



DGS Safety Manual Element P Safety Protocols for Standard Operating Procedures when Applicable to the Workplace and Workplace Environments

SAFETY PROTOCOLS OR STANDARD OPERATING PROCEDURES WHEN APPLICABLE TO THE WORKPLACE AND WORKPLACE ENVIRONMENTS

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Electrical and Machine Guarding

I. Electrical Safeguarding Program

A. Policy Statement

DGS employees shall not be exposed to electrical hazards that may cause injuries or fatalities. Equipment shall be inspected to ensure all hazards are controlled. Unsafe equipment shall be taken out of service. If maintenance must be done on electrical systems, electrical power servicing the equipment or systems shall be de-energized, and locked out, if required by the lockout/tagout program.

All employees must be properly instructed concerning electrical hazards in their workplaces and understand the necessary safe work practices to avoid injury. Specific electrical hazards in each department shall be addressed to employees that have responsibilities to operate equipment.

B. Examination, Installation, and Use of Electrical Equipment

All electrical equipment shall be installed and examined to ensure it is free from recognized hazards that are likely to cause death or serious physical harm to employees. Proper safety shall be determined by using the following considerations:

- Suitable installation of Underwriters Laboratory listed and labeled equipment and use per OSHA standard 29 CFR 1910, Subpart S and the National Electrical Code, NFPA-20.
- Proper mechanical strength and durability, including parts enclosing and protecting equipment.
- Protection from heating effects under normal usage.
- Arc protection
- Proper classification by type, size, voltage, current capacity, and specific use.
- Any other factors that should be considered to ensure employee safety.

C. Working Clearances

Indoor areas containing electrical equipment; such as disconnects and electrical panels shall be maintained in a clean and orderly fashion, shall not be used as storage, and will have adequate illumination. Objects shall not be placed within 36 inches of the front of an electrical panel.

II. Machine Guarding

A. Policy Statement

One or more methods of machine guarding or controls must be used to protect the operator and others in the machine area from hazards such as:

- Points of operation, such as saw blades, and metal shears;
- In-going nip points, such fan belts and chain drives;
- Rotating parts, such as fan blades, grinder wheels, motor shafts, and power take-off shafts;
- Flying chips and sparks, such as from grinding and welding operations.

Machine Guarding requirements and procedures to be used as per OSHA 29 CFR 1910, Subpart O and P; should be followed.

The supervisor or manager shall ensure all required guards are in place. Factory installed guards must not be removed or altered. Employees should be informed to not operate equipment that is not guarded properly. Equipment that is not guarded properly must be taken out of service until guards are replaced. Two hand controls may be used for equipment that cannot be guarded effectively. The area supervisor is responsible to ensure all safety aspects of the machine guarding program are consistently implemented. If two-hand controls are used to provide protection, the supervisor shall ensure that the control systems operate properly before the machine is used.

B. Maintenance Operations

If maintenance operations require guards to be removed for servicing of equipment, require other controls to be disabled, or the employee must place any part of his body in a hazardous area, the equipment must be de-energized before maintenance begins. If the equipment can be locked-out, locks and tags should be installed according to the requirements of the DGS Lockout/Tagout program. Equipment that cannot be locked out shall be tagged in the de-energized position. Exceptions include plug and cord type equipment where the maintenance person maintains control of the plug, and mobile equipment such as tractors and other power equipment. Mobile equipment shall be shut down during maintenance that requires guards to be removed.

C. Inspections

Area supervisors shall, on a monthly basis, inspect all equipment to ensure that guards are installed as required. The attached checklist shall be used for inspections. **Completed checklists shall be returned to the Bureau Director or Section Chief responsible for the equipment.** Equipment that is not guarded properly must be taken out of service until the guards are replaced.



Machine Guarding Inspection Checklist

Equipment:

Date: _____ Location: _____ Conducted By: _____

Mechanical Hazards	Yes	No
<i>The point of operation :</i>		
1. Is there a point-of-operation safeguard provided for the machine?		
2. Does it keep the operator's hands, fingers, and body out of the danger area?		
3. Are safeguards in place and not altered?		
4. Are fans and compressors properly enclosed?		
<i>Power transmission apparatus :</i>		
1. Are all gears, sprockets, pulleys, motor shafts, power take-off shafts and/or flywheels properly guarded?		
2. Are all belts and chain drives properly guarded?		
3. Are all setscrews, key ways, or collars properly guarded?		
4. Are starting and stopping controls within easy reach of the operator?		
<i>Other moving parts :</i>		
1. Are safeguards provided for all hazardous moving parts of the machine, including auxiliary parts?		
Non-mechanical Hazards		
1. Have special guards, enclosures, or personal protective equipment been provided, where necessary, to protect workers from exposure to harmful substances used in machine operation?		
Training		
1. Do operators and maintenance workers have the necessary training in how to use the safeguards and why? _____		
2. Have operators and maintenance workers been trained in where the safeguards are located, how they provide protection, and what hazards they protect against?		
3. Have operators and maintenance workers been trained in how and under what circumstances guards can be removed?		
4. Have workers been trained in the procedures to follow if they notice guards that are dangerous, missing, or inadequate?		
Machinery Maintenance and Repair		
1. Have maintenance workers received up-to-date instruction on the machinery they service?		
2. Do maintenance workers lock out the machine from its power sources before beginning repairs where the guard must be removed?		
3. Where several maintenance persons work on the same machine, are multiple lockout devices used?		
4. Do maintenance persons use appropriate and safe equipment in their repair work?		
Other Items to Check		
1. Are emergency stop buttons, switches, or bars provided?		
2. Are two hand control provided where required?		
3. Are the emergency stops clearly marked and painted red?		
4. Are there warning labels or markings to show hazardous areas?		
5. Are the warning labels or markings appropriately identified by yellow, yellow and black, or orange colors?		

P-2

Personal Protective Equipment (PPE)

I. Policy Statement

Employees of the Department of General Services (DGS) shall be protected from hazards in the workplace that can result in injury to the head, hands, feet, eyes, face, respiratory system and other parts of the body. This program describes the personal protective equipment (PPE) program to protect employees from such hazards. The program includes:

- Assessment of hazards in various operations to determine whether employees are likely to be exposed to potential injury or exposures to chemicals.
- Assigning personal protective equipment such as hard hats, respirators, gloves, protective clothing, eye and face protection.
- Training employees to ensure they know how to use the PPE and the reasons for the PPE.
- Monitoring the situations requiring the use of PPE to ensure the proper equipment is selected and used.
- Periodic re-assessment of the PPE program to ensure the employee continues to be protected.

Note: Refer to the Hearing Conservation Program for the use of Hearing Protection.

II. Responsibilities

A. Safety Coordinator

- Maintain this written program.
- Assist in the hazard assessment and suggest appropriate PPE.
- Provide the Deputy Secretaries/Bureau Directors/Division Chiefs and/or Supervisors, as appropriate with the knowledge and information to conduct required training as outlined in this program.
- Request assistance from the Safety and Health Consultant to conduct Job Hazard Assessments as necessary.

B. Bureau Directors

- Ensure workplace hazard assessments are conducted and proper PPE is selected by Division Chiefs, Building Managers, or Supervisors.
- Assist the Safety Coordinator with the development of additional workplace hazard assessments, when new hazards are present in the workplace.
- Obtain proper PPE and make available to employees.

C. Division Chiefs/Building Managers/Supervisors

- Train employees in the requirements outlined in this program.
- Maintain a copy of the Job Hazard Assessment and PPE Assignment form applicable to their organization or area of responsibility.
- Provide the Job Hazard Assessment and PPE Assignment form to employees, including new employees assigned to the organization..
- Provide PPE to the employees upon initial assignment and when the PPE is broken or defective.
- Enforce the use of required PPE.
- Support and ensure that all elements of this program are implemented completely for the protection of all employees.

D. Employees

- Comply with all DGS safety rules and regulations concerning PPE.
- Properly maintain and sanitize their PPE.
- Avoid the use of damaged or defective PPE.
- Contact their supervisor if they need to be issued new or additional PPE.

III. Job Hazard Assessment and Assignment of PPE

The Division Chiefs/Building Managers/Supervisors and Safety Coordinator will conduct the workplace job hazard assessments and assign required PPE to protect against hazards that are present, or will likely be present. The Safety Consultant may be requested to assist with the hazard assessments.

A. Head Protection

Each employee shall wear an approved hardhat when working in areas where there is a potential for head injury from falling or overhead objects. The specific type of protective hardhat shall comply with ANSI Z89.1-1997 Standards. The Type II hardhat intended for impact resulting from a blow that may be received off center or to the top of the head shall be used.

B. Hand Protection

Employees shall wear appropriate hand protection when exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes. The type of hand protection used will be dependent on the hazard(s) present as identified in the workplace job hazard assessment.

The Safety Coordinator and the Division Chiefs/Building Managers/Supervisors shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the following:

- Task(s) to be performed
- Dexterity required.
- Conditions present.
- Duration and frequency of use.
- Degree of exposure of the hazard.
- Physical stress that will be applied.
- The hazards and potential hazards identified.

In addition to the above, the factors below shall be considered when selecting chemical resistant gloves:

- The toxic properties of the chemical, in particular the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- The chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials. The employees' ability to remove the glove without skin contamination.

Manufacturer recommendations shall be followed, when selecting gloves for protection against chemical hazards.

C. Respiratory Protection

Respirators may be required, if deemed necessary, to protect employees from systemic effects or irritation caused by the inhalation of harmful substances or dusts. Respirators are selected based upon the following criteria:

- The chemical characteristics of the exposure agent, such as, whether the chemical is an organic hydrocarbon, acid, toxic dust, or nuisance dust, for example.
- The toxicity of chemical or material to which the employee is exposed.
- The duration of the exposure.
- The physical state of the exposure agent, whether it is a gas, vapor, dust, mist or fume.
- Whether the respirator is required to protect the employee from a toxic substance, or whether the respirator is used on an optional basis for comfort reasons.

In addition, the respiratory protection program shall include:

- Medical evaluation of employees who are required to use respiratory protection.
- Employee training which shall include fit testing, use and limitations of the respirators. Training shall be completed annually and fit testing shall be conducted every six months. Training shall be completed by the equipment vender, Safety Consultant or a 'Competent Person' within the agency. For a definition of a 'Competent Person', refer to the OSHA standard for respiratory protection 29 CFR 1910.133.
- Requirements that non-disposable respirators shall be cleaned after each use and stored in a clean and sanitary location.
- Issuing respirators for individual use.
- Requirements for replacing respirators or cartridges on a programmed basis.
- Requirements that the employee clean and sanitize respirators that will be reused.

D. Eye and Face Protection

If employees may be exposed to eye hazards such as flying particles, sparks, dusty environments, splashing liquids, etc., the employees must be provided with effective eye protection. This may include safety glasses, face shields, chemical splash goggles, or welding goggles or helmets. Employees shall be provided with the required eye protection and trained in the proper use. The employee is responsible to ensure the equipment is used where required and is maintained in serviceable condition.

E. Roadside Personal Protective Equipment

Employees who may work close to highways, streets/roads or construction sites containing heavy machinery must wear high visibility vests. High visibility clothing must meet ANSI class II garment visibility requirements. High visibility vests must be worn over the employees clothing in order to be effective. Employees who work within **10 feet of any roadway** must wear high visibility garments. Employees shall be provided high visibility garments by the employee's supervisor. For more information on the ANSI standard, vests and garments which fall under the ANSI standard, and proper usage of personal protective equipment, please contact the DGS Fire, Safety & Environmental Section.

IV. Training

The Division Chiefs/Building Managers/Supervisors shall provide training to employees in the proper use of PPE. Training can also be obtained from the equipment vender or the Safety Consultant.

Training shall generally include:

- The type of PPE that is used for each job.
- Proper methods for donning the PPE.
- Methods to clean and sanitize PPE.
- Limitations of the PPE.
- Responsibility to replace PPE when it becomes damaged or it reaches the end of service life.
- Proper storage of PPE.
- Qualitative fit testing for negative pressure respirators

Each employee shall physically demonstrate an understanding of the training, information and an ability to use the PPE properly before being allowed to perform any task requiring PPE. Written training records for each employee detailing the extent of training received and the date it was received will be documented in employee training files.

V. Replacement of PPE

PPE shall be replaced when it becomes damaged or is no longer serviceable. For example, the following guidelines can be used for replacement of PPE:

- Chemical resistant gloves shall be replaced when they show signs of deterioration or wear, or when they have been penetrated by the chemicals.
- Disposable gloves shall be disposed of after a single use.
- Hard hats shall be replaced if the shell or support system becomes damaged or they become outdated.
- Disposable respirators shall be disposed of after use.
- Reusable respirators shall be replaced when the face piece shows signs of wear or damage, or if the straps or inhalation/exhalation valves become damaged.
- Organic vapor or acid mist respirator cartridges shall be replaced when they have reached the end of the service life based on the exposure intensity and duration. The cartridges shall also be replaced if the end-of-life-indicator shows the cartridge to be expired or if breakthrough is detected.

VI. Periodic Assessment of the Program

The Bureau Directors and the Safety Coordinator shall periodically review the PPE program to ensure it continues to provide the desired level of protection. In particular, the program should be reviewed to assess whether there are any new hazards that are not controlled, whether employee training is effective, and whether employees are using PPE as required. The Job Hazard Assessment and PPE Assignment form shall be updated as necessary. The Bureau Directors shall ensure updated information is communicated to employees.

**Department of General Services
Job Hazard Assessment and PPE Assignment*
Grounds Keeping and Building Maintenance**

Operation	Employees Exposed	Hazards	PPE Required
Lawn mowing and weed trimming	Grounds keeping staff	Flying stones and dust	Safety glasses
Applying liquid fertilizer	Grounds keeping staff	Chemical vapors and mists, chemical exposure to the skin	Face shields or safety glasses, chemical resistant gloves such as neoprene or nitrile, coveralls or protective suits.
Cutting trees and brush	Grounds keeping staff	Flying and falling objects and tree branches	Face shields, hard hats
Cleaning with chemical cleaners	Housekeeping and building maintenance, building operations	Acids or caustic liquid exposure to the skin and eyes	Face shields or safety glasses, chemical resistant gloves such as neoprene or nitrile
Maintenance on building equipment	Building maintenance	Flying particles and dusty environments	Safety glasses
Pesticide application	Grounds keeping staff	Chemical vapors and mists, chemical exposures to the skin, eyes and respiratory tract.	Safety Goggles, chemical resistant gloves, such as neoprene or nitrile, and protective suits and respiratory protection with organic vapor and HEPA filtration cartridges, if deemed necessary by Capital grounds management.

* For hearing protection, refer to the Hearing Conservation Program.

**Department of General Services
Job Hazard Assessment and PPE Assignment*
Shop Workers and Trades Workers**

Operation	Employees Exposed	Hazards	PPE Required
Operating power tools such as drills, saws, grinders, table saws	Carpenters, Shop workers	Flying particles	Safety glasses
Painting with solvent based paints	Painters	Paint mist, organic vapors, and liquid solvent exposure to the skin.	Safety glasses, respirators with organic vapor cartridges and paint mist pre-filters, chemical resistant gloves

* For hearing protection, refer to the Hearing Conservation Program.

**Department of General Services
Job Hazard Assessment and PPE Assignment*
Environmental Response Team**

Operation	Employees Exposed	Hazards	PPE Required
Asbestos abatement	Abatement workers	Asbestos	Safety glasses, full body protective clothing, gloves, respirator with HEPA filters
Confined space entry	Entry personnel	Defined for each space, refer to the confined space entry program	Defined for each space, refer to the confined space entry program
Surface preparation of lead based paint	Lead workers	Flying particles, lead dust	Safety glasses, disposable suits, gloves, respirator with HEPA filters

* For hearing protection, refer to the Hearing Conservation Program.

**Department of General Services
Job Hazard Assessment and PPE Assignment*
Commodities and Surplus Warehouse Workers**

Operation	Employees Exposed	Hazards	PPE Required
Placing or retrieving products from overhead storage	Warehouse workers	Head injuries from falling objects	Hard hats
Working in Warehouse	Warehouse workers	Flying particles and dusty environments	Safety glasses

* For hearing protection, refer to the Hearing Conservation Program.

**Department of General Services
Job Hazard Assessment and PPE Assignment*
Vehicle Maintenance Workers**

Operation	Employees Exposed	Hazards	PPE Required
Vehicle maintenance	Mechanics	Flying particles and dust while working under cars, operating brake lathe, grinders, and other shop equipment	Safety glasses
Operating degreaser	Mechanics	Solvent exposures to the skin and eyes	Safety glasses or face shield, chemical resistant gloves such as neoprene or nitrile

* For hearing protection, refer to the Hearing Conservation Program.



Department of General Services
Job Hazard Assessment and PPE Assignment*
Department or Location: _____

Operation	Employees Exposed	Hazards	PPE Required

* For hearing protection, refer to the Hearing Conservation Program.

P-3

Hearing Conservation

I. Policy

This operating procedure provides the minimum steps required for all affected Divisions or Bureaus to ensure that the Department of General Services' Hearing Conservation Program is successfully and consistently implemented.

This procedure is designed to protect the General Services personnel who perform work in areas where noise levels may exceed 85 decibels; A-weighted scale (dBA) over an 8 hour time-weighted average (TWA) in the completion of their job duties.

The OSHA standard 29 CFR 1910.95 provides the guidelines for the General Services Hearing Conservation Program.

Employees who are exposed to noise levels exceeding 85 dBA on an 8-hour time-weighted average (TWA) basis shall be included in the General Services Hearing Conservation Program. Aspects of the program include:

- Evaluation of noise exposures to employees.
- Initial and periodic training.
- Provision of hearing protection devices.
- Annual audiometric testing.

If employees are exposed over 90 dBA averaged over an 8-hour period, the following aspects of the Hearing Conservation Program also apply:

- The Safety Coordinator or Consultant shall assess whether noise exposures can be reduced below 90 dBA TWA using engineering controls.
- Hearing protection is **mandatory** if noise levels can not be reduced below 90 dBA.

II. Responsibilities

- A. Supervisors and Bureau Directors should evaluate their work areas and operations to determine if existing work (equipment, tools, etc.) appears to be generating excessive noise levels or if planned work may be expected to do so. If they are uncertain about exposure levels, they should contact the Safety Coordinator to discuss conducting a noise exposure assessment. When noise exposure hazards are identified, they should be eliminated or controlled to ensure employees are provided a workplace free of these hazards or where adequate controls are provided.
- B. Supervisors should ensure their personnel are familiar with this procedure, adhere to its guidelines, and are provided necessary hearing protection devices as necessary.
- C. The Safety Coordinator is responsible for evaluating the administration of this procedure. The Safety and Health Consultant is available to provide technical guidance, noise dosimetry and training.

III. Definitions

Sound: Rapid pressure variations which travel through an elastic medium (air) that are picked up by a receiver (the ear).

Noise: Unwanted sound (unwanted because of its interference with communication, irritation, annoyance, and possible loss of hearing).

Continuous Noise: A noise in which the noise remains essentially constant for a prolonged period of time.

“A Weighting”: An electrical network incorporated into a sound level meter that is designed to approximate the hearing response of the human ear.

Decibel: A non-dimensional unit used to express sound levels on a logarithmic scale.

Attenuate: To reduce the intensity.

Temporary Threshold Shift: Temporary loss of hearing that is recoverable after a period of time. Typical frequencies at which the temporary threshold shift occurs are 4000 to 6000 hertz.

Standard Threshold Shift: A change relative to a baseline of 10 dB or more in the average hearing level at 2000, 3000, and 4000 hertz in either ear.

Presbycusis: Hearing loss related to aging.

Conductive Hearing Loss: Hearing loss not associated with physical damage to the inner ear, but is due to the interference with normal transmission of vibration to the inner ear.

Sensor-Neural Hearing Loss: Hearing loss associated with poor transmission of sounds by the nerve pathways to the brain due to damage to the nerves.

Noise Induced Hearing Loss: A cumulative, permanent loss of hearing in the inner ear, which develops over a period of long noise exposure. Noise induced hearing loss usually affects both ears equally.

Audiogram: A chart or table showing hearing level (ability) as a function of the sound frequency and left or right ear.

Audiologist: A person trained in specialized problems of hearing and deafness.

Audiometer: An instrument that measures a person’s hearing ability.

Hair Cells - Sensory receptors for sound stimuli located in the cochlea (inner ear).

Tinnitus: A subjective sense of noises in the head such as ringing, humming, or buzzing in the ears for which there is no observable external cause.

