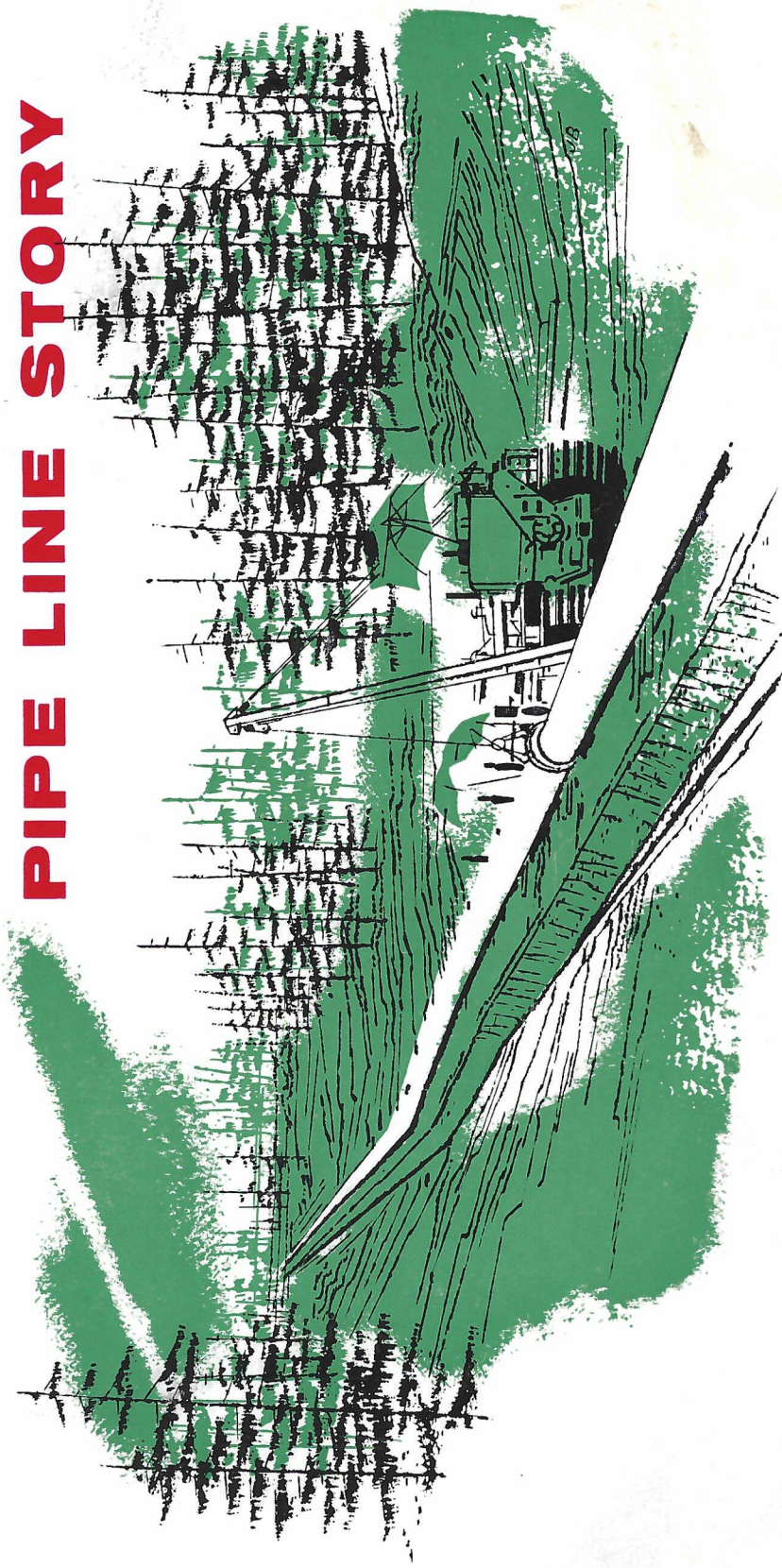


THE WOLVERINE

PIPE LINE STORY



WOLVERINE PIPE LINE COMPANY

630 FIFTH AVENUE

NEW YORK 20

To our friends along the Wolverine Pipe Line System:

Most of you in the Great Lakes area of the United States are familiar with pipe lines of one kind or another. The Wolverine Pipe Line Company, however, is a newcomer, and this booklet is designed to make you better acquainted with us and our operations.

