

ASBESTOS MANAGEMENT PROGRAM

California Polytechnic State University

San Luis Obispo, California 93407

Public Safety Services

Office of Environmental Safety

Revision: December, 1993

FORWARD

A GUIDE TO REDUCING ASBESTOS EXPOSURE

A List of Important Points to Remember

DON'T DISREGARD THE HAZARD. Asbestos related diseases are not just another "dust in the lung" disease. Asbestos is a unique product with sharp fibers much smaller than average dust particles. They can cause disabling and life shortening health problems with a long latency period between damage and illness. Each individual is affected to a different degree.

DON'T OVER-ESTIMATE THE HAZARD. All types of asbestos containing material can be dangerous if handled improperly; however, all types can be properly contained. Exposure can be prevented by containment, regular inspections, and proper precautions when working around or with the material. The majority of all asbestos products effectively immobilize the asbestos fibers by mixing them into a strong binding material such as cement or epoxy (e.g. vinyl floor tile, transite). These so called "hard" asbestos materials do not generally create exposure problems unless machined, sawed or sanded.

KNOW HOW TO RECOGNIZE ASBESTOS HAZARDS. Soft, loosely bound, "friable" asbestos containing materials are the most hazardous type. These can cause contamination of the air and exposure problems. Some asbestos products are applied in this manner, but most hazards are a result of old asbestos containing material becoming worn, damaged, vandalized, or loose, thereby releasing asbestos fibers into the environment.

KNOW WHERE TO LOOK FOR AN ASBESTOS HAZARD. Asbestos has been used in over 3000 different products in industry. Hazardous asbestos should be expected whenever you see torn, damaged, or deteriorated "friable" materials on walls, ceilings, pipe and tank insulation, and fire doors.

DO NOT HANDLE OR DISTURB FRIABLE ASBESTOS. If asbestos damage is suspected, notify your supervisor and/or the Environmental Safety Officer of the location and nature of the problem. Vacate the room and wait for an inspection and determination to be made.

DON'T BE HESITANT TO ASK FOR SAMPLING OR PROTECTIVE EQUIPMENT. If you see loose friable materials or are planning a renovation or messy cleanup job which may disturb some suspicious looking material, ask your supervisor to check it, and submit an asbestos sample request to the Environmental Safety Office.

USE PROPER PROTECTION WHEN HANDLING ASBESTOS HAZARDS. Minimal exposure will be encountered if you wear the proper protective equipment when handling asbestos. When taking a sample, always wear a respirator, and if the substance is touched with your hands, wash them thoroughly.

SECTION 1

CAMPUS RESPONSIBILITIES

SECTION 1

CAMPUS RESPONSIBILITIES

The responsibilities defined below are required in order to implement an effective campus asbestos management program which provides for a safe environment for building occupants, identifies unsafe asbestos conditions, provides training and protection to employees working with asbestos, and effectively administers contracts to remove friable asbestos that presents a risk to building occupants.

1.1 Environmental Safety Officer (Public Safety Services)

- A. Coordinate training of campus personnel working with asbestos.
- B. Interface with Chancellor's Office on asbestos abatement projects.
- C. Maintain and update Campus Asbestos Management Plan.
- D. Track regulatory and technical issues relating to asbestos.

1.2 Environmental Health Technician (Public Safety Services)

- A. Maintain records of locations of asbestos-containing building materials (ACBM).
- B. Coordinate the periodic inspections of friable ACBM.
- C. Provide training to campus employees working with asbestos.

- D. Perform air sampling for quantification of asbestos fiber count.
- E. Review periodic asbestos inspection records for completeness.
- F. Interface with regulatory agencies on matters relating to asbestos.
- G. Review and sign off on all manifests for the disposal of asbestos.
- H. Track regulatory and technical issues relating to asbestos.

1.3 Facility Services

- A. Administer campus contracts for asbestos abatement.
- B. Perform small scale operations and maintenance work involving asbestos.
- C. Perform periodic inspections of friable asbestos.
- D. Respond to and cleanup small spills (debris) that contain asbestos.

SECTION 2

PROCEDURAL PLAN FOR HANDLING / WORKING WITH ASBESTOS

2.1 PROCEDURES FOR ASBESTOS IDENTIFICATION

The following safety precautions should be followed when any suspicious loose friable (readily crumbled) material is seen (especially if your work area has incurred any damage involving loose dust and debris of unknown materials), or if you are engaged in any operation(s) which may cause fibers to be released into the air:

2.1.1 DO NOT ATTEMPT TO CLEAN THE MATERIAL UP OR MAKE CONTACT WITH THE MATERIAL IN ANY WAY.

2.1.2 Employees or individuals who observe suspicious material should immediately notify their supervisor of the location(s) and nature of the problem.

2.1.3 If the supervisor has received the appropriate training, he should determine the nature of the damaged material. If the material is confirmed as containing no asbestos, no action need be taken other than timely repair and clean up.

2.1.4 If the qualified supervisor has any doubts or is unable to determine the type of material and there is evidence of dust and debris, the supervisor should immediately contact the Environmental Safety Officer at extension 6662, or the Environmental Health Technician at extension 6651 and request their assistance at the site location. If the appropriate person cannot be reached, the supervisor should immediately contact Public Safety Services Dispatch at extension 2281 and request that the Environmental Safety

Safety Services Dispatch at extension 2281 and request that the Environmental Safety Officer be paged.

2.1.5 If the contents of the material are in doubt, the qualified campus person on-site will sample and analyze the material according to Section 3 of this Asbestos Management Plan prior to any repair or cleanup taking place. If an emergency repair is needed, **treat all suspect material as asbestos.**

2.2 ASBESTOS CLEANUP/ABATEMENT PRELIMINARY CHECKLIST

2.2.1 Any proposed cleanup/abatement of asbestos containing materials or suspect asbestos containing materials must be coordinated with the Environmental Safety (ES) Officer and/or the Environmental Health Technician prior to any attempt to cleanup the material.

2.2.2 Agency Notifications

In the event that the renovation of a facility will disturb over 260 linear feet, 160 square feet, or 35 cubic

feet of regulated asbestos containing material (RACM), as defined in 40 CFR 61.141, then the notification described below must take place at least 10 working days before the disturbance of RACM will begin. The Office of Environmental Safety will maintain a running log of work activity involving RACM, and if the cumulative total of materials disturbed over the course of a year are going to reach the limits stated above (260 square feet, 160 linear feet, or 35 cubic feet), then notifications must be made. In addition, all demolitions of facilities, as defined in 40 CFR 61.141, must involve a notification at least 10 working days prior to beginning the demolition. The form shown in 40 CFR 61.145, Figure 3 shall be used for making notifications. A copy of the notification form is included in appendix _____. Notification forms must be sent to the following agencies:

San Luis Obispo County Air Pollution Control District

2156 Sierra Way, Suite B

San Luis Obispo, CA 93401

Attn: Enforcement Section

California Department of Industrial Relations

Division of Occupational Safety and Health

1655 Mesa Verde Drive, Room 150

Ventura, CA 93003

2.2.3 Any person performing an asbestos cleanup/abatement operation must have received the appropriate training in use of respiratory protection.

2.2.4 The assigned cleanup/abatement person(s) must have passed a physical examination, specifically for asbestos workers, within the last year.

2.2.5 The assigned cleanup/abatement person(s) must have received training on the techniques of asbestos abatement and cleanup. Training must be received through an

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EPA accredited course or equivalent. Campus personnel can provide the training to abatement cleanup persons if they have received certification as an instructor.

2.2.6 The following minimum supplies should be on hand prior to the start of the cleanup/abatement person(s) work:

1. One (1) High Efficiency Particulate Air (HEPA) vacuum cleaner.
2. Two (2) tyvek suits per person.
3. Two (2) pairs of tyvek shoe covers per person.
4. Two (2) pairs of protective gloves per person.
5. Twice the number of plastic bags, with asbestos warning signs on them, that will be needed to cleanup the large pieces of asbestos.
6. One (1) roll of duct tape.
7. Enough warning signs or warning tape to post the area and warn against entry into the area.
8. One (1) Hudson sprayer with a mixture of water and wetting agent (see instructions on wetting agent).
9. One (1) approved respirator with asbestos-approved cartridges, per person.
10. If needed to isolate area, enough 6-mil thickness plastic sheeting to completely seal off the area.
11. Approved glove bag (if necessary).

Note: The respirator must have been personally issued and fit tested by the Environmental Safety Office.

If there are any questions, the abatement cleanup personnel should contact the Environmental Safety Office.

2.3 SAFETY PROCEDURES FOR WORKING IN CEILING AREAS

(For Minor Operations Only!)

2.3.1 CEILING AREA PRE-ENTRY EVALUATION CHECKLIST

2.3.1(A) If the ceiling area has visible sprayed on insulation that could be disturbed by the work to be performed, go to section 2.3.2(B) of the "Safety Procedures for Working in Ceiling Areas".

2.3.1(B) If there is no access to the ceiling and access must be cut, go to section 2.3.2(B) of "Safety Procedures for Working in Ceiling Areas".

2.3.1(C) If access can be made by removing ceiling tile or by opening the access panel, take all of the items listed in section 2.3.2(D). Then, continue to section 2.3.1(D) below.

2.3.1(D) E i th ili f ll f id f d i l ti

2.3.1(D) Examine the ceiling area as follows for any evidence of sprayed on insulating material:

i. Tape the open end of the plastic bag around the outline of the ceiling tile or access door (have all needed tools inside the bag before taping).

ii. Open the access door or push open the tile and slide it back. At this point examine the clear bag, without removing it, for any sign of sprayed insulating material that could have fallen out.

iii. If insulating material falls into the bag, leave the bag in place and go to Step 2 of the Safety Procedures. If the bag is clean, continue on.

iv. Don your respirator with HEPA filters and a tyvek suit.

v. Take the bag down and dispose of it in the normal fashion.

vi. Being careful not to touch the sides of the access way, look inside with a flashlight to determine whether or not there is sprayed insulating material present or has fallen into the area where the work will be performed. If none is present, normal work procedures can be used. If sprayed insulation was used, continue on to vii below.

vii. Look very carefully for any signs of deteriorating sprayed insulation or signs that the material has begun to fall onto the area that you intend to work in. If the material is not completely intact, go to section 2.3.2. If the insulation material is completely intact, continue on to viii.

viii. Follow your normal work procedures, keeping your protective clothing on! If at anytime, evidence of deteriorating insulation becomes evident while working, **leave the area immediately** and go to section 2.3.2.

2.3.2 Before Going to the Work Area

2.3.2(A) Check with the ES Office, Environmental Health Technician to determine whether or not the proposed work will involve any contact with asbestos containing insulating material. If YES (contact is possible) or unknown, go on to 2.3.2(B). If NO (contact is not possible), follow your normal work procedures.

2.3.2(B) Contact the Environmental Safety Office 48 hours prior to starting work so that inspection and/or air monitoring can be performed.

2.3.2(C) If the results of the inspection and/or air monitoring reveal acceptable conditions but the potential for disturbing the asbestos exists, proper respiratory protection should be worn while performing work and the employee must receive asbestos awareness training as specified in

Section 6. If the air monitoring or inspection results indicate an unsafe environment, and the work must be performed, one of the following should take place; (1) contract with a qualified firm to accomplish the work or (2) perform the work with qualified, trained in-house personnel.

If option (2) is selected, the following steps should be followed:

2.3.3(D) Ensure that the following protective clothing and supplies are provided:

1. Enough disposable tyvek coveralls and hoods to ensure that each person involved can change into a fresh suit prior to starting the job, after lunch, and after breaks.
2. One respirator with asbestos filters for each person who will be involved in the job.
3. Unvented goggles to protect the eyes from any falling debris or insulating material.
4. Duct tape (2" wide) to seal around the collar sleeves.
5. Enough 6-mil thickness plastic sheeting to insure that the work area is COMPLETELY SEALED AND ISOLATED from other areas.
6. Duct tape (2" wide) to seal around the visqueen plastic sheeting.
7. Flashlight to examine the ceiling area for damaged or deteriorating insulating material.
8. A High Efficiency Purified Air (HEPA) vacuum cleaner and attachments to clean up any insulating material which may be dislodged.
9. Enough warning signs to alert and inform anyone who approached the work area.
10. 6-mil, labeled, plastic bags for collection and proper disposal of protective clothing. (These are special bags; trash bags cannot be used.)

Note: All items listed in 2.3.2(D) should be obtained from the person in charge of the Facility Services store room.

At the Work Site Prior to Starting Work

2.3.2(E) Qualified supervisors should inspect all persons that will be required to wear protective clothing for the following:

1. Facial hair that could interfere with the proper fit of their respirator (i.e., beards, large sideburns, more than one day of beard growth, etc.)
2. Any respiratory illnesses.
3. Any other conditions that could interfere with the fit or wearing of a respirator.
4. The absence of a current respiratory training card.

*****WARNING*** IF ANY OF THE CONDITIONS DESCRIBED IN 2.3.3(E) ARE FOUND, THE PROPER FITTING AND/OR WEARING OF A RESPIRATOR WILL BE IMPOSSIBLE. THAT PERSON CANNOT SAFELY WORK IN AREAS THAT REQUIRE RESPIRATORY PROTECTION. THE CALIFORNIA CODE OF REGULATIONS WILL NOT ALLOW ANY PERSON TO WORK IN SUCH AREAS WITHOUT PROPER PROTECTION.**

2.3.2(F) COMPLETELY SEAL AND ISOLATE the work area or room with visqueen plastic and duct tape with only a single slit for entering and exiting.

2.3.2(G) Set up the work area as follows:

1. Place the HEPA vacuum, plastic disposal bags, and all tools inside the work area.
2. Keep all other protective clothing out of the work area

2. Keep all other protective clothing out of the work area.
3. Post warning signs to alert and inform anyone who approaches the work area.
4. Remove any furniture and/or objects that contaminated dust could accumulate upon. If removal is impossible, the objects must be completely sealed; this would include the floor if it is carpeted.

2.3.2(H) Under the guidance of the designated contractor/supervisor for the job, don all protective clothing and air monitoring equipment. There should be one air monitoring pump for each worker and at least one pump for the work area (more if the work area is large).

2.3.2(I) The designated contractor/supervisor will perform the following inspections:

1. Inspect the work area for proper isolation and sealing.
2. Inspect for the proper donning of protective clothing and monitoring devices.

2.3.2(J) If all of the requirements in Steps 2 - 8 are fulfilled, the contractor/supervisor will give the go ahead to start work.

2.3.2(K) The contractor/supervisor will start all air monitoring pumps, to include all personal and room pumps. That person will then record the information on the Air Sampling Data Sheet (Appendix A) as the job progresses.