Hearing Conservation: A five-part program, which involves exposure evaluation, audiometric testing of employees, use of hearing protection, employee training, and recordkeeping.

Action Level: 85 dBA over an 8-hour TWA, the exposure level at or above which employees must be included in a hearing conservation program.

IV. Noise Exposure Evaluations

Noise exposure evaluations should be conducted by an Industrial Hygienist to determine if high noise work tasks are performed by General Services' employees. An appraisal of each exposure should be made to determine the most effective prevention and control strategies and whether employees should be included in a Hearing Conservation Program. The following criteria and methods should be considered:

- When information indicates that any employee's exposure may equal or exceed an 8-hour TWA of 85 dBA, operations in that area should be evaluated with noise level measurements and preferably personal noise dosimetry.
- The sampling strategy must be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
- Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise makes area noise monitoring generally inappropriate, the analyst must use representative personal dosimetry.
- All continuous, intermittent, and impulsive sound levels from 80 dBA to 130 dBA must be integrated into the noise measurements.
- Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.
- Monitoring must be repeated whenever a change in equipment or controls increases noise to the extent that additional employees may be exposed at or above the action level; or the attenuation provided by the hearing protectors being used is no longer adequate.

V. Noise Control Approaches

Control strategies should be selected based on the following priority system:

1. Eliminate noise exposure through process (including engineering) controls.
2. Provide and assure the proper use of hearing protection devices.
3. Administratively protect people.

The following minimal controls should be implemented when noise exposures are identified. Where exposures to noise are at or above 90 dBA over an 8 hour TWA, the following methods to control noise should be considered:

- Engineering methods, i.e., physical changes that reduce the noise that is generated.
- Administrative methods, i.e., changes in scheduling or employee rotation that result in reducing the workers exposure by limiting exposure time.
- Personal protective equipment such as earplugs and ear muffs.

If noise can be brought below 85 dBA over an 8 hour TWA, through either sole use or a combination of engineering and administrative controls, then a hearing conservation program is not required.

Ideally, removing or reducing noise by engineering controls would be the best approach to control employees' exposures to noise and reduce the possibility of a noise induced hearing loss (NIHL).

Hearing protection is the most common method for reducing noise exposure to employees. A hearing protection device (HPD) is a device that can be worn to reduce the level of sound entering the ear. They fall into two general categories: Earmuffs and inserts. There are several types of each.

Since each employee is different, they will react differently to the variety of HPDs available. It is required that a variety (i.e., at least two) different types of devices be made available.

Fitting is a critical component of hearing protection use. If hearing protectors are not properly fitted, they are not as effective. The following guidelines apply:

- Each employee must learn the correct way to fit the hearing protectors they chose.
- The manufacturer's instructions for the specific hearing protectors should be read and followed.
- The audiologist or other individual administering the audiometric test should be able to provide instruction to the employer on proper fit.

As with any protective device, hearing protectors must be cared for and maintained. Reusable muffs and inserts require regular inspection, cleaning, sanitation, and proper storage.

It is important to note that the selected hearing protection must have the capability to attenuate noise at the ear to an 8 hour TWA of 90 dBA or to 85 dBA or below for employees who have experienced a standard threshold shift. The noise reduction rating (NRR) is a manufacturer's rating that is used to compare hearing protectors regarding their ability to attenuate noise. Actual noise reduction may be less than the NRR.

VI. Audiometric (Hearing) Testing

- A. Audiometric testing is critical to the success of hearing conservation programs. It is the only way to determine whether noise induced hearing loss has occurred and/or is being prevented by the hearing conservation program. This is done by comparison of baseline audiograms to annual audiograms. All employees who are exposed over 85 dBA averaged over an eight hour TWA must be provided with audiometric testing before the initial assignment in the area and annually thereafter.
- B. When a comparison of audiograms shows a standard threshold shift, temporary threshold shift, early permanent threshold shift, or progressive noise induced hearing loss has occurred, it is essential to take quick action to halt the loss before additional deterioration occurs. Because noise induced hearing loss occurs gradually, it is not typically accompanied by pain or other warning signs. The affected employee will not notice the change until a large standard threshold shift has occurred.
- C. Audiograms should be performed on the following five occasions:
- Pre-placement, or if not possible;
 - Within 6 months of an employee's first exposure at or above the action level;
 - Annually for as long as the employee is exposed to noise levels at or above the action level;
 - At the time of reassignment out of the area where employees are exposed to noise levels at or above the action level and/or
 - At the time of termination of employment.
- D. Audiometric tests must be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council for Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining, and checking calibration and proper functioning of the audiometer being used. A technician who operates microprocessor audiometers does not need to be certified. A technician must be responsible to an audiologist, otolaryngologist, or physician.

VII. Training

- A. Departments must provide education for all personnel who might be exposed to noise levels exceeding 85 dBA on an eight-hour TWA basis. The program must enable personnel to recognize the hazards and provide guidance in methods to minimize exposure to those hazards. The program shall ensure that each employee is informed of the following:
1. The effects of noise on hearing;

2. The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and
 3. The purpose of audiometric testing, and an explanation of the test procedures.
- B. Circumstances where additional training is required include, but are not limited to:
1. Changes in the workplace that render previous education inadequate; and
 2. Changes in regulations or health data that introduces new information that must be presented.
 3. Training is usually updated on an annual basis.

VIII. Program Review and Continuous Improvement

- A. The Safety Coordinator will evaluate the Hearing Conservation Program at least annually to ensure their effectiveness. The evaluation will be performed to ensure that the procedures are current and practical, and that the regulatory requirements are being implemented
- B. Modifications will be implemented and incorporated into the procedures within one month. When revisions are made to the procedures, General Services employees will be furnished with information regarding modifications.

IX. Record keeping

A. Hazard Evaluations

Hazard evaluations should be recorded and maintained in applicable department files.

B. Training

Each Bureau and the Safety Coordinator must maintain records of Hearing Conservation Training. The following minimum data must be recorded:

1. Name(s) of employee(s);
2. Date of training;
3. Proficiency results;
4. Instructor; and
5. Training summary.

C. Procedure Review

Records of annual procedure reviews must be kept by Safety Coordinator.

D. Audiometric Testing

Records of audiometric testing shall be maintained in the employee's confidential personnel file.

Appendix A: Site Wide Evaluation

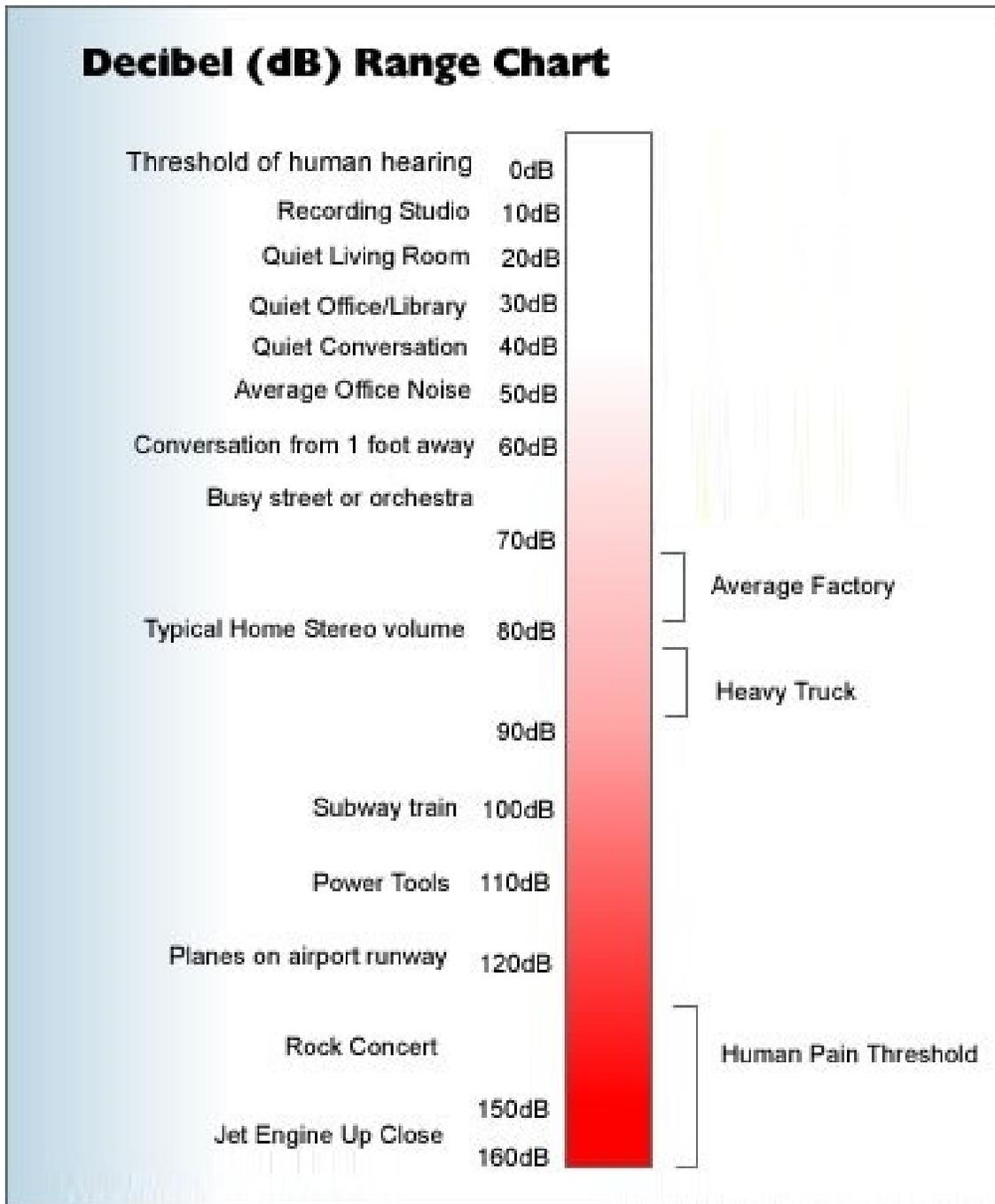
Required Hearing Protection (Points Reaching 90 DBA and above)

1. Central Plant
2. Finance Elevator Motor Room
3. Irvis Building Mechanical/Fan Rooms (Basement)
4. Finance (1st Floor) Fan Room D

Provided Hearing Protection (Points Reaching 85 DBA)

1. North Office Building (Basement) B26 – Mechanical Space – During Operation
2. Rachel Carson (Penthouse) Elevator Motor Room – During Operation
3. Rachel Carson (4th Floor) Mechanical Areas- During operation
4. Rachel Carson (1st Floor) Room 125 – During Operation
5. Ryan Building (Basement) Generator Room – During Operation

Appendix B: Industrial Noise Level Chart



P-4

Sight Conservation

Please refer to P-2
*Personal Protective
Equipment*

P-5

Lockout/Tagout

I. Overview

A. Policy Statement

An effective program shall be established to protect employees from the unexpected start-up, release of stored energy, or release of hazardous energies during maintenance and servicing on machines and equipment. The purpose of the program is to protect employees, contractors and the public from injuries that could be caused by the release of hazardous energy or the unexpected start-up of a piece of equipment. The program shall include training for authorized personnel, procedures for locking out equipment, provision of necessary equipment, and procedures to coordinate with contractors. This program applies to maintenance operations when an employee must remove a guard from a machine to perform maintenance or service, and/or when an employee must place any part of his body in a hazardous area or point of operation while performing an operation on that piece of equipment.

The program does not apply to equipment powered by a plug and cord, when the maintenance person can unplug the equipment and remain in control of the plug during the operation. The program does not apply to mobile construction or agriculture equipment, but such equipment shall be turned off, equipment lowered to the ground, and pressure released from mechanical and hydraulic systems before servicing.

NOTE: For non DGS managed buildings and/or leased spaces this program is not to override any existing lock out-tag out procedures developed by the building owner(s). If necessary this program can be used if there is no existing program or can be used to augment an existing program from the building owner/management. Contact your safety coordinator if you have any questions.

B. Applicability

All equipment that is capable of being locked out shall be locked out before maintenance or servicing operations. Equipment that cannot be locked out shall be tagged out of service. The program specifically applies to:

- HVAC fans and motors
- Other motor-driven equipment
- Heat pumps
- Shop equipment that is hard-wired to a circuit breaker or knife switch
- Building main electrical systems
- Water chillers and associated systems
- Any other equipment that has guards removed during servicing

Note that de-energizing high voltage electrical systems requires specific procedures and personal protective equipment to protect from arc flash and other hazards. High energy systems are outside the scope of this program. Refer to the High Energy Lockout Program.

II. Inspection of the Program

The Building Managers responsible for equipment covered by this program shall periodically and at least annually review operations to ensure all equipment and operations are considered in this program and all employees understand the requirements of the program. The Division Chief, Building Manager, or Supervisor shall complete the **Lockout and Tagout Log** (Attachment 1) specific to that buildings. These records shall be maintained in the Building Manager's office for at least one (1) year. Contact the Safety Coordinator if a new piece of equipment or operation is introduced into the workplace that requires a specific energy control procedure. Develop the energy control procedure using the **Equipment-Specific Lockout/Tagout Procedure** form (Attachment 2), post the procedure on the machine, and forward a copy to the Safety Coordinator.

III. Training

Training shall be provided to all employees who may work in systems that may have hazardous or stored energies. These employees are referred to as Affected Employees. Training shall also be provided to people who are authorized to lock out equipment. These employees are referred to as Authorized Employees.

Training shall include:

- The purpose of the lockout and tagout program.
- Recognition of energy sources that must be locked out.
- Procedures for locking and tagging equipment out of service.
- Requirements that equipment that is locked and or tagged must not be reenergized by anyone other than the Authorized Employee who locked out the system, or by his Supervisor.
- Understanding that equipment that is tagged out has the same requirements as equipment that is locked out.

Training shall be provided when an employee is assigned to a position requiring the use of this program, and when new equipment is introduced that presents new or additional hazards. The Supervisor shall document the training in the employee-training file.

IV. Contractors Coordination

Contractor activities on equipment that may expose DGS employees to hazardous conditions must be controlled with an effective lockout program. The Contractor may use the DGS program or may use an equally effective program. If DGS employees are placed at risk, or if there is a potential for equipment damage following an unauthorized start-up of equipment, the Division Chiefs, Building Managers, or Supervisors must control the situation with the DGS program, and the Contractor must protect his employees by joining in the lock-out process. The procedures for a multiple lockout are shown in Section V(C).

V. Energy Control Procedures

A. Equipment-Specific Lockout and Tagout Procedures

1. Minimum Requirements

For any equipment that is capable of being locked out, an equipment-specific lockout procedure must be developed and documented **unless all of the following are true:**

- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- The machine or equipment has a single energy source that can be readily identified and isolated (i.e. unplugged).
- The isolation and locking out of that energy source (such as a circuit breaker) will completely deenergize and deactivate the machine or equipment.
- The machine or equipment is isolated from the energy source and locked out during servicing or maintenance.
- A single lockout device will achieve a locked-out condition.
- The lockout device is under the exclusive control of the Authorized Employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.
- There have been no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing.

2. Development of a Lockout Procedure

Following are general procedures for developing a specific lockout procedure for a piece of equipment or machine. The **Equipment Specific Lockout/Tagout Procedure** form (Attachment 2) shall be used to document the lockout procedure. An example lockout procedure is shown in Attachment 3. A copy of the completed form shall be maintained in the Bureau or Building office and a copy shall be posted on or near the machine or equipment.

- a. Identify all energy sources for the piece of equipment, including, electrical, mechanical, pressurized systems, and stored energies.
- b. Identify the locations where the energy sources must be locked out.
- c. Identify the specific order that the machine or piece of equipment must be locked out.
- d. Notify building management that the equipment will be locked out.
- e. Apply the lockout to **control all energies**. This may include blocking mechanical equipment, discharging capacitors, blocking steam or pressurized lines, as well as opening circuit breakers.
- f. Verify equipment is deenergized at all energy sources.
- g. Document the start-up procedure.

3. Multiple Lockout Systems

If multiple locks are required to control all of the energies in a system, the Bureau Director shall establish a program to ensure all aspects of the system remain safe until the system is ready to be returned to service. All locks must stay in place until guards are replaced, system parts are replaced, blocks are removed, and all personnel are out of the system. All keys from a multiple lockout system shall be placed in a lock box, and all Authorized Employees shall place their locks on the lockbox. The Division Chief, Building Manager, or Supervisor shall also place his lock on the box. The Division Chief, Building Manager, or Supervisor shall remove his lock only after all other personnel have removed their locks. The system can be then returned to service using normal procedures.

B. General Lockout and Tagout Procedures

Following are the general procedures to be followed to conduct a lockout when all eight conditions in V (A)(1) are met.

1. Procedures to Initiate a Lockout

- a. The Authorized Employee obtains a lock and/or tag from: during normal working hours the building manager, after normal working hours from the control center.
- b. A building specific lockout-tag out log of all equipment locked-tagged out will be maintained in the specific building manager's office as well as an emergency log to be kept in the Control Center.
- c. Each log will have 5 locks uniquely identified to that building and lock out-tag log. There will be no limitations for the tags.
- d. The log shall be completed to indicate the equipment that is to be locked out, the reason for the lockout, and the name of the Authorized Employee.
- e. The Authorized Employee turns off the equipment at the switch or control panel.
- f. The Authorized Employee opens the knife switch or circuit breaker and applies the lock and tag. The tag shall be noted with the name of the Authorized Employee, the equipment to be locked out, and the reason for the lockout. The Authorized Employee retains the key to the lock so only that person can reenergize the system.
- g. Before beginning maintenance, the Authorized Employee shall cycle the main operating control on and then off to ensure the system is de-energized. Ensure the operating control is in the off position. The equipment is now locked out.

2. Transferring a Lockout

If an operation or piece of equipment must remain locked out for more than one shift, the lockout shall be transferred to a new Authorized Employee or the control center. The key is transferred to the new employee or the control center and the log updated to indicate the change in responsibility. Note the equipment must remain locked out

as long as guards are removed or the equipment is disassembled or unsafe. If a lockout must be removed and the Authorized Employee has left the area, only his Supervisor is authorized to remove a lock, and only after the area is inspected and the safety of the systems is ensured.

3. Procedures to Remove a Lockout

- a. After the maintenance is complete, the Authorized Employee shall ensure the guards are replaced, tools and equipment are removed from the area, and people in the area are clear of the machine or operation.
- b. Notify building management that the machine or equipment will be reenergized.
- c. The operating switch must be turned off.
- d. The Authorized Employee removes the lock and tag and re-energizes the system.
- e. The system is restarted following normal procedures.
- f. Verify normal operating conditions.
- g. The lock is returned to the building manager or Control center and the log(s) is updated to indicate the date and time the lockout was released.

4. Equipment for the Lockout and Tagout Program

Equipment used for the lockout program shall be durable, substantial enough to prevent removal without the use of excessive force, and standardized with respect to shape or color. Tags should be standardized with respect to color and format, durable, and indicate the identity of the Authorized Employee and the reason for the lockout.

C Procedures for Coordination with Contractors

If Contractors are working on a piece of equipment and DGS employees are at risk, the Division Chief or trade Supervisor shall ensure the equipment is fully locked out before work begins. The Contractor and Division Chief, trade Supervisor shall jointly conduct the lockout procedure. A multiple lock hasp shall be placed on the lockout, and the Contractor and Division Chief, or Trade Supervisor shall both place locks on the hasp.

At the completion of the activity, the Contractor shall verify all Contractor equipment and personnel are out of the area, and the machine is safe to restart. The Contractor then removes his lock or locks. Then the Division Chief, or trade Supervisor conducts the start-up procedure and removes the DGS lock only after he confirms the system is safe to reenergize.

VI. Documentation

The trade Supervisor shall ensure that the **Lockout and Tagout Log** (Attachment 1) is completed for each lockout operation. The log shall be retained for a year in the building manager's office for the work that was completed. The Division Chief or Supervisor shall ensure all training records are maintained according to agency procedures.

Appendix B
Equipment-Specific Lockout/Tag-out Procedure

Procedure #:	Page #:
---------------------	----------------

Equipment Information		
Equipment:	Location:	
Inventory #:	Model #:	Serial #:
Energy Information		
Energy Type	Lock Location	Special Equipment Required
Shutdown Procedure		
1. 2. 3. 4. 5. 6.		
Verification Procedure		
1. 2.		
Startup Procedure		
1. 2. 3. 4. 5. 6.		
Prepared by:		Date:
Reviewed by:		Date:
Reviewed by:		Date:

See the back of this form for a diagram of the lockout/tagout needs of this equipment, if available.

