

# **ASBESTOS MANAGEMENT PLAN**

## **409TH BASE SUPPORT BATTALION GRAFENWOEHR /VILSECK**

**STATUS: JANUARY 2002**

**PREPARED BY;**

Environmental Division  
Directorate of Public Works  
409th BSB Grafenwoehr / Vilseck  
Unit 28130  
APO AE 09114

**APPROVED BY;**

---

JAMES P. DRAGO  
LTC, FA  
Commanding

## TABLE OF CONTENT

	PAGE
Table of Content	2 - 3
References	4
1. Purpose and Council Makeup	5
1.1 Purpose	5
1.2 409th BSB Asbestos Council	5 - 6
2. Responsibilities	7
2.1 BSB Commander's Policy for Asbestos Management	7
2.2 BSB Directorate of Public Works	8
2.3 Staff Judge Advocate	8
2.4 Civilian Personnel Office and Works Council	9
2.5 409th BSB Public Affairs Office	9
2.6 409th BSB Safety Office	9
2.7 100th ASG Industrial Hygiene Office	10
3. Storage and Handling - Standard Operating Procedure	11
3.1 Asbestos Survey	11
3.2 Asbestos Hazard Assessment	11
3.3 Asbestos Containment and Abatement	11
3.4 Operations and Maintenance Plans	12
3.5 Design Reviews	12
4. Background on Asbestos	13
4.1 Mineralogy	13
4.2 Chemistry	13
4.3 Identification	14
4.4 Uses	14
4.5 Classification	14
4.6 Health Hazard	15
5. Training	16 - 17
6. Monitoring and Inspection	18
6.1 Asbestos Containing Materials Surveillance Program	18
6.2 Work Control/Permit System	18
6.3 Medical Program	19
6.4 Survey Subplan for Leased Facilities	19 - 20
6.5 Abatement Action Subplan	20 - 22
6.6 Resource Subplan	22
6.7 Public Information Subplan	22 - 23
6.8 Laws and Regulations Applicable to the 409th BSB	23 - 25

TABLE OF CONTENT (CONT'D)

	PAGE
Appendix A: Asbestos Algorithm and Building Asbestos Survey Form (Sampling Report)	A - 26
Appendix B: Sampling Procedures	B - 30
Appendix C: Operations and Maintenance Program	C - 35
Appendix D: Design Review Flowchart	D - 44
Appendix E: Explanation of Acronyms	E - 46
Appendix F: Contractor Accreditation Program	F - 49
Appendix G: Controlling Brake Dust in Auto Shops	G - 52
Appendix H: "Asbestos Data Base" – GIS incorporation, Abatement and Re-Survey Requirements for the 409th BSB	H - 59
Appendix I: Asbestos Emergency Response Action	I - 61
Appendix J: Personnel Asbestos Abatement Training List	J - 66
Appendix K: Quick Reference Phone List	K - 68
Appendix L: Resources Subplan	L - 70
Appendix M: Permissible Exposure Limits, Action Levels, and Final Air Clearance Values	M - 72

REFERENCES:

National Institute of Occupational Safety and Health (NIOSH)

National Institute of Standards and Technology

Occupational Safety and Health Administration (OSHA):

- Employee Exposure and Medical Records, Title 29, Part 1910, Section 2.
- Occupational Exposure to Asbestos, Title 29, Part 1910, Section 1001 and part 1926, Section 58 of the Code of Federal Regulations (CFR).
- Respiratory Protection, Title 29, Part 1926 Section 26, CFR.
- Training and Work Practices, Title 29, Part 1926, Section 26, CFR.

U.S. Army Corps of Engineers

U.S. Army Consumer Product Safety Commission

U.S. Department of Transportation

U.S. Environmental Protection Agency (EPA):

- Asbestos Hazard Emergency Response (AHERA) 40 CFR 763
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Consumer Products Safety Act
- Hazardous Material Transportation Act
- National Emission Standards for Hazardous Air Pollution Sources (NESHAPS), Clean Air Act of 1970, 40 CFR 61
- National Environmental Policy Act

Berufsgenossenschaften der Bauwirtschaft, ZH 1/120.46, ZH 1/134, ZH 1/606

Deutsches Institut fuer Normung, DIN 18520

Gefahrstoffverordnung

Laenderarbeitsgemeinschaft Abfall (LAGA) "Entsorgung asbesthaltiger Abfaelle"

Richtlinie fuer die Bewertung und Sanierung schwach gebundener Asbestprodukte in Gebaeuden (Asbest-Richtlinien).

Technische Regeln fuer Gefahrstoffe, TRGS 519, 102, 100, 402, 415, 560, 900.

Verein Deutscher Ingenieure, VDI 3492, 3861, 2262.

Abfallgesetz vom 27.8.1986 (BGBl I S. 1410) i.d.F.v. 12.2.1990.  
TA Abfall

Final Governing Standards (FGS)

## 409TH BSB GRAFENWOEHR / VILSECK ASBESTOS MANAGEMENT PLAN

### 1. Purpose and Council Makeup

#### 1.1. Purpose

To ensure the health and safety of soldiers and civilians within the 409th BSB Grafenwoehr / Vilseck, an asbestos management program has been established by the Directorate of Public Works (DPW) Environmental Office. This program covers areas of concern for asbestos hazards and includes an annually updated Asbestos Management Plan (AMP). This plan contains the Commander's Asbestos Policy, which delegates responsibilities for asbestos management and gives standard operating procedures for handling asbestos containing materials (ACM). This plan should be referred to whenever an asbestos problem is encountered or expected. Compliance with U.S. Army Europe Regulation UR 200-1, the U.S. Army Regulation AR 200-1, and the Final Governing Standards (FGS) is required. In addition, an Asbestos Management Plan is required by each Base Support Battalion within the United States Army Europe (USAREUR).

NOTE: Any mention, or reference to, either German or U.S. laws and regulations is not meant to supersede those laws or regulations. Please refer to the complete text of those laws or regulations if you have any questions about them.

#### 1.2. 409th BSB Asbestos Management Council

The 409TH Base Support Battalion has established an Asbestos Management Council (AMC). This is an informal board chaired by the 409th BSB DPW. The AMC will meet periodically to discuss asbestos issues. Representatives from the following offices will make up the AMC board:

- a. BSB Directorate of Public Works
- b. BSB DPW Engineering Plans and Services (EP&S)
- c. BSB DPW Environmental Office
- d. BSB Safety Office
- e. BSB Public Affairs Office
- f. Civilian Personnel Office
- g. Works Council
- h. Staff Judge Advocate

- i. ASG Industrial Hygienist
- j. ASG Occupational Health Nurse

The AMC will work to solve problems regarding asbestos control, management, abatement, and disposal, as well as to provide the latest technical and administrative information to activities and persons involved in asbestos management.

## 2. RESPONSIBILITIES

### 2.1. BSB Commander's Policy for Asbestos Management

The BSB Commander shall

- a. Ensure funding for asbestos abatement actions required because of an imminent health hazard.
- b. Close a facility in which asbestos cannot be abated because of budgetary constraints and provide an alternate working location for those affected by the asbestos at the closed facility.
- c. Appoint a BSB Asbestos Control Officer.
- d. Ensure that all community facilities are adequately surveyed for the presence of asbestos containing materials.
- e. Develop abatement actions for all Priority I projects (projects rated 80 or greater on the 409TH BSB Asbestos Algorithm).
- f. Provide training to inspectors who will supervise contractor performance and inspect housing units.
- g. Ensure that facilities being considered for leasing have been surveyed for the presence of asbestos-containing materials and that an abatement action plan exists if asbestos is present in the facility.
- h. Update real property records to reflect the results of the asbestos surveys.
- i. Exclude asbestos-containing material from all procurement and uses where asbestos free substitutes exist.
- j. Write clauses in construction, renovation, demolition, and maintenance contracts directing contractors to comply with applicable asbestos requirements.
- k. State the presence or absence of asbestos-containing materials in the following documents (as applicable): DA Form 4283 (Work Request), DA Form 337 (Request for Approval of Disposal of Building and Improvements), Project Development Brochure, and real estate records of first time leases or renewals.
- l. Provide the Public Affairs Office (PAO) with information, as appropriate, for publication in community newspapers to inform the readership of the status of the asbestos management program as it relates to members of the community.

## 2.2. BSB Directorate of Public Works

The BSB Directorate of Public Works shall:

- a. Serve as the BSB Commander's primary representative for implementation of the BSB asbestos management program.
- b. Ensure that all community facilities have been surveyed for the presence of asbestos containing materials.
- c. Program abatement actions for all Priority I asbestos abatement projects, using contractual resources.
- d. Ensure that BSB asbestos requirements (surveys, plans, abatements) are programmed in the Annual Work Plan and EPR respectively.
- e. Ensure that an Indefinite Delivery Type Contract (IDT) exists to provide air/bulk analysis for suspected asbestos-containing materials.
- f. Ensure that an IDT exists for performing emergency asbestos abatement on an as-needed basis.
- g. Write technical specifications for contracted asbestos abatement in accordance with the laws and regulations of Germany, the United States, and the U.S. Army.
- h. Provide technical assistance, training, and guidance to BSB personnel involved with asbestos-containing materials.
- i. Appoint a BSB Asbestos Control Officer who shall:
  - (1) Be responsible for the development and implementation of asbestos procedures and policies and
  - (2) Maintain on file the applicable policies and procedures that involve asbestos materials.
- j. Serve as a member of the 409th BSB Asbestos Management Council.

## 2.3 Staff Judge Advocate

The Staff Judge Advocate shall:

- a. Assist with legal questions that may arise in the asbestos management program.
- b. Serve as a member of the 409th BSB Asbestos Management Council.

