



Bulletin No. 6

March 16, 1984

Hospital Evacuation - Ethylene Oxide Suspected

On Friday September 16, 1983, toxic fumes forced the emergency closure of Valley Hospital in Palmer, Alaska. All employees and patients were evacuated from the hospital.

Of the approximately 70 employees and 19 patients present at Valley Hospital on Friday, September 16, 12 hospital employees complained of illness and were treated in the hospital emergency room. Between 9:00-11:00 a.m., 10 employees detected an unusual odor in their workplace, described as "sweet, musky, like-ether, or like burnt broccoli". Within 30 minutes to two hours, symptoms developed characterized by nausea (83%), weakness (83%), fatigue (50%), headache (92%), chills (50%), tingling (50%), and watery eyes (42%). Additional symptoms included fatigue, paleness, confusion, feeling of floating, excitement, euphoria, sweating, nasal irritation, feeling flushed. Acute symptoms resolved within a 4-12 hour period of time. The onset of illness occurred at almost identical times among the affected individuals. Two males and 10 females were affected; their ages ranged from 15-52 years.

At the time of the evacuation, Valley Hospital was in the midst of building a new addition and renovating the old building. Of 8 individuals located in the medical records room and the admitting and business office room, all developed symptoms. In addition, illness affected one individual working in the basement of the old hospital, one person involved in hospital maintenance who was circulating through the hospital, one individual working in the laboratory, and one individual whose office was in the old building but who became ill after entering the medical records area. No patients or hospital employees who were located in the old hospital building, the patient wing, or in the emergency room developed similar illness. No construction workers became ill.

Two air samples were obtained at Valley Hospital at 5:10 p.m. on September 16. Ethylene oxide was found at a concentration of 0.2902 moles percent (4400 ppm) at the floor of the gas sterilizer room and 0.0451 moles percent (684 ppm) at the floor of the business office. These levels are substantially above federal OSHA standards of 50 ppm.

A new ethylene oxide gas sterilizer had been installed in the new hospital, supplied by two cylinders containing an ethylene oxide/Freon gas mixture (12%/88% proportion). After calculating the amount of gas used per cycle, and the number of cycles run, approximately 50 lbs. of gas mixture was potentially unaccounted for. A detailed check of the gas sterilizer failed to identify a defect that would account for a loss of 30-50 lbs. of ethylene oxide/Freon gas. All employees who became ill, except one person who developed illness in the basement supply room in the old building, were located in areas of the hospital which received their air supply from one of the two air supply units - the one most closely adjacent to the main air exhaust port. Examination of the area in which the sterilizer was located revealed several possible routes which could account for gas reaching the hospital air distribution system, as well as the basement supply room of the old hospital building.

Epidemiologic investigation supports strongly the hypothesis that illness among employees was due to a common source environmental exposure. Serious problems were discovered with the ventilation and exhaust systems of the new hospital. In addition, several problems were discovered with the installation and operation of the gas sterilizer. However, none of these findings have explained the specific source of the gas leak, and there is no proof that the illness was caused by ethylene oxide/Freon gas.

Prompt action by hospital personnel and administrators to evacuate patients and close the hospital is to be commended. All employees had recovered from their acute symptoms when re-interviewed on September 20, 1983. Based on epidemiologic investigation, and assuming the cause of illness was from acute exposure to ethylene oxide/Freon gas, it is unlikely that any serious acute medical problems could be expected from the exposure which might have occurred. While it is also theoretically possible that long-term, adverse effects could occur from exposure to ethylene oxide, the possibility is so extremely remote so as not to warrant serious consideration.

(We wish to thank the following individuals for their assistance and cooperation: Eric Buckland, Hospital Administrator, Penny Chmielewski, Head Nurse, Drs. Michael Senta, Linda Slone, Mike Moser, Valley Hospital; Vincent Moore and Jim Garrison, AMSCO Sterilizer Company; Mr. Bob Martin, Mr. Steve Zrake, DEC; Mr. Steve Ede, Chemical and Geological Laboratories of Alaska; Dr. Jim Melius, NIOSH; Sandy Witek, Stuart Ashley, OSHA.)