PRELIMINARY SURVEY REPORT:

CONTROL TECHNOLOGY FOR ASBESTOS REMOVAL INDUSTRY

AT

VETERANS ADMINISTRATION HOSPITAL
DENVER, COLORADO

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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Division of Physical Sciences and Engineering
Engineering Control Technology Branch
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PLANT SURVEYED:	Veterans Administration (VA) Hospital 1055 Clermont Street Denver, CO
SIC CODE:	1799
SURVEY DATE:	August 7, 1984
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REMOVAL CONTRACTOR REPRESENTATIVES:	Major Insulators 2020 Arapahoe Street, Suite 800 Denver, Colorado 80205 Telephone: (303) 422-2815 Mr. Tom Major, President Mr. Bill Major Mr. Mel Salter, General Foreman Mr. Mike Graham

I. INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) is the primary Federal agency engaged in occupational safety and health research. Located in the Department of Health and Human Services (formerly DHEW), it was established by the Occupational Safety and Health Act of 1970. This legislation mandated NIOSH to conduct a number of research and education programs separate from the standard setting and enforcement functions carried out by the Occupational Safety and Health Administration (OSHA) in the Department of Labor. An important area of NIOSH research deals with methods for controlling occupational exposure to potential chemical and physical hazards. The Engineering Control Technology Branch (ECTB) of the Division of Physical Sciences and Engineering has been given the lead within NIOSH to study the engineering aspects of health hazard prevention and control.

Since 1976, ECTB has conducted a number of assessments of health hazard control technology on the basis of industry, common industrial process, or specific control techniques. Examples of these completed studies include the foundry industry; various chemical manufacturing or processing operations; spray painting; and the recirculation of exhaust air. The objective of each of these studies has been to document and evaluate effective control techniques for potential health hazards in the industry or process of interest, and to create a more general awareness of the need for or availability of an effective system of hazard control measures.

These studies involve a number of steps or phases. Initially, a series of walk-through surveys is conducted to select plants or processes with effective and potentially transferable control concepts or techniques. Next, in-depth surveys are conducted to determine both the control parameters and the effectiveness of these controls. The reports from these in-depth surveys are then used as a basis for preparing technical reports and journal articles on effective hazard control measures. Ultimately, the information from these research activities builds the data base of publicly available information on hazard control techniques for use by health professionals who are responsible for preventing occupational illness and injury.

The objective of this pilot study is to determine the state-of-the-art of asbestos removal control technology and to what extent it has been successfully applied in various industries. It will provide an assessment of the need for research and/or validation of existing capabilities and their potential for transfer to other industries. The purpose of this visit was to explore the use of this technology in the asbestos removal industry.

II. BACKGROUND OF SURVEY

On August 7, 1984 a meeting was held at the Denver VA Hospital administrative offices to discuss the design and operation of the asbestos removal/renovation project at this hospital. The nine story Denver VA Hospital is undergoing a major renovation as part of a three-year project. It has been in progress for about one and one-half years. It is required that asbestos be removed from "controlled areas," which are adjacent to "uncontrolled" occupied patient facilities.

The overall renovation project is being conducted by Western Empire Construction Company of Denver, as prime contractor; actual asbestos removal operations are being conducted by Major Insulators of Golden, Colorado, as subcontractor. Approximately 50 employees of Major Insulators are involved in this project. Asbestos removal work usually takes place under normal working hours. However, at the time of our visit, two shifts per day were worked, due to time frame availability.

This project is under the guidance and monitoring of an Independent, Certified Industrial Hygienist (CIH) Consultant, hired and paid for by the Veterans Administration to do the following:

a. Monitor continuously, performance of contractor during abatement work to ensure adherance to abatement design. Monitor air quality in and around work space, worker exposure, operating procedures, respiratory protection systems, the abatement process and the packing, transportation and disposal of asbestos. Secure the services of a qualified analytical laboratory, to turn over sample results within 24 hours.

b. At the end of abatement and after final cleaning, inspect the work space and perform the required testing to establish decontamination level achieved.

c. Provide a certificate to the Resident Engineer certifying that the abatement process was performed in accordance with the best practice; the maximum feasible protection of people and the environment has been achieved during the abatement process; and the impacted space has achieved the VA required decontamination levels.

Arrangements were made, previously, with Mr. Tom Major, President of Major Insulators and Mr. Chris Krygos, of the VA Hospital administrative staff, to observe these removal operations. Since Mr. Major has been involved in asbestos removal in the Denver area for many years, we have been particularly interested in reviewing his hazard control programs and procedures. These operations were observed at the actual removal site, following discussions at the hospital administrative office.