Appendix C

Example Equipment-Specific Lockout/Tag-out for Boiler

Equipment Information		
Equipment: Boiler/vaporizer system (2units- large and small)		Location: Outside of the Facility (N ₂ tank farm)
Inventory #:	Model #:	Filename: Outside boilers
Energy Information		
Energy Type	Lock Location	Special Equipment Required
Electric – disconnect switch (main controls)	At unit	Lock and tag
Electric – disconnect switch (recirculation pump)	At unit	Lock and tag
Natural gas (small vaporizer) – large ball valve	At base of small vaporizer unit	Large ball valve lockout device, lock, and tag
Natural gas (small vaporizer) – large ball valve	At base of large vaporizer unit	Large ball valve lockout device, lock, and tag
Liquid nitrogen (LN ₂ Tank 1) – large ball valve	At base of LN ₂ Tank 1, labeled V.51.1	Large ball valve lockout device, lock, and tag
Liquid nitrogen (LN ₂ Tank 2) – large ball valve	At base of LN ₂ Tank 2, labeled V.51.2	Large ball valve lockout device, lock, and tag
Shutdown Procedure		
<ol style="list-style-type: none"> 1. Notify all affected employees and department of impending shutdown and lockout 2. Move unit control disconnect switch to the off position, attach lock and tag 3. Move unit recirculation pump disconnect switch to the off position, attach lock and tag 4. Close natural gas ball valve for the small vaporizer, located at the base of the unit, attach large ball valve lockout device, lock, and tag 5. Close natural gas ball valve for the large vaporizer, located at the base of the unit, attach large ball valve lockout device, lock, and tag 6. Close liquid nitrogen ball valve for LN₂ tank 1, attach large ball valve lockout device, lock, and tag 7. Close liquid nitrogen ball valve for LN₂ tank 2, attach large ball valve lockout device, lock, and tag 8. Apply multiple locks on hasp for each person performing work on system 		
Verification Procedure		
<ol style="list-style-type: none"> 1. Retest unit for power 		
Startup Procedure		
<ol style="list-style-type: none"> 1. Verify all employees are clear of the equipment 2. Remove locks and tags 3. Move unit controls disconnect switch to the on position 4. Move unit recirculating pump disconnect switch to the on position 5. Open natural gas ball valves for both system vaporizers 6. Open liquid nitrogen ball valve for LN₂ tank 1 7. Open liquid nitrogen ball valve for LN₂ tank 2 8. Start equipment 9. Verify proper operation 		
Prepared by: Peter Power pack		Date:
Reviewed by:		Date:

This procedure must be used when performing maintenance and service on this equipment. All energy sources must be locked out. This procedure must be performed by Authorized Personnel only.

P-6

Hazardous Material & Waste (Worker Right to Know Program)

Comments and Questions Regarding This Manual Section Should Be Directed To:
The DGS Safety Coordinator at 717-346-1526 or email at apreston@pa.gov or mail at:
Andy Preston
403 North Office Building
Harrisburg, PA 17125

I. General

Act 1984-159, the Worker and Community Right to Know Act of October 5, 1984, commonly called the “Right to Know” or “R2K” Act, is a State law referencing the handling and storage of hazardous chemicals. The purpose this program is to inform:

A. Employees of:

1. Hazardous substances stored and/or used in the workplace;
2. The hazards they pose; and
3. The precautions that should be taken when using/disposing such substances or being potentially exposed to them; and

B. The community and emergency services of what hazardous substances are present, and where they are located, in order to protect themselves and be better prepared in case of an emergency.

The Department of Labor and Industry (L&I) administers the R2K Act. The Bureau of Worker and Community Right to Know, L&I, provides training and technical assistance for implementation of the law and is responsible for enforcement.

II. Policy

Employees, the general public and emergency service organizations shall be provided information on hazardous chemicals in accordance with the Pennsylvania Community and Worker Right to Know Act (R2K).

III. Exemptions to the Act:

A. “Articles”: manufactured items in a shape or design which have an end use function and which, under normal conditions, do not release harmful chemicals (i.e. chairs, paper, etc.). Note: Self-contained cartridges, such as toner cartridges, are considered an “article,” and therefore exempt.

B. Products intended for personal use or consumption by the employee.

C. Products primarily intended for sale on the retail market to the general public and sealed in a package.

D. Food, drugs, cosmetics as defined in the Federal Food Drug and Cosmetic Act, and tobacco products as defined under the Federal Cigarette Labeling and Advertising Act.

E. Consumer products packed in containers which are primarily designed for distribution and use by the general public.

F. Research and development laboratory products need not meet all the requirements of this law.

G. Sealed packages.

IV. Responsibilities

A. DGS Fire, Safety and Environmental Section will:

1. Develop and maintain Department-wide implementation guidelines.
2. Provide technical Hazardous handling, exposure and disposal assistance to any/all DGS supervisors.
3. Monitor compliance with all the requirements of the Act.

B. Supervisors are responsible to ensure:

1. Posters:

The R2K Employee Workplace Notice, Attachment 2, is posted on work area official bulletin board(s) where mandatory employee notices are posted.

2. Hazardous Substance Survey Forms(HSSF):

a) An area Hazardous Substance Survey Form (HSSF) is completed annually prior to April 1 of each year.

b) The HSSF must be posted on official bulletin board(s) where mandatory employee notices are posted, and a copy sent to the building manager where the work area is located and to the DGS Safety Coordinator. *Note: if no hazardous substances are located in the work area, complete a work area HSSF, indicating “negative” in column B.*

- c) To complete an HSSF Option 1 (Attachment 1) is preferred but if Option 1 is impracticable Option 2 is acceptable.
- d) If the workplace is comprised of several work areas which are distinct from the workplace, a HSSF should be completed for each work area and all work area HSSFs should then be combined into one workplace HSSF.
- e) For DGS managed buildings; a copy of all HSSF and MSDS will be sent to the Building Manager to combine into an area HSSF.
- f) If the office is the sole occupant of a leased building, the supervisor is responsible for the workplace HSSF.
- g) If the office is located in a leased building of mixed occupancy (other Departments and/or private firms) each DGS office/bureau must consider itself a workplace for completing the HSSF and other R2K responsibilities.

3. Material safety Data Sheets:

- a) The required Material Safety Data Sheets (MSDS) are obtained for all hazardous substances stored and/or used in the work area.
- b) Place MSDS in locations easily accessible to all employees, during normal work hours, without having to request permission or intervention from their supervisor/manager. They should be filed for quick and easy access in case of emergency.
- c) Provide a copy of an MSDS to an employee within five days of receiving a written request. If not in possession of the requested MSDS, try to obtain it from the manufacturer, or other source, within 15 days. Inform the employee in writing (within five working days of receiving his/her written request) of your action(s). If the requested MSDS is not provided or an attempt to get it is not taken, the employee has the right to refuse to work with that particular substance. Reassignment of an employee to other work, at equal pay and benefits, is not considered a penalty.

4. Ensure TRAINING is provided:

- a) R2K awareness training is provided for all DGS employees during orientation.
- b) Specific R2K training is provided annually for employees working with hazardous substances (see Section E.2).
- c) Written R2K training records are maintained (see Section E.3).

d) To inform employees of their right to request information from the Department of Labor and Industry (L&I) or to complain to L&I if they believe that their rights under the R2K Act were violated. Requests for information or complaints should be addressed to L&I, Bureau of Right to Know 7th and Forster Streets, Harrisburg, PA 17120.

5. Labeling

a) Ensure that all containers and ports of pipelines of hazardous substances are properly labeled with a sign, emblem, sticker, tag or mark affixed or stenciled onto the container.

b) The label must contain:

- (1) The chemical name or common name of the substance;
- (2) Hazard warnings if any (i.e., health, flammability, reactivity, explosive, and/or personal protection);
- (3) The name, address and phone number of the manufacturer.

c) If a container is already labeled by the manufacturer, and the label contains the aforementioned information, it does not have to be relabeled by the employer.

d) When a hazardous substance is transferred from a labeled container into another container for immediate and complete use by the employee performing the transfer, the “other” container does not have to be labeled. However, if left unattended, it must be labeled,

6. Records:

Ensure that R2K medical/exposure records are forwarded to HR and the Safety Coordinator.

7. Disposal

a) All hazardous materials are disposed of according to the information contained on the MSDS.

b) Contact the manufacturer or the Safety Coordinator for any technical assistance.

C. Storeroom/Warehouse manager/clerk is responsible for:

1. Collecting MSDSs for all hazardous substances received. If an MSDS is not available, contact the supplier.

2. Distributing copies of the MSDS to:
 - a) Right to Know Coordinator
 - b) Work area supervisor/unit head where the hazardous substance is to be stored or used.
3. Verifying that all containers of hazardous substances are appropriately labeled.

D. Human Resources Office is responsible for ensuring that:

1. New employee orientation program includes a R2K session;
2. R2K training records are established and maintained;
3. R2K medical/exposure records are kept in the human resources office in a separate, secure, and confidential file, not part of the Official Personnel File, for at least 30 years beyond the employee's termination. Refer to Attachment 3 for details.

V. Training

The following R2K training must be provided:

A. R2K awareness training to all employees within 120 days of employment and later as deemed necessary. The content of this R2K awareness training should include the following information:

1. The provisions of the R2K Act;
2. The location of the Employee Workplace Notice;
3. The location of the HSSF;
4. The location of the MSDSs;
5. The identity of the Right to Know Coordinator;
6. The employee's right to access their own exposure record (Attachment 3).
7. How to determine that proper handling and disposal techniques for any/all hazardous materials.

B. Specific R2K training on hazardous substances for those employees working with or potentially exposed to hazardous substances. This training must be provided:

1. Within 120 days of employment;
2. Whenever the potential for exposure to hazardous substances is different from that for which training was previously provided (i.e. new hazardous

substances have been introduced, employee has been reassigned to different work area, new and significant information concerning hazardous substance is received, etc.); and

3. Annually thereafter.

Note: the content of this specific R2K training should include the following information, most of which can be found in the hazardous substances' MSDSs:

- a. Location of the hazardous substance;
- b. Location of the MSDS for the hazardous substance;
- c. Chemical or common name;
- d. Properties;
- e. Hazards (flammability, explosive, etc.);
- f. Acute and chronic health effects;
- g. Symptoms arising from exposure;
- h. Appropriate personal protective equipment (PPE) and proper condition for safe use;
- i. Appropriate emergency treatment;
- j. Emergency procedures for spills, fire, etc.;
- k. Reminded of employee's right to access to own exposure record (Attachment 3).

C. R2K training records must be accurately maintained on a roster (example found in Attachment 4), indicating the date/time of training, the names of employees trained and the hazardous substances which were the topic of their training. A copy of this training roster should be immediately forwarded to the Safety Coordinator who will keep a R2K training file.

VI. References

- Act 1984-159, Rules and Regulations, are contained in 34 Pa Code, Chapters 301-323
- Management Directive 505.27, The Worker and Community Right to Know Act (P.L. 734, No. 159)
- DPW Safety/Occupational Health Manual 7067.16, Safety Standards for Asbestos Containing Materials

VII. Appendix

- a. Hazardous Substance Survey Form and Directions
- b. Employee Workplace Notice
- c. Employee Medical/Exposure Records
- d. Sample R2K Training Roster

INSTRUCTIONS FOR COMPLETION OF THE HAZARDOUS SUBSTANCE SURVEY FORM (HSSF)

PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT

The Hazardous Substance Survey Form lists the hazardous substances, special hazardous substances, and environmental hazards found in the workplace. The employer must provide the following information on this form:

Item 1 Employer Name.

Item 2 Federal Employer Identification Number.

This number can usually be obtained from the company's accounting department, budget or comptroller's office.

Item 3 Division or Plant Name.

Item 4 Workplace Covered By This Form.

The name of the specific workplace for which the Hazardous Substance Survey Form is being completed. A workplace is defined by the Act as "Any building or work area or contiguous group of buildings or work areas at one geographical location composing a plant site in the Commonwealth used by the employer on a permanent or temporary basis to conduct business."

Item 5 Street Address of the Workplace.

The actual/physical location of the workplace.

Item 6 Mailing Address.

The mailing address for the workplace if different from the street address.

Item 7 Telephone Number.

The appropriate telephone number (including area code and extension) to receive calls regarding the Hazardous Substance Survey Form.

Item 8 County Name and Code.

The county name and code from the table below showing the location of the workplace.

Pennsylvania Counties and Codes

COUNTY CODE	COUNTY CODE	COUNTY CODE	COUNTY CODE
Adams 01	Clinton 18	Lackawanna 35	Pike 52
Allegheny 02	Columbia 19	Lancaster 36	Potter 53
Armstrong 03	Crawford 20	Lawrence 37	Schuylkill 54
Beaver 04	Cumberland 21	Lebanon 38	Snyder 55
Bedford 05	Dauphin 22	Lehigh 39	Somerset 56
Berks 06	Delaware 23	Luzerne 40	Sullivan 57
Blair 07	Elk 24	Lycoming 41	Susquehanna 58
Bradford 08	Erie 25	McKean 42	Tioga 59
Bucks 09	Fayette 26	Mercer 43	Union 60
Butler 10	Forest 27	Mifflin 44	Vanango 61
Cambria 11	Franklin 28	Monroe 45	Warren 62
Cameron 12	Fulton 29	Montgomery 46	Washington 63
Carbon 13	Greene 30	Montour 47	Wayne 64
Centre 14	Huntingdon 31	Northampton 48	Westmoreland 65
Chester 15	Indiana 32	Northumberland 49	Wyoming 66
Clarion 16	Jefferson 33	Perry 50	York 67
Clearfield 17	Juniata 34	Philadelphia 51	Out-of-State 99

Item 9 Name of Employer or Employer Representative; Title; Date.

The name and title of the Employer or Employer Representative responsible for the information on the Hazardous Substance Survey Form. Provide the date the form was prepared.

Item 10 Business Address of Signatory.

The business address of the Employer or Employer Representative completing the Hazardous Substance Survey Form.

Item 11 Report Period.

The report period is for the entire prior calendar year.

Item 12 Signature of Employer or Employer Representative.

The person responsible for the information on the form and who can be contacted for additional information must sign the form. The signature must be the same name that appears in Item 9.

In listing workplace hazardous chemicals on Hazardous Substance Survey Form Option 1:

Employers are encouraged to first list the name of the product containing the hazardous chemical(s) and then list the substance name of the hazardous chemical as it appears on the Hazardous Substance List. Place a check mark in the appropriate box for the physical and/or health hazard(s) posed by the product.

Information about physical and health hazards (fire, sudden release of pressure, reactivity, immediate (acute), delayed (chronic)) may be found on the product label and Material Safety Data Sheet. Definitions of hazard categories are as follows:

- **Fire hazard**, includes "flammable," "combustible liquid," "pyrophoric" and "oxidizer."
- **Sudden release of pressure**, includes "explosive" and "compressed gas."
- **Reactive hazard**, includes "unstable reactive," "organic peroxide" and "water reactive."
- **Immediate (acute) health hazard**, includes "highly toxic," "toxic," "irritant," "sensitizer," "corrosive" and other hazardous chemicals that cause an adverse effect to a target organ which usually occurs rapidly as a result of short term exposure.
- **Delayed (chronic) health hazard**, includes "carcinogens" and other hazardous chemicals that cause an adverse effect to a target organ and the effect of which occurs as a result of long term exposure and is of long duration.

If the substance is an environmental hazard, insert an 'E' in the appropriate block. If the substance is a special hazardous substance, insert an 'S' in the appropriate block. If neither is applicable, no blocks should be marked.

A **Chemical Abstracts Service (CAS) number** is the unique identification number assigned to chemicals by the Chemical Abstracts Service, a division of the American Chemical Society. Provide the Chemical Abstracts Service number as it appears on the Hazardous Substance List. If a substance has no Chemical Abstracts Service number, leave this item blank.

In listing workplace hazardous chemicals on Hazardous Substance Survey Form Option 2:

Complete Items 1 through 12 on Part I. Enter "X" for all hazardous substances present at the workplace on Part II. Indicate the Federal Employer Identification number on upper right portion of each sheet that contains an "X" for a hazardous substance present at the workplace.

PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT

EMPLOYEE WORKPLACE NOTICE PUBLIC SECTOR

The Pennsylvania Worker and Community Right to Know Act requires that information about hazardous substances in the workplace and in the environment is available to public sector employees and employees of private sector workplaces not covered by the Federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard and to all persons living or working in the state. Employee rights listed below are further defined in the Worker and Community Right to Know Act (P.L. 734, No. 159) and Regulations. For additional information, contact the Department of Labor and Industry, Bureau of PENNSAFE, Room 155-E, Seventh and Forster Streets, Harrisburg, Pennsylvania 17120; (717) 783-2071; FAX (717) 783-5099; li-pennsafe@state.pa.us (e-mail).

Employee Workplace Notice:

Public sector employers (including state and local government agencies and public schools and public universities) and private sector employers not covered by the OSHA Hazard Communication Standard must post this notice informing employees of their rights under the law. This notice must be posted prominently in the workplace at a location where employee notices are normally posted.

Training:

Public sector employers and private sector employers not covered by the OSHA Hazard Communication Standard must provide an annual education and training program to employees exposed to hazardous substances. The training program may be presented either in written form or in training sessions.

Hazardous Substance Survey Form:

The Hazardous Substance Survey Form (HSSF) provides an inventory of the hazardous substances found in the workplace during the prior calendar year. All employers must complete a workplace HSSF annually. Public sector employers and private sector employers not covered by OSHA must post the HSSF prominently in the workplace and must provide a copy to any employee upon request.

Work Area List:

The Work Area List names the hazardous substances used or produced in a specific work area in the workplace. Public sector employers and private sector employers not covered by the OSHA Hazard Communication Standard must update a Work Area List at least annually, must provide a copy to any employee of the work area upon request, and must offer a copy to any employee newly assigned to that work area.

Material Safety Data Sheet:

The Material Safety Data Sheet (MSDS) provides detailed information about a hazardous substance. In public sector workplaces and private sector workplaces not covered by the OSHA Hazard Communication Standard, an MSDS must be accessible in the work area where the hazardous substance it describes is used. MSDSs must be readily available to employees without the intervention or permission of management or supervisors, and any employee may obtain and examine an MSDS for any hazardous substance in the workplace. If an employee's request to obtain a copy of an MSDS is made to the employer in writing and, after five working days from the date the request is made, the employer fails to furnish the employee with an MSDS in the employer's possession or fails to provide the employee with proof of the employer's effort to obtain the requested MSDS from the manufacturer, importer, supplier or distributor and from the Department of Labor and Industry, the requesting employee may refuse to work with the substance.

PSF-4 REV 4-04

Environmental Hazard Survey Form:

The Environmental Hazard Survey Form (EHSF) provides information about any environmental hazards emitted, discharged or disposed of from the workplace. All employers are required to complete an EHSF when and if requested to do so by the Department of Labor and Industry. If an EHSF has been completed by a public sector employer or a private sector employer not covered by the OSHA Hazard Communication Standard, a copy must be provided to any employee upon request.

Labeling:

All containers and parts of pipelines of hazardous and non-hazardous substances in public sector workplaces and private sector workplaces not covered by the OSHA Hazard Communication Standard must be properly labeled. Employers must ensure that each label, sign, placard or other operating instruction is prominently affixed and displayed on the container or part of a pipeline system so that employees can easily identify the contents.

Health and Exposure Records:

Public sector employers and private sector employers not covered by the OSHA Hazard Communication Standard must maintain and allow employee access to records of employee chemical exposure to the extent required by OSHA (under 29 CFR 1910.1200) or by the Mine Safety Health Administration (under 30 CFR 70.210 and 71.210).

Non-discrimination:

If a public sector employee or an employee of a private sector workplace not covered by the OSHA Hazard Communication Standard believes that he or she has been discharged, disciplined or discriminated against by an employer for exercising his or her rights granted under the Pennsylvania Worker and Community Right to Know Act, that employee has 180 days from the date of the alleged violation to file a written complaint with the Department of Labor and Industry, Bureau of PENNSAFE.



