

NATIONAL TRANSPORTATION SAFETY BOARD  
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Forwarded to:

Mr. D. L. Dienstbier  
President  
Northern Natural Gas Company  
2223 Dodge Street  
Omaha, Nebraska 68102

SAFETY RECOMMENDATION(S)

P-83-12 and -13

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About 2:15 p.m., c.s.t., on November 4, 1982, a tile plow installing field drainage tile on a farm located 4 miles west of Hudson, Iowa, struck and punctured a well marked, 20-inch-diameter natural gas transmission pipeline. Natural gas escaping at about 820 psig ignited immediately, and the ensuing fire killed five persons, destroyed five pieces of excavation machinery and two pickup trucks, and burned several acres of soybean stubble. 1/

The Safety Board believes that excavation-caused damage to pipelines can be prevented by pipelines being well marked, by notifying pipeline operators in advance of proposed excavating activities, by having pipeline operator representatives on site during excavation, and by utilizing contractors who perform their work in a careful, conscientious manner. In this accident, these precepts had been met. The contractor had notified the company of his intention to excavate well in advance of work commencement as well as on the day of the excavation, and the company had responded by marking its facilities and sending a maintenance man to monitor the operations. The contractor, in the presence of the maintenance man, had successfully excavated across both pipelines, and the maintenance man had determined that both pipelines were 8 feet deep where they were crossed; up to that point everything had been done correctly. However, two things were then done which negated all of the previous good work and which set the stage for this accident.

First, the contractor changed his plans, but did not inform Northern's maintenance man. Second, the maintenance man left the job site before all work over the pipelines had been completed. The contractor had previously excavated 10 feet south of the 20-inch pipeline, from which point he reportedly had said that he would continue with two strings of 5-inch tile, one in a southerly direction and one in a southeasterly direction (away from the pipelines). This would have necessitated the installation of a 6"x5"x5" Y-tile at this point. Apparently, between the time that Northern's maintenance man left and the time that the contractor resumed tiling, the contractor decided to start the 5-inch tile installation between the 20- and the 26-inch pipelines, rather than to the south of the pipelines.

1/ For more detailed information, read Pipeline Accident Report—"Northern Natural Gas Company Pipeline Puncture, Explosion and Fire, Hudson, Iowa, November 4, 1982" (NTSB-PAR-83-2).

The contractor may not have wanted to take the time to obtain the necessary additional 6-inch tile needed to "hand lay" the 30 to 35 feet to clear the pipelines before he started to install the 5-inch tile. However, it is unlikely that the contractor, who had been so cautious and attentive when first crossing the two pipelines and who had about 30 years of experience and was well aware of the hazards of excavating near high pressure pipelines, would have started tiling from a point between the two pipelines unless he believed that the lines were as deep 35 feet to the east as they were at the first crossing. For whatever reason the contractor changed his plans, he did not inform Northern's maintenance man.

The maintenance man left the job site before the tiling operation had been completed across both pipelines. Although the excavation had been completed across both pipelines, a 6-inch tile installation and a backfill operation had yet to be completed, and the maintenance man should have remained at the job site. If he had remained, the maintenance man would have learned of the change in plans and, based on his prior actions, it seems likely that he would have measured the pipeline depth with his spotting bar at the point of the new crossing. Based upon the shallower depth which thus would have been determined, it would have become obvious to the maintenance man and to the contractor that the new crossing would have required hand excavation because the use of mechanical equipment would have been too dangerous. In this case, if either the contractor had mentioned his change of plans to the maintenance man or if the maintenance man had remained at the job site, preventive measures would likely have been taken to avoid the puncture.

Northern did not have any detailed maps of the pipelines at the Waverly valve site which showed their depth and profile. The depth of the pipelines -- 8 feet -- at the valve site had been determined by the maintenance man. Even if, as he stated, the company maintenance man had told the tile contractor that the lines were shallower further away in the field, the information did not provide the contractor with specific information on the depth of the pipelines at the accident site. The need for accurate maps and records has been discussed previously by the Safety Board in other accident investigations.

On May 17, 1978, in Mansfield, Ohio, a pipeline accident <sup>2/</sup> occurred which involved the erroneous tapping by a gas company maintenance crew of high pressure gas into a low pressure distribution system because of inaccurate gas main maps. Gas at 42 psig entered the 0.4 psig low pressure system. Pilot lights flared 2 feet high and burned 16 houses, 5 of which suffered extensive damage.

On June 28, 1982, a gas company's service line was snagged by a contractor in Portales, New Mexico. <sup>3/</sup> The line was pulled out of a compression coupling under the street in front of a house. Thirty-seven days later, the slowly migrating gas exploded in the house and six persons were killed. At the time of the accident, none of the gas service lines in Portales were shown on the gas company maps. In both the Mansfield and Portales accidents, if accurate maps had been available and had been used, the accidents would not have occurred.

By the same token, Northern did not have a profile map for the Grundy Road crossing to better inform its maintenance man and, in turn, the contractor. As Northern's representative, the maintenance man should have been briefed about the pipeline depth,

<sup>2/</sup> Safety Recommendations P-78-45 through -52, issued August 21, 1978.

<sup>3/</sup> For more detailed information, read Pipeline Accident Report—"The Gas Company of New Mexico, Natural Gas Explosion and Fire, Portales, New Mexico" (NTSB-PAR-83-1).

the pipeline profile, and how abruptly the lines ascended from the road crossing at the accident site. Without maps and records, a spotting bar would have had to have been used to measure the depth where other excavation activities close to the pipeline were to be undertaken.

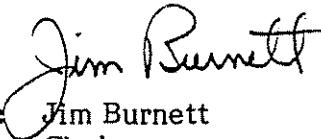
As a result of its investigation of this accident, the National Transportation Safety Board recommends the Northern Natural Gas Company:

Revise its procedures to require that employees performing excavation inspection work near company facilities be fully informed as to the location, depth, and change in depth of these facilities and to remain on the job until all excavation activities are well clear of company facilities. (Class II, Priority Action) (P-83-12)

Instruct its employees to clearly explain to contractors working near company facilities that the depth of a pipeline may change abruptly in short distances and that the contractor should immediately notify the company about any changes in planned excavation activities. (Class II, Priority Action) (P-83-13)

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." (P.L. 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 recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.

  
By: Jim Burnett  
Chairman