

Industrial Hygiene Services

Environmental Health Recognition, Evaluation, Control

Survey Report

Asbestos Exposure Evaluation
USS Chemicals-Neville Island

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Table 1
Asbestos Exposures
Common Example Operations
USS Chemicals
Neville Island Plant
March, 1984

Occupation	Total Duration (minutes)	Eight-Hour Time-Weighted Average Asbestos Exposure (fibers/cc) *	Description of Operation
Mechanic	142	0.56	Removing insulation from steam heating pipes in office building.
Mechanic	142	0.88	
Pipefitter	138	0.10	Removing insulation for steam pipe removal in plant.
Pipefitter	135	0.10	
Mechanic**	15	0.77	Cutting six (6) linear feet of Transite board with a portable power saw.
Mechanic	15	0.82	
Mechanic	15	<0.01	Removing packing from pump and replacing it.
Mechanic	15	<0.01	
Mechanic	11	<0.01	Cutting gasket material.
Mechanic	11	0	
Mechanic	103	<0.01	Removing insulation from salt cooler near barge dock.
Mechanic	103	<0.01	
Pipefitter	152	0.11	Removing insulation from pipes near barge dock.
Pipefitter	150	0.05	

*Eight-hour time weighted average asbestos exposure in fibers per cubic centimeter of air analyzed in accordance with the OSHA 29 CFR 1910.1001 Asbestos Standard. The eight-hour time-weighted average is calculated assuming the employee is exposed to asbestos for the time shown during the eight-hour workshift. The OSHA permissible exposure limit (PEL) is currently 2 fibers/cc with proposed revision to 0.5 or 0.2 fibers/cc.

**During this operation, employee exposure to asbestos, when time-weighted over the entire workshift, is well below the current OSHA PEL. The 15 minute peak exposures however are 24.79 and 26.38 fibers/cc, well above the 15 minute ceiling value limit of 10 fibers/cc.

May 17, 1984

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Plant Manager
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Summary and Recommendations

On March 5 and 6, 1984 arrangements were made to measure employee exposure to asbestos during maintenance operations which are normally randomly scheduled. These operations were representative of normal jobs and, in all cases, were conducted in the usual manner. Employees used all the appropriate protective equipment required by the applicable Safe Job Procedure.

The results of this evaluation indicate that removal of well wetted asbestos insulation and the handling of materials containing well bound asbestos (gaskets, etc.) does not result in employee eight-hour time-weighted average asbestos exposures above the current Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 2 fibers per cubic centimeter of air (2 fibers/cc) nor the proposed OSHA PEL's of either 0.5 fibers/cc or 0.2 fibers/cc. While the removal of insulation containing asbestos in an office area (not as well wetted) does not expose employees to eight-hour time-weighted average asbestos doses above the current OSHA PEL, such an operation may exceed the proposed OSHA PEL's. The use of a power saw on Transite board does not result in employee eight-hour time-weighted average asbestos exposures above the OSHA PEL, but does result in employee peak exposures to asbestos of more than double the current OSHA ceiling value of 10 fibers/cc as measured over a 15 minute period.

While removing asbestos insulation in office areas, greater care should be taken to thoroughly wet the insulation through the use of a more intense water spray, or by trial use of a 1:5 ethylene glycol and water solution. The area involved should be restricted to allow only the employees removing the asbestos to enter the area to prevent unnecessary exposures. Post removal clean-up should also be improved to prevent re-distribution of dust containing asbestos. Power tools should not be used on any Transite materials, and whenever possible, a substitute for Transite materials should be used.

Detailed findings for each operation are contained within the report.

USEI000065

May 17, 1984

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On March 5 and 6, 1984 common maintenance operations were scheduled at the Neville Island Plant for the specific purpose of measuring employee exposure to asbestos during such jobs. Mechanics and pipefitters performed jobs which required handling materials containing asbestos that are representative of normal operations. In all cases, the Neville Island Safe Job Procedure (SJP) for working with asbestos products was adhered to including the use of all the appropriate personal protective equipment. The results of this evaluation follow.

