National Transportation Safety Board
Washington, D.C. 20594

Pipeline Accident Brief

Pipeline Accident Number:	DCA-96-MP-004
Type of System:	Petroleum products
Accident Type:	Release of hazardous liquid
Location:	Near Gramercy, Louisiana
Date and Time:	May 23, 1996, about 10 p.m. (CDT)
Owner/Operator:	Marathon Pipe Line Company[1]
Fatalities/Injuries:	None
Damage:	In excess of $7 million
Material Released:	Gasoline
Quantity Released:	About 475,000 gallons (about 11,300 barrels)
Pipeline Pressure:	1,094 psig
Component Affected:	20-inch steel pipe

Description of the Accident

On May 23, 1996, a pipeline controller was on duty in Marathon Pipe Line Company's pipeline operations center in Findlay, Ohio, operating and monitoring a 68-mile-long segment of Marathon pipeline located in Louisiana. This pipeline is used to transport hazardous liquids between a refinery at Garyville, Louisiana, and a station at Zachary, Louisiana. Pumps at the Garyville refinery pressurize the pipeline and generate the power to transport the liquids to the Zachary station.

About 9:53 p.m. central daylight time on May 23, the pipeline controller had just completed operations to transport a batch of unleaded gasoline through the pipeline. He then remotely executed commands to introduce into the pipeline (behind the gasoline) a batch of 125,000 barrels of low-sulfur diesel fuel.

About 10 p.m., unknown to the controller, the pipeline ruptured at a location near Gramercy, Louisiana. At 10:01:53 p.m., the supervisory control and data acquisition (SCADA) system[2] reported high-pump-case pressure at Garyville. The SCADA system activated an audible

[1] Because of a merger that took place since the accident, the name of the owner of the affected pipeline is now Marathon Ashland Pipe Line LLC.

[2] Pipeline controllers use the SCADA system to remotely control movement of product through the pipeline. Controllers can monitor flow rates and pressures along the lines and control valves and mainline pumps to adjust the flow and make product deliveries. According to Marathon, the company had, on May 1, 1996, put into operation a new SCADA system. The new system was functional at the time of the accident, and the controller had been trained in its use.

alarm and also displayed a message on a display screen. Almost immediately, the SCADA system sounded and displayed alarms reporting that certain pumping units at the Garyville station had automatically shut down because of low suction pressure (low liquid pressure on the inlet side of the pump).[3] At 10:02:30 p.m., the SCADA system reported a line balance alarm.[4]

The pipeline controller said he initially believed that the alarms resulted from activity at the refinery adjacent to the Garyville station. He said that on occasion the refinery would deliver product from the pipeline to river barges, an operation that sometimes decreased the pipeline pressure sufficiently to cause the SCADA system to alarm and to automatically shut down pumping units. According to the controller, this scenario had, in fact, occurred a few days before the accident.

The pipeline controller continued to receive alarms. Initially, he acknowledged each one individually, but believing that each subsequent alarm was related to operations at the refinery, he elected to simultaneously acknowledge all the alarms and the alarm text messages without attending to the nature of each alarm. The controller said he had anticipated a positive differential line balance alarm because of the shutdown of the pumping units. He said he therefore did not read the full alarm message on the SCADA screen and consequently did not notice that the line balance alarm was reporting a negative differential (indicating that less product was exiting the pipeline at Zachary than was being introduced at Garyville).

The controller said he called Garyville and discussed the situation with the station operator there. The station operator confirmed the automatic pump shutdowns. The station operator determined that the Garyville refinery was, indeed, loading product to a barge. Even though refinery personnel reported that the volume of product being delivered was insufficient to have caused the SCADA system to alarm, the pipeline controller and the station operator concluded that the loading of the barge had precipitated the alarms and the pump shutdowns.

About 10 minutes after the initial alarm, the controller attempted to restart the pumps that had shut down automatically. The pumps restarted, but went down again. At 11:00:30 p.m., about 1 hour after the pipeline rupture, the controller received another line balance alarm. This time, he closely examined the data and also checked the readings of the flow meters for the Zachary station. Determining that product was leaking from the pipeline, he immediately initiated emergency action. Marathon crews were dispatched to the site, determined the approximate leak location, and completed manual closure of valves on either side of the rupture

[3] The high-pump-case pressure alarm would also have triggered a pump shutdown.

