

**ASBESTOS AND OTHER HAZARDOUS MATERIALS
(IDENTIFICATION, HANDLING AND REMOVAL)**

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CHAPTER A-12

ASBESTOS IDENTIFICATION AND REMOVAL

12.1 GENERAL.

12.1.1 Scope. This chapter identifies the Architect-Engineer's (A-E's) responsibility for determining the existence of asbestos and other regulated hazardous building materials (HBMs) including mercury and polychlorinated biphenyl articles (PCBs), radioactive materials or biohazards, and implementing the safeguards for removal. (See Chapter A-13 for lead and lead based paint guidance.) In some cases asbestos and HBM surveys may be conducted by USACE or the installation. However all buildings in which renovation or demolition will be conducted must have both an asbestos survey and a HBM survey conducted.

12.1.2 Overview. In most cases, existing surveys whether for military construction, civil works or work for others are incomplete or obsolete. All asbestos surveys must include friable and non-friable materials whether inside the structure or on the exterior of the structure. Whenever asbestos containing material (ACM), or other HBMs are reported by the using military installation Director of Engineering and Housing (DEH), Base Civil Engineer (BCE) or is discovered by the A-E during a field visit, the A-E shall incorporate the provisions of this chapter into the design documents. Most 1391's will not address ACM or HBMs directly, but should include the cost of abatement and disposal in the total cost of demolition. Do not assume that because it is not specifically mentioned that it does not exist. Many states are requiring proof of ACM and HBM surveys before demolition permits are issued. Unless the owning agency can provide specific locations, types, quantities of asbestos, and certifications of the asbestos inspector and the analytical lab through recent (< 2 years old) survey reports the A-E shall be responsible for determining the actual existence and/or nonexistence of asbestos on all renovation, rehabilitation or demolition projects. All previous asbestos sampling and analysis must meet the state's current requirements and the requirements of this chapter. HBM surveys shall be made for each structure as these materials change frequently from incidental repairs and upgrades. Note that the only ACM that has been banned is friable asbestos. Non-friable asbestos is still being used in new building materials.

Acceptable verification of ACM and HBM includes the assumption of the hazardous compound's present by visual inspection by the A-E for fluorescent light tubes (mercury), light ballast, switches, manometer switches (mercury), smoke and fire detection and computerized alarm systems, roofing materials, and any switches and controls with a history of containing hazardous compounds. Negative ACM presence will require representative sampling of materials. HBM's may also include biological materials. Bats, pigeons, feral cats, rodents and other vermin may inhabit buildings. Insects such as wasps and bees may be present. Their presence, including nesting materials and guano are also considered hazardous materials that will need to be addressed for buildings going under renovation or demolition. The A-E shall include building history (construction and renovation dates) with survey report submittal. A-E firms that indicate an inability to determine the existence of asbestos (or other HBM's) shall inform the Savannah District in writing at the submittal of the initial fee proposal. However, in most cases subcontractors can perform this work for the A-E.

Asbestos (or other HBMs) survey may also be accomplished independently by the Savannah District for incorporation into the construction documents. Type and size of the project and the schedule of the USACE Asbestos Inspector will determine whether this can be accomplished. USACE will provide the survey reports for inclusion in the Request for Proposal or the Design

Package. Time allowing, USACE will prepare full size drawings. It will be the A-E's responsibility to ensure that borders for these full size drawings match the package they are preparing. Reports and drawing will be provided electronically.

12.1.3 Hazardous Materials. Exposure to airborne asbestos has been associated with multiple diseases including. Other regulated hazardous materials cause health problems. Heavy metals such as mercury, cadmium, chromium, and lead cause health problems that can lead to death. Many hazardous compounds are additives to existing products or systems, such as chromium to cooling systems and polychlorinated biphenol (PCBs), formaldehyde, arsenic and chloride compounds. Others are by products or deterioration products from materials stored or processes that occurred in the buildings. The Environmental Protection Agency and the Occupational Safety and Health Administration have adopted regulations requiring control procedures for exposure and disposal of materials containing these compounds. These regulations also provide guidance to ensure safe working conditions during demolition or renovation of buildings or structures.