2.4. Civilian Personnel Office and Works Council

The Civilian Personnel Office and Works Council shall:

- a. Help resolve any personnel problems resulting from this program.
- b. Recommend appropriate hazardous-duty pay/severity allowance for employees involved in asbestos abatement or maintenance projects.
- c. Serve as a member of the 409th BSB Asbestos Management Council.

2.5. 409TH BSB Public Affairs Office

The 409th BSB Public Affairs Office shall:

- a. Inform the community members on the purposes and activities of the asbestos program.
- b. Release pertinent information to the public regarding the asbestos program.
- c. Serve as a member of the 409th BSB Asbestos Management Council.

2.6 409TH BSB Safety Office

The 409th BSB Safety Office shall:

- a. Ensure that supervisors refer all potentially exposed employees to Occupational Health Nurse to enroll in the medical surveillance program.
- b. Monitor employee training programs and coordinate with the Civilian Personnel Office to ensure that employees are trained.
- c. Coordinate with the DPW and Directorate of Logistics (DOL) the procurement of equipment to ensure that the correct protective equipment is procured and that adequate amounts are stocked.
- d. Review construction/renovation designs for applicability to Occupational Safety and Health Administration (OSHA) Regulations and Host Nation (Germany) Laws.
- e. Conduct investigations with Occupational Health Office and the BSB DPW Environmental Office of known or suspected facilities with asbestos exposure.
- f. Serve as a member of the 409th BSB Asbestos Management Council.

2.7 100TH ASG Occupational Health Office - Industrial Hygienists

The 100th ASG Occupational Health Office shall

a. Institute a replacement and periodic medical surveillance program in conjunction with the 409th BSB Safety Office for those BSB employees routinely exposed to asbestos hazards (i.e. in-house abatement teams or contract inspectors).

b. Conduct, in conjunction with 409th BSB Safety Office, respirator-fit testing for all in-house personnel involved in asbestos projects.

c. Evaluate employees' capability for wearing a respirator.

d. Conduct air monitoring to ensure that employee and worker protection standards are met. (These samples shall be analyzed using the contract established by the BSB DPW).

e. Serve as a member of the 409th BSB Asbestos Management Council.

### 3. Storage and Handling - Standard Operating Procedure

The following subsections prescribe briefly the standard operating procedures for performing asbestos surveys and abatements and dealing with other asbestos issues.

#### 3.1. Asbestos Survey

All materials that are suspected of containing asbestos shall be surveyed by U.S. Environmental Protection Agency (EPA) or German Technische Regeln fuer Gefahrstoffe (TRGS) 519 Sachkundige accredited surveyors. This survey shall supply the 409th BSB with information on the type of asbestos material, kind of asbestos, percentage of asbestos, how much material contains asbestos, the condition of the material, amount of damage, amount of material, and how the material relates to the facility use. The 409th BSB Asbestos Algorithm (appendix A shall be used to assess the risk from the ACM found in a particular building. Any material and/or location having a value of 80 or greater (Priority 1) shall be considered a top priority project for remediation.

Should a material be found that is suspected of containing asbestos, and it is not known if it was identified by an earlier risk assessment survey, the DPW Environmental Office shall be notified. The Environmental Office shall then check the survey to see if the material has been sampled and analyzed. If not, arrangements shall be made for the material to be sampled (according to the sampling procedures presented in Appendix B) by the contractor and sent to the laboratory with the IDT established by the BSB Environmental Office.

#### 3.2. Asbestos Hazard Assessment

Any asbestos-containing material shall have its hazard to personnel assessed by the DPW Environmental Office Asbestos Control Officer, using the Asbestos Algorithm in Appendix A. Any materials that pose a health threat shall be marked with appropriate warning levels, the area shall be sealed off, and appropriate measures shall be taken to remediate the problem.

#### 3.3. Asbestos Containment and Abatement

Any material that is found to contain asbestos and is identified as a health hazard shall be contained by encapsulation or shall be removed. Consideration shall be given to the type of building, the building use, and whether the material is scheduled to be removed in the future by a renovation or construction project. All abatements shall be performed per the abatement procedures presented in Appendix C (Operation and Maintenance Program) of this plan.

### 3.4 Operations and Maintenance Plan

Depending upon their original Algorithm value, UR 200-1, AR 200-1, and the 409th BSB Asbestos Management Plan require annual re-inspections of buildings containing asbestos. The annual re-inspection shall include a visual survey of the condition of the asbestos containing material and a recalculation of the BSB Asbestos Algorithm. If during the re-inspection the asbestos containing material has an algorithm value different than the original, appropriate remediation shall be taken according to the Asbest - Richtlinien Guidelines. The specifics of the operations and maintenance (O&M) plan are found in Appendix C.

The following guidelines are followed for re-surveying:

Priority I. Materials with a value of 80 or higher on the Algorithm is not re-surveyed - the ACM must be abated.

Priority II. Materials with 70-79 value must be resurveyed within two years and a new Algorithm value assigned.

Priority III. Materials with a value less than 70 they must be resurveyed within five years and a new Algorithm value assigned, except for asbestos fire-protection lids and fire doors.

### 3.5 Design Reviews

All facilities planned for renovation, construction, and demolition shall be surveyed for asbestos containing materials by either the designer or Environmental Office personnel. Since 1988 asbestos surveys have been performed continuously at Grafenwoehr and Vilseck. Surveys were performed by contractor and inhouse personnel and the results have been entered on an "Asbestos Data Base" which is available at the Environmental Division. This Asbestos Data Base will be integrated into the GIS system and access for viewing only will be provided, among others, also to the EPS Division. Any information regarding the condition of a specific building is readily available to the designers from the Environmental Office and shall be cross referenced before completing the design. The Design Review Flow Chart in Appendix D shows how this system should work. Should the data base not list a particular building, the Environmental Office shall be contacted for further investigation prior to the design of the project. Should the project involve disturbing any materials that contain asbestos, appropriate measures shall be taken to limit the asbestos exposure to the workers, or the material shall be abated prior to the project. At a 35% completion point of the project the Environmental Office shall be provided a copy of the design for review.

#### 4. Background on Asbestos

Since the late 1800s, asbestos has been widely used to fireproof and insulate heat pipes, ducts, boilers, and other materials in buildings. Workers sprayed or trowelled over a billion square feet of asbestos onto structural beams and roof decks.

##### 4.1. Mineralogy

Asbestos is the common name given to a group of naturally occurring fibrous mineral silicates. These minerals separate into thin strong fibers that are useful in many applications. Because of its high tensile strength, chemical resistance, noncombustibility, and low electrical and heat conductivity, asbestos has been used extensively in the construction industry in a wide variety of materials.

Minerals are classified as asbestos if their morphology as an aspect ratio (length-to-diameter) of greater than 3:1 (some experts say an aspect ratio of 10:1 is more accurate) and if the fiber is longer than 5 micrometers ( $\mu\text{m}$ ) and has a diameter less than  $0.3 \mu\text{m}$  (a human hair is about  $80 \mu\text{m}$ ).

##### 4.2. Chemistry

Asbestos minerals are categorized as two chemical groups: serpentines and amphiboles. These two chemical groups contain six different types of asbestiform minerals: chrysotile, amosite, crocidolite, tremolite, and anthophyllite. All of the asbestiform minerals have a chemically equivalent non-asbestiform mineral counterpart. The name commonly used to identify the asbestiform mineral is not necessarily the true name of the non-asbestiform mineral. For example, amosite is actually an acronym for Asbestos Mines of South Africa; its real name is cummingtonite-grunerite. Crocidolite's non-asbestiform name is riebeckite; and chrysotile's is lizardite (or antigorite).

Chrysotile is the only asbestiform mineral that is part of the serpentine group and has the chemical composition of  $\text{MgSiO}(\text{OH})$ . Normally a mineral in the serpentine group has tetragonal crystallography, but in the case of chrysotile, the tetragonal crystallography is altered so the mineral rolls up on itself, creating a layered, fiber-like mineral. The other five asbestiform minerals are from the amphibole group and exhibit perfect cleavage along one direction of the crystal axis forming the asbestos fiber. Amphiboles, like many silicates, are characterized by wide compositional variations (solid solution formation) as varying proportions of calcium, sodium, and potassium occupy some lattice sites of the structure while magnesium, aluminum, ferrous iron, and ferric iron occupy other sites. These minerals, with the exception of anthophyllite, have the same structure, but they have varying chemical compositions (isomorphous).

#### 4.3 Identification

Because asbestos includes six specific mineral forms, different types of asbestos fibers have different physical and chemical characteristics. The asbestos minerals have in some instances been identified by their color, however, this is not an accurate method of identifying asbestos. The color of one type may occasionally be the color of another. The most cost effective and widely accepted method of identifying asbestos in building materials is through the use of polarized-light microscopy. This method can quickly and accurately identify any asbestos fibers by passing polarized light through a thin section of material. The asbestos is differentiated from the other constituents by morphology, refractive index, birefringence, anisotropy, and extinction angles.

#### 4.4 Uses

Because of its excellent physical characteristics, asbestos is used as a filler and bonding agent for many types of building materials, such as pipe insulation and floor tiles.

Chrysotile accounts for approximately 90% of all commercially used asbestos. Amosite and crocidolite each account for about 5%. The remaining three types were not extensively used in commercial applications.

#### 4.5. Classification

Asbestos in building materials is classified as either friable or non-friable. Friable asbestos materials are those that are crushable under hand pressure. These release asbestos fibers quite readily when they are disturbed. Nonfriable asbestos materials are those that are not crushable with hand pressure. They do not readily release asbestos fibers. Nonfriable materials pose few health hazards when they are in good condition.

Examples of friable asbestos materials are sprayed-on fireproofing, sprayed-on sound absorption/reduction materials, insulation for pipes and boilers, decorative products, ceiling tiles, etc. Nonfriable asbestos containing materials include such products as water and sewer pipes / conduits, wallboard sheets (commonly called transite or eternit), gaskets, roofing and siding materials, paper products, textiles, vinyl and asphalt flooring, mastics underneath floor tiles, joint compounds, brake and clutch linings, etc.

