| | |
|---|---|
| HASP #: | Approval Date: |
| Expiration Date: | Next Review Date: |

(This section completed by the Safety Health and Environmental Management (SHEM) Office)

# Health and Safety Plan

**Title:** BUILDING DEMOLITION EVALUATION PHASE III STUDY ALTERNATIVE ASBESTOS CONTROL METHOD FOR BUILDING DEMOLITION
**Principal Investigator(s):** William Barrett and Roger Wilmoth
**Branch ID:**Industrial Multimedia Branch
**Laboratory/Division:** NRMRL/STD
**Project Location:** Fort Worth, Texas
**Start Date:** December 7, 2007
**Estimated Research Completion Date:** December 14, 2007

**Approvals**

| Name | Phone | Signature | Date |
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| (Additional Approvals: such as CO-PI or Contractor Manager) | | | |

(Additional Approvals: such as CO-PI or Contractor Manager)

## Project Description

**Background:** The Clean Air Act provides the USEPA with the authority to promulgate and enforce a "work practice standard" for demolition of buildings that contain regulated asbestos containing materials (RACM) if it is not feasible to establish an emission standard. Section 112 of the Clean Air Act, determined asbestos to be a hazardous air pollutant, and the use of asbestos is regulated under the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Asbestos, 40 CFR Part 61, Subpart M (Asbestos NESHAP). Requirement for the demolition and renovation of buildings that contain asbestos are contained in 40 CFR 61.145.

The asbestos NESHAP defines RACM as the following [40 CFR 61.141]:

(a) Friable asbestos material,
(b) Category I nonfriable ACM that has become friable,
(c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or
(d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

The asbestos NESHAP requires emissions control when demolition or renovating a facility if the combined amount of RACM is: [40 CFR 61.145(a)(1)]

- At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

- At least 1 cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously.

For facilities containing asbestos above the threshold quantity, the emissions controls required for demolition include removal of all RACM prior to any demolition activity that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. The asbestos NESHAP specifies emissions control procedures to be used during RACM removal and/or building demolition [40 CFR 61.145(c)] and wastes generated during demolition must be disposed of in accordance with the requirements of 40 CFR 61.150.

If the facility is being demolished under an order issued by a State or local government agency because the facility is structurally unsound and in danger of imminent collapse, the RACM is not required to be removed prior to demolition, but the portion of the building that contains RACM must be kept adequately wet during demolition [40 CFR 145(a)(3) and 40 CFR 61.145(c)(9)].

It is generally regarded that the cost of compliance with the asbestos NESHAP is currently forestalling redevelopment efforts in a number of communities because the labor costs associated with removal of the RACM is significantly greater than the costs of building demolition. As a result, the USEPA has devised the Alternate Asbestos Control Method (AACM) that provides emissions controls believed to be equivalent to the current work practices required by the asbestos NESHAP. Previous studies indicated that there were situations where releases of asbestos were documented from demolition activities. These studies included both demolitions conducted by the NESHAP process and ones conducted under imminent danger of collapse situations. (Wilmoth et al 1993, Wilmoth et al 1994, City of Saint Louis 2004).

To date, the USEPA has conducted an evaluation of the AACM by performing a controlled side-by-side comparison of the AACM and the NESHAP on identical buildings at Fort Chaffee Redevelopment Authority (Wilmoth et al, 2007). The buildings in the first study had positive asbestos–containing wall systems and vinyl asbestos floor tile. A follow-up study has also been conducted to evaluate the AACM's ability to control emissions from the demolition of a building that had exterior transite siding.

This third phase of the AACM evaluation is intended to evaluate the ability of the AACM to control emissions from a building that has textured wallboard surfaces, such as asbestos-containing popcorn ceiling.

The AACM requires that certain RACM (such as thermal system insulation and fireproofing) be removed before demolition in accordance with the asbestos NESHAP; other RACM (such as transite, wallboard joint compound, resilient flooring/mastic, glazing compound, popcorn ceilings, etc.) may remain in place. The AACM varies from the existing Asbestos NESHAP in the use of an amended-water wetting process, type of demolition equipment, and demolition techniques. Once the RACM has been removed, the demolition can then be conducted using amended water to suppress emissions of asbestos before, during, and after demolition to trap asbestos fibers, minimizing the potential for release to the air. The RACM is less likely to become friable when the wetting process and demolition techniques specified in the AACM are used. Wastewater generated during the demolition is collected and filtered, and all debris is disposed of as asbestos-containing waste. Soil in the affected area is excavated and disposed as asbestos-containing waste. Appendix A contains the AACM developed by EPA Region 6, the EPA ORD, and with input from the EPA QAPP Technical Development Team.

The purpose of this research project is to gather additional data to document the environmental and cost-effectiveness of the AACM.

# Methodology

## *Task 1 - Pre-Demolition Site and Building Inspection*

The first task is the conduct of a comprehensive pre-demolition inspection will be conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR 763), and the requirements of the American Society of Testing and Materials (ASTM) E2356-04e1 Standard Practice for Comprehensive Building Asbestos Surveys to identify the type, quantity, location, and condition of Asbestos-Containing Materials (instead of only RACM) in the building in accordance with the asbestos NESHAP and the Texas Department of State Health Services (DSHS) asbestos program requirements. This section provides an outline of the known environmental condition of the site.

## *Site Description*

The site selected for conduct of this study is the former office building for the Oak Hollow Apartment complex located at 5901 Boca Raton, Fort Worth, Texas. The subject building is a two-story structure that is slab-on grade construction, as shown in Figure 1. It appears that the building was constructed with wood frame, and has exterior brick veneer applied to the lower portion of the structure. The upper portion of the structure use wood panel siding. The building has an asphalt shingled roof. The interior of the building contains a wallboard system that has a surface texture coating and a wallboard system ceiling with asbestos-containing "popcorn" ceiling texture. The wells have been painted, likely numerous times, using latex paint. Various flooring materials are present in the structure, including flexible tile with mastic and carpets. The City of Fort Worth conducted an asbestos survey of the building for their own purposes. The RACM identified during this inspection are listed in Table 1.

**Table 1. RACM Identified in the former office of the Oak Hollow Apartments, 5901 Boca Raton Boulevard, Fort Worth, Texas.**

| RACM Type | Description | Location |
|---|---|---|
| Sheetrock | Ceiling Texture (White, Popcorn) | Office #1<br>Upstairs Open Area<br>Next to Fire Place Lounge |
| Sheetrock | Sheetrock (White) and Joint Compound | Upstairs Open Area<br>Office #3<br>Foyer |
| Flooring Materials | 9" x 9" Floor Tile with Mastic | Kitchen |
| Sheetrock | Ceiling Texture (Beige, Popcorn) | Work Room<br>Sauna |
| Sheetrock | Sheetrock and Joint Compound, Beige Walls | Work Room<br>Storage Room |

**Figure 1 Oak Hollow Apartment Complex Office Building located at 5901 Boca Raton in Fort Worth, Texas.**

The comprehensive pre-demolition inspection was conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR 763) and the requirements of the ASTM E2356-04e1 Standard Practice for Comprehensive Building Asbestos Surveys to identify the type, quantity, location, and condition of Asbestos-Containing Materials (instead of only RACM) in the building in accordance with the asbestos NESHAP and the Texas Department of State Health Services (DSHS) asbestos program requirements. As noted in the asbestos NESHAP [40 CFR 61.145(a)], in addition to RACM, Category I and Category II Non-friable Asbestos-Containing Materials must also be identified prior to demolition or renovation.

The building has been surveyed for the presence of inorganic lead (e.g. lead paint) in accordance with Housing and Urban Development's (1997) "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" to characterize the potential for occupational exposure during demolition. Representative composite bulk samples of the suspect lead-containing building materials were collected in accordance with the HUD sampling protocols and analyzed to determine the lead content by EPA SW-846 Methods 3050B/7420. No lead was present in the paint chips, and as a result, lead is not a concern for either worker exposure or waste disposal.

Additionally, the electrical switches in the building were inspected and found to not contain mercury. The ballasts in the fluorescent lights were visually inspected and found to be labeled as "non-PCB containing." The fluorescent light tubes will be removed from the building prior to demolition and properly disposed of, or recycled.

The area surrounding the project is primarily residential, including apartment complexes, townhouses and single-family homes, as shown on Figure 2. The apartment complex that the subject building is located within and the apartment complex to the south, circled in yellow, have been acquired by the City of Fort Worth, are currently unoccupied, and will be demolished following conduct of the AACM evaluation. The apartment complex located to the southeast, across Boca Raton Boulevard, and the apartment complex to the north of the subject building are


**Figure 2. Aerial Photograph of Subject Site and Surrounding Area.**

currently occupied. In addition, a low-density residential community is located approximately 300 feet to the northwest of the subject building. A police substation is located approximately 500 feet southeast of the subject building. For purposes of the evaluation, Boca Raton Boulevard will be closed during the demolition and subsequent soil removal. Additionally, the bus stop located along Boca Raton Boulevard will be relocated. Also, to provide additional protection against accidental release of asbestos in the direction of the occupied structures, a protective poly wall will be built along Boca Raton Boulevard.

## *Task 2 - Building Demolition*

The AACM building will be demolished using the demolition practices specified in the "Alternative Asbestos Control Method" contained in Appendix A. This task will be conducted by Intercon Environmental, Inc. (Intercon), a contractor to the City of Fort Worth, Texas. The USEPA will coordinate with the City of Fort Worth to conduct the demolition in such a way that the goals of Task 3 - Building Demolition Sampling and Sample Analysis can be accomplished.

## *Task 3 - Building Demolition Sampling and Sample Analysis*

Task 3 includes the collection and analysis of air, dust, worker, water, soil, and pavement samples in order to evaluate the impact of the AACM at this site. Specific requirements for monitoring are described in Section B of this QAPP.

## *Task 4 - Quality Assurance Activities*

This project is a Category II Project - this study is being performed to generate data used in support of the development of environmental regulations or standards.

All field and laboratory data shall be reviewed, verified, and validated, including as a minimum, review of field sampling logs, verification of sample collection data (e.g., air sampler flow rates and volume collected), review of laboratory count sheets, verify count and other data transcription, check all mathematical calculations, and review and summarize QA/QC related sample analyses.

The USEPA will conduct on-site audits (laboratory and/or field) of all contract or project-specific activities.

## *Task 5 - Reporting and Deliverables.*

### Deliverable A. Pre-Demolition Site and Building Inspection Report

A report of the pre-demolition site and building inspection will be prepared. This report shall include, but are not limited to, a detailed site description, building description, results of the pre-demolition inspection documenting the types and nature of ACM within the building, demolition work plan including schedule, ACM removal cost estimates, demolition cost estimates, field sampling plan, demolition specifications, berm construction details, and water treatment system details.

### Deliverable B. Draft Report

A draft report will be prepared of the research project and a final PowerPoint presentation, including a detailed site description, the project-specific methodology employed for the demolition, sample collection and analysis, discussion of monitoring data including statistical analysis of the sample data to determine whether project objectives have been met, and cost effectiveness of the demolition technique. The contractor will present a briefing to Agency officials on the results/conclusions.

### Deliverable C. Final Report

The draft report will undergo independent peer review at the direction of the USEPA. The contractor shall make the necessary changes after all peer review comments have been received by EPA and communicated to the contractor.

## Field Activities (if applicable):

The work involves sampling activities associated with the evaluation of environmental impacts associated with building demolition. The demolition will be performed in accordance with the Alternative Asbestos Control Method (AACM), included in Appendix 4.Demolition activities will be performed by a contractor to the City of Fort Worth. Sampling will be performed by the Cadmus Group, as described in the QAPP.

## Laboratory Activities:

Laboratory analysis will consist of analyzing samples for asbestos. This analysis is described in the QAPP and will be performed by an off-site contract laboratory.

### *Job Hazard Analysis and PPE Assessment*

### Potential Hazards:

Job hazards include those associated with building demolition activities. Work meets the definition of Category I Asbestos work under 29 CFR 1926.1101.

### Field Activities (if applicable):

Category I asbestos work conducted by outside building demolition contractor and sampling by EPA Contractor.

### Laboratory Activities:

Analysis of asbestos samples will be performed by an off-site contract lab per the QAPP.