Commonwealth of Pennsylvania
Edward G. Rendell, Governor

Department of Labor and Industry
Stephen M. Schmerin, Secretary

ATTACHMENT 2 TO 7067.21 RIGHT TO KNOW
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**ACTA DE DERECHOS A CONOCER
PARA LOS TRABAJADORES
Y COMUNIDADES EN PENNSILVANIA**

**AVISO PARA SER
COLOCADO EN
AREA DE TRABAJO
PUBLIC SECTOR**

El Acta Sobre los Derechos del Trabajador y la Comunidad a Ser Informados en Pensilvania, requiere que información sobre sustancias peligrosas en el lugar de trabajo y en el ambiente este disponible para empleados del sector público y empleados del sector privado que no están cubiertos por la Ley de Comunicar Peligros de la Administración de Seguridad y Salud en el Trabajo (OSHA). Esta información también debe estar disponible para todas las personas que viven o trabajan en el estado. Los derechos del empleado están resumidos mas adelante y están explicados en su totalidad en el Acta Sobre los Derechos del Trabajador y la Comunidad a Ser Informados, (Ley Pública 734 num:159) y las regulaciones. Para mas información, favor de ponerse en contacto con el Department of Labor and Industry, Bureau of PENNSAFE, Room 155-E, Seventh and Forster Streets, Harrisburg, Pennsylvania 17120; (717) 783-2071; FAX (717) 783-5099; li-pennsafe@state.pa.us (e-mail).

Aviso en el Lugar de Trabajo:

Los Patronos del sector público (incluyendo agencias estatales, gobierno local, escuelas públicas y universidades) y patronos o empresarios del sector privado que no estén cubiertos por la Ley de Comunicar Peligros de OSHA, deben de colocar este aviso en un lugar prominente donde se pone noticias para empleados para informar a los empleados de sus derechos bajo esta ley.

Adiestramiento:

Los patronos del sector público y patronos del sector privado que no están cubiertos por la Ley de Comunicar Peligros de OSHA, tienen que proveer un programa educativo anual para aquellos empleados que están expuestos a sustancias peligrosas en el lugar de trabajo. El programa educativo puede ser presentado en forma escrita o en sesiones educativas.

Formulario Para Catalogar las Sustancias Peligrosas (HSSF):

Formulario Para Catalogar las Sustancias Peligrosas (Hazardous Substance Survey Form, HSSF, por sus siglas en inglés) es un documento que provee una lista de las sustancias peligrosas que se encuentran en el lugar de trabajo. Todos los patronos deben colocar esta forma anualmente. Los patronos del sector público y privados que no están cubiertos por OSHA, deben postear esta forma en un lugar prominente en el trabajo y deben proveer una copia a cualquier empleado que lo solicite.

Lista Para el Area de Trabajo:

La lista en el área de trabajo identifica las sustancias peligrosas usadas y producidas en un área específica del lugar de trabajo. Los patronos del sector público y del sector privado no cubiertos por la Ley de Comunicar Peligros a OSHA, deben actualizar la lista en el lugar de trabajo por lo menos una vez al año. Estos patronos deben de proveerle una copia a cualquier empleado nuevo que sea asignado al área de trabajo y a cualquier empleado del área de trabajo que así lo solicite.

Hoja de Información Sobre la Sanidad de Materiales (MSDS):

Hoja de Información Sobre la Sanidad de Materiales (Material Safety Data Sheet, MSDS, por sus siglas en inglés) es un documento que provee información detallada sobre una sustancia peligrosa. Los patronos del sector público o privado que no estén cubiertos por la Ley de Comunicar Peligros de OSHA, deben de tener estas formas disponibles en el área de trabajo donde se usa la sustancia peligrosa que la hoja describe. Estos documentos deben de estar disponibles a los empleados sin la intervención o permiso del supervisor o administración. Los empleados tienen el derecho a obtener y examinar las hojas de información sobre cualquier sustancia peligrosa que se encuentre en el lugar de trabajo. Un empleado puede rehusar a tratar con cualquier sustancia química cuando este ha solicitado por escrito información sobre esa sustancia, y si después de cinco días el patrono no cumple con su obligación de proveerle al empleado el MSDS orde proveer al empleado prueba de que ha tratado de obtener dicha información del fabricante, importador, proveedor, distribuidor o del Departamento del Trabajo e Industria (Department of Labor and Industry).

Formulario Para Catalogar Los Peligros Ambiente (EHSF):

Formulario Para Catalogar Los Peligros Ambientales (Environmental Hazard Survey Form, EHSF, por sus siglas en inglés) es un documento que provee información relacionada a las sustancias peligrosas que son emitidas, arrojadas, vaciadas o desechadas del lugar de trabajo al ambiente. Se requiere que todos los patronos completen esta formulario cuando el Departamento del Trabajo e Industria así lo solicite. Si esta formulario ha sido completada por un patrono del sector público o del sector privado que no esté cubierto por la Ley de Comunicar Peligros de OSHA, esta debe ser entregado a cualquier empleado que así lo solicite.

Etiquetas o Rotulos de Identificación:

Todos los recipientes o envases y puerto de entrada de tuberías en el área de trabajo que contengan sustancias peligrosas y no peligrosas en el sector público y en el sector privado que no estén cubiertos por la Ley de Comunicar Peligros de OSHA, deben de estar correctamente rotulados. Los patronos deben de asegurar que cada etiqueta, rótulo, letrero, cartelón y otras instrucciones para su manejo estén exhibidos y visibles en un lugar prominente del recipiente o envase, o y puerto de entrada de tuberías, para que los empleados puedan identificar fácilmente el contenido cada sustancia química.

Expediente Médico y de Exposición:

Patronos del sector público y patronos del sector privado que no están cubiertos por la Ley de Comunicar Peligros a OSHA deben de mantener y permitir que los empleados tengan acceso a sus expedientes en el lugar de trabajo hasta el punto requerido por OSHA (bajo la sección 29 del CFR 1910.20) o por la Administración de Seguridad y Salud de Minas) (bajo la sección 30 del CFR 70.210 y 71.210).

No Discriminación:

Cualquier empleado del sector público o del sector privado no cubierto por la Ley de Comunicar Peligros de OSHA, que crea que él/ella ha sido despedido, disciplinado o discriminado injustamente por su patrono por haber ejercido sus derechos bajo esta ley, tiene el derecho a someter una querrela por escrito al Department of Labor and Industry, Bureau of PENNSAFE, dentro de los 180 días desde el día que ocurrió la violación.



Estado de Pensilvania
Edward G. Rendell, Gobernador

Departamento del Trabajo e Industria
Stephen M. Schmerin, Secretario

**DEPARTMENT OF GENERAL SERVICES
EMPLOYEE MEDICAL/EXPOSURE RECORDS**

A. Definitions

1. Employee Exposure Record means a record containing any of the following kinds of information concerning employee exposure to toxic substances or harmful physical agents:
 - a. Environmental (workplace) monitoring or measuring, including personal, area, grab, wipe, or other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained;
 - b. Biological monitoring results which directly assess the absorption of substance or agent by body systems (e.g. the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent;
 - c. Material Safety Data Sheets;
 - d. In the absence of the above, any other record which reveals the identity (e.g. chemical, common, or trade name) of a toxic substance or harmful physical agent, such as the Hazardous Substance Survey Form (HSSF).
 - e. A copy of the JPA-797, Workers' Compensation Claim Form, and other related documents (e.g. Accident/Injury Witness Statement(s), DPW Supervisors Accident/Injury/Incident Investigation Report); and
 - f. Copies of the training records documenting that the employee has been trained on the hazardous substances in question.
2. By comparison, an Employee R2K Medical Record means a record concerning the health status of an employee, resulting from exposure to a hazardous substance, which is maintained by a physician, nurse, or other health care or administrative person, including:
 - a. Medical and employment questionnaires and histories (including job description and occupational exposure);
 - b. Material Safety Data Sheet(s) for hazardous substance(s) involved;

- c. The results of medical examinations (pre-employment, pre-assignment, periodic, or episodic) and laboratory test (including x-ray examinations and all biological monitoring);
- d. Medical opinions, diagnoses, progress notes, and recommendations;
- e. Descriptions of treatments and prescriptions; and
- f. Employee medical complaints.

B. General

1. Records must be kept on each employee exposed to chemical/ hazardous substances. An exposure record begins when an employee has an actual exposure to a chemical (ingestion, inhalation, absorption through the skin or eyes or otherwise comes into contact with a chemical mixture). If the employee already has a medical record (or will have a medical record) as a result of the exposure, the exposure record can become part of the medical record. If no medical record exists, a separate exposure record must be initiated.
2. All R2K medical and exposure records are to be retained by facilities/offices for at least 30 years beyond the employee's termination of employment in a separate, secure, and confidential R2K file which must **not** be part of the employee's official personnel file. The official personnel file shall be annotated that such a separate R2K exposure file exists.
3. The R2K exposure file shall not be forwarded to the State Records Center with the terminated employee's Official Personnel File. It shall remain for 30 years in the Human Resource Office of the employee's last place of employment.
4. The R2K exposure file shall be forwarded to the gaining agency (along with the official personnel file) when an employee transfers to an agency under the Governor's jurisdiction. If the gaining employer is not an agency under the Governor's jurisdiction, the exposure file is to be maintained in the losing DPW Unit Human Resource Office for 30 years from the date of termination. If DPW were to rehire a former state employee, the gaining Unit Human Resource Office shall request the employee exposure file from the former Unit Human Resource Office.

C. Record Accessibility

1. The following individuals have access to medical records without written permission of the affected employee:

- a. Authorized representatives from the Department of Labor and Industry.
 - b. The employee (or former employee).
 - c. The employee's physician.
 - d. Recognized or certified union representative.
2. Access by any individual(s) must be in accordance with the requirements as stated in 29-CFR Subpart C General Safety and Health Provisions Section 1910.20 Access to Employee Exposure and Medical Records.

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Confined Space Entry

I. Scope

This program shall apply to all DGS employees and to contractors during entry into Permit and Non permit confined spaces. These mandatory procedures prescribe the minimum criteria for preventing employee exposures to hazardous conditions when entering and working within any confined space. Additional requirements may be designated for confined space entry by the Department of General Services prior to permitting entry.

An assessment and classification has been performed for all identified confined spaces and is in Appendix A.

II. References

- A OSHA 29 CFR 1910.146- Permit Required Confined Spaces
- B. Federal Register 58 FR4462
- C. American National Standards Institute (ANSI), "Safety Requirements for Working in Tanks and Other Confined Spaces", ANSI Z117.1-1989.
- D. National Institute for Occupational Safety and Health (NIOSH), Criteria Document, "A Guide to Safety in Confined Spaces", July, 1987

III. Definitions

Acceptable Atmospheres: - Acceptable environmental conditions within confined spaces in which uncontrolled hazardous atmospheres are not present.

Acceptable Entry Conditions: - Conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit required confined space entry can safely enter into and work within the space.

Attendant: - An employee assigned as a standby person who is trained in non-entry emergency rescue and stationed outside one or more permit required confined space to communicate, observe and assist those inside.

Authorized Entrant: - An employee authorized by the shop supervisor to enter a permit required confined space to perform a specific type of duty(ies) and has received the necessary confined space entry training.

Blanking or Blinding: - Absolute closure of a pipe, line or duct, by fastening across its bore a solid plate or cap that completely covers the bore, extends at least to the outer edge of the flange, and can withstand maximum upstream pressure.

Class II Chest Harness: - A chest-waist harness used for side entry into confined spaces where only a limited fall hazard exists and where personnel retrieval may be necessary.

Class III Full-Body Harness: - A full-body harness used for top entry into confined spaces where a vertical free fall hazard exists and where personnel retrieval may be necessary.

Permit Required Confined Space (PRCS): - A space has **all** of the following characteristics:

1. Large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit;
3. Is not designed for continuous employee occupancy;
4. And there is a reasonable risk of exposure to: serious hazards, entrapment, asphyxiating atmospheres and/or the moving parts of machinery.

Confined Space Entry Permit: - Is a permit form authorizing entry and work in a confined space; which states the type of work, air test results, entry requirements, and protective measures. This document is signed by an Entry Supervisor and is required to be posted at the entrance of the space during such work.

Contaminant: - Any organic or inorganic substance, dust, fume, mist, vapor, or gas, the presence of which in air can be harmful or hazardous to human beings.

Double Block and Bleed: - Closure of a line, duct or pipe by closing and locking or tagging a drain or vent which is open to the atmosphere in the line between two locked-closed valves.

DGS Safety Coordinator: - Chief of the Fire, Safety and Environmental Section.

Emergency: - Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment: - The surrounding, capturing, or both, of a person by a finely divided particulate matter or liquid that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry: - Ingress by persons into a confined space which occurs upon breaking the plane of the confined space portal with any part of the entrant's body; and all periods of time in which the confined space is occupied.

Entry Supervisor: - The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

Hazardous Atmosphere: - Hazardous atmosphere poses risk of death, incapacitation, or impairment of self-rescue ability, injury or illness from:

1. Flammable gas, vapor, or mist >10% LEL
2. Combustible dusts exceeding its LEL (obscures vision at distance of 5 feet)
3. Oxygen below 19.5% or above 23.5%
4. Chemical/physical hazards exceeding Permissible Exposure Limits
5. IDLH (Immediately Dangerous to Life or Health) atmospheres

Hoisting Device: - A person-rated hoist, winch, or similar mechanical device of specific design to permit an employee to safely enter and/or be removed through a top-opening of a confined space.

Hot Work: - Work involving welding, burning, open flame, sparks or temperatures that could ignite combustible materials.

Fire Safety Permit: - A written authorization issued for hot work operations.

Immediately Dangerous to Life or Health (IDLH): - Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space. Values established by NIOSH.

Inerting: - Displacing an atmosphere with a non-reactive gas (e.g., nitrogen or carbon dioxide) so that the resulting atmosphere is noncombustible.

Isolation: - A process of removing a confined space from service and preventing release of engulfing substances, or hazardous substances or energy. Isolation includes:

1. Disconnection, removal or misalignment of lines;
2. Blanking or blinding at flanges;
3. Double block and bleed with valves;
4. Electrical lockout and tagout or disconnection; and
5. Mechanical lockout and tag out or disconnection.

Lockout/Tagout: - Placement of a lock/tag on the energy-generating device to isolate and prevent operation of the device.

Lower Explosive Limit (LEL): - The minimum concentration of gas, vapor, or dust in air that can ignite in the presence of an ignition source.

Non-Permit Required Confined Space (NPRCS): - A space meeting the following specifications:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit;
3. Is not designed for continuous employee occupancy;
4. There are no atmospheric or physical hazards to be reasonably expected to be present in the space.

Oxygen Deficiency: - Any atmosphere containing less than 19.5 percent oxygen by volume

Oxygen Enriched Atmosphere: - An atmosphere containing more than 23.5 percent oxygen by volume

Permissible Exposure Limit (PEL): - OSHA has published permissible exposure limits concerning various toxic and hazardous chemical substances and physical agents to which employees may be exposed during the course of employment without developing any adverse health effects.

Permit-Required Confined Space (PRCS): - A space that meets all the requirements of a confined space AND that potentially has ANY one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere
2. Contains a material with the potential for engulfment of an entrant
3. Has internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor which slopes downward and tapers to a smaller cross-section
4. Contains any other recognized serious safety or health hazard

Retrieval Systems: - Equipment used for non-entry rescue of persons from confined spaces consisting of the following items:

1. Cable, line, or rope of at least 1/2 inch diameter and capable of withstanding 2000-pounds test. The line shall be equipped with fittings for attachment to a safety harness and shall be of a length that permits attachment to a hoisting device, or to an anchor point located outside the entry portal to the confined space;
2. A hoisting device, winch, or similar mechanical device of specific design for use to permit an employee to safely enter and/or be removed through a top-opening of a confined space; and
3. Class II Chest Harness used for side entry into confined spaces where only a limited fall hazard exists and where personnel retrieval may be necessary; or
4. Class III Full-Body Harness used for top entry into confined spaces where a vertical free fall hazard exists and where personnel retrieval may be necessary.
5. Wristlets & Anklets may be utilized where it is determined by the entry supervisor that the use of a harness would create an additional hazard to the entrant due to space configuration.

Retrieval Line: - A cable, line, or a rope of at least 1/2 inch diameter and capable of withstanding 2000-pounds test. The line shall be equipped with fittings for attachment to a safety harness and shall be of a length that permits attachment to a hoisting device, or to an anchor point located outside the entry portal to the confined space.

Threshold Limit Value(TLV): - The American Conference of Governmental Industrial Hygienists has established recommended threshold limit values (TLVs) concerning chemical substances and physical agents to which employees may be exposed during the course of employment. TLVs shall be used as guidelines only, and shall be considered as one of many contributing factors in evaluating the overall degree of hazard for confined space work.

IV. Guidance/ Program

A. PROGRAM RESPONSIBILITIES

1. Bureau Director or Regional Manager has the responsibility to:

- a. Support and ensure that all elements of procedure are implemented completely for the protection of all employees.
- b. In areas **outside of the Harrisburg area**, make the final determination if DGS employees will be permitted to enter all confined spaces and clearly institute mechanism to adequately enforce.
- c. Ensure that the overall program effectiveness is evaluated annually.

2. The Safety Coordinator has the responsibility for:

- a. Reviewing the confined space program on annual basis
- b. Overseeing the space identification/classification process.
- c. In areas in and around the **Harrisburg area**:
 - Make the final approval on the confined space permit to allow DGS employees or DGS Contracted employees to enter permit required confined spaces.
 - Conduct confined space assessment for all new or significantly modified spaces.
 - Coordinating emergency response activities per this program.
 - Issuing Fire Safety Permits pending appropriate approvals (in accordance with Fire Safety Permit Procedure).
 - Coordinating with contractors to ensure proper procedures are being followed per this program.
- d. Establishing a mechanism to ensure the confined space program elements are being performed, including:
 - Coordination of entrant, attendant, supervisor required training.
 - All pre-entry conditions are met entry permits reviewed prior to entry.
 - No unauthorized employee will enter or be exposed to a PRCS.
 - The confined space entry permit is completed and maintained at the worksite during confined space entry operations

3. **Managers have the responsibility to:**
 - a. Ensure Supervisors are performing their responsibilities defined in this procedure.
 - b. Notify the Safety Coordinator of any employee concerns and/or exposure potentials that they have identified in their areas.
 - c. Notify the Safety Coordinator of any significant equipment modification/upgrade/addition that can be expected to create a new PRCS or substantially modify an existing confined space.
 - d. Assist the Safety coordinator in coordinating confined space training for affected employees in their department.
 - e. Outside the Harrisburg area:
 - i. Determine is a confined space assessment necessary for all new or significantly modified spaces.
 - ii. Coordinating emergency response activities per this program.
 - iii. Issuing Fire Safety/hot work Permits.
 - iv. Coordinating with contractors to ensure proper procedures are being followed per this program.

4. **Authorized Attendant responsibilities include, but are not limited to, the following:**
 - a. When required, complete the Confined space entry permit and submit it to the entry supervisor.
 - b. Know the hazards, including information on the mode of exposure (e.g., inhalation or dermal absorption), signs or symptoms, and consequences of the exposure;
 - c. Be aware of possible behavioral effects in entrants due to exposure;
 - d. Know the number and identity of entrants in the space at all times;
 - e. Remain outside the space until relieved by another attendant;
 - f. Maintain communication with entrants throughout the entry.
 - g. Maintain some form of communication to emergency response personnel
 - h. Monitor activities inside and outside space to determine whether it is safe for entrants to remain in the space;
 - i. When required, perform air monitoring and surveillance of the confined space prior to and during entry into a confined space;
 - j. Evacuate the space if:
 1. detect a prohibited condition
 2. detect behavioral effects in entrants due to hazard exposure
 3. detect a situation outside the space which could endanger entrants
 4. cannot adequately perform these duties;
 - k. Summon rescue/emergency services if entrants may need assistance to escape;
 - l. While entry is underway:
 - warn unauthorized persons to stay away from space;
 - advise them to exit immediately if they have entered the permit space;

- Inform entrants and entry supervisor if unauthorized persons have entered the space;
- m. Perform non-entry rescues as specified by rescue procedure.
- n. Perform no duties that may interfere with the primary duty of monitoring and/or protecting authorized entrants; and
- o. Never enter a permit space to attempt a rescue.

5. Entry Supervisor shall:

- a. Know the hazards, including information on the mode of exposure (e.g., inhalation or dermal absorption), signs or symptoms, and consequences of the exposure;
- b. For Non permit confined spaces ensure that there are at least two employees assigned to the task with a reliable form of communication.
- c. Verify appropriate entries have been made on entry permit, all tests have been conducted, all pre-entry conditions have been met and all procedures/equipment specified by permit are in place before endorsing permit and authorizing entry;
- d. In the **Harrisburg area:**
 - Send the permit to the Safety Coordinator for final approval
 - post a confined space entry permit
- e. In **areas outside the Harrisburg** area:
 - Issue and post the confined space permit
 - Verify the availability and means of summoning rescue/emergency services;
- f. If appropriate, terminate entry, cancel permit and notify the DGS Fire Safety and Environmental office when tasks are completed or when a condition not allowed by the permit arises;
- g. Remove unauthorized individuals who enter or attempt to enter the space; and determine,
- h. Whenever responsibility for entry is transferred, that operations remain consistent with the terms of the permit and acceptable entry conditions are maintained.