#### 4.6 Health Hazards

Inhalation of asbestos fibers can cause certain types of respiratory diseases and can cause cancer of the lungs, esophagus, larynx, and oral cavity to develop. There has been no determination to date as to how much asbestos is safe to inhale; it would be wise to assume that zero exposure is best. Because of the small size of asbestos fibers, it is possible for the smallest fibers to remain airborne for weeks. Even though an asbestos fiber release may have happened some time ago, the fibers may still be airborne presenting a continuing hazard. Smoking, combined with exposure to asbestos, significantly increases the risk of developing respiratory diseases and cancers. Past studies of unprotected workers working with asbestos in occupational settings have shown that smoking increases the risk of asbestos related diseases up to 90 times that of nonsmokers.

Symptoms of asbestos respiratory diseases generally do not appear until 20 to 40 years after initial exposure to airborne asbestos. The three primary diseases that can result from inhalation of asbestos are asbestosis, lung cancer, and mesothelioma. Asbestosis is a chronic disease of the lungs that makes breathing progressively more difficult. The asbestos fibers, ranging in the size from 0.1  $\mu\text{m}$ , are inhaled into the lungs, where they lodge themselves in the air sacs. Scar tissue forms and lung capacity is lost. Lung cancer can develop from asbestos exposure and is much more common in smokers than nonsmokers. Mesothelioma is a rare cancer of the chest and abdominal membranes; it is a most severe cancer and is always fatal.

Picture

Asbestos in the lungs

Picture

5. Training

All personnel who in the course of their work deal with asbestos shall receive proper and suitable training. A training course shall be offered to prepare individuals for working with asbestos in their specific area. Personnel must first receive a basic training course and then attend an annual refresher.

The courses needed by personnel at the 409th BSB are listed below. Each course is identified by name, length of course, and for whom it is designed. Refresher courses are offered annually for those who have already attended the basic course. These courses will be offered in the language that best fits the personnel attending the course.

a. Project Designer Course (3-day course).

This course should be attended by EP&S design engineers who are or will be assigned asbestos project design or review responsibilities.

b. Management Planner Course (5-day course).

This course should be attended by the community asbestos control officer and other members of the Asbestos Management Council.

c. Inspector Course (3-day course).

This course should be attended by contract inspectors who will be assigned to projects involving asbestos removal in the future.

d. Asbestos Worker Supervisor Course (4-day course).

This course should be attended by the direct supervisor(s) of the personnel attending the asbestos worker course.

e. Asbestos Worker Course (3-day course).

This course should be attended by the DPW in-house labor force members who comprise the asbestos abatement team. (Examples are plumbers, steamfitters, electricians, etc.)

f. Custodial/Maintenance Worker Course (2-day course).

This course should be attended by custodial and maintenance workers servicing Department of Defense Dependent Schools (DoDDS) that contain asbestos.

**As a substitute to above mentioned courses USAREUR also offers TRGS courses. TRGS courses do not require an annual refresher class. Refresher courses need to be taken in case of changes of the existing host nation laws.**

- 16 -

Arrangement for the training shall be made by the supervisors for any personnel that need training. A memorandum is distributed by HQ USAREUR Environmental Office well in advance of courses offered for the year. This allows sufficient time for signing up personnel. The 409th BSB Environmental Office may be contacted for information about training classes offered for any particular year.

Appendix J of this plan lists the personnel within the 409th BSB who have completed asbestos training.

On an “as needed” basis, the 409th BSB Environmental Office can offer “2 Hour Asbestos Awareness Training”. This training covers basic knowledge of asbestos, its hazards and where it is most often encountered. Classes in the past have been given to units who may in the course of their work, come in contact with asbestos. The class emphasizes how to avoid exposure and what to do if asbestos is expected. **For more detail information please contact the designated Asbestos Control Officers for Grafenwoehr, Mr. Salavs DSN: 475-7209 and for Vilseck, Mr. Haertl DSN: 476-2944**

## 6. Monitoring and Inspection

### 6.1. Asbestos Containing Materials Surveillance Program

All surveyed asbestos containing material (ACM) must be re-inspected (according to its algorithm value) to assess its hazard. The following procedures must be used to perform the re-inspection:

1. Locate all ACM that was identified during the previous survey and note its location.
2. Note any changes to the materials from that recorded in the original survey.
3. Use the 409th BSB Asbestos Algorithm (Appendix A) for classifying ACM hazards to occupants.
4. Use the Algorithm to rate the materials and, depending upon the results, respond with appropriate actions.
5. If necessary, schedule the ACM for abatement.

### 6.2. Work Control/Permit System

All work undertaken on ACM needs to be performed by trained personnel with current certification. Asbestos related work by Army personnel (both civilian and enlisted) is limited to emergency work or small scale work (less than one square meter or linear meter) and to work that will not allow fibers to be released from material.

Any project that may involve disturbing asbestos needs to be approved by the BSB Environmental Office prior to commencement of the work. If asbestos will be disturbed, then an abatement design must be prepared by EP&S, or by contract, and the project modified to reflect the asbestos abatement. Work Order reception personnel shall verify the presence or absence of ACM prior to issuing a work order.

If suspected asbestos material is uncovered unexpectedly during a project, the BSB Environmental Office shall be contacted for positive identification and for further instructions on how to handle the material. **NO WORK SHALL CONTINUE UNTIL APPROPRIATE SAFETY MEASURES HAVE BEEN TAKEN.**

### 6.3. Medical Program

Occupational Health Office shall administer the asbestos medical surveillance program. Even though the 409th BSB does not perform large scale asbestos abatements, there may be people who come in contact with asbestos. Any persons who come into contact with asbestos should be monitored by a medical surveillance program for asbestos. Any persons who suspect that they may be in contact with asbestos should consult with the Occupational Health Office to arrange for the program to be initiated. For more information about the program, Occupational Health Office can be reached at DSN 475-6873/7058.

As mentioned earlier (Responsibilities, Section 2.7) Occupational Health Office shall work with Safety Office to ensure that all preventive measures to safeguard personnel from asbestos exposure shall be taken. Please refer to Section 2.7 for information on the responsibilities of Occupational Health Office for asbestos.

If the action level (AL) of 15,000 fibers per cubic meter (0.015 fibers/ccm) is exceeded for more than 30 days per year, then a medical surveillance program for the area must be instituted. This program includes daily air sampling of the area. Every employee must be notified of the sampling results as soon as they are available. When the exposure levels exceed the permissible exposure level (PEL) of 15,000 fibers per cubic meter (0.015 fibers/ccm), the employees must be informed of corrective actions that shall be taken to reduce the level. Note: The AL and PEL are identical under German Law (TRGS 519 and TRGS 402).

### 6.4. Survey Subplan for Leased Facilities

Building records shall be presented to the BSB Environmental Office for review of asbestos containing materials used during any construction or renovation.

Prior to leasing a building, an initial building inspection shall be performed for asbestos containing materials. This shall be a thorough inspection of all of the building's materials. The Building Asbestos Survey Form (Appendix A) shall be used for recording data.

The results of the building survey shall be documented with the following information:

1. Sequential inventory number.
2. Building number, floor number, and room number.

3. Normal use of building.
4. Location of ACM.
5. Physical condition of the ACM.
6. Estimated quantity of the material.

- 19 -

7. Results of the analysis (if the material was sampled).
8. Location of identical ACM found in adjacent rooms.
9. Date of survey.
10. Name of person performing the survey.

The 409th BSB Building Asbestos Survey Form (Appendix A) shall be used for the building survey. The Asbestos Algorithm (Appendix A) shall be used to evaluate the condition of the material being surveyed.

In rooms where no ACM is found during the survey, "No suspected ACM observed" shall be written on the Building Asbestos Survey Form.

Appendix B describes specific sampling procedures for various types of materials.

The samples taken during the survey shall be analyzed through the use of an indefinite Delivery Type Contract for laboratory analysis. The laboratory shall participate in the National Volunteer Accreditation Program or in the German equivalent of Verein Deutscher Ingenieure (VDI) 3492 and 3861. Polarized light microscopy (PLM) is the preferred method of analysis. If the same laboratory is used for the quality control (QC) samples, it should not be aware of which samples are used for quality control. The sample containers should not state that they are QC samples, nor should the sample chain-of-custody documents state this.

The numerical value from the Algorithm risk analysis determine the priority of remediation. This will classify the material being surveyed as requiring immediate attention, schedule remediation, or long-term remediation.

Abatement actions shall be performed within the required amount of time depending upon the determination achieved by the Algorithm.

Abatement actions at leased facilities shall be performed in accordance with German guidelines and shall not use in-house personnel (DPW workers or military). It is the responsibility of the contractor to notify the Employees' Liability Board (Gewerbeaufsichtsamt) 20 days prior to the ACM removal according to the Ordinance on Hazardous Waste (Gefahrstoffverordnung).

#### 6.5. Abatement Action Subplan

The required abatements for the 409TH BSB buildings are given in the Electronic Asbestos Data Base” that will be integrated into the GIS system, as described in Appendix H. According to German Guidelines (Asbest-Richtlinien) for all buildings, any item having a value or greater on the Algorithm needs to be completely and permanently abated within three years from the date of survey. Also, any room that contains asbestos must be made safe by temporarily encapsulating the asbestos material or by sealing off the asbestos from the room occupants.

- 20 -

The three types of abatement that may be performed within the 409th BSB are enclosure, encapsulation, and removal. Removal is the preferred method of abatement. However, depending upon building use, future building use, and even future installation use, the other two types of abatement may be used if cost effective.