Examples of materials which may contain or be covered by asbestos are as follows:

- a. piping
- b. ducts
- c. boilers
- d. turbines
- e. furnaces
- f. walls, ceilings, floor tiles, roofing, siding, glazing, caulking
- g. sprayed on acoustic and/or fireproofing materials
- h. textiles such as gasket rope, curtains, etc.
- i. soil
- j. vibration control mats
- k. elevator brakes and door insulation
- l. mastics

Examples of materials which may contain HBMs are as follows:

- a. light ballasts (PCBs)
- b. fluorescent lighting (mercury)
- c. high intensity direct (HID) lighting (mercury and heavy metals)
- d. water tower cooling waters (fungicides, heavy metals)
- e. hydraulic fluids, electrical coolant/lubricant oils (PCBs, heavy metals)
- f. batteries (lead & other heavy metals, acids)
- g. fire suppression dump systems (alkali compounds)
- h. computer boards (heavy metals)

Examples of materials which may be biological hazards in buildings are as follows:

- a. bats and bat guano (rabies and fungi)
- b. feral cats and cat droppings (toxoplasmosis, ticks)
- c. pigeons and other birds (guano with fungi and bacteria, ticks)
- d. rogue bee and wasp nests (Africanized bees, allergic reaction potential)
- e. raccoons (rabies)
- f. rodents (bacteria, fleas and ticks)
- g. damaged septic tanks or drain fields (bacteria, industrial wastes)

Military and former military sites may have been used for weapons storage or detonation. If the site has been used for these purposes, or is/was located along side of a rail line or spur, there is a potential for buried unexploded ordnance, chemical warfare test kits, radioactive materials, and the training aids associated with these items. The A-E shall contact the owning agency and determine if and when clearances have been made on the area. Documentation is usually done in the Environmental Assessment (EA), however, the EAs frequently state only that there is no record of anything ever being found and not the results of actual surveys or scans. It is important to identify the potential for these items early in the design process.

Unless there is a record of all ordnance and munitions stored, stating that no radioactive materials have been stored, storage igloos, pole barns, de-mil buildings, etc. shall be scanned radioactive compounds. Contact the USACE PM for assistance from the USACE HTRW Section as soon as possible if no documentation of inventories or scans can be located. Examples of materials or projects which may be radiological hazards in buildings, ranges or drop zones can include:

- a. Davy Crocket Systems
- b. nuclear motors
- c. spotting rounds
- d. Law Rockets
- e. tridium triggers
- e. depleted uranium (DU)
- f. 91B programs

Chemical Warfare Test Kits and Training Aids, grenades, triggers, fuses smoke bombs, and other miscellaneous materials are frequently buried along rail lines, at the edge of wooded areas, fence lines, marshes and other areas that were once considered marginal or remote in the 1950's through the 1970's. All RFPs and full designs that have a potential for encountering these materials shall include a clause that directs the Contractor to have work to perform in other areas of the site should these materials be encountered. Total stoppage of work should only occur if high explosives or large quantities of hazardous materials are present and require a wide safety set back. Contact the Installation Munitions experts and the USACE PM for assistance from the USACE HTRW Section as soon as suspect items are located. Work in this area may be delayed from 30 -120 days while materials are being removed.

12.2 REQUIREMENTS.

12.2.1A-E Designer Requirements. The A-E shall comply with the provisions of this chapter for design purposes where the conditions indicate asbestos (friable and non-friable) or other hazardous building materials are to be encountered:

12.2.2 A-E Asbestos Designer Requirements The asbestos designer or consultant, and inspectors/samplers shall have attended an initial designers/inspectors Model Accreditation Program (MAP) training course and have successfully passed the examination. Annual refresher training with a successfully completed examination shall also be required. The designer and inspectors shall also be certified and licensed in the state in which the work is to be performed (e.g. state of North Carolina per state requirements if the project is in North Carolina, South Carolina if in the state of South Carolina, etc.) Copies of all licenses/state certifications shall be submitted and all related documents are to be signed with license numbers included with the signatures. The A-E shall comply with the provisions of this chapter

for design purposes where the following conditions indicate asbestos (friable or non-friable) are likely to be encountered:

- a. If the site is found to be or suspected of being asbestos contaminated and is to be demolished or renovated,
- b. If the ACM will be drilled, scraped, sanded, cut through, or penetrated, (such as encountered in replacing HVAC systems on roofs) thereby releasing asbestos or
- c. If any ACM will be enclosed or encapsulated.