6. Authorized Entrant shall:

- a. Know confined space hazards, including information on the mode of exposure (e.g., inhalation or dermal absorption), signs or symptoms, and consequences of the exposure;
- b. Use appropriate personal protective equipment properly (e.g., face and eye protection, and other forms of barrier protection such as gloves, aprons, and coveralls);
- c. Maintain communication (e.g., telephone, radio, visual observation) with Attendants to enable the Attendant to monitor the Authorized Entrant's status as well as to alert the Authorized Entrant to evacuate;

- d. Alert the attendant whenever a warning sign or symptom of exposure to a dangerous situation exists or a prohibited condition is detected; and
- e. Exit from confined space as soon as possible when ordered by an authorized attendant/entry supervisor, when the authorized entrant recognizes the warning signs or symptoms of exposure exists, when a prohibited condition exist, or when an automatic alarm is activated.

7. Employees have the responsibility to:

- a. Notify his/her supervisor immediately of any adverse or unanticipated reactions/incidents occurring during or after entering a confined space.
- b. Notify his/her supervisor if he/she has ANY safety concerns or notice any unsecured confined spaces.
- c. Not enter any confined space unless authorized and performed per the procedures outlined in this program

B. GENERAL PROGRAM MANAGEMENT

This section describes the main elements of the Commonwealth of Pennsylvania Department of General Services confined space program.

1. Confined Space Hazard Identification

The DGS Safety Coordinator shall identify all potential confined spaces and classify each as either "non-permit required" or "permit-required". These spaces are listed in Appendix B. A re-evaluation is required for any new potential confined space introduced into the agency or when a significant change in a characteristic(s) of an existing space occurs

Two simple tests are used to determine if a PRCS exists:

a. **The first test verifies if the space is a confined space.**

For an enclosure to be considered a confined space, it must meet the definition of a confined space as outlined in the definition section of this procedure.

Clarification: If access is any more difficult than walking through an ordinary door or walking up an ordinary flight of stairs, it is to be considered limited.

b. **The second test determines the type of confined space it is.**

Permit required confined spaces are confined spaces that are hazardous to enter unless special precautions are taken. To be a PRCS, the space must possess any ONE of the following characteristics:

- actually, or potentially, contain a hazardous atmosphere such as oxygen deficiency or enrichment, flammable gases or vapors, or toxic air contaminants at levels exceeding OSHA established permissible exposure limits (PEL). [i.e., afterburners/thermal oxidizers, RTOs, solvent recovery adsorber beds, ductwork, sewers]
- poses a potential for engulfment by liquids or finely divided solids, that can surround an entrant or be aspirated into the lungs.
- has inwardly converging walls that taper to a smaller cross-sectional area that could trap an entrant (i.e., cone-shaped hoppers, bins or tanks, cyclones).
- presents any other serious health or safety hazard such as unguarded mechanical equipment, energized conductors, temperature extremes or hazardous radiation. (i.e. press ovens)

Non-permit required confined spaces are those that don't present any of the above mentioned hazards that could cause death or serious harm. [i.e. drop ceilings, mechanical cabinets, telephone equipment closets and some building crawl spaces]

2. Confined Space Labeling and Site Security

When possible, signs or labels identifying each space as either "non-permit required" or "permit required" per the assessment above shall be permanently affixed outside of each opening leading to the space. When possible, Sign wording shall comply with OSHA 1910.146(c)(2). Additionally, each entry port or access to a confined space shall be secured such as to prevent unauthorized access.

NOTE:

There are many confined spaces by their nature can not be practically labeled (i.e. man holes, elevator pits...) it will be the manager/supervisors responsibility to know the definitions of "confined space" and to take the appropriate steps to protect their employees.

3. Confined Space Entry Procedures

a. Non-Permit Confined Space (NPRCS) Entry Procedure

The following requirements and procedures apply to entry into a designated NPRCS :

- Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed;
- When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space;
- The entry supervisor will coordinate any joint NPRCS entries made with outside contractors to ensure this procedure is understood and followed by all involved parties.
- If deemed necessary by the manager/supervisor air sampling equipment can be obtained from the DGS Fire Safety and Environmental section or DGS High voltage supervisor for the following conditions:
 - oxygen content;
 - flammable gases and vapors; and
 - potential toxic air contaminants.
- The determinations and data required above are made available to each employee who enters the confined space;
- There may be no Hazardous Atmosphere in the confined space whenever any employee is inside;
- Any personal protective equipment deemed necessary shall be available and utilized by entrant(s).
- When appropriate, continuous forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the confined space and shall continue until all employees have left the confined space;

- The air supply for the forced air ventilation shall be from a clean source and shall not increase the hazards;
- Where initial air testing is required due to the potential for a hazardous environment, the atmosphere shall be monitored continuously to ensure that the continuous forced air ventilation is preventing the accumulation of a Hazardous Atmosphere.
- If a Hazardous Atmosphere is detected during entry:
 - each employee shall leave the confined space immediately;
 - the confined space shall be evaluated to determine how the Hazardous Atmosphere developed; and
 - measures shall be taken to eliminate the Hazardous Atmosphere before any subsequent entry takes place;
- Training shall be provided as outlined in Section VI- Training of this program.

b. Permit Required Confined Space (PRCS) Entry Procedure

- **Pre-Entry**

The following procedures shall be performed to verify that acceptable entry conditions exist before a Confined Space Entry Permit will be completed and entry into a PRCS will be permitted:

- A safety meeting will be conducted with employees involved in the entry to review:
 - the elements of the permit
 - job specific information regarding the nature of the work to be performed,
 - the potential hazards associated (including atmospheric conditions),
 - the correct use of required personal protective equipment and monitoring equipment, and
 - emergency procedures shall be reviewed;
- Ensure a sign is posted at the entrance to a permit-required confined space containing the following language:

DANGER
PERMIT-REQUIRED CONFINED SPACE
AUTHORIZED ENTRANTS ONLY

- All individuals who are to enter the confined space shall be currently qualified for confined space entry and respiratory protection (NOTE: Employees who are not currently qualified shall not be permitted to conduct confined space entry activities);
- All pipe and lines shall be cleaned out and locked-out prior to entry.
- All electrical and mechanical equipment shall be disconnected and/or de-energized and locked/tagged out; power supplies to pumps are to be shut-off and the controls locked in the "OFF" position by means of

padlocks; the Entry Supervisor will retain positive control of all padlock keys; each electrical panel is to be tagged/labeled to indicate the reason why the panels are locked out.

- Air monitoring will be conducted prior to and continuously throughout the entry; the atmosphere shall be checked in an area that would represent the breathing zones of the employees while performing work inside confined space; measurements shall be taken and recorded for the following:
 - oxygen content (Note: no entry shall be made if the oxygen concentration is less than 19.5% without approved supplied air respirators; no entry shall be made if the oxygen content is greater than 23.5% by volume);
 - flammability level (Note: no entry shall be made if the level is greater than 10% of the LEL); and
 - other air contaminants (Note: no entry shall be made if the level(s) is above IDLH; air contaminants above PELs but below IDLH will require use of respiratory protection for entry).
- The Entry Supervisor shall be notified before entry into Hazardous Atmospheres to review confined space procedures;
- The entrance to the confined space shall be maintained free of obstructions, debris and/or other conditions that prevent ready entry into and exit from the confined space;
- Confined spaces with both side and top openings shall be entered from side openings when practical;
- At least one attendant shall be stationed at the entrance to the confined space. (Note: The Attendant(s) shall have some means to summon medical or other emergency assistance without leaving the confined space entrance);
- A minimum of one additional employee, who may have other assigned duties, must be immediately available within sight or call of the attendant to help in case of an emergency. This additional employee must also be trained as an authorized attendant.
- Communication shall be maintained between the Attendant and Authorized Entrants in the confined space; radio or retrieval line signals must be used when Authorized Entrants are out of sight of the Attendant; affected employees shall be trained in the use of the communication system which shall be tested before each use;
- When entering confined spaces which previously contained flammable or combustible materials, the following ADDITIONAL requirements shall apply (reference Procedure HS250- Hot Work):
 - no hot work or ignition sources shall be allowed in or adjacent to the confined space; (**If hot work must be performed, contact Safety Coordinator for further guidelines)
 - all electrical equipment, including lighting, shall be explosion proof and safe for use in Class I, Agency I atmospheres;

- all monitoring equipment shall be intrinsically safe for use in Class I, Agency I atmospheres;
- ground fault circuit interrupters shall be used as appropriate; and
- non-sparking tools shall be used;
- The availability of a rescue team shall be verified as able to respond within a five minute response time or must be stationed on site;
- Isolation of a confined space shall be performed to prevent the release of hazardous substances or energy into the space and prevent unauthorized entry;
 - spaces containing flammable, toxic, corrosive, irritating or engulfing liquids or solids must be emptied, flushed or otherwise purged from the space whenever possible;
 - pipes or hoses conveying flammable, toxic, incapacitating or engulfing substances must be disconnected, blanked, or double blocked and bled;
 - mechanical or electrical equipment that could force substances into a confined space or injure workers in the space if energized must be disconnected or de-energized and locked/tagged out;
 - appropriate warning signs and barriers shall be posted at the entrances to confined spaces to protect employees. Signs and barriers shall be removed only after the operation is completed and the confined space is secured.
- If ventilation is required during confined space work in order to minimize concentrations of air contaminants and to maintain the oxygen content at safe levels in the confined space; the following ADDITIONAL considerations shall be made:
 - confined spaces shall be ventilated prior to entry and during occupancy;
 - whenever a ventilation system is employed, the system shall be evaluated before and during each work shift to ensure that it is functioning properly and that acceptable atmospheres are maintained;
 - the physical properties of the contaminants within the confined space and the configuration of the confined space shall be considered in determining the ventilation technique to be employed;
 - only explosion proof air movers shall be used to ventilate confined spaces;
 - whenever possible, air movers shall be used with ducting to increase the efficiency of the ventilation system in the confined space and to prevent recirculation of contaminated air due to ventilation "short circuiting;" and
 - when ventilating confined spaces previously containing flammable or combustible products, ventilation equipment shall be bonded or grounded to prevent the build-up and release of static electricity.

- Monitoring for oxygen content, flammable gases or vapors and potential toxic contaminants shall be performed continuously and documented periodically on the entry permit to ensure that changes in atmospheric conditions are identified and workers are adequately protected. Air monitoring instruments that shall be used include combustible gas indicators, oxygen indicators, colorimetric gas detector tubes, organic vapor analyzers, and other direct reading air contaminant measuring devices.
- When preparing to enter a permit-required confined space, the following air testing requirements shall apply:
 - a person with adequate knowledge and training shall perform appropriate confined space testing instruments shall be calibrated and maintained according to manufacturer requirements;
 - initial air testing of the confined space shall be made from outside of the confined space. Initial testing of the confined space shall be completed with mechanical ventilation equipment off so that "worst case" conditions can be assessed;
 - all air testing results shall be recorded on the entry permit; and
 - if the configuration of the confined space prevents initial testing from outside, entry shall not be made until authorization is obtained from the Entry Supervisor.
- In addition to atmospheric testing, positive steps shall be taken to ensure that employees are protected from physical hazards in the permit-required confined space, which include, but are not limited to, the following:
 - discharge of steam, high-pressure air, water or oil into the confined space, or failure of confined space structural support members;
 - falling objects;
 - openings and elevated work areas from which persons may fall;
 - hoses, pipes, tools, or equipment posing trip and fall hazards;
 - wet or oily surfaces posing slip hazards;
 - inadequate lighting;
 - insufficient or faulty personal protective equipment;
 - insufficient or faulty equipment or tools;
 - noise in excess of permissible levels;
 - temperature extremes that could cause heat or cold stress; and
 - electrical shock due to faulty wiring or improper grounding procedures (GFCI protected circuits must be used when electrical equipment is used in a potentially wet environment or outside)
- Selection and use of personal protective and safety equipment shall be determined by Entry Supervisor; selection of such equipment is based on the following conditions:

- specific work activities of personnel inside the confined space;
- type of chemical residues inside the confined space;
- actual or potential for development of dangerous air contamination and/or oxygen deficiency; and
- potential physical hazards associated with the confined space;
- The personal protective and safety equipment that may be required include:
 - eye and face protection - safety glasses, chemical goggles, face shields or full face respirators;
 - head protection - hard-hats;
 - body protection - chemical resistant coveralls, suits, and aprons;
 - foot protection - steel-toe boots and boot covers;
 - respiratory protection - air-purifying respirators, supplied air-line respirators, escape packs, and self-contained breathing apparatus;
 - hearing protection - ear plugs and ear muffs;
 - retrieval devices - Class II chest harness and Class III full-body harness, wristlets, retrieval line, hoisting device (man-rated top entry extraction winch or hoist);
 - fall protection - chest harness, full-body harness and lanyard;
 - warning devices - barricades, signs, caution tape and cones; and
 - other equipment - first aid kit, eye wash, emergency shower, fire extinguisher, lighting equipment, and ladders.

c. PRCS Entry Permit System

- The PRCS entry permit authorizes the entry into a confined space with a Hazardous Atmosphere and documents compliance with applicable regulations. A PRCS permit (Appendix B) must be completed prior to entry into any identified PRCS. The permit shall identify the following items:
 - tester's initials or signature;
 - the confined space to be entered;
 - the purpose of the entry;
 - the date and authorized duration of the entry permit;
 - the Authorized Entrants within the confined space, by name, roster, or other such tracking system, so that the Attendant knows exactly who is within the confined space during the entire duration of the permit;
 - name(s) of Attendant(s);
 - name(s) of Entry Supervisor(s), with a space for the signature or initials of the Entry Supervisor who originally authorized the entry;

- the hazards of the confined space to be entered;
 - the measures used to isolate the confined space and eliminate or control permit space hazards before entry (e.g. lockout/tagging of equipment, procedures for purging, inerting, ventilating, and flushing permit spaces, etc.);
 - acceptable entry conditions;
 - results of initial and periodic testing accompanied by the names or initials of the testers, and time that tests were performed;
 - the rescue and emergency services that can be summoned and the equipment to use and numbers to call;
 - the communication system used to maintain contact between Authorized Entrants and Attendants during an entry operation;
 - equipment including personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment to be provided;
 - any other information necessary to ensure the safety of employees; and
 - any additional permits which have been issued for the confined space, such as hot work permits.
- The Entry Supervisor shall sign the permit and:
 - in the Harrisburg area:
 - forward the permit it to the DGS Fire Safety and Environmental section for finale approval.
 - the DGS Fire Safety and Environmental section will review the permit notify the appropriate emergency response personnel and return the permit to the entry supervisor to be posted thus allowing the entry operation to begin.
 - For areas outside of Harrisburg:
 - The permit will be forwarded to the regional manager.
 - the regional manager will review the permit, sign it and return the permit to the entry supervisor to be posted thus allowing the entry operation to begin.
- The permit shall be posted at the entry portal, or otherwise available for inspection by all Authorized Entrants, so that they may confirm all pre-entry preparations have been made.
 - The duration of the permit shall not exceed the time required to complete the job or task specified on the permit.
 - The Entry Supervisor shall terminate the entry and cancel the entry permit if the operations covered by the entry permit have been completed or a condition not allowed under the entry permit arises in or near the confined space.

- The Entry Supervisor shall sign-off to cancel an entry permit only after it is confirmed that the space has been properly secured and covered so as to prevent unauthorized access.

C. Rescue Operations

Appropriately trained Department of General Services' employees may perform non-entry rescues. Retrieval systems shall be used to facilitate non-entry rescues whenever an authorized entrant enters a PRCS, unless the retrieval system increases the overall risk of entry.

All rescues requiring entry into the space will be performed by a qualified outside service, in most cases it will be the local Fire department. Rescue personnel must be trained in accordance with section (k) of the confined space standard. The Department of General Services has contracted with Harrisburg Fire Department to perform all such rescue tasks with in the Harrisburg areas. If confined space entry is required in regional area contact the DGS Safety coordinator. Procedures shall be developed and implemented for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing emergency services to rescue employees, and for preventing unauthorized personnel from attempting a rescue.

{NOTE: internal entry rescue is not permitted}

V. Training

A. Initial

Internal initial training is dependent upon the type(s) of confined space entries permitted by the agency in the program (see guidance/program- Agency Entry Status) and shall be performed prior to permitting or authorizing the employee to enter a confined space. As the Department of General Services has elected to , the following training applies to our employees: *{select and insert the training section below that corresponds with the entry status selected by the agency. NOTE: The remaining sections may be deleted from this section.}*

1. Confined space awareness training is required for Commonwealth of Pennsylvania employees who are not permitted to enter any confined space, including those employees in agencies where confined space entry is permitted, but they are not authorized to enter. Initial training is required and shall include the following elements:
 - a. The hazards associated with confined spaces
 - b. The identification and classification of existing confined spaces
 - c. Clarification of no entry policy
 - d. The characteristics of NPRCS and PRCS and their labeling requirements.
2. Confined space training is required for employees who are not authorized to enter any PRCS, but may enter non-permit required confined spaces (NPRCS) or spaces declassified to NPRCS. Initial training shall include the following elements:
 - a. Clarification of agency NO ENTRY policy regarding PRCS
 - b. The hazards associated with confined spaces
 - c. The characteristics of NPRCS and PRCS
 - e. The identification and classification of confined spaces
 - f. Labeling requirements
 - g. Methods for declassifying PRCS to NPRCS
 - h. Responsibilities and duties of personnel
 - i. Air monitoring/testing equipment use
 - j. PPE selection, use and requirements
 - k. Ventilation
 - l. Review of Agency confined space written program
 - m. General contractor requirements
 - n. The OSHA confined space standard
3. Full confined space program training is required for employees authorized to perform all PRCS and NPRCS entries. Initial shall include the following elements:
 - a. All training topics required in option 2 above PLUS
 - b. Respiratory protection (if applicable)

- c. Permit entry procedures
- d. Designation and certifications of entrants, attendants, entry supervisor, and rescue team
- e. Emergency egress and rescue procedures (including annual simulated non-entry rescue operations)

B. Refresher

Internal refresher training is dependent upon the type(s) of confined space entries permitted by the agency in the program (see guidance/program- Agency Entry Status) and shall be performed as outlined above. As the Department of General Services has elected to **Permit authorized Commonwealth of Pennsylvania employees to enter PRCS and NPRCS or spaces declassified as such**, the following refresher training applies to our employees:

1. Refresher training required where identified as appropriate following the annual review of program, after occurrence of non-compliance with any of the listed training elements, or every three (3) years, whichever comes first.
2. Refresher training must be conducted as applicable based on annual review of program, contractor permits and NPRCS declassification forms or every three (3) years, whichever comes first.
3. Refresher training is required on an annual basis and shall be comprehensive. Refresher training must include simulated practice non-entry rescue.

VI. Testing/Monitoring

A. Environmental

Not applicable

B. Health and Safety

1. Employee Medical

Individual OSHA expanded health standards (29 CFR 1910.1001 – 1910.1200) require employee medical evaluation/testing at specified action/permissible levels. In cases where entry involves a health hazard with an expanded standard, the specific OSHA standard shall be referenced and all applicable medical requirements followed based on the exposure levels.

Additionally, in cases where respiratory protection is required or provided for use during entry or rescue operations, the medical requirements of 29 CFR 1910.134- Respiratory Protection shall be followed. (reference HS#350-Respiratory Protection).

2. Equipment/Sampling

The confined space monitor shall be calibrated according to manufacturer's directions on a monthly basis and prior to each use. Monitoring of a space shall be conducted continuously throughout the entire entry for any PRCS and spaces declassified from PRCS to NPRCS where a hazardous atmosphere may occur.

In order for a space to be declassified from PRCS to NPRCS, the only hazard present may be atmospheric which is controlled through the use of forced ventilation alone and a written certified declassification permit must be completed. [see Guidance/Program, Entry Procedures- NPRCS Entry Procedure]. Results should be recorded and retained with permit or declassification document. (see Section VIII- Recordkeeping/ Documentation)

Air testing shall be conducted using a properly maintained confined space monitor capable of monitoring (at a minimum) oxygen, LEL and carbon monoxide (CO) simultaneously plus any additional toxin known to be present in potentially hazardous concentrations.