# Physical Hazards Summary

| Physical Hazards | Yes | No | Physical Hazards | Yes | No |
|---|---|---|---|---|---|
| Electrical Hazards | X | | Noise | X | |
| Radioactive Materials | | X | Temperature | X | |
| Non-Ionizing Radiation | | X | Illumination | X | |
| Ionizing Radiation | | X | Compressed Gas | | X |
| Heavy Lifting | X | | Sharp Objects / Tools | X | |
| Vibration | X | | Slips, Trips, Falls | X | |
| Will this research require protection from radionuclides? | | | | | X |
| Will this research require protection from toxic chemicals? | | | | | X |
| Will the products being used require protection from contamination by the researchers? | | | | | X |

# PPE Summary

| **PPE Level Required** | **D** | **X** | **C** | **X** | **B** | | **A** | | |
|---|---|---|---|---|---|---|---|---|---|
| Click here to review PPE summary | | | | | | | | | |
| Click here to review full PPE descriptions at OSHA's website | | | | | | | | | |
| **Face / Eye Protection** | Yes | No | | | | | | Yes | No |
| Safety Glasses w/ Side Shields | X | | Face Shield | | | | | | X |
| Chemical Splash Goggles | X | | Other (specify) | | | | | | X |
| **Ear Protection** | | | | | | | | | |
| Ear Plugs (Foam Inserts) | X | | Ear Muffs | | | | | | X |
| Both Ear Plugs and Ear Muffs | | X | | | | | | | |
| **Hand Protection** | | | | | | | | | |
| Chemical - Nitrile | X | | Chemical - Silver Shield ® | | | | | | X |
| Chemical - Butyl | | X | Leather | | | | | | X |
| Latex | | X | Cut Resistant (Kevlar ®) | | | | | | X |
| Cotton | X | | Other (specify) | | | | | | X |
| **Protective Clothing** | | | | | | | | | |
| Lab Coat (Tyvek ®, Cotton) | | X | Jumpsuit | | | | | | X |
| Lab Apron | | X | Other (specify) | | | | | | X |
| **Respiratory Protection*** | | | | | | | | | |
| Air Purifying Full Face Respirator | X | | Air Purifying Half Face Respirator | | | | | X | |
| N-95 Particulate Respirator | | X | P-100 Particulate Respirator | | | | | | X |
| Nuisance Dusk Mask | | X | Other (specify) | | | | | | X |

***Note: Employees Wearing Respiratory Protection must be enrolled in the Respiratory Protection Program, must be medically cleared to wear a respirator and have current, annual training. Please see SHEM Staff for additional requirements*

| **Respiratory Protection** | **Yes** | **No** |
|---|---|---|
| Is respiratory protection required? | X | |
| If respiratory protection is required, are all authorized personnel medically cleared to wear respirators? | X | |
| If respiratory protection is required, are all authorized personnel current with respiratory protection training? | X | |

# Equipment Requirements (Check all that apply)

| | | | |
|---|---|---|---|
| 4' Chemical Fume Hood | | Clear Air Bench (laminar flow hood | |
| 5' Chemical Fume Hood | | Local Exhaust Ventilation | |
| 6' Chemical Fume Hood | | Spot Ventilation Unit (Snorkel) | |
| Specialty Fume Hood | | Canopy Hood | |
| Walk-in / Bulking Hood | | Liquid Scintillation Counter | |
| Radiological Fume Hood | | Refrigerator / Freezer | |
| Biological Safety Cabinet | | Deep Freezer | |
| Other (specify) | | Other (specify) | |

# Chemicals to be Used

** (Federal law under SARA, Title III, (also known as the Emergency Planning and Community Right to Know Act) requires that Material Safety Data Sheet (MSDS) be readily available for every chemical in the facility. EPA utilizes an online service to assist in meeting this requirement: http://epa.chemwatch.us User Name: **epauser**; Password: **12021970**. If the MSDS is not available through Chemwatch, a hardcopy of the manufacturer supplied MSDS must accompany the HASP. The NFPA hazard rating table is supplied below)*

| Item # | Chemical Name | CAS# | Hazardous Agent | Max Qty stored | Disposal Method for Excess Chemicals | | | MSDS: |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sink | Contract* | Trash | **C**:Chemwatch **H**:Hardcopy |
| 1 | NF-3000 Foam and Wetting Agent Concentrate | See MSDS in Appendix 5 | | | | | | H |
| 2 | Alconox | See MSDS in Appendix 5 | | | | | | H |
| 3 | Isopropanol | See MSDS in Appendix 5 | | | | | | H |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
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| 15 | | | | | | | | |

***** Indicates that material will be sent for proper waste management by the SHEM office

# Biological Agents

| Item # | Biological Agent (list all that apply) | BSL # | Source of Biological Agent | Vaccination Required? |
|---|---|---|---|---|
| | NONE | | | |
| | | | | |
| | | | | |
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| | | | | |

# Waste Management

Excess NF3000 foam will be donated to the City of Fort Worth for use.

Water generated from building demolition will be contained on-site, filtered through a 5-micron filter and disposed in the sanitary sewer for treatment at the POTW.

Building debris and excavated soils will be disposed of in a asbestos-licensed landfill.

# Sample Management

Samples will be managed by the off-site laboratory in accordance with their standard operating procedures.

**Will Hazardous Waste Be Generated?** **No.** **Will the Treatability Exemption be Utilized?** **No.**

# Spill Response .

See Remedial Action Plan in Appendix 6.

# Authorized Personnel:

A variety of craft labor will be required for this project. As a general requirement, all workers entering the exclusion zone will be Asbestos Workers licensed by the State of Texas Department of State Health Services (DSHS). In addition, a Certified Industrial Hygienist licensed as an Asbestos Consultant by the Texas DSHS. In addition, workers may have the following training, as appropriate:

| | | | |
|---|---|---|---|
| **40 - hour Hazwoper** | **X** | **Hearing Protection** | **X** |
| **Current 8 - hour Hazwoper refresher** | X | **First Aid / CPR / AED** | X |
| **Respiratory Protection** | X | **SPCC** | X |
| **24 - hour Laboratory Safety** | | **Personal Protective Equipment** | X |
| **Current Laboratory Safety Refresher** | | **DOT** | X |
| **Biosafety / Bloodborne Pathogens** | | **RCRA** | |
| **Radiation Safety** | | **Other (specify)** | |
| | | | |
| | | | |

# References:

# Project Staff Concurrence:

I have read, understood and will comply with all the requirements of the attached Health and Safety Plan. I have also had the opportunity to ask any questions, and had my questions satisfactorily answered prior to my beginning work under this plan.

| Date | Name (Print) | Government Employee | Other (Specify) | Signature |
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# Appendix 1

## PPE Hazard Assessment Table

| Hazard Source | Operation | Room / Area | Hazard - Assessment of Hazards | Risk | PPE | PPE Criteria |
|---|---|---|---|---|---|---|
| Asbestos Demolition | Category I Asbestos Work | Exclusion Zone | Removal of Surface ACM | Asbestos Exposure | Level C | |
| | | | | | | |
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**Assessment Preformed by:** _____ **Date:** _____

# Appendix 2

| **Safety, Health & Environmental Management** **October 2004**<br>**Program Guidelines**<br><br>**Personal Protective Equipment** | | |
|---|---|---|
| **PPE Checklist** | Yes | No |
| 1. Has the workplace been assessed to determine if hazards that require the use of head, eye, face, hand, or foot protection are present or likely to be present? | ☒ | ☐ |
| (a) Did the assessment include and identification and evaluation of equipment and process? | ☒ | ☐ |
| | | |
| (b) Were accident records reviewed? | ☐ | ☒ |
| | | |
| (c) Were the sources of hazards identified? | ☒ | ☐ |
| | | |
| (d) Is the selected PPE inadequate for the task? | ☒ | ☐ |
| | | |
| 2. Have all affected employees been trained on the proper use of PPE? | ☒ | ☐ |
| | | |
| 3. Can employees demonstrate an understanding of the training? | ☒ | ☐ |
| | | |
| 4. Has training been documented through a written certification? | ☒ | ☐ |
| | | |
| 5. Have any of the following situations occurred that require a re-evaluation of the workplace? | ☒ | ☐ |
| | | |
| (a) The purchase of any new types of PPE? | ☐ | ☒ |
| | | |
| (b) The procurement of new equipment or facilities? | ☐ | ☒ |
| | | |
| (c) The introduction of new operations or procedures? | ☒ | ☐ |
| | | |
| 6. If you answered yes to any of the questions in question 5, was the workplace re-evaluated using questions 1-4? | ☒ | ☐ |

# Appendix 3

# Job Hazard Analysis

| Sequence of Basic Job Steps | Potential Hazards | Recommended Action or Procedure |
|---|---|---|
| | | |
| | | |
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| | | |
| | | |
| | | |
| | | |
| | | |

JHA performed by: _____ Date: _____

Appedix 4

Alternative Asbestos Control Method

# ALTERNATIVE ASBESTOS CONTROL METHOD
Developed by EPA Region 6 and EPA Office of Research and Development
November 1, 2007

## 1.0 Background

In response to Section 112 of the Clean Air Act which requires EPA to develop emission standards for hazardous air pollutants, EPA promulgated the National Emission Standards for Hazardous Air Pollutants (NESHAP). 40 CFR Part 61 Subpart M (Asbestos NESHAP) specifically addresses asbestos, including demolition activities.

Asbestos NESHAP regulations require that all regulated asbestos-containing materials (RACM) above a specified amount be removed from structures prior to demolition. Asbestos-containing materials (ACM) are defined as those materials containing more than one percent asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM).

RACM includes friable ACM; Category I non-friable ACM that has become friable, Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; and Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected during demolition operations.

Asbestos removal can account for a significant portion of the total demolition costs. In many cities, the cost of asbestos removal prohibits timely demolitions and results in substandard structures which become fire and safety hazards, attract criminal activity, and lower property values.

For structures that are structurally unsound and in imminent danger of collapse, the Asbestos NESHAP requires that the portion of the structure which contains RACM must be kept adequately wet during demolition and during handling and loading of debris for transport to a disposal site. No other engineering controls are required.

This Alternative Asbestos Control Method (AACM) was developed by EPA as an alternative work practice to the Asbestos NESHAP, where certain RACM are removed prior to demolition and other RACM are left in place.

The goal is to provide significant cost savings while achieving an equal or better standard of protection of human health and the environment. This method is much more restrictive than the Asbestos NESHAP requirements for buildings in imminent danger of collapse.

## 2.0 Applicability

This Alternative Asbestos Control Method applies to any structure subject to the Asbestos NESHAP regulation (i.e., structures that meet the definition of facility under the Asbestos NESHAP), except as noted below.

The size of structures which can be demolished using this method is limited to three stories or less (maximum height of 35 feet). This allows adequate wetting of both the interior and exterior of the structures and is within the working reach of both the wetting and the demolition equipment.

## 3.0 Building Inspection/Asbestos Assessment

A comprehensive inspection of the interior and exterior of the structure to be demolished shall be conducted in accordance with EPA's Asbestos Hazard Emergency Response Act (AHERA, 40 CFR Part 763). Specific criteria for inspection, sampling, and assessment are in Subpart E (763.85, 763.86, and 763.88, respectively). The inspection shall be performed by an accredited asbestos building inspector.

## 4.0 Asbestos Removal

Table 1 summarizes the ACM that may be present in buildings and whether or not the ACM must be removed prior to demolition.

All thermal system insulation (TSI) and spray-applied fireproofing shall be removed due to the inability to adequately wet these materials during demolition. Fire curtains may be removed if it is easier to do so than to adequately wet and handle this heavy material.

Vermiculite insulation, if present, shall be removed prior to demolition as an RACM, regardless of the measured asbestos concentration.

All asbestos removal operations shall be performed in accordance with state and federal law by a licensed asbestos abatement contractor.

## 5.0 Demolition Practices

Several demolition work practice standards shall be employed to ensure that the method is protective of human health and the environment. These standards involve the equipment used, the wetting process, the demolition process, and visible emissions.

Demolition contractors shall provide an Asbestos NESHAP-trained individual to oversee the demolition process.

5.1 Equipment Used

Track hoes and end loaders or equivalent shall be used during demolition to minimize the generation of dust. No bulldozers, explosives, or burning will be permitted.

5.2 Wetting Process

Structures to be demolished will be thoroughly and adequately wetted with amended water (water to which a surfactant has been added) prior to demolition, during demolition, and during debris handling and loading. Surfactants reduce the surface tension of the water, increasing its ability to penetrate the ACM.

