Shell

GO DEVIL

1976:7

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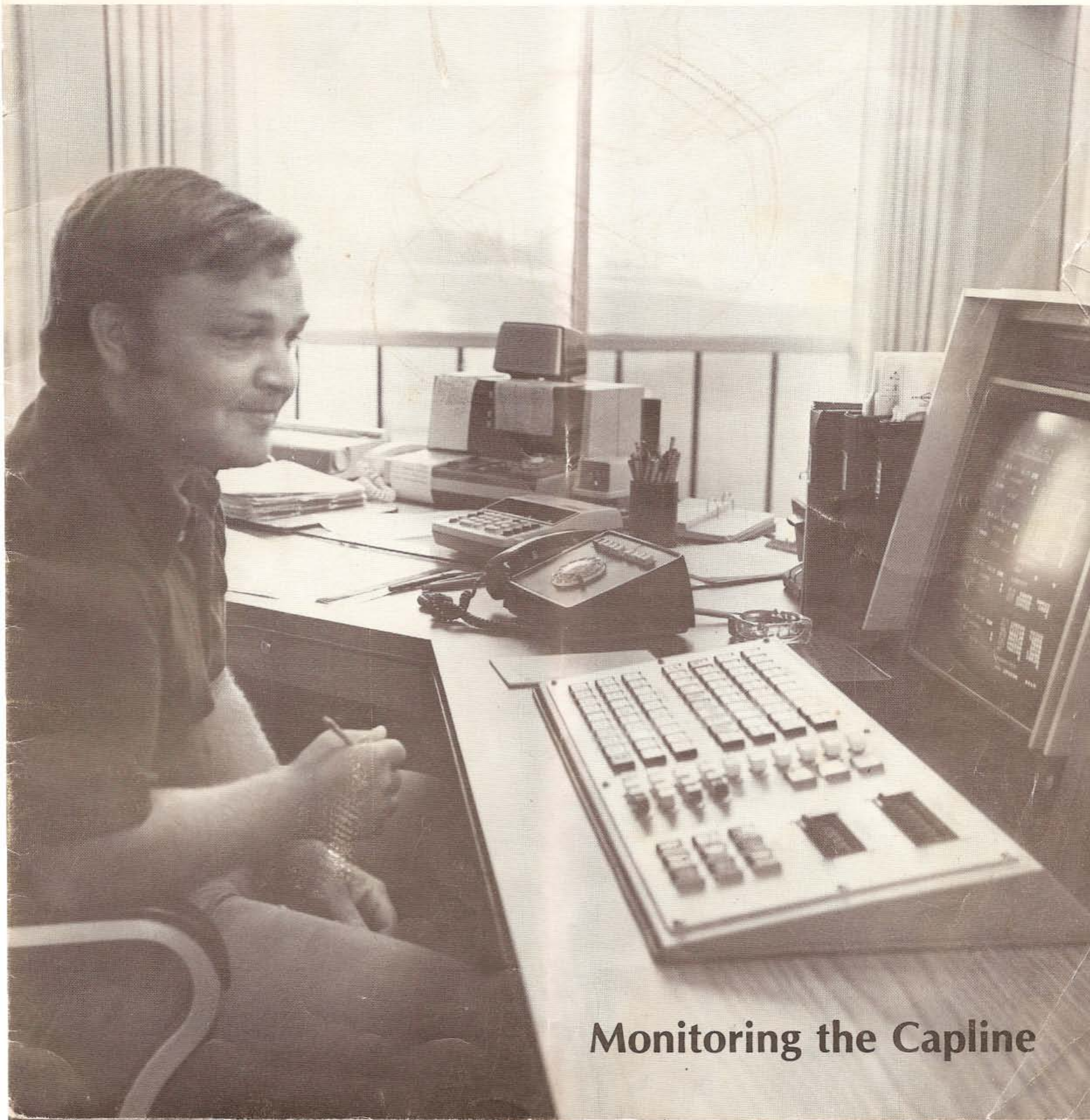

Monitoring the Capline

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Cover story: Ronald Bourgeois, oil movements controller, monitors the flow of crude up the Capline at the St. James computer center.

