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AN INNOVATIVE APPROACH TO ASBESTOS REMOVAL

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ABSTRACT

Asbestos-containing materials were used during the construction of the Savannah River Plant over thirty years ago. Through the years, a major effort has been made to identify materials containing asbestos and control personnel exposure. Six methods used to protect personnel from asbestos exposure are discussed.

* The information contained in this article was developed during the course of work under Contract No. DE-AC09-76SR00001 with the U.S. Department of Energy.

The Savannah River Plant is a nuclear facility operated by Du Pont for the Department of Energy. During the construction of this plant over 30 years ago, asbestos materials were used in many plant locations. These materials included steam pipe insulation, powerhouse boiler insulation, Transite® wallboards, gaskets and several other products. The common asbestos types found in these materials are chrysotile and amosite.

Plant personnel do not routinely work with asbestos. When an asbestos job is performed, it usually is of short duration. The most common asbestos jobs occur during maintenance activities which include the removal of old insulation and replacing it with asbestos-free materials.

Through the years, a major effort has been made to identify asbestos-containing materials and control personnel exposure to asbestos using a variety of methods. These control methods were tailored after the plant's conservative radiation protection program and include:

- Strict Controls During Asbestos Insulation Removal
- Medical Surveillance
- Workplace Surveillance/Analysis
- Aluminum Enclosure of Asbestos Insulated Equipment
- Use of Asbestos-Free Materials
- Asbestos Identification

Each of these programs will be described.

Strict Controls During Asbestos Insulation Removal

In general, insulation is not removed when it is still in good condition. When it becomes friable, strict removal procedures are used. These procedures include the following elements:

- Industrial Hygiene Review
- Employee Training
- Administrative Controls
- Engineering/Workpractices
- Personal Protective Equipment
- Workplace Surveillance

Industrial Hygiene Review

Each operation which can generate airborne asbestos fibers is reviewed by industrial hygiene personnel. Since each job is unique, a variety of control methods are utilized.

Employee Training

In general, controls are only as effective as the knowledge of the employees. Before employees can be authorized to perform asbestos work, they are given training. The training is repeated annually and covers:

- Review of Health Hazards
- OSHA Regulations
- Specific Job Requirements
- Use of Personal Protective Equipment
- Air Monitoring
- Medical Program

A plant-produced videotape is used for the training.

Administrative Controls

A Work Clearance Permit is required for asbestos jobs. It provides the necessary safety analysis and information on the safety requirements of a specific job, and a written authorization for the start of the work. Signatures on the permit indicate that each group included (Safety, Industrial Hygiene, Custodian, etc.) is satisfied that the equipment and work area have been prepared for the assigned work and that the necessary safety precautions have been taken.

All entrances or access ways to asbestos work locations are posted with warning signs and are barricaded to prevent non-asbestos workers from unknowingly entering an asbestos work location. A current roster of personnel authorized to work in these areas is posted along with the operating procedures and the Work Clearance Permit at the work site.

Engineering/Work Practices

The potential of asbestos fibers becoming airborne is greatly reduced by applying a fine water mist to the insulation. Surfactants and other wetting agents have been used to enhance water penetration.

Plastic hut enclosures have been used during operations to contain asbestos and to protect nearby employees. This was a logical progression for the plant since this technique has been successfully used to control the spread of radioactive materials. For large operations, the enclosure is exhausted through a high efficiency particulate filter.

Airlocks have also been used for asbestos operations to separate regulated areas from the nonregulated areas. It is an important line of defense in controlling the spread of asbestos. Separate change stations are used to prevent contamination of street clothing from work clothing.

A vacuum cleaner is used with a high efficiency particulate air filter to remove loose insulation following a job.

Asbestos waste is placed in double walled impermeable bags, labeled as containing asbestos and sent to the plant asbestos landfill in accordance with EPA requirements.

Personal Protective Equipment

Each employee who is authorized to handle asbestos is also given annual respirator training and a quantitative fit test. The respirator training includes a videotape review of the reasons for and proper use of respirators. A technician gives the asbestos worker hands-on training in the proper method of donning a respirator and performing the negative or positive pressure functional fit test.

A quantitative fit test is given to the employee to ensure the proper choice of respirators. The employee and his supervisor are given a card indicating which respirators the employee can wear.