For this method, the Asbestos NESHAP definition for "adequately wet" will be used. That is, "sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from the asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emission is not sufficient evidence of being adequately wet." The demolition contractor's Asbestos NESHAP-trained individual will verify that ACM is adequately wetted.

Amended water shall be applied with a minimum of two hoses. The water shall be delivered as a mist. Direct high-pressure water impact of RACM is prohibited.

The wetting process consists of three stages. In each stage, both interior and exterior wetting of the structure shall be performed. To the extent feasible, cavity areas and interstitial wall spaces shall be wetted during each of the wetting stages.

**Table 1. Asbestos Removal Requirements of AACM**

| Asbestos-Containing Material | Removed Prior to Demolition? |
|---|---|
| *Thermal System Insulation (TSI)* | |
| ▪ Tank insulation | Yes |
| ▪ Pipe insulation | Yes |
| ▪ Elbow/fitting/valve insulation | Yes |
| ▪ Boiler insulation | Yes |
| ▪ Duct insulation | Yes |
| ▪ Cement and patching compound | Yes |
| *Surfacing Material* | |
| ▪ Asbestos-impregnated plaster, stucco | No |
| ▪ Spray-applied fireproofing | Yes |
| ▪ Spray-applied surface coatings (popcorn ceiling, vermiculite treatments) | No |
| ▪ Spray applied acoustical or decorative surfacing | No |
| ▪ Troweled-on crows foot texture, splatter texture, and joint compound. | No |
| ▪ Spray-applied surface coatings crows foot texture, splatter texture, etc. | No |
| *Miscellaneous Material* | |
| ▪ Fire curtains in auditoriums | Optional |
| ▪ Fire doors | Optional |
| ▪ Vibration-dampening cloths | No |
| ▪ Asbestos-cement tiles, sheets, roofing, shingles, and transite | No |
| ▪ Asbestos-impregnated roofing cement and asphalt roofing | No |
| ▪ Shingles | No |
| ▪ Linoleum or other floor tile | No |
| ▪ Roll flooring | No |
| ▪ Ceiling tile | No |
| ▪ Asbestos-impregnated pipe | No |
| ▪ Vermiculite insulation | Yes |
| ▪ Mastic for flooring | No |
| ▪ Window Cauking | No |

On the day before the demolition, access openings shall be made into the attic spaces from the exterior. The structure shall be first pre-wet (until adequately wet) from the interior and then from the constructed exterior attic access openings to enhance water retention and maximize wetting effectiveness.

This pre-wetting shall prohibit further access into the structure, because of safety concerns. The structure shall be re-wet (until adequately wet) from the exterior through the windows, doors, and attic access openings on the day of demolition prior to demolition. Finally, wetting (until adequately wet) shall be done during the demolition and during loading of debris into lined disposal containers.

### 5.3 Demolition Process

The demolition contractor shall minimize breakage of asbestos-containing materials. All demolition shall be completed in a timely manner that will allow the debris generated during that day to be completely removed from the demolition site for disposal.

### 5.4 Visible Emissions

The Asbestos NESHAP standard of "no visible emissions" shall be employed. Visible emissions mean any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing material. This does not include condensed, uncombined water vapor. The demolition contractor's NESHAP-trained individual shall verify the absence of visible emissions and has the authority to stop work if visible emissions are observed.

During a demolition, it is often not possible to distinguish visible emissions from ACM and those from construction debris; therefore, should a visible emission be observed, the demolition effort shall pause until the deficiencies in the application of the wetting controls eliminate the visible emission.

## 6.0 Weather Restrictions

Demolition activities shall be delayed/halted in the case of any inclement weather that will impede the demolition contractor's ability to adequately wet the structure (e.g., freezing temperatures).

In addition, if visible dusting is observed in the vicinity of the demolition site, the demolition shall be delayed/halted.

## 7.0 Monitoring Requirements

Demolition contractors are required to comply with all applicable OSHA (29 CFR 1926) regulations for worker protection during asbestos removal and demolition activities. This

includes the use of personal protective equipment (PPE) such as Tyvek suits or equivalent, respirators (as necessary), and gloves (as necessary); and personal monitoring.

Because, like the Asbestos NESHAP, this method is designed to be a work practice standard, monitoring of air (other than that mandated by OSHA statute), soil, and other media is not required.

## 8.0 Waste Handling

Several wastes are generated during demolition activities, including demolition debris, disposable PPE, and potentially contaminated water and soil, and must be properly disposed. All wastes generated must be removed from the site at the end of the day and transported to an appropriate disposal facility. Transport and disposal shall be in accordance with all federal, state, and local requirements. All waste haulers shall be leak-proof. Double-lining of the haulers with 4-mil or thicker polyethylene film and then sealing the top seams of the film is a suggested mechanism, but the contractor must do what is required to prevent leaks from the transport vehicles. Vehicles shall be decontaminated within the bermed area before leaving the demolition area.

### 8.1 Demolition Debris

Segregation of portions of a structure that may contain RACM from portions of a structure that clearly do not contain RACM shall be done when practical in an effort to minimize RACM debris. For example, segregation may be used if a large warehouse is being demolished and only a small portion (e.g., office space) contains RACM.

When segregation is not practical, all demolition debris shall be disposed as RACM in a licensed asbestos disposal facility. Debris shall be kept adequately wet during loading into containers. Containers shall be covered during transport.

### 8.2 PPE

All disposable PPE shall be disposed as RACM. Reusable PPE shall be decontaminated in accordance with OSHA standard practices.

### 8.3 Potentially Contaminated Water and Impervious Surfaces

No potentially contaminated water runoff is permitted from the site during the demolition period. All impervious surfaces will be thoroughly washed with amended water before site closure.

Construction site best management practices shall be used to prevent water runoff. Drains and sewer connections must be capped or plugged prior to wetting. Berms and/or trenches must be created as necessary to prevent runoff of water from the demolition site. If possible, the bermed/trenched area should extend 25 ft from the building and/or loading area. If not possible, adjacent areas and structures need to be covered with plastic.

The berm/trench must be sufficiently spaced from the building to permit the movement of the demolition equipment and to allow the truck loading to occur within the enclosed space. All plastic shall be disposed as RACM.

If large water volume use or impermeable conditions surrounding the building create excessive water volume and simple containment and percolation is not feasible, the water must be pumped and either disposed as ACM or filtered through a series of filters ultimately removing all fibers equal to or larger than five microns before transporting to a publicly-owned treatment works or discharging to a sanitary sewer. The filters must be disposed as RACM.

### 8.4 Potentially Contaminated Soil

Following the removal of demolition debris, bare soil within the bermed area shall be excavated to a minimum depth of three inches or until no debris is found. Berms created shall also be removed and disposed as potentially asbestos-contaminated. All removed soil shall be disposed as RACM.

## 9.0 Site Closure

Following demolition and waste disposal, all waste and debris must be gone from the site and the site must be secured so as not to create a safety hazard

Appendix 5

Material Safety Data Sheets

**DATA SHEET**
**#NFC970**

# NF-3000
# Foam & Wetting Agent Concentrate

## *Description*

Environmentally responsible **NF-3000** Wetting Agent concentrate, is a unique new formulation providing unmatched wetting performance, foamability and flexibility. NF-3000 is specially designed for use in industrial and remedial wetting applications. NF-3000 can be used through conventional foam making devices, Class A/B foam systems and is excellent for Compressed Air Foam Systems (CAFS). **This environmentally responsible formulation does not contain reportable components under SARA Title III, Section 313 of 40 CFR-372, or CERCLA.**

NF-3000 improves the penetrating capability of water. It reduces the surface tension of water, which allows it to penetrate surfaces where water might normally run off. Foaming and wetting ingredients give water the ability to adhere to vertical surfaces that allows longer contact with the material to be penetrated. The longer the water is in contact with an absorbent material, the more water is absorbed.

## *Features*

- Environmentally responsible formulation.
- Excellent Wetting and Foaming for dust control and containment.
- Excellent for wetting materials which may contain hazardous dusts and particles such as abestos.
- Premix is stable for more than 30 days (using potable water), which is significantly longer than traditional Class A foam solutions.
- Contains NO alcohols for higher flash point and compatibility with Class A/B Systems.
- Can be used with fresh, brackish and sea water.
- Exhibits good foamability, even in cold water.
- Can be used as a Class A firefighting foam concentrate.

## *Typical Physical Properties*

| | |
|---|---|
| Appearance | Pale yellow liquid |
| Specific Gravity @ 77°F (25°C) | 1.05 |
| pH | 9.0 |
| Minimum Usable Concentrate Temp. | 20°F(-7°C) |
| Maximum Usable ConcentrateTemp. | 120°F(49°C) |
| Freezing Point. | 6°F(-14°C) |
| Viscosity @ 70°F (21°C) | 20 csks |
| Viscosity @ 20°F (-7°C) | 32 csks |
| Surface Tension at 0.1% Conc. | 25.7 Dynes/cm |
| Surface Tension at 0.5% Conc. | 24.1 Dynes/cm |
| Flash Point: Pensky Martens Closed Cup Method | >205°F |
| Freeze/Thaw: | No Effects on Concentrate Properties |

## *Typical Proportioning Settings*

| | |
|---|---|
| Wetting | 0.3% - 1.0% |
| Foaming, Aspirated | 0.7% - 1.0% |
| Compressed Air Application | 0.1% - 0.5% |

## *Standards & Approvals*

- NFPA 18

## *Compatibility*

It is recommended that NF-3000 not be mixed with any other type of foam concentrate in long-term storage. Such mixing could lead to chemical changes in the product and a possible reduction in or loss of its capability.

## *Storage and Handling*

The recommended storage temperature range for NF-3000 concentrate is 20°F (-7°C) to 120°F (49°C). NF-3000 foam concentrate is not affected by freeze/thaw cycles, and it has unique premix stability properties. Samples of NF-3000, premixed with potable municipal water supplies, have been shown to be stable and not suffer any significant loss of expansion or drainage properties after 30 days. Actual results may vary based on the water supply.

NF-3000 should be stored in its original shipping container or in tanks or other containers that have been designed

for such foam storage. Recommended construction materials are stainless steel (Type 304L or 316), high-density cross-linked polyethylene, or reinforced fiberglass polyester (isophthalic polyester resin) with a vinyl ester resin internal layer coating (50 -100 mils).

Foam concentrates are subject to evaporation which accelerates when the product is exposed to air. Storage tanks should be sealed and fitted with a pressure vacuum vent to prevent free exchange of air.

### *Shelf Life, Inspection, and Testing*

The shelf life of any foam concentrate is maximized by proper storage conditions and maintenance. Factors affecting shelf life are wide temperature changes, extreme high or low temperatures, evaporation, dilution, and contamination by foreign materials. The expected shelf life of NF-3000 foam concentrate is 20 years or more, if stored properly, according to the manufacturer's recommendations. Should the concentrate become contaminated, testing to ensure original foam concentrate physical properties is a service available from National Foam. Annual testing of foam concentrates is recommended to ensure reliability.

### *Environmental and Toxicological Information*

NF-3000 is biodegradable. However, as with any substance, care should be taken to prevent discharge from entering ground water, surface water, or storm drains. With advance notice, NF-3000 foam concentrate or foam solution can be treated by local biological sewage treatment systems. Since facilities vary widely by location, advance notice should be given, and disposal should be made in accordance with federal, state, and local regulations.

The biological oxygen demand (BOD) and chemical oxygen demand (COD) of NF-3000 are as follows:

| | Concentrate | 0.5% Sol. | 1% Sol. |
|---|---|---|---|
| $BOD_5$ | 389,000 mg/kg | 2,140 mg/kg | 4,220 mg/kg |
| COD | 782,000 mg/kg | 3,900 mg/kg | 7,980 mg/kg |

Tests for acute oral toxicity have proved negative. NF-3000 concentrate is a primary skin irritant. Repeated skin contact will remove oils from the skin and cause dryness. NF-3000 is classified as a primary eye irritant, and contact with the eyes should be avoided. Users are advised to wear protective eyewear. If the foam concentrate enters the eyes, flush them well with water and seek immediate medical attention. For further details see the NF-3000 Material Safety Data Sheet.

