

National Manual for Assets and Facilities Management Volume 10, Chapter 4

Asbestos Disposable Procedure

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Asbestos Disposable Procedure

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Asbestos Disposable Procedure

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1.0 PURPOSE

Operations and/or Maintenance work performed in and around facilities, entities, and associated contractors throughout the Kingdom of Saudi Arabia can involve activities dealing with the removal of asbestos. Due to the health hazards (i.e., inhalation, absorption, ingestion) associated with exposure to constituents generated by these activities it is necessary for Entities, and/or their contractors, to implement a procedure to give the requirements and guidance for providing hazard controls and mitigations for asbestos removal work.

2.0 SCOPE

The scope of this procedure is to provide means to the user to create a custom procedure outlining and detailing the requirements and responsibilities when performing work with asbestos. This includes proper work methods of removal and disposal of asbestos containing wastes and required PPE. This procedure applies throughout the Kingdom of Saudi Arabia to Operations and Maintenance functions and activities on, in, and around government owned facilities and projects.

3.0 DEFINITIONS

Definitions	Description
APR	Air Purifying Respirator
Area Sample	A non-personal air sample representing the general area concentration and not collected in the breathing zone of a worker.
Asbestos	Asbestos is a class of aluminium, magnesium, or other metal silicate minerals that occur in fibrous form including chrysotile, anthophyllite, amosite, crocidolite, tremolite, actinolite, and any of these minerals that have been chemically treated and/or altered.
Asbestos Competent Person (ACP)	A person who has the following training and experience: – Successful completion of the acceptable initial asbestos worker and supervisor course and annual refresher updates, current within the last 12 months. – A working knowledge of asbestos standards and strategies, engineering controls, air and bulk sampling, safe work practices, decontamination units, personal protective equipment (PPE), high-efficiency particulate air (HEPA) filtration systems, and other background and knowledge necessary to implement an asbestos disposal program. – A minimum of 3 years of experience with industrial hygiene and/or safety matters. – Additional training/certifications required by the facility/contract.
Asbestos Fibre	An asbestos fibre is an asbestos particle that has an aspect ratio (length to width) of at least 3:1 and is longer than 5 micrometres. Shorter asbestos fibres are now under scrutiny as fibres of concern.
Asbestos Management Plan (AMP)	A section of the site HSE plan that addresses site-specific asbestos policies. This is a brief description of how asbestos will be handled onsite and will define required programs and approvals that must be in place before any work involving removal and disposal of the asbestos.
Breathing Zone	The radius around an individual's head equal to the distance from the mouth to the lapel.
Decontamination Unit	A unit of three chambers connected to the asbestos regulated work area. The first chamber is immediately adjacent to the abatement location and is called the dirty room . Here the employee's contaminated clothing is removed and any small equipment is decontaminated and stored. Impermeable bags or containers are in this chamber for disposal of contaminated clothing and/or equipment. The second chamber is the shower connected to the dirty room. The third chamber is the clean room connected to the shower and is used to remove and store street clothing and to don/store clean disposable clothing.
Encapsulant	A specific material used to chemically entrap asbestos in various configurations to prevent fibres from becoming airborne.



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Definitions	Description
Glove Bag	An assembly used to remove ACM from HVAC ducts, pipe runs, valves, joints, elbows, and other similar surfaces. The glove bag assembly is a heavy-duty polyethylene or polyvinyl chloride plastic bag containing two projecting gloved arm sleeves, an internal tool pouch, and an attached label that identifies content and hazard. The glove bag is installed in a manner that encloses the asbestos material and prevents all asbestos fibres from being released.
High-Efficiency Particulate Air Filter	A filter capable of retaining 99.97 percent of particles having a diameter of 0.3 micrometre or larger
NIOSH	National Institute of Occupational Safety and Health
Occupational Exposure Limit (OEL)	An 8-hour time-weighted average of 0.1 fibres longer than 5 micrometres per cubic centimetre of air (f/cc) determined in the individual's breathing zone. A 1 f/cc OEL averaged over 30 minutes may be used, but the 8-hour TWA must still be in effect.
PAPR	Powered Air Purifying Respirator
PCM	Phase Contrast Microscopy
Personal Sampling	Collection of an air sample within the breathing zone of a worker
PLM	Polarized Light Microscopy
Presumed Asbestos Containing Material (PACM)	A material that could be asbestos but has not been sampled to confirm asbestos and therefore is considered to be asbestos. Once it is designated as PACM, only an asbestos inspector can remove it as PACM.
Prior Experience	refers to experience that is required of the consultant/subcontractor and its employees as a prerequisite relevant to the work. This experience is necessary to ensure that the consultant/subcontractor can perform the asbestos inspection or abatement in a satisfactory manner. Relevant experience shall include but not be limited to size of jobs/projects, number of employees, type and composition of material, work methods including engineering controls, and safe work practices.
SDS	Safety Data Sheet
Time-Weighted Average (TWA)	A concentration averaged over a specified time period. Typically, the TWA means a concentration averaged over 8 hours.

4.0 REFERENCES

- OSHA 29CFR 1926 Subpart E Personal Protective and Life Saving Equipment
- OSHA 29CFR 1926.1101 Asbestos
- OSHA 29CFR 1926 Subpart D Occupational Health and Environmental Controls
- OSHA 29CFR 1926.252 Disposal of Waste Material
- OSHA 29CFR 1910.1001 Asbestos
- OSHA 29CFR 1910 Subpart H Hazardous Materials
- L143, Health and Safety Executive Managing and Working with Asbestos, 20 (Second edition) 2013
- EOM-KSS-PR-000001 General Safe Working Requirements Procedure
- EOM-KSS-PR-000002 Housekeeping Requirements Procedure
- EOM-KSS-PR-000003 Personal Protective Equipment Procedure
- EOM-KSS-PR-000016 Hazardous Work Permit Procedure
- EOM-KSH-PR-000001 Medical Services and Medical Surveillance Procedure
- EOM-KSH-PR-000004 Respiratory Protective Equipment Procedure
- EOM-KSH-PR-000005 Air Surveillance Program Procedure
- EOM-KSH-PR-000007 Control of Hazardous Materials Procedure

5.0 RESPONSIBILITIES

5.1 Facility / Contract Manager



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- Perform management assessments to ensure compliance with this Asbestos Disposable Procedure.
- Assess and approve any decision to have consortium be contractually responsible for asbestos removal by engaging and supervising qualified external asbestos consultants and asbestos contractors. Such approval must be in accordance with consortium partner's policies and legal instructions.
- Access and approve asbestos removal.
- Stop work to prevent an unsafe practice, asbestos exposure, or spread of contamination.