****SPECIAL NOTE:** If while working, it becomes clearly evident that there is no possibility of disturbing any asbestos containing insulation material, protective measures may be discontinued. This determination can ONLY be made by the contractor/supervisor!

2.4 GLOVE BAG REMOVAL OF ASBESTOS PIPE LAGGING

ABATEMENT PROCEDURES

2.4.1 Requirements

a. Only bags commercially manufactured for the specific purpose of glove bag removal of asbestos containing material shall be used. All bags shall be at minimum six (6) mil clear Poly Vinyl Chloride (PVC) or polyethylene. All bags shall be appropriately sized for the task to be accomplished.

b. Glove bags shall only be used on pipes that have a temperature below the maximum allowable temperature specified by the glove bag manufacturer.

c. The following precautions should be taken when performing glove bag removal of asbestos pipe insulation.:

isolate and seal all return air vents ducts etc close all doors to work area building

- isolate and seal all return air vents, ducts, etc., close all doors to work area building except for door housing HEPA exhaust unit (if used).
- protect immediate area by covering floor and nearby equipment with layer of polyethylene.
- temporarily wrap damaged asbestos insulation adjacent to the work location with plastic and tape to prevent damage or disturbance during removal.
- have HEPA exhaust unit available to filter air if there was a breach of glove bag seal.
- provide a trained, two person crew to remove asbestos insulation. One person will serve the role of ensuring that the glove bag is secured to the pipe and no breaching of the bag occurs.
- label all entrances to work area with warning signs alerting unauthorized personnel from entering work area.

2.4.2 Preparation

- a. Place necessary tools in bag. Wrap glove bag around pipe, seal with staples and tape leaving enough sealed space above pipe to allow easy access. Secure bag to pipe to support weight of stripped insulation and water.
- b. Insert HEPA vacuum nozzle and flexible tubing of wetting agent sprayer into hole location provided and seal airtight with duct tape.
- c. Perform a smoke test by injecting smoke into glove bag via a small hole and slowly squeeze bag. Repair any leaks or holes.

2.4.2 Removal Procedure

- a. Thoroughly wet insulation, then cut insulation sharply for neat sealing of exposed insulation. Leave a minimum margin of safety of five (5) inches at both ends of bag seal.
- b. Periodically use HEPA vacuum to reduce airborne fiber levels during removal.

2.4.2 Removal Procedure (Continued)

- c. After gross removal, use brush to remove small amounts of asbestos that may remain on pipe and then wipe down pipe with wet cloth.
- d. After removing all asbestos from pipe, saturate all material in glovebag and ensure that all material is below the level where the glovebag will be sealed.

2.4.4 Post Abatement

- a. All tools shall be gathered in hands and then the gloves pulled inside out. Seal the area with six (6) inch tape and cut through the middle of the tape. Bend and retape the ends. Save the bagged tools for the next bag operation or clean by placing in a pail of water.
- b. Collapse the bag with a HEPA vacuum and with the vacuum still in place, seal the bag just above the glove level. Remove nozzle and tubing and place a six (6) mil polyethylene over the glove bag and carefully remove the glove bag from the pipe and immediately seal the glove bag in the waste bag. A final inspection of the pipe should take place before any repairs or maintenance is performed.
- c. If no additional removal is required, the glove-enclosed tools shall be immersed in a pail of water, opened and cleaned. All water, rags, and debris shall be disposed of as
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hazardous waste.

SECTION 3

ASBESTOS SURVEY AND MONITORING PROGRAM

SECTION 3

ASBESTOS SURVEY AND MONITORING PROGRAM

3.1 Overview

Asbestos Containing Building Materials (ACBM) are prevalent throughout Cal Poly facilities. Typically, ACBM is found in fireproofing, acoustical and decorative ceiling and wall plasters, and thermal pipe and tank insulation. ACBM is also found in such materials as plaster walls, ceiling and floor tiles, roof felts, insulating chemical hoods, oven gaskets, and many other items. Because of the significant amount of asbestos (both friable and non-friable) within Cal Poly buildings, it's imperative a well documented program for identifying ACBM, notifying building occupants of its presence and location, and developing procedures to minimize disturbance of asbestos and possible exposure.

This section describes the Cal Poly program for identifying and characterizing the condition of asbestos in buildings.

- System-wide Surveys for friable ACBM

1. History
2. Resurvey
3. Procedures
4. Schedule

- Campus Survey and Inspection Program

1. Periodic surveillance of friable ACBM
2. Identification of Non-Friable ACBM
 - A. Survey
 - B. Periodic Sampling and Analysis
 3. Bulk Material Sampling and Analysis
 - A. Sampling
 - B. Quality Control
 - C. Documentation

C. Documentation

4. Pre-Demolition and Renovation Inspections

3.2 System-Wide Surveys

3.2.1. History

To date, two (2) system-wide asbestos surveys have been accomplished for the CSU. Baker consultants performed the initial survey in 1985, and a follow-up survey was performed in 1987-88 by the Dynamac Corporation. The Baker Consultants survey is located in appendix ____ of this Plan. A copy of the Dynamac survey is located in appendix ____ of this Plan. A copy of both surveys are available from the Environmental Safety Office. The scope of both surveys are as follows:

- a. Locate all suspected friable asbestos containing materials (ACBM).
- b. Sample all suspected materials and analyze them using Phase Light Microscopy (PLM).

3.2.1. History (Continued)

- c. Characterize the condition of the asbestos based upon a modified EPA algorithm developed by the consultants (see Appendix B).
- d. Assign a hazard ranking category and number to each sample location that tested positive for asbestos.
- e. Develop abatement cost estimates for all asbestos locations that were categorized as C, D, and F by Dynamac or 4, 5, 6, and 7 by Baker Consultants.
- f. Cost estimates included asbestos abatement, development of abatement specifications, project monitoring, and, in the Dynamac report, restoration. However, restoration costs were not included for all locations that were needed, and Baker consultants did not include any restoration costs in their reports.
- g. Develop guidelines for an asbestos operation and maintenance program.

3.2.2. Resurvey

A resurvey program for friable asbestos has been developed by the Chancellor's Office to achieve the following two (2) objectives:

- a. Periodic system-wide resurvey of all CSU facilities to update the priority ranking scale for asbestos abatement.
- b. Resurvey of specific locations on campus to recategorize an existing condition that has changed (e.g. deteriorated) or survey a location not previously identified.

3.2.3. Procedures

A resurvey of all campuses will be administered through the Chancellor's Office, Physical Planning and Development. The scope of the resurveys will be as follows:

- a. Visually observe the condition of all asbestos locations identified in the earlier

surveys, along with any additional locations not previously surveyed.

b. Take and analyze bulk samples of building materials to determine presence and content of asbestos if not previously surveyed). All bulk samples will be non-destructive (unless otherwise directed by the Chancellor's Office and the Campus Coordinator) and analyzed by Phase Light Microscopy (PLM).

c. Categorize and assign priority hazard ranking numbers to all locations surveyed. These shall remain A, B, C, D, and F as defined in the Dynamac Report.

d. Provide a summary table identifying locations that have changed priority hazard ranking (compared to the 1988 Dynamac Report) and indicate why the ranking has changed.

e. For locations categorized as C, D, and F develop abatement alternatives and cost estimates for abatement.

3.2.3. Procedures (Continued)

f. Cost estimates will include the following factors:

1. Abatement of asbestos.
2. Project management and monitoring.
3. Development of removal specifications and plans.
4. Development of restoration specifications and plans (if necessary).
5. Restoration construction (if necessary).
6. Phasing and relocation.

3.2.4. Schedule

System-wide surveys for friable asbestos are scheduled for every three (3) years by the CSU Chancellor's Office. A survey was scheduled for fiscal year 1990-91, but was delayed pending the outcome of negotiations on a system-wide consent decree issued by the United States Environmental Protection Agency.

3.3 Campus Survey and Inspection Program

3.3.1. Periodic Surveillance of Friable ACBM

In order to prevent exposure of building occupants to asbestos fibers, periodic surveillance of known locations of friable ACBM should be performed. Periodic surveillance allows for an evaluation of the condition of the asbestos to determine if deterioration has occurred. If deterioration has occurred which increases the potential for exposure of building occupants to asbestos, the following steps should be taken by the Environmental Safety Office.

- a. Contact the Manager, Environmental Compliance Program, Physical Planning and Development and inform her/him of the situation.
- b. Physical Planning and Development will arrange with an asbestos consulting firm to

meet with a campus representative to survey or resurvey the asbestos location.

c. The consultant will submit both to the Chancellor's Office and campus, a report documenting where any bulk samples were taken, results of the analysis, if asbestos is present, the type and percent, the hazard ranking of the location, and a cost estimate for abatement (if ranked within category C, D, or F).

d. Based upon the consultants report, Physical Planning and Development will determine the appropriate course of action.

The Chancellor's Office recommends inspection of friable asbestos location every twelve (12) months.

3.3.2. Identification of Non-Friable ACM

Neither one of the system-wide asbestos surveys sampled for and confirmed the presence of non-friable ACM such as plaster walls, vinyl asbestos floor tiles, ceiling tiles, and roofing felts. Because of the potential for employee exposure to asbestos fibers when these materials are disturbed (e.g. penetrating walls, removing floor and ceiling tiles). Each campus should have a program for sampling and analyzing building materials prior to construction or maintenance activities being performed. The campus should adopt one of the following two approaches:

A. Survey

The most proactive approach to identifying all non-friable ACM on campus is to survey all suspected building materials. The survey should consist of the following steps:

1. Identifying all building materials suspected of containing asbestos (plaster walls, floortiles, etc.).
2. Obtain bulk samples of all homogeneous materials that are suspected on containing asbestos.
3. Analyze the bulk samples using the Environmental Protection Agency's method of Polarized Light Microscopy (PLM).
4. Document the results of the survey.

The survey should follow the Asbestos Hazard Emergency Response Act (AHERA) guidelines and protocols for surveying, sampling, and analysis. A copy of the AHERA regulations is provided in Appendix C. The documented survey report should identify all sample locations on building floor plans, identify whether the material contains asbestos or not, and if it does contain asbestos, identify the type and percent of asbestos. Consolidation of the non-friable asbestos data with the existing friable asbestos data in a data management system is recommended.

B. Periodic Sampling and Analysis

If an up-front survey of non-friable asbestos containing building materials cannot be accomplished, each campus should implement a program to sample and analyze suspected asbestos containing building materials prior to construction or maintenance work being performed that would disturb the asbestos. The following procedures should be followed to achieve this objective:

1. Input all known locations of ACM into the maintenance management system or equivalent system. When a work order is generated it should indicate if asbestos is

equivalent system. When a work order is generated, it should indicate if asbestos is present or not. If present, appropriate precautions or actions should be taken.

2. If the presence of asbestos is not indicated, analyze a bulk sample of the material for the presence of asbestos and document the results.

3. Update the instructions on the maintenance management system to reflect the new information.

3.3.3. Bulk Material Sampling and Analysis

3.3.3(A). Sampling

All sampling of asbestos containing building materials should comply with Title 40, Part 763 of the

Code of Federal Regulations and/or the publication EPA 560/5-85-030a, Asbestos in Buildings,

Simplified Sampling Scheme for Friable Surfacing Materials.

Asbestos containing material should never be sampled dry. A surfactant or water should always be applied to the sample area first. The following steps should be followed when sampling bulk material.

1. Secure the immediate area so that building occupants are not present.
2. Wear a respirator (minimum of negative pressure, half mask) prior to taking sample.
3. Touch the sample area to determine friability of materials to be sampled.
3. Wet the surface of the sample area with a surfactant (typically 50% polyethylene-glycol) or water.
4. Penetrate the suspected material completely with a sharp object such as a blade or core tube and remove a small section of the material.
 - ◆ If the material being sampled is non-homogeneous, a sample should be obtained from each non-homogeneous area for characterization of that area.
 - ◆ If the material being sampled is layered, all layers should be sampled and the chain of custody form should specify, "analyze all layers."
5. Place the sample in a 6 mil thick, "ziplock" style sample bag, and seal it.
6. Patch or repair the material where the sample was removed.
7. Label the bag and record the following information:
 - a. Sample number
 - b. Date of sample
 - c. Time of sample
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- d. Building number
- e. Room number
- f. Location in room
- g. Material sampled
- h. Inspector
- i. Sample results (to be filled in after analysis)

8. The sample should be sent to an approved laboratory for analysis.

9. Depending upon the quantification limit needed, the sample should be analyzed by either of these two methods:

a. Polarized Light Microscopy (PLM) for quantification limits equal to or exceeding 1% asbestos by weight (analysis showing "trace" amounts or greater are considered to be asbestos-containing for purposes of work practices and controls). If the University desires to determine exact quantification of content below 10%, point-counting methods shall be specified to the laboratory.

3.3.3(B) Clearance Air Sampling

After completion of an asbestos abatement action, except for glove bag, small scale short duration, and exempted activities (as defined by section 1529(d)(2)(A), Title 8, California Code of Regulations), area clearance samples shall be obtained prior to release of the area for re-use. All clearance sampling and analysis shall use methods described in publication EPA 600/4-85-049.

Measuring Airborne Asbestos Following An Abatement Action. Phase Contrast Microscopy (PCM) may be used for analysis of clearance air samples, unless it is determined by the Environmental Safety Office that more stringent criteria is necessary for a particular clearance. Failure of a clearance sample analyzed by PCM will require all subsequent clearance samples in that area to be analyzed by Transmission Electron Microscopy (TEM).

3.3.3(C). Quality Control (QC)

If more than one or two samples are being analyzed for the presence of asbestos, quality control measures should be instituted to ensure the validity of the results. The following guidelines should be used:

1. Collect at least 1 QC sample per building or 1 QC sample per 20 samples, whichever is larger. A QC sample is taken from the area abutting a regular sample. The QC sample should be analyzed at a second laboratory to confirm the results of the primary laboratory.

3.3.3(D). Documentation

1. The information presented under 1.g. of this section should be obtained on all samples including QC samples, and blanks.

2. All records should be kept with the Environmental Safety Office and maintained on campus until the asbestos has been removed (documentation verifying removal should be kept on file indefinitely),

3. The results of positive tests should be incorporated into the campus database on locations of ACBM. This information must be provided to all employees in writing within fifteen (15) days of knowledge of the presence of asbestos, unless ACBM had previously been identified in similar building materials in that general area and employees had previously been notified.

3.4 Pre-Demolition and Renovation Inspections

A. Requirements

Prior to any demolition or renovation of campus facilities, as defined in 40 CFR 61.141, the affected

facility must be surveyed by an accredited building inspector. If any asbestos containing materials are identified in the facility during this inspection, the Environmental Safety Officer or

Environmental Health Technician shall be consulted to determine the proper course of action

including, but not limited to, removal strategies, work practices, engineering controls, and

notifications.