This product does NOT contain reportable components under SARA Title III, Section 313 of 40 CFR-372 or CERCLA

### *Ordering Information*

| Capacity | Description | Part Number | Shipping Weight lbs. | (kg) | Approximate Shipping Cube $Ft^3$ | ($m^3$) |
|---|---|---|---|---|---|---|
| 5-Gallon (19 litres) | Pails (Round) | 2170-9340-6 | 46 | (20.9) | 1.13 | (0.029) |
| 55-Gallon (208 litres) | Drums | 2170-9481-6 | 503 | (228.0) | 11.10 | (0.326) |
| 275-Gallon (1041 litres) | IBC Reusable Tote Tank | 2170-9725-6 | 2549 | (1156.0) | 48.20 | (1.061) |
| Per Gallon | Bulk Delivery | 2170-9001-6 | 8.75 | (4.0) | | |



04/06 Printed in U.S.A. (NFC970-NF3000.PMD)

**NATIONAL FOAM, INC.**
P.O. Box 695 • Exton, PA 19341-0695 • (610) 363-1400 • Fax: (610) 524-9073
www.Kidde-Fire.com

National Foam

# MATERIAL SAFETY DATA SHEET #NMS970

## NF-3000

Synthetic Foam

### Section 1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

**Material Identification**

Product: NF-3000
Synonyms: Synthetic Detergent, Wetting Agent
CAS No: Mixture - No single CAS # applicable

**Company Identification**
**Manufacturer:**
National Foam, Inc.
150 Gordon Drive
P.O. Box 695
Exton, PA 19341-0695
Emergency Phone Number (Red Alert): (610) 363-1400 (U.S.A.)
Fax (610) 524-9073
http://www.kidde-fire.com/nf1.shtml

### Section 2. COMPOSITION / INFORMATION ON INGREDIENTS

| Components | CAS Number |
|---|---|
| Water | 7732-18-5 |
| Proprietary mixture of synthetic detergents | No single CAS # applicable |
| 1, 2 Propanediol | 57-55-6 |
| (2-Methoxymethylethoxy) Propanol | 34590-94-8 |
| Proprietary mixture of corrosion inhibitors | No single CAS # applicable |

## Section 3. HAZARDS IDENTIFICATION

**Potential Health Effects**

**Inhalation**
Vapors are minimal at room temperature. If product is heated or sprayed as an aerosol, airborne material may cause respiratory irritation.

**Skin Contact**
Contact with liquid may cause moderate irritation or dermatitis due to removal of oils from the skin.

**Eye Contact**
Product is an eye irritant.

**Ingestion**
Not a hazard in normal industrial use. Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing large amounts may cause injury or irritation.

**Additional Health Effects**
Existing eye or skin sensitivity may be aggravated by exposure.

**Carcinogenicity Information**
No data available.

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## Section 4. FIRST AID MEASURES

**Inhalation**
No specific treatment is necessary since this material is not likely to be hazardous by inhalation. If exposed to excessive levels of airborne aerosol mists, remove to fresh air. Seek medical attention if effects occur.

**Skin Contact**
In case of skin contact, wash off in flowing water or shower. Launder clothing before reuse.

**Eye Contact**
In case of eye contact, flush eyes promptly with water for 15 minutes. Retract eyelids often to ensure thorough rinsing. Consult a physician if irritation persists.

**Ingestion**
Swallowing less than an ounce is not expected to cause significant harm. For larger amounts, do not induce vomiting. Give milk or water. Never give anything by mouth to an unconscious person. Seek medical attention.

## Section 5. FIRE FIGHTING MEASURES

**Flammable Properties**
Flash Point – Not applicable

**Fire and Explosion Hazards**
Avoid contact with water reactive materials, burning metals and electrically energized equipment.

**Extinguishing Media**
Product is an extinguishing media. Use media appropriate for surrounding materials.

**Special Fire Fighting Instructions**
This product will produce foam when mixed with water.

## Section 6. ACCIDENTAL RELEASE MEASURES

**Safeguards (Personnel)**
**NOTE:** Review FIRE FIGHTING MEASURES and HANDLING (Personnel) sections before proceeding with clean-up. Use appropriate Personal Protective Equipment during clean-up.

**Accidental Release Measures**

**Concentrate**
Stop flow if possible. Use appropriate protective equipment during clean up. For small volume releases, collect spilled concentrate with absorbent material; place in approved container. For large volume releases, contain and collect for use where possible. Flush area with water until it no longer foams. Exercise caution, surfaces may be slippery. Prevent discharge of concentrate to waterways. Disposal should be made in accordance with federal, state and local regulations.

**Foam/Foam Solution**
See above. Flush with water. Prevent discharge of foam/foam solution to waterways. Do not discharge into biological sewer treatment systems without prior approval. Disposal should be made in accordance with federal, state and local regulations.

## Section 7. HANDLING AND STORAGE

**Handling (Personnel)**
Avoid contact with eyes, skin or clothing. Avoid ingestion or inhalation. Rinse skin and eyes thoroughly in case of contact. Review HAZARDS and FIRST AID sections.

**Storage**
Recommended storage environment is between 20°F (-7°C) and 120°F (49°C). Store product in original shipping container or tanks designed for product storage.

## Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls**
Special ventilation is not required.

**Personal Protective Equipment**

**Respiratory**
Recommended exposure limits (OSHA-PEL and ACGIH-TLV) have not been determined for this material. A qualified health specialist should evaluate the need for respiratory protection.

**Protective Clothing**
Rubber or PVC gloves recommended.

**Eye Protection**
Safety glasses, face shield or chemical splash goggles must be worn when possibility exists for eye contact. Contact lenses should not be worn. Eye wash facilities are recommended.

**Other Hygienic Practices**
Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before re-use.

**Exposure Guidelines**

**Exposure Limits**
(2-Methoxymethylethoxy) Propanol (34590-94-8)

**PEL (OSHA)**
100 ppm, 8 hr. TWA Skin
150 ppm, 15 min. STEL Skin

**TLV (ACGIH)**
100 ppm, 8 hr. TWA Skin
150 ppm, 15 min. STEL Skin

## Section 9. PHYSICAL AND CHEMICAL PROPERTIES

### Physical Data

| | |
|---|---|
| Boiling Point: | Not applicable |
| Vapor Pressure: | Not applicable |
| Vapor Density: | Not applicable |
| Melting Point: | Not applicable |
| Evaporation Rate: | <1 (Butyl Acetate = 1.0) |

| | |
|---|---|
| Solubility in Water: | 100% |
| pH: | 8.0 |
| Specific Gravity: | 1.05 @ 25°C |
| Odor: | Bland |
| Form: | Liquid |
| Color: | Pale Yellow |

## Section 10. STABILITY AND REACTIVITY

**Chemical Stability**
Stable.

**Incompatibility, Materials to Avoid**
Avoid use of product on burning metals, electrically-energized equipment and contact with water reactive materials.

**Polymerization**
Will not occur.

## Section 11. TOXICOLOGICAL INFORMATION

**Mammalian Toxicity**

| | Concentrate | 1% Solution |
|---|---|---|
| Acute Oral Toxicity – Sprague-Dawley Rats | $LD_{50}$ > 5000 mg/kg | $LD_{50}$ > 5000 mg/kg |
| Acute Dermal Toxicity – New Zealand White Rabbits | $LD_{50}$ > 2000 mg/kg | $LD_{50}$ > 2000 mg/kg |
| Primary Dermal Irritation – New Zealand White Rabbits | Slightly Irritating (Toxicity Category IV) | Non-Irritating (Toxicity Category IV) |
| Primary Eye Irritation – Unwashed Eyes New Zealand White Rabbits | Moderately Irritating (Toxicity Category I) | Minimally Irritating (Toxicity Category IV) |
| Primary Eye Irritation – Washed Eyes New Zealand White Rabbits | Mildly Irritating (Toxicity Category III) | Practically Non- Irritating (Toxicity Category IV) |

## Section 12. ECOLOGICAL INFORMATION

**Ecotoxicological Information Aquatic Toxicity**
96 hr. $LC_{50}$ for Rainbow Trout (oncorhynchus mykiss) is reported to be 28 mg/liter.

**Environmental Fate**

| | Concentrate | 0.5% Solution | 1.0% Solution |
|---|---|---|---|
| $BOD_5$ | 389,000 mg/kg | 2,140 mg/kg | 4,220 mg/kg |
| COD | 782,000 mg/kg | 3,900 mg/kg | 7,960 mg/kg |

This product meets the criteria for Readily Biodegradable when tested in accordance to EPA OPPTS 835-3110, Section 0, Ready Biodegradability (greater than 60% biodegradation in 28 days).

## Section 13. DISPOSAL CONSIDERATIONS

NF-3000, as sold, is not a RCRA-listed waste or hazardous waste as characterized by 40 CFR 261. However, State and local requirements for waste disposal may be more restrictive or otherwise different from Federal regulations. Therefore, applicable local and state regulatory agencies should be contacted regarding disposal of waste foam concentrate or foam/foam solution.

**Concentrate**
Do not discharge into biological sewer treatment systems without prior approval. Specific concerns are high BOD load and foaming tendency. Low dosage flow rate or antifoaming agents acceptable to the treatment plant may be helpful. Do not flush to waterways. Disposal should be made in accordance with federal, state and local regulations.

**Foam/Foam Solution**
NF-3000 solution can be treated by wastewater treatment facilities. Discharge into biological sewer treatment facilities may be done with prior approval. Specific concerns are high BOD load. Dilution will reduce BOD and COD factors proportionately. Low dosage flow rate or antifoaming agents acceptable to the treatment plant may be helpful. Do not flush to waterways. Disposal should be made in accordance with federal, state and local regulations.

NOTE: As a service to our customers, National Foam has approvals in place with disposal facilities throughout the U.S. for waste water treatment and solidification and landfill of our foam liquid concentrates and foam solutions. If required, National Foam, Inc. can also provide information on the disposal of drums used for shipping our concentrates. Please contact National Foam's Risk Management Administrator at (610) 363-1400 for additional information.

## Section 14. TRANSPORTATION INFORMATION

**Shipping Information**
Proper Shipping Name: Fire Extinguisher Charges or Compounds N.O.I., Class 60
National Motor Freight Code: 69160 Sub 0
Hazard Class: None
UN Number: None

## Section 15. REGULATORY INFORMATION

**U.S. Federal Regulations**

**Toxic Substances Control Act (TSCA)**
All components of this product are listed in the TSCA inventory.

**Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III**

**Section 302/304**
There are no components of this material with known CAS numbers which are on the Extremely Hazardous Substances (EHS) list.

**Section 311 & 312**
Based on available information, this material contains the following components which are classified as the following health and/or physical hazards according to Section 311 & 312:
(2-Methoxymethylethoxy) Propanol 34590-94-8 (Flammability)

**Section 313**
This material does not contain any chemical components subject to Section 313 reporting requirements.

**COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)**
This material does not contain any components subject to the reporting requirements of CERCLA.

**OTHER REGULATORY INFORMATION**
None.

**STATE REGULATIONS**

**PENNSYLVANIA RIGHT-TO-KNOW HAZARDOUS SUBSTANCES LIST**

**PA Hazardous Substances present at levels greater than 1%:**
1, 2 Propanediol 57-55-6
(2-Methoxymethylethoxy) Propanol 34590-94-8

## Section 16. OTHER INFORMATION

**NFPA Rating**

Health 0
Flammability 0
Reactivity 0

**WHMIS Rating**

D2B

## ADDITIONAL INFORMATION

**Revision Summary**
3/13/06 New Issue

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**The information contained herein is furnished without warranty either expressed or implied. This data sheet is not a part of any contract of sale. The information contained herein is believed to be correct or is obtained from sources believed to be generally reliable. However, it is the responsibility of the user of these materials to investigate, understand and comply with federal, state and local guidelines and procedures for safe handling and use of these materials. National Foam, Inc. shall not be liable for any loss or damage arising directly or indirectly from the use of this product and National Foam, Inc. assumes no obligation or liabilities for reliance on the information contained herein or omissions herefrom.**

March 13, 2006

# Material Safety Data Sheet
## Isopropanol, Reagent ACS

ACC# 95531

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** Isopropanol, Reagent ACS
**Catalog Numbers:** AC423830000, AC423830010, AC423830040, AC423830200, AC423835000
**Synonyms:** Isopropanol; Dimethylcarbinol; sec-Propyl alcohol; Rubbing alcohol; Petrohol; 1-Methylethanol; 1-Methylethyl alcohol; 2-Hydroxypropane; 2-Propyl alcohol; Isopropyl alcohol; Propan-2-ol; IPA; 2-Propanol.
**Company Identification:**

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01
**For emergencies in the US, call CHEMTREC:** 800-424-9300

## Section 2 - Composition, Information on Ingredients

| CAS# | Chemical Name | Percent | EINECS/ELINCS |
|---|---|---|---|
| 67-63-0 | 2-Propanol | >= 99.5 | 200-661-7 |

**Hazard Symbols:** XI F
**Risk Phrases:** 11 36

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: 12 deg C. **Warning!** May cause central nervous system depression. May form explosive peroxides. **Flammable liquid and vapor.** Hygroscopic (absorbs moisture from the air). Causes respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. This material has been reported to be susceptible to autoxidation and therefore should be classified as peroxidizable. Causes eye irritation. Breathing vapors may cause drowsiness and dizziness. Prolonged or repeated contact causes defatting of the skin with irritation, dryness, and cracking.
**Target Organs:** Central nervous system, respiratory system, eyes, skin.