12.2.3 A-E Hazardous Building Materials Designer Requirements. The designer or consultant shall have demonstrated advanced knowledge in the handling and disposal of hazardous materials. This requirement may be documented by having a baccalaureate degree related to hazardous chemical compounds, such as Toxicology, Public Health, or Chemical Engineering; or who has taken and passed examinations for certification programs such as a Certified Industrial Hygienist (CIH), Certified Industrial Hygiene Technician (CIHT), Certified Hazardous Materials Manager (CHMM), Certified Safety Professional (CSP) Certified Health Physicist (CHP) or who has had and can document extensive related training by a reputable state or acceptable training agency. The designer shall also meet any certification and license required by the state in which the work is to be performed. Copies of all licenses, degrees, or certifications shall be submitted as per section 12.4b and all related documents are to be signed by the designer with license or certification numbers included with the signatures. The A-E shall comply with the provisions of this chapter for design purposes where the following conditions indicate hazardous materials are to be encountered:

12.2.3.1 If the site is found to be or suspected of containing articles contaminated with hazardous materials and is to be demolished or renovated (lights, light fixtures, electrical or manometer switches, excessive bird droppings or other biological wastes, radioactive source, etc.),

12.2.3.2. If the hazardous material is to be removed and disposed of has potential for it's containment to be accidentally breached during renovations or is a material that must be disinfected or cleaned prior to renovation or demolition, thereby releasing it or

12.2.3.3 If any onsite hazardous material will be enclosed or encapsulated in-place by the renovation.

12.2.4 A-E Responsibilities for Asbestos. Demolition of asbestos material without Environmental Protective Agency (EPA) notification, or designated state agency note, and improper work practices can result in a \$10,000 per day fine being levied on both the building owner and Contractor. The Unified Facility Guide Specification 02 82 14.00 10 is written so that the construction contractor will be required to provide the written notifications and report to the EPA. In some states this function has been taken over by an approved state agency and notification will follow the requirements of the states to fulfill the EPA notification clause. It is the A-E's responsibility to determine existence, quantity, condition and location of asbestos material, to prepare contract documents recommending methods of disposing of the ACM, and to prepare an estimate of construction cost relating to the recommended methods.

12.2.5 A-E Responsibilities for Hazardous Materials. Demolition of buildings or structures without removal of hazardous materials result in a violation of Federal and state OSHA

requirements related to worker overexposure; violation of Department of Transportation hazardous materials transportation and shipping laws, or EPA/state landfill disposal laws. Although there are no UFGS specifications expressly written for each hazardous material that may be encountered, the A-E is responsible for determining the existence and location of hazardous materials, for preparing contract documents, recommending methods of removing and disposing of the hazardous materials, and for preparing an estimate of construction costs relating to the recommended methods. The A-E may use the Savannah District Hazardous Building Materials Removal specification (02 09 10) as a template to develop an appropriate specification, or may include such information in the Demolition and Deconstruction specification (UFGS-02 41 00). The A-E shall ensure that all methods meet Federal, State, and local requirements for the handling and disposing of hazardous materials, and that “cradle to grave” tracking is maintained. Contract documents shall require that all hazardous materials are delivered directly to the treatment storage and disposal center (TSD) and are not sent to holding or bulking facilities.

12.3 SITE VISIT.

12.3.1 The A-E, meeting the requirements in 12.2, or his asbestos/hazardous building material consultant, shall perform a site investigation to determine the existence, physical condition and location of asbestos and hazardous building materials. The site visit shall include the taking of bulk samples from suspected locations and perform any necessary exploratory work on the site, using good engineering judgment. Sampling should not be taken if it renders the material unstable, or causes leaking or other deterioration of the base material or poses a hazard to those working in and around the building.

12.3.1.1 Asbestos surveys shall be performed using general procedures and protocols appearing in EPA 40 CFR, part 763, dated October 30, 1987 (ASHERA Protocols). However, all suspect asbestos containing materials, not just interior structures, shall be included in the survey. In obtaining the samples for testing, the A-E shall follow all OSHA/EPA/NIOSH safety requirements for personal and public safety, and must insure that the disturbed area will not increase the hazard from release of asbestos fibers or hazardous building materials.

12.3.1.2 A sufficient number of samples shall be analyzed to cover all suspect materials. Areas that cannot be sampled due to a “non destructive” clause, shall be noted in the asbestos and HBMs survey. Bulk asbestos samples with 1 percent (by volume) or greater content shall be considered asbestos containing material (ACM), and that material shall be designated for removal, enclosure or encapsulation. In most cases the building owner will want the ACM and HBM removed unless it is physically too difficult or dangerous to do or too cost prohibitive. A-E shall state encapsulation and enclosure as a last resort measure.