Testing requirements are as follows (in the order listed):

a. TEST Permissible Level for entry

-
- % oxygen between 19.5% and 23.5%
 - % LEL less than 10% of LEL for flammable present (10% of LEL for toluene= 1,200 ppm)
 - CO less than 50 ppm (unless proper respiratory protection provided)

- Hydrogen sulfide less than 10 ppm
- Any other identified potentially hazardous chemical must be measured in addition to the above and levels maintained below the established OSHA PEL and STEL through continuous forced ventilation. Documentation: Documented site evaluation and classification for each confined space present within a agency shall be maintained for the duration of occupancy or until permanently removed from service.

VII. Contractors

- A. Contractors used by the Commonwealth of Pennsylvania to enter confined spaces, shall be informed in advance of potential hazards associated with the confined space if known. Contractors shall have and follow a written PRCS program and utilize their own entry permit. Both the contractor program & entry permit must be at least as stringent as those required by this procedure.
- B. The contractor's entry permit shall be reviewed prior to entry into a PRCS to ensure that it is acceptable to the Commonwealth of Pennsylvania. The Commonwealth of Pennsylvania shall also have the authority to review the contractor's atmospheric testing results prior to and during entry.
- C. The Commonwealth of Pennsylvania and the contractor shall establish, prior to permit-required confined space operations, who will serve as the rescue responder in an emergency and what system will be used to notify the responder that an emergency exists.

Plans will be developed and implemented to coordinate entry operations when employees of more than one contracted employer are working simultaneously as authorized entrants in a permit-required confined space.

VII. Recordkeeping/Documentation

The following records will be maintained:

- A. Documented site evaluation and classification for each confined space present within an agency shall be maintained for the duration of occupancy or until permanently removed from service.
- B. Contractor confined space entry permits, training records and air monitoring data shall be retained by the contractor and the Commonwealth of Pennsylvania safety coordinator for a minimum of one year.
- C. Employee training records and certifications shall be retained in the employee's training file for the duration of employment in position requiring such training.
- D. Records of all declassification documents and all PRCS permits, including all supporting air monitoring results, shall be retained and maintained with the safety coordinator for a period of one year from the date of entry.
- E. Documentation of annual review of all declassification documents and PRCS permits (both Commonwealth of Pennsylvania and contractor) to determine continued

- program/ permit effectiveness is required and shall be maintained for a period of three years from the date of the review.
- F. Documentation of confined space monitor, rescue equipment, rescue and PPE inspection (monthly and prior to each use) and maintenance (per mfr. recommendations) shall be retained for a minimum of three years.
 - G. Documentation of confined space monitor calibration (required monthly and prior to each use) should be maintained with the safety coordinator for a minimum of three years.
 - H. Documentation of any agreement(s) made with outside rescue services to act as rescue team for confined space entries. [Note: documentation must include initial assessment performed by the Commonwealth of Pennsylvania (Appendix C) and the most recent Off-Site Rescue Performance Evaluation (Appendix D)]

Appendix A. Confined Space Identification and Classification Form

Description/Name of Space _____

Location of Space _____

A. Confined Space Determination:

Yes No

A confined space means a space that: (1) is large enough and so configured that an employee can bodily enter and perform assigned work; and, (2) has limited or restricted means for entry/exit (for example: tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and, (3) is not designed for continuous employee occupancy.

This space meets all three of the above criteria.

Note: A "NO" answer means that this is not a confined space. Go no further.
A "YES" answer means that this is a confined space; proceed with the next section.

B. Identification of Potential Hazards:

1. Potential for Hazardous atmosphere?

- ⇒ Oxygen deficiency (less than 19.5%)
- ⇒ Oxygen enrichment (greater than 23.5%)
- ⇒ Flammable gas or vapor (greater than 10% LEL or LFL)
- ⇒ Airborne combustible dust (dust explosion hazard)
- ⇒ Toxic contaminant (greater than PEL/TLV for any chemical present)

2. Engulfment by liquid or finely divided, flowable solid substance that can be aspirated to cause death by filling or plugging the respiratory system, or that can surround and effectively capture a person or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.?

3. Entrapment and/or constriction of torso (asphyxiation hazard) by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section?

4. Hazardous energy (mechanical, electrical, thermal, chemical, pneumatic, etc)?

5. Significant fall hazard (slippery surfaces, 10 foot or more drop/fall potential, etc.)?

C. Classification of Confined Space:

Non-permit Confined Space. (Section A is answered YES. Section B has all NO answers.) The Permit Required Confined Space Standard has no further application. Follow the Non-Permit Required Confined Space Procedures found In the Commonwealth of Pennsylvania Confined Space Procedure (HS200).

Permit-Required Confined Space. (Section A is answered YES. Section B has one or more YES answers.) The Permit-Required Confined Space Standard (1910.146) and the Commonwealth of Pennsylvania Confined Space Procedure (HS200) requirements must be met.

Assessment and classification performed by:

_____ (print name) _____ (signature) _____ (date)

Reviewed and approved by: _____ (print name) _____ (signature)

Appendix B: Sample DGS Permit

This form must be filled out by the Entry Supervisor 24 hours in advance of entry into the permitted space. The Entry Supervisor must be able to confirm that all employees are properly trained and will be provided with safety controls to safely enter the Permit Required Confined Space without injury. If there are any questions on the permit or questions about Confined Space entry please contact The Office of Fire and Safety at (717)-772-4545

Building:(Click Here)	Floor: (Click Here)	Closest Room Number Or Description: (Click Here)	
Type of Work Being Performed: (Click Here)			
Entry Performed by: State employee <input type="checkbox"/> / Contracted employee <input type="checkbox"/>			
Date of Entry: (Click Here)	Entry Time: (Click Here)	Time Restriction: (Click Here)	Exit Time: (Click Here)
Building Manager: (Click Here)		Entry Supervisor:(Click Here)	
Confined Space Attendant: (Click Here)		Confined Space Entrant: (Click Here)	
Contact Information: (Click Here)			
Description of work being performed? (Click Here)			
Description of equipment brought into the space? (Click Here)			
Safety Controls Checklist:			
Potential Hazards Identified: Yes <input type="checkbox"/> No <input type="checkbox"/> Emergency Procedures Developed: Yes <input type="checkbox"/> No <input type="checkbox"/>			
Personal Protective Equipment used: Yes <input type="checkbox"/> No <input type="checkbox"/> Entrants and Attendants Trained: Yes <input type="checkbox"/> No <input type="checkbox"/>			
Isolation of Energized Equipment: Yes <input type="checkbox"/> No <input type="checkbox"/> Emergency Retrieval System in place: Yes <input type="checkbox"/> No <input type="checkbox"/>			
Direct Communication procedures established between supervisor/attendant/entrant: Yes <input type="checkbox"/> No <input type="checkbox"/>			
Entry Team Trained in the Hazards associated with the entry Yes <input type="checkbox"/> No <input type="checkbox"/>			
Entry Team Trained in Emergency Evacuation Procedures Yes <input type="checkbox"/> No <input type="checkbox"/>			
Confined Space Entry Equipment & Required PPE:			
Temporary Lighting: Yes <input type="checkbox"/> No <input type="checkbox"/>		Rescue Tripod with Lifeline: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Tripod with Mechanical Wench: Yes <input type="checkbox"/> No <input type="checkbox"/>		Direct/Radio Communications: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Class II Fall Prevention: Yes <input type="checkbox"/> No <input type="checkbox"/>		Class III full body fall prevention: Yes <input type="checkbox"/> No <input type="checkbox"/>	
General/Local Exhaust Ventilation: Yes <input type="checkbox"/> No <input type="checkbox"/>		Hard Hat/Bump Cap: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Self Contained Breathing Apparatus: Yes <input type="checkbox"/> No <input type="checkbox"/>		Laceration/chemical Resistant Gloves: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Safety Glasses/Goggles/Face Shield: Yes <input type="checkbox"/> No <input type="checkbox"/>		Hearing Protection: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Chemical Resistant Clothing: Yes <input type="checkbox"/> No <input type="checkbox"/>		Air Purified Respirator: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Initial Air Monitoring:			
Air Monitoring Required? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Continuous Monitoring Required? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Oxygen: (Click Here) % LEL (Click Here)% CO (Click Here) % H2S (Click Here)%			
Continuous Air Monitoring: Testing shall be documented every half an hour. If entry required more than four samples documented than this sheet must be expanded.			
Time: (Click Here) Oxygen: (Click Here)% LEL (Click Here)% CO (Click Here)% H2S (Click Here)%			
Time: (Click Here) Oxygen: (Click Here)% LEL (Click Here)% CO (Click Here)% H2S (Click Here)%			
Time: (Click Here) Oxygen: (Click Here)% LEL (Click Here)% CO (Click Here)% H2S (Click Here)%			
Time: (Click Here) Oxygen: (Click Here)% LEL (Click Here)% CO (Click Here)% H2S (Click Here)%			
De-energization Points and Lockout Tag out locations: If equipment must be shutdown and locked and tagged out than document the following information. (If more than 6 shutdown locations please add additional sections).			
1.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	2.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	3.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	
4.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	5.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	6.Equipment: (Click Here) Energy: (Click Here) Location: (Click Here) Completely De-energized? Yes <input type="checkbox"/> No <input type="checkbox"/>	

Appendix C: Off-Site Rescue Initial Evaluation

Name of Rescue Service being evaluated: _____

1. Is the service willing to perform rescues at this facility?
Yes _____ No _____
 2. How quickly can the rescue team or service get from its location to the permit spaces from which rescue may be necessary? _____
 3. What is the availability of the rescue service? Is it unavailable at certain times of the day or in certain situations? _____
 4. If the rescue service becomes unavailable while an entry is underway, does it have the capability of notifying the Agency so that the entry can be aborted immediately?
Yes _____ No _____
 5. Does the rescue service meet all the requirements of paragraph (k)(2) of the standard? If not, has it developed a plan that will enable it to meet those requirements in the future? If so, how soon can the plan be implemented?
Yes _____ No _____
-
6. Is an adequate method for communications between the attendant, the Commonwealth of Pennsylvania and the prospective rescuer available so that a rescue request can be transmitted to the rescuer without delay? How soon after notification can a prospective rescuer dispatch a rescue team to the entry site?
Yes _____ No _____
-
7. If the Agency has spaces with a vertical entry over 5 feet in depth, can the prospective rescue service properly perform entry rescues? Does the service have the knowledge and equipment to perform rope work or elevated rescue, if needed?
Yes _____ No _____
 8. Does the rescue service have the necessary skills in medical evaluation, patient packaging and emergency response?
Yes _____ No _____
 9. Does the rescue service have the necessary equipment to perform rescues or must the equipment be provided by the Commonwealth of Pennsylvania?
Service _____ Commonwealth of Pennsylvania _____

Using the information obtained in this assessment, the {enter agency name} agency has elected to utilize the above named company for permit required confined space entry rescue operations.

Signature of Safety Coordinator

Date

Appendix D: Sample Off-Site Rescue Performance Evaluation

In accordance with the requirements of OSHA 29 CFR 1910.146 (k)(2) (iv), an annual performance evaluation is required. Please complete the following questions and return to the Commonwealth of Pennsylvania, {enter address}. Please send to the attention of the Safety Coordinator. Thank you for your cooperation.

Name of Rescue Service being evaluated: _____

Person Completing Evaluation: _____

1. Have all members of the service been trained as permit space entrants, at a minimum, including training in the potential hazards of all permit spaces, from which rescue may be needed? Yes___ No___
2. Is every team member provided with, and properly trained in, the use and need for PPE, such as SCBA or fall arrest equipment, which may be required to perform permit space rescues in this facility? Yes___ No___
3. Is every team member properly trained to perform his/her functions and make rescues, and to use any rescue equipment, such as ropes and backboards, that may be needed in a rescue attempt? Yes___ No___
4. Are team members trained in the first aid and medical skills needed to treat victims overcome or injured by the types of hazards that may be encountered in the permit spaces at this facility? Yes___ No___
5. Do all team members perform their functions safely and efficiently? Yes___ No___
6. If necessary, can the rescue service properly test the atmosphere to determine if it is IDLH? Yes___ No___
7. Can the rescue personnel identify information pertinent to the rescue from entry permits, hot work permits, and MSDS's? Yes___ No___
8. If necessary, can the rescue service properly package and retrieve victims from a permit space that has a limited size opening(less than 24 inches in diameter), limited internal space, or internal obstacles or hazards? Yes___ No___
9. If necessary, can the rescue service safely perform an elevated (high angle) rescue? Yes___ No___
10. Does the rescue service have a plan for each of the kinds of permit space rescue operations at this facility? Is the plan adequate for all types of rescue operations that may be needed at this facility? Yes___ No___

According to OSHA 29 CFR 1910.146 (k)(2)(iv), the rescue service is required to practice a simulated rescue at least once every 12 months, provided that the service has not successfully performed a similar type permit space rescue within that time. Should you wish to schedule a time to perform a simulated confined space rescue on-site, please contact {enter name and telephone here}.

The information provided in this performance evaluation is truthful to the best of my knowledge.

Signature of evaluator

Date

P-8

Fire Prevention and Control Practices

I. Purpose

The intended purpose of this safety program is to ensure that all Department of General Services (DGS) employees are properly identifying, evaluating and controlling their work areas in regards to fire hazards, and that all work areas are provided with the proper fire protection and prevention controls. It is also the intent of this Safety program to ensure that all DGS employees follow all applicable Federal, state and/or local standards regarding fire protection and prevention.

II. Scope

The Scope of this program is for all General Services employees and all visitors on commonwealth property by the DGS' request.

III. Policy Statement

The Department of General Services shall provide and administer a Fire Protection and Prevention Program for the protection of facilities and to ensure the safety of employees.

The program shall include:

- Facility inspections.
- Provision of fire extinguishers and fire suppression systems.
- Training in the use of fire extinguishers.
- Proper storage of flammable liquids.
- Work practices such as limits on smoking areas and precautions to be used during hot work.
- A hot work permit program.

IV. Program Outline

A. Facility Inspections

The Safety Coordinator or designee shall ensure all facilities operated by the Department of General Services or occupied by DGS employees are inspected at least annually to evaluate all aspects of the fire prevention and protection program. Areas where flammable liquids are stored should be inspected at least monthly. The inspections should follow the Facility Inspection Checklist as specified in Section D of the AIPP.

The inspections shall include:

- Verification that fire extinguishers are placed so that travel of no more than 75 feet is necessary to reach a fire extinguisher.

- Verification that fire extinguishers have been serviced within the last year. Fire extinguishers that do not have a current certification must be taken out of service.
- Verification that flammable liquids are stored properly.
- Verification that fire exits are not blocked and that stored materials do not block aisles.
- Verification that combustible materials are stored properly.
- Verification that fixed fire suppression equipment such as sprinkler or Halon systems are certified/inspected as per the NFPA, OSHA or any other applicable federal state or local standard.

Deficiencies identified in the inspections shall be recorded on the inspection checklist and communicated to the department or facility manager. Minor issues that can be corrected should be corrected immediately. The facility or department manager shall ensure all other deficiencies are corrected and report progress to the Agency Safety Coordinator or designee.

B. Provision of Fire Extinguishers

Fire extinguishers shall be provided as required by NFPA and Department of General Services guidelines. Department of General Services shall ensure fire extinguishers are placed in Commonwealth owned office buildings or facilities. The Fire and Safety Division shall ensure fire extinguishers are properly placed in Commonwealth Buildings operated by Department of General Services. In leased facilities, the Agency Safety Coordinator or designee shall ensure the building owner places fire extinguishers as necessary.

All fire extinguishers shall be inspected monthly to ensure they are fully charged and secured with a wire seal. The monthly inspection shall be documented and initialed on the card attached to the fire extinguisher; this inspection shall be scheduled or performed by the Building Manager or designee in each DGS Building.

C. Fire Extinguisher Training

If DGS employees are encouraged to fight fires using fire extinguishers, the Agency Safety Coordinator, Bureau Director, or Building Manager shall ensure employees receive training in the proper use of fire extinguishers. The training shall be provided upon an employee's assignment in an area where fire extinguishers may be used, and repeated annually. The Building Manager shall maintain records of training according to DGS guidelines.

D. Flammable and Combustible Liquid Storage

Flammable liquids must be stored properly to prevent fires or to limit the potential damage if a fire occurs. Refer to the OSHA standard 29 CFR 1910.106 for storage requirements and limits.

The following definitions apply:

"Combustible liquid" means any liquid having a flashpoint at or above 100 deg. F. (37.8 deg. C.) Combustible liquids shall be divided into two classes as follows:

"Class II liquids" shall include those with flashpoints at or above 100 deg. F. (37.8 deg. C.) and below 140 deg. F. (60 deg. C.), except any mixture having components with flashpoints of 200 deg. F. (93.3 deg. C.) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

"Class III liquids" shall include those with flashpoints at or above 140 deg. F. (60 deg. C.) Class III liquids are subdivided into two subclasses:

"Class IIIA liquids" shall include those with flashpoints at or above 140 deg. F. (60 deg. C.) and below 200 deg. F. (93.3 deg. C.), except any mixture having components with flashpoints of 200 deg. F. (93.3 deg. C.), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

"Class IIIB liquids" shall include those with flashpoints at or above 200 deg. F. (93.3 deg. C.). This section does not cover Class IIIB liquids. Where the term "Class III liquids" is used in this section, it shall mean only Class IIIA liquids. When a combustible liquid is heated for use to within 30 deg. F. (16.7 deg. C.) of its flashpoint, it shall be handled in accordance with the requirements for the next lower class of liquids.

"Flammable liquid" means any liquid having a flashpoint below 100 deg. F. (37.8 deg. C.), except any mixture having components with flashpoints of 100 deg. F. (37.8 deg. C.) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids shall be known as Class I liquids. Class I liquids are divided into three classes as follows:

Class IA shall include liquids having flashpoints below 73 deg. F. (22.8 deg. C.) and having a boiling point below 100 deg. F. (37.8 deg. C.).

Class IB shall include liquids having flashpoints below 73 deg. F. (22.8 deg. C.) and having a boiling point at or above 100 deg. F. (37.8 deg. C.).

Class IC shall include liquids having flashpoints at or above 73 deg. F. (22.8 deg. C.) and below 100 deg. F. (37.8 deg. C.).

This program refers in particular to the following classes of materials:

- Class IB flammable liquids such as gasoline.
- Class IC flammable materials such as paint thinner, mineral spirits, and turpentine.
- Class II combustible liquids such as fuel oil and kerosene.

1. Storage of Flammables and Combustibles Inside Buildings

The following guidelines shall be followed for the storage of flammable and combustible liquids inside buildings:

- A maximum of 120 gallons of Class IB, Class IC, Class II or Class III liquids may be stored inside one fire area of a maintenance building or shop, and outside of a flammable storage cabinet or storage room. Such materials should not be stored in office buildings, except for the materials that are necessary for the operation of the building. Quantities in excess of 120 gallons must be stored inside a flammable storage cabinet or inside a storage room. Refer to 29 CFR 1910.106 for the requirements of storage rooms.
- Liquids must be stored in metal cans, safety cans, or drums. The containers must be labeled according to Hazard Communication Requirements. Class IB liquids may be stored in safety cans or metal cans of 5 gallons capacity or less. No more than one quart of a Class IB liquid may be stored in glass or approved plastic containers.
- The storage area must be kept free of trash and other combustible materials.
- Aisles and access to the storage area must be kept free of stored materials.
- Class IB, Class IC, Class II or Class III liquids should not be stored inside the basement of any building.
- A fire extinguisher must be placed no less than 10 feet and no more than 25 feet from a Class I or Class II storage area.
- No Smoking signs shall be posted in Class I and Class II storage areas.

2. Storage of Flammables and Combustibles in Outside Storage Areas

The following guidelines shall be followed for the storage of flammable and combustible liquids outside buildings:

- Fuel oil and gasoline tanks in outside aboveground storage areas shall be diked to capacity using concrete curbs or other enclosures.
- Tanks shall be protected from vehicle damage by barriers or high curbs.
- There shall be no combustible materials, empty or full drums, or barrels inside the diked area.
- The distance between flammable or combustible storage tanks shall be at least three feet.

- There shall be a clear zone around tanks and the zone shall be free of weeds, trash and other combustible materials.
- Liquid petroleum gas (LPG) tanks shall be placed at least 20 feet from flammable or combustible storage tanks.
- Class I liquids may only be dispensed when the nozzle from the tank and the container are electrically connected.
- Smoking shall be prohibited within 50 feet of fuel storage areas.