5.2 HSE Representative

- Assist and advise the contractor Manager on standards and regulations.
- Ensure that the necessary PPE are on place
- Conduct frequent audit on compliance for removal area.
- Provides technical assistance on removal and disposal of asbestos

5.3 Responsible Engineer

- Ensure that asbestos is not engineered into planning documents unless so far as is reasonably practicable.
- Plan work to prevent unsafe practices, asbestos exposure, or spread of contamination.
- Ensure organizations develop asbestos policy, procedures, and specifications and update them as necessary to comply these requirements, lessons learned, and new policy.
- Ensure competent people are appointed to ensure work involving asbestos for removal is properly planned and managed.
- Survey work activities to ensure all workers including subcontractor employees are not exposed to asbestos when ACM/PACM is handled. This may involve air sampling of employees, or their workplace areas.
- Ensure work locations are free of asbestos before allowing "normal" maintenance activities to proceed.
- Stop work to prevent an unsafe practice, asbestos exposure, or spread of contamination.

5.4 Supervisor

- Ensure the implementation of this procedure.
- In conjunction with HSE, Legal, and Risk Management, ensure that ACM is handled only by an asbestos qualified contractor/consultant.
- Ensure that HSE provides an ACP to support if work requires asbestos removal.
- Stop work to prevent an unsafe practice, asbestos exposure, or spread of contamination.

5.5 Entity Legal

- Resolve any conflicts in allocation of responsibilities for asbestos.
- Review contacts to ensure compliance with this procedure.
- Stop work to prevent an unsafe practice, asbestos exposure, or spread of contamination.

5.6 Personnel

- Comply with the provisions of all applicable laws in the Kingdom of Saudi Arabia governing asbestos.
- Comply with agreed-upon contractual requirements including provisions of this procedure.
- Stop work to prevent an unsafe practice, asbestos exposure, or spread of contamination.



6.0 GENERAL COMPLIANCE REQUIREMENTS

6.1 Prohibited Activities

Eating, smoking, drinking, and chewing tobacco or gum shall not be permitted in the asbestos removal area. No asbestos sawing, grinding, air blowing, sweeping, drilling, or similar operations that may create airborne asbestos fibers shall be performed without dust-reducing engineering controls in place.

Personnel outside regulated areas shall not be exposed to airborne concentrations of asbestos in excess of the background level unless there is compliance with requirements and qualifications of an asbestos worker including training, medical, engineering controls, personal protective equipment, safe work practices, and other measures outlined herein.

6.2 Medical Requirements

The entity/contractor shall ensure that all asbestos workers, and supervisors are certified by a licensed health care provider to work in an asbestos environment and to wear approved respiratory protection. The health care provider shall provide recommendations and limitations to the employee based on the medical examination. The baseline medical examination shall be provided before the start of work involving asbestos and shall be repeated annually and upon exit from the job site. The annual and exit medical examination shall be like the baseline.

Asbestos awareness training - Custodial workers who are not working directly with asbestos but may encounter it should receive this training. Safety Data Sheets (SDSs) for the ACM products shall be included in the awareness training. Training records of each employee shall be maintained for at least 75 years.

6.3 Protective Clothing

Disposable whole body impermeable clothing suitable for protection against asbestos shall be used. An example of such clothing is Tyvek® coveralls with attached hood and foot coverings. Impermeable, disposable, sturdy outer gloves suitable for the work shall be used. Disposable vinyl, neoprene, or rubber gloves can be worn inside the outer glove but cannot be used alone. No skin surface shall be open to the environment and all adjoining parts, including zippers, must be taped. Disposable cloth work clothing may be worn under the disposable protective coveralls, but no personal clothing may be used inside an asbestos regulated abatement area.

6.4 Respiratory Protection Program

A Respiratory Protection Program shall be established as required by the EOM-KSS-PR-000003 Personal Protective Equipment, and EOM-KSH-PR-000004 Respiratory Protective Equipment Procedure.

Employees shall be respirator fit-tested and be medically qualified to wear the type of respirator in use. A person wearing a full-facepiece air purifying respirator (APR) shall be quantitative fit tested prior to field use. Fit testing records shall be maintained onsite and shall be documented and tracked through the database. APRs used for protection against asbestos shall have high-efficiency particulate air (HEPA) filters and be certified to protect against asbestos. Respirators used for asbestos must meet the requirements of Table A.

Allowable Types of Respirator	Fibers Per cc of Air
Half-facepiece air-purifying respirator ¹	Not in excess of 1 f/cc (certified 10 PF)
Tight-fitting full-facepiece air-purifying respirator (APR) ²	Not in excess of 5 f/cc (certified 50 PF)
Powered air-purifying respirator (PAPR) ^{2,3}	Not in excess of 100 f/cc (certified 1000 PF)



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Supplied-air respirator operated in a continuous flow mode	Not in excess of 100 f/cc (certified 1000 PF)
Tight-fitting full-facepiece supplied-air respirator operated in a positive-pressure, pressure-demand mode	Not in excess of 100 (certified 1000 PF)
Tight-fitting full-facepiece self-contained breathing apparatus operated in a positive-pressure demand mode and equipped with an auxiliary positive-pressure self-contained breathing apparatus	1000 f/cc (certified 10,000 PF)
1. Half-facepiece respirators will only be allowed after a negative exposure assessment for any type of asbestos work. 2. Must be equipped with HEPA filters. 3. Must be able to provide test data summary demonstrating PF of 1000.	

