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**Evaluation of the Alternative Asbestos Control Method at Site Two (AACM2) for
Demolition of Asbestos-Containing Buildings**

By

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EXECUTIVE SUMMARY

The Asbestos NESHAP (National Emission Standards for Hazardous Air Pollutants) generally requires the removal of all Regulated Asbestos-Containing Material (RACM) from a building prior to its demolition. In many circumstances, this removal process can be a costly and time-consuming endeavor and is believed to contribute to the growing crises of abandoned buildings in this country. Under this Alternative Asbestos Control Method (AACM) research project, certain asbestos-containing materials (ACM) were allowed to remain in the building during demolition. In addition to leaving most of the ACM in the building, the AACM process differed from the NESHAP process in that the interior of the building was pre-wetted with amended water (water with a wetting agent added), all demolition and debris-loading activities were continuously wetted with amended water, all runoff was contained, three or more inches of soil were removed after demolition, all materials were disposed of as RACM, and respirators and protective garments were worn by workers throughout the entire demolition process.

This research effort (AACM2) is the second of the AACM research efforts, each targeting specific asbestos and building/site configurations. AACM2 evaluated the use of the AACM process on a transite-covered building that was in danger of imminent collapse at the Fort Chaffee Redevelopment Authority near Fort Smith, AR. Separate reports have been issued for AACM1 and AACM3.

At this time, the AACM is a research method only and EPA does not permit its use as an approved work practice under the Asbestos NESHAP for demolishing buildings containing RACM.

Conclusions

The following conclusions are relevant to the demolition of the transite building (AACM2) at Fort Chaffee Redevelopment Authority:

Primary Objective:

- The airborne asbestos concentrations measured by transmission electron microscopy (TEM) during the AACM2 demolition processes were orders of magnitude below any EPA existing health or performance criterion. Almost all of the airborne asbestos (TEM) concentrations were near or below the limit of detection, which was 0.0015 s/cm^3 (or 2.99 times the analytical sensitivity of 0.0005 s/cm^3). Only five samples exceeded the limit of detection, with the highest total asbestos concentration being 0.0052 s/cm^3 .
- The statistical analyses were restricted by differences in results from different analytical laboratories and by the fact that some laboratory samples were overloaded and required indirect analysis, which are not directly comparable with direct analysis results. First, the statistical analyses concluded that there were differences in results from the different laboratories. Using one lab's results, the inferential statistics indicated *since the background mean detection limit was below the lower limit of the confidence interval (0.00057 s/cm^3), one would conclude it was significantly different than the mean perimeter concentration of 0.0014 s/cm^3* . Using the second lab's results, however, the statistical conclusions were that

one would conclude there was no difference in the probability of observing a censored (non-detect) value in the perimeter and background data sets. Overall, the statistical analyses were inconclusive in determining whether there was a difference between the perimeter and background airborne asbestos concentrations.

Secondary Objectives

AIR

- No visible emissions were observed during the AACM2 demolition.
- Virtually all the perimeter, top of wall, and background air samples were non-detect for fibers as measured by Phase Contrast Microscopy (PCM). There was one single fiber detected in one sample (0.001 f/cm^3). This is likely because there was little fibrous material in the transite building to begin with and because the amended water was effective at suppressing releases.

DUST

- Many of the perimeter samples and some of the background samples contained asbestos in the dust. The maximum dust loading was $3,980 \text{ s/cm}^2$ in a perimeter sample and 958 s/cm^2 in a background sample. Although *the statistical analyses indicated one would fail to reject the null hypothesis of no difference in the asbestos concentrations in the settled dust (TEM s/cm²) for perimeter and background*, the empirical data appear to indicate a difference in the asbestos concentrations. Also, *due to the high level of censoring (non-detects), an inferential test for AACM and BKGD mean differences could not be conducted, the Kaplan-Meier test indicated that the mean concentration of asbestos in the AACM2 perimeter settled dust was greater than background.*

WORKERS

- Five of the seven worker breathing zone samples were non-detect for total asbestos at the 0.001 s/cm^3 analytical sensitivity level. None of the worker samples showed detectable PCME asbestos structures during the demolitions. The two worker samples that showed detectable asbestos had breathing zone asbestos concentrations of 0.006 and 0.002 s/cm^3 respectively.
- Only one of the six workers had PCM fibers observed on their breathing zone filters, and that concentration was 0.003 f/cm^3 . Time-weighted averages, based upon the PCM fiber counts above, were therefore well below the OSHA Personal Exposure Limit (PEL) of 0.1 f/cm^3 .

PAVEMENT

- The site assessment survey data showed very high pavement dust asbestos loadings ($2,700,000 \text{ s/cm}^2$ max), highlighting the problem of erosion of weathered transite and subsequent contamination of adjacent surfaces. The AACM2 effectively reduced the pavement dust levels as seven of eight post-demolition pavement samples were non-detect for asbestos. *The statistical analysis indicated that one would conclude there was a difference in the probability of observing a censored (non-detect) value in the pre- and*

post-demolition data sets; i.e., one is more likely to observe a censored value in the post-demolition data.

WATER

- As has been seen in each of the AACM demolitions, the amended water captured significant amounts of asbestos. The mean asbestos concentration in the captured AACM water was about 40 billion asbestos structures (of all sizes) per liter. This water was all captured, filtered, and disposed to the sanitary sewer.

TIME

- Even with delays caused by the research nature of the project and the extreme heat hampering worker effectiveness, it required two days to demolish the transite building by the AACM protocol; it is estimated that three days would have been required for the NESHAP protocol if abatement had been done.

COST

- Overall, the use of AACM2 at the transite building and disposal of the waste at the Fort Smith Landfill was about equal to what the demolition cost would have been by the NESHAP. The total cost for the AACM2 process was \$23,873 compared to \$24,615 for the NESHAP (with abatement). If the building would have been demolished by the NESHAP Imminent Danger provision, it would have cost an estimated \$15,380.

CONTAINMENT

- The barrier wall constructed immediately adjacent to the back side of the transite building to simulate closely adjacent buildings was very effective in minimizing asbestos migration. All three of the air samples on top of the barrier wall were non-detect for asbestos. Only one of the three dust samples had asbestos detected and that loading was minimal (2,740 s/cm²).