The Wolverine System links three great industrial centers: Chicago on the west, and Detroit and Toledo on the east. For many years the great bulk of petroleum products moving eastward from Chicago to Detroit and Toledo went by water. This was economical transportation, but it had the serious drawback of being subject to interruptions because of ice and storms in winter. By building the Wolverine System, this difficulty has been overcome and the companies shipping through the line are better able to meet the increased demands of this region for petroleum products.

The System also is a valuable addition to the communities through which it passes and to the entire nation. For many years to come it will pay taxes to support local governments and will purchase substantial quantities of materials and supplies in the localities where it operates. It is regarded by military leaders as important to the nation's defense as a part of the underground transportation network connecting the oil producing regions of the Southwest to the industrial centers of the North and East.

Primarily, however, the Wolverine Pipe Line System is a result of the remarkable growth of the region which it serves and an expression of the conviction of its owners that this progress will continue. We are proud to take our place among the businesses serving the industry, agriculture and people of this area and look forward to a long and friendly association with our neighbors.

Cyrus S. Gentry

Cyrus S. Gentry
President

THE OIL INDUSTRY'S UNIQUE TRANSPORTATION SYSTEM

The oil industry's transportation system is unique in size and diversity. Besides special adaptations of ordinary means of transportation — ocean-going tankers, barges, railroad tank cars and tank trucks — it includes thousands of miles of crude oil and products pipe lines. They form a system that is able to deliver huge quantities of portable power wherever and whenever it is needed.

Improved means of transportation have been an important factor in the development and growth of the petroleum industry. The need for pipe lines to supplant other methods of transportation of crude oil from wells to refineries was recognized in the early days. In more recent years, as pipe line techniques have improved, products pipe lines have been developed to



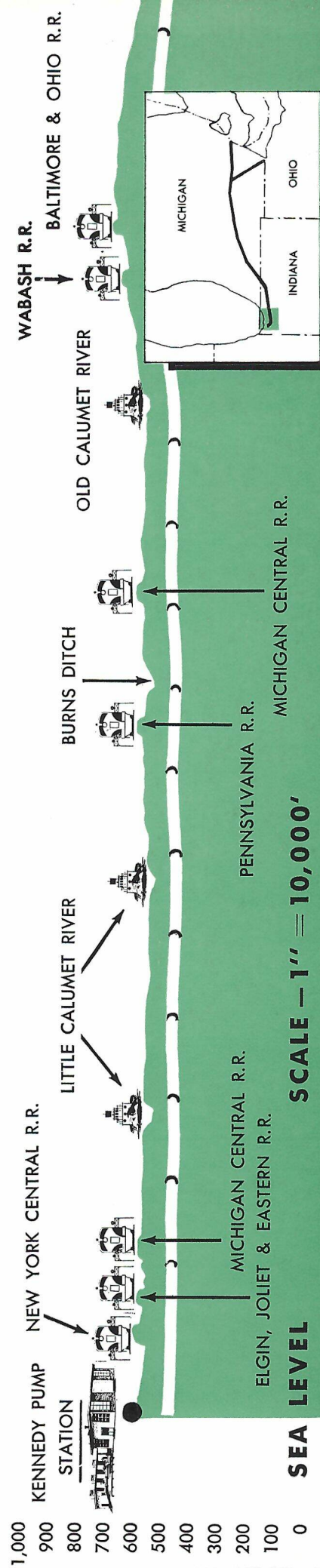
supplant other methods of transportation of refined products from the refineries to the distribution centers. Pipe lines are by far the most economical means for moving huge quantities of petroleum over land.