### Potential Health Effects

**Eye:** Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause transient corneal injury. In the eyes of a rabbit, 0.1 ml of 70% isopropyl alcohol caused conjun ctivitis, iritis, and corneal opacity.
**Skin:** May cause irritation with pain and stinging, especially if the skin is abraded. Isopropanol has a low potential to cause allergic skin reactions; however, rare cases of allergic contact dermatitis have been reported. May be absorbed through intact skin. Dermal absorption has been considered toxicologically insignificant. T he cases of deep coma associated with skin contact are thought to be a consequence of gross isopropanol vapor inhalation in rooms with inade quate ventilation, rather than being attributable to percutaneous abso rption of isopropanol per se.
**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. The probable oral lethal dose in humans is 240 ml (2696 mg/kg), but in gestion of only 20 ml (224 mg/kg) has caused poisoning.
**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause narcotic effects in high concentration. Causes upper respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.
**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.
**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.
**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
**Notes to Physician:** Urine acetone test may be helpful in diagnosis. Hemodialysis should be considered in severe intoxication. Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. May form explosive peroxides. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.
**Extinguishing Media:** Water may be ineffective. Do NOT use straight streams of water. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. For small fires, use carbon dioxide, dry chemical, dry sand, or alcohol-resistant foam. Cool containers with flooding quantities of water until well after fire is out.
**Flash Point:** 12 deg C ( 53.60 deg F)
**Autoignition Temperature:** 399 deg C ( 750.20 deg F)
**Explosion Limits, Lower:**2.0 vol %
**Upper:** 12.7 @ 200°F
**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.
**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Use water spray to dilute spill to a non-flammable mixture. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist. Do not allow to evaporate to near dryness.
**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area

away from incompatible substances. Flammables-area. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Addition of water or appropriate reducing materials will lessen peroxide formation. Store protected from moisture. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

**Exposure Limits**

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|---|---|---|---|
| 2-Propanol | 200 ppm TWA; 400 ppm STEL | 400 ppm TWA; 980 mg/m3 TWA 2000 ppm IDLH | 400 ppm TWA; 980 mg/m3 TWA |

**OSHA Vacated PELs:** 2-Propanol: 400 ppm TWA; 980 mg/m3 TWA

**Personal Protective Equipment**

**Eyes:** Wear chemical goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colorless

**Odor:** alcohol-like

**pH:** Not available.

**Vapor Pressure:** 33 mm Hg @ 20 deg C

**Vapor Density:** 2.1 (Air=1)

**Evaporation Rate:**1.7 (n-butyl acetate=1)

**Viscosity:** 2.27 mPas @ 20C

**Boiling Point:** 82 deg C @ 760 mmHg

**Freezing/Melting Point:**-88 deg C

**Decomposition Temperature:**Not available.
**Solubility:** Miscible.
**Specific Gravity/Density:**0.7850 (water=1)
**Molecular Formula:**C3H8O
**Molecular Weight:**60.09

## Section 10 - Stability and Reactivity

**Chemical Stability:** Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation. Isopropanol is susceptible to autoxidation and therefore should be classified as peroxidizable.
**Conditions to Avoid:** Light, ignition sources, excess heat, exposure to moist air or water.
**Incompatibilities with Other Materials:** Attacks some forms of plastics, rubbers, and coatings., chlorine, carbony dichloride(phosgene), acetaldehyde, ethylene oxide, isocyanates, amines, aluminum at high temperatures, strong oxidizing agents, strong acids, ammonia, strong bases.
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.
**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**
**CAS#** 67-63-0: NT8050000
**LD50/LC50:**
CAS# 67-63-0:
Draize test, rabbit, eye: 100 mg Severe;
Draize test, rabbit, eye: 10 mg Moderate;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg Mild;
Inhalation, mouse: LC50 = 53000 mg/m3;
Inhalation, rat: LC50 = 16000 ppm/8H;
Inhalation, rat: LC50 = 72600 mg/m3;
Oral, mouse: LD50 = 3600 mg/kg;
Oral, mouse: LD50 = 3600 mg/kg;
Oral, rabbit: LD50 = 6410 mg/kg;
Oral, rat: LD50 = 5045 mg/kg;
Oral, rat: LD50 = 5000 mg/kg;
Skin, rabbit: LD50 = 12800 mg/kg;
**Carcinogenicity:**
CAS# 67-63-0: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

**Epidemiology:** Experimental teratogenic and reproductive effects have been reported for isopropanol. Early epidemiological studies hav e suggested an association between the strong acid man ufacture of isopropyl alcohol and paranasal sinus cancer in workers.
**Teratogenicity:** A rat & rabbit developmental toxicity study showed no teratogenic effects at doses that were clearly maternally toxic. In a separate rat study, no evidence of developmental neurotoxicity was associated with gestational exposures to IPA up to 1200 mg/kg/d.
**Reproductive Effects:** See actual entry in RTECS for complete information.
**Neurotoxicity:** No information available.
**Mutagenicity:** See actual entry in RTECS for complete information.
**Other Studies:** Standard Draize Test: Administration onto the skin (rabbit) = 500 mg (Mild). Standard Draize Test: Administration into the eye (rabbit) = 100 mg (Moderate). Standard Draize Test : Administration into the eye = 10 mg (Moderate). Standard D raize test: Administration into the eye (rabbit) = 100 mg/24 H (Moderate).

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: >1000 ppm; 96h; LC50Daphnia: >1000 ppm; 96h; LC50Fish: Gold orfe: 8970-9280 ppm; 48h; LC50 IPA has a high biochemical oxygen demand and a potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect secondary waste treatment microbial metabolism, a low potential to affect the germination of some plants, a high potential to biodegrade (low persistence) with unacclimated microorganisms from activated sludge.
**Environmental:** No information available.
**Physical:** THOD: 2.40 g oxygen/gCOD: 2.23 g oxygen/gBOD-5: 1.19-1.72 g oxygen/g
**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
**RCRA P-Series:** None listed.
**RCRA U-Series:** None listed.

## Section 14 - Transport Information

| | US DOT | IATA | RID/ADR | IMO | Canada TDG |
|---|---|---|---|---|---|
| Shipping Name: | ISOPROPANOL | | | | No information available. |
| Hazard Class: | 3 | | | | |
| UN Number: | UN1219 | | | | |
| Packing Group: | II | | | | |

## Section 15 - Regulatory Information

### US FEDERAL

**TSCA**
CAS# 67-63-0 is listed on the TSCA inventory.
**Health & Safety Reporting List**
CAS# 67-63-0: Effective 12/15/86; Sunset 12/15/96
**Chemical Test Rules**
None of the chemicals in this product are under a Chemical Test Rule.
**Section 12b**
None of the chemicals are listed under TSCA Section 12b.
**TSCA Significant New Use Rule**
None of the chemicals in this material have a SNUR under TSCA.
**SARA**

**CERCLA Hazardous Substances and corresponding RQs**
None of the chemicals in this material have an RQ.
**SARA Section 302 Extremely Hazardous Substances**
None of the chemicals in this product have a TPQ.
**SARA Codes**
CAS # 67-63-0: acute, chronic, flammable.
**Section 313**
This material contains 2-Propanol (CAS# 67-63-0, 99 5%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
**Clean Air Act:**
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
**Clean Water Act:**
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
**OSHA:**
None of the chemicals in this product are considered highly hazardous by OSHA.
**STATE**

CAS# 67-63-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

XI F

**Risk Phrases:**

R 11 Highly flammable.
R 36 Irritating to eyes.
R 67 Vapours may cause drowsiness and dizziness.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.
S 24/25 Avoid contact with skin and eyes.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 7 Keep container tightly closed.

**WGK (Water Danger/Protection)**

CAS# 67-63-0: 1

**Canada - DSL/NDSL**

CAS# 67-63-0 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

**Canadian Ingredient Disclosure List**

CAS# 67-63-0 is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits**

CAS# 67-63-0: OEL-AUSTRALIA:TWA 400 ppm (980 mg/m3);STEL 500 ppm (12 25 mg/m3) OEL-BELGIUM:TWA 400 ppm (985 mg/m3);STEL 500 ppm (1230 mg/m
3) OEL-DENMARK:TWA 200 ppm (490 mg/m3);Skin OEL-FRANCE:STEL 400 ppm (980 mg/m3) OEL-GERMANY:TWA 400 ppm (980 mg/m3) OEL-JAPAN:STEL 400 p pm (980 mg/m3) OEL-THE NETHERLANDS:TWA 400 ppm (980 mg/m3);Skin OEL-THE PHILIPPINES:TWA 400 ppm (980 mg/m3) OEL-RUSSIA:STEL 400 ppm (10 m g/m3) OEL-SWEDEN:TWA 150 ppm (350 mg/m3);STEL 250 ppm (600 mg/m3) OE L-SWITZERLAND:TWA 400 ppm (980 mg/m3);STEL 800 ppm OEL-TURKEY:TWA 200
ppm (500 mg/m3) OEL-UNITED KINGDOM:TWA 400 ppm (980 mg/m3);STEL 500 ppm;Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OE L IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 7/27/1999
**Revision #9 Date:** 10/12/2001

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# ALCONOX MSDS

## Section 1 : MANUFACTURER INFORMATION

**Product name:** Alconox

**Supplier:** Same as manufacturer.

**Manufacturer:** Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

**Manufacturer emergency phone number:** 800-255-3924.
813-248-0585 (outside of the United States).

**Manufacturer:** Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

**Supplier MSDS date:** 2005/03/09

**D.O.T. Classification:** Not regulated.

## Section 2 : HAZARDOUS INGREDIENTS

| C.A.S. | CONCENTRATION % | Ingredient Name | T.L.V. | LD/50 | LC/50 |
|---|---|---|---|---|---|
| 25155-30-0 | 10-30 | SODIUM DODECYLBENZENESULFONATE | NOT AVAILABLE | 438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL | NOT AVAILABLE |
| 497-19-8 | 7-13 | SODIUM CARBONATE | NOT AVAILABLE | 4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL | 2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION |
| 7722-88-5 | 10-30 | TETRASODIUM PYROPHOSPHATE | 5 MG/M3 | 4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL | NOT AVAILABLE |
| 7758-29-4 | 10-30 | SODIUM PHOSPHATE | NOT AVAILABLE | 3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL | NOT AVAILABLE |

## Section 2A : ADDITIONAL INGREDIENT INFORMATION

**Note:** (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

## Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

**Physical state:** Solid

**Appearance & odor:** Almost odourless.
White granular powder.

**Odor threshold (ppm):** Not available.

**Vapour pressure (mmHg):** Not applicable.

**Vapour density (air=1):** Not applicable.

**By weight:** Not available.

**Evaporation rate (butyl acetate = 1):** Not applicable.

**Boiling point (°C):** Not applicable.

**Freezing point (°C):** Not applicable.

**pH:** (1% aqueous solution).
9.5

**Specific gravity @ 20 °C:** (water = 1).
0.85 - 1.10

**Solubility in water (%):** 100 - > 10% w/w

**Coefficient of water\oil dist.:** Not available.

**VOC:** None

## Section 4 : FIRE AND EXPLOSION HAZARD DATA

**Flammability:** Not flammable.

**Conditions of flammability:** Surrounding fire.

**Extinguishing media:** Carbon dioxide, dry chemical, foam.
Water
Water fog.

**Special procedures:** Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

**Auto-ignition temperature:** Not available.

**Flash point (°C), method:** None

**Lower flammability limit (% vol):** Not applicable.

**Upper flammability limit (% vol):** Not applicable.

Not available.

