



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: November 4, 2004

In reply refer to: P-04-13

Dr. Arthur W. Winston
President
Institute of Electrical and Electronics Engineers
445 Hoes Lane
Piscataway, New Jersey 08854

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the adequacy of industry standards for emergency planning. The recommendation is derived from the Safety Board's investigation of the April 7, 2003, storage tank explosion and fire in Glenpool, Oklahoma, and is consistent with the evidence we found and the analysis we performed.¹ As a result of this investigation, the Safety Board has issued eight safety recommendations, one of which is addressed to the Institute of Electrical and Electronics Engineers. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On April 7, 2003, about 8:55 p.m., central daylight time, an 80,000-barrel storage tank at ConocoPhillips Company's (ConocoPhillips) Glenpool South tank farm in Glenpool, Oklahoma, exploded and burned as it was being filled with diesel. The tank had previously contained gasoline, which had been removed from the tank earlier in the day. The tank contained between 7,397 and 7,600 barrels of diesel at the time of the explosion. The resulting fire burned for about 21 hours and damaged two other storage tanks in the area. The cost of the accident, including emergency response, environmental remediation, evacuation, lost product, property damage, and claims, was \$2,357,483. There were no injuries or fatalities. Nearby residents were evacuated, and schools were closed for 2 days.

The Safety Board determined that the probable cause of the storage tank explosion and fire was ignition of a flammable fuel-air mixture within the tank by a static electricity discharge due to the improper manner in which ConocoPhillips conducted tank operations. Contributing to the extent of the property damage and the magnitude of the impact on the local community was

¹ For additional information, see National Transportation Safety Board, *Storage Tank Explosion and Fire in Glenpool, Oklahoma, April 7, 2003*, Pipeline Accident Report NTSB/PAR-04/02 (Washington, DC: NTSB, 2004).

the failure of American Electric Power (AEP) employees to recognize the risk the tank fire posed to the nearby power lines and take effective emergency action.

AEP power poles were located east of the Glenpool South tank farm on top of the wall of the dike that surrounded the tank farm. The facilities included three conductors and two shield wires² supported off a single cross bar on dual wooden poles. AEP personnel became aware of the accident through broadcast news reports shortly after the explosion occurred, and although the AEP transmission system operator knew the AEP power lines were near the fire, no AEP personnel responded until several hours later when a ConocoPhillips employee contacted AEP and asked that the electric lines be inspected. An AEP representative visited the scene twice while the tank burned, and he inspected the power lines. But he did not notify the incident commander when he arrived on scene or inform him of his findings. About 6:00 a.m. on April 8, the shield wires and energized conductors on these poles fell to the ground. This started a fire in the unburned diesel that was released from the destroyed tank that was being impounded in the dike north of the destroyed tank 11.

Because of the proximity of the AEP power lines and the Glenpool South tank farm, it is obvious that damage, a failure, or an emergency at one facility had the potential to jeopardize the safety of the other. However, neither AEP personnel nor ConocoPhillips personnel had contacted one another to familiarize themselves with the affected facilities at the Glenpool South tank farm or to plan for a coordinated response to pipeline and electrical emergencies there.

The fact that the AEP representative never made contact with the incident commander limited the incident command's ability to keep AEP informed as the fire situation changed and limited AEP's knowledge of the situation. As a result, AEP's second response to the accident site was too late, and its overall response was ineffective.

Many States, including Oklahoma, have adopted the *National Electrical Safety Code*, published by the Institute of Electrical and Electronics Engineers. Other States have adopted all or part of the code or use its provisions as the basis for regulations. Nationally recognized codes are an important resource for facility operators. When written by Government and industry professionals with experience in emergency planning, implementation, and personnel training, a code can be a primary reference when an operator prepares a company-specific emergency plan. The *National Electrical Safety Code*, however, does not address emergency preparedness.

Other industry codes applicable to major infrastructure include provisions for emergency planning and training (for example American Society of Mechanical Engineers [ASME] B31.8, ASME B31.4, and National Fire Protection Association [NFPA] 30).³ The Safety Board concluded that comprehensive, practical industry guidance for the preparation of emergency plans would help operators of electric systems respond effectively to emergencies involving their utilities.

² A *shield wire* is a grounded conductor installed to shield a phase conductor from a direct lightning strike.

³ ASME B31.8 (*Gas Transmission and Distribution Piping Systems*), ASME B31.4 (*Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids*), NFPA 30 (*Flammable and Combustible Liquids Code*).

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Institute of Electrical and Electronics Engineers:

Revise the *National Electrical Safety Code* to establish requirements for operators to prepare and implement emergency response plans for electric facilities where an emergency may affect pipeline facilities or that may be affected by emergencies at pipeline facilities. (P-04-13)

The Safety Board also issued safety recommendations to the Research and Special Programs Administration in the Department of Transportation, ConocoPhillips Company, American Electric Power, and the American Society of Mechanical Engineers. In your response to the recommendation in this letter, please refer to Safety Recommendation P-04-13. If you need additional information, you may call (202) 314-6177.

Chairman ENGLEMAN CONNERS, Vice Chairman ROSENKER, and Members CARMODY, HEALING, and HERSMAN concurred in this recommendation.

By: Ellen Engleman Connors
Chairman