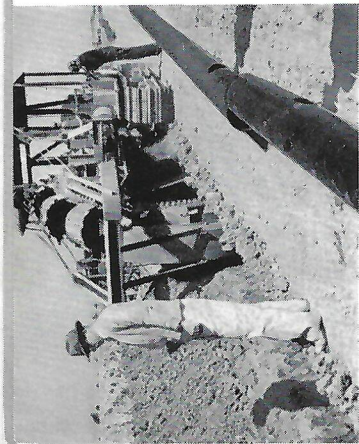
Thus the oil industry has created in the United States a vast network of more than 185,000 miles of petroleum pipe lines, carrying billions of gallons of petroleum annually. They operate around the clock 365 days a year, avoiding the interruptions of bad weather and other hazards that affect surface transportation.

No other industry — aside from the closely related natural gas industry — has done such a job. It had to be done, for ordinary methods of transportation would be swamped by the tremendous volume of petroleum our nation uses. To get an idea of the size of the delivery system the oil industry must have to meet the needs of modern life, consider the volume of gasoline alone that is used. The average passenger car uses 730 gallons of gasoline a year. A gallon weighs more than 6 pounds. So every year the petroleum industry must deliver about two tons of gasoline for every car in your neighborhood. And gasoline, of course, is only one of the many petroleum products you use.

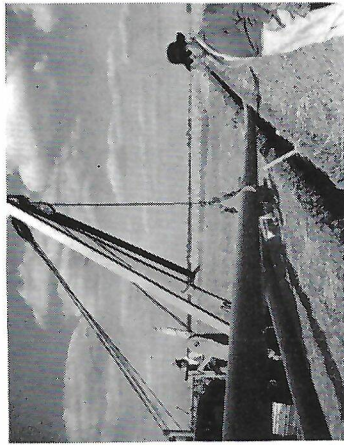
Transportation of these products actually begins at the bottom of an oil well perhaps two or three miles deep and possibly more than 1,000 miles away. Gathering lines take crude oil to field storage tanks. Then it goes by pipe line, barge, tank car or tanker to refineries in many parts of the country. The refineries transform the crude oil into gasoline and other fuels, lubricants and ingredients for more than 1,000 products. Products pipe lines (supplemented by barges, tankers, trains and trucks) take the products to distribution points. From there they go by truck to service stations and other retail outlets, and at last into the tanks of consumers' cars, trucks, tractors, engines, and furnaces.

An amazing thing about these pipe lines is that they can transport many different kinds of products one right after another and maintain the separate identity of each. Pipeliners call each shipment of a particular product a batch. Batches of gasoline, fuel oil, kerosene, naphtha, diesel oil, and other products move along one behind the other, almost as if they were in separate tank cars of a freight train. Ingenious and precise operating methods keep the product of each shipper completely separate and up to the highest standards of quality and purity.

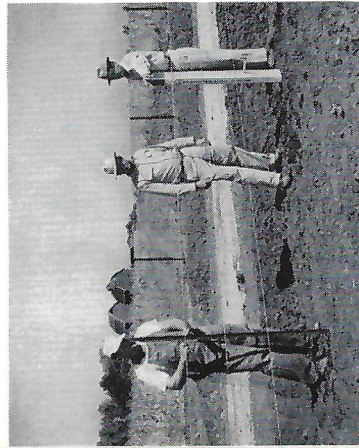




Pipe sections are strung along the right of way as the big ditching machine digs the necessary trench.