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editorially speaking

In the August 23 issue of the Oil and Gas Journal, Robert Ewing, Pipeline Editor, wrote a very relevant editorial concerning the rising costs of building a pipeline. With the permission of the Oil and Gas Journal, it is reprinted here for your information.

If you want to know how pipeliners build pipelines, just get on a pipeline right-of-way — land or sea, makes no difference. And should you do this each year, you may find that the past year's methods may have yielded to new practices.

Generally, a lot of pipe is welded end-to-end. A ditch is dug. The pipe is put into the ditch and then covered rather unceremoniously. Certainly, this statement is oversimplified. The whole act takes combined talent measured in hundreds of years of experience.

Once a year, however, the Journal delves deeply into a phase of pipelining other than that of a mechanical nature. We find it takes something other than skill and new procedures to get the job done. It takes money, lots of it.

On our annual trip to Washington, D. C. we visit federal agencies to find out how much money is actually spent on pipelines. And right away, we learn that last year's money will not buy this year's pipeline.

Relative costs of U.S. pipeline construction have risen to an all-time high. The relative cost index for construction has risen from an index of 100 in 1947 to an index of 343 in 1975, according to the Interstate Commerce Commission.

From 1947 through 1970, decreases or increases over the previous year rarely exceeded more than seven points. For the three years prior to 1974, the index increased an average of 14 points a year.

In 1974, the index increased 34 points. This approached the previous record set in 1963 when the index increased 45 points. In 1975, the index shows a shattering increase of 64 points.

Greatest increases have appeared in the costs of line pipe and linepipe fittings. For liquid lines, the average cost of these materials represents 29.1 percent of the total. Construction of these lines is costing an average of 38.4 percent of the total.

On a pipeline right-of-way, sparks are flying, our feet are muddy, and we have dust in our eyes. This spectacle continues mile after mile, and we enjoy it almost as much as eating.

But this is overshadowed by the awesome thought that we are watching a lot of bucks disappear as the bulldozer pushes the last bit of soil in place over a pipeline.

What happens after that is shown at the bottom of the last column under net income. For gas and oil pipelines in 1975, the combined total is nearly $2.2 billion.

However, it took 425,541 miles of interstate pipelines to do it. If we added another 52,000 miles onto that, the total mileage would equal a lunar round trip. But that last mile would cost a bundle.

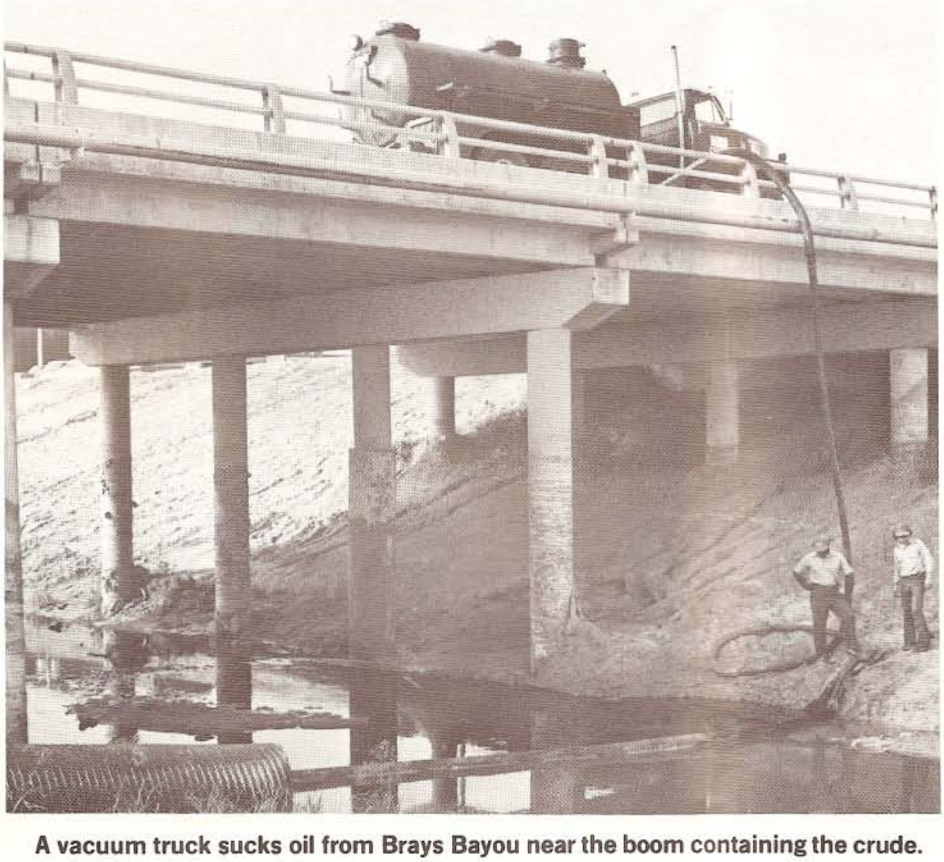
—Robert C. Ewing
Pipeline Editor
Oil and Gas Journal

