

Log P-240

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Mr. G. A. Lawrence
President
American Gas Association
1515 Wilson Boulevard
Arlington, Virginia 22209

Mr. Jerome J. McGrath
President
Interstate Natural Gas Association
of America
1660 L Street, N.W.
Washington, D.C. 20036

SAFETY RECOMMENDATION(S)
P-83-38 through -40

At 12:04 p.m., mountain daylight time, on May 26, 1983, natural gas at 815 pounds/square inch gage began to escape through a failed gasket in a compressor at the El Paso Natural Gas Company's Blanco Gasoline Plant near Bloomfield, New Mexico. The compressor station operator heard a loud noise, ran to the valve manifold outside the compressor building, and tried to shut off the gas supply to compressor No. 14. Another employee, who also heard the noise, ran into the compressor building and tried to shut down the compressor engine. Before either person succeeded, the escaping gas ignited, exploded, and burned. The two employees were burned severely, one compressor was destroyed, another compressor was damaged, the windows and doors of the compressor building were blown out, and other structural damage resulted. 1/

Compressor Examination.—After the accident, a team of investigators, including a Safety Board investigator, checked the compressor piping and compressor No. 14 for leakage. The nuts were loosened and removed from the No. 2 compressor cylinder using a torque wrench and the torque, measured in foot-pounds, was recorded for each bolt removed. 2/ On compressor cylinder No. 2, the torque required to loosen the nuts ranged

1/ For more information read, Pipeline Accident Report: "El Paso Natural Gas Company Compressor Station Explosion and Fire, Bloomfield, New Mexico, May 26, 1983," (NTSB/PAR/83/4).

2/ Torque: The amount of twisting force, expressed in inch-pounds or foot-pounds, applied to the nut, when a nut is used, or applied to the head of a cap screw (threaded into a tapped hole). Twelve-inch pounds or one-foot pound of torque would be created by exerting a one pound pull on a point of a wrench handle exactly 12 inches from the center line of a bolt.

from a low reading of 0 foot-pounds (loose) at the area of the failure, to a high reading of more than 400 foot-pounds on the internal nuts. On the external nuts of the same cylinder head, the torque readings ranged from a low of 0 foot-pounds (loose) to a high reading of 390 foot-pounds. After the compressor head was removed, a failed gasket was discovered.

The bolts on compressor cylinders Nos. 1 and 3 and the bolts on the suction and discharge bottles were also loosened and removed and the torque required to loosen them was recorded. Visual inspection of the stud bolts and nuts revealed that they had not been overtightened nor had they failed.

The gas company does not have written procedures specifically detailing torquing operations for compressor head bolts. However, at unspecified intervals, gas company maintenance personnel are required to view a 2-hour video tape on proper maintenance procedures, a portion of which discusses proper torquing procedures. In addition, the gas company has specifically prohibited the use of air wrenches on cast iron engines or compressor heads.

As a result of the Safety Board's investigation of an explosion and fire in a compressor station near Robstown, Texas, on December 7, 1976, ^{3/} the American Gas Association, Compressor Committee developed guidelines (yet to be published) for the torquing of threaded fasteners. These guidelines specifically recommend against attempting to "tighten down" a leaking gasket under pressure. Had these guidelines been issued at the time of the accident and adhered to by the gas company, the Safety Board believes that this accident would have been avoided.

Emergency Operations.—It is difficult to say precisely how much time had passed from the time the gasket failed until the gas ignited, but a review of actions taken by the operator and the attendant indicate that at least 1 minute had elapsed. If, within that minute, either the operator or the attendant had activated the Plant A emergency shut down (ESD) switch located just outside of the south door of the compressor building, all of the compressors would have shut down, all of the valves would have been closed, all of the electricity would have shut off, and most of the other sources of ignition would have been eliminated. As a result, the escaping gas probably would not have ignited.

The operator's actions to try to "unload" the compressor by shutting off the supply of pipeline gas took too much time to accomplish and posed too great a risk. During a postaccident interview, he stated that if he had it to do over again he would have shut off the fuel to the compressor and then unloaded it. Likewise, the attendant's action of running toward the front of compressor No. 14 and trying to shut off its fuel gas was unsuccessful as well as risky.

Although both persons reacted rapidly to the emergency, their actions were inappropriate. Either they assessed the emergency incorrectly or their training was not sufficient to allow them to formulate proper corrective action. The Emergency Plant Plan — Blanco Plant—lists names, addresses, and telephone numbers of key persons to be notified in the event of an emergency, describes critical valves, incorporates station piping diagrams, defines fire protection equipment, and details the emergency shutdown system. However, it does not describe or detail what constitutes an emergency nor does it provide guidelines or instructions for situations which require shutdown of a compressor plant, shutdown of the entire complex, or blowdown of a failed facility. Given the

^{3/} Pipeline Accident Report, "Exxon Gas System Inc., Natural Gas Explosion and Fire Robstown, Texas, December 7, 1976," (NTSB-PAR-77-3).

incompleteness of the Emergency manual, it is understandable that even though they had signed statements that they understood the Emergency Plan, neither the operator nor the attendant activated the ESD or remembered to activate the Plant A blowdown valve to relieve the gas pressure in the station piping. The Safety Board, therefore, concludes that better guidelines and instructions on appropriate action in various emergency situations, as well as training, drilling, and testing of gas company personnel regarding such appropriate action, might have greatly reduced the effects of this accident.

Therefore, the National Transportation Safety Board recommends that the American Gas Association and the Interstate Natural Gas Association of America:

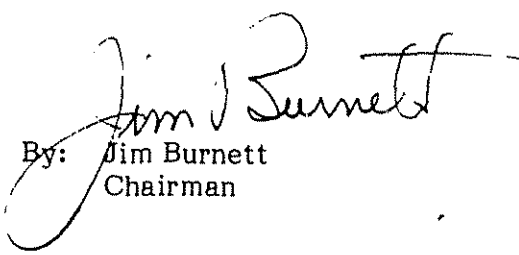
Notify its member companies of the circumstances of the accident in Bloomfield, New Mexico, on May 26, 1983, and urge them to emphasize to their maintenance employees the importance of bolt tightening procedures, the correct sequence of bolt tightening, and the hazards of tightening bolts under pressure. (Class II, Priority Action) (P-83-38)

Urge its member companies to review their Emergency Operations for clarity and specificity and to train, drill, and test their employees on their knowledge of these procedures. (Class II, Priority Action) (P-83-39)

Advise its member companies to coordinate and cooperate with local fire and emergency agencies along their systems to allow them to become familiar with company facilities and to provide facility maps to these agencies in order that rapid, effective response can be made in emergency situations. (Class II, Priority Action) (P-83-40)

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. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

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


By: Jim Burnett
Chairman