#### 6.5.1. Operations and Maintenance Program

The Operations and Maintenance (O&M) Program for the 409th BSB is given in Appendix C. This program describes how and what shall be performed in the event of an asbestos fiber release, damage to materials that contain asbestos, or any other event that may release asbestos into the air. The O&M Program is the “working” section of this Asbestos Management Plan and should always be referred to when something must be done to ACM.

#### 6.5.2. Abatement Requirements

As mentioned previously in the description of asbestos, there are two types of ACM, friable and non-friable. The friable materials need much more care and containment while being abated because of the high possibility of fiber release. Friable asbestos will be the main emphasis of the abatement project. Non-friable asbestos will only be removed if it is badly damaged and if removal is cost effective. Appendix C of this plan gives specifications for asbestos abatement. Types of asbestos containing material are listed there along with abatement procedures.

#### 6.5.3. Disposal of ACM

Disposal of ACM must be in accordance with German Law (TRGS 519 and Asbest Richtlinien). The contained material must be delivered to an asbestos approved landfill within the same county of the abatement. Small amounts of ACM may be delivered to the Sanitary Landfill, Grafenwoehr Training Area. The sanitary landfill can only be used as an interim storage area until the ACM waste is picked up by the contractor for disposal. Asbestos material must be double packed in plastic bags and labeled “ASBESTOS”. The delivery of the material shall be coordinated with the Environmental Office to verify the acceptance of ACM at the sanitary landfill. It is the responsibility of the company performing the abatement to dispose of the asbestos materials in accordance with German Law. The 409th BSB area lies within two different counties. However, the County of Amberg/Sulzbach does not have an orderly sanitary landfill. Therefore asbestos waste from 409th BSB has been disposed of at Kalkhaeusl, Weiherhammer or at any other landfill approved by the German authorities for asbestos disposal. The contractor must show

proof of proper disposal of the ACM waste through landfill receipts. Disposal information must be included in the final report of the abatement contractor.

#### 6.5.4. In-House Emergency Abatement Teams

The In-House Emergency Asbestos Abatement Team composed of personnel from the DPW, shall perform only emergency or small-scale (less than one linear or square meter) abatement projects. They will concentrate their efforts on repairing asbestos containing materials and not on replacing ACM. Most in-house projects will be emergency repair of ACM pipe insulation by using thoroughly wetted casting wrap.

- 21 -

The in-house team will be managed by the 409th BSB Asbestos Control Officers. The 409th BSB Asbestos Control Officers will coordinate the team and direct them as to where and when an abatement is required. Supplies will be programmed into the annual Work Plan and shall be procured as needed for the team to accomplish its small scale abatements. The goal of the in-house abatement team is to be quick, simple, and effective.

The list of personnel who have had asbestos abatement training and are certified to perform small scale, short duration asbestos abatement projects is given in Appendix N. The personnel mentioned there are all team members of the 409th BSB In-House Emergency Asbestos Abatement Team.

#### 6.6. Resource Subplan

Funding for asbestos abatement shall receive high BSB priority due to its potential health related problems. As already mentioned any material that contains asbestos and has a value of 80 or greater on the Asbestos Algorithm needs to be completely and permanently abated within three years from the date of survey. This is in accordance with German Guidelines (Asbest Richtlinien) and therefore shall receive a Priority I project rating. If the room is to be used before the abatement can be performed, the material needs to be temporarily encapsulated or sealed off from the room's occupants. The Priority Project list shall be updated annually and shall reflect the current condition of asbestos containing materials that may need to be abated because of their value on the Algorithm.

Each year, approximately \$ 30,000 shall be required to perform re-surveys of materials previously identified as containing asbestos. The order of re-inspection shall be in accordance with the value assessed during the initial survey of the asbestos containing material. The highest valued materials shall be re-surveyed first; the lower assessed materials shall be re-surveyed later.

Appendix L discusses the Resource Sub-Plan for upcoming asbestos abatement projects. Funding for these projects will be required to comply with the German Guidelines (Asbest Richtlinien).

#### 6.7. Public Information Subplan

This Public Information Subplan shall be used to keep the public informed of the asbestos program and any work that may involve asbestos. Articles shall be printed in the local newspaper explaining the program's activities and how it may affect the local residents.

If a building is to be surveyed or have an abatement performed, an informational letter shall be drafted and given to the building's occupants prior to any work being performed. This letter shall detail the dates of the work, the estimated duration of the work, and whether any changes need to be made in the occupants' use of the building.

- 22 -

Armed Forces Network Radio shall be used if possible for "Informational Spot Announcements".

The surveys for the 409th BSB are on file with the Environmental Office. From time to time, it will be necessary to inspect buildings, and rooms within surveyed buildings, for missed asbestos containing material. The DPW shall inform the occupants of the building to be surveyed or abated that asbestos work shall take place and when the work shall take place.

Results of the asbestos survey shall be made available to the building occupants by the DPW. These results shall state the locations of samples, their condition, and the risk assessment associated with each sample.

Asbestos containing materials will be in the 409TH BSB facilities for many years to come. The surveys are complete for the most part, and the area of concern is abatement. There will be some additional asbestos surveys conducted, but removal of friable ACM that has already been identified is the main concern of the 409TH BSB asbestos program. It shall be necessary for the Public Affairs Office to keep the public informed about the asbestos program as the abatements and small surveys take place. It is important to inform, not to scare, the public.

#### 6.8. Laws and Regulations Applicable to the 409TH BSB.

The Department of Defense policy for Outside of Continental United States (OCONUS) facilities is to adhere to the most stringent environmental laws and regulations, whether they be U.S. or Host Nation Laws and Regulations. This policy is defined in the Department of Defense Directive (DODD) 6050.16, "DoD Policy for Establishing and Implementing Environmental Standards at Overseas Installations."

For asbestos, the 409TH BSB must adhere to the laws and regulations of both Germany and the United States. Some regulations are more stringent under German Law for areas of asbestos management; other regulations are more stringent under U.S. Laws. The laws and regulations mentioned in this plan have been compared and the most stringent, between U.S. and German, have been documented and are to be adhered to by the 409TH BSB.

Agencies and acts that have some laws that the 409TH BSB must adhere to, include:

- Asbestos Hazard Emergency Response Act (AHERA) 40 CFR 763, Subpart E, and Subpart G.

- Environmental Effects of Army Actions, AR 200-2.

- Environmental Protection and Enhancement, AR 200-1.

- Hazardous Materials Transportation Act, 49 CFR 177.

- 23 -

- National Emissions Standards for Hazardous Air Pollution Sources (NESHAPS), 40 CFR 61, Subpart M.

- Occupational and Environmental Health Guidelines for Evaluation and Control of Asbestos Exposure, TB MED 513.

- Occupational and Environmental Health: Respiratory Protection Program, TB MED 502.

- OSHA's Asbestos Standard for the Construction Industry, 29 CFR 1926.58.

- OSHA's Safety and Health Standards, 29 CFR 1910

- The Army Safety Program, AR 385-10.

- Deutsches Institut fuer Normung (DIN)

- Gefahrstoffverordnung

- Richtlinien fuer die Bewertung und Sanierung schwach gebundener Asbestprodukte in Gebaeuden (Asbest-Richtlinien).

- Technische Regeln fuer Gefahrstoffe (TRGS)

- Verein Deutscher Ingenieure (VDI)

The following chart shows diagrammatically the major laws and regulations that the US Army in Germany must follow.



U.S. Army in Germany

U.S. Laws and Regulations

German Laws and Regulations

Clean Air Act	Gefahrstoffverordnung
Toxic Substances Control Act	TRGS 519, 102, 100, 415, 560, 900
Occupational Safety and Health Act	Asbest-Richtlinien
AR 200-1, UR 200-1	DIN 18520

**APPENDIX A**

**ASBESTOS ALGORITHM AND BUILDING  
ASBESTOS SURVEY FORM**

**(SAMPLING REPORT)**

## APPENDIX A:

### Asbestos Algorithm and Building Asbestos Survey Form (Sampling Report)

The Asbestos Algorithm was translated from the Asbest-Richtlinien and is designed to fit the needs of the 409TH BSB. If there is any question concerning the interpretation or translation contact the 409TH BSB DPW Environmental Office immediately.

#### Instructions for using the 409TH BSB DPW Environmental Office Asbestos Algorithm.

1. Write the required information on the top of the Asbestos Algorithm.
2. Use (at a minimum) one sheet per material surveyed, not one per building.
3. Check the appropriate line number as it pertains to the material being surveyed.
4. Add the total amount at the end of the form, taking only the highest value from each group if more than one is checked per group.
5. The total value will be assessed on the following basis:
  - 80 and greater is an urgent abatement project (Priority).
  - 70 to 79 is a required abatement project (Priority 2).
  - Less than 70 is a long-range abatement project (Priority 3).
6. Use the rating system for classifying any abatement projects or any other asbestos hazard.

#### Instructions for using the 409TH BSB DPW Building Asbestos Survey Form (Sampling Report).

1. Fill out identification for facility/installation, building number, and room number.
2. Fill in surveyor name, date, time, weather, and material surveyed.
3. Assess the condition and amount of ACM.
4. Identify sample (if taken) using sequential numbering.
5. Locate the sample in the room by noting distance from north, south, east, or west walls. Locate from at least three walls in order to create a triangulation point.
6. Add comments pertinent to the sample, including room use.