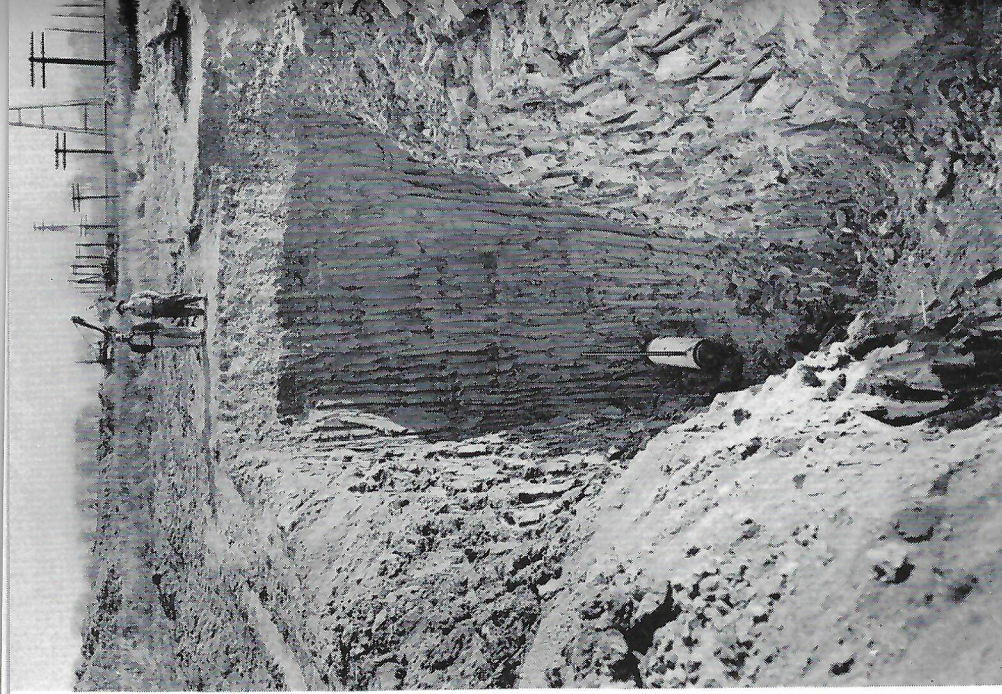
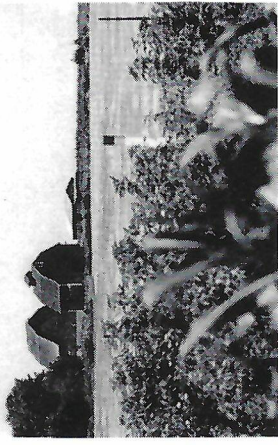
After welders join the lengths a side boom tractor lowers the string of pipe into place.



Farmland is regraded, roadside drainage ditches redug and new fence strung, and a few months later the only sign of the pipe line is the roadside marker post.



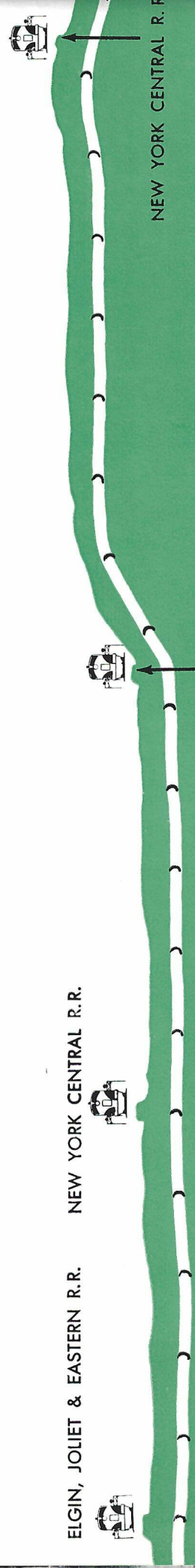
Afterward all damaged drainage tile is repaired or replaced by new transite pipe.



While pipe lines generally run about four feet deep, sometimes at railroad and highway crossings they must go much deeper. Here near Detroit the Wolverine builders had to excavate 35 feet and bore through 250 feet of earth to go under a highway railroad underpass.

ELGIN, JOLIET & EASTERN R.R.