3. Storage of Ammunition

Ammunition may be stored only in approved storage areas. The storage area shall be protected from sources of heat or fire, and away from combustible and flammable materials. A specific person shall be assigned the responsibility for the control and storage of ammunition. A positive control and inventory system shall be put in place and maintained by the responsible person.

E. Fire Protection and Prevention Work Practices

1. Smoking

Smoking shall be **prohibited** in areas where flammable and combustible materials are stored or dispensed.

2. Hot Work

Hot work such as welding or brazing shall include consideration of fire protection and prevention work practices, such as:

- Hot work may be done only in approved areas.
- The areas where hot work will be done must be free of combustible and flammable materials, trash and dry weeds.
- Fire extinguishers must be available at the work location when hot work is conducted.
- Protect wood floors and other materials in the area with noncombustible tarps or fire blankets.
- Install barricades or barrier tape to prevent unauthorized personnel from entering the hot work area.
- All sources of heat or fire must be eliminated before the responsible employee leaves the area.
- For Areas in the Harrisburg area the Hot Work procedures that are stated on the form below will be followed.
- For DGS employees that are in leased buildings follow the accepted building hot work request procedures.

Date of Request:		Work Order # DGS Project #	
Building:		Floor/Room:	
Exact location:			
Work Description: (Note) Select From Drop down List		Work Description	
Explanation of Work to be done:			
Contractor / Agency:			
Date of Work:		Start Time:	Finish Time:
Person Filling out Permit:		Phone #	
Person Conducting Work:		Fire Watch:	
On-Site Supervisor:		Contact Phone #	
<p>THE FOLLOWING ITEMS ARE REQUIRED AND MUST BE ADHERED TO ACCORDINGLY OR WORK WILL BE DENIED OR RESCHEDULED</p> <p>PERSONS CONDUCTING WORK THAT REQUIRES A FIRE/SAFETY PERMIT SHALL:</p> <ul style="list-style-type: none"> • Notify the DGS Building Manager and the DGS Fire Safety Office of any intended Work via this form NOT LESS THAN 24 HRS NOTICE - UNLESS DEEMED AN EMERGENCY. • SUBMIT THIS FORM ELECTRONICALLY TO GS-firesafetyenv@pa.gov, the Building Manager and the Regional Manager ONCE IT IS COMPLETED. • Be responsible for fire protection in the work areas and staging areas. • <i>Supply and maintain all necessary fire protection equipment.</i> • Provide a minimum of two APPROVED working fire extinguishers rated at 10 lb. ABC within each Work/Event area 75 ft. apart. • Utilize a flame resistant pad to protect all adjacent surfaces from open flame. • Provide a smoke/dust elimination devices or negative air enclosure at work site. • Provide a fire watch at all times while open flame, hot work and spark producing operations are taking place <u>and for one hour after</u> completion of work • Not permitted to leave the work area until the materials have reached a temperature where it can be touched with a non-gloved hand. <p style="text-align: center;">Contact information for DGS Fire Safety Phone (717-772-4545 or 717-705-2213) E-Mail to: GS-firesafetyenv@pa.gov, the Building Manager & Regional Manager</p>			
For Fire & Safety Division Use ONLY		HOT WORK CHECKLIST	
<input type="checkbox"/> Fire alarm system is disabled or there is no risk of activation.			
<input type="checkbox"/> The area is swept clean of combustibles.			
<input type="checkbox"/> All movable combustible items have been moved away from Hot Work area.			
<input type="checkbox"/> All non-movable combustible flooring, building material, adjacent surfaces are covered with flame Resistant blankets.			
<input type="checkbox"/> Flame Resistant Pads / Tarpaulins suspended beneath work if working on walls or ceilings.			
<input type="checkbox"/> Hot Work is being conducted on Non-Combustibles and without Combustible Covering or Insulation.			
<input type="checkbox"/> Enclosed equipment (If at or adjacent to the Hot Work areas) is cleaned of all combustibles.			
<input type="checkbox"/> Containers adjacent to Hot Work area purged of ALL Combustible Materials.			
<input type="checkbox"/> Fire Watch is trained in use of Portable Fire Extinguishers and Sounding the Alarm.			
DISABLED POINT (S) OR LOOP (S)			
Approval date:		Approval Time:	
Date Posted:		Time Posted:	
DGS FIRE / SAFETY APPROVAL:			

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Substance Abuse Awareness and Prevention Policies

I. Policy

This operating procedure provides the minimum steps required of all Department Of General Services personnel to ensure that the Substance Abuse Awareness and Prevention Program is successfully and consistently implemented.

This program is designed to protect Department Of General Services employees from accidents and injuries resulting from the misuse of alcohol and uncontrolled substances.

II. References

- A. Executive Order 1996-13, Commonwealth of Pennsylvania's Policy on Substance Abuse in the Workplace.
- B. Drug-Free Workplace Act of 1988, (P.L 100-690, Title V. Subtitle D).
- C. Controlled Substance Act (21 U.S.C. 812).
- D. Executive Order 1980-18, Governor's Code of Conduct.

III. Definitions

Controlled Substance – A controlled substance in Schedules I-V of Section 202 of the Controlled Substance Act (21 U.S.C. 812) and as further defined by regulation at 21 C.F.R. 1300.11-1300.15.

Conviction – A finding of guilty (including a plea of nolo contendere, disposition in lieu of trial, probation without verdict or accelerated rehabilitative disposition) or imposition of sentence or both by any judicial body charged with the responsibility to determine violation of the federal or state criminal or other relevant drug statutes.

Criminal Drug Statute – A federal or non-federal criminal or other relevant statute involving the manufacture, distribution, dispensation, use, or possession of any controlled substance.

Workplace – A site for the performance of work done while on duty. This includes client owned or leased properties, construction sites, and any other field location where work is assigned.

VI. Responsibilities

Managers/supervisors should be observant of any employee reporting to work or remaining at work in an unfit condition as a result of alcohol or other drugs. Managers/supervisors must notify HR in such cases.

Managers/Supervisors should ensure their personnel are familiar with these procedures and adhere to its guidelines.

The Safety Coordinator is available to provide guidance and is responsible for evaluating the administration of this procedure.

V. Procedure

- A. The unlawful manufacture, distribution, dispensation, possession, or use of alcohol and other controlled substances by employees either while on duty or at any client workplace is prohibited.
- B. Inappropriate use of alcohol or other controlled substances by any employee while on duty or at any client workplace is prohibited. Such conduct shall subject the employee to appropriate discipline, up to and including termination.
- C. Employees are prohibited from reporting to work or remaining at work in an unfit condition as a result of alcohol or other drugs. Such conduct shall subject the employee to appropriate discipline, up to and including termination.
- D. Any employee convicted of violating any statute governing the unlawful manufacture, distribution, dispensation, possession, or use of alcohol or other controlled substances shall notify, in writing, his or her supervisor or other appropriate management officials of such conviction in accordance with procedures established in this procedure.
- E. Any employee who has self-disclosed a problem with alcohol or other drugs shall be referred to an Employee Assistance Program.

VI. Training

- A. All employees shall receive information and training regarding this procedure, the dangers of substance abuse, and the availability of counseling and rehabilitation.
- B. The Department Of General Services drug-free awareness training program shall minimally include:



1. Information on the Department Of General Services substance abuse policy to all new employees.
 2. Information/training to supervisors regarding their responsibilities in the administration of the substance abuse policy.
 3. Literature and information regarding the dangers of drug and alcohol abuse in the workplace.
 4. Information regarding other available counseling programs.
- C. Employees shall receive information and training regarding the substance abuse awareness and prevention program during orientation and at least every two years thereafter.

VII. Recordkeeping

- A. Training – The Department of General Services must maintain records of Substance Abuse Awareness and Prevention training.

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Bloodborne Pathogens Program

Table of Contents

- A.** Policy Statement
- B.** Definitions
- C.** Exposure Control
- D.** Methods of Compliance
- E.** Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up
- F.** Communication of Hazards to Employees
- G.** Recordkeeping

Appendix A: Hepatitis B Vaccine Declination Form

Appendix B: P-10 Training Sign-In Sheet

References

- DGS Secretary Topper’s “Safety Program Policy Statement” dated 01-13-16
- PA Management Directive 530.31 Amended
- PA Management Directive 505.26 Amended
- Element C of the DGS AIPP Safety Manual
- CFR 29 1910.1030

A. Policy Statement

The following Bloodborne Pathogens Program is official policy for the PA Department of General Services (DGS) and all of its employees. Authority and responsibility for its execution are pursuant to DGS Secretary Topper’s “Safety Program Policy Statement” dated 01-13-16, PA Management Directive 530.31, PA Management Directive 505.26 and “Element C” of the DGS Accident & Injury Prevention Program (AIPP) and Safety Manual. All of these documents are available for review online.

This policy includes material that applies directly to DGS operations. The in-depth treatment of this subject is CFR 29 1910.1030 and its associated letters of interpretation, which have been used for guidance.

B. Definitions

Blood – human blood or human blood components

Bloodborne pathogens – pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV)

Bodily fluid disposal kit – a sealed package, kept in stock in each building manager’s office, containing the tools and personal protective equipment needed to safely clean up blood and /or OPIM

Contaminated – the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface

Contaminated sharps – any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes and exposed ends of dental wires

Decontamination – the use of physical or chemical means to remove, inactivate or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use or disposal

Engineering controls – controls, such as sharps disposal containers, that isolate or remove the bloodborne pathogens hazard from the workplace

Exposure incident – a specific eye, mouth, other mucous membrane, non-intact skin or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee’s duties

Final receptacle – the plastic trash barrel with the biohazard logo on top and lined with a red “Biohazard” bag

Handwashing facilities – a facility providing an adequate supply of running potable water, soap and single-use towels or air-drying machines

Occupational exposure – reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee’s duties

Other potentially infectious materials (OPIM) –

1. The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood and all body fluids in situations where it is difficult or impossible to differentiate between bodily fluids;
2. Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and
3. HIV-containing cell or tissue cultures, organ cultures, HIV-or HVB-containing culture medium or other solutions and blood, organs or other tissues from experimental animals infected with HIV or HVB

Parenteral – piercing mucous membranes of the skin barrier through such events as needle sticks, human bites, cuts and abrasions

Personal protective equipment (PPE) – specialized clothing or equipment worn by an employee for protection against a hazard

Regulated waste – liquid or semi-liquid blood or other potentially infectious materials, contaminated items that would release blood or OPIM in a liquid or semi-liquid state if compressed, items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling, contaminated sharps and pathological and microbiological wastes containing blood or other potentially infectious materials

Source individual – any individual living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee.

Sterilize – the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores

Universal precautions – an approach to infection control. According to the concept of universal precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV and other bloodborne pathogens

Work practice controls - controls that reduce the likelihood of exposure by altering the manner in which a task is performed

C. Exposure Control

1. Exposure control plan – DGS’ exposure control plan consists of the information that follows under C2 (exposure determination) and D (methods of compliance).
2. Exposure determination – DGS has determined that the following occupations have potential occupational exposure to bloodborne pathogens: Bureau of Police and Safety employees, Fire, Safety & Environmental Division employees, custodians, maintenance repairmen, plumbers and those who directly supervise or manage any of these employees. If you believe that your occupation should be listed here, but it is not, please contact your Safety Coordinator, Tim Burke

D. Methods of Compliance

1. Universal precautions shall be observed to prevent contact with blood or OPIM. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.
2. Engineering and work practice controls –
 - a. Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, PPE shall also be used.
 - b. Handwashing facilities are readily available for employees who could have occupational exposure to bloodborne pathogens so that they may use them promptly following a cleanup.

c. DGS has also provided antiseptic hand cleanser and clean cloth/paper towels or antiseptic towelettes. These items are all included in the bodily fluid disposal kits available in each Building Manager's office. However, if antiseptic hand cleansers or towelettes are used due to lack of immediate access to handwashing facilities, hands shall be washed with soap and running water as soon as possible thereafter.

d. Contaminated sharps (including broken glass or needles) found at the scene of a cleanup shall be gathered using the cardboard scraper and scoop portions of the cleanup kit if small enough to be handled in that manner. They must then be placed into a biohazard bag with the least amount of handling possible and the biohazard bag must be carefully placed in the final receptacle immediately upon completing clean-up. Never handle contaminated sharps by hand even with gloves on. If it seems to you that handling contaminated sharps by hand is your only option, contact the Fire, Safety & Environmental Division for advice or assistance.

e. Neither blood nor OPIM are to be handled with the hands no matter what type of gloves the employee is wearing or how thick they may be. The cardboard scraper and scoop tools that are part of the cleanup kit are to be used to gather all contaminated materials into the red bio-bag in all cases. If the volume of blood, OPIM and/or other contaminated materials is too large for a few cleanup kits, call the Fire, Safety & Environmental Division for advice or assistance.

f. Eating, drinking, smoking, applying cosmetics, applying lip balm and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure such as a contaminated area requiring clean-up.

g. All procedures involving blood or OPIM shall be performed in such a manner as to minimize splashing, spraying, spattering and generation of droplets of these substances.

h. All surfaces, equipment, machinery and anything that becomes contaminated with blood or OPIM must be cleaned up. Notify your supervisor immediately if you are unable to properly de-contaminate any contaminated object. The contaminated area must remain secure until de-contamination is completed.

3. Personal protective equipment (PPE)

a. Provision - For those employees recognized as having potential occupational exposure, DGS provides bodily fluid disposable kits. These kits include

appropriate PPE such as gloves, gowns, face masks and eye protection. In order to receive the best protection available from these kits, the use of all of their contents in accordance with the instructions printed on each kit is a mandatory part of any blood or OPIM cleanup process.

c. Accessibility - DGS managers shall ensure that appropriate PPE in the appropriate sizes is readily accessible at the worksite or is issued to employees. Hypoallergenic gloves, glove liners, powderless gloves or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

d. Cleaning, laundering and disposal – DGS does not provide reusable materials for the bodily fluid cleanup process. All components of each disposal kit are to be discarded into the final receptacle immediately upon concluding a blood or OPIM cleanup process. If a supervisor approves the use of a bodily fluid disposal kit to clean up materials other than blood or OPIM, observe customary practices and your supervisor’s instructions regarding disposal. Bodily fluid disposal kits used to clean up materials other than blood or OPIM must not be placed into the final receptacle.

e. Repair and replacement – DGS shall repair or replace PPE as needed to maintain its effectiveness at no cost to the employee.

f. Gloves – Gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, OPIM, mucous membranes and non-intact skin and when handling or touching contaminated items or surfaces.

g. Masks, eye protection and face shields – Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, shall be worn whenever splashes, spray, spatter or droplets of blood or OPIM may be generated and eye, nose or mouth contamination can be reasonably anticipated. All of these items are included in the bodily fluid disposal kits, and the use of all of them is required during the cleanup of any blood or OPIM.

h. Aprons and other protective body clothing – Appropriate protective clothing shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated. Depending on the situation and what is being cleaned up the bodily fluid disposal kits most likely include sufficient protection for the situations that DGS employees might encounter.

i. Housekeeping – DGS does not deploy reusable materials for bodily fluid cleanups. All components of each bodily fluid disposal kit are to be discarded into the final receptacle immediately upon conclusion of the cleanup process.

j. Disposal of used bodily fluid disposal kits and reporting – Used bodily fluid disposal kits shall be placed in the final receptacle that is kept in East Wing Room #61, which is found just to the right after entering East Wing Building Manager’s Room #62E, found beside the PSECU ATM machine behind the Capitol Café. Use of the final receptacle must be reported to the Fire, Safety & Environmental Division as soon as possible after use.

E. Hepatitis B Vaccination - Post-exposure Evaluation & Follow-up

1. Exposure incident

If an exposure incident (as defined above in Section B. Definitions) occurs, contact the Fire, Safety and Environmental Division who will make sure that the detailed procedures specified in the current version of 29 CFR 1910.1030(f)(3) through (f)(5) are followed.

2. Hepatitis B vaccination at no charge to employees

a. Hepatitis B vaccination (HBV) offer – DGS offers the HBV at no charge to all employees who have potential occupational exposure to bloodborne pathogens. Please contact your supervisor to initiate the arrangements for your HBV series with one of DGS’ Workers’ Compensation Panel Physicians.

b. Vaccination refusal – Employees are free to refuse the Hepatitis B vaccine. If an employee chooses to do so, they will need to sign a copy of the attached Hepatitis B Vaccine Declination form included within this document as Appendix A. However, if at any time in the future the employee changes their mind and decides that they want the vaccine, DGS will pay for it if the employee still has the potential for an occupational exposure.

F. Communication of Hazards to Employees

1. Labels and signs

a. Labeling and signage compliance for bodily fluid disposal kits – As long as the bodily fluid disposal kit is used per its instructions and placed into the final receptacle the labeling requirements will be met. If all contaminated materials cannot be contained within one or more bodily fluid disposal kits, contact the Fire, Safety and Environmental Division for advice or assistance.

c. Incomplete decontamination – Immediately notify the Fire, Safety and Environmental Division in the event that decontamination is not possible for any contaminated surfaces or other objects. They will make sure that the specialized labels and signs described in 29 CFR 1910.1030(g)(1)(i)(H) are correctly applied.

2. Information and training

a. DGS will provide training for each employee with potential occupational exposure without charge to the employee. This training shall consist of a personal session with a supervisor, manager or their designee during which a copy of this document is reviewed, discussed and provided for the employee's reference.

b. This training will be provided at the time of initial assignment to tasks where occupational exposure may take place, at any time new hazards develop due to changed processes or equipment that affect an employee and annually thereafter.

c. The person conducting the training shall be knowledgeable in the subject matter covered by the training program as it relates to the workplace.

G. Recordkeeping

1. Confidential medical records

a. DGS will maintain an accurate record for each employee with occupational exposure. For each employee, this record shall include:

(1) Name and employee number

(2) Copy of hepatitis B vaccination status and associated data

b. DGS will ensure that medical records are kept confidential and will not disclose or report on them to any person within or outside the workplace without employee's written consent or as required by law.

2. Training records



a. DGS will maintain completed copies of the attached (Appendix B) training session sign-in sheets with the date, trainer's name and the employees' names and signatures.



Appendix A – Hepatitis B Virus Vaccine Declination

Date: _____

I acknowledge that I have been identified as an employee with an Occupational Exposure as defined in DGS' Bloodborne Pathogens Program. This means that the duties of my employment could bring me into close proximity with blood or other potentially infectious materials (OPIM), which could result in my being exposed to bloodborne pathogens. In an effort to protect me in the event of such an exposure, DGS has offered me the Hepatitis B Virus (HBV) vaccine at no charge to me.

Since I have declined to receive the HBV vaccine, I have signed this form acknowledging that I have received a copy of the Bloodborne Pathogens Program, have had the opportunity to read both it and this form and affirm my decision to refuse vaccination.

I understand that due to my occupational exposure to blood or other potentially infectious materials (OPIM) I may be at higher risk of acquiring HBV infection. I have been given the opportunity to be vaccinated with the HBV vaccine at no charge to myself. However, I decline HBV vaccination at this time. I understand that by declining this vaccine, I continue to be at higher risk of acquiring HBV. If in the future I continue to have potential occupational exposure to blood or OPIM and I want to be vaccinated with the HBV vaccine, I can receive the vaccination series at no charge to me.

Employee's name: _____

Employee #: _____

Employee's Occupation Title: _____

Employee's Signature: _____

Supervisor name: _____

Supervisor's Title: _____

Supervisor's signature: _____

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Pre-Operational Process Review

I. Purpose

When a new hazard will be introduced into the workplace because of changes in equipment, operations, or processes, the hazards must be assessed, training must be provided, and protective equipment must be assigned as necessary.

II. Responsibilities:

The responsibilities for the hazard review will depend on the situation, but is generally shared by many people in the procurement and installation process. For example:

- ***Personnel responsible for the design*** of a new operation or process shall ensure safety issues such as electrical safety, fire safety, indoor air quality issues, and ergonomics are considered in the design.
- ***Purchasing*** shall ensure that equipment vendors verify that new equipment meets the current design standards; that Material Safety Data Sheets are obtained for all chemicals introduced into the workplace; and that the least toxic chemical is selected for the operation.
- The ***Safety Coordinator or designee*** shall review the new process or operation and assign personnel protective equipment or assess whether other controls must be put into place.
- ***Facilities*** shall ensure the equipment is installed as required.
- ***Supervisors*** shall ensure employees are trained in the operation of new equipment or operations, and that required guards or safeguards are maintained in place. Equipment vendors generally will train users in new equipment, but the Supervisor will be responsible to ensure that new employees receive appropriate training and personal protective equipment.
- ***Employees*** shall verify that they understand how to use the equipment or perform the operation, that they use the required personal protective equipment, and that all safeguards are in place before using the equipment or performing the operation.