L I N E	G R O U P	Asbestos Products Evaluation		Evaluation
		Building	Room	
	<b>I</b>	<u>What type of asbestos containing material has been used?</u>		
1		Sprayed asbestos	_____	20
2		Asbestos containing wall finish (wall plaster, paper etc)	_____	10
3		Lightweight asbestos-containing slabs (Eternit, transite)	_____	5
4		Other ACM (pipe insulation)	_____	5-20
	<b>II</b>	<u>Kind of Asbestos</u>		
5		Crocidolite (blue asbestos)	_____	2
6		All other types of asbestos	_____	0
	<b>III</b>	<u>Condition of surface/structure of ACM</u>		
7		Loosened fiber structure	_____	10
8		Firm fiber structure with or without sealed surface	_____	4
9		Laminated sealed surface	_____	6
	<b>IV</b>	<u>Surface condition damage of ACM</u>		
10		Significantly damaged	_____	6
11		Damaged but can be repaired	_____	3
12		Good condition	_____	0
	<b>V</b>	<u>Exposure to wear damages of ACM</u>		
13		Damage due to direct access	_____	10
14		Occasional work done on product	_____	10
15		Product is exposed to mechanical impacts	_____	10
16		Product is exposed to vibrations	_____	10
17		Product is exposed to extreme climate conditions	_____	10
18		Product is exposed to excessive air flow	_____	10
19		Excessive air circulation in room with ACM	_____	7
20		Inexpert operation may cause wear of ACM	_____	3
21		No external damage to ACM	_____	0
	<b>VI</b>	<u>Rooms affected by asbestos products</u>		
22		Room is used regularly by children and/or athletes	_____	25
23		Room is permanently used by other persons	_____	20
24		Room is used temporarily	_____	15
25		Room is used rarely	_____	8
	<b>VII</b>	<u>Room affected by ACM location in room</u>		
26		Directly in room	_____	25
27		In ventilation system of room	_____	25
28		Behind suspended unsealed ceiling	_____	25
29		Behind suspended sealed ceiling	_____	0
30	Total points of evaluation (Add highest from each group) >80 Priority I, 70-79 Priority II, <70 Priority III		Total _____	

- 409<sup>th</sup> BSB Building Asbestos Survey Form (Sampling Report)

Facility / Installation	Building Number
Surveyor	Date
Time:	Floor/Level
Room Number	- Material Surveyed
Location in Room	Friable Yes / No
Number of Occupants (were sample was taken)	Normal Use of Room:  Normal Hours of Operation
Significantly damaged: Damaged: Good condition:	Color: Amount: Sampled: Yes / No    Sample #:
Photo Id. No.	Photo Location:
Photo Id. No.	Photo Location
Photo Id. No.	Photo Location
Photo Id. No.	Photo Location:
Comments:	-
-	- - -
<b>Note: Use Additional Forms as Needed</b>	

**APPENDIX B**  
**SAMPLING PROCEDURES**

## Appendix B

### Sampling Procedures

Note: The following appendix is a summation of EPA document 560/5-85-024, sampling guidelines and does not supersede that document.

#### **Sampling Protocol**

Sampling and analysis of suspected asbestos containing samples will be performed according to the following guidelines. Only persons who have passed an EPA inspector course or are qualified as a Sachkundige person according to TRGS 519 Anlage 4 may perform sampling. The persons taking the sample shall use protective equipment appropriate to the conditions of the ACM.

- A. For friable materials collect at least three homogeneous samples. For non-friable materials collect at least two homogeneous samples. EPA Document 560/5-85-024, “Guidance for Controlling Asbestos-Containing Materials in Buildings” suggests that non-friable suspected material be “assumed” to be asbestos containing. The 409<sup>th</sup> BSB needs a complete and accurate survey and can not accept “assumed” for a building material. Because of time and money constraints all renovation and construction projects need to have sound, readily information regarding a particular material at the time the project is being designed. Having “assumed” information on a material will not tell the designers anything that they need to know about the material when designing a project.
- B. Collect one quality control sample per building whichever is greater. A QC sample is taken from the area adjacent to a regular sample. (The two samples are referred to as “side-by-side samples”). The QC samples must be analyzed by a laboratory participating in the Environmental Protection Agency Bulk Sampling Quality Assurance Program. If the QC samples have significant result differences from the reference samples (positive or negative for asbestos, missed asbestos type, or a difference of 60 or more of the percentages of asbestos ) the samples will need to be re-analyzed by both labs, if two labs are used. If a discrepancy still exists than the sample will need to be re-taken and re-submitted for analysis.

The QC samples should not be labeled as such on the chain of custody the laboratory should not know what samples are QC samples. The QC samples should be documented and labeled on the Building Asbestos Survey Form and any field logs that are kept on by the field surveying crew. The optimal QC program would utilize a separate laboratory for the QC samples and these results would be compared to the results of the original samples. (In this case the laboratory may know the origin of the samples and the samples may be labeled as QC samples.) All samples taken for QC analysis must be well labeled and easily identified by the surveying personnel.

To prevent the area from further contamination during sampling, use a plastic drop cloth to catch any material that may fall to the floor. When finished sampling in the area fold the cloth onto itself to prevent any material from falling out, tape shut with duct tape and discard it (along with other asbestos contaminated materials) following AMP disposal procedure (Section 6.5.3).

C. All samples shall be well labeled with an easy to understand labeling or numbering system. The individual samples will be labeled in sealable airtight containers or bags. A sampling report (and field log, if appropriate) will be kept of the sampling location (installation name, building number, room number and location in the room by using distance from north, south, east, or west walls to create a triangulated point), date sample number, name of person taking the sample, and type of material being sampled. The type of material being sampled may be entered on the field log and on the sample container by using a code that is explained in the sampling report. The Building Asbestos Survey Form (Appendix A) is used for making the sampling report.

D. Procedures for certain types of materials.

1. Surfacing materials.

- a. Spray the sample area with amended water to keep fiber release to a minimum.
- b. Using a core sampler or knife penetrate the material with a firm twisting motion. Do not use the actual sample container for a core sampler as this can easily contaminate the outside of the sample container. Ensure that a representative sample is collected and that the sample taken has included all layers of the material. If there are more than three layers or three types of material in one sample area, take two or more samples. There shall be no more than three types of material in one sample container.
- c. To prevent the release of fibers after the area is dry, reseal the damaged sample area by using an encapsulating spray or latex paint.

2. Pipe and boiler insulation

- a. Start at the boiler room and follow air, water, and steam distribution systems throughout the facility.
- b. Sample the insulation materials from damaged or exposed ends or other parts. If the pipe is damaged or in poor condition, then the material should be sampled where the material is damaged or exposed. Wet the sample area with amended water to reduce fiber release. If the insulation is in good condition then sampling should be conducted at joints in the pipes. After sampling reseal sample area or the disturbed joints with an encapsulating spray or latex paint

3. Hard non-friable material

Most of the material in this category are such things as floor tiles, transite panels, wallboards, window chalk, roofing materials, etc. When taking the sample, proper sampling equipment is required to reduce fiber release and to prevent the material from becoming friable. The material sampled shall be repaired after the sample has been taken (using appropriate methods) to return the material to good condition. Note: When sampling floor tiles the mastic should also be sampled.

4. Asbestos Survey (Inventory)

The asbestos survey or inventory is made using the Asbestos-Survey Form (Sampling Report) in Appendix A. In order to assess the asbestos problem the following information should be included in the survey.

- Inspection date
- Name of inspector
- Building number or name, floor and room number
- Number of occupants where the sample was taken
- Normal use of room
- Normal operation hours for the room
- Sequential inventory number for each sample taken.
- Location of material within the room using triangulation with north, south, east and west walls.
- Physical condition of the material.
- Quantity of the material in metric and English units.
- Identification number of the photos taken of the material with location

In rooms where suspected asbestos containing material was not found during the survey, only fill out the first three items (date, name, and building number) and write "No suspected ACM present."

5. Safeguarding the area

- a. When bulk samples are taken in areas with air currents going through the room, an effort should be made to stop the air flow during sampling if at all possible. To prevent any accidents by your action, check with the regular occupants before turning off any equipment.
- b. After each sample properly decontaminate the sampling equipment used. Use wet wipes to wipe off knives, tweezers, core samplers, or any other tool used. This is done to prevent any cross-contamination of samples. If wooden tools are used discard after each use because wood cannot be decontaminated.

- c. To prevent the area from further contamination during sampling, use a plastic drop cloth to catch any material that may fall to the floor. When finished sampling in the area, fold the cloth onto itself to prevent any material from falling out, tape shut with duct tape, and discard it (along with other asbestos contaminated materials) following AMP disposal procedure (Section 6.5.3)
- d. Ship the sample to the laboratory in such a manner to prevent the release of any asbestos fibers, and to allow the samples to arrive at the laboratory in good condition suitable for analysis.

6. Photographs

Photographs of the sampled area shall be taken by the inspector. Photos shall show the location of the sample in the room and the condition of the material sampled. Two photos shall be taken with one showing the sampling area location within the room and the other showing a close-up of the sample area. Each finished photo shall be identified with a number, and cross-referenced to the Building Asbestos Survey Form and on the field log (if appropriate).

7. Warning labels or signs

All positively identified asbestos material shall be labeled at the site in both German and English to warn personnel of the presence of asbestos in a particular material. The warning sign or label should (1) identify the material, (2) warn of the asbestos danger, and (3) have a “DO NOT DISTURB OR BREATHE DUST” warning.

At a minimum as follows:

P i c t u r e



## **APPENDIX C**

### **OPERATIONS AND MAINTENANCE PROGRAM**

## Appendix C

### Operations and Maintenance Program

Note: The following appendix is a summation of documents from EPA OSHA and TRGS and does not supersede those documents.

If asbestos abatement and maintenance activities must be performed the 409TH BSB Environmental Office should be contacted for the correct procedures

#### **Asbestos abatement and maintenance procedures**

##### A. Evaluation for asbestos abatement

During the survey and subsequent annual inspections the Asbestos Algorithm (Appendix A) shall be used. Information from this form shall determine the urgency of an asbestos abatement. If the algorithm results have a value of 80 or above, it shall be classified as a Priority I asbestos abatement. A Priority I area shall be immediately remediated. A value of 70 to 79 shall be classified as Priority II and shall have an abatement scheduled as soon as possible. A value less than 70 is classified as a Priority III project, this is a long term project and the asbestos abatement will take place during the next scheduled renovation or construction.