City pipelining: same problems, different twist

Sue Wilson, John Gantenbein, Pete Eska and Bill Cooper study the hole being dug to expose the leaking pipe.

In the last Go-Devil, Carroll Boecker, Western District Superintendent, Gulf Coast Division, commented that pipeline maintenance has been complicated in areas such as Houston by tremendous residential growth around pipeline right-of-ways.

Well, those words were barely spoken when a prime example of this problem of pipeline maintenance in congested areas occurred. At approximately 4 a.m. on September 14, the Houston Fire Department received a phone call from a citizen reporting the presence of crude oil at the corner of Willowbend and Fondren, near a residential growth area. The fire department notified Shell Pipe Line of the probable leak in its Hope-Houston line at that location. Immediately, the line was shut down, and maintenance foreman Pete Eska and his crew went to work.



A vacuum truck sucks oil from Brays Bayou near the boom containing the crude.

Unfortunately, the fire department preceded the pipeliners to the area and sprayed the oil off the streets and into the storm sewers, which transported about 10 barrels of crude into the drainage ditches leading to Brays Bayou. When Pete and the maintenance crew arrived at the scene, booms were deployed to impede the progress of the oil until a vacuum truck could arrive and recover the oil from the drainage ditch. The Goodrich maintenance crew and oil spill van were also pressed into service for the clean-up.

With the oil contained, the next step was to find the leak. "We isolated the location of the leak to a professional building parking lot," said Pete Eska. "That meant we had to dig up the paved lot to reach the pipe about 10 feet down. That caused some disruption in the flow of traffic on Fondren Drive and into the parking lot, a problem you wouldn't encounter in a rural area."

Finding a pinhole leak is no easy task, but by four that afternoon, the hole was located close to the casing, near the road. The leak was then clamped off and the line was back in service shortly afterwards. By 5:30 p.m., the clean-up was complete, the emergency was over and the pipeliners could go home.

But this leak reminded the Houston pipeliners of the ever-present hazards of pipelining in metropolitan areas. "Reaction time on any leak is important," Carroll commented, "but time is especially critical in cities such as Houston where oil can get into a sewer system and potentially cause much larger problems."

At St. James

Computers man the line

An important element in any company is the people, the employees who work to make the company a profitable organization. But in today's world, it is sometimes nice to have a little outside help now and then. And that's where a computerized monitoring system such as the one for the Capline comes in handy.