SECTION 4

NOTIFICATION REQUIREMENTS

SECTION 4 - ASBESTOS NOTIFICATION REQUIREMENTS

4.1 Overview

State law (Chapter 10.4, Division 20, Health and Safety Code) requires written notification to each employee working in a building that contains asbestos. Even though state law requires a certain level of asbestos notification, it is prudent practice on behalf of the CSU to provide as much information to building occupants as possible on the locations of asbestos, health risks associated with asbestos, and possible exposure. Discussed below are the requirements of AB3713 and the model notification letter distributed to all campuses for pending notification to employees of known asbestos locations.

4.2 Employee Notifications

Chapter 10.4, Division 20, Health and Safety Code requires building owners to provide a written notice to its employees informing them of the known presence of asbestos in campus buildings. This notice must include locations of ACBM, information of the health risks associated with asbestos, procedures to prevent disturbance of ACBM and

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exposure, and locations where employees can access additional information on any surveys, bulk sampling, and air monitoring results performed in any of the buildings. A copy of the referenced section of the Health and Safety Code is provided in Appendix D.

Each campus has been provided by the Chancellor's Office a model asbestos notification letter. This notification letter should serve both initial and ongoing employee notifications. Each campus will be responsible for attaching to the notification, the location and type of asbestos containing materials known to the campus. This includes the data from the Baker and Dynamac surveys along with any data on non-friable ACBM locations identified through internal campus surveys. Other data such as air monitoring and bulk sample analysis should be made available upon request.

Cal Poly Public Safety Services, Office of Environmental Safety, annually publishes an updated booklet entitled, "Asbestos on Campus," to comply with this notification requirement. This booklet is distributed to all employees of the University, Foundation, and Associated Students, Incorporated.

In addition to the notification requirements discussed above, each campus must provide a copy of the notification letter to the owners of campus facilities that are leased or rented by the CSU, and to all contractors performing work for the campus in buildings containing ACBM. This notice must be provided within fifteen (15) days after knowledge of ACBM and annually thereafter. Also, warning signs must be posted at all maintenance or construction sites where there is a potential for employees to contact, disturb, or be exposed to ACBM.

The Health and Safety Code requires that all asbestos survey and monitoring data for a specific building be maintained in that building and made available to employees during normal working hours. If this is not possible, the information should be kept centrally with either the Campus Asbestos Coordinator or the Environmental Health and Safety Officer. Some campuses may prefer a tiered approach to providing the information. Tier one would be a notated summary of survey data maintained at the Personnel Services office where the data could be reviewed and copied if desired. Tier two would be to direct the individual to the Environmental Health and Safety Officer or the Campus Asbestos Coordinator for specific information. The Chancellor's Office recommends that the asbestos information be kept with the campus representative who not only knows the locations of ACBM on campus, but who also is able to respond to specific concerns employees may have regarding health effects and procedures for minimizing exposure.

SECTION 5

MEDICAL SURVEILLANCE PROGRAM

SECTION 5 - ASBESTOS MEDICAL EXAMINATION PROTOCOLS

5.1 - Overview

Cal Poly administers a comprehensive occupational health surveillance program, including required asbestos examinations, through the Office of Environmental Safety. Requirements for asbestos exams are as follows:

Authority: California Code of Regulations, Title 8, Section 1529 and 5208 (Appendix E-1).

Substances: Protocol applies to exposures of all of the different forms of asbestos to include tremolite, anthophyllite and actinolite.

Frequency: An examination must be given at the time of hire if the potential work exposure will be at or above the action level of 0.1 fibers/cc of air. The examination will be repeated annually thereafter and upon termination. The same requirements hold for employees assigned to wear respiratory protection. This includes positive pressure respirators.

Medical

History: Completion of a medical history questionnaire "Initial Medical Questionnaire" or "Periodic Medical Questionnaire" per Title 8, Section 1529, with specific emphasis on eliciting symptomatology of the upper and lower respiratory or the gastrointestinal system for disease. Copies of the initial and periodic questionnaires are provided as Appendix E-2 and Appendix E-3.

Occupational

History: Detailed work history to include past employment exposures.

Physical

Examinations: Standard comprehensive medical examination.

Laboratory

Procedures: Radiology

Chest radiography, a (14" x 17") posterior-anterior chest x-ray, right and left anterior oblique views to be interpreted by a "B" reader* and given the ILO rating.**

Chest radiology is to be repeated as follows:

Years Since First Exposure	Age of Employee	
	<u>15 - 39</u>	<u>40+</u>
1 - 10	Every 3 years	Every 3 years
10 +	Every 1 year	Every 1 year

Pulmonary Function Test

Must include forced vital capacity (FVC) and a forced expiratory volume at one second (FEV), and be performed by a certified pulmonary function technician.

Gastrointestinal Examination

For employees 40 years of age or older or with 10 years or more since the initial

For employees 40 years of age or older or with 10 years or more since the initial occupational exposure to asbestos, a rectal examination and stool guaiac test for occult blood shall be performed annually.

Education

The worker should be informed regarding the nature of asbestos-related diseases and the rationale for the medical surveillance program.

* A radiologist or other medical specialist in the interpretation of chest radiographs for pneumoconiosis, and who has been certified by examination.

** The classification scheme for the pneumoconiosis - International Labor Office/Cincinnati (ILO U/C)

5.2 - MEDICAL INFORMATION ON ASBESTOS

- a. Asbestos exposure causes many serious health problems. This is based on well-documented research on human exposures to asbestos.
- b. Epidemiological studies have been based on various industrial exposures, primarily insulation workers.
- c. People, whose only contact with the material was that they lived in the same house as asbestos workers, were found to be dying of mesothelioma.
- d. No one really knows for sure how hazardous low levels of asbestos in the air are.
- e. Asbestos removal is a complicated task that, if done improperly, can leave higher asbestos air levels in the buildings than existed before the work started.
- f. National Research Council Committee on Non-occupational Exposure to Asbestiform Fibers concluded that breathing the asbestos that is present in ambient air may be hazardous and that some deaths from cancer probably will result.
- g. Before the mid 1970's, asbestos was widely used in the construction of public buildings. According to the American Federation of Government Employees, 16% of federally owned or leased buildings contain some application of asbestos, and 25% of federal buildings contained asbestos in pipe and boiler insulation.
- h. The health risks of breathing high amounts of asbestos fibers are clear. What is less certain is the relationship between the quantity of fibers inhaled and the frequency, and likelihood, of disease developing.
- i. There is no evidence in occupational studies to show there is a threshold level below which there are no adverse effects to breathing asbestos.
- j. The shape of the dose-response curve at low exposure to asbestos is not known and the curve must be extrapolated from high occupational exposures. The NRC assumed the response was linear. This is a conservative assumption that tends to over estimate the incidence of cancer for those having low exposure. Basically, they are saying that any exposure to asbestos increases the risk of developing cancer.

k. The type of asbestos has little bearing on the risk. There is some evidence that chrysotile asbestos (the type most commonly used in the U.S.) causes fewer deaths from mesothelioma than other asbestos types. However, all types of asbestos cause lung cancer, the most common type of cancer associated with asbestos exposure.

l. NRC has developed risk factors for lifetime exposure to ambient urban air and school rooms with asbestos surfaces. One can use these estimates and extrapolate the risk for occupational exposures.

m. Canadian reports state that asbestos in the air of buildings will almost never pose a health hazard to the building's occupants unless elevated exposure is caused by disturbing the asbestos.

n. Factors which influence asbestos fiber release are: its condition, location, exposed surface area, and asbestos content.

For more information on asbestos, contact the Environmental Safety Office at extension 6662.

SECTION 6

EMPLOYEE TRAINING PROGRAM

SECTION 6 - EMPLOYEE TRAINING PROGRAM

6.1 Overview

The employer must develop a training program for all employees that engage in asbestos related work, are exposed to asbestos, or reasonably expected to be exposed to asbestos at or above the action level. The action level is currently defined by the California Division of Occupational Safety and Health (CAL-OSHA) as 0.1 fibers per cubic centimeter of air. This figure is an eight hour time weighted average. In addition, CAL-OSHA defines asbestos-related work as "any activity by which disturbing asbestos-containing construction materials may release asbestos fibers into the air and which is not related to its manufacture, the mining or excavation of asbestos bearing ore or materials, or the installation or repair of automotive materials containing asbestos.

Training must be provided to the employee prior to or at the time of initial assignment and at least annually thereafter. CAL-OSHA currently defines three levels of training. Those are:

1. Employees participating in asbestos-related work.
2. Employees exposed, or maybe reasonably expected to be exposed to asbestos at or above the action level.
3. Employees engaged in asbestos related work involving over 100 square or linear feet of asbestos- containing construction material.

Appendix F lists the specific training requirements for each of the three (3) categories.

Each employee receiving training required under Appendix F shall be provided with written certification by the employer that he or she has been trained in accordance with requirements stated in Appendix F.

The record of employee certification shall include the certified employees name, job title, date(s) of required training, instructor(s), and the course outline(s) used to meet the requirements specified in Appendix F. The record of certification shall be valid for one year from the date of initiation.

6.2 Training Based Upon Job Description

Personnel training requirements are based upon specific activities which are conducted by employees performing duties which are part of the Campus Asbestos Management Program. Listed in Section I of the Asbestos Management Plan are specific responsibilities which are to be performed at administrative, management, and technician levels. Training courses are available for individuals performing at these various levels. An outline of the course contents is provided in Appendix G.

6.3 Employee Awareness Training

The employer shall institute a training program for and ensure the participation of all employees engaged in asbestos-related work is defined by the California Occupational Safety and Health Standards Board as "any activity by which disturbing asbestos-containing construction materials may release asbestos fibers into the air and which is not related to its manufacture, the mining or evacuation of asbestos bearing ore or materials, or the installation or repair of automotive materials containing asbestos".

All employees who are involved in asbestos related work shall be provided with employee information and training as outlined in Title 8, General Industry Safety Orders, Section 1529, (0)(1)(A), listed in Appendix F.

6.4 Respirator Maintenance Program Training

Employees shall be instructed and trained in the need, use, sanitary care, and limitations of such respiratory equipment that any employee may have the occasion to use. Respirators shall be inspected before each use and shall not be worn when conditions prevent a good gas-tight face seal (e.g. facial hair). Every respirator wearer shall be instructed in how to properly fit and test respiratory equipment and how to check the facepiece fit. Each employee shall be provided the opportunity to wear respiratory equipment in normal air for an adequate familiarity period, and to wear it in a test atmosphere (such as generated by smoke tubes or isoamyl acetate) prior to entering a controlled work place where asbestos fibers may be present.

Contained in Appendix H is a respiratory protection manual developed by the California State University. This manual discusses maintenance and care of respiratory equipment, fit testing, and provides a listing of respiratory equipment.

The most common respirators used for asbestos work are listed below as well as their advantages and limitations. Only those respirators and equipment approved for asbestos use by the Mining Enforcement and Safety Administration or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare may be used.

Half-mask Respirator: The half-mask respirator consists of a neoprene rubber face shield which covers the nose and mouth. Air is filtered through two cartridges which trap asbestos fibers preventing asbestos entry to the respiratory system. This mask requires a tight seal to the face to prevent air from entering between the face and mask. Eye protection is not included with this mask.

Full Face Respirator: Same as above except comes equipped with an integral full face shield to protect the eyes of the wearer.

Powered Air Purifying Respirator: This respirator (PAPR) is designed with a full face mask utilizing a separate air filter chamber which is connected to the mask by a flexible tube. Rechargeable batteries are used to power a motor which pulls ambient air through a filter and delivers it under positive pressure to the face mask. The advantage of this respirator is that a positive seal to the face is less critical as air is provided to the face mask under slight pressure.

Supplied Air Respirator(SAR): This respirator is similar to the powered air respirator except that it provides a compressed air cylinder or air pump to supply air to the mask under positive pressure. It is the most effective and expensive respirator available.

SECTION 7

RECORD KEEPING PROGRAM

SECTION 7 - ASBESTOS RECORD KEEPING PROGRAM

7.1 Overview

An integral part of an Asbestos Management Plan (AMP) is a well organized record keeping system which accurately documents all activities included in the AMP. Records documenting inspection, sampling, air monitoring, training, disposal, medical records, abatement projects, respirator program, hazard communications program, or any other activity involving asbestos containing materials must be maintained. It is the responsibility of each campus to establish a record keeping system which will facilitate rapid retrieval of data involving asbestos.

Specific requirements for record keeping are outlined in Title 8, Section 5208 (Appendix J). The requirements include specific information to be maintained on employee medical records, training, air and bulk samples, and test results of respirator fit tests. Specific time requirements are made which require that medical records be maintained for thirty (30) years by the employer for each employee exposed to asbestos. Training records must be maintained for one (1) year beyond employment and respirator fit test results must be maintained for three (3) years.

Cal Poly maintains a comprehensive set of paper and electronic databases for management of information related to the campus asbestos program. This data is maintained at Public Safety Services, Office of Environmental Safety. Information regarding the following topics is maintained:

Medical Examination

Training

Respirator Fit Tests

Exposure Measurements

Employee Notification

Bulk Samples

Survey

Air Samples

SECTION 8

CAMPUS ADMINISTRATION OF ASBESTOS ABATEMENT CONTRACTS

SECTION 8 - CAMPUS ADMINISTRATION OF ASBESTOS ABATEMENT CONTRACTS

8.1 - Overview

In order to assist campuses in the administration of asbestos abatement projects, the Chancellor's Office has developed policy which details the procedures for submitting asbestos contracts to the Chancellor's Office for review and approval, selection of asbestos consultants and contractors, pre-qualification, and campus reimbursement for project related expenses. This policy is contained within this section and is provided below.

8.2 - POLICIES AND PROCEDURES OF ASBESTOS ABATEMENT CONTRACTS:

8.2.1 Design Phase:

8.2.1(A) Obtain proposals from a minimum of three consultants drawn from a pre-qualified list

(Appendix K) that will be provided by Physical Planning and Development. Each proposal should provide the following information.

8.2.1(A)(i) Fixed price for development of both asbestos removal specifications and a construction cost estimate based upon the project scope identified in the Dynamac Report. In some cases the design fee may include additional costs associated with

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surveying, bulk sampling, and analysis. This fee shall be clearly defined in the cost proposal. The fixed price shall include costs for contract/project administration during the abatement contractor selection phase; specifically, assistance to the campus during bidding phase, pre-bid conference, job walk, contract review, and review of bid submittals. These costs shall be clearly defined in the proposal.

8.2.1(A)(ii) Cost for providing project management and air monitoring during abatement.