Table 1: Allowed Respirator Use

6.5 Posting, Labels, and Emergency Phone Numbers

Warning Sign: Warning signs shall be posted in both Arabic, English and the other workforce languages at all approaches, entries, and other access points to asbestos-regulated areas. Each sign shall be located at such a distance that personnel can read the sign and take the necessary protective steps before entering the area.

Signs shall be 50 cm × 36 cm and shall display the following legend:

- Danger Asbestos.
- Cancer and Lung Disease Hazard.
- Authorized Personnel only.
- Respirators and Protective.
- Clothing Required in this Area.

Warning Label: labels shall be properly affixed to packages of asbestos materials, scrap, waste, debris, and other products that have ACM. Labels shall be of sufficient size to be clearly legible at 3 meters and shall display the following legend:

- Danger.
- Contains Asbestos Fibers.
- Avoid Creating Dust.
- Cancer and Lung Disease Hazard.
- Breathing Asbestos Dust.
- Causes Serious Bodily Harm.

Facility/Contract shall apply “ASBESTOS-FREE” markings to the exterior jackets of installed non-asbestos-insulated piping at maximum 6.1 meters’ intervals. The limits of “ASBESTOS-FREE” insulation must be indicated with a 2.5 cm wide band with attached arrow pointing in the direction of the label “ASBESTOS-FREE.” Paint markings shall be a highly visible pink.

The facility/contract shall install 15 cm × 15 cm warning labels over ACM that is to remain in place. The labels shall read at a minimum “**CAUTION - ASBESTOS.**” The labels shall be placed so that they are visible from ground/floor level and are spaced every 2.5 meters on tanks and ducts and every 3 meters on pipes.

Emergency Phone Numbers: Emergency phone numbers shall be posted in conspicuous locations for local fire department, police, hospital, and any specialists or consultants associated with the facility/contract.

6.6 Housekeeping



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Good housekeeping and cleanup procedures are essential steps in asbestos dust control. Meticulous attention shall be given to restricting contamination spread, including airborne fibers, dust, and debris.

Cleanup: Cleanup shall meet the following criteria:

- Surfaces shall be cleaned with water and HEPA vacuum equipment and shall be maintained free of asbestos accumulations.
- Asbestos waste shall not be distributed over the general area.
- Dry sweeping or space blow-down shall not be allowed.
- An adequate period shall be allowed for dust to settle before using wet cleaning and HEPA vacuuming of equipment and surfaces.

The ACP shall provide authorization in writing before allowing breakdown of an asbestos containment. Authorization shall be based on a visual inspection and air sampling data.

- No visible contamination shall be present.
- Aggressive clearance samples cannot exceed background.

Enclosures, perimeter boundaries, caution signs, etc. shall not be removed before written approval is received from the ACP. Containment shall remain in place during cleanup. Plastic sheeting, filters, etc. shall be disposed of as ACM waste.

Prior to dismantling containment: The ACP shall perform a visual inspection for asbestos dust, residue, and freestanding water and shall review clearance air sampling data before downgrading an asbestos regulated area. If asbestos dust, residue, or freestanding water is found, another wipe-down/vacuuming shall be performed. This procedure shall continue until all asbestos dust, residue, and freestanding water are properly removed and air sample results are below background.

Lockdown: After contamination clean-up, has occurred, a post-removal (lockdown) encapsulate shall be spray applied to the ceiling, walls, floors, and other exposed areas. Encapsulation shall include but not be limited to plastic barriers, furnishings, articles to be discarded, decontamination chambers, and air locks. The encapsulate shall be allowed to dry prior to final clearance sampling. After this is accomplished, plastic barriers can be removed and disposed of as ACM.

6.7 Reviews and Oversight

While performing asbestos removal activities, the facility/contract will be subject to close oversight by the Contractor by completing audits and assessments. If a violation is found, a "Stop Work Order" shall be issued immediately and remain in effect until the violation(s) is resolved if the work is found to violate the contract, a regulatory requirement, and/or safe work practice.

6.8 Safety Data Sheets

A current SDS shall be provided for each hazardous material brought onsite, whether or not such material is to be used during asbestos removal. If an SDS does not exist, suitable alternative arrangements must be made.

6.9 Air Sampling

Air sampling shall comply with EOM-KSH-PR-000005 Air Surveillance Program, and requirements herein:

- Air samples shall be collected by the ACP before containment is installed and before abatement occurs. These samples shall be used to determine background asbestos levels that will later be compared to clearance sample data and used to determine containment integrity. The baseline level is determined by collecting at least three general area samples at each asbestos abatement location.
- The ACP shall collect daily area air samples outside the asbestos containment during any abatement. Sample locations shall be determined based on the type of work. The samples are used to verify containment integrity and must not exceed background level. During abatement, three samples shall be collected daily outside the containment to ensure that concentrations remain



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below background. In addition, daily area samples shall be collected at the entrance to the asbestos regulated area, at the local exhaust system opening, and at the ACM storage location. If air sample results outside the containment exceed background at any sample location, work shall immediately stop and corrective actions shall be taken to reduce the level. Employees shall immediately evacuate the adjacent work areas and not be allowed to return until after the written clearance from the ACP. The HSE Representative shall be notified immediately of the condition.