Priority I. Materials with a value of 80 or higher on the Algorithm is not re-surveyed - the ABM must be abated.

Priority II. Materials with 70-79 value must be resurveyed within two years and a new Algorithm value assigned.

Priority III. Materials with a value less than 70, they must be resurveyed within five years and a new Algorithm value assigned except for asbestos fire-protection lids and fire doors.

##### B. In-house emergency asbestos abatement.

If at all possible asbestos abatement work should be performed by experienced asbestos abatement contractors. Projects larger than one glove bag or one square or linear mater shall not be performed by in-house DPW workers if at all possible. It is the responsibility of the local Asbestos Control Officer to determine whether or not in-house personnel may perform the asbestos abatement.

Asbestos removal shall be performed by professional contractors with a contract for asbestos abatement. In-house personnel shall be used only in an emergency. An emergency is whenever an asbestos abatement project needs to be completed quicker than an abatement company can respond to the work. Contractors will respond generally within four days. In-house abatement shall be performed only by personnel who have had asbestos abatement training.

Should an in-house abatement be required than the following procedures shall apply.

1. Prior to start of any work On ACM clearance will be obtained from the shop supervisor and the DPW Environmental Office.

2. Isolation of the area shall be adequate to ensure there is no fiber release during the abatement. In all cases, procedures will be implemented to protect residents and workers during and after the work. Types of procedures include, but are not limited to:

- Creation of critical barriers if abatement area is one meter or more.
- Use of glove bags.
- Wetting of the material before work begins.
- Temporary personnel evacuation
- Construction of temporary polyethylene barriers.
- High Efficiency Particulate Aerosol Filtration System (HEPA) vacuuming of contaminated area.
- Bagging of ACM and proper disposal
- Air monitoring (by Industrial Hygienists)
- Use of required safety equipment (respirators, tyveks, gloves, etc.)
- Maintenance of 20 Pascal negative pressure within critical barriers.

3. Workers involved in the abatement shall wear (and be responsible for) OSHA/NIOSH- or German Berufsgenossenschaft (ZH 1/606.ZH 1/134)- approved respirators suitable for asbestos exposure expected to be encountered. The following chart shows what type of respirator should be worn, depending upon the concentration of airborne asbestos fibers in ambient air.

Respirator Requirements



<i>Airborne Asbestos Concentration</i>	<i>Required Respirators</i>
Less than or equal to 1 f/cm (10xPEL) U.S. Regulation	Half-Face air purifying respirators Equipped with high efficiency filters
Less than or equal to 10 f/cm (50xPEL) U.S. Regulation	Full-Face, air purifying respirators Equipped with high efficiency filters
Less than or equal to 20f/cm (100xPEL) U.S.Regulation	Any powered air-purifying respirator equipped with high efficiency filters. Any supplied air- operated in continuous flow mode

4. Workers shall wear disposable protective suits and gloves. After completion of the work, the protective clothing shall be removed and properly bagged within the air lock structure or work area. At completion of work all bagged, contaminated material shall be disposed of, following AMP disposal procedure (Section 6.5.3.).

5. All ACM shall be thoroughly wetted down prior to any work or removal . ACM shall be kept continually wetted during the abatement cleanup and disposal.

6. Personnel who are to work on ACM shall be trained in U.S. EPA or TRGS certified courses and additionally by the DPW Environmental Office prior to start of work. Training shall include, but is not limited to:

- ACM locations
- Asbestos use and types
- Safety precautions
- Respirator fit testing and protective clothing usage.
- Proper ACM handling methods
- Health effects of asbestos exposure.

7. Equipment. The following equipment shall be available in sufficient quantity for work on ACM.

- HEPA filtered vacuum with emergency backup units.
- Half-face respirator
- Cartridges for half-face respirators.
- Spray bottles (with amended water).
- Disposable coveralls (tyveks) with hoods.
- Disposable gloves
- Plastic six mm thick
- ACM disposable bags.
- Duct tape
- Encapsulation material
- Glove bags

8. Emergencies that occur during the abatement shall be reported immediately to the DPW Environmental Office.

9. At completion of work, the area shall be cleaned of all equipment and debris following AMP disposal procedures.

C. Abatement and cleaning requirements for asbestos containing materials.

1. Cemented asbestos containing materials (e.g. non-friable transite (eternit), heat shields, firedampers, shutters, louvers.)

a. Initial and periodic cleaning: None required.

b. Additional cleaning: Non required.

c. Labeling: ACM shall be labeled with warning signs, in both English and German.

d. Maintenance and repair procedures:

Damaged (10% overall or 25% localized)

cement asbestos materials should be replaced

with non-asbestos materials (rather than be repaired

Spot repair of damaged areas one square meter or less must be conducted if immediate

removal and replacement is not feasible. Response actions for areas greater than one

square meter must be designed and performed according to the specifications for

asbestos abatement.

e. Removal of cemented asbestos-containing materials shall be performed following these guidelines:

Thoroughly wet all surfaces, especially the edges, using a spray bottle with amended water.

Using only hand tools carefully remove the material. Take care to avoid unnecessary breaks.

Bag seal, and label all ACM in approved ACM disposal bags, and dispose of following AMP guidelines.

Clean up the area so that no asbestos fibers are left behind. Use HEPA vacuum for cleanup.

Wear required worker protection (respirators, tyvek coveralls, and gloves as a minimum).

Discard all disposable protective wear in AMC disposal bags and dispose of following AMP guidelines.

f. Repair of surface areas. Small areas (less than one square meter) of cemented asbestos surfaces (floors, walls, or ceilings) may be spot repaired by application of non-asbestos cement or other similar patching compound.

g. Restricted activities. Maintenance staff must avoid activities that damage the cement asbestos materials. For example:

- Do not cut, saw, abrade, or drill cemented asbestos materials.
- Do not use power tools; they can easily create dust that contains asbestos fibers.
- Do not use abrasive materials on cemented asbestos materials
- Do not use an ordinary vacuum for cleanup; do not dry sweep any area that has asbestos dust.

2. Removal of asbestos containing materials.

a. Initial and periodic cleaning: Not applicable.

b. Additional cleaning: Not applicable.

c. Labeling: All materials that contain asbestos shall be labeled with warning signs, in both English and German.

d. Maintenance and repair procedures: Small removal items such as Bunsen burner pads, hot plates, gloves, etc., should be removed and replaced with non-asbestos items. Use the following procedures:

- Wet all items with spray bottle.
- Bag and dispose of items in accordance with TRGS 519

Removal of asbestos containing materials from electrical equipment (e.g. electrical cords) must be performed using dry-removal methods. To prevent potential shock hazards these materials must **not** be wetted. HEPA vacuum shall be used to clean up any debris left after the removal of the ACM. This type of removal shall only be performed by personnel who are knowledgeable, proficient, and accredited in both electrical equipment and asbestos removal techniques.

3. Surfacing material, and wall; ceiling, or miscellaneous tiles.

a. Additional cleaning: In areas where friable sprayed-on or trowelled-on ceiling or wall materials are located, special cleaning procedures must be followed until all asbestos containing materials have been removed.

- All rugs and carpets must be vacuumed with a HEPA filtered vacuum.
- All rugs and carpets must be steam-cleaned after a thorough HEPA vacuuming. HEPA vacuuming and cleaning should be performed four times each year.
- All non-carpeted floors should be damp-mopped daily.

b. Maintenance and repair procedures: The following procedures must be followed to protect building occupants if wall and ceiling surfacing materials or tiles require maintenance or repair. These procedures apply only to small-scale activities involving less than one square meter of surfacing material.

**Surfacing material, and wall or ceiling materials:**

- Patch holes with non-asbestos spackle or joint compound
- Paint repaired surface with latex paint.
- Clean work area in accordance with O&M Program.

**Sprayed-on or trowelled-on surfacing material:**

- Restrict access to area and conduct repair when building is not occupied.
- Seal all air ducts in area.
- Spray affected area with amended water.
- Carefully remove loose or de-laminated material with a putty knife. Place all material into ACM disposal bags.
- Encapsulate scraped wall or ceiling with spray lacquer, being careful not to disturb intact material.
- Clean work area in accordance with O&M Program.

**Surface blemishes should be repaired according to the following procedures:**

- Place a large disposable plastic sheet below affected area.

- Lightly spray affected area with lacquer paint
- Clean work area in accordance with O&M Program.

**CAUTION: When severe damage or delamination occurs:**

- Restrict access to area.
- Shut down ventilation system. Check with maintenance staff before shutting off the system.)
- Close and lock all doors to area.
- Contact the asbestos coordinator.

**Acoustical wall or ceiling tiles:**

- Repair of acoustical tile is normally not required except for patching of small holes or abrasions. Spray paint or putty the affected area, being careful not to release fibers into the air
- Removal of suspended ceiling tiles is accomplished by wetting the tile, removing tile from metal grid, and disposing of the tile.
- Glued tiles shall be removed by wetting the tile and removing the tile with a stiff-blade putty knife while keeping all cut edges wet. After removal, encapsulate remaining glue and tile with paint to reduce fiber release.

4. Gasket material, duct joint vibration cloth, and expansion joints.

a. Maintenance and repair: Do not repair gasket, vibration cloth, or joint expansion materials. Replace with non-asbestos materials.

b. Removing and replacing:

- Shut down ventilation system if possible. Check with maintenance staff before shutting off system.)
- Isolate air duct section, if applicable.
- Thoroughly wet exposed material with amended water.
- Loosen bolts on flanges holding material in place.
- Remove all material, periodically wetting with amended water.

- Thoroughly clean entire area using HEPA vacuum.

c. Restricted activities:

- Do not cut, drill, or tear gaskets or cloth.
- Do not use an ordinary vacuum or dry sweep the area.