This shall include:

- 1) unit cost per work shift
- 2) identification of resources which are included in the unit cost (e.g. Industrial Hygienist, Engineer, Construction Manager, etc.)
- 3) number and type of air sample analysis included in unit cost
- 4) maximum length of work shift included in unit cost and whether it includes travel to work site

8.2.1(A)(iii) Unit or hourly costs for the following:

- professional, administrative, technical, and clerical staff
- analytical costs for Phase Contrast Microscopy (PCM), Phased Light Microscopy (PLM), Transmission Electron Microscopy (TEM I, II, & III), Scanning Electron Microscopy (SEM) - costs shall be submitted for 48 hours, one week and two week turnaround time.
- travel, per diem, and miscellaneous costs

8.2.1(A)(iv) Manpower load plan for the project

8.2.1(A)(v) Names and organizational relationship of proposed project management team

8.2.1(B) Submit copies of consultant proposals and campus recommendations for consultant selection to Physical Planning and Development* for review. Upon selection of a consultant, Physical Planning and Development will allocate the required funds to the campus for design contract award.

8.2.1(B)(i) If the design fee exceeds \$25,000, the campus must request written authorization to administer the funding from the Assistant Vice Chancellor, Physical Planning and Development, before proceeding with a contract.

8.2.1(C) For large projects which will severely impact the campus (e.g. library, administration, etc.), the Chancellor's Office recommends that campuses establish a committee to coordinate the phasing and specific details of the project with the consultant and abatement contractor. This committee should consist of representatives from the following departments:

- 1) Health and Safety
- 2) Plant Operations
- 3) Design/Construction/Planning
- 4) Public Relations
- 5) Dean or Administrator of affected building

8.2.1(D) It is the responsibility of the campus to ensure that the specifications and plans developed for the asbestos abatement/building restoration meet all applicable Federal, State, and local code requirements. This includes, but is not limited to, California Code of Regulations (CCR) Titles

8 (Health and Safety), 19 (State Fire Marshal), 22 (Hazardous Materials), and 24 (Building Standards).

8.2.1(D)(i) The Chancellor's Office uses an independent plan checking organization, to review and approve construction specifications and plans for code compliance. The campuses are encouraged to use outside contractors for plan checking if in-house resources are not available.

8.2.1(E) Final asbestos removal specifications developed by the consultant and approved by the campus committee or appropriate campus staff shall be submitted to Physical Planning and Development* for scope review prior to proceeding to the next phase of the project (i.e. project monitoring). If the project is complex, the Chancellor's Office may request submittal of preliminary design plans.

8.2.1(F) Asbestos removal specifications developed by campus personnel must be submitted to Physical Planning and Development* for scope approval prior to proceeding to next phase of project.

8.2.1(G) Cost estimates for campus asbestos abatement projects were based upon normal working hours, reasonable number of work shifts, and phasing of work. If campus requirements for the project differ significantly from acceptable practices, the project may not be funded. In order to ensure project funding the campuses should resolve specific project requirements with Physical Planning and Development as early as possible.

8.2.1(H) The following paragraph shall be included in all general contract conditions for asbestos

abatement projects:

"Contractor shall assume all costs arising from the use of patented or copyrighted materials, equipment, devices, processes used on or incorporated in the project and agrees to save harmless, defend, and indemnify State, Trustees, Architect, and their officers or employees from all suits, actions, or claims for or on account of, the use of any patented or copyrighted materials, equipment, devices, or processes."

8.2.2 Asbestos Abatement Phase:

8.2.2(A) Subsequent to final scope review and approval of the project specifications and plans by Physical Planning and Development, the campuses will advertise and solicit bids from qualified contractors for abatement of the asbestos. requirements for advertisement of Public Works Contracts are contained in Coded Memo ABS 86-39 (now located in SUAM sections 2600, at seq.) and should be followed on all asbestos abatement contracts.

8.2.2(B) Pre-qualification is required of all asbestos contractors bidding on public works contracts estimated at \$100,000.00 or greater. Pre-qualification packages can be obtained from the office of Construction Management, Physical Planning and Development.

8.2.2(B)(i) Pre-qualified contractors receive letters from Physical Planning and Development acknowledging their pre-qualification status. Submittal of this letter to the

campus with the contractor's bid should serve as proof of pre-qualification (a copy of the pre-qualification requirements are provided in Appendix L).

8.2.2(B)(ii) Asbestos contractors bidding on public works contracts estimated at less than \$100,000.00, and not pre-qualified with the Chancellor's Office, must provide proof of one year successful experience in asbestos removal work. Proof of experience shall include at least two projects during the last year equal to or exceeding the estimated contract amount.

8.2.2(C) Each asbestos contractor bidding on a public works contract shall submit the following documentation prior to contract award:

1. Proof of valid registration with the California Department of Industrial Relations (DIR) for performing asbestos related work.
2. \$1,000,000.00 General Liability Insurance
3. \$1,000,000.00 Vehicle Liability Insurance
4. \$1,000,000.00 Environmental Impairment Liability Insurance covering asbestos related work
5. Workers Compensation Insurance including Employers Liability coverage at not less than \$1,000,000.00. If contractor is permissibly self insured by the Department of Industrial Relations (DIR) for Workers Compensation Insurance, contractor can submit a valid letter from the DIR stating this. However, Employers Liability coverage of \$1,000,000.00 must still be provided.
6. A signed statement by President or Principal of company containing the following information:
 - a. A record of any citations issued by Federal, State, or Local regulatory agencies relating to asbestos abatement activity, including projects, dates, and resolutions.
 - b. A list of penalties incurred through noncompliance with asbestos abatement project specifications including liquidated damages, overruns in scheduled time limitations, and resolutions.
 - c. Situations in which an asbestos related contract has been terminated, including projects, dates, and reasons for termination.
 - d. A listing of any asbestos related legal proceedings/claims in which the contractor has participated or is currently involved, including descriptions of role, issue, and resolution.
7. ♦ Pre-qualified Contractors - Submittal of letter from Physical Planning and Development acknowledging pre-qualification.
- ♦ Non-pre-qualified contractors - Proof of one year successful experience in asbestos removal work.

8.2.2(C)(i) It is the campus responsibility to review and confirm the validity of all bid submittals prior to recommending selection of a contractor to Physical Planning and Development.

8.2.2(D) Contractor shall furnish the University a certificate of insurance prior to the commencement of work that shall provide:

1. That the State of California, the Trustees of the California State University, the University and the employees officers and agents of each of them are included as

University, and the employees, officers, and agents of each of them are included as additional insureds.

2. That the insurer will not cancel insured's coverage without fifteen days prior written notice to the University.

3. That the State, the Trustees, and the University, and the employees, officers, and agents of each of them will not be responsible for any premiums or assessments on the policy.

8.2.2(D)(i) On asbestos abatement contracts, contractor shall either require each subcontractor to procure and to maintain during the term of the subcontract public liability insurance in the amounts specified in section 8.2.2(C) above, or shall insure the activities of subcontractors in the policy specified in 8.2.2(C) above.

8.2.2(E) Summary form of Contractors Bid Proposals, and recommendations for contractor selection shall be submitted to Physical Planning and Development for review and approval once valid bids have been received and reviewed by campus personnel. The recommendation letter from the campus shall state whether the contractors have met all bid and pre-qualification submittal requirements. After Physical Planning and Development has reviewed and approved the campus' recommendations for contractor selection, Physical Planning and Development will then allocate the required funds to the campus for contract award.

8.2.2(E)(i) When the anticipated cost of an asbestos abatement construction contract exceeds \$200,000, the campus must receive written authorization from the Assistant Vice Chancellor, Physical Planning and Development, prior to entering into the contract.

8.2.2(E)(ii) If the Chancellor's Office determines that the asbestos abatement project involves reconstruction work beyond the scope of the campus' expertise, the asbestos abatement project will be administered through Physical Planning and Development.

8.2.2(F) In addition to the pre-qualification and bid submittals listed in section 2.2 and 2.3 above, the Chancellor's Office recommends that the campus request the following documentation from the asbestos contractor selected prior to starting the project. The required documentation is broken down into pre-contract document submittals and post-contract document submittals.

8.2.2(F)(i) Pre-Contract Document Submittals:

A. Contractors respiratory protection program

B. Cal-OSHA's training program

C. Verification that all contractor employees that will be involved in the project have had asbestos training and a medical examination in compliance with CFR 1926.58 and CCR Title 8.

D. Documentation verifying that the contractor has obtained approval from the disposal facility to accept the asbestos waste generated from the project.

8.2.2(F)(ii) Post Contract Document Submittals:

A. Copy of written letter to nearest CAL-OSHA, and NESHAPS coordinator notifying them of the asbestos related project.

B. Copies of all permits, licenses (excluding registration with Department of Industrial Regulation)

Relations), and fees necessary to perform work.

C. Proposed work schedule and manpower loading plan. This shall also include a contingency plan to respond to both life threatening and nonlife threatening emergencies.

D. List of all chemicals that will be used during the project. An MSDS shall be provided for each chemical.

E. Certification by an accredited organization for all equipment that will be used during the project.

F. Name, EPA ID number, state hauler number, type of vehicle to be used, and type and amount of insurance coverage maintained by the transporter of the asbestos waste.

G. Copies of all manifests used to transport and dispose of hazardous waste from the project site.**

8.2.3 Asbestos Abatement Management

8.2.3(A) Work area air monitoring, employee air monitoring, and enforcement of the Occupational

Safety & Health Agency (OSHA) and Environmental Protection Agency (EPA) regulations

must be performed during the asbestos abatement work.

8.2.3(A)(i) This service must be performed by an independent third party with no affiliation to the

asbestos abatement contractor, or by a campus representative who is competent and proficient in industrial hygiene and safety requirements.

8.2.3(A)(ii) If a campus wishes to accomplish the services listed under 3.1 with campus personnel, approval must be obtained from Physical Planning and Development.*

8.2.3(B) Based upon the removal specifications and asbestos abatement time schedule developed by the design consultant, the campus will obtain a fixed cost proposal from the design consultant for providing services listed in Section 3.1 of this Coded Memo.

8.2.3(B)(i) If the campus elects, bids can be solicited from additional asbestos consultants (with no affiliation to the asbestos abatement contractor) for this service.

8.2.3(C) Submit copies of the consultant(s) proposal with the campuses recommendations the Physical Planning and Development* for scope review and approval. Upon approval, Physical Planning and Development will allocate the required funds to the campus for contract award.

8.2.3(D) Prior to the start of asbestos abatement work a safety conference must be scheduled by the campus coordinator. This conference shall include campus representatives, the contractor, project manager, and other individuals who are involved in the project. The safety conference shall include a discussion of the methods and procedures to be used by all parties to ensure a safe working environment. A review of the contingency plan specified in section 2.5.2-C shall be included.

8.2.4 Contract Documentation

Documentation noted in 4.1 shall accompany all asbestos abatement construction contracts exceeding \$25,000 submitted to the Chancellor's Office for review and approval.

8.2.4(A) Contract Document Checklist

1. Notice to contractors and invitation to bid.
2. Contractors bid proposals.
3. Contract general conditions.
4. Supplementary general conditions (when applicable).
5. Standard California Nondiscrimination Construction Contract Specifications.
6. Scope of work which includes asbestos abatement specifications.
7. General construction specifications if required.
8. Plans.
9. Bidder's Security equal to 10% of contract bid and performance and payment bonds equal to 50% each of bid proposal.
10. Contractor pre-qualification and bid submittals identified in section 2.2 and 2.3 of this Coded Memo.

8.2.5 Project Related Expenses (PRE)

8.2.5(A) The following table identifies the PRE funds that will be allocated to the campus to cover costs associated with administration of asbestos abatement contracts. These funds will be distributed up front to the campuses. Establishment and use of these funds provides each campus increased flexibility for effective use of asbestos abatement funds. Expenditures from the PRE allocation may be audited annually. Incorrect use of the funds may require future restriction on fund usage.

<u>Description</u>	<u>% of Contract Estimate</u>	<u>Contract Estimate</u>
<u>Contract Administration</u> which consists of advertising, drafting, duplication and mailing.	2%	\$200,000
	\$5,000	\$200,000
<u>Asbestos Abatement Specification Development</u> which consists of Development of Asbestos Abatement Removal Specification for Contract Bid.	2%	\$200,000
	\$5,000	\$200,000
<u>Air Monitoring & Construction Management</u>	5%	\$500,000

Construction Management

which consists of providing a full-time individual (or the level of project management needed) to take air samples and ensure compliance with OSHA and EPA requirements.

2%

\$500,000

* Submit to Chief, Environmental Resources, P.P. & D.

** Submitted to campus subsequent to disposal of asbestos waste.

Campuses are to review bond documents to make certain that no riders have been added. Also, Surety bonds can only be executed by an admitted Surety insurer.

Note: Provisions in Section 2600 et seq. of SUAM are not specifically modified or waived in PP&D 89-06-C, but shall remain in effect for campus-delegated asbestos related projects.

APPENDICES

APPENDIX A

ASBESTOS GLOSSARY OF TERMS

APPENDIX A

ASBESTOS GLOSSARY

ABIH: American Board of Industrial Hygiene

ACBM: Asbestos-containing building material. Means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a school building.

Accessible: when referring to ACM, the material is subject to disturbance by school building occupants or custodial or maintenance personnel in the course of their normal activities.

Accredited or accreditation: when referring to a person or laboratory means that such person or laboratory is accredited in accordance with section 206 of Title II of the Act.

Act: Toxic Substances Control Act (TSCA)

Action Level: An airborne concentration of asbestos of 0.1 fiber per cubic centimeter of air (f/cc) calculated as an eight (8)-hour time-weighted average by the method prescribed in Appendix A of this section or an equivalent method.

Active waste disposal site: any disposal site other than an inactive site.

ACM: Asbestos Containing Material. When referring to school buildings means that any material or product which contains more than 1 percent asbestos

material or product which contains more than 1 percent asbestos.

Acoustical Insulation: The general application or use of asbestos for the control of sound due to its lack of reverberant surfaces.

Acoustical Tile: A finishing material in a building usually found in the ceiling or walls for the purpose of noise control.

Adequately Wet: Sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wet.

Aggressive Sampling: Air sampling which takes place after final clean-up while the air is being physically agitated to produce a "worst case" situation.

AIA: Asbestos Information Association.

AIA: American Institute of Architects.

AIA: American Insurance Association.

AIHA: American Industrial Hygiene Association

AIHA Accredited Laboratory: A certification given by the AIHA to an analytical laboratory that has successfully participated in the "Proficiency Analytical Testing" program for quality control as established by the National Institute for Occupational Safety and Health.