- Daily personal air samples shall be collected on asbestos workers inside the containment area and on the support team outside the containment. This type of sample is used to verify that the engineering controls are functioning appropriately and that the respirator protection factor is not exceeded, and to document airborne levels. Samples shall be collected on a representative number of workers for all activities. Typically, because of the small number of asbestos workers at a specific abatement location, all employees inside the abatement chamber and the support team outside the chamber should be sampled.
- Aggressive air sampling shall be conducted for all clearance samples prior to dismantlement of containment. Aggressive air sampling shall be conducted using high-volume sample pumps over a period of 30 minutes while using a mechanical method (e.g., a fan) to disturb dust.

6.10 Laboratory

The facility/contract shall maintain the name, address, and telephone number of the laboratory selected to perform asbestos analytical analysis. There shall be sufficient evidence that the laboratory has the credentials defined herein to analyze air and bulk asbestos samples, and that the asbestos analysts are currently and successfully participating in an Asbestos Proficiency Analytical Testing Program.

The ACP shall verify that the laboratory can meet the following criteria:

- Has equipment capable of analyzing air samples by phase contrast microscopy (PCM) to a level less than 0.1 f/cc and uses an appropriate procedure equivalent to the USA National Institute of Occupational Safety and Health (NIOSH) Method No. 7400 for air samples.
- Has the capability to analyze bulk samples by polarized light microscopy (PLM) to a level of less than 0.1 percent and uses the appropriate procedure equivalent to the USA NIOSH Method No. 9002 for bulk samples.
- Has the capability of analyzing samples by transmission electron microscopy (TEM), equivalent to the NIOSH Method 7402. This analysis is used for clearance samples.
- Has asbestos analysts qualified to analyze air and bulk asbestos samples. These analysts shall be trained in the equivalent of the US-style asbestos counting process compliant with the US Department of Health and Human Resources, NIOSH Course 582, Sampling and Evaluating Asbestos, and successfully participate in a Proficiency Analytical Testing (PAT) Program for asbestos.

7.0 REQUIRED ASBESTOS PLANS AND REPORTS

7.1 Permits and Notifications

Permitting and notification requirements shall be met before, during, and at the completion of an asbestos removal job. This stipulation is applicable to any host country standard since it pertains to asbestos removal, hauling, and disposition of ACM. The ACP, HSE Representative, and Supervisor will assist the Entity environmental specialist responsible for handling any permitting and notification requirement.

7.2 Engineering Controls

Engineering controls are the primary method of controlling asbestos exposure and spread of contamination. Containment shall be the principal means of controlling the spread of asbestos contamination and mitigating exposure potential. ACM shall be sufficiently wet with a fine spray of amended water (wetting agent added to water) to reduce the emission of airborne asbestos.



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ACM waste material in a containment area shall immediately be placed inside plastic disposal bags or other approved containers. Freestanding water used to wet ACM materials shall be recovered from the containment floor. Excessive water, such as shower water, shall be filtered using a 5 micron filter system prior to water disposal.

7.3 Containment

Surfaces where containment will be established shall be pre-cleaned before the plastic floor coverings are installed. All surfaces shall be HEPA vacuumed and then wet wiped prior to establishment of containment.

Openings in a containment area shall be blocked and sealed. Plastic curtains, portable partitions, or other enclosures shall be used to prevent spread of airborne and waste contamination. Containment shall have plastic sheeting (minimum of two 6mm layers) on walls, ceilings, floors, and openings. The 6mm plastic sheeting over the floors shall extend a minimum of 61cm up the walls. All seams shall be sealed with waterproof duct tape, and any penetrations of the floor, walls, and ceiling shall be sealed with 6mm plastic sheeting and waterproof tape. Reinforced sheeting shall be used when enclosures are exposed to the outside.

Any equipment that remains in an asbestos abatement location shall be covered and sealed with 6mm plastic sheeting. Furnishings that cannot be covered shall be removed from the work area and disposed of. There shall be filtered openings that are placed at strategic locations that will provide makeup air for the negative-pressure system.

7.4 Glove Bag

A glove bag may be used on items like pipe insulation. Glove bag installation and use shall be in accordance with best practices for asbestos. During ACM removal, the ACM shall be wetted in a glove bag. Because of weight, the glove bag should not be filled to more than one-fourth its capacity and shall never exceed one-third capacity. A HEPA exhaust system (typically a vacuum) shall be used to create negative pressure inside the glove bag during the asbestos abatement. Use of the HEPA exhaust shall continue through dismantlement of the glove bag.

Remaining ACM shall be encapsulated before pipes are removed or non-ACM insulation is installed. Rough ends shall be wetted and cut square with sharp tools. Edges shall be encapsulated with at least a 6mm thick layer of insulating cement trowled to a smooth, hard finish. When the cement is dry, ends shall be lagged with a layer of fiberglass cloth or other acceptable material using thermal insulation adhesive. Ends shall be overlapped by at least 10cm.

A 6.1 meter roped-off perimeter around the glove bag area shall be established. If the roped-off area becomes compromised by loss of local exhaust ventilation, asbestos spill, or elevated airborne asbestos levels, all adjacent areas shall be evacuated and personnel shall not be allowed to return until the condition is corrected and the ACP has determined that it is safe to return.

7.5 Decontamination Unit

A decontamination unit shall be constructed contiguous to the abatement area. The unit shall contain negative pressure like that in the abatement chamber. The decontamination unit shall consist of three adjacent chambers:

- The “dirty chamber” is where workers remove soiled clothing and decontaminate small equipment. This chamber is connected to the abatement chamber. Only minor decontamination is allowed in this chamber, and every tool that enters the chamber shall be HEPA vacuumed, wet wiped, and packaged for either storage or removal. Tools stored in this chamber shall be placed into impermeable containers. Workers’ clothing shall be HEPA vacuumed in the chamber before workers disrobe and then placed in an impermeable plastic bag or other approved container that can be sealed. HEPA filters shall be discarded as ACM waste. All surfaces shall be wet wiped to remove residual asbestos, and wipes shall be discarded as ACM.



