FACE: 84-13
DATE: none
CAUSE: Confined Space (Poisoning)
SUBJECT: Two Confined Space Fatalities During Construction of a Sewer Line

On March 8, 1984, a male worker entered an enclosed sewer that was under construction, to fill a pump with gasoline. He was killed by carbon monoxide (CO) poisoning, and a male Arizona Department of Transportation inspector was also killed by CO while attempting a rescue. Following rescue attempts, 30 firefighters and 8 construction workers were treated for CO intoxication and/or exhaustion.

In the course of constructing an Interstate Highway, the contractor had to construct several thousand feet of new sanitary sewer line, 66 inches in diameter, connected to an existing line. The existing line was to remain in operation, and a 30-inch bypass line was installed to pass sewage around the point where the new line was attached. Sandbags to keep sewage out of the new line were not effective, so the contractor substituted a steel plug and placed a gasoline-driven pump in the new line to remove sewage that had seeped past the sandbags. The pump was located 3,000 feet from the entrance of the new line and 1,200 feet from the nearest manhole on the new line -- an enclosed area. Fueling the pump every three days was not sufficient to drain the sewage, and on the 8th a procedure of refueling the pump three times a day was initiated. At 3:00 P.M. a foreman and worker (the foreman's son) entered the new line through the entrance to refuel the pump for the second time that day. About 450 feet from the pump, the foreman halted. The worker went forward, and was instructed to keep talking so that the foreman would be aware of problems. The foreman heard the worker try to start the pump four times and complain of dizziness. The foreman ordered the worker back, but by the time the foreman reached the worker, he was down and unresponsive. The foreman was unable to carry him out, and left for help. Seven construction workers and the state inspector entered the line. Six of the workers left before they could reach the victim; the worker who reached the victim could not move the victim and had to exit as well. At 3:26 P.M. the fire department received a call, and firefighters were at the scene shortly after 3:30. The fighters were equipped with 30-minute SCBAs, a short time given the long distances the fighters had to travel in the sewer. On finding the inspector, who was still breathing, fighters placed a SCBA on him and resorted to "buddy breathing" to exit. The inspector was retrieved at 4:00 and the laborer at 5:00 P.M. Both were dead at the scene with carboxyhemoglobin levels over 50%. Recommendations:

- Effective plans for keeping sewage out of the new line should have been made ahead of time. The pump should either have been located outside the sewer with a hose running down, or an electric pump should have been used.

- Workers entering enclosed spaces should be trained on the dangers of enclosed spaces, air in enclosed spaces should be tested before entry, and ventilation or SCBA should be available.

- Management should establish safe policies and procedures on rescue efforts.

- The fire department should examine its policies on "buddy breathing," and consider obtaining more powerful SCBA gear.