III. SITE AND PROCESS DESCRIPTION

Site Description

Removal of asbestos is being conducted in "controlled areas" of this nine story VA Hospital, which are often directly adjacent to occupied patient facilities. The overall project is being accomplished in several phases, with each phase being a specific area. At the time of this visit, removal activities had just started at a new phase on the first floor of the building. This area is adjacent to areas occupied by patients. This condition necessitated a high degree of dust containment and control to ensure that ambient dust levels were kept to a minimum.

Asbestos pipe lagging was being removed above a false ceiling in a small room off a corridor. This corridor and adjoining rooms were sealed off from the remainder of the building by plastic sheets and maintained under negative air pressure by means of a HEPA filter unit. Workers entered and exited this "control area" through a three module, Detoxification (Detox) mobil unit, manufactured by the Evergreen Industries, Inc., an affiliate of Major Insulators, Inc. The filter unit, which was located at one end of the main hallway. There were two replacement air inlets: the first inlet led from one of the several rooms off the hall; and the second inlet led from the other end of the hall, through the Detox unit.

Process Description

Several removal phases had already been completed before this survey was made. One phase had involved the removal of pipe lagging and contaminated soil from the crawl spaces beneath the hospital. This was described as a very difficult job.

A previous phase had involved the removal of asbestos from hot boilers and pipes. This condition was necessary, since these hot systems needed to remain in operation during the removal period. Removal activities were interrupted between phases so that completed areas could be renovated and reoccupied before a new phase began.

At the time of this visit, a new removal phase had just commensed. Workers, on ladders, were removing pipe lagging from above a false ceiling. They were also cleaning corridor ceiling pans which contained fiber glass insulation batting. Wet removal methods were used, including spraying of pipe lagging and cleaning of surfaces with wet rags. HEPA cleaning was also used.

IV. POTENTIAL HAZARDS

The carcinogenic potential of asbestos is no longer in doubt; however, there is some uncertainty about the toxicological and morphological properties which determine the carcinogenic potency of various fibers. NIOSH believes that on the basis of available information, there is no scientific basis for differentiating between asbestos fiber types for regulatory purposes.

NIOSH has recommended that asbestos be controlled to the lowest detectable limit. It is our contention that there is no safe concentration of exposure to asbestos. Any standard, no matter how low the concentration, will not ensure absolute protection for all workers from developing cancer as a result of their occupational exposure. However, lower concentrations of exposure carry low risks.

NIOSH continues to believe that both asbestos and smoking are independently capable of increasing the risk of lung cancer mortality. When exposure to both occurs, the combined effect, with respect to lung cancer appears to be multiplicative rather than additive. From the evidence presented, we may conclude that asbestos is a carcinogen capable of causing, independent of smoking, lung cancer and mesothelioma.

Data available to date provide no evidence for the existence of a threshold level. Virtually all levels of asbestos exposure studied to date demonstrated an excess of asbestos-related disease.

Although the present Permissible Exposure Limits (PEL) of OSHA is 2 fibers per cc as a Time-Weighed Average (TWA) concentration with a Ceiling Limit (CL) of 10 f/cc, deliberations are, at present, underway to reduce these limits to the order of 0.1 to 0.5 f/cc. NIOSH's recommended standard (RS) for all forms of asbestos is 0.1 f/cc, based on the lowest level detectable by the presently recommended PCM analytical technique. The VA's permissible exposure limit is 0.005 f/cc, which includes monitoring outside the working area and the final (clearance) sample on the working areas.

V. CONTROL OF EXPOSURES TO ASBESTOS

Principles of Control

There are two health-related objectives of asbestos control. One is to protect the public from a hazardous pollutant. The other is to reduce or eliminate worker exposures. It is often the case that the most effective means of achieving one of these objectives may cause difficulties in meeting the other. However, these two objectives must be met by an integrated approach to the control solution.

The primary objective of this project is the evaluation and development of effective and feasible methods of control of worker exposures to asbestos during its removal from buildings, while, at the same time, minimizing ambient air contamination with asbestos.