**Sensitivity to mechanical impact:** Not applicable.

**Hazardous combustion products:** Oxides of carbon (COx).
Hydrocarbons.

**Rate of burning:** Not available.

**Explosive power:** None

## Section 5 : REACTIVITY DATA

**Chemical stability:** Stable under normal conditions.

**Conditions of instability:** None known.

**Hazardous polymerization:** Will not occur.

**Incompatible substances:** Strong acids.
Strong oxidizers.

**Hazardous decomposition products:** See hazardous combustion products.

## Section 6 : HEALTH HAZARD DATA

**Route of entry:** Skin contact, eye contact, inhalation and ingestion.

**Effects of Acute Exposure**

**Eye contact:** May cause irritation.

**Skin contact:** Prolonged contact may cause irritation.

**Inhalation:** Airborne particles may cause irritation.

**Ingestion:** May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

**Effects of chronic exposure:** Contains an ingredient which may be corrosive.

**LD50 of product, species & route:** > 5000 mg/kg rat oral.

**LC50 of product, species & route:** Not available for mixture, see the ingredients section.

**Exposure limit of material:** Not available for mixture, see the ingredients section.

**Sensitization to product:** Not available.

**Carcinogenic effects:** Not listed as a carcinogen.

**Reproductive effects:** Not available.

**Teratogenicity:** Not available.

**Mutagenicity:** Not available.

**Synergistic materials:** Not available.

**Medical conditions aggravated by exposure:** Not available.

**First Aid**

**Skin contact:** Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

**Eye contact:** Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

**Inhalation:** Remove victim to fresh air.
Seek medical attention if symptoms persist.

**Ingestion:** Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

## Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

**Leak/Spill:** Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

**Waste disposal:** In accordance with municipal, provincial and federal regulations.

**Handling procedures and equipment:** Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

**Storage requirements:** Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

## Section 8 : CONTROL MEASURES

**Precautionary Measures**

**Gloves/Type:**

Neoprene or rubber gloves.

**Respiratory/Type:**

If exposure limit is exceeded, wear a NIOSH approved respirator.

**Eye/Type:**

Safety glasses with side-shields.

**Footwear/Type:** Safety shoes per local regulations.

**Clothing/Type:** As required to prevent skin contact.

**Other/Type:** Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

**Ventilation requirements:** Local exhaust at points of emission.

Appendix 6

Remedial Action Plan

# REMEDIAL ACTION PROJECT PLAN

# BUILDING DEMOLITION EVALUATION PHASE III STUDY
# ALTERNATIVE ASBESTOS CONTROL METHOD
# FOR BUILDING DEMOLITION

**December 12, 2007**

**Prepared by:**
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**Watertown, MA 02472**

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**2300 N Street, NW**
**Washington, DC 20037**

**Contract No. EP-C-05-058**
**Task Order No. 0057**

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DISTRIBUTION LIST

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Bob Olexsey. USEPA NRMRL
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# PROJECT DESCRIPTION

This Remedial Action Plan is being prepared to address concerns with the potential for release of asbestos during the upcoming test of the Alternative Asbestos Control Method (AACM) on the former office of the Oak Hollow Apartment Complex located at 5901 Boca Raton Boulevard in Fort Worth, Texas.

This document will provide a description of the AACM, a description of the subject building, the organizational chart and responsibility for conduct of the project and contingency plans for responding to various release mechanisms.

## *Background*

The Clean Air Act provides the USEPA with the authority to promulgate and enforce a "work practice standard" for control of asbestos during building demolition if it is not feasible to establish an emission standard. Section 112 of the Clean Air Act, determined asbestos to be a hazardous air pollutant, and the use of asbestos regulated under the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Asbestos, 40 CFR Part 61, Subpart M (Asbestos NESHAP). Requirement for the demolition and renovation of buildings that contain asbestos are contained in 40 CFR 61.145.

The asbestos NESHAP defines a regulated asbestos-containing material (RACM) as the following [40 CFR 61.141]:

(a) Friable asbestos material,
(b) Category I nonfriable ACM[1] that has become friable,
(c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or
(d) Category II nonfriable ACM[2] that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

The asbestos NESHAP requires emissions control when demolition or renovating a facility if the combined amount of RACM is: [40 CFR 61.145(a)(1)]

- At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

- At least 1 cubic meter (35 cubic feet) of facility components where the length or area could not be measured previously.

For facilities containing asbestos above the threshold quantity, the emissions controls required for demolition include removal of all RACM prior to any demolition activity that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. The asbestos NESHAP specifies

[1] Category I nonfriable asbestos-containing material (ACM) means asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Appendix E(1), Polarized Light Microscopy.

[2] Category II nonfriable ACM means any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the methods specified in 40 CFR 763Appendix E(1), Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. [40 CFR 61.141]

emissions control procedures to be used during RACM removal and/or building demolition [40 CFR 61.145(c)] and wastes generated during demolition must be disposed of in accordance with the requirements of 40 CFR 61.150.

If the facility is being demolished under an order issued by a State or local government agency because the facility is structurally unsound and in danger of imminent collapse, the RACM is not required to be removed prior to demolition, but the portion of the building that contains RACM must be kept adequately wet during demolition [40 CFR 145(a)(3) and 40 CFR 61.145(c)(9)].

It is generally regarded that the cost of compliance with the asbestos NESHAP is currently forestalling redevelopment efforts in a number of communities because the labor costs associated with removal of the RACM is significantly greater than the costs of building demolition. As a result, the USEPA has devised the Alternate Asbestos Control Method (AACM) that provides emissions controls believed to be equivalent to the current work practices required by the asbestos NESHAP, particular for abandoned buildings that are left unoccupied and unmaintained until the building becomes in "imminent danger of collapse" and can be demolished without removal of all of the RACM prior to demolition. Previous studies indicated that there were situations where undesirable releases of asbestos were documented from demolition of these unsafe structures. These studies included both demolitions conducted by the NESHAP process and ones conducted under imminent danger of collapse situations. (Wilmoth et al 1993, Wilmoth et al 1994, City of Saint Louis 2004).

To date, the USEPA has conducted an evaluation of the AACM by performing a controlled side-by-side comparison of the AACM and the NESHAP on identical buildings at Fort Chaffee Redevelopment Authority (Wilmoth et al, 2007). The buildings in the first study had positive asbestos–containing wall systems and vinyl asbestos floor tile. A Follow-up Study has also been conducted to evaluate the AACM's ability to control emissions from the demolition of a building that had exterior transite siding.

This third phase of the AACM evaluation is intended to evaluate the ability of the AACM to control emissions from a building that has textured wallboard surfaces, such as popcorn ceiling. These data would then be used in conjunction with data obtained during the initial study involving evaluations on environmental impacts during implementation of two demolition processes (one using the AACM) and the other following NESHAP to help EPA determine whether it is appropriate to include an alternate method in the current asbestos regulations contained in 40 CFR Part 61 Subpart M. The AACM, if determined to be equally environmentally acceptable to the current regulations, may have the benefit of allowing municipalities to demolish abandoned buildings that otherwise would remain standing until they were in danger of imminent collapse.

The AACM requires that certain RACM (such as thermal system insulation and fireproofing) be removed before demolition in accordance with the asbestos NESHAP; other RACM (such as transite, wallboard joint compound, resilient flooring/mastic, glazing compound) may remain in place. The AACM varies from the existing Asbestos NESHAP in the use of an amended-water wetting process, type of demolition equipment, and demolition techniques. Once the RACM has been removed, the demolition can then be conducted using amended water to suppress emissions of asbestos before, during, and after demolition to trap asbestos fibers, minimizing the potential for release to the air. The RACM is less likely to become friable when the wetting process and demolition techniques specified in the AACM are used. Wastewater generated during the demolition is collected and filtered, and all debris is disposed of as asbestos-containing waste. Soil in the affected area is excavated and disposed as asbestos-containing waste. Appendix A contains the AACM developed by EPA Region 6, the EPA ORD, and with input from the EPA QAPP Technical Development Team.

The purpose of this research project is to gather additional data to document the environmental and cost-effectiveness of the AACM. This research project will assist EPA in considering modification of the practices of the Asbestos NESHAP.

## *Site Description*

The site selected for conduct of this study is the former office building for the Oak Hollow Apartment complex located at 5901 Boca Raton Boulevard, Fort Worth, Texas. The subject building is a two-story structure

that is slab-on grade construction, as shown in Figure 3. It appears that the building was constructed with wood frame, and has exterior brick veneer applied to the lower portion of the structure. The upper portion of the structure exterior is finished with wood panel siding. The building has an asphalt shingled roof. The interior of the building contains a wallboard system that has a surface texture coating and a wallboard system ceiling with asbestos-containing "popcorn" ceiling texture. The wells have been painted, likely numerous times, using latex paint. Various flooring materials are present in the structure, including flexible tile with mastic and carpets.

The City of Fort Worth conducted an asbestos survey of the building for their own purposes. The RACM identified during this inspection are listed in Table 2.

**Table 2. RACM Identified in the former office of the Oak Hollow Apartments, 5901 Boca Raton Boulevard, Fort Worth, Texas.**

| RACM Type | Description | Location |
|---|---|---|
| Sheetrock | Ceiling Texture (White, Popcorn) | Office #1<br>Upstairs Open Area<br>Next to Fire Place Lounge |
| Sheetrock | Sheetrock (White) and Joint Compound | Upstairs Open Area<br>Office #3<br>Foyer |
| Flooring Materials | 9" x 9" Floor Tile with Mastic | Kitchen |
| Sheetrock | Ceiling Texture (Beige, Popcorn) | Work Room<br>Sauna |
| Sheetrock | Sheetrock and Joint Compound, Beige Walls | Work Room<br>Storage Room |

The area surrounding the project is primarily residential, including apartment complexes, townhouses and single-family homes. A police substation is located approximately 500 feet from the site. For purposes of the evaluation, Boca Raton Boulevard will be closed during the demolition and subsequent soil removal. Additionally, the bus stop located along Boca Raton Boulevard will be relocated. Also, to assure against accidental release of asbestos in the direction of the occupied structures, a protective poly wall will be built to shield releases in that general direction.

## *Environmental Condition of Building*

The comprehensive pre-demolition inspection has been conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR 763) and the requirements of the ASTM E2356-04e1 Standard Practice for Comprehensive Building Asbestos Surveys to identify the type, quantity, location, and condition of Asbestos-Containing Materials (instead of only RACM) in the building in accordance with the asbestos NESHAP and the Texas Department of State Health Services (DSHS) asbestos program requirements. As noted in the asbestos NESHAP [40 CFR 61.145(a)], in addition to RACM, Category I and Category II Non-friable Asbestos-Containing Materials must also be identified prior to demolition or renovation.

The building has been surveyed for the presence of inorganic lead (*e.g.* lead paint) in accordance with Housing and Urban Development's (1997) "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" to characterize the potential for occupational exposure during demolition. Representative composite bulk samples of the suspect lead-containing building materials were collected in accordance with the HUD sampling protocols and analyzed to determine the lead content by EPA SW-846 Methods 3050B/7420. Based upon these results, additional samples may be collected for waste characterization purposes.

**Figure 3. Oak Hollow Apartment Complex Office Building located at 5901 Boca Raton Boulevard in Fort Worth, Texas.**

# Purpose

This Remediation Plan is intended to:

- Identify communication channels for response effort;
- Set criteria for determining if an airborne asbestos release has occurred based on air monitoring data;
- Outline impacts based on wind speeds observed;
- Outline cleanup methods; and
- Set criteria for sampling methods.

# Criteria for Determining Impacts

The demonstration of the AACM will be conducted on the two-story office building for the former Oak Hollow Apartment Complex. As in any demolition operation allowed under the asbestos NESHAP, visible emissions will be monitored and demolition operations will be adjusted based on the visible emissions.

Visible emissions will serve as a real-time trigger for corrective actions; particularly if the emission is more than a momentary release. The corrective action will attempt to correct the work practice implementation that might have caused the release. If visible emissions are observed, the demolition will be halted while the practice is investigated and then resumed when the practice has been corrected.