12.3.1.3 A sufficient number of samples shall be analyzed to cover all suspect hazardous materials. Areas that cannot be sampled due to a “non destructive” clause, shall be noted in the hazardous materials survey report or detailed in a letter of findings to the Project Manager. Equipment or objects (ballasts, lights, switches) that contain hazardous materials shall be removed from the building or structure as intact as possible. Biohazards, such as potentially infectious guano, may require bio-sampling and analysis. The presence of live animals may require live trapping and release (bats, snakes, birds, etc.) before waste materials can be removed. The materials shall be removed intact prior to a demolition and cleaned prior to a renovation. Large areas, such as laboratories, process/research and development areas that are suspected to be contaminated with chemical compounds, may require special testing,

removal and disposal of all effective furnishings and building components prior to general demolition or renovation.

12.3.2 Notification. The A-E shall immediately notify the Savannah District Project Manager of any hazardous material or highly friable, contaminated occupied areas that pose an immediate threat to the health of the occupants. A written notification shall immediately follow.

12.4 ASBESTOS LABORATORY REQUIREMENTS.

12.4.1 Asbestos bulk samples shall be sent to a laboratory for testing to determine percent of asbestos, type of asbestos, and binding material, and the results documented with the Preliminary Design Analysis. Polarized light microscopy (PLM) analysis will be specified for initial screening. Analysis of floor tile and other resin-bound materials by the PLM method (EPA/600/R-93/116, July 1993) may yield false negative results because of method limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Therefore, a qualitative assessment of vinyl floor tile, mastics, and some grouts may be done by the transmission electron microscopy (TEM) method. The qualitative analysis of vinyl tile and other materials by TEM shows that asbestos is either present in high portions or not present in detectable quantities. Floor tile qualitative TEM results shall be reported as "> 1 percent asbestos," "< 1 percent asbestos, trace," or "no asbestos detected." By specifying qualitative analysis for floor tile, considerable cost savings should be realized over the quantitative assessment by the TEM method.

12.4.2 Laboratories performing bulk asbestos analyses must utilize U.S.EPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" as found in 40 CFR Part 763, Subpart F, App. A. or the current EPA method for the analysis of asbestos in building material. Analyzing laboratories shall participate in the AIHA/NIOSH Bulk Asbestos Proficiency Analytical Testing (BAPAT) Program and shall have participated in at least 50 percent of the rounds within the last year and scored 90 percent or better. Details on BAPAT applications can be found on the Web at <http://www.aiha.org> or call (703) 849-8888.

12.4.3 All laboratories which analyze samples or materials (metals, silica, asbestos, lead, and solvents) for the purposes of evaluating workplace exposures or contaminants shall be accredited under the AIHA Laboratory Accreditation Program (NAVLAP). The laboratories, as a part of the NAVLAP accreditation, shall successfully participate in the AIHA/NIOSH Proficiency Analytical Testing (PAT) Program and shall have participated in at least 50 percent of the rounds within the last year and scored 90 percent. Details on accreditation applications can be found on the Web at <http://www.aiha.org>. All fiber- counting analysts using the phase contrast microscopy method (PCM) must have successfully completed a NIOSH 582 course or equivalent.

12.4.4 All laboratories performing analysis of microorganisms commonly detected in air, fluids, and bulk samples shall be accredited under the Environmental Microbial Laboratory Accreditation Program (EMLAP). Proof of continued participation and competency in the AIHA Environmental Microbiology Proficiency Testing (EMPAT) is required.

12.5 SURVEY REPORTS.

12.5.1 Proof of AIHA accreditation under the Laboratory Quality Assurance Program (LQAP) shall be required. Each location and type of lab, (Fixed Site, Mobile Facility and Field

Operation) shall have a separate accreditation. Details on accreditation applications can be found on the Web at <http://www.aiha.org>.

12.5.2 The asbestos and the HBM survey report shall contain single line floor plan sketches of the buildings and rooms, showing where samples were taken, indexed schedule of samples surveyed with the sample number and other pertinent notes, and a narrative on methodology of survey. The laboratory bulk sample report numbers will be correlated with the samples taken. Drawings shall be compatible in scale with all other drawings unless otherwise noted.