At the plant, breathing air compressors are easily accessible to personnel since much of the radioactive work requires supplied air suits. Depending upon the nature of the job, supplied air or negative pressure respirators are required.

Air-supplied respirators are required except where it has clearly been demonstrated that the wet method is effective and monitoring has shown that levels on the job will not exceed the protection factor of the air purifying respirator.

Disposable coveralls are required for most asbestos operations. Depending upon the operation, a Tyvek® hood, boots and gloves (taped to the coveralls) may also be required.

As the personnel remove their protective clothing, the respirator is taken off last to avoid inhaling dust which may be on their protective clothing. It is a common practice to vacuum off dust or use a wet sponge over the protective clothing.

Medical Surveillance

The names of personnel authorized to work with asbestos are submitted to the Plant Medical Department. These employees are included in the Plant's Medical program. The site follows the Du Pont program for medical surveillance of asbestos workers. This program includes a chest x-ray, a pulmonary function test in addition to the physician's examination.

Workplace Surveillance/Analysis

Asbestos air monitoring is performed during removal operations by trained technicians under the direction of one of the plant industrial hygienists. Detailed procedures have been developed for collecting personnel samples. In addition to monitoring the job, the technicians conduct visual audits to assure that the work practices are being followed properly and the personal protective equipment is correctly worn.

The air samples are analyzed by the plant industrial hygiene laboratory using phase contrast microscopy. One of the advantages of analyzing the samples on plant is that the results are quickly available.

Air monitoring data are reviewed by an industrial hygienist and made available to supervision and the surveyed employees.

Asbestos controls, including respiratory protection, are required for all renovation or demolition work involving asbestos regardless of the monitoring results. Monitoring data, however, are used to characterize the jobs, determine the effectiveness of the controls, and guide future operations. The data are stored in a permanent file. Current summary data are additionally being entered

into a computer program that stores the data by job, statistically evaluates the data, and updates statistical parameters as new data are added.

Aluminum Enclosure of Asbestos Insulated Equipment

The plant's Power Department has enclosed the majority of the site's steam lines with an aluminum jacket. This represents over 35 miles of enclosed steam lines. Based on plant experience, aluminum enclosures have contained the asbestos, improved the maintenance of steam lines and enhanced the general appearance.

Use of Asbestos-Free Materials

It is plant policy to purchase asbestos-free insulation. Asbestos has been eliminated wherever possible and substituted with asbestos-free materials for a number of applications. Examples of asbestos substitutes are outlined in Table 1.

Table 1

Asbestos Application	Substitute
Aprons Used for Heat Protection	Fiberglass/Silica Fabric
Gloves	Kevlar® (High Strength Aramid Fiber)
Laboratory Hot Pads	Ceramic Fiber Board
Pipe Insulation	Fiberglass, Mineral Wool
Talcum Powder	Asbestos-Free Talcum Powder
Transite® Wallboards	Chem-Fil® (Cement Fiberglass)

Asbestos Identification

An offplant, accredited laboratory is used to identify bulk insulation samples with the dispersion staining technique and polarized light microscopy.

Identification tape is used to alert personnel to asbestos and nonasbestos insulation. On the tape, there is an arrow pointing in the direction of the insulation. The NA symbol refers to non-asbestos. The ASB symbol refers to asbestos. Wherever asbestos-free insulation is installed on a pipeline, a strip of tape is placed around the circumference to show where the asbestos-free insulation starts. The arrows are oriented to indicate that the line has asbestos-free insulation. Personnel have been alerted to recognize these symbols and to follow appropriate measures. If the insulation is not identified, it is assumed to be asbestos and treated as such.

CONCLUSION

A major effort was conducted by the Savannah River Plant to identify asbestos-containing materials and control personnel exposure to asbestos using a variety of methods. The Plant's successful radiation protection program was used as a basis for these methods.

Since controls are only as effective as the knowledge of the employees, a training program was developed for employees who are authorized to perform asbestos work.

Plant personnel have accepted the asbestos program and have suggested ways to better control personnel exposure. Industrial hygiene and supervision have found asbestos-free materials for many applications and have used engineering controls where feasible. A number of work practices were developed to minimize employee exposure.

Asbestos air monitoring is done to characterize the jobs, determine the effectiveness of the controls, and guide future operations.

Employees who are authorized to work with asbestos are included in the Plant's Medical program which follows the corporate policy for medical surveillance of asbestos workers.