Method and Criteria

To determine employee exposure to asbestos, breathing zone air samples are collected using a calibrated MSA Monitaire pump and an appropriate filter. The filter is then inspected using 450 magnification on a phase contrast microscope. Asbestos fibers at least five microns (5 μ m) in length and three times longer than their diameter (3:1 aspect ratio) are counted and the occupational exposure to asbestos is calculated.

The Occupational Safety and Health Administration (OSHA) has established that no employee shall be exposed to an eight-hour time-weighted average (8-hour TWA) asbestos dose of more than 2 fibers per cubic centimeter of air (2 fibers/cc). Further, in any 15 minute period, occupational exposure to asbestos must be limited to 10 fibers/cc (called the ceiling value). It is expected in the near future that OSHA will reduce the permissible exposure limit (PEL) for asbestos to an 8-hour TWA of either 0.5 fibers/cc or 0.2 fibers/cc with a corresponding ceiling value ten times the PEL (5 fibers/cc or 2 fibers/cc). All efforts to control employee exposure to asbestos should be with the recognition that OSHA will reduce these limits in the near future. Recently revised Corporate guidelines for the protection of employees against the hazards of asbestos dust exposure were distributed on April 27, 1984. These guidelines detail the requirements of the OSHA standard and offer methods for compliance.

G. R. Hanington
USS Chemicals
Neville Island
Asbestos Evaluation
May 17, 1984
Page Two

Conclusions and Recommendations

The following conclusions and recommendations are based on the results of the air samples collected, data supplied by plant personnel and observations during the survey. The employee exposures to asbestos have been time-weighted averaged for comparison to the OSHA regulations. The survey results are presented in Table 1.

Conclusions

1. No significant exposures to asbestos fibers were measured during the asbestos gasket cutting operation or during the unpacking and repacking of pumps.
2. The removal of asbestos insulation from process and steam lines in the operating areas (lines that are exposed to the open atmosphere), and the removal of asbestos insulation from the old salt cooler (stored near the barge dock) results in eight-hour time-weighted asbestos exposures below the current OSHA permissible exposure limit, and below the proposed OSHA permissible exposure limits.
3. Removal of asbestos insulation from steam lines in office areas, or in areas where such lines are not exposed to the open environment results in eight-hour time-weighted average asbestos exposures below the current OSHA PEL, but this operation can result in employee asbestos exposures in excess of the proposed OSHA PEL of 0.5 fibers/cc.
4. Evaluation of employee asbestos exposure while cutting Transite with a power saw (total cut of six (6) linear feet) indicates an eight-hour time-weighted average exposure of 0.77 - 0.82 fibers/cc (well below the current OSHA PEL). This operation does however result in employee asbestos exposure of more than double the OSHA permissible ceiling limit value of 10 fibers/cc for a 15 minute period.

Recommendations

1. The Neville Island SJP for handling materials containing asbestos, which requires the use of respiratory protection, protective clothing and gloves, and wetting the product prior to removal, provides the maximum practical employee protection available. Continued emphasis of the SJP for all operations involving materials containing asbestos is essential to prevention of asbestos related disease.

USEI000067

G. R. Hanington
USS Chemicals
Neville Island
Asbestos Evaluation
May 17, 1984
Page Three

2. When removing asbestos insulation from steam pipes in office areas, the insulation should be more thoroughly wetted. This may be accomplished by using a water fire extinguisher such as was used when removing the insulation from lines near the barge dock. The insulation should be wetted to the maximum extent possible, even to the point of being "dripping wet". In addition, trial of a 1:5 solution of ethylene glycol and water may better control the releasing of asbestos fibers. To avoid asbestos exposure for employees not involved in the removal procedure, the area involved should be isolated as much as possible and posted as a restricted area.

After the insulation has been removed and bagged, all shelves and ledges in the room should be wiped down with a soggy cloth, and the floor carefully wet-mopped to control the redistribution of dust containing asbestos. Clean-up employees should follow the protective equipment requirements of the asbestos SJP. Care should be taken to avoid tracking dust containing asbestos into other office areas.

3. When changes in buildings require the removal of Transite materials, the whole sheet of material should be removed with as little cutting or breaking as possible. Every effort should be made to avoid the use of any power tools without local exhaust ventilation on any Transite materials. Whenever possible, Transite materials should be replaced by building materials which do not contain asbestos.