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- A shower chamber placed adjacent to the dirty chamber shall be used by all asbestos workers and supervisors upon exiting the abatement chamber. Respirators shall be worn into the shower before removal.
- A clean chamber is placed adjacent to the shower. This is where employees change into and out of street clothing. No potentially contaminated clothing or equipment shall be brought into this chamber. Only asbestos-free equipment and street clothing are handled in the clean room. Individual lockers shall be provided for the street clothing.

7.6 Local Exhaust System

A local exhaust system shall be installed and operated during pre-cleaning through clearance and dismantlement of the containment. The HVAC system shall be shut down and sealed from contamination prior to an asbestos removal process. A local exhaust system shall be used in an asbestos containment area in accordance with these summary requirements:

- Vacuums and exhaust equipment shall contain HEPA filters certified capable of removing particles having a diameter of 0.3 microns or larger at a minimum of 99.97 percent efficiency.
- Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of 0.02 mm of mercury, or equivalent in water column, and provide four air changes per hour in an enclosure unit.
- A manometer, or equivalent, shall be used to measure negative pressure differential with accuracy within plus or minus 1.0 percent. The HSE Representative shall calibrate the manometer daily or as recommended by the original equipment manufacturer.
- Enclosure pressure differential readings shall be recorded in the asbestos abatement chamber, decontamination unit, and any adjacent unsealed areas at the beginning of each workday and every 2 working hours thereafter.
- Reduction in pressure differential below 0.02 mm of mercury shall be corrected immediately.
- Air filters shall be replaced as required to maintain the efficiency of the negative pressure system.
- Local exhaust shall be operated continuously, 24 hours a day, until the asbestos regulated area enclosure is cleared for dismantling.
- The HVAC system shall not be used for local exhaust.

7.7 Encapsulate

Encapsulation substances shall conform to the following requirements:

- **Fire resistance:** Negligible effect on fire resistance rating over 3-hour test for use over fibrous/cementitious sprayed fireproofing (tested for lockdown encapsulate with fireproofing applied directly to steel member).
- **Toxicity:** Zero mortality.
- **Life expectancy:** 20 years.
- **Permeability:** No greater than 0.4 perms.
- **Cohesion/adhesion test:** 23 kg of force per foot.
- **Impact resistance:** Minimum 109 cm/kg Gardner impact test.
- **Flexibility:** No rupture or cracking.
- **Impact resistance:** Minimum 109 cm/L (FOR PENETRATING ENCAPSULANT ONLY).
- **Bond strength:** 45 kg of force per foot (tests compatibility with cementitious and fibrous fireproofing) (FOR LOCK-DOWN ENCAPSULANTS ONLY).

7.8 Tools, Equipment and Materials

- Mastic removers shall have a flashpoint above 93.3°C.
- HEPA vacuums shall be equipped with HEPA filters and be leak-proof to the filter.
- Power tools shall not be used to remove ACM unless the tool is equipped with an effective, integral HEPA-filtered exhaust ventilation systems. All residual asbestos shall be removed from reusable tools prior to storage or reuse.



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- IF rental equipment is to be used, THEN the facility/contract shall furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

7.9 Special Procedures

This section describes special techniques that are best practices for asbestos work. The ACP should consult the KSA standards to ensure that all requirements are met.

- Personnel of other trades who are not engaged in the removal and demolition of asbestos shall not be permitted to be exposed at any time to airborne concentrations of asbestos more than 0.1 fiber/cc of air, unless the trade personnel comply with the protection provisions of this summary.
- Wet removal procedures shall be used and any electrical service shall be locked out before the wet removal activity begins.
- Temporary electrical service protected by a ground fault circuit interrupter shall be used to provide adequate power, lighting, heat, and water to accomplish the abatement.
- Backflow prevention shall be implemented when using a water supply.

7.10 Interior Surfaces

For interior surfaces where the non-friable asbestos surfacing materials (such as vinyl asbestos or asbestos cement) can be removed intact, precautions shall be taken to remove nails or screws without breaking the panels. Amended water (wetting agent) shall be used to wet the surfaces including any broken edges. A double layer of 6mm plastic shall be used to protect the floor and to package the removed panels. Breaking vinyl asbestos or asbestos cement panels is prohibited.

7.11 Exterior Surfaces

Exterior work involving the removal of asbestos cement siding including transit and asphalt composition shingles shall exclude uninvolved personnel from an area extending at least 15 meters from the perimeter of the structure. Asbestos warning signs and danger tape secured to sturdy upright posts every 6.1 meters shall be placed around the perimeter.

The facility/contract shall erect critical barriers to block non-emergency exits through the asbestos control area. Windows shall be covered with two layers of 6mm plastic sheeting. The ground shall be covered with two layers of 6mm plastic extending to at least 3 meters from the structure.

Work shall be conducted systematically from top to bottom so that each piece of transit or shingle is removed without breakage. The asbestos cement shingles shall be pre-packaged in fiberglass-reinforced plastic, nylon, or other material to prevent puncture of the double layer of 6mm plastic bags. Siding panels shall be wrapped in 6mm plastic.

All materials shall be passed or hoisted to the ground without dropping. Breakage of asbestos cement materials such as transit panels is prohibited.

7.12 Removal of ACM Boiler Stacks and ACM Cement Pipe

Boiler stacks and asbestos cement pipe shall be removed and disposed of in sections. Each section shall, at a minimum, be wrapped and sealed with two layers of 6mm plastic for transportation and disposal. Where cutting, or disturbing of ACM is required to create manageable sections, the cutting shall be accomplished within an enclosed asbestos regulated area with a negative air pressure local exhaust system.

7.13 Removal of ACM Joint Compound between Gypsum boards

Gypsum board containing asbestos joint compound shall be handled by removing the entire joint without cutting or disturbing the ACM joint compound.