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THE WOLVERINE LINE AND HOW IT WAS BUILT

The Wolverine Pipe Line System consists of 295 miles of welded steel pipe 16 inches in diameter. It begins at Hammond, Indiana, and runs eastward to a point near Ann Arbor, Michigan, where it branches and continues to Detroit and Toledo. It is a common carrier available to all shippers and subject to the regulations of the Interstate Commerce Commission. Its owners are Cities Service Oil Company, Shell Oil Company and The Texas Company.

The System receives shipments of products through private feeder lines from the Cities Service refinery and the Shell and Texas terminals in nearby East Chicago, and delivers the various shippers' products to their terminals at Niles, Jackson and Detroit, Michigan, and Toledo, Ohio.

The line is capable of delivering 4,000,000 gallons of petroleum products a day. This capacity may be boosted to 7,350,000 gallons by adding more pumping stations. There are now two pump stations, at Kennedy Avenue in Hammond, and at Vicksburg, Michigan. There are also seven stations along the line at which meters are installed to measure the quantity of products being delivered.

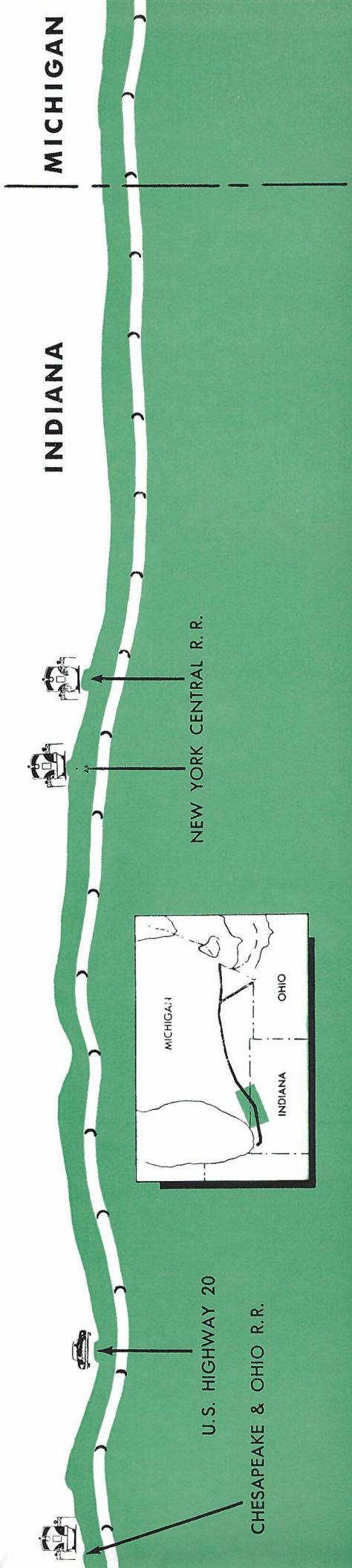
Before the line could be laid, right of way agents had to ob-

tain agreements with more than 1,000 property owners. Their helpful cooperation, along with that of local officials and other neighboring residents, speeded this job, and construction began in June, 1953.

Clearing of the right of way began while steel companies were delivering the pipe, aggregating some 45,000 tons, at railroad sidings every few miles along the route. Then big ditching machines rapidly dug the necessary trench. Its depth generally was between four and eight feet, although at one point near Detroit it went to 35 feet. As the lengths of pipe were strung out beside the trench, crews of welders followed along joining the sections. Then a side boom tractor lowered the string of pipe into the ditch.

All drainage tile damaged in laying the line was repaired or replaced by new tile. The land was regraded and smoothed, roadside drainage ditches were redug and new fence strung. Again right of way agents visited farmers and arranged settlements for crop damages. In a few months, the land showed little sign of having been disturbed.

The first products began flowing through the line in December, 1953, although the pump stations were not completely finished until the late spring of 1954.





The intake and discharge valves and other piping at the Kennedy Avenue station are in plain view of the operator through the panoramic window of the control building. Noticeable by their absence

are wheels for turning the valves manually. Instead of such manual operations, an electrical system enables operators to open and shut or start and stop all station and feeder line units by remote control.

