

Roy P 266 SP-20

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 10, 1985

Forwarded to:
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Chairman, President and
Chief Executive Officer
Texas Eastern Corporation
1 Houston Center
Post Box 2521
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SAFETY RECOMMENDATION(S)

P-85-6

About 9:15 p.m., c.s.t., on April 27, 1985, natural gas at about 960 psig ruptured a 30-inch diameter pipeline, tore out about 29 feet of the carrier pipe, blew apart about 16 feet of a 36-inch-diameter casing pipe, blasted an opening across Kentucky State Highway 90, and cut out a pear-shaped crater approximately 90 feet long, 38 feet wide, and 12 feet deep about 2 miles east of Beaumont, Kentucky. The escaping natural gas ignited almost immediately and incinerated an area extending 800 feet north and south and 600 feet east and west of the rupture. Five persons were killed in a house about 320 feet north of the rupture, and three persons were injured in a housetrailer about 330 feet south of the rupture. The gas-fed fire destroyed two houses, three housetrailer, a sawmill, two barns, a schoolbus, numerous parked and abandoned automobiles, and nine pieces of road construction equipment.

The gas transmission pipeline was operated by your subsidiary, the Texas Eastern Gas Pipeline Company (Texas Eastern) between Texas and New York. At 9 p.m., the pipeline was operating normally at its Tompkinsville, Kentucky, compressor station, where natural gas was being compressed to 998 psig in three large diameter pipelines (Nos. 10, 15, and 25) which extended northward from the station. At 9:15 pm, the Tompkinsville Compressor Station operator received a telephone call from a resident of Beaumont who informed him of the explosion and intense fire in the vicinity of the Texas Eastern pipelines. While proceeding to check the pressure gauges of the two compressors at the station, the operator saw a large orange glow in the sky north of the station. The station's recording discharge pressure gauge indicated a sharp, rapid pressure drop from 998 psig to less than 400 psig, at which point the recording pin went off the chart. The station operator confirmed that the pressure drop was in the No. 10 line, closed the station valve on the No. 10 line, shut down one compressor, and then alerted company personnel by telephone to close crossover valves located about 20 miles north of the station. The crossover valves to the No. 10 line were closed at 9:30 p.m. At 11:20 p.m., the fires had burned out except for grass fires and residual flames burning small amounts of gas at the open ends of the pipe at the rupture.

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Several hours later after the area had cooled, an inspection was made of the accident site. Safety Board investigators examined, measured, and photographed the failed pipe in the crater and six pieces of the 30-inch-diameter pipe which had been blown out of the crater and had been ripped from the main body of the pipe by the force of the explosion. Severe, extensive external corrosion pitting was found in the area of the pipe failure and a longitudinal rupture about 30 feet long extended northward within the casing. The wall thickness of the pipe had been reduced substantially by corrosion from the original specified pipe wall thickness of .375-inch to 0.140-inch and less at some locations.

The No. 10 line was installed in 1952 and was encased in a 36-inch-diameter pipe where it crossed under roads and railroads. The No. 15 line, a 30-inch-diameter pipeline constructed in 1957, lay 25 feet west of the No. 10 line, and the No. 25 line, a 36-inch-diameter pipeline constructed in 1965, lay 25 feet east of the No. 10 line.

The effectiveness of the cathodic protection of pipelines encased at road and railroad crossings can be monitored generally by measuring the voltage difference between the pipe and soil and the casing and soil. When the voltage differences between these readings is small, corrosion is more likely to occur. At State Highway 90 where the three pipelines crossed the road, the lines had been checked during the annual corrosion survey on March 29, 1985, and the following voltages had been recorded.

<u>Line No.</u>	<u>Pipe-to-Soil (volts)</u>	<u>Casing-to-Soil (volts)</u>	<u>Voltage Difference</u>
15	1.440	0.700 volt	0.740
10	1.330	1.240 volt	0.090
25	1.480	0.670 volt	0.810

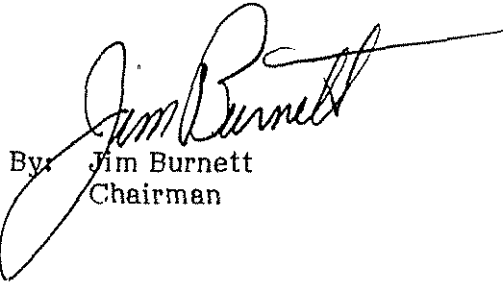
At the rupture location, the No. 10 line had only a 0.090-volt difference between the pipe and its casing, while the No. 15 line had more than eight times that difference and the No. 25 line had nine times that difference at the same location. In general, the greater the voltage difference between the carrier pipe and its casing, the more electrically insulated the carrier pipe is from the casing pipe and the better it is protected cathodically. In its initial review of the records of a 30-mile section of the Texas Eastern pipeline system, the Safety Board determined that other pipe-to-soil and casing-to-soil readings were closely approaching the same values as the the No. 10 line and that corrosion inducing conditions may exist at other locations on the pipeline system.

Therefore, the National Transportation Safety Board recommends that the Texas Eastern Gas Pipeline Company:

Review all cathodic protection test station readings for pipe installed in casing to identify those locations where there is the possibility of a direct or partial electrical short circuit, conduct necessary inspections and tests to confirm or reject the existence of corrosion, and take corrective action to restore cathodic protection and to eliminate unsafe conditions. (Class I, Urgent Action) (P-85-6)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "... to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in this recommendation.

A handwritten signature in black ink, appearing to read "Jim Burnett", with a long horizontal flourish extending to the right.

By: Jim Burnett
Chairman