

Investigations of Industrial Hazards in State Government Facilities

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ALTHOUGH the primary function of the industrial hygiene unit of the Pennsylvania State Division of Occupational Health is to protect the health of persons in industry, it also receives a substantial number of requests for its services from other governmental agencies in the State. Such requests may be for information concerning the toxicity of a particular chemical—as a means of defining a hazard in a particular work location—or may require considerable study and consultation concerning the placement and safeguarding of an industrial operation.

Unless an industrial hygiene unit is part of an agency with diversified programs, its services devoted directly to other governmental agencies are limited. This is primarily because of poor dissemination of information and because the other agencies do not know where to obtain industrial hygiene services. The industrial hygiene agencies, as a regular practice, rarely inspect other governmental units for hazards. Even though large organizations publish periodicals containing articles about industrial hygiene, these articles seldom reach persons in particular need of the service. Only when a concerted effort is made to acquaint other governmental agencies with the services it offers does an industrial hygiene unit function as well at “home” as it does in the field.

The division of occupational health is one of several programs of the Pennsylvania State Bureau of Environmental Health. Other programs include sanitation, sanitary engineering, air pollution control, and environmental safety. The division of occupational health, in addition to the industrial hygiene unit, includes sections for plant health services (medical and chest X-

ray), radiological health services, and employee health services. The employee health services section, because it serves many agencies of the State government, periodically refers occupational health problems to the industrial hygiene unit.

A review of our files showed that comprehensive studies of a carbon monoxide hazard were made in the State’s central garage in August 1933, December 1935, February 1936, and February 1937. Concentrations of several hundred parts of carbon monoxide per million parts of air were found during repairing and testing of State-owned vehicles. Other early studies included a benzol hazard associated with the paint used in a carpenter shop, and oxygen and carbon dioxide levels in offices of the State department of revenue.

Sporadically, studies were made throughout the early 1950’s. These included an evaluation of illumination levels in offices of the tax equalization board, measurement of carbon tetrachloride exposures while testing the composition of paving materials in the garage of the department of highways, an evaluation of hazards from chlorinated hydrocarbons used to remove grease from typewriters at the bureau of grounds and buildings shop, two investigations of the level of illumination in an office of the department of public instruction, and a study of dust exposures associated with a slag-sizing

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operation of the department of highways. Carbon monoxide concentrations also were determined periodically in turnpike tunnels.

Activities of the unit increased during the late 1950's, and investigations included tests for carbon dioxide in State offices; X-ray scatter radiation from dental and photofluorographic X-ray units used by local and State departments of health; hazards from X-ray diffraction units in State laboratories, antiquated X-ray machines, and faulty storage of radium in State hospitals; from carbon tetrachloride used as a typewriter cleaner, wood alcohol in spirit duplicators, ammonia from blueprint machines, and spores in peat moss used in nurseries of the highway department; the oxygen content in a department of revenue hearing room; and hydrofluoric acid used to clean the outside of the capitol building.

Requests for services might have continued on the usual basis except for an incident that occurred in the department of health. The department photographer, a nonsmoker, had a sore throat that persisted. Although he had medical treatment, medication did not seem to correct the condition. He visited the State employee health service, where he was questioned about his exposure to chemicals. Tests made in the darkroom he used showed general concentrations exceeding 100 parts acetic acid per million parts of air. A ventilation system was installed in the darkroom, and the acetic acid concentrations were reduced below detectability. The photographer's throat soreness disappeared.

This incident prompted investigations of other darkrooms and comprehensive inspections for hazards in all State buildings. Many industrial-type operations were seen during these inspections. In addition to the usual occupational health hazards associated with offices and laboratories, a variety of hazards were found in shops for repairing trucks and heavy equipment; carpenter shops with lathes, bench saws, band saws, circular saws, drills, jointers, and grinding wheels; machine shops with lathes, grinding wheels, and soldering and welding operations; electrical shops with degreasing and spray- and brush-painting operations; and a host of incidental operations.