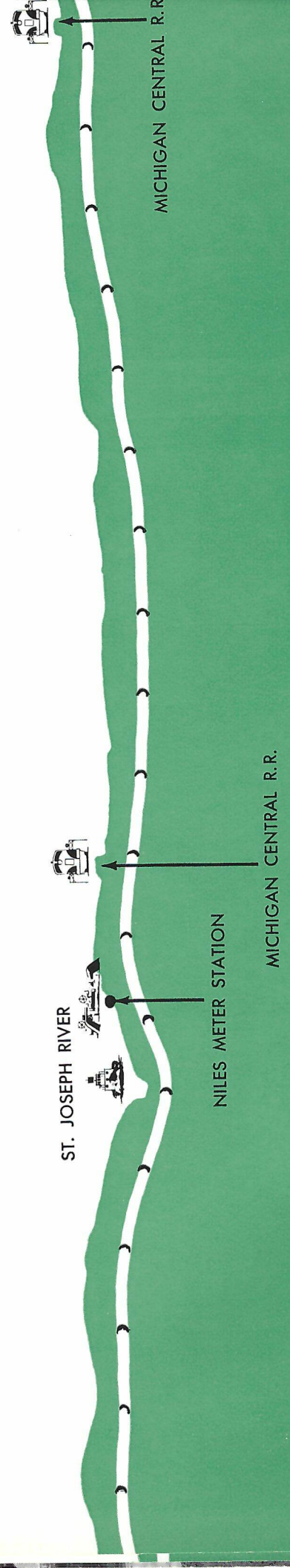
THE PUMPING STATIONS AND THEIR EQUIPMENT

Basic to any pipe line system are the pumping installations which push the stream of material through the pipe. Wolverine's two pumping stations have many design and engineering features unique in the industry.

The Kennedy Avenue station in Hammond is the key operating point for the entire Wolverine System. There two large

pumps, each driven by a 1,250 horsepower electric motor, provide the initial pumping pressure for the line.

Control of operations is centralized in a separate building. Lights on a control desk indicate the positions of all tanks, valves, meters and pumps, and show which are operating. Electrical circuits give the operator fingertip control over all equip-

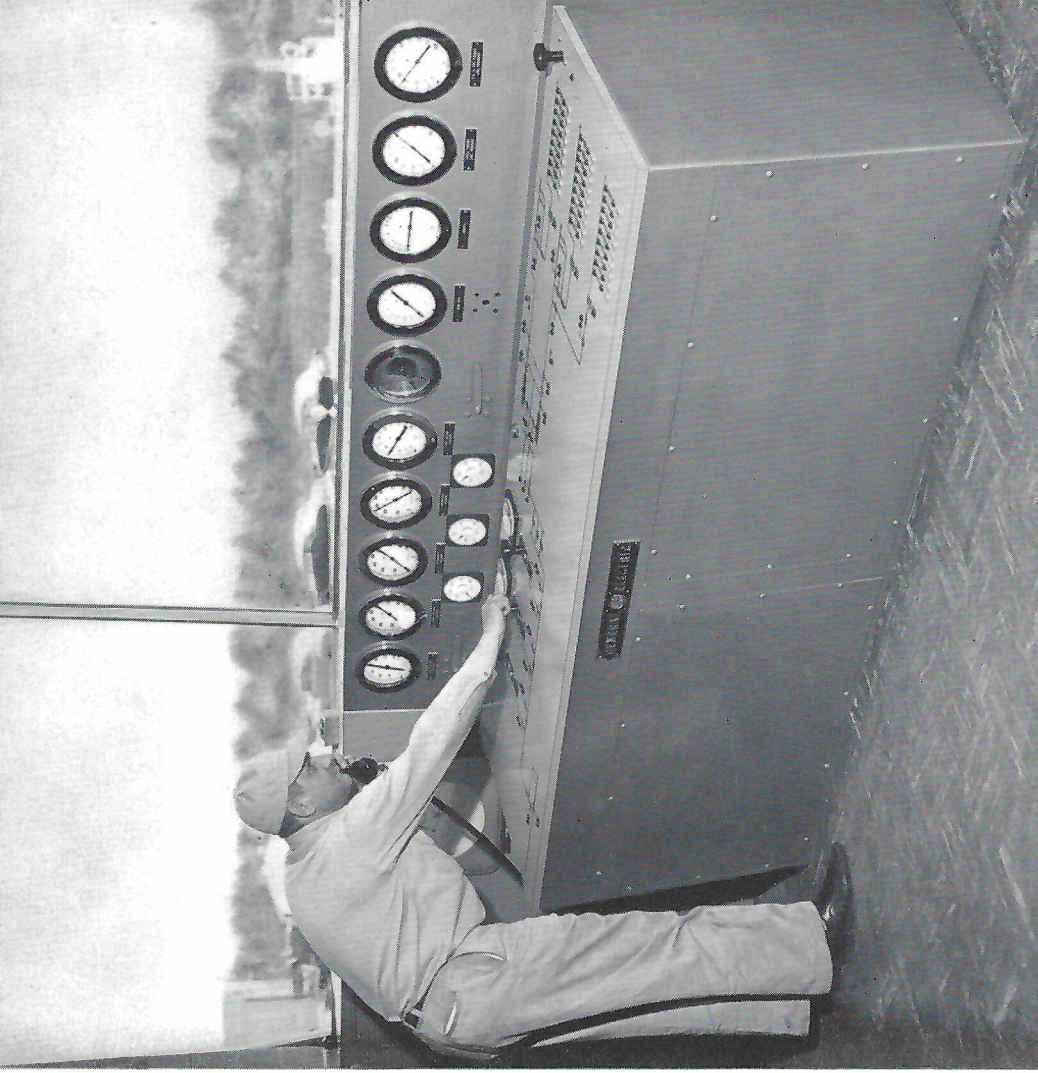
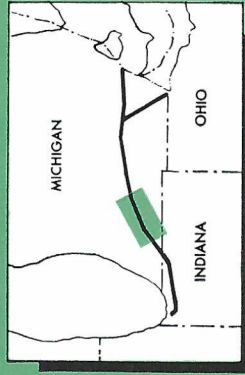


ment. By pushing a single button the operator starts product flowing from any one of the shippers' tanks. In a similar way, the operator starts and stops one or both of the station pumps. The Kennedy operator can, if necessary, extend his control hundreds of miles to the Vicksburg station via teleprinter hook-up. He can dial code numbers to start and stop the pump at Vicksburg. He can dial other code numbers to obtain an automatic report of operating conditions at Vicksburg.

The Vicksburg station is markedly different from Kennedy. Power comes from a 12-cylinder, 2,500-horsepower diesel engine, the largest of its kind ever installed on a pipe line. The engine drives a single pump, the same as those at Kennedy. At a speed of 5,000 revolutions per minute, however, the one pump will develop as much pressure as both Kennedy pumps.

In contrast to Kennedy, the Vicksburg pumping and control facilities are housed in a single building. The grounds also contain three attractive homes for the operators.

Safety was an important consideration in layout and design of the Wolverine System. Any departure from regular operating pressures or any abnormal condition will immediately shut down the offending equipment and, in certain instances, the entire station. A loud alarm alerts the operator and an electric indicator shows the cause of the shutdown. These automatic devices play an important part in making pipe lines the safest known method of transporting petroleum products.



Fingerrip control of operations is centered on this console desk at Kennedy station. On the top is a diagram of the Wolverine line and the shippers' feeder lines and tanks. Lights and gauges show which equipment is in operation. All units are controlled by the buttons and knobs on the desk.

WOLVERINE PIPE LINE SYSTEM