[4] The *line balance alarm* signals to the controller that the amount of product metered out of the pipeline at Zachary is different from the amount of product being metered through the Garyville refinery and that the difference exceeds the preset alarm limits. If the Zachary meter reports a higher volume of product than the Garyville meter, the alarm message will tend to display a positive line balance differential. If the Garyville meter registers more product at the beginning of the line than is being removed at Zachary, the alarm message will tend to indicate a negative differential. (Marathon's line balance system may be better described as a modified volume balance system in that it attempts to account for volume changes within the pipe.)

at approximately 2:30 a.m. on May 24, 1996. Closing these valves isolated the rupture site within an approximate 3.5-mile segment of the pipeline.

The ruptured pipeline ultimately released about 475,000 gallons of gasoline into a common pipeline right-of-way and marsh land. Gasoline also entered the Blind River, causing environmental damage and killing fish, wildlife, and vegetation in the area. After the accident, Marathon arranged for the deployment and construction of containment and sorbent booms, berms, and fencing at several locations to minimize damage and deter public access.

Investigation of the rupture site revealed an approximate 200- by 100-foot excavation area that extended over the Marathon pipeline and included the rupture site. Safety Board investigators found a longitudinal crack approximately 53 inches long near the top of the pipe. In the area of the crack were multiple dents, scrapes, and gouges that were consistent with damage that would be made by a backhoe or similar digging tool.

The investigation determined that in 1995, LaRoche Industries, Inc., arranged for excavation of and repairs to various portions of its 8-inch pipeline, which was located about 30 feet from the Marathon pipeline. These excavations took place in September and October 1995 in the vicinity of the Marathon pipeline rupture.

According to Louisiana law, an excavator, before beginning work, must use the Louisiana One Call system to ensure that no buried utilities will be affected by the excavation. No evidence was found that LaRoche or its excavation contractor used the Louisiana One Call system or made any attempt to coordinate the excavation activities with Marathon or any of the other operators with pipelines in the vicinity of the excavation near the site of the eventual rupture.[5] According to officials from LaRoche's contractor, the equipment operators were told by LaRoche superintendents that no pipelines were located in the area of the Marathon pipeline. A LaRoche superintendent who supervised the excavation stated that when the excavation work was completed, the excavation crew did not fill in the excavated area. According to Marathon officials, the company was not informed by LaRoche or LaRoche's excavation contractor of any incident or activity involving its pipeline in the area of the eventual rupture. Other pipeline operators with pipelines in the area of the Marathon pipeline told the Safety Board that they had not performed any excavation work in the area of the rupture since at least May 1990.

LaRoche, in April 1998, implemented a written policy for repairing its 8-inch pipeline that includes requirements to notify the Louisiana One Call system before beginning excavations. LaRoche has told the Safety Board that all its future excavations will be preceded by notification of the Louisiana One Call system.

Marathon has reported that since the accident, it has run a "smart pig" (a magnetic flux internal inspection tool) down the entire 68-mile length of the accident pipeline, with particular

[5] Records indicate that the excavation contractor used Louisiana One Call once during its work for LaRoche, but that call involved excavations 1 to 2 miles from the eventual pipeline rupture.

attention given to those segments that parallel the LaRoche pipeline. According to the company, segments that showed indication of significant damage have been repaired or replaced.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was damage done to the Marathon pipeline during excavations of a nearby pipeline operated by LaRoche Industries, Inc., which resulted from the failure of LaRoche Industries, Inc., either to take adequate measures to ensure that excavations performed under its supervision did not damage underground utilities or to notify Marathon Pipe Line Company that those excavations may have damaged the Marathon pipeline. Contributing to the severity of the accident was Marathon's delay in recognizing the rupture, which delayed shutting down the pipeline and isolating the rupture.

Adopted: September 21, 1998