12.5.3 The presence (or absence) of other suspected hazardous materials shall be verified by similar applicable methods discussed above.

12.6 **APPLICABLE PUBLICATIONS.** The most current editions of the publications listed below constitute an addendum to this chapter wherever referenced or applicable.

Federal Standards No. 313A

NIOSH The National Institute for Occupational Safety and Health
Manual of Analytical Methods, Physical and Chemical Analysis
Method

OSHA The Occupational Safety and Health Administration

29 CFR 1910.1001, 29 CFR 1910.134, 29 CFR 1910.1200
29 CFR 1926.58, 29 CFR 1926.1101

EPA Environmental Protection Agency

40 CFR 61 Subpart A & M
40 CFR Part 763, Oct 30, 1987
EPA/600/r-93/116, July 1993

USACE Guide Specification UFGS 02 82 14.00 10

Note: The above referenced agencies may be contacted at the following addresses:

- a. The National Institute for Occupational Safety and Health
CDC-NIOSH
Building J, N.E., Room 3007
Atlanta, Georgia 30333
- b. The Occupational Safety and Health Administration
200 Constitution Avenue
Washington, D.C. 20210
- c. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
- d. The Corps of Engineers

Huntsville Engineering and Support Center
<http://www.hnd.usace.army.mil>
See TECHINFO/Publications

12.7 PRECONCEPT SUBMITTAL REQUIREMENTS. The A-E shall collect and evaluate all existing sampling data, records of removal, encapsulation, or enclosure of all known asbestos and the presence of hazardous materials. The A-E shall then prepare and submit a summation of known acceptable data and areas of no data or unacceptable data. It shall be the responsibility of the A-E to then prepare a schedule of when the data gaps will be filled (by site visits, surveys, etc.) This shall be presented in a tabular form. Photographs are not required, however a single photograph of the building, showing the building number is encouraged.

12.8 CONCEPT (35%) DESIGN SUBMITTAL REQUIREMENTS. The Concept Design Submittal shall include the following:

12.8.1 Criteria listings - standards, manuals, and all applicable references which will be used in developing the specification or the RFP.

12.8.2 Asbestos and hazardous materials survey report. The report shall include a description of findings in text and tabular form, following AHERA guidelines for physical condition and damage assessments. The report shall include all analytical support data such as field notes and chain of custody receipts. Technicians must sign all sampling documents, analytical results, and chain of custody receipts. In North Carolina (and any other states that require a professional or licensed oversight person), the report shall be signed by the CIH, CSP (or applicable professional). Sample locations shall correlate to site drawings. Drawings shall be compatible and to scale with all other site drawings. Text and drawings shall be submitted in hard copy and project compatible electronic format. All test methods and procedures shall be described and referenced. Areas unable to be sampled shall be noted and the reason given.

12.8.3 Written notification shall be made of any highly friable or damaged asbestos and asbestos contaminated areas that pose an immediate threat to the health of the occupants.

12.8.4 Certification and experience of A-E or consultant and all personnel performing asbestos and hazardous material sampling and abatement design shall be submitted. The function of each person shall be described with his/her certifications attached. All copies must be legible.

12.8.5 Name and certification of the asbestos/hazardous materials testing laboratory shall be submitted. See Section 12.1.6.8 Laboratory Accreditation.

12.8.6 Submit a narrative describing anticipated scope of work based upon survey findings. (Document building relative to making assumptions, including original construction date).

12.9 PRELIMINARY (60%) DESIGN SUBMITTAL REQUIREMENTS.

12.9.1 Preliminary Design Analysis. In the event that 35 percent and 60 percent submittals are combined or a fast track RFP is being prepared, the USACE project manager may request that the asbestos or hazardous materials survey be submitted separately from standard submittal dates for USACE review in order to prevent design complications from unexpected materials discoveries.

12.9.1.1 The Preliminary Design Analysis shall include all items contained in the Concept/Early Preliminary Design submittal and any necessary changes as required. The A-E shall address and annotate all comments. Responses shall be grouped by reviewer and include reviewer's name, the question or comment, the A-E's response, and where in the text or drawing the changes were made.

12.9.1.2 The A-E shall furnish certified laboratory test results with the project Preliminary Design Analysis verifying the existence of asbestos by type, concentration level (in percent), location, condition, and binder type (including percent). The analysis of vinyl floor tile and mastics are an exception as noted earlier. Qualitative TEM analysis of bulk sample test results shall be reported as ">1 percent asbestos," "<1 percent asbestos, trace," or "no asbestos detected." Negative test reports are also required.