5. Vinyl floor tiles or sheeting:

- a. Maintenance and repair: Damaged floor tiles or sheets shall be replaced rather than repaired.

b. Removal: Soak material with hot water to reduce fiber release and to make tile more flexible. Remove tile by hand using only hand tools, work so as to avoid creating dust. Clean the work area.

c. Restricted activities:

- Do not cut, saw, abrade, or drill the tiles.
- Do not use power tools on tiles (except power tools designed for asbestos removal).
- Do not create dust by any means.

**APPENDIX D**

**DESIGN REVIEW FLOW CHART**

## **APPENDIX E**

### **EXPLANATION OF ACROMYMS**

**APPENDIX F**  
**CONTRACTOR ACCREDITATION PROGRAM**

**APPENDIX G**

**CONTROLLING BRAKE DUST IN AUTO SHOPS**

**APPENDIX H**  
**ABATEMENT AND RE-SURVEY REQUIREMENTS**  
**FOR THE 409TH BSB**

Abatement and Re-Survey Requirements for the 409<sup>th</sup> BSB

The Asbestos Control Officers at Grafenwoehr and Vilseck have, and maintain an electronic “Asbestos Data Base” that will be incorporated into the future GIS system. GIS users will have the opportunity to view the asbestos status of all buildings within Grafenwoehr and Vilseck. For example, it can be determined which buildings have been surveyed, if friable or non-friable asbestos was found, if ACM has been removed or if and when a building needs to be resurveyed.

Therefore this appendix does not separately list the locations within the 409<sup>th</sup> BSB that need to be resurveyed or abated within the required time frame.

If you do not have a link to the “Asbestos Data Base” you may obtain any information regarding the status of ACM in a particular building by calling your Asbestos Control Officer.

**409<sup>th</sup> BSB Grafenwoehr, Mr. Herbert Salavs, DSN 475-7209**

**409<sup>th</sup> BSB Vilseck, Mr. Stefan Haertl, DSN 476-2944**

**(See enclosed “Letter of Assignment)**

This “Asbestos Data Base” also keeps track of all buildings that need to be resurveyed or abated within a certain time frame.

If a resurvey is required it will be performed according to the following chart.

ORIGINAL ASBESTOS ALGORITHM VALUE	FRIABLE	RE-SURVEY SCHEDULE
80 (or greater) (Priority I)	Yes / No	No re-survey/abatement within three years
70-79 (Priority II)	Yes / No	Resurvey every two years with new Algorithm value
60-69 (Priority III)	Yes	Re-survey within five years with new Algorithm value
60-69 (Priority III)	No	Re-survey within five years with new Algorithm value

An Indefinite Delivery Type Contract shall be established to perform the re-survey. The survey shall first re-survey the material with a value of 80 or greater from the previous survey, whether friable or not; then the materials between 70 and 79, both friable and non-friable; then friable materials between 60 and 69 and then non-friable materials between 60 and 69.

Any building that has a value of 80 or more on the Asbestos Algorithm shall be abated within three years of the survey according to German guidelines (Asbest-Richtlinien). Once a material has been assessed a value of 80 or more, it immediately becomes a Priority I Abatement Project. To have the abatement completed within the required time frame it shall be programmed for funding in the annual EPR Report.



## **APPENDIX I**

### **ASBESTOS EMERGENCY-RESPONSE ACTION**

## Appendix I:

### **Asbestos Emergency Response Action**

In order to safeguard the personnel of the 409<sup>th</sup> BSB an Asbestos Emergency Response Action has been developed. The procedures presented here are to be followed in the event of an asbestos fiber release episode (as defined in Section II-E of this Appendix).

#### I. Identification of an asbestos fiber release.

A. Warning labels or signs are attached to any damaged or altered asbestos containing material that has a potential for fiber release.

1. If an asbestos containing material has been previously identified the attached warning label will identify the material.
2. The warning labels are commonly red with warnings in both English and German, typically:

Picture

## B. Unlabeled Materials

Unlabeled materials are more difficult to identify than labeled materials. The following list identifies materials that may release asbestos fibers if damaged. This list is taken from EPA Document 20T-2003 July 1990. "Managing Asbestos in Place. A Building Owner's Guide to Operations and Maintenance Programs for Asbestos Containing Materials."

### Possible Asbestos Containing Materials

Cement Pipes	HVAC Duct Insulation
Cement Wallboard	Boiler Insulation
Cement Siding	Breaching Insulation
Asphalt Floor Tile	Ductwork Flexible Fabric Connections
Vinyl Floor Tile	(Joint Vibration Cloth)
Vinyl Sheet Flooring	Cooling Towers
Flooring Backing	Pipe insulation (corrugated air-cell
	Block, etc)
Construction Mastics	Heating and Electrical Ducts
Acoustical Plaster	Electrical Panel Partitions
Decorative Plaster	Electrical Cloth
Textured Paints/Coatings	Electrical Wiring Insulation
Ceiling Tiles and Lay-in Panels	Chalkboards
Spray-Applied Insulation	Roofing Shingles
Blown-in Insulation	Roofing Felt
Fireproofing Materials	Base Flashing
Taping Compounds (thermal)	Thermal Paper Products
Packing Materials (for wall/floor	Fire Doors
Penetration)	Caulking/Putties
High Temperature Laboratory	Gaskets
Hoods/Table Tops	Gasket Adhesives
Fire Blankets	Wallboard
Fire Curtains, Vinyl	Joint Compounds
Elevator Equipment Panels	Wall Coverings
Elevator Brake Shoes	Spackling Compound

**NOTE:** The list does not include every product/material that may contain asbestos. It is intended as a general guide to show which types of materials may contain asbestos.

II. Procedures to be followed if an asbestos fiber release is suspected.

A. Limit access to the area and keep all unnecessary personnel out of the area.

B. Call the BSB Environmental Office and request they inspect the area of concern

1. 409<sup>th</sup> BSB Grafenwoehr Environmental Office,  
Telephone: DSN 475-7209 or Civilian 09641 – 837209

2. 409<sup>th</sup> BSB Vilseck Environmental Office,  
Telephone: DSN 476-2944 or Civilian 09662 – 832944

C. Call 100<sup>th</sup> ASG Occupational Health Office

Telephone: DSN 475-6815 / 6873, Civilian 09641 – 836873  
The 409<sup>th</sup> BSB Safety Office Grafenwoehr/Vilseck 476 – 1870

D. DO NOT TRY TO REPAIR OR CLEAN UP THE AREA YOURSELF. This may actually increase your exposure to asbestos by spreading the material to a greater area and enabling more fibers to become airborne.

E. There are two classifications for asbestos fiber releases: Major fiber releases and minor fiber releases. Major fiber releases are those that involve an area of one linear or square meter (three linear or nine square feet) or greater. Minor fiber releases are those that are less than one linear or square meter.

1. In general, for major fiber releases the area should be isolated by closing doors and/or erecting temporary barriers to restrict airflow and site access. Signs should be posted immediately outside the fiber release site to prevent persons not involved in the clean-up operation from inadvertently entering the area. If asbestos fibers can enter the Heating, Ventilation and Air Conditioning (HVAC) system, the system should be modified to prevent fiber entry or should be shut down and sealed off. The final step should be to employ thorough cleanup procedures. These cleanup procedures include proper control of the asbestos containing material, a careful visual inspection, and a final clearance air monitoring to verify satisfactory cleanup.

2. Similar procedures can be used for minor fiber releases.

III. Remediation methods for asbestos fiber releases.

A. Remediation should only be performed by personnel having asbestos abatement training and up-to-date certification. DPW's Buildings and Grounds (B&G) personnel have asbestos abatement training and are authorized to perform remediation on asbestos containing materials that are under one linear or square meter. Any fiber release greater than one linear or square meter shall be treated by a contractor.

- B. Remediation after a major fiber release will require the use of an air-supplied respirator. A “Type C” airline respirator equipped with a backup high-efficiency filter or Self-Contained Breathing Apparatus (SCBA) is required.
- C. Remediation after a minor fiber release will require at a minimum an air purifying respirator with high efficiency filters (half-face or full-face piece)
- D. If for some reason it is totally impossible to contact the DPW Environmental Office, the Safety Office or Preventive Medicine Services, and the asbestos containing material has been damaged, the following should be done:
  - 1. Wear appropriate protective equipment.
  - 2. Carefully wet down any loose material that may have fallen to the ground or on any other surface with water or amended water. Be careful not to further damage the area.
  - 3. If spray paint is available paint the damaged area, taking care not to further damage the material, and then “encapsulate” the area. If spray paint is not available then wet the area with water to reduce the fiber release potential.
  - 4. Place the wetted-down material into thick plastic bags (ACM disposal bags) and store in a safe area until you are able to contact the DPW Environmental Office or the Safety Office or the Occupational Health Office.
  - 5. Carefully wrap the damaged area with duct tape or similar tape or cover the area with a plastic sheet and tape down.
  - 6. Label the area as being an asbestos hazard: post a **DO NOT DISTURB OR BREATHE IN DUST** asbestos warning sign
  - 7. If appropriate, seal off the area.

IV. Important things to remember about asbestos.

- A. Asbestos is hazardous when it is airborne, the microscopic-sized fibers are respiratable. Asbestos is especially dangerous because the fibers are not visible with an unaided eye and small fibers can remain airborne for weeks after an asbestos fiber release has occurred.
- B. Friable asbestos is more hazardous than non-friable asbestos because of the higher potential for fiber release. Non-friable items are more resistant to damage than friable materials.
- C. Simple paper filter face-masks, or similar devices, offer no protection from asbestos.
- D. When a potential asbestos fiber release has occurred, may occur, or is suspected, call your local BSB Environmental Office at the numbers listed earlier in this Appendix (Sec. II B).
- E. Asbestos related diseases have a 20-year latency period. It is not known for sure how little asbestos is required to begin serious health effects; therefore, it is wise to minimize exposures.