Airborne asbestos samples will be collected and analyzed during the demonstration project as described in the QAPP. Laboratory analysis of the air samples will be conducted by both PCM (NIOSH 7400) and TEM analysis (ISO Method 10312:1995). If the asbestos airborne concentrations downwind are found to be statistically significantly different that upwind then the average upwind concentration will be subtracted from the downwind concentration and then:

- If the adjusted downwind sample average is less than or equal to 0.01 asbestos structures per cubic centimeter of air analyzed by TEM using PCME (equivalency) techniques then a response action is not necessary.

- If the adjusted downwind sample average exceeds 0.01 asbestos structures per cubic centimeter of air analyzed by TEM using PCME (equivalency) techniques then a response action will be initiated.

# Organizational System

The United States Environmental Protection Agency's (U.S. EPA's) Office of Research and Development (ORD) and U.S. EPA's Region 6 are cooperatively conducting this research project to determine the effectiveness of the Alternate Asbestos Control Method. The Cadmus Group, Inc. (Cadmus) is the prime contractor on the project and will have overall responsibility to ensure that the project is conducted in accordance with the approved Quality Assurance Project Plan (QAPP). The Louis Berger Group, Inc. (Berger) will assist Cadmus in the conduct of this study.

The overall project organization is presented in Figure 4. It graphically shows the functional organization structure and lines of communication for this project. The project structure along with the technical personnel selections are designed to provide efficient management and a high level of technical competence to accomplish this research project. The roles and responsibilities of key project personnel are summarized in

Table 3.

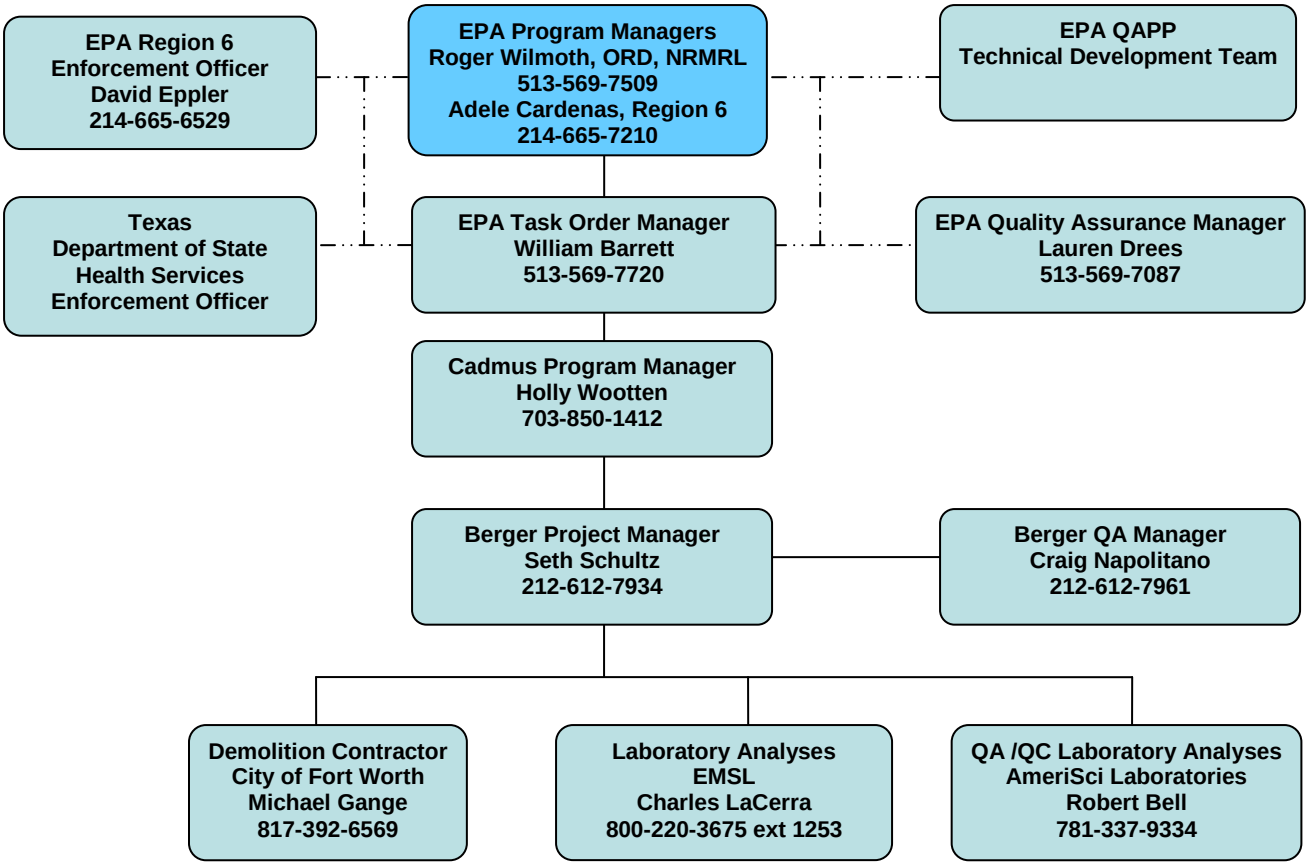


**Figure 4. Project Organizational Structure.**

Table 3. Roles and Responsibilities of Key Project Personnel

| Personnel | Role and Responsibility |
|---|---|
| Roger Wilmoth<br>U.S. EPA, ORD, NRMRL | *Program Manager*, will have overall administrative and technical responsibility for this program. |
| William Barrett<br>U.S. EPA, ORD, NRMRL | *Task Order Manager (TOM),* will direct the project and ensure that it is proceeding on schedule and within budget. Point of contact for Cadmus. |
| Lauren Drees<br>U.S. EPA, ORD, NRMRL | *QA Officer*, will provide QA oversight to ensure that the planning and plan implementation are in accordance with the approved QAPP. In addition, ORD's QA Officer will oversee a field audit and laboratory audit. |
| Holly Wootten<br>Cadmus | -*Overall Project and Task Order Lead*, will have overall administrative responsibility for the Cadmus Team and to serve as the primary client interface to ensure continuity between EPA, the Cadmus Team and all subcontractors (listed below) in working towards stated project objectives. |
| Seth Schultz<br>LBG | *Berger's Project Manager*, will have overall administrative and technical responsibility for Berger on this project. Will also have overall administrative and technical responsibility for Berger and its sub-contractors to ensure that data collection and analysis and the technical report meet the planned study objectives. |
| Craig Napolitano<br>LBG | *Quality Assurance Manager* to ensure compliance with final QAPP and study objectives. Will oversee laboratory analysis and perform data validation. |
| Michael Gange<br>City of Fort Worth, Texas | Will Provide Contractor to Perform AACM demolition |
| Charles LaCerra<br>EMSL | Will provide primary laboratory analysis of asbestos samples |
| Amerisci Laboratories, Inc. | Will provide quality assurance (QA) secondary sample analysis |

The actual demolition will be performed by a contractor properly trained in accordance with the OSHA Hazard Waste Operations and Emergency Response (HAZWOPER). The City of Fort Worth's Fire and Rescue Department will be first responder for a potential transportation related accident to ensure waste debris remains adequately wet and contained. The City of Fort Worth – Transportation and Public Works Department will be on ready call to provide heavy equipment support as necessary to respond to transportation related emergencies. The demolition contactor will be primary responder to release to outdoor air or surface water from the demolition operation. Contractor will utilize personnel with current HAZWOPER Training in accordance with OSHA requirements.

# Response Actions

## *Visible Emissions*

Response actions will vary based on the observed visible emission(s). Visible emissions from the demolition operation (i.e., demolition of structure, handling of demolition debris, loading of demolition debris for disposal and transportation of demolition debris), and associated response actions will be grouped into the following categories:

- Momentary release (e.g., puff) that is controlled by the water stream in an immediate fashion will not require additional engineering controls. For example, a slight puff from a working edge of demolition that is dissipated by the applied water as it is produced.

- Small sustained release (e.g., small dust cloud) that either dissipates through dispersion into the air column or through additional use of the wetting hoses will require a temporary halt in demolition operations while the working edge of demolition is wetted for approximately one minute. At the initiation of demolition activities both wetting water streams will be directed at this area providing a mixture of misting and wetting.

- Medium sustained release (e.g., small dust cloud that drifts) that is transported away from the working edge of demolition but dissipates prior to leaving the footprint of the demolition area will require a temporary halt in demolition operations while the while the working edge of the demolition is wetted for approximately five minutes. At the initiation of demolition activities both wetting water streams will be directed at this area providing a mixture of misting and wetting.

- Large sustained release (e.g., dust cloud that drifts) that is transported away from the working edge of the demolition but dissipates prior to leaving the property boundary will require a temporary halt in demolition while the working edge of the demolition is wetted for approximately 15 minutes. At the initiation of demolition activities both wetting water streams will be directed at this area providing a mixture of misting and wetting.

- Uncontrolled release (e.g., dust cloud leaves site) that is transported off the facility boundary and onto surrounding properties. Demolition operations will cease immediately. Wetting of the demolition debris will continue to ensure all exposed areas are adequately wetted. Response actions will be initiated following TEM analysis of air samples. Visibly impacted areas may be cleaned with a HEPA vacuum if possible.

Special Note: an uncontrolled release may occur if the building becomes unstable for some reason collapses under its own pressure. Also, an uncontrolled release as defined here is any release, not necessary an asbestos release, and the NESHAP trained individual on site as well as other observers will have to determine the potential source of the release.

## *Airborne Fiber Release*

Response actions will vary based on the observed wind conditions on the day of the release. Wind speeds will be grouped into the following categories:

- Light: Less than or equal to 3 mph on average.
- Moderate: Greater than 3 mph and less than or equal to 10 mph with an average wind speed of 6 mph.
- High: Greater than 10 mph with an average wind speed of 16 mph.

It should be noted that in the event of high winds, the demolition will be halted. Monitoring of the site for visible emissions will continue through the duration of the high winds. If the winds remain elevated and the evaluation must be halted overnight, the structure will be covered with visqueen until the winds subside and the demolition can be resumed. The light and high wind speed ranges reportedly have similar potential impacts and will treated as the equivalent for cleanup method use.

- Light Wind Speeds

1. HEPA vacuum hard surfaces within 300 feet of the site.
2. Wet wipe hard surfaces within 300 feet of the site.

3. Wash down roadways, walkways, and driveways within 300 feet of the site and collect rinse and filter rinse water prior to discharge to the sanitary sewer system. Filter media will be disposed as asbestos-contaminated waste.
4. Recommend HVAC filters be changed in buildings within impacted area

- Moderate wind speeds observed

1. HEPA vacuum hard surfaces within 350 feet of the site.
2. Wet wipe hard surfaces within 350 feet of the site.
3. Wash down roadways, walkways, and driveways within 350 feet of the site and collect rinse and filter rinse water prior to discharge to the sanitary sewer system. Filter media will be disposed as asbestos-contaminated waste.
4. Recommend HVAC filters be changed in buildings within impacted area

- Heavy Wind Speeds

1. HEPA vacuum hard surfaces within 400 feet of the site.
2. Wet wipe hard surfaces within 400 feet of the site.
3. Wash down roadways, walkways, and driveways within 400 feet of the site and collect rinse and filter rinse water prior to discharge to the sanitary sewer system. Filter media will be disposed as asbestos-contaminated waste.
4. Recommend HVAC filters be changed in buildings within impacted area

## *Surface Water Impacts*

In accordance with the Quality Assurance Project Plan (QAPP) for the Phase 3 Demonstration of the AACM, if runoff is produced in sufficient quantities to sample then samples will be collected on a periodic basis of runoff water collected and contained.

1. The containment system will be inspected hourly for breaches, and if a breach in the containment system is identified, it will immediately be repaired.
2. The following response actions will be initiated as follows based on the estimated release amount:

a) Less than 10 gallons no further response action will be initiated.
b) Greater 10 gallons and less than 50 gallons then hard surfaces of the impacted area will be HEPA vacuumed.
c) Greater than 50 gallons then the surface water body will be temporarily dammed using earthen material and the water pumped and filtered before disposal into the sanitary sewer.

All collected water will be contained on site and filtered with a five-µm particle filter prior to being discharged into the sanitary sewer located at the site. Samples of the filtered water will be collected and analyzed for asbestos as described in the QAPP.