"The purpose of this computer system," explains Jack Milam, Assistant Supervisor, Oil Movements, St. James, "is to rapidly gather information about the operating conditions along the pipeline from the St. James Terminal to Paroka and along Shell's Capwood line which ends at the Wood River Refinery. In order to fulfill this goal, the system was specially designed for Shell Pipe Line's needs by TRW, a computer hardware company that built the system based upon our specifications."

Dual computers

The computerized system is composed of several interrelated elements. First, there are the computers. When the system was initially installed in 1968, there was a single Sigma 2 computer. But in 1975, this single computer was replaced with dual Xerox 530's, three years earlier than previously forecast. Replacement was necessary because Capline expanded more rapidly than expected due to the increased demands for imported oil in the Midwest.

"We could have expanded the capacity of the Sigma 2," explained Bill Osborne, staff engineer, "but it would have cost twice as much as the original system. We could replace the Sigma 2 with two Xerox 530 computers for about three fourths of the original cost of the Sigma 2 due to the dropping cost of computer hardware. Just like your pocket calculators are getting lower in cost due to greater sophistication of their components, so too are computers getting lower in cost."

Although there are two computers, only one at a time runs the system. The backup computer is connected to the prime computer and is on "hot standby." Every 15 seconds, the backup computer looks over at the primary machine to determine if it is still running. If it isn't, the backup machine takes over.

Oliver Dufresne, transfer attendant, checks computer figures while Ronald Bourgeois, oil movements controller, instructs the computer, through his keyboard, to perform certain functions along the line.

Remote terminal units

In addition to the computers, there are remote terminal units (RTU's) at each of the 16 booster stations along the line. The remotes, black boxes which are hooked up to the station pumps, gather information about line pressures and flow rates. Every six-and-one-half seconds, the computer, via the communication lines, gathers the data from the RTU's. "The remote terminal unit is a major part of our system," explained Jack, "because when it stops working, our information about that station disappears."

Not all the work is done automatically by machines, however. The human factor must enter the operation of the pipeline at some point. And that's where the oil movement controller comes into the picture. Coordinating the communication between the computer and the remote terminal units is carried out by the oil movement controllers who sit atop a three-story building overlooking the tanker docking area. These controllers instruct the computer to perform certain functions through a keyboard unit and a CRT screen that lists all the various functions of the pumps at each station.

"By typing out the messages on the keyboard, the controller can direct the computer to send messages to each of the stations, altering the conditions on the line, like starting or stopping pumps, or opening or closing valves," explained Jack.

Microwave lines

Transmission of instructions from the computer to each of the stations is by microwave. Shell uses six communications channels to funnel the information to and from St. James. These channels overlap each other so that if one channel fails, there is still complete coverage of the line; the coverage simply isn't as dense as it once was.

"This channel overlap feature characterizes one of the basic features of our system — backup protection," explained Clyde McMeans, Engineering Assistant. "The main purpose of this system is to coordinate information rapidly, and in order to attain this goal, we need constant computer system integrity. So, for safety purposes, there are at least two of everything — computers, keyboards, CRT's and such."

How it works

Here's an example of how the system works: In the computer, there are limits set for the several programs (software) that churn through the raw data received from each of the pumping stations. Let's say that all of a sudden, the flow rate at the Oakland Station drops below the limit value that has been set for the data. The computer program that processes flow rate data will see it and will react, "Here's a rate that's out of tolerance. I'll go to the alarm program," which automatically generates a red alarm light on the CRT tube for the controller.

The flow rate change is probably the fastest way to detect a large leak on the line. But metering is the most efficient way to find a small leak over a longer period of time. "We have a fairly sophisticated way of comparing the metered input at St. James with the metered output at Patoka," said Clyde. "At least every 15 minutes, the input and output are compared, and any imbalance in the line is shown on the CRT."

Power optimization

In addition to maintaining the line integrity, the controllers use the system, in conjunction with another computer in Houston, to determine the most efficient use of power along the line. "This procedure is called power optimization," said Jack. "We have a teletype terminal that is linked to the Information Center in Houston. Electricity to run the pumps is cheaper at some stations along the line than at others. The Houston computer has stored in it the power contracts at each station. By typing into the computer which pumps are currently operational on the system and what flow rate we want, the computer can tell us which pumps to use to get the most efficient use of power along the line. It has been a real cost-efficient system for us."