Worker Protection Controls

Occupational exposures can be controlled by the application of a number of well-known principles, including engineering measures, work practices, personal protection, and monitoring. These principles may be applied at or near the hazard source, to the general workplace environment, or at the point of occupational exposure to individuals. Controls applied at the source of the hazard, including engineering measures (material substitution, process/equipment modification, isolation or automation, local ventilation) and work practices, are generally the preferred and most effective means of control both in terms of occupational and environmental concerns. Controls which may be applied to hazards that have escaped into the workplace environment include dilution ventilation, dust suppression, and housekeeping. Control measures may also be applied near individual workers, including the use of remote control rooms, isolation booths, supplied-air cabs, work practices, and personal protective equipment.

In general, a system comprised of the above control measures is required to provide worker protection under normal operating conditions as well as under conditions of process upset, failure, and/or maintenance. Process and workplace monitoring devices, personal exposure monitoring, and medical monitoring are important mechanisms for providing feedback concerning effectiveness of the controls in use. Ongoing monitoring and maintenance of controls to insure proper use and operating conditions, and the education and commitment of both workers and management to occupational health are also important ingredients of a complete, effective, and durable control system.

These principles of control apply to all situations, but their optimum application varies from case-to-case. The application of these principles in Major Insulators, Inc., asbestos removal process is discussed below.

VI. OBSERVATIONS

Administrative Controls

Training of workers in Good Work Practices is an essential element in Major Insulator's Hazard Control Program. All employees of Major are required to be "certified," by the program developed at Colorado State University, and to be familiar with the safety precautions and procedures in the Major Insulators' manual (Ref. 1). At the VA Hospital project, most workers were recently hired and had been trained only one week before our visit. All of Mr. Major's available "certified" Manpower pool had been previously committed to other projects.

Work Practices

Wet removal methods were observed during all phases of these removal operations. However, procedures did not appear to be as effective as those carried on by their more experienced associates at another work site.

It appeared that their placement of the HEPA exhaust system and replacement air inlets was not optimized to obtain maximum dust control. This preliminary survey emphasized the need for adequate training and work experience in this potentially hazardous trade. Proper showering techniques were followed by all workers observed.

Personal Protective Equipment

All workers in the "controlled area" wore contamination control disposal coveralls and half-face mask respirators with high efficiency dust cartridges. As mentioned in the Major Training Manual, failure to wear respiratory protection in the "controlled area" is grounds for immediate dismissal from employment. This safety precaution was well monitored.

Engineering Controls

The HEPA exhaust system, located in the "controlled area" was apparently effective in maintaining a negative pressure in the control area and, thereby, preventing external contamination. The 9-1/2 inch exhaust duct (0.5 square feet) was removing approximately 500 cubic feet of air per minute (cfm) from the work area. However, its effectiveness could have been improved by locating replacement air inlets closer to the potential dust sources.

A water proof, portable fluorescent work drop light, manufactured by KH Industries of Angola, New York was demonstrated. Since most removal operations involve copious quantities of water on both work surfaces and workers, stray electric currents are a constant hazard. Positive ground faults interupters properly grounded equipment and water-proof devices are essential for safe operations.

The three module, mobile Detox unit, developed by Bill Major, (Evergreen Industries) permits excellent personal hygiene practices by removal personnel. It appeared to be well designed and extremely functional. It is noted that an additional modual section on the clean dressing room end would have improved utility by providing space to store street clothing.

Atmospheric Monitoring

Atmospheric samples, collected by Major Insulators and analyzed by Hager Laboratories, have indicated minimal external contaminants to other hospital areas. Typical samples, collected for 26 hours, have shown levels of less than 0.005 f/cc during removal operations. Other samples collected in the "controlled areas" by Major have not exceeded the OSHA PEL of 2 f/cc.

Four sets of atmospheric samples were collected by NIOSH: At the inlet to the HEPA exhaust system; on a door opening to the small room removal area; close to the removal operation in the room; and outside the Decon unit to estimate the degree of dust dispersion to the outside environment. Since the primary purpose of collecting these samples was for development of analytical procedures, test results have not yet been completed.

VII. CONCLUSIONS AND RECOMMENDATIONS

1. The asbestos removal activities of Major Insulators seemed to be well planned and executed, based on observations of the written work plan of the removal operations and of the contractor's air sampling data. Training and motivation of operators to use good work practices seem to be especially important factors in maintaining safe asbestos levels.

2. Further studies to optimize the use of HEPA exhaust systems could be carried out through in-depth studies with Major Insulators' staff. They seem to have an acute awareness of the value of good work practices; adequate worker training; proven use of personal protective equipment; good personal hygiene procedures; and the provision of good air control systems. This company is, therefore, a good candidate for additional collaborative studies to document good hazard control technology in asbestos removal operations.