12.9.2 Preliminary Drawings.

12.9.2.1 Drawing(s) shall be submitted at Preliminary for all projects or portions thereof which contain asbestos (or other HBM).

12.9.2.2 The A-E shall provide demolition or renovation drawing(s) which show(s) any asbestos/HBM abatement work. Each drawing shall indicate the location of all HBMs and type of the asbestos with enough detail so that quantities can be estimated. Drawings shall contain markings based upon the type and location of the various materials found. A detailed key shall be included.

12.9.2.3 The drawings shall include a schedule of occupancy phasing, (if applicable).

12.9.2.4. In crawl spaces, where the dirt floor has been contaminated with asbestos, the A-E shall indicate the area of dirt to be removed to a minimum of 50 mm (2 inches) depth or greater as deemed necessary, and note whether the material is friable or non-friable.

12.9.2.5 Plate numbers will carry an "R- or H-" prefix for asbestos abatement. Work related to other HBMs may be located on "R- or H-" plates or elsewhere as is feasible.

12.9.2.6. If part of a larger set of drawings, all asbestos drawings shall be grouped together immediately following the site development drawings. Sheet and ring numbers shall follow sequentially with the other drawings in the set.

12.9.3 Preliminary Specifications. The concept submitted Unified Facilities Guide Specifications (UFGS) list shall be updated to include any new specifications based on the refined preliminary design. All specifications from the list shall be tentatively marked up, with major edits, and submitted as part of the preliminary (60 percent) submittal. Specifications shall comply with the requirements of Chapter A-11, SPECIFICATIONS. Specifications shall be submitted with red-line edits indicating all deleted/modified text.

12.10 FINAL (100%) DESIGN SUBMITTAL REQUIREMENTS.

12.10.1 Final Design Analysis. The Final Design Analysis shall be a refinement of the Concept Submittal and the Preliminary Design Analyses. If the Preliminary stage is not required, the Final Design Analysis shall include all items required in paragraphs 12.9 .

12.10.2 Final Drawings.

12.10.3 Final plans will be the refinement and completion of preliminary drawings. All comments from this office relating to concept and preliminary design shall be incorporated in the final drawings.

12.10.4 Where crowded conditions exist, sufficient sections and elevations will be shown to indicate clearly the exact location of the asbestos in relation to other items.

12.10.5 The number of floor plans, elevations, and details will be sufficient to enable the Contractor to perform a detailed estimate.

12.10.6 Final Specifications

12.10.7 Guide Specification, as noted above will either be developed by the A-E if a full design or required to be developed if an RFP. Where the RFP A-E is responsible for reviewing specifications, the A-E shall ensure that a MAP trained asbestos designer reviews the Contractor's specification.

12. 10.8 A copy of the "Asbestos Survey Report" shall be included as an appendix to the Asbestos specification. A copy of the survey report for other HBMs shall be included in the documents where applicable.

12. 10.9 The A-E shall include only final specifications in the Final Design or RFP submittal package.

12.11 **CORRECTED FINAL DESIGN SUBMITTAL REQUIREMENTS.**

12.11.1 Notice. In the Corrected Final Design Submittal, the designer of record finalizes the construction documents. This includes the incorporation of approved comments from the previous design submittal reviews. The Corrected Final Design Submittal requirements shall be the same as the Final Design Submittal requirements. Unless indicated otherwise in the project Specific Instructions, this submittal will not be another review in ProjNet and is only for final backcheck of all comments.

12.11.2 Compliance. The comments generated during the Final Design review shall be incorporated in the Corrected Final submittal.

12.12 **ESTIMATE.** In preparing the Project Estimate, the costs of the asbestos and HBM abatement will be identified as a separate item for the quantity of asbestos involved. The Project Estimate shall include a detailed breakdown or backup data in the estimate for cost of the asbestos and/or hazardous building material professional (CIH, CSP, CHP, CHMM, etc.) for the project, permit filing costs, air and final cleanup, sampling and laboratory analysis costs, labor cost for abatement work for each of the major types of materials involved, transportation costs, and disposal costs.

12.13 **FEE PROPOSAL.** The A-E's fee proposal shall identify the material sampling and laboratory test analysis as a separate item.

*** End of Section ***