## *Soil Impacts*

A minimum depth of three inches of soil within the containment area shall be removed and disposed as asbestos-containing wastes in accordance with the Quality Assurance Project Plan (QAPP) for the Phase 3 Evaluation of the AACM. Should there be a breach of the water containment system that spills onto soil surfaces, soil removal in the affected areas shall be accomplished to minimum depth of three inches and disposed as asbestos-containing waste.

a) Soil will be wetted during excavation activities to suppress airborne dust.

b) Soil will be loaded for transportation. During loading operations the soil will be wetted.
c) All transportation dumps will be covered with a tarp during transport and shall not leak.

Following the excavation of the 3 inches of soil from within the containment area, soil samples will be collected in accordance with the QAPP. If the concentrations of asbestos in any of these samples exceed the Texas Risk Reduction Program (TRRP) standard of 2,900 mg/kg asbestos for a residential source area less than 0.5 acres, an additional 3 inches will be excavated and re-sampled until the soil meets the TRRP cleanup criterion.

# Worker Protection

Cleanup workers will have the following Personal Protective Equipment (PPE) during remediation efforts:

- Half-face air purifying respirators equipped with P-100 (formerly HEPA) cartridges;
- Disposable Tyvek suits;
- Safety glasses as necessary; and
- Steel toe boots.

Decontamination of workers will be performed using a one-stage dry decontamination system. This system will include:

1. HEPA vacuum Tyvek suit.
2. Wash face and hands.
3. Remove Tyvek suit by inverting or rolling it into itself.
4. Only after completion of the above tasks will the respirator be removed and prepared for proper storage.

Comply with OSHA 29 CFR 1926.1101 and 1910.134 as applicable.

# APPENDIX A

# ALTERNATE ASBESTOS CONTROL METHOD

# ALTERNATIVE ASBESTOS CONTROL METHOD
Developed by EPA Region 6 and EPA Office of Research and Development
November 1, 2007

## 1.0 Background

In response to Section 112 of the Clean Air Act which requires EPA to develop emission standards for hazardous air pollutants, EPA promulgated the National Emission Standards for Hazardous Air Pollutants (NESHAP). 40 CFR Part 61 Subpart M (Asbestos NESHAP) specifically addresses asbestos, including demolition activities.

Asbestos NESHAP regulations require that all regulated asbestos-containing materials (RACM) above a specified amount be removed from structures prior to demolition. Asbestos-containing materials (ACM) are defined as those materials containing more than one percent asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM).

RACM includes friable ACM; Category I non-friable ACM that has become friable, Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; and Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected during demolition operations.

Asbestos removal can account for a significant portion of the total demolition costs. In many cities, the cost of asbestos removal prohibits timely demolitions and results in substandard structures which become fire and safety hazards, attract criminal activity, and lower property values.

For structures that are structurally unsound and in imminent danger of collapse, the Asbestos NESHAP requires that the portion of the structure which contains RACM must be kept adequately wet during demolition and during handling and loading of debris for transport to a disposal site. No other engineering controls are required.

This Alternative Asbestos Control Method (AACM) was developed by EPA as an alternative work practice to the Asbestos NESHAP, where certain RACM are removed prior to demolition and other RACM are left in place.

The goal is to provide significant cost savings while achieving an equal or better standard of protection of human health and the environment. This method is much more restrictive than the Asbestos NESHAP requirements for buildings in imminent danger of collapse.

## 2.0 Applicability

This Alternative Asbestos Control Method applies to any structure subject to the Asbestos NESHAP regulation (i.e., structures that meet the definition of facility under the Asbestos NESHAP), except as noted below.

The size of structures which can be demolished using this method is limited to three stories or less (maximum height of 35 feet). This allows adequate wetting of both the interior and exterior of the structures and is within the working reach of both the wetting and the demolition equipment.

## 3.0 Building Inspection/Asbestos Assessment

A comprehensive inspection of the interior and exterior of the structure to be demolished shall be conducted in accordance with EPA's Asbestos Hazard Emergency Response Act (AHERA, 40 CFR Part 763). Specific criteria for inspection, sampling, and assessment are in Subpart E (763.85, 763.86, and 763.88, respectively). The inspection shall be performed by an accredited asbestos building inspector.

## 4.0 Asbestos Removal

Table 1 summarizes the ACM that may be present in buildings and whether or not the ACM must be removed prior to demolition.

All thermal system insulation (TSI) and spray-applied fireproofing shall be removed due to the inability to adequately wet these materials during demolition. Fire curtains may be removed if it is easier to do so than to adequately wet and handle this heavy material.

Vermiculite insulation, if present, shall be removed prior to demolition as an RACM, regardless of the measured asbestos concentration.

All asbestos removal operations shall be performed in accordance with state and federal law by a licensed asbestos abatement contractor.

## 5.0 Demolition Practices

Several demolition work practice standards shall be employed to ensure that the method is protective of human health and the environment. These standards involve the equipment used, the wetting process, the demolition process, and visible emissions.

Demolition contractors shall provide an Asbestos NESHAP-trained individual to oversee the demolition process.

## 5.1 Equipment Used

Track hoes and end loaders or equivalent shall be used during demolition to minimize the generation of dust. No bulldozers, explosives, or burning will be permitted.

## 5.2 Wetting Process

Structures to be demolished will be thoroughly and adequately wetted with amended water (water to which a surfactant has been added) prior to demolition, during demolition, and during debris handling and loading. Surfactants reduce the surface tension of the water, increasing its ability to penetrate the ACM.

For this method, the Asbestos NESHAP definition for "adequately wet" will be used. That is, "sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from the asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emission is not sufficient evidence of being adequately wet." The demolition contractor's Asbestos NESHAP-trained individual will verify that ACM is adequately wetted.

Amended water shall be applied with a minimum of two hoses. The water shall be delivered as a mist. Direct high-pressure water impact of RACM is prohibited.

The wetting process consists of three stages. In each stage, both interior and exterior wetting of the structure shall be performed. To the extent feasible, cavity areas and interstitial wall spaces shall be wetted during each of the wetting stages.

**Table 1. Asbestos Removal Requirements of AACM**

| Asbestos-Containing Material | Removed Prior to Demolition? |
|---|---|
| ***Thermal System Insulation (TSI)*** | |
| ▪ Tank insulation | Yes |
| ▪ Pipe insulation | Yes |
| ▪ Elbow/fitting/valve insulation | Yes |
| ▪ Boiler insulation | Yes |
| ▪ Duct insulation | Yes |
| ▪ Cement and patching compound | Yes |
| ***Surfacing Material*** | |
| ▪ Asbestos-impregnated plaster, stucco | No |
| ▪ Spray-applied fireproofing | Yes |
| ▪ Spray-applied surface coatings (popcorn ceiling, vermiculite treatments) | No |
| ▪ Spray applied acoustical or decorative surfacing | No |
| ▪ Troweled-on crows foot texture, splatter texture, and joint compound. | No |
| ▪ Spray-applied surface coatings crows foot texture, splatter texture, etc. | No |
| ***Miscellaneous Material*** | |
| ▪ Fire curtains in auditoriums | Optional |
| ▪ Fire doors | Optional |
| ▪ Vibration-dampening cloths | No |
| ▪ Asbestos-cement tiles, sheets, roofing, shingles, and transite | No |
| ▪ Asbestos-impregnated roofing cement and asphalt roofing | No |
| ▪ Shingles | No |
| ▪ Linoleum or other floor tile | No |
| ▪ Roll flooring | No |
| ▪ Ceiling tile | No |
| ▪ Asbestos-impregnated pipe | No |
| ▪ Vermiculite insulation | Yes |
| ▪ Mastic for flooring | No |
| ▪ Window Cauking | No |

On the day before the demolition, access openings shall be made into the attic spaces from the exterior. The structure shall be first pre-wet (until adequately wet) from the interior and then from the constructed exterior attic access openings to enhance water retention and maximize wetting effectiveness.

This pre-wetting shall prohibit further access into the structure, because of safety concerns. The structure shall be re-wet (until adequately wet) from the exterior through the windows, doors, and attic access openings on the day of demolition prior to demolition. Finally, wetting (until adequately wet) shall be done during the demolition and during loading of debris into lined disposal containers.

### 5.3 Demolition Process

The demolition contractor shall minimize breakage of asbestos-containing materials. All demolition shall be completed in a timely manner that will allow the debris generated during that day to be completely removed from the demolition site for disposal.

### 5.4 Visible Emissions

The Asbestos NESHAP standard of "no visible emissions" shall be employed. Visible emissions mean any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing material. This does not include condensed, uncombined water vapor. The demolition contractor's NESHAP-trained individual shall verify the absence of visible emissions and has the authority to stop work if visible emissions are observed.

During a demolition, it is often not possible to distinguish visible emissions from ACM and those from construction debris; therefore, should a visible emission be observed, the demolition effort shall pause until the deficiencies in the application of the wetting controls eliminate the visible emission.

## 6.0 Weather Restrictions

Demolition activities shall be delayed/halted in the case of any inclement weather that will impede the demolition contractor's ability to adequately wet the structure (e.g., freezing temperatures).

In addition, if visible dusting is observed in the vicinity of the demolition site, the demolition shall be delayed/halted.

## 7.0 Monitoring Requirements

Demolition contractors are required to comply with all applicable OSHA (29 CFR 1926) regulations for worker protection during asbestos removal and demolition activities. This

includes the use of personal protective equipment (PPE) such as Tyvek suits or equivalent, respirators (as necessary), and gloves (as necessary); and personal monitoring.

Because, like the Asbestos NESHAP, this method is designed to be a work practice standard, monitoring of air (other than that mandated by OSHA statute), soil, and other media is not required.

## 8.0 Waste Handling

Several wastes are generated during demolition activities, including demolition debris, disposable PPE, and potentially contaminated water and soil, and must be properly disposed. All wastes generated must be removed from the site at the end of the day and transported to an appropriate disposal facility. Transport and disposal shall be in accordance with all federal, state, and local requirements. All waste haulers shall be leak-proof. Double-lining of the haulers with 4-mil or thicker polyethylene film and then sealing the top seams of the film is a suggested mechanism, but the contractor must do what is required to prevent leaks from the transport vehicles. Vehicles shall be decontaminated within the bermed area before leaving the demolition area.

### 8.1 Demolition Debris

Segregation of portions of a structure that may contain RACM from portions of a structure that clearly do not contain RACM shall be done when practical in an effort to minimize RACM debris. For example, segregation may be used if a large warehouse is being demolished and only a small portion (e.g., office space) contains RACM.

When segregation is not practical, all demolition debris shall be disposed as RACM in a licensed asbestos disposal facility. Debris shall be kept adequately wet during loading into containers. Containers shall be covered during transport.

### 8.2 PPE

All disposable PPE shall be disposed as RACM. Reusable PPE shall be decontaminated in accordance with OSHA standard practices.

### 8.3 Potentially Contaminated Water and Impervious Surfaces

No potentially contaminated water runoff is permitted from the site during the demolition period. All impervious surfaces will be thoroughly washed with amended water before site closure.

Construction site best management practices shall be used to prevent water runoff. Drains and sewer connections must be capped or plugged prior to wetting. Berms and/or trenches must be created as necessary to prevent runoff of water from the demolition site. If possible, the bermed/trenched area should extend 25 ft from the building and/or loading area. If not possible, adjacent areas and structures need to be covered with plastic.

The berm/trench must be sufficiently spaced from the building to permit the movement of the demolition equipment and to allow the truck loading to occur within the enclosed space. All plastic shall be disposed as RACM.

If large water volume use or impermeable conditions surrounding the building create excessive water volume and simple containment and percolation is not feasible, the water must be pumped and either disposed as ACM or filtered through a series of filters ultimately removing all fibers equal to or larger than five microns before transporting to a publicly-owned treatment works or discharging to a sanitary sewer. The filters must be disposed as RACM.

**8.4 Potentially Contaminated Soil**

Following the removal of demolition debris, bare soil within the bermed area shall be excavated to a minimum depth of three inches or until no debris is found. Berms created shall also be removed and disposed as potentially asbestos-contaminated. All removed soil shall be disposed as RACM.

**9.0 Site Closure**

Following demolition and waste disposal, all waste and debris must be gone from the site and the site must be secured so as not to create a safety hazard