The State government also maintains several

service operations that were inspected: print shops where carbon arc lamps are used, printing press blankets are washed, and silk screen processing is done and where stitchers, collators, and automatic paper punches contribute to the noise levels. One carbon arc unit was operated for 150 6-minute exposures a week. Data processing machines are used continuously. Historical markers and road signs are constructed, painted, and repaired. Key punch, graphotype, and addressograph machines are used often. Many substances such as battery dry-charge fluid, antifreeze, paint solvents, and other fluids are purchased in bulk and repackaged by machine. Many are noisy operations.

About 50 surveys were made as the result of inspections for hazards, either because an operation warranted further study or because the inspections served as a means of informing persons where to obtain industrial hygiene services. The surveys ranged from a simple evaluation of hazards in a single room to a comprehensive appraisal of an entire building. Each could be discussed in detail, but the scope of this article is limited to a few brief descriptions of significant studies.

The occupants of an 18-story air-conditioned office building were greatly concerned about the quality of the air supplied to their building. Air enters through openings in the side of a penthouse-like structure. The quantity of air varies from season to season, but the air velocity through the intake is always significant. Numerous complaints were received concerning foul odors in the building, but it took some time to locate the source. Pigeons had been known to roost near the intake and, on occasion were sucked against the debris screen. They died there because they were unable to escape. The debris screens were cleaned, and new screens installed that prevented the pigeons from roosting near the air intake.

A curator of the State museum requested information on handling animal hides and pelts. The skins of animals are mounted on wooden and plastic frames until they attain a lifelike appearance and are then placed in display cases. A particular group of hides and pelts had been preserved by taxidermy about 30 years ago with a process requiring arsenic compounds. The pieces, which had been stored during this period,

were dirty and needed cleaning before being mounted on frames. With precautionary measures such as personal protective devices, the hides and pelts were cleaned without incident by vacuuming. No arsenic was detected in the air samples collected during various phases of the task.

The industrial hygiene unit investigated numerous complaints of particulate contamination and the smudging of dirt on important documents. The complaints were made after a central air-conditioning (cooling) system had been installed in a building. The return-air ducts of the general ventilating system were used to supply the cooled air. A 30-year accumulation of dirt that had settled in the pipes was gradually being re-entrained into the airstream and forced out into the offices. Samples collected with sequential samplers and in fallout jars placed on the tops of desks during weekends indicated air-contamination levels to 983 mg. per sq. ft. per day, equivalent to the levels found in the vicinity of solid-fuel powerplants without efficient control systems. The piping was vacuum-cleaned, and the condition improved significantly.

A space-utilization study brought about an interesting survey of a structure, partly underground, which was selected as a suitable site to relocate a duplicating unit. Since such facilities require the housing of massive equipment and a considerable amount of paper stock, it was decided that the duplicating unit could best be located in an area previously used for storage. Such a move, it was reasoned, would make additional prime office space available in the area to be vacated. A study of the structure showed it to be deficient in heat outlets and illumination. Because of the tile walls and floors, the temperature conditions in the building, including heat losses to the structure, were studied. These tests indicated that the building would require considerable insulation. Because of prohibi-

tive renovating costs, the transfer project was abandoned. In all probability, numerous complaints about working conditions were averted by this industrial hygiene survey before moving.

The final investigation to be reported here concerns a civil defense exercise. A suitable location was sought to house about 50 persons for one weekend under simulated disaster conditions. A tunnel joining two buildings was selected, and the industrial hygiene unit was requested to evaluate the site. Smoke tubes were used to determine the air pattern through the tunnel. Airflow was almost zero. When the dimensions of the tunnel were determined and the carbon dioxide buildup was calculated, it was concluded that the exercise could not continue for more than 7 hours. We suggested auxiliary fans, which somewhat modified the disaster conditions, but with the additional ventilation the drill was continued for the weekend and was a success. The carbon dioxide level, monitored periodically, did not exceed 700 parts per million parts of air.

This brief discussion of some of the industrial hygiene investigations associated with governmental operations points up the need for work to be done within our own agencies. Although industrial hygiene units are operated to protect the health of persons in industry, they also are obligated to offer their special knowledge and technical competence to everyone who requests assistance.

Frequently, we do not see the hazards around us because we are too close to them. We should look for them in our own offices and buildings and in all the buildings that form the complexes of our governments. Although such investigations may have to be "sandwiched in" while carrying out the primary duties required of the unit, protecting the health of our fellow workers is a serious responsibility that cannot be lightly neglected or ignored.