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7.14 Asbestos Disposal

Asbestos waste, scrap, debris, bags, containers, filters, equipment, and asbestos-contaminated clothing shall be sealed in double 6mm plastic bags, or wrapped in 6mm plastic sheeting imprinted with the asbestos caution label. Where the asbestos material is, hard or has sharp edges, the ACM shall be packaged in a manner that will prevent puncture. Disposal of friable and non-friable asbestos waste shall incorporate at least 15cm of compacted cover of non-asbestos materials with a final cover of at least 46cm of earth. ACM shall be disposed of in a licensed landfill, or in compliance with local regulatory requirements. The landfill shall be approved to accept friable and non-friable asbestos waste. Temporary storage shall be in sealed impermeable bags in waste drums labeled with the asbestos warning. An area for interim storage of asbestos waste-containing drums will be approved by the Entity environmental specialist.

The environmental specialist shall obtain written evidence that the landfill can be used for asbestos waste disposal and is approved to accept such waste. Detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill, must be documented by the facility/contract within 5 working days after delivery.

8.0 DOCUMENTATION AND REVIEWS

8.1 Recordkeeping

HSE Representative shall maintain a copy of the physician's statement, work restrictions, examination dates, and location where the medical examination occurred for each employee who is required to work inside an asbestos-regulated area and/or wear respiratory protection. These records shall be maintained in a confidential manner to protect the employee's privacy for 75 years. HSE Representative shall document and track medical information through database with required information for each affected employee.

9.0 ATTACHMENTS

1. EOM-KSH-TP-000012 - Mandatory Medical Questionnaire Template
2. EOM-KSH-TP-000013 - Mandatory Abbreviated Periodical Medical Questionnaire Template
3. EOM-KSH-TP-000014 - Employee Asbestos Medical Surveillance Exam Results Template



Asbestos Disposable Procedure

Attachment 1 - EOM-KSH-TP-000012 - Mandatory Medical Questionnaire Template

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the allowable exposure limits, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements.

Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

INITIAL MEDICAL QUESTIONNAIRE

1. NAME _____
2. IQAMA NUMBER/EQUIVALENT (If you are a citizen of a country where you are not required to have any such number, write "Not Applicable" _____)
3. EMPLOYEE NUMBER _____
4. PRESENT OCCUPATION _____
5. CURRENT EMPLOYER _____
6. HOME ADDRESS _____
7. POSTAL CODE _____
8. TELEPHONE NUMBER _____
9. INTERVIEWER _____
10. DATE _____
11. Date of Birth _____
Month Day Year
12. Place of Birth _____
13. Sex: Male ___ Female ___
14. What is your marital status? Single ___ Separated/Widowed ___ Married ___ Divorced ___
15. Race White ___ Hispanic ___ Black ___ Indian ___ Asian ___ Other ___
16. What is the highest grade you completed in school? _____
(For example 12 years is completion of high school)

OCCUPATIONAL HISTORY

17. A. Have you ever worked full time (30 hours per week or more) for 6 months or more? Yes ___ No ___

IF YES:

Have you ever worked for a year or more in any dusty job? Yes ___ No ___ Does Not Apply ___



Asbestos Disposable Procedure

Specify job/industry _____

Total Years Worked _____

Was dust exposure: _____

Mild ____ Moderate ____ Severe ____

- B. Have you ever been exposed to gas or chemical fumes in your work?

Yes ____ No ____

IF YES:

Specify job/industry _____

Total Years Worked _____

Was dust exposure: _____

Mild ____ Moderate ____ Severe ____

- C. What has been your usual occupation or job—the one you have worked at the longest?

Job occupation _____

Number of years employed in this occupation _____

Position/job title _____

Business, field or industry _____

- D. Have you ever worked:
(Record on lines the years in which you have worked in any of these industries, e.g., 1960–1969)

YES NO

In a mine? _____

In a quarry? _____

In a foundry? _____

In a pottery? _____

In a cotton, flax, or hemp mill? _____

With asbestos? _____

PAST MEDICAL HISTORY

18. A. Do you consider yourself to be in good health?

Yes ____ No ____

If "NO" state reason: _____

- B. Have you any defect of vision?

Yes ____ No ____

If "YES" state nature of defect: _____

- C. Have you any hearing defect?

Yes ____ No ____

If "YES" state nature of defect: _____

- D. Are you suffering from or have you ever suffered from:

YES NO



Asbestos Disposable Procedure

Epilepsy (or fits, seizures, convulsions)? _____

Rheumatic fever? _____

Kidney disease? _____

Bladder disease? _____

Diabetes? _____

Jaundice? _____

CHEST COLDS AND CHEST ILLNESSES

19. A. If you get a cold, does it "usually" go to your chest? Yes ____ No ____ Does Not Apply ____
(Usually means more than 1/2 the time)
- B. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? Yes ____ No ____

IF YES:

Did you produce phlegm with any of these chest illnesses? Yes ____ No ____ Does Not Apply ____

In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses ____
No such illnesses ____

20. Did you have any lung trouble before the age of 16? Yes ____ No ____
21. Have you ever had any of the following?
- A. Attacks of bronchitis? Yes ____ No ____

IF YES:

Was it confirmed by a doctor? Yes ____ No ____ Does Not Apply ____

At what age was your first attack? Age in Years ____ Does Not Apply ____

- B: Pneumonia (include bronchopneumonia)? Yes ____ No ____

IF YES:

Was it confirmed by a doctor? Yes ____ No ____ Does Not Apply ____

At what age did you first have it? Age in Years ____ Does Not Apply ____

- C. Hay fever? Yes ____ No ____

IF YES:

Was it confirmed by a doctor? Yes ____ No ____ Does Not Apply ____

At what age did it start? Age in Years ____ Does Not Apply ____

22. Have you ever had chronic bronchitis? Yes ____ No ____

IF YES:

Do you still have it? Yes ____ No ____ Does Not Apply ____



Asbestos Disposable Procedure

- Was it confirmed by a doctor? Yes ___ No ___ Does Not Apply ___
- At what age did it start? Age in Years ___ Does Not Apply ___
23. Have you ever had emphysema? Yes ___ No ___
- IF YES:**
- Do you still have it? Yes ___ No ___ Does Not Apply ___
- Was it confirmed by a doctor? Yes ___ No ___ Does Not Apply ___
- At what age did it start? Age in Years ___ Does Not Apply ___
24. Have you ever had asthma? Yes ___ No ___
- IF YES:**
- Do you still have it? Yes ___ No ___ Does Not Apply ___
- Was it confirmed by a doctor? Yes ___ No ___ Does Not Apply ___
- At what age did it start? Age in Years ___ Does Not Apply ___
- If you no longer have it, at what age did it stop? Age Stopped ___ Does Not Apply ___
25. Have you ever had:
- A. Any other chest illness? Yes ___ No ___
- If "Yes" please specify _____
- B. Any chest operations? Yes ___ No ___
- If "Yes" please specify _____
- C. Any chest injuries? Yes ___ No ___
- If "Yes" please specify _____
26. Has a doctor ever told you that you had heart trouble? Yes ___ No ___
- IF YES:**
- Have you ever had treatment for heart trouble in the past 10 years? Yes ___ No ___ Does Not Apply ___
27. Has a doctor ever told you that you had high blood pressure (hypertension)? Yes ___ No ___
- IF YES:**
- Have you ever had treatment for high blood pressure (hypertension) in the past 10 years? Yes ___ No ___ Does Not Apply ___
28. When did you last have your chest X-rayed? (Year) _____
29. A. Where did you last have your chest X-rayed (if known)? _____
- B. What was the outcome? _____



Asbestos Disposable Procedure

FAMILY HISTORY

30.	Was either of your natural parents ever told by a doctor that they had a chronic lung condition such as:	FATHER YES NO Unsure	MOTHER YES NO Unsure
A.	Chronic bronchitis	____	____
B.	Emphysema?	____	____
C.	Asthma?	____	____
D.	Lung cancer?	____	____
E.	Other chest conditions?	____	____
F.	Is parent currently alive?	____	____
G.	Please specify:	____	____
		____ Age if Living	____ Age if Living
		____ Age at Death	____ Age at Death
		____ Don't Know	____ Don't Know
H.	Please specify cause of death:	____	____
31. A.	Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.)		Yes ____ No ____
	<u>If "No" then skip to question 32C</u>		
B.	Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week?		Yes ____ No ____
C.	Do you usually cough at all on getting up or first thing in the morning?		Yes ____ No ____
D.	Do you usually cough at all during the rest of the day or at night?		Yes ____ No ____
	IF YES TO ANY OF ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO NEXT QUESTION.		
E.	Do you usually cough like this on most days for 3 consecutive months or more during the year?	Yes ____ No ____ Does Not Apply ____	
F.	For how many years have you had the cough?	Number of Years ____ Does Not Apply ____	
32. A.	Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.)		Yes ____ No ____
	<u>If "No" then skip to 33C</u>		
B.	Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week?		Yes ____ No ____
C.	Do you usually bring up phlegm at all on getting up or first thing in the morning?		Yes ____ No ____



Asbestos Disposable Procedure

- D. Do you usually bring up phlegm at all during the rest of the day or at night? Yes ___ No ___

**IF YES TO ANY OF THE ABOVE (33A, B, C, OR D), ANSWER THE FOLLOWING.
IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO 34A.**

- E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? Yes ___ No ___ Does Not Apply ___
- F. For how many years have you had trouble with phlegm? Number of Years ___ Does Not Apply ___

EPISODES OF COUGH AND PHLEGM

33. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year? Yes ___ No ___
* (For persons who usually have cough and/or phlegm)

IF YES:

For how long have you had at least 1 such episode per year? Number of Years ___ Does Not Apply ___

WHEEZING

34. Does your chest ever sound wheezy or whistling...
A. When you have a cold? Yes ___ No ___
B. Occasionally apart from colds? Yes ___ No ___
C. Most days or nights? Yes ___ No ___

IF YES TO ANY:

For how many years has this been present? Number of Years ___ Does Not Apply ___

35. A. Have you ever had an attack of wheezing that has made you feel short of breath? Yes ___ No ___

IF YES:

- B. How old were you when you had your first such attack? Age in Years ___ Does Not Apply ___
- C. Have you had 2 or more such episodes? Yes ___ No ___ Does Not Apply ___
- D. Have you ever required medicine or treatment for the (se) attack(s)? Yes ___ No ___ Does Not Apply ___

BREATHLESSNESS

36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39.
Nature of condition(s):



Asbestos Disposable Procedure

37. A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? Yes ___ No ___

IF YES:

- B. Do you have to walk slower than people of your age on the level because of breathlessness? Yes ___ No ___ Does Not Apply ___
- C. Do you ever have to stop for breath when walking at your own pace on the level? Yes ___ No ___ Does Not Apply ___
- D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level? Yes ___ No ___ Does Not Apply ___
- E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs? Yes ___ No ___ Does Not Apply ___

TOBACCO SMOKING

38. A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.) Yes ___ No ___

IF YES:

- B. Do you now smoke cigarettes (as of one month ago) Yes ___ No ___ Does Not Apply ___
- C. How old were you when you first started regular cigarette smoking? Age in Years ___ Does Not Apply ___
- D. If you have stopped smoking cigarettes completely, how old were you when you stopped? Age stopped ___ Does Not Apply ___
Still smoking cigarettes ___
- E. How many cigarettes do you smoke per day now? Cigarettes per day ___ Does Not Apply ___
- F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? Cigarettes per day ___ Does Not Apply ___
- G. Do or did you inhale the cigarette smoke?
Not at all ___ Slightly ___ Moderately ___ Deeply ___ Does Not Apply ___