III. New Equipment:

The Supervisor in an area shall be responsible to ensure that a Preoperational Process Review is conducted whenever a new operation or piece of equipment is introduced into the workplace. The PPE hazard assessment, vision conservation assessment, training and so on shall be documented according to department procedures.

The hazard assessments and controls can be documented using the forms in Attachments A, B, and C.

Attachment B Hazard Inventory Checklist

This checklist may be used to identify potentially hazardous conditions that may be present during changes occurring to processes and/or equipment during installation or renovation.

Hazard	Potentially Present	Not Expected
Walking/Working Surfaces		
1. Normal means of egress restricted or blocked		
2. Unprotected openings		
3. Areas not properly drained or with uneven surfaces		
4. Hazardous underground (i.e., tunnels) exposures		
5. Hazardous overhead (i.e., piping, loads, etc) exposures		
6. Signage or demarcation missing		
Machinery Safeguarding		
1. Unprotected point of operation hazards		
2. Unprotected power transmission hazards		
3. Nature of operation change requiring training		
Fire Safety		
1. Fire hazard due to combustible or flammable materials use		
2. Fire hazard due to protection interruption		
3. Fire hazard due to hot work		
4. Explosion hazard		
Chemical Exposures		
1. New chemicals introduced		
2. Nature of chemical use or exposure changed		
3. Chemical protection level reduced		
Heat/Cold Stress		
1. Hot or cold process being introduced/used		
2. Normal cooling/heating process being altered		
3. Activity level resulting in heat/cold stress		
Noise/Vibration		
1. High construction levels		
2. High equipment/process levels		
Fall Protection		
1. Work in man lifts, in booms, other raised equipment		
2. Work on other raised surfaces		
Confined Space Entry		
1. Potential permit-required space entry		

Hazard	Potentially Present	Not Expected
2. Modification of spaces to make them permit-required		
Lockout/Tag-out		
1. Introducing new equipment requiring safeguarding		
2. Reducing protection level during construction		
Ergonomics		
1. Physical demand during change exceeding workers capabilities		
2. Physical demand after change exceeding workers capabilities		
Other Potential Hazards		
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
General Comments:		
Completed by:		Date:

P-12

Asbestos Management

**Department of General Services
Asbestos Management Program**

I. Policy Statement

A. Overview

This program shall be followed to prevent exposure of the public, Commonwealth employees and Department of General Services (DGS) employees, in particular, from uncontrolled exposures to asbestos. Exposures to asbestos shall be eliminated or controlled in all Commonwealth buildings except for employees who have been specifically trained in the hazards of asbestos, and who have been provided with appropriate personal protective equipment. Exposures can be eliminated by removing damaged material, or controlled by keeping installed materials in good condition.

The purpose of this program is to protect the public, employees of DGS and Commonwealth employees in DGS-controlled buildings from the hazards associated with asbestos containing materials (ACM) and to ensure the safety of DGS employees working around ACM. In addition, this program is intended to assist DGS in complying with the intent of OSHA 29 CFR 1910.1001, the OSHA Asbestos Standard for General Industry, and 29 CFR 1926.1101, the Asbestos Standard for the Construction Industry; and the requirements of the Environmental Protection Agency and the Commonwealth of Pennsylvania.

Asbestos materials that are in good condition may be maintained in place using an effective Operations and Maintenance Program.

The Asbestos Management Program shall include:

- Conducting surveys to document the locations and conditions of asbestos containing materials.
- Providing awareness information to Contractors and employees to inform them of the locations and conditions of asbestos materials in project areas.
- Providing awareness information for building occupants to inform them of the location of asbestos materials, and procedures to report damaged ACM.
- Providing procedures and training for the management of asbestos in a formal Operations and Maintenance Program, and removal of materials that have become damaged.
- Removing asbestos that may be disturbed during renovations of buildings, repair of plumbing systems, or repair of HVAC systems.

B. Responsibilities

The following personnel have specific responsibilities as detailed herein for the asbestos program:

Position	Name	Phone	e-mail
Agency Safety Coordinator	Andy Preston	346-1526	apreston@pa.gov

II. Applicability

The program shall apply to asbestos containing materials in Commonwealth owned or operated buildings under the control of the Department of General Services, and provides for the management of asbestos materials by DGS employees, or contractors working under the direction of DGS.

This program shall apply to DGS employees and to contractors during work that may disturb asbestos materials such as plumbing repairs, Operations and Maintenance repairs of damaged asbestos materials, clean up of damaged ACM, intentional removal during building renovations, or modification of HVAC or plumbing systems. The program also is intended to inform employees who may be in the vicinity of asbestos materials of the hazards of asbestos. These employees will not intentionally disturb ACM but may come in contact with materials by virtue of their jobs. This may include mechanics, engineering staff, maintenance workers, and custodial workers.

III. References

- OSHA 29 CFR 1910.1001- Asbestos (General Industry)
- OSHA 29 CFR 1926.1101- Asbestos (Construction Industry)
- PA Licensing and Certification of Asbestos Occupations.
- EPA Guidance Document, *Controlling Asbestos Exposures in Buildings* (EPA 1973)
- EPA Guidance Document, *Operations and Maintenance Programs*
- City of Philadelphia Asbestos Control Regulations, for work within the City of Philadelphia
- Allegheny County Asbestos Control Regulations, for work within Allegheny County

IV. Definitions

Asbestos-containing material (ACM): ACM includes any material that contains one percent or more asbestos. The analysis of the material is done by polarized light microscopy (PLM) or transmission electron microscopy (TEM).

Class I asbestos work: Class I asbestos work includes the intentional removal of thermal system insulation (TSI), surfacing ACM and presumed ACM (PACM). The removal of more than one bag of asbestos waste is considered Class I work, as opposed to Class III work, which is smaller scale removal for clean up or repair. Only properly trained and licensed workers may do Class I work. Workers must be licensed by the Commonwealth of Pennsylvania Department of Labor and Industry as asbestos abatement workers and supervisors.

Class II asbestos work: Class II asbestos work includes the removal of nonfriable ACM which is not TSI, surfacing ACM, or PACM. Class II work usually refers to removal of floor tiles, roofing, shingles, or transite panels. Workers must be licensed by the Commonwealth of Pennsylvania Department of Labor and Industry as asbestos abatement workers and supervisors.

Class III asbestos work: Class III asbestos work includes repair and maintenance operations, where limited amounts of TSI or surfacing material are likely to be disturbed. For example, Class III operations may involve selected removal to access a valve that needs to be repaired, removing damaged pipe insulation using one glovebag, repair and patching of damaged TSI on a vessel or boiler, and drilling into a transite panel or an asbestos-containing lab bench. Repair is defined to include encapsulation or other sealing of ACM or PACM. Class III operations are limited to the generation of no more than one bag of waste. If more than one bag of waste is generated, the project would be considered a Class I operation. Workers must be licensed by the Commonwealth of Pennsylvania Department of Labor and Industry as asbestos abatement workers and supervisors.

Class IV asbestos work: Class IV asbestos work includes maintenance and custodial work during which employees may contact ACM or PACM, and activities to clean up waste and debris that may contain ACM. Examples of Class IV work include stripping asbestos containing tile floor, and cleaning up small amounts of debris from damaged pipe insulation or surfacing material. General maintenance of floor materials that is not part of a removal project is covered under the general industry standard and is not considered Class IV work.

Competent person: The competent person is someone who can recognize existing asbestos hazards in the workplace, select the appropriate control strategy, and has the authority to take prompt corrective action. The competent person is typically the person in charge of Class I, II, III and IV asbestos work. For Class I and II work, the competent person must have specific EPA model program training as an asbestos abatement supervisor.

Presumed asbestos-containing material (PACM): PACM is TSI and surfacing material found in buildings constructed no later than 1980. Flooring installed prior to 1985 is also PACM. The presumption of a material containing asbestos can be rebutted if building records show the

materials are not asbestos, if there has been a survey and sampling of the materials, or if the materials are clearly fiberglass, expanded foam or rubber.

Permissible exposure limit (PEL): The PEL is the airborne concentration of asbestos fibers that an employee may be exposed to without the use of respirators or other controls. The OSHA PEL is 0.1 fibers per cubic centimeter of air (f/cc), averaged over an eight-hour period. The EPA recommended clearance concentration of 0.01 f/cc is used as the limit in any building to protect the public and Commonwealth employees.

Regulated area: A regulated area is any area where Class I, II, or III work is done, any adjoining area where debris and waste is accumulated, and any work area where there is a reasonable possibility that the PEL will be exceeded.

V. Operations and Maintenance Program

A. Program Overview

An Operations and Maintenance Program shall be established to control asbestos exposures in Commonwealth owned buildings, to provide guidelines for the maintenance of asbestos materials installed in buildings, and to arrange for the removal of asbestos materials if necessary to complete building renovation or maintenance activities. The program shall include:

- Building surveys to identify the location and quantities of asbestos materials.
- A hazard communication program and procedures.
- Training for individuals who may be responsible to remove asbestos materials, and awareness training for those individuals who may have incidental but unintentional exposure to asbestos materials as part of their jobs.
- Procedures to report damaged asbestos materials.
- Procedures for the removal of asbestos materials.
- Clearance requirements and testing after removal activities.
- Record keeping requirements.

B. Facility Surveys

Asbestos surveys have been completed in buildings operated by DGS:

The DGS Fire, Safety and Environmental Section maintain the survey report for each DGS owned & operated building; and for the annex properties. The survey reports can be reviewed upon request. The DGS Fire, Safety and Environmental Section shall ensure the conditions of asbestos materials are reviewed on an annual basis. The agency Safety Coordinator shall maintain electronic or paper copies of all surveys.

The responsible Supervisor shall review projects that may impact asbestos materials. The responsible Supervisor shall review the work area to identify suspected asbestos materials and review the survey report to verify whether asbestos materials are present. If there are suspected asbestos materials, but a survey is not available, the Bureau Director of Maintenance Management shall be contacted to arrange for sampling of suspect materials. Suspected materials shall not be disturbed until it is known for certain whether asbestos is present. Refer to procedures below for sampling suspect asbestos containing materials.

The Service Request Form in Attachment 1 shall be used to request sampling of suspected asbestos materials. The form shall be forwarded to the Bureau Director who will arrange for sampling of the suspect materials. The completed sampling report will be attached to and filed with the building survey. Notify the Agency Safety Coordinator of all completed service requests.

C. Hazard Communication and Information

1. Signs and Labels

Signs shall be posted at entrances to mechanical rooms where asbestos materials are present. The signs shall indicate the type of asbestos materials present and the phone number and name of the person for employees to call if damaged ACM are observed.

Where feasible, labels shall be placed on installed asbestos materials where the materials are accessible to employees in their workplaces. The labels shall contain the following information:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

At a minimum, asbestos signs or labels should be placed in corridors; hallways and rooms where asbestos pipe insulation is present and employees and or the public may have access to the materials.

2. Hazard Communication

Employees shall be informed of the locations and conditions of ACM in their workplaces during initial orientation. They shall be informed of the location of the asbestos survey, and procedures to follow if damaged ACM is observed.

In particular, employees should be informed of locations of asbestos materials in their workplaces, including asbestos containing floor tiles, acoustical plaster, and pipe insulation. The effective hazard communication program shall be used in addition to signs and labels.

Contractors shall be informed of the locations and types of asbestos materials in their project areas.

D. Training

1. Initial Training

a. Awareness Information

When information is available, employees shall be informed of the asbestos in the buildings where they may work. The information should include:

- Location and types of asbestos materials in their work areas.
- The location of the asbestos survey for the building.
- Procedures to follow if damaged asbestos materials are observed.

If employees may have unintentional contact with asbestos materials because of their job requirements, they shall also receive training following the requirements for two-hour awareness training for Class IV workers. This would generally include plumbers, HVAC mechanics, certain carpenters, maintenance and custodial workers. The training shall include:

- Health effects associated with asbestos exposure.
- Synergistic effects of asbestos exposure and cigarette smoking.
- Procedures to follow to avoid exposure.
- Procedures for floor maintenance.
- Definition of Class I, II, III and IV asbestos work.
- Training requirements for Class I, II, III and IV workers.

b. Inspector Training

Any employee who will conduct a survey to sample and/or assess asbestos materials shall complete the three-day EPA certified Asbestos Building Inspector training. People who may collect bulk samples of asbestos containing materials shall be licensed by the Pennsylvania Department of Labor and Industry as Building Inspectors.

c. Abatement Worker Training

Asbestos abatement workers conducting Class I, II, or III asbestos abatement shall complete the EPA 32 hour Asbestos Worker training. Asbestos abatement workers shall be licensed by the Pennsylvania Department of Labor and Industry as Asbestos Abatement Workers. If work occurs in Philadelphia or Allegheny County, the workers shall be licensed to complete work in those areas.

d. Asbestos Abatement Supervisor Training

The supervisor or competent person on any abatement project shall complete the EPA 40-hour Asbestos Supervisor training and be licensed by the Pennsylvania Department of Labor and Industry as an Asbestos Abatement Supervisor.

e. Training Records

All training records, copies of course outlines, copies of completion certificates and copies of licenses shall be maintained according to agency guidelines.

2. Refresher Training

Awareness training shall be repeated annually or as conditions change, or if new people are potentially exposed to asbestos materials.

Licensed Workers, Supervisors, and Inspectors shall complete the EPA approved refresher training annually, and shall renew applicable licenses.

E. Reporting Damaged Asbestos Containing Materials

1. Leased Buildings

The Building Owner or Property Manager shall be notified of and shall be responsible to repair or remove any damaged asbestos containing material such as pipe insulation or floor tiles. Contact the Agency Safety Coordinator if asbestos materials are damaged and present an exposure to DGS employees.

2. Commonwealth Owned Buildings

Employees should report the location of damaged asbestos materials to their Supervisor, who will contact the Building Manager. If damaged ACM is discovered, the Supervisor shall isolate the area to prevent exposures to employees and the public. The Building Manager shall contact the DGS Fire, Safety and Environmental Section to arrange for repair or removal. Procedures shall follow EPA recommendations, requirements of 29 CFR 1926.1101(g) and local regulations, as applicable. The DGS Fire, Safety and Environmental Section shall decide whether the work is done internally or completed by an outside contractor.

F. Maintaining Asbestos Containing Floor Tiles

Specific work practices must be employed during maintenance of asbestos containing floor tiles to prevent damage to the tiles and possible release of asbestos fibers. Requirements are:

- Sanding of flooring material is prohibited.
- Stripping of finishes shall be conducted using low abrasion pads at speeds less than 300 rpm and wet methods.
- Burnishing or dry buffing may be performed only on flooring that has sufficient wax or finish so the pad cannot contact the flooring material.

Maintenance Supervisors or Building Managers shall ensure employees who are assigned to maintain floors are provided with two hour asbestos awareness training, and the proper equipment to complete the work according to the requirements above.

VI. Asbestos Abatement Procedures

A. General Requirements

The DGS Fire, Safety and Environmental Section shall ensure:

- Removal or repair is done according to EPA guidelines, Commonwealth of Pennsylvania requirements and local regulations as applicable.
- Notifications are submitted to the Commonwealth of Pennsylvania, Environmental Protection Agency and local agencies.
- All abatement work is conducted inside Regulated Areas that are enclosed to prevent exposure to the public, and posted with OSHA warning signs. Any area where Class I, II, or III asbestos removal is done is referred to as a Regulated Area. Only those employees or contractors who are trained in the hazards of asbestos, and have the proper PPE are allowed to enter the Regulated Area. The Regulated Area shall be demarcated with signs bearing the following information:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA**

- Licensed contractors are retained to conduct the work, or abatement may be completed by the Special Projects crew. If the Special Projects crew conducts the removal, workers must be licensed by the Commonwealth. A licensed asbestos abatement supervisor must supervise the work.
- The DGS Industrial Hygienist or an Environmental Consultant conducts project inspections, clearance inspections and air sampling according to local and state regulations.

- Asbestos surveys are updated to document the location and quantity of asbestos removed.
- Documents are retained for the project including project notifications, copies of contractor and worker licenses, project logbook, air sampling results, certification of clearance inspections, and final clearance air sampling results. Waste manifests documenting the proper disposal of asbestos waste shall be maintained with the project information.

B. General Class I Removal Procedures

Removal of thermal system insulation, acoustic plaster, or other types of friable asbestos containing material shall follow the requirements of the OSHA standard 29 CFR 1926.1101(g). The Competent Person or a Licensed Asbestos Project Designer shall review and approve the project set up and removal procedures. The specific requirements of the project and materials to be removed shall be considered in the project design, but the following general requirements shall apply.

1. Post regulated work area signs at all entrances to the work area.
2. Pre-clean the work area using HEPA vacuuming and wet methods.
3. Install critical barriers over all openings into the work area such as doors, windows, HVAC diffusers, etc. Critical barriers shall be installed with two layers of 6-mil polyethylene sealed with tape.
4. Cover fixed objects with one layer of 6-mil polyethylene sealed with tape.
5. Install a three-stage decontamination facility with a shower, and attach to the work area.
6. Install HEPA exhaust in the work area, and direct the discharge to the exterior of the building through a manifold installed in a window or door. Maintain a negative pressure within the work area of 0.02 inches water gauge, measured by a recording manometer.
7. Construct an enclosure with two layers of 6-mil polyethylene on the walls and floors, or construct a mini-enclosure with two layers of polyethylene supported by wood or metal studs.
8. Request a work area preparation inspection by the DGS Industrial Hygienist or Environmental Consultant.
9. Remove asbestos materials using wet methods.
10. Bag the wetted material in properly labeled 6-mil disposal bags.
11. Clean to remove all visible dust, debris and water from all surfaces.
12. Remove inner layers of polyethylene and reclean the work area. Critical barriers shall remain in place until clearance has been achieved.
13. Encapsulate the entire work area, if applicable.
14. Request a clearance inspection by the DGS Industrial Hygienist or Environmental Consultant.

15. The DGS Industrial Hygienist or Environmental Consultant shall conduct clearance sampling inside the work area, and verify the final clearance concentration is within applicable regulations.

C. Glovebag Removal Procedures

Pipe insulation may be removed from horizontal pipes using glovebag removal techniques. Glovebag work areas shall be constructed as follows:

1. Install covers over all critical barriers.
2. Install a secondary containment with one layer of 6-mil polyethylene.
3. Install a HEPA exhaust that is directed to the outside of the building.
4. Install a two or three stage decontamination facility as required by OSHA regulations and local regulations.
5. Remove pipe insulation using glovebags sealed with tape. The DGS Industrial Hygienist or Environmental Consultant shall verify the glovebags are airtight before removal begins.
6. Clean the area, encapsulate, and prepare for clearance sampling as per the procedures above. The secondary containment and HEPA exhaust shall remain in place until final clearance of the work area is achieved.

D. Floor Tile and Mastic Removal Procedures

1. Install a limited enclosure with critical barriers and HEPA exhaust. Follow the requirements of the OSHA standard 29 CFR 1926.1101(g)(8)(i).
2. Install a two-stage decontamination facility.
3. Remove floor tiles with wet methods and manual scraping. Alternately, the floor tiles can be removed intact after diking and flooding the area, or by removing the tiles with an infrared heating machine.
4. In Philadelphia, establish a fully enclosed work area unless the tiles are all removed intact.
5. Remove asbestos containing mastic by using a low odor hydrocarbon mastic solvent, a citrus-based mastic softener, or a soy based mastic remover. The soy based remover would be preferred in sensitive areas where odors could be a problem. Do not use mastic removers containing methylene chloride. Maintain Material Safety Data Sheets for all chemicals used during the project.
6. Thoroughly clean the project area with wet methods and HEPA vacuuming and remove all dust, debris and water.
7. Prepare the work area for clearance sampling by the DGS Industrial Hygienist or Environmental Consultant.

E. Personal Protective Equipment

The DGS Environmental Crew shall be provided with and use personal protective equipment at all times when asbestos materials may be disturbed. Requirements for personal equipment shall follow the requirements of the OSHA standard 29 CFR 1926.1101(h) for Respiratory Protection, and section (i) for Protective Clothing. The following PPE is generally used for all asbestos abatement:

- Tyvek suits that cover the entire body, head and feet.
- Safety glasses or full-face respirators.