**APPENDIX J**

**PERSONNEL ASBESTOS ABATEMENT  
TRAINING LIST**

## Appendix J

### Personnel Training

The following list of 409th BSB and 100th ASG personnel shows who has attended the various asbestos training courses offered by USAREUR.

Training classes are being offered annually during February/March time frame; they are funded and scheduled by the HQ USAREUR Environmental Office. All personnel who attended the AHERA basic class and want to keep their accreditation need to take the annual refresher course. The below listed personnel should attend the refresher courses at that time. Anyone else who is new to the system should be offered the basic course appropriate to the asbestos area they may be working in.

**HQ USAREUR started to offer more TRGS 519 asbestos courses. These courses have been very well accepted by worker, supervisors, designers, technicians and the various types of engineers, because once accredited under TRGS 519 no annual refresher classes are required. Refresher are only required upon a change in existing laws. TRGS 519 can be taken as a substitute to the AHERA asbestos courses.**

COURSE TITLE: ASBESTOS - CONSTRUCTION/SUPERVISOR COURSE

<u>NAME:</u>	<u>ORGANIZATION:</u>	<u>POSITION:</u>
Elisabeth Doebrich	DPW, Grafenwoehr	C/Constr. Branch
Kurt Loh	DPW, Grafenwoehr	Stove Shop Foreman
Herbert Ackermann	DPW, Grafenwoehr	Plumber Foreman
Peter Nittmann	DPW, Grafenwoehr	Constr. Inspector

COURSE TITLE: ASBESTOS - TRGS 519

Following personnel received TRGS 519 certification and do not require a recertification:

<u>NAME:</u>	<u>ORGANIZATION:</u>	<u>POSITION:</u>
Herbert Salavs	DPW, Grafenwoehr	Environmental Engineer
Hans, Graml	DPW, Grafenwoehr	Environmental Technician
Peter Schopf	DPW, Grafenwoehr	Shop Supervisor
Wolfgang Schwemmer	DPW, Grafenwoehr	C/PM Team
Gerhard Keck	DPW, Grafenwoehr	B&G Div
G. Wildbrett	DPW, Grafenwoehr	B&G Div
Kurt Loh	DPW, Grafenwoehr	Stove Shop Supervisor
Herbert Ackermann	DPW, Grafenwoehr	Plumber Shop Supervisor
Klaus Ploessner	DPW, Grafenwoehr	Carpenter
Gerhard Trummer	DPW, Grafenwoehr	Carpenter
Johann Fritsch	DPW, Grafenwoehr	Rofer
Georg Bruederer	DPW, Grafenwoehr	Carpenter
Johann Walberer	DPW, Grafenwoehr	Carpenter
Joachim Oesterreicher	DPW, Grafenwoehr	C/B&G Div
Reinhard Fichtl	DPW, Grafenwoehr	Estimator
Hans Mark	100 <sup>th</sup> ASG Grafenwoehr	COR
Rudolf Kastl	100 <sup>th</sup> ASG Grafenwoehr	Mechanical Engineer
Josef Besold	100 <sup>th</sup> ASG Grafenwoehr	Civil Engineer

<u>NAME:</u>	<u>ORGANIZATION:</u>	<u>POSITION:</u>
Stefan Haertl	DPW, Vilseck	Environmental Engineer
Elisabeth Prem	DPW, Vilseck	Environmental Engineer
Phillip Kirsch	DPW, Vilseck	Environmental Engineer
Hans Kuehner	DPW, Vilseck	Electrical Engineer
Juergen Alex	DPW, Vilseck	C/Util Div
Heinz Rauschert	DPW, Vilseck	Foreman Plumber
Hans Iberer	DPW, Vilseck	Estimator
Peter Fuchs	DPW, Vilseck	Electrician
Franz Schultes	DPW, Vilseck	ERM Div
Helmut Wittich	DPW, Vilseck	ERM Div
Markus Venzl	DPW, Vilseck	ERM Div
Otto Sperber	DPW, Vilseck	Fire Station
Karl Fenk	DPW, Vilseck	Fire Station
Josef Dotzler	DPW, Vilseck	B&G Division
Manfred Lingl	DPW, Vilseck	Utilities Division

**APPENDIX K**  
**QUICK REFERENCE PHONE LISTING**

QUICK REFERENCE PHONE LISTING

409TH BSB Environmental Office Grafenwoehr	DSN 475-7209 (Civ. 09641-837209)
409th BSB Environmental Office Vilseck	DSN 476-2944 (Civ. 09662-832944)
100th ASG Environmental Office	DSN 475-6457 (Civ. 09641-836457)
100th ASG Occupational Health Office	DSN 475-6873 (Civ. 09641-836873)
409th BSB Safety Office Grafenwoehr/Vilseck	DSN 476-1870 (Civ. 09662-831870)
7th ATC Safety Office	DSN 475-6162 (Civ. 09641-836162)
Berufsgenossenschaft in Nuernberg	0911-6803208
Gewerbeaufsichtsamt in Regensburg	0941-5025 0
Oberfinanzdirektion in Nuernberg	0911-376 0
HQ USAREUR Environmental Office	DSN 370-8125 (Civ. 06221-578125)
CERCLA Reportable Quantity Hotline	(U.S.) 800 424 8802
U.S. EPA in Washington DC	(U.S.) 202 554 1404
OSHA in Washington DC	(U.S.) 202 523 8151
NIOSH in Cincinnati	(U.S.) 513 533 8323

**APPENDIX L**  
**RESOURCE SUBPLAN**

## Appendix L:

### Resource Subplan

As per UR 200-1, Section 10-6, d., the Asbestos Management Plans's Resource Subplan shall contain the following information:

1. Costs for installation surveys and resurveys.
  2. Costs for bulk sample and air sample laboratory analysis.
  3. Projected and planned personnel training costs (including annual refresher training).
  4. Costs for equipment and supplies.
- 
1. The initial surveys for the 409th BSB have been completed. Resurvey of facilities will be done by in-house DPW Environmental personnel and by IDT Contract as required. Each year, personnel within the Directorate of Public Works receive appropriate training for this purpose. German law requires materials rated over 70 to be re-surveyed within three years. As a minimum, every three years there should be a re-survey of the materials rated over 70.
  2. Each year, an IDT contract should be established to sample and analyze both bulk samples and air samples as needed. At least \$ 30,000 per year will be required for the IDT sampling and analysis contract.
  3. Personnel training costs for the asbestos program are covered by HQ USAREUR. Each year, HQ USAREUR establishes a contract for various types of asbestos training and is offered to all those within USAREUR. The 409th BSB continually sends numerous personnel to the training sites each year when the courses are offered. Appendix J gives a list of all personnel who have attended past training courses.
  4. Equipment requirements for the 409th BSB are for the In-House Asbestos Abatement Team. Each year the team will need to be supplied equipment for the small-scale, short duration projects they will be working on. Approximately \$ 3,000 per year will be required to fund the In-House Asbestos Abatement Team. This will cover all materials and supplies required to perform small-scale, short-duration abatement projects.

**APPENDIX M**

**PERMISSIBLE EXPOSURE LIMITS,  
ACTION LEVELS, AND**

**FINAL AIR CLEARANCE VALUES**

## Appendix M

### **Permissible Exposure Limits, Action Levels, and Final Air Clearance Values**

- A. The permissible Exposure Limit is not to exceed 15,000 fibers per cubic meter (0.015 fibers per cubic centimeter) for all asbestos types as an eight-hour, time weighted average (TWA) following the German Regulation (VDI 3492) for Scanning Electron Microscopy (SEM).
- B. The action level is an airborne concentration of over 15,000 fibers per cubic meter or 0.015 asbestos fibers per cubic centimeter, calculated as an eight-hour time weighted average using SEM.
- C. The final air-clearance value that shall be used is the German regulation of 500 fibers of asbestos per cubic meter (0.0005 f/cm<sup>3</sup>) for all types of asbestos using SEM per VDI 3492 methodology for analysis. Industrial hygienists shall not perform final air clearances; this shall be performed by a contractor certified to perform final air clearances.

*A recent court case in Germany may change the permissible exposure limit for German standards to 0 fibers/m<sup>3</sup>. This will greatly change the asbestos program in USAREUR if this in fact is done. As of yet a final determination has not been made and therefore the following is the most up to date information we have.*

The following chart shows how the German and U.S. asbestos regulations compare to each other. The German regulations are taken from TRGS 519 dated September 1992 and from Asbest-Richtlinien. The U.S. regulations are from OSHA.

## Comparison of German and U.S. Asbestos Exposure Limits

### Permissible Exposure Limits

German Standards: 62,500 fibers/m<sup>3</sup> \* (0.0625 fibers/cm<sup>3</sup>)  
15,000 fibers/m<sup>3</sup> (0.015 f/m<sup>3</sup>) for ASI works

- VDI 3492 methodology for analysis
- 

American Standards: 100,000 fibers/m<sup>3</sup> (0.10 fibers/cm<sup>3</sup>) for all types of asbestos

\*Phase contrast microscopy (PCM) or Transmission electron microscopy (TEM)

---

### Action Levels

---

German Standards: 15,000 fibers/m<sup>3</sup> (0.015 fibers/cm<sup>3</sup>) for all types of asbestos  
500 fibers/m<sup>3</sup> for school and other facilities for children

- VDI 3492
- 

American Standards: 100,000 fibers/m<sup>3</sup> (0.10 fibers/cm<sup>3</sup>) NO LONGER USED!

- PCM or TEM analysis
- 

### Final Air Clearance Values

---

German Standards: 500 fibers/m<sup>3</sup> (0.0005 fibers/cm<sup>3</sup>)

- VDI 3492
- 

American Standards: 10,000 fibers/m<sup>3</sup> (0.01 fibers/cm<sup>3</sup>) with PCM analysis

AHERA Standards: Not significantly greater (when using statistical comparison  
“Z” test than value of outside air when TEM is used.

---