39. A. Have you ever smoked a pipe regularly? (Yes means more than 12 oz. of tobacco in a lifetime.) Yes ___ No ___

IF YES:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

- B. How old were you when you started to smoke a pipe regularly? Age ___
- C. If you have stopped smoking a pipe completely, how old were you when you stopped? Age Stopped ___ Does Not Apply ___
Still smoking a pipe ___



Asbestos Disposable Procedure

D. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? Oz. per week _____
Does Not Apply _____

(a standard pouch of tobacco contains 1 1/2 oz)

E. How much pipe tobacco are you smoking now? Oz. per week _____
Not currently smoking a pipe _____

F. Do you or did you inhale the pipe smoke?
Never smoked _____ Not at all _____ Slightly _____ Moderately _____ Deeply _____

40. A. Have you ever smoked cigars regularly? Yes _____ No _____
(Yes means more than 1 cigar a week for a year)

IF YES:

FOR PERSONS WHO HAVE EVER SMOKED CIGARS

B. How old were you when you started smoking cigars regularly? Age _____

C. If you have stopped smoking cigars completely, how old were you when you stopped. Age Stopped _____ Does Not Apply _____
Still smoking cigars _____

D. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? Cigars per week _____ Does Not Apply _____

E. How many cigars are you smoking per week now? Cigars per week _____
Not currently smoking cigars _____

F. Do or did you inhale the cigar smoke?
Never smoked _____ Not at all _____ Slightly _____ Moderately _____ Deeply _____

Signature _____ Date _____

Print name _____



Asbestos Disposable Procedure

Attachment 2 - EOM-KSH-TP-000013 - Mandatory Abbreviated Periodical Medical Questionnaire Template

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the allowable exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

PERIODIC MEDICAL QUESTIONNAIRE

1. NAME _____
2. SOCIAL SECURITY NUMBER EQUIVALENT (If you are a citizen of a country where you are not required to have any such number, write "Not Applicable") _____
3. EMPLOYEE NUMBER _____
4. PRESENT OCCUPATION _____
5. CURRENT EMPLOYER _____
6. HOME ADDRESS _____
7. POSTAL CODE _____
8. TELEPHONE NUMBER _____
9. INTERVIEWER _____
10. DATE _____
11. What is your marital status? Single ____ Separated/Widowed ____ Married ____ Divorced ____

OCCUPATIONAL HISTORY

12. A. In the past year, did you work full time (30 hours per week or more) for 6 months or more? Yes ____ No ____

IF YES:

- B. In the past year, did you work in a dusty job? Yes ____ No ____ Does Not Apply ____
- C. Was dust exposure: Mild ____ Moderate ____ Severe ____
- D. In the past year, were you exposed to gas or chemical fumes in your work? Yes ____ No ____
- E. Was exposure: Mild ____ Moderate ____ Severe ____
- F. In the past year, what was your:

Job/occupation:



Asbestos Disposable Procedure

Position/job title:

RECENT MEDICAL HISTORY

13. A. Do you consider yourself to be in good health? Yes ___ No ___

If "No" please state reason:

B. In the past year, have you developed:	YES	NO
Epilepsy	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

CHEST COLDS AND CHEST ILLNESSES

14. If you get a cold, does it "usually" go to your chest? Yes ___ No ___ Don't get colds ___
(Usually means more than 1/2 the time)

15. A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? Yes ___ No ___

IF YES:

B. Did you produce phlegm with any of these chest illnesses? Yes ___ No ___ Does Not Apply ___

C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number illnesses ___ No such illnesses ___

RESPIRATORY SYSTEM

16. A. In the past year have you had: YES NO Further Comment on Positive Answers

Asthma	___	___	_____
Bronchitis	___	___	_____
Hay fever	___	___	_____
Other allergies	___	___	_____
Pneumonia	___	___	_____



Asbestos Disposable Procedure

Tuberculosis _____

Chest surgery _____

Other lung problems _____

Heart disease _____

B. Do you currently have: YES NO Further Comment on Positive Answers

Frequent colds _____

Chronic cough _____

Shortness of breath
when walking or
climbing one flight of
stairs _____

C. Do you: YES NO Further Comment on Positive Answers

Wheeze _____

Cough up phlegm _____

Smoke cigarettes _____ Packs per day _____ How many years

Other lung problems _____

Heart disease _____

Signature _____ Date _____

Print name _____



Asbestos Disposable Procedure

Attachment 3 - EOM-KSH-TP-000014 - Employee Asbestos Medical Surveillance Exam Results Template

Reviewing physician or other licensed health care provider (PLHCP): Please keep this form confidential and do not disclose to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos. A completed copy of this form shall be returned to the employee's employer and a copy shall also be provided to the employee.

EMPLOYEE NAME: _____

EMPLOYEE ID NUMBER: _____

JOB TITLE: _____

COMPANY AND LOCATION: _____

DATE OF EXAM: _____

EXAM TYPE: ☐ **BASELINE/INITIAL** ☐ **ANNUAL/PERIODIC** ☐ **EXIT** ☐ **FOLLOW-UP**

Based on the information provided by the employee and on the physical examination performed:

- ☐ No medical condition was detected that would place employee at increased risk of health impairment as a result of work with asbestos.
- ☐ A medical condition(s) was detected which may place employee of increased risk of health impairment as a result of work with asbestos. The following work limitations should be imposed:

- ☐ Employee has been informed of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

- ☐ Employee **is** medically qualified to perform work in an asbestos environment.
- ☐ Employee **is not** medically qualified to perform work in an asbestos environment.

I have explained the results of the medical examination to employee, including any medical conditions related to asbestos exposure that require further evaluation or treatment, and any special provisions for use of protective clothing or equipment.

PLHCP's Signature

PLHCP's Printed Name

Date