Computers have been a cost-cutting and time-saving tool for pipeliners who have the responsibility for maintenance of line integrity. They have reduced the guesswork involved in finding leaks, and have enabled Pipe Line to efficiently operate its pipelines. But computers can't operate independently. The last say, the final decision is a human one. People are still the most important element in any successful operation.

Tankers such as the Amoco Savannah dock at St. James daily to deliver their crude to the Capline. The computer center also monitors tanker discharge.

Using his CRT screen, Ronald monitors the line's operation at each of the booster stations as Jack Milam looks on.

SPLC extinguisher prevents disaster

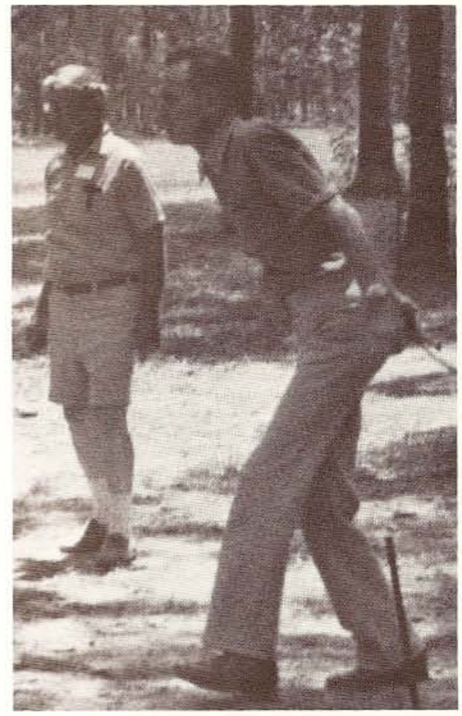
Bob Beemer, gauger-operator for the Wood River District, Mid-Continent Division, was working in his backyard on August 19 when his daughter said he was wanted on the telephone. It was his neighbor, in search of a fire extinguisher to put out a fire that had erupted from his electric stove, Fortunately, Shell Pipe Line had just given all its employees, including Bob, a fire extinguisher in recognition of Pipe Line's first place award in the 1975 National Safety Council Contest for Crude Pipelines, and Bob ran to help his neighbor, fire extinguisher in hand.

His neighbor's kitchen door was closed, and when they opened it, the smoke from burning wires almost choked them. They put a fan in the window with the intention of drawing the smoke from the room so they could see, but the fan would not run because the power was shut off. They finally lifted the burner plates on the stove, and Bob pulled the pin on the fire extinguisher and sprayed powder not only on the fire and the stove, but over the entire kitchen as well. Bob's neighbor sure had a mess to clean up, but at least he had a home to sleep in that night.

Bob learned one important thing from this little episode: All homeowners should have access to a fire extinguisher. Thanks to Shell Pipe Line, Bob had one available. When he took the extinguisher to be recharged, the man asked him if he wanted a loaner — you bet he did!

Janet Hess

Max Cummings, Joan Boecker, Curtis Boecker and Jolene Cummings are absorbed in a friendly game of dominoes.



John Gantenbein and Alan Arnold try their hand at a game of horseshoes.

Summer
Gulf Coast Di

The Western District employees of Pasadena in the Gulf Coast Division recently held their group picnic at Alexander Dussen Park near Lake Houston. Overeating was the most popular activity, but horseshoes, softball, volleyball and dominoes were also enjoyed.

—Photos by Gene Goings

For those active folks, volleyball was the hit of the picnic. Those hitting and spiking were Mike Burton, Tommy Godwin, Sheila Riddle, Terry Pearson, Juan Gonzales, Tom Sawyer and Doyle Campbell, Jr.