Airborne Asbestos Analysis: Determination of the amount of asbestos fibers suspended in a given amount of air.

Air Diffuser: A device designed to disperse an air stream throughout a given area.

Air Erosion: The passage of air over friable ACBM which may result in the release of asbestos fibers.

Air Lock: A system of enclosures consisting of two polyethylene curtained doorways at least three feet apart that does not permit air movement between clean and contaminated areas.

Air Man: An industrial hygienist or other qualified individual who collects air samples and monitors the asbestos abatement worksite.

Air Monitoring: The process of measuring the airborne fiber concentration of a specific quantity of air over a given amount of time.

Air Plenum: Any space used to convey air in a building or structure. The space above a suspended ceiling is often used as an air plenum.

Algorithm: A universally accepted procedure developed for the purpose of solving a particular problem. algorithms developed for asbestos provide a numerical index for evaluating a degree of hazard in a particular area. The Sawyer Algorithm and the Ferris Index are two, but neither are widely used today.

Alveoli: Located in clusters around the respiratory bronchi of the lungs, this is the area in which true respiration takes place.

Ambient Air: The surrounding air or atmosphere in a given area under normal conditions.

Amended Water: Water to which a chemical wetting agent (surfactant) has been added to improve penetration into asbestos-containing materials that are being removed.

Amosite: An Asbestiform mineral of the amphibole group containing approximately 50% silicon and 40% Iron (II) Oxide, and is made up of straight, brittle fibers, light gray to pale brown in color.

Amphibole: One of the two major groups of minerals from which the Asbestiform minerals are derived, distinguished by their chain-like crystal structure and chemical composition.

ANSI: American National Standards Institute

Approved Landfill: A site for the disposal of asbestos-containing and other hazardous wastes that has been given EPA approval.

Asbestiform Minerals: Minerals which, due to their crystal structures and chemical composition, tend to be separated into fibers and can be classified as a form of asbestos.

Aspect Ratio: The length of a fiber vs. its width.

Asbestos: Any of the following asbestiform minerals alone or in combination: chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite, and any of these minerals that have been chemically treated and/or altered.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in buildings.

Asbestos Consultant: Any person who contracts to provide professional health and safety services relating to asbestos-containing construction material as defined in this subsection, which comprises 100 square feet or more of surface area. The activities of an asbestos consultant include building inspection, abatement project design, contract administration, sample collection, preparation of asbestos management plans, clearance monitoring, and supervision of site surveillance technicians as defined in this subsection.

Asbestos-containing Construction Material: Any manufactured construction material which contains more than one-tenth of 1 percent asbestos by weight.

Asbestos-containing Waste Materials: Mill tailings or any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes regulated asbestos-containing material waste and materials contaminated with asbestos including disposable equipment and clothing.

Asbestos Control: Minimizing the generation of airborne asbestos fibers until a permanent solution is developed.

Asbestos Debris: Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Asbestos Exposure Assessment System: A decision tool which can be used to determine the extent of the asbestos hazard that exists in a building, and which can also be used to develop corrective actions.

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Asbestos Fibers: Fibers with their length being greater than five microns (length to width ratio of 3:1), generated from an asbestos-containing material.

Asbestosis: A non-malignant, progressive, irreversible lung disease caused by the inhalation of asbestos dust and characterized by diffuse fibrosis.

Asbestos Mill: Any facility engaged in converting, or in any intermediate step in converting, asbestos ore into commercial asbestos. Outside storage of asbestos material is not considered a part of asbestos mill.

Asbestos-related Work: Any activity which by disturbing asbestos-containing construction materials may release asbestos fibers into the air and which is not related to its manufacture, the mining or excavation of asbestos-bearing ore or materials, or the installation or repair of automotive materials containing asbestos.

Asbestos Standard: Reference to the OSHA requirements in the general industry standards regarding asbestos exposure (29 CFR 1910.1001), and EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) (40 CFR 61, subpart M).

Asbestos Tailings: Any solid waste that contains asbestos and is a product of asbestos mining or milling operations.

Asbestos Waste from Control Devices: Any waste material that contains asbestos and is collected by a pollution control device.

Atmospheres Immediately Dangerous to Life or Health: A hazardous atmosphere to which exposure will result in serious injury or death in a matter of minutes, or cause serious delayed effects.

Authorized Person: Any person authorized by the employer and required by work duties to be present in regulated areas.

Bridging Encapsulant: The application of a sealant over the surface of asbestos-containing material to prevent the release of asbestos fibers.

Bronchi: Primary branches of the trachea (windpipe).

Bronchogenic Cancer: An abnormal cell growth in the primary branches or the trachea (windpipe).

Cancer: A cellular tumor which normally leads to premature death of its host unless controlled.

Category I Nonfriable Asbestos-Containing Material (ACM): Asbestos-containing packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

Category II Nonfriable ACM: Any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined by using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Cementitious: Asbestos-containing materials that are densely packed, granular and are friable.

Certified Asbestos Consultant: Any asbestos consultant certified by the Division pursuant to this section.

Certified Site Surveillance Technician: Any site surveillance technician certified by the Division pursuant to this section.

Certified Supervisor: An individual who is capable of identifying asbestos hazards in the workplace and who has sufficient experience and authority to take prompt corrective measures to eliminate them. The duties of the certified supervisor include at least the following: establishing the negative-pressure enclosure, ensuring its integrity, and controlling entry to and exit from the enclosure; supervising any employee exposure monitoring required by this section; ensuring that all employees working within such an enclosure wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified in this section; and ensuring that engineering controls in use are in operating condition and are functioning properly. The certified supervisor is certified to the Division by the employee according to and as required by Section 341.9(a)(4). A certified supervisor need not be a certified asbestos consultant or certified site surveillance technician to perform the above described duties, provided that the certified supervisor is an employee of the registered contractor or registered employer performing the asbestos related work.

CFM: Cubic feet per minute

Chief: The Chief of the Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142.

Chrysotile (White Asbestos): The only asbestiform mineral of the serpentine group which contains approximately 40% each of silica and magnesium oxide. It is the most common form of asbestos used in buildings.

CIH: An industrial hygienist who has been granted certification by the American Board of Industrial Hygiene.

Cilia: Tiny hair-like structures in the windpipe and bronchi of the lung passages that help force undesirable particles and liquids up and out of the lungs.

Clean Area: The first stage of the decontamination enclosure system in which workers prepare to enter the work area.

Commercial Asbestos: Any material containing asbestos that is extracted from ore and has value because of its asbestos content.

Contaminated Items: Any objects that have been exposed to airborne asbestos fibers without being sealed off or isolated.

Contract Specifications: A set of guideline that a contractor must follow when conducting an asbestos abatement job.

Criteria Documents: NIOSH publications that address toxic materials, analytical methods, personal protective equipment, etc.

Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite side of the doorway.

Cutting: Penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

DPM: Designated Program Manager.

Damaged Friable Miscellaneous ACM: Friable miscellaneous ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or, if applicable, which has delaminated such that its bond to the substrate (adhesion) is inadequate or which for any other reason lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACM. Asbestos debris originating from the ACM in question may also indicate damage.

Damaged Friable Surfacing ACM: Friable surfacing ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or which has delaminated such that its bond to the substrate (adhesion) is inadequate, or which, for any other reason, lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACM. Asbestos debris originating from the ACM in question may also indicate damage.

Damage or Significantly Damaged Thermal System Insulation ACM: Thermal system insulation ACM on pipes, boilers, tanks, ducts, and other thermal system insulation equipment where the insulation has lost its structural integrity, or its covering, in whole or in part, is crushed, water stained, gouged, punctured, missing, or not intact such that it is not able to contain fibers. Damage may be further illustrated by occasional punctures, gouges or other signs of physical injury to ACM; occasional water damage on the protective coverings/jackets; or exposed ACM ends or joints. Asbestos debris originating from the ACM in question may also indicate damage.

Decontamination: A series of connected rooms with polyethylene enclosure system curtained doorways for the purpose of preventing contamination of areas adjacent to the work area.

Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment contaminated with asbestos.

Delaminate: To separate into layers. As used here, to separate from the substrate.

Demolition: The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Director: The Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Dirty Area: Any area in which the concentration of airborne asbestos fibers exceeds 0.01 f/cc, or where there is visible asbestos residue.

Dispersion Staining: Used in conjunction with polarized light to identify bulk samples. A particle (fiber) identification technique based on the difference between light dispersion of a particle (fiber) and liquid medium in which it is immersed.

Division: The Division of Occupational Safety and Health of the California Department of Industrial Relations.

Duct Tape: Heavy gauge tape capable of sealing joints or adjacent sheets of

Duct Tape: Heavy gauge tape capable of sealing joints or adjacent sheets of polyethylene.

Dusk Mask: Single use or disposable dust respirator with a low protection factor.

Electron Microscopy: A method of asbestos sample analysis which utilizes an electron beam to differentiate between fibers.

Emergency Renovation Operation: A renovation operation that was not planned but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden. This term includes operations necessitated by nonroutine failures of equipment.

Employee Exposure: Exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment. Whenever the term exposure is used in this section it refers to exposure of employees.

Employee Notification: Informing employees or building occupants if asbestos is present in the building, also informing them of the hazards associated with asbestos exposure, what is being done to eliminate the problem, etc.

Employer's Liability: Legal responsibility imposed on an employer requiring him/her to pay damages to an injured employee.

Encapsulant (sealant): A substance applied to asbestos-containing material which controls the release of airborne asbestos-fibers.

Encapsulation: The treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers, as the encapsulant creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant).

Enclosure: An airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air.

EPA: Environmental Protection Agency

EPA Regulations: Regulatory standards which cover emissions into the outside environment from a workplace and disposal of hazardous wastes from job sites.

Equipment Room (Change Room): A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fabricating: Any processing (e.g. cutting, sawing, drilling) of a manufactured product that contains commercial asbestos, with the exception of processing at temporary sites (field fabricating) for the construction or restoration of facilities. In the case of friction products, fabricating includes bonding, debonding, grinding, sawing, drilling, or other similar operations performed as part of fabricating.

Facepiece: The portion of a respirator which covers the wearer's nose, mouth, and eyes in a full facepiece.

Facility: Any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building,

structure, or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.

Facility Component: Any part of a facility including equipment.

Fallout: The intermittent release of fibers which occurs as a result of weakened bonds in the material, or because of deterioration.

F/CC: Fibers per cubic centimeters of air.

Fiber: A particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Fiber Releasability: The potential for generation of airborne fibers from an asbestos-containing source.

Fiber Release Episode: Any uncontrolled or unintentional disturbance of ACBM resulting in visible emission.

Fibrosis: A condition of the lungs caused by the inhalation of excessive amounts of fibrous dust marked by the presence of scar tissue.

Fibrous: Composed almost entirely of fibers.

Fibrous Aerosol Monitor (FAM): A portable survey instrument with the capability of providing instantaneous airborne fiber concentration readings.

Fireproofing: Spray-on trowel-applied fire resistant materials.

Friable: When referring to material in a school building means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously nonfriable material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

Friable Asbestos: Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763 section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

Fugitive Source: Any source of emissions not controlled by an air pollution control device.

Full Facepiece Respirator: A respirator which covers the wearer's entire face from the hairline to below the chin.

Functional Space: A room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling and the floor or roof deck above), such as classroom(s), a cafeteria, gymnasium, hallway(s), designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

Glove bag: A manufactured or fabricated device consisting of a bag constructed of a minimum thickness of 6 mil plastic or other impervious material, two inward-projecting long-sleeve gloves impervious to asbestos fibers, one inward-projecting water-wand sleeve and an attached labeled receptacle for asbestos waste. The glove bag is

sleeve, and an attached, labeled receptacle for asbestos waste. The glove bag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains the asbestos fibers released during the removal process. The glove bag may be modified to accommodate other tools and work practices as long as it remains sealed.

Glove-box (bag): Plastic enclosure placed around a specific operation such as a valve to contain small areas of materials for asbestos removal.

Grinding: To reduce to powder or small fragments and includes mechanical chipping or drilling.

Ground Fault Circuit Interrupter: A circuit breaker that is sensitive to very low levels of current leakage from a fault in an electrical system.

Ground Fault Interrupter: A device which automatically de-energizes any high voltage system component which has developed a fault in the ground line.

Half Mask High Efficiency: A respirator which covers one-half of the wearer's face and is equipped with filter capable of screening out 99.97% of all particles larger than 0.3 microns.

Heat Stress: A bodily disorder associated with exposure to excessive heat.

HEPA: High Efficiency Particulate Air (Air Filter). A filter capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers in diameter or larger.

HEPA Filtered Vacuum: A high efficiency particulate air (HEPA) filtered vacuum capable of trapping and retaining 99.97% of all particulates larger than 0.3 microns.

Holding Area: The airlock between the shower room and the clean room in a worker decontamination system.

Homogenous: Evenly mixed and similar in appearance and texture throughout.

Homogeneous Area: An area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

HVAC System: Heating, Ventilation, and Air Conditioning system usually found in large business and industry facilities.

In Poor Condition: The binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.

Inactive Waste Disposal Site: Any disposal site or portion of it where additional asbestos-containing waste material has not been deposited within the past year.

Incident: Any unanticipated event which causes, or is immediately likely to cause, an exposure of an employee, unprotected by an appropriate respirator, to asbestos fibers in excess of the PEL and/or excursion limit.

Industrial Hygienist: A professional qualified by education, training, and experience to recognize, evaluate, and develop controls for occupational health hazards.

Installation: Any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

Leak-tight: Solids or liquids cannot escape or spill out. It also means dust-tight.

Local Education Agency: Means:

(1) Any local educational agency as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 3381).

(2) The owner of any nonpublic, nonprofit elementary, or secondary school building.

(3) The governing authority of any school operated under the defense dependents' education system provided for under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921, et seq.).

Local Exhaust Ventilation: The mechanical removal of air contaminants from a point of operation.

Logbook: An official record of all activities which occurred during a removal project.

Lung Cancer: An uncontrolled growth of abnormal cells in the lungs which normally results in the death of the host.

Make-up Air: Supplied or recirculated air to offset that which has already been exhausted from an area.

Malfunction: Any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner so that emissions of asbestos are increased. Failures of equipment shall not be considered malfunctions if they are caused in any way by poor maintenance, careless operation, or any other preventable upset conditions, equipment breakdown, or process failure.

Manufacturing: The combining of commercial asbestos-or, in the case of woven friction products, the combining of textiles containing commercial asbestos-with any other material(s), including commercial asbestos, and the processing of this combination into a product. Chlorine production is considered a part of manufacturing.

MCEF: Mixed Cellulose Ester Filter which is one of several different types of media used to collect asbestos air samples.

Medical Examinations: An evaluation of a person's health status conducted by a medical doctor.

Medical History: A record of a person's past health record, including all the hazardous materials that they have been exposed to and also any injuries or illnesses which might dictate their future health status.

Mesothelioma: A relatively rare form of cancer which develops in the lining of the pleura or peritoneum with no known cure.

Method 7400: NIOSH sampling and analytical method for fibers using phase-contrast microscopy. Replaces method P & CAM 239.

Micron: One millionth of a meter.

Mil: Prefix meaning one-thousandth.

Millimeter: One-thousandth of a meter.

Mineral Wool: A commonly used substitute for asbestos

Mineral Wool: A commonly used substitute for asbestos.

Miscellaneous ACM: Miscellaneous material that is ACM in a school building.

Miscellaneous Material: Interior building material on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or thermal system insulation.

MSDS: Material Safety Data Sheet

Natural Barrier: A natural object that effectively precludes or deters access. Natural barriers include physical obstacles such as cliffs, lakes or other large bodies of water, deep and wide ravines, and mountains. Remoteness by itself is not a natural barrier.

Negative Pressure: An atmosphere created in a work area enclosure such that airborne fibers will tend to be drawn through the filtration system rather than leak out into the surrounding areas. The air pressure inside the work area is less than that outside the work area.

NESHAP: National Emission Standards for Hazardous Air Pollutants - EPA Regulation 40 CFR subpart M, part 61.

NIOSH: The National Institute for Occupational Safety and Health which was established by the Occupational Safety and Health Act of 1970.

NIOSH/MSHA: The official approving agencies for respiratory protective equipment who test and certify respirators.

Nonfriable: Material in a school building which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

Nonfriable Asbestos-Containing Material: Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763m section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Nonscheduled Renovation Operation: A renovation operation necessitated by the routine failure of equipment, which is expected to occur within a given period based on past operating experience, but for which an exact date cannot be predicted.

Numerical Value: Refers to the types and percentages of asbestos present in a given sample.

Operations and Maintenance Program (OMP): A program of work practices to maintain friable ACM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling friable ACM disturbance or damage.

OSHA: The Occupational Safety and Health Administration which was created by the Occupational Safety and Health Act of 1970; serves as the enforcement agency for safety and health in the workplace environment.

Outside Air: The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open air ferry dock.

Owner or Operator of a Demolition or Renovation Activity: Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Particulate Asbestos Material: Finely divided particles of asbestos or material containing asbestos.

PAT Samples: Proficiency Analytical Testing of asbestos samples conducted through NIOSH for laboratories involved with the analysis of asbestos samples.

P & CAM 239: A NIOSH sampling and analytical method for measuring airborne fibers using phase contrast microscopy.

PCM: Phase Contrast Microscopy.

PEL: Permissible Exposure Limit as stated by OSHA.

Penetrating Encapsulant: Liquid material applied to asbestos-containing material to control airborne fiber release by penetrating into the material and binding its components together.

Peritoneum: The thin membrane that lines the surface of the abdominal cavity.

Personal Protective Equipment (PPE): Any material or device worn to protect a worker from exposure to, or contact with, any harmful material or force.

Personal Sample: An air sample taken with the sampling pump directly attached to the worker with the collecting filter placed in the worker's breathing zone.

Personal Protection: Notification and instruction of all workers prior to the beginning of a project as to the hazards associated with the job and what they can do to protect themselves from these hazards.

PF: Protection factor is provided by the respirator which is determined by dividing the airborne fiber concentration outside of the mask by the concentration inside the mask.

Phase Contrast Microscopy (PCM): An optical microscopic technique used for the counting of fibers in air samples, but which does not distinguish fiber types.

Pipe Lagging: The insulation or wrapping around a pipe.

Planned Renovation Operations: A renovation operation, or a number of such operations, in which some RACM will be removed or stripped within a given period of time and that can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

Pleura: The thin membrane surround the lungs, and which lines the internal surface of the chest cavity.

Polarized Light Microscopy (PLM): An optical microscopic technique used to distinguish between different types of asbestos fibers by their shape and unique optical properties.

Polyethylene: Plastic sheeting which is often used to seal off an area in which asbestos removal is taking place for the purpose of preventing contamination of other areas.

Posting: Refers to caution or warning signs which should be posted in any area in which asbestos removal is taking place, or where airborne fiber levels may present a health hazard.

Potential Damage: Circumstances in which:

(1) Friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities.

(2) There are indications that there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage.

Potential Significant Damage: Circumstances in which:

(1) Friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities.

(2) There are indications that there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage.

(3) The material is subject to major or continuing disturbance, due to factors including, but not limited to accessibility or, under certain circumstances, vibration or air erosion.

Pre-Construction Conference: A meeting held before any work begins between the contractor and the building owner at which time the job specifications are discussed and all details of the work agreed upon.

Pre-Employment Physical: Complete medical examination of an employee before the job begins to determine whether or not he/she is fit to perform the functions of their employment.

Preventive Measures: Actions taken to reduce disturbance of ACBM or other wise eliminate the reasonable likelihood of the material's becoming damaged or significantly damaged.

Progress Payments: A pre-work agreement whereby the building owner pays the contractor after completion of certain phases of the project.

Protective Clothing: Protective, lightweight garments worn by workers performing asbestos abatement to keep gross contamination off the body.

Pulmonary: Pertaining to, or affecting the lungs, or some portion thereof.

Pulmonary Function Tests: A part of the medical examination required to determine the health status of a person's lungs.

Qualified Person: The individual required for the purpose of registration in accordance with Labor Code Section 6501.5 of asbestos-related work involving 100 square feet or more, as defined in subsection 341.6(a). of asbestos-containing materials. The qualified person is the individual identified by the employer to the Division pursuant to subsection 341.9(a)(5), who is responsible for conducting air sampling required by this section, calibration of air sampling equipment, evaluation of sampling results and respiratory fit testing, as well as the evaluation of those tests. The qualified person performs or is responsible for the tasks outlined in subsection 1529(o)(5)(B). A qualified person need not be a certified asbestos consultant or certified site surveillance technician to perform the above described activities, provided that the qualified person is an employee of the registered contractor or registered employer performing the asbestos-related work.

Qualitative Fit Test: A method of testing a respirator's face-to-facepiece seal by covering the inhalation or exhalation valves and either breathing in or out to determine the presence of any leaks.

Random Sample: A sample drawn in such a way that there is no set pattern and is designed to give a true representation of the entire population or area.

Record Keeping: Detailed documentation of all program activities, decisions, analyses, and any other pertinent information to a project.

Regulated Area: An area demarcated by the employer in order to establish where airborne concentrations of asbestos exceed, or can reasonably be expected to exceed, the PEL and /or excursion limit. The regulated area may take the form of (1) a temporary enclosure, as required by subsection (e)(2) of this section, or (2) an area demarcated in any manner that minimizes the number of employees exposed to asbestos.

Regulated Asbestos-Containing Material (RACM): Means (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 regulated by this subpart.

Reintrainment: The disturbance of fibers already separated from the main body so that they re-suspend into the atmosphere after having initially settled.

Removal: The taking out or stripping asbestos or materials containing asbestos.

Remove: To take out RACM or facility components that contain or are covered with RACM from any facility.

Renovation: The modifying of any existing structure, or portion thereof, where exposure to airborne asbestos may result.

Repair: The overhauling, rebuilding, reconstructing, or reconditioning of structures, or parts thereof, where asbestos is present.

Resilient Floor Covering: Asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in appendix A, subpart F, 40 CFR part 763, Section 1, Polarized Light Microscopy.

Resolution: The ability to distinguish between individual objects, as with a microscope.

Resolve: to distinguish different objects with a microscopy.

Respirable: Breathable.

Respiratory Program: A written program established by an employer which provides for the safe use of respirators on their job sites.

Response Action: A method, including removal, encapsulation, enclosure, repair, operations and maintenance, that protects human health and the environment from friable ACBM.

Resuspension: The secondary dispensal or re-entrainment of settled fibers which have previously been released by impact or fallout.

Rip-Out: The actual removal of asbestos-containing materials from a building.

Risk: The likelihood or probability of developing a disease, or being hurt, as the result of exposure to a contaminant or a condition.

Roadways: Surfaces on which vehicles travel. This term includes public and private highways, roads, streets, parking areas, and driveways.

Routine Maintenance Area: An area, such as a boiler room or mechanical room, that is not normally frequented by students and in which maintenance employees or contract workers regularly conduct maintenance activities.

School: Any elementary or secondary school as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854).

School Building: Means:

(1) Any structure suitable for use as a classroom, including a school facility such as a laboratory, library, school eating facility, or facility used for the preparation of food.

(2) Any gymnasium or other facility which is specially designed for athletic or recreational activities for an academic course in physical education.

(3) Any other facility used for the instruction or housing of students or for the administration of educational or research programs.

(4) Any maintenance, storage, or utility facility, including any hallway, essential to the operation of any facility described in this definition of "school building" under paragraphs (1), (2), or (3).

(5) Any portico or covered exterior hallway or walkway.

(6) Any exterior portion of a mechanical system used to condition interior space.

Serpentine: One of the two major groups of minerals from which the asbestiform minerals are derived, distinguished by their tubular structure and chemical composition.

Shower Room: A room between the clean room and the equipment room in a worker decontamination system in which workers take showers when leaving the work area.

Significantly Damaged Friable Miscellaneous ACM: Damaged friable miscellaneous ACM where the damage is extensive and severe.

Significantly Damaged Friable Surfacing ACM: Damaged friable surfacing ACM in a functional space where the damage is extensive and severe.

Site Surveillance Technician: Any person who acts as an independent on-site representative of an asbestos consultant. The site surveillance technician monitors the asbestos abatement activities of others, provides asbestos air monitoring services for area and personal samples, and performs building surveys and contract administration at the direction of an asbestos consultant.

Small-Scale, Short-Duration Activities: For the purposes of this section, small-scale, short-duration activities are operations for which a negative pressure enclosure is infeasible, impractical, or unsafe due to the small size of the task. Examples of these are tasks such as, but not limited to: removal of asbestos-containing insulation from short sections of pipes; removal of small quantities of asbestos-containing insulation on beams

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or above ceilings; replacement of an asbestos-containing gasket on a valve; installation or removal of small sections of drywall; roofing; other general building maintenance; and installation of electrical conduits through or proximate to asbestos-containing materials.

Spirometer: An instrument which measures the volume of air being expired from the lungs.

Structural Member: Any load-supporting member such as beams and load supporting walls of a facility.

State: A State, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Northern Marianas, the Trust Territory of the Pacific Islands, and the Virgin Islands.

State-of-the-Art: State-of-the-art asbestos abatement and control work procedures are those procedures currently in use which have been demonstrated to be the most effective, reliable, and protective of workers' health. As new procedures are developed which demonstrate greater effectiveness, reliability, and worker protection and thereby come into use, they become the state-of-the-art.

Strip: To take off RACM from any part of a facility or facility components.

Structural Member: Any load supporting member of a facility, such as beams and load supporting wall; or any nonload-supporting member, such as ceilings and nonload-supporting walls.

Substrate: The materials or existing surface located under or behind the asbestos-containing material.

Surfacing ACM: Surfacing material that is ACM.

Surfacing Material: Material in a school building that is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

Surfactant: a chemical wetting agent added to water to improve its penetration abilities into asbestos-containing materials.

Thermal System Insulation: Material in a school building applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes.

Thermal System Insulation ACM: Means thermal system insulation that is ACM.

TLV: Levels of contaminants established by the American Conference of Governmental Industrial Hygienists to which it is believed that workers can be exposed to with minimal adverse health effects.

Transmission Electron Microscopy (TEM): A method of microscopic analysis which utilizes an electron beam that is focused onto a thin sample. As the beam penetrates (transmits) through the sample, the difference in densities produces an image on a fluorescent screen from which samples can be identified and counted.

Tumor: A swelling or growth of cells and tissues in the body which does not serve a useful purpose.

TWA: Time Weighted Average, as in air sampling.

USEPA: United States Environmental Protection Agency

Vermiculite: A micaceous mineral that is sometimes used as a substitute for asbestos which is lightweight and highly water-absorbent.

Vibration: The periodic motion of friable ACBM which may result in the release of asbestos fibers.

Visible Emissions: Any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing waste material, or from any asbestos milling, manufacturing, or fabricating operation. This does not include condensed, uncombined water vapor.

Visual Inspection: A walk-through type of inspection of the work area to detect incomplete work, damage, or inadequate clean up of a worksite.

Washroom: A room between the work area and the clean room in the equipment decontamination enclosure system where workers shower.

Waste Generator: Any owner or operator of a source covered by this subpart whose act or process produces asbestos-containing waste material.

Waste Shipment Record: The shipping document, required to be originated and signed by the waste generator, used to track and substantiated the disposition of asbestos-containing waste material.

Water Damage: Deterioration or delamination of ceiling or wall materials due to leaks from plumbing or cracks in the roof.

Wet Cleaning: The process of eliminating asbestos contamination from surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

Wetting Agents: Materials that are added to water which is used for wetting the asbestos-containing material in order for the water to penetrate more effectively.

Worker's Compensation: A system of insurance required in some states by law, financed by employers, which provides payments to employees or their families for occupational injuries, illnesses, or fatalities resulting in loss of wage or income incurred while at work.

Working Day: Monday through Friday and includes holidays that fall on any of the days Monday through Friday.

AIR SAMPLING DATA SHEET

APPENDIX C

BAKER CONSULTANTS SURVEY REPORT, MAY 1985

APPENDIX D

BAKER CONSULTANTS FOLLOW-UP INSPECTION REPORT

AUGUST, 1985

APPENDIX E

DYNAMAC SURVEY REPORT

NOVEMBER, 1987

APPENDIX F

DYNAMAC ABATEMENT FEASIBILITY STUDY

MAY, 1988

APPENDIX G

RISK MANAGEMENT AND COST ANALYSIS ALGORITHMS

APPENDIX G

RISK ASSESSMENT AND COST ANALYSIS ALGORITHMS

Risk Assessment

A. Background

The CST's Request For Proposal suggested the use of an algorithm developed by the EPA and outlined in their guidance document "Asbestos Containing Materials in School Buildings" 1979. In a later publication, EPA document "Airborne Asbestos Levels in Schools" EPA 560/83-003 June 1983 the EPA discussed the practical use of this algorithm and determined that it did not correlate well with airborne asbestos fibers.

The following are conclusions from EPA document "Airborne Asbestos Levels in Schools" EPA 560/83-003 June 1983.

"1. The existing algorithm is not a valid predictor of airborne asbestos levels, when the algorithm score for the sites surveyed in the report were compared with airborne asbestos levels, the correlation factor was found to be -0.17 (p=0.25).

2. The amount of asbestos in the bulk samples is not a valid predictor of exposure to airborne asbestos levels.

3. The releasability rating system developed in this study is related to the level of airborne asbestos in the school districts examined, when the releasability rating of the sites were compared to airborne asbestos levels, the correlation coefficient was 9.44 (p= 01) "

(p .01).

Based upon these findings, the EPA algorithm was not considered valid for the purposes of this survey. An improved algorithm was developed based upon the original algorithm with the two (2) additional parameters of "releasability" and "type of asbestos".

Two (2) other factors were originally considered for inclusion in the algorithm. These were "airborne fiber concentration" and "asbestos fiber in settled dust". It was later decided not to include them in the algorithm and that if positive results were found in either or these two categories, the possible asbestos hazards would be determined manually and not by computer.

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The improved algorithm (Revised Audit Score) is based upon the factor listed below.

F1 Physical Damage

F2 Water Damage

F3 Part of the Air Moving System

F4 Exposure

F5 Accessibility

F6 Activity

F7 Occupancy

F8 Integrity

F9 Type of Asbestos

F10 Percentage of Asbestos

F11 Releasability

B. Concept of the Algorithm

The Revised Audit Score (RAS) is used to set priorities for remedial action in areas where friable asbestos is found. The RAS is computed from assessment factors that are determined in the field and in the laboratory. The field assessment of the integrity of the material is weighted equally with the laboratory assessment of the reasonability of fibers from the material. The combined factor is multiplicative so that if the field assessment is that the material has good integrity and the laboratory assessment is that it is unlikely for fibers to be released, the RAS goes to zero and no remedial action would be recommended.

If the material does not contain asbestos and no asbestos is found in air monitoring or settled dust, the RAS goes to zero and no remedial action would be recommended.

If the material is swept by the flow of air in an air moving system (e.g. lining the interior of a return air plenum) the assessment factor is weighted heavily (5x) because of the high potential for spreading the problem.

If the material is deteriorated, shows signs of physical or water damage, is badly weathered, or has been abused, it is in a condition that has been shown to correlate with airborne asbestos fibers. Taking advantage of this predictive value, physical condition and water damage assessment factors are double weighted in the RAS.

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The other assessment factors: exposure, access, activity, and occupancy may have some value even though their correlation factors with predicting airborne asbestos are low. These assessment factors are used in the RAS with single weighting as additive factors to physical damage, water damage and air moving system.

Four different iterations of the algorithm were made before one was selected that showed good correlation to the field team's observations and comments. The final algorithm or Revised Audit Score (RAS) was:

$$\text{RAS} = 0.2 \times (2F1 + 2F2 + 5F3 + F4 + F5 + F6 + F7) \times (F9 + F10) \times (1/3F11 + F8)$$

C. Detailed Description of Algorithm Assessment

There are several different assessment factors used for the determination of risk prioritization. They are listed below together with a detailed description of each factor.

F1. Physical Condition

An assessment of the condition should evaluate the quality of installation, adhesion of the friable material to the underlying substrate, deterioration, and damage from vandalism or any other cause. Evidence of debris on horizontal surface hanging material, dislodged chunks, scrapings, indentations, or cracking is indicative of poor material condition.

Accidental or deliberate physical contact with the friable material can result in damage. The inspection team looked for any evidence that the asbestos-containing material had been disturbed: e.g., finger marks in the material, graffiti, pieces dislodged or missing, scrape marks from movable equipment of furniture, or accumulation material or the strength of the adhesion to the substrate. Deterioration can result in the accumulation of dust from the surface of the asbestos-containing material, delamination of the material (i.e., the separation of layers), or an adhesive failure of the material where it pulls away from the substrate and either hangs loosely or falls to the floor and exposes the substrate. The inspectors touch the asbestos-containing material to determine whether dust was released when the material was light brushed or rubbed.

If the coat surface gives when slight hand pressure is applied or if the material moves up and down with light pushing, the asbestos-containing material is no longer tightly bonded to its substrate.

<u>Condition</u>	<u>Score</u>
No Damage	0
Minor Damage	2

Moderate Damage	3
Severe Damage	5

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F2. Water Damage

Water damage is usually caused by roof leaks, particularly in buildings with flat roofs or concrete slab and steel beam construction. Skylights also can be significant sources of leaks. Water damage also can result from plumbing leaks, condensate from air conditioning, and water or high humidity in the vicinity of pools, locker rooms, showers and lavatories, or exposure to weather.

Water can dislodge, delaminate, or disturb friable asbestos-containing materials that can otherwise be in good condition and can increase the potential for fiber release by dissolving and washing out binders in the material. Materials which were not considered friable may become friable after water has dissolved and leached out the binders. Water also can form a slurry to carry fibers to other areas where evaporation will leave a collection of fibers that can become suspended in the air.

Each area was inspected for visible signs of water damage, such as discoloration or stains on the asbestos-containing material, stains on adjacent walls or floor, buckling of the walls or floors, or areas where pieces of the asbestos-containing material have separated into layers or fallen down, thereby exposing the substrate.

In many areas, staining may occur only in a limited area, but water damage causing delamination may have occurred in a much larger area.

Delamination is particularly a problem in areas where the substrate is very smooth, such as a concrete slab. A check was made to see if the material gave when pressure was applied to it.

<u>Water Damage</u>	<u>Score</u>
None	0
Minor	1
Severe	2

F3. Part of Air Moving System

F3. Part of Air Moving System

Moving air may erode some soft asbestos-containing materials. Often return air plenums have asbestos-containing materials. An air plenum is often created by a suspended ceiling for air to return to the air handler at low speed and low pressure. Heating, ventilation and air conditioning (HVAC) systems may use ducts that are insulated on the inside. In all mechanically ventilated buildings, the inspector checked both supply ducts and return ducts and plenums for the presence of friable material.

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At suspended ceilings, the ceiling tiles were lifted to inspect the plenum. Piping and ductwork in the plenum may have friable asbestos-containing material exposed to the return air stream. The structural ceiling may have an asbestos-containing material which may be friable. If the space above the suspended ceiling is used for a return air plenum, then any friable asbestos-containing material found there would be part on an air moving system. Care was taken when lifting a suspended ceiling tile to avoid disturbing possible accumulated asbestos-containing dust.

Any asbestos-containing material on the inside of HVAC ducts and plenums is part of an air moving system.

Where air streams impinge directly on asbestos-containing material, such as an air supply diffuser or heating vent directed at a wall or ceiling covered with a friable asbestos-containing material, there may be erosion of the asbestos-containing material and such material should be scored as part of an air moving system.

Special attention was paid to whether frequent activities (such as maintenance) disturb the material in the plenum. The inspectors checked for evidence of material being released or eroded.

PART OF AIR MOVING SYSTEM SCORE

Yes 1

No 0

F4. Exposure

An asbestos-containing materials was located behind a suspended ceiling with movable ceiling tiles, a close investigation was made of the condition of the suspended ceiling, the likelihood and frequency of access into the area above the suspended ceiling, and whether the suspended ceiling formed a complete barrier or was only partially concealing the material. Asbestos-containing material above a suspended ceiling was considered exposed if the space above the suspended ceiling was an air plenum. Suspended ceiling with numerous louvers, grids, or other open spaces were considered exposed.

<u>Exposure</u>	<u>Score</u>
Enclosed	0

10 percent exposed	1
Greater than 10% exposed	3

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F5. Accessibility

If friable asbestos-containing material can be reached by the building users or maintenance people, either directly or by impact from objects used in the area, it is accessible and subject to accidental or intentional contact and damage. Material which is accessible is likely to be disturbed in the future.

Height above the floor is one measure of accessibility. However, objects have been observed embedded in ceiling twenty-five (25) feet or more high. Nearness of the friable asbestos-containing material to heating, ventilation, lighting and plumbing systems requiring maintenance or repair increase the material's accessibility.

In addition, the activities and behavior of persons using the building were included in the assessment of whether the material was accessible. For example, persons involved in athletic activities may accidentally damage the material on the walls and ceilings of gymnasiums with balls or athletic equipment. To become fully aware of the occupants' use of the building, the inspector consulted with the building staff or personnel as arranged by the Campus Asbestos Coordinator.

<u>Accessibility</u>	<u>Score</u>
Enclosed	0
Inaccessible (Beyond reach during Normal Activity)	1
Accessible	5

F6. Activity or Movement

When assessing activity levels, the inspectors considered not only the activities of people but also movement from other sources, such as high vibration from mechanical equipment, highway traffic and aircraft operations. Another sources of vibration is sound such as music and noise. The impact of sound waves may release fibers from asbestos-containing materials. Therefore, auditoriums and music practice rooms may have more fibers released than the rest of the buildings.

The amount of activity of the occupants can best be described by identifying the purpose of the area as well as estimating the number or persons who enter the area on a typical day.

<u>Activity</u>	<u>Score</u>
None or Low	0
Moderate	1
High	2

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F7. Occupancy

Space utilization or occupancy was another factor considered during the assessment process. The number of hours per day an area is occupied or in use is considered to have an impact upon potentially hazardous exposure levels to building occupants and need to be considered when determining the relative need for corrective action. Inspectors reviewed space utilization data and arranged through the Campus Asbestos Coordinator to interview building managers (and occupants if necessary) to determine the average number of hours per day that an area is occupied.

<u>Occupancy</u>	<u>Score</u>
Area occupied less than 1 hour per day	0
Area occupied between 1 and 8 hours per day	2
Area occupied more than 8 hours per day	4

F8. Integrity

An assessment of the integrity of the building material to determine the potential for releasing airborne asbestos fibers should evaluate the bonding qualities of the material. Materials that are firmly bound with paint, a jacket cover, or other type of sealant pose no existing hazard, but high activity areas may create situations in which the material could be damaged by hand (i.e., ceiling tile). Friable materials that can be crushed by hand or have deteriorated to a point where pieces of the materials can be dislodged without direct contact present a high potential for fiber release.

<u>Integrity</u>	<u>Score</u>
Firmly bound	0
Fair: Difficult but possible to damage by hand.	1
Soft, easily crumbled: Fairly easy to dislodge d h	2

and crush.

Poor, lacks integrity: Fluffy, Spongy, flaking,
pieces hanging 3

F9. Type of Asbestos

Various types of asbestos have been shown to have different potency in causing human disease. Laboratory results entered in Block D, item 3, are used to determine the assessment score.

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<u>Type of Asbestos</u>	<u>Score</u>
Tremolite, Actinolite, Antholphyllite	1
Chrysotile	1
Amosite	2
Crocidolite	5

F10. Percentage of Asbestos

To determine the presence of asbestos in suspected building materials, each bulk sample taken was analyzed by Certified Testing Laboratory (CTL). Laboratory results entered in the data base were used to determine the assessment score.

<u>Percentage of Asbestos</u>	<u>Score</u>
Less than 1 percent (TR or NC)	0
Between 1 and 5 percent	1
Between 5 and 50 percent	2
Greater than 50 percent	3

F11. Releasability

The factor of releasability was shown to correlate well with airborne levels of asbestos as mentioned in the EPA document "Airborne Asbestos Levels in Schools" EPA 560/83-003 June 1983. See quote in Appendix F. The Factors that determine releasability were determined by laboratory analysis of the bulk sample. Releasability was then determined by the micropist and reported on the Laboratory Analysis Date Form. The laboratory results entered in the data base were used to determine the releasability assessment score.

<u>Releasability</u>	<u>Score</u>
No asbestos present	0
Low	1 - 3
Moderate	4 - 6
High, fibers easily released	7 - 9

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Cost Analysis Algorithm

An algorithm was developed to provide a standardized means of estimating the cost of the removal of asbestos-containing materials and the replacement with non-asbestos-containing materials taking into account the following variables:

A. Location and type of material - Usually one of three possible parameters:

1. Fireproofing applications
2. Acoustic applications
3. Pipe and utility insulation

B. Amount of Material - Field measured quantities of asbestos containing materials.

C. Abatement difficulty - A qualitative judgment of asbestos removal difficulty, based upon experience.

These were combined with unit price and the information entered into the computer program so that each homogeneous area of asbestos containing material would be priced.

APPENDIX H

DYNAMAC REPORT

ASBESTOS HAZARD RATING SYSTEM

APPENDIX H

DYNAMAC REPORT - ASBESTOS HAZARD RATING SYSTEM

The hazard rating system is a tool used to prioritize recommended response actions in areas where friable ACM has been located. The Dynamac rating system has been developed specifically for ranking ACM response action recommendations in accordance with AHERA guidelines. The system has been tested for validity on a number of school inspections and found to rank ACM hazard potential reasonably well and in line with expert judgment.

The rating system is based on eight factors that are determined from the asbestos surveys and laboratory analysis of bulk samples. The description of the eight factors and the criteria for assigning numerical values to each is given in the paragraphs that follow. Once the eight factors have been evaluated, the overall hazard rating is given by:

$$\text{Hazard Rating} = (\text{HR1} + \text{HR2} + \text{HR3} + \text{HR4} + \text{HR5} + \text{HR6} + \text{HR7}) \times \text{HR8}$$

It is to be noted that the hazard rating system is not designed to unequivocally rank all areas according to potential risk. Rather, it is a rough decision making tool that can be used as a guide for allocating financial resources for asbestos abatement actions. Other factors, such as public perceptions, preexisting renovation schedules, and changes in building functions, are not included in the rating system and must be taken into account in scheduling abatement.

HR 1 - Friability

The friability of an ACM refers to its ability to be crumbled and/or reduced to a powder by hand pressure. A highly friable material will be more likely to release fibers than material with low friability.

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
High	H	30
Moderate	M	20
Low	L	10
None	N	5

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HR 2 - Exposure Potential

The exposure potential refers to the accessibility of the homogeneous sampling area in which the ACM is located. Also taken into account is whether the area is occupied on a routine basis and whether the area is likely to distribute fibers to other occupied areas.

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>	<u>Description</u>
Accessible - Occupied	AO	20	The area is both accessible and routinely occupied (Ex: classroom)
Accessible - Unoccupied	AU	10	The area is accessible but is not routinely used (Ex: mechanical room)
Inaccessible - Likely	IL	25	The area is inaccessible but is likely to distribute fibers to occupied areas (Ex: sub ceiling used as ventilation system)
Inaccessible - Unlikely	IU	0	The area is inaccessible and is not likely to distribute fibers to an occupied area (Ex: enclosed wall)

HR 3 - Condition

The condition describes the types of damage associated with the ACBM or, if there is no damage, the potential for material becoming damaged. This factor is further divided based on the type of material (e.g., surfacing, thermal, or miscellaneous).

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
Significantly damaged friable surfacing ACBM	01	24
Damaged friable surfacing ACBM	02	20
Damaged or significantly damaged thermal system insulation ACM	03	16
Damaged or significantly damaged friable miscellaneous ACM	04	12
ACBM with potential for significant damage	05	8
ACBM with potential for damage	06	4
Any remaining friable ACBM or friable suspected ACBM	07	4

HR 4 - Amount of Material (Square or Linear Feet)

The amount of material refers to quantity of ACBM contained in the abatement area. The value is expressed in square feet for surfacing material and in linear feet for pipe insulation material.

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
10,000	01	15
1,000 - 9,999	02	12
100 - 999	03	9
10 - 99	04	6
9	05	3
Entire Building	EB	10
Gymnasium	BY	10
Hallway	HA	8
Kitchen	KI	10
Laboratory	LA	8
Lobby	LB	8
Library	LI	8
Lounge	LO	8
Locker Room	LR	8
Mechanical Room	MR	4
Office	OF	6
Outside	OS	2
Roof	RF	2
Restroom	RR	8
Storage Area	SA	4
Sub Ceiling	SC	2
Shop	SH	8
Shower Room	SR	8
Tunnel	TU	2

HR 5 - Percent of Asbestos

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
50	01	20
10 - 49	02	16
1 - 9	03	12

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HR 6 - Number of People

The number of people refers to the total number of teachers, students, and maintenance people utilizing, on a daily basis, the building in which the ACM is located.

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
1,000	01	15
500 - 999	02	12
100 - 499	03	9
1 - 99	04	6
0	05	0

HR 7 - Area

The area is a general description of the location of the homogeneous sampling area.

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
Air Distribution System	AI	20
Attic	AT	2
Auditorium	AU	8
Boiler Room	BR	4
Cafeteria	CA	8
Chase	CH	2
Classroom	CR	1

Crawlspace	CS	2
Dormitory	DO	10
Electrical	ER	4

HR 8 - Does Material Contain Greater Than 1% Asbestos?

<u>Category</u>	<u>Computer Code</u>	<u>Point Value</u>
Yes	Y	1
No	N	0

APPENDIX I

CHAPTER 10.4, DIVISION 20,

CALIFORNIA HEALTH AND SAFETY CODE

APPENDIX J

TITLE 8, CALIFORNIA CODE OF REGULATIONS

Sections 1529 and 5208

INITIAL AND PERIODIC MEDICAL QUESTIONNAIRES

APPENDIX K

TITLE 8, CALIFORNIA CODE OF REGULATIONS

Section 1529 and 5208

MEDICAL SURVEILLANCE

APPENDIX L

CAL-OSHA SPECIFIC COURSE REQUIREMENTS

APPENDIX L

APPENDIX L

CAL-OSHA SPECIFIC TRAINING REQUIREMENTS

A. Employees Participating in Asbestos-Related Work -- Title 8, Chapter 4

- "1. The physical characteristics of asbestos including type, fiber size, aerodynamic characteristics, and physical appearance.
2. Examples of different types of asbestos and asbestos-containing products and materials which employees may encounter in their specific work assignments. Asbestos and asbestos-containing products and materials shall be used only for observation by trainees and shall be enclosed in sealed unbreakable containers
3. The health hazards of asbestos including the nature of asbestos-related disease, routes of asbestos to asbestos, dose-response relationships, the latency period of asbestos-related diseases, hazards of contamination of personal contacts outside of work, and the health basis for asbestos standards.
4. The increased risk of lung cancer associated with smoking cigarettes and asbestos exposure; and
5. The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of the operations which could result in exposure to asbestos, and specific information to aid the employee in recognizing when and where asbestos exposure may result;"

These requirements apply to all employees who have the potential to disturb asbestos. This will typically include most of the Facility Services staff.

B. Employees exposed or maybe reasonably expected to be exposed to asbestos at or above the action level, Title 8 - Section 4

- "1. Air monitoring requirements of this section, a description of equipment, sampling methods and strategies used by the employer, reasons for air monitoring, types of samples including, where applicable, area, personal, and clearance samples, current standards on airborne concentrations of asbestos, employee observation and notification, record keeping, employee access to exposure monitoring records, interpretation of air monitoring results, and analytical methods for bulk and air samples.
2. Medical monitoring requirements of these orders, benefits of medical monitoring, and employee access to medical monitoring records:

Appendix L

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3. Discussion of the respirators provided by the employer including, where applicable, the classes and characteristics of respirators, limitations of respirators, proper selection, donning, use, maintenance and storage procedures, methods for field checking of the face piece-to-face seal (positive and negative pressure checks), qualitative and quantitative fit testing procedures, variability between protection factors obtained in the laboratory and under actual factors obtained in the laboratory and under actual conditions of use, factors that alter respirator fit (e.g., eye glasses and facial hair), requirements for oil lubricated reciprocating piston compressors for breathing air, the components of the respiratory

Protection program required by Section 1531 of these orders and the role of the respirator program administrator;

4. Selection, use, storage, handling, and limitations of protective clothing, footwear, and gloves, eye protection, hard hats and any other personal protective equipment, provided by the employer;
5. Measures implemented to control employee exposure to asbestos including appropriate engineering control, work practices, personal protective equipment, housekeeping procedures, hygiene facilities, decontamination procedures, emergency procedures, waste disposal procedures, and any necessary instruction on the use of these controls and procedures;
6. Personal hygiene practices including entry and exit procedures for areas where airborne concentrations of asbestos exceed the permissible exposure limit, use of showers, and prohibitions on eating, drinking, smoking and chewing (gum or tobacco) in the work area;
7. A review of the provisions of this section and its appendices and other sections of the General Industry and Construction Safety Orders applicable to asbestos-related work; and
8. Recognition of removal, demolition, and renovation operations which would require construction of a negative pressure enclosure or which may result in exposures above the action level."

This applies to all employees who will have to handle asbestos containing material.

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C. Employees engaged in asbestos related work involving over one hundred (100) square or linear feet of asbestos containing material

- "1. The physical characteristics of asbestos including types, fiber size, aerodynamic characteristics, and physical appearance.
2. Examples of different types of asbestos and asbestos-containing products and materials which employees may encounter in their specific work assignments. Asbestos and asbestos-containing products and materials shall be used only for observation by trainees and shall be enclosed in sealed unbreakable containers
3. The health hazards of asbestos including the nature of asbestos-related disease, routes of asbestos to asbestos, dose-response relationships, the latency period of asbestos-related diseases, hazards of contamination of personal contacts outside of work, and the health basis for asbestos standards.
4. The increased risk of lung cancer associated with smoking cigarettes and asbestos exposure; and
5. The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of the operations which could result in exposure to asbestos, and specific information to aid the employee in recognizing when and where asbestos exposure may result;"
- "6. Air monitoring requirements of this section, a description of equipment, sampling methods and strategies used by the employer, reasons for air monitoring, types of samples including where applicable area personal and clearance samples current

samples including, where applicable, area, personal, and clearance samples, current standards on airborne concentrations of asbestos, employee observation and notification, record keeping, employee access to exposure monitoring records, interpretation of air monitoring results, and analytical methods for bulk and air samples.

7. Medical monitoring requirements of these orders, benefits of medical monitoring, and employee access to medical monitoring records:

Appendix L

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8. Discussion of the respirators provided by the employer including, where applicable, the classes and characteristics of respirators, limitations of respirators, proper selection, donning, use, maintenance and storage procedures, methods for field checking of the face piece-to-face seal positive and negative pressure checks), qualitative and quantitative fit testing procedures, variability between protection factors obtained in the laboratory and under actual factors obtained in the laboratory and under actual conditions of use, factors that alter respirator fit (e.g., eye glasses and facial hair), requirements for oil lubricated reciprocating piston compressors for breathing air, the components of the respiratory protection program required by Section 1531 of these orders and the role of the respirator program administrator;

9. Selection, use, storage, handling, and limitations of protective clothing, footwear, and gloves, eye protection, hard hats and any other personal protective equipment, provided by the employer;

10. Measures implemented to control employee exposure to asbestos including appropriate engineering control, work practices, personal protective equipment, housekeeping procedures, hygiene facilities, decontamination procedures, emergency procedures, waste disposal procedures, and any necessary instruction on the use of these controls and procedures;

12. Personal hygiene practices including entry and exit procedures for areas where airborne concentrations of asbestos exceed the permissible exposure limit, use of showers, and prohibitions on eating, drinking, smoking and chewing (gum or tobacco) in the work area;

13. A review of the provisions of this section and its appendices and other sections of the General Industry and Construction Safety Orders applicable to asbestos-related work; and

14. Recognition of removal, demolition, and renovation operations which would require construction of a negative pressure enclosure or which may result in exposures above the action level."

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"15. Where applicable to the employee's work assignment, review of state of the artwork practices for asbestos removal and encapsulation activities including the purposes for, and the construction and maintenance of, barriers and enclosures systems, posting of

warning signs, electrical and ventilation system lock-out procedures, use of tools with vacuum attachments for minimizing fiber release, use of wet methods and surfactants, contamination prevention, and scoring and breaking techniques for rigid asbestos products.

16. Other safety and health hazards that may be encountered by the employee while engaged in asbestos-related work including electrical hazards, scaffold and ladder hazards, slips, trips, and falls, confined spaces, noise and heat stress.

17. Where applicable to the employee's work assignment, hands-on training to include:

- a. Donning of protective clothing consisting of coveralls, foot coverings, and head coverings.
- b. Basic construction of a decontamination unit, and performance of proper entry and exit procedures;
- c. Removal and repair of sprayed-on material, troweled-on material and pipe lagging; and
- d. Use of glove bags."

This will apply to a select group of employees on campus who will be involved in asbestos abatement.

APPENDIX M

OUTLINE OF TRAINING COURSES FOR:

- BUILDING MAINTENANCE WORKER**
- COMPETENT PERSON**
- MANAGEMENT WORKER**

APPENDIX M

OUTLINE OF TRAINING COURSES

<u>COURSE</u>	<u>SUBJECTS COVERED</u>
Building Maintenance Person	Physical Characteristics of Asbestos
	Potential Health Effects Related to Asbestos Exposure
	Employee Personal Protective Equipment
	State of the Art Work Practices
	Additional Safety Hazards
	Medical Monitoring
	Air Monitoring

Contractors/Supervisors and Competent Persons	<p>Relevant Federal, State, and Local Regulatory Requirements</p> <p>Physical Characteristics of Asbestos</p> <p>Potential Health Effects Related to Asbestos Exposure</p> <p>Employee Personal Protective Equipment</p> <p>Medical Monitoring</p> <p>(Personal Hygiene) Entry and Exit Procedures for the Work Area</p> <p>Additional Safety Hazards</p> <p>State of the Art Work Practices</p>
Management Planner	<p>Air Monitoring</p> <p>Relevant Federal, State, and Local Regulatory Requirements</p> <p>Respiratory and Medical Surveillance Programs</p> <p>Insurance and Liability Issues and Contract Specifications</p> <p>Record Keeping</p> <p>Supervisory Techniques for Asbestos Abatement Workers</p> <p>Qualification and Roles of the Management Planner</p> <p>Evaluation and Interpretation of Survey Results</p> <p>Hazard Assessment and Response Action Evaluation</p> <p>Legal Responsibilities of the Management Planner</p> <p>The Role of Other Professionals in the Management Planning Process</p> <p>Regulatory Review</p> <p>Record Keeping for the Management Planner</p> <p>Assembling and Submitting a Management Planner</p> <p>Cost Estimation and Financing Abatement Projects</p> <p>Course Review and Final Examination</p>

APPENDIX N
RESPIRATORY PROTECTION MANUAL

APPENDIX O
LIST OF TRAINING RESOURCES

APPENDIX O
LIST OF TRAINING RESOURCES

Pacific Asbestos Information Center

University of California, Berkeley

University Extension

Berkeley, CA 94720

(415)642-4111

University of Southern California

Attention: Asbestos Training

University Park

Los Angeles, CA 90089

(213)743-2311

Center for Accelerated Learning

400 Buck Ave, Suite G

Vacaville, CA 95688

(707)446-7996

Hall-Kimbrell Environmental Services

Training and Education Division

4840 West 15th Street

Post Office Box 307

Lawrence, KS 66044-0307

(800)346-2860

(913)749-2381

Hall-Kimbrell Environmental Services

646 South Brea Canyon Road

Walnut, CA 91789

(714)594-3232

APPENDIX P

TITLE 8, CALIFORNIA CODE OF REGULATIONS

Sections 5208 and 1529

RECORD KEEPING REQUIREMENTS

APPENDIX Q

CHANCELLOR'S OFFICE CONTRACTOR EVALUATION

AND PRE-QUALIFICATION

APPENDIX Q

CONTRACTOR EVALUATION AND PRE-QUALIFICATION FORMS

Contractors Statement of Experience and Contractor Evaluation

These forms may be used for contractors to provide qualification information. Information (e.g. active license, references, etc.) should be verified by contacting the Department of Consumer Affairs to verify license and principles of prior projects.

Verification of Financial Responsibility

Contractors may be asked to submit detailed Financial Statements to verify that the company is financially sound. Sample statements are attached.

An alternative method to determine that a contractor has sufficient financial resources to perform asbestos abatement work is to require the contractor to provide a statement from a Certified Public Accountant (CPA). The statement should indicate the CPA has evaluated the financial statements of the contractor and finds the contractor financially stable and has the resources required to perform the asbestos abatement work.

This alternative provides the campus with an easy means to evaluate financial responsibility of the contractor without the need to evaluate financial statements. It places the responsibility of financial evaluation upon a CPA. Most legitimate contractors utilize Certified Public Accountants to provide accounting and tax services making this

requirement relatively easy to obtain.

Identify Contractor Business Entity to Establish Responsibility

It is important to identify the individuals who are responsible for ownership of the contracting business doing asbestos abatement work. The use of fictitious business names can make it difficult to determine the persons responsible for operating business. The Affidavit of an Individual form can be used to determine the person(s) responsible for operating a contracting business whether it be an individual proprietor, partnership, or corporation. The information provided on this form is essential if litigation is needed.

Supplemental Contractor Qualification Statement

This section may be used in its entirety or reduced. It may also be incorporated into the Contractor's Statement of experience to simplify qualification information provided by the contractor.

APPENDIX R

RESPIRATORY PROTECTION PROGRAM

APPENDIX S

CAL POLY ASBESTOS SAMPLE LOG BOOK

APPENDIX T

"ASBESTOS ON CAMPUS" ANNUAL NOTIFICATION BOOKLET

Questions or comments regarding this page should be e-mailed to **David Ragsdale**, Environmental Health & Safety Manager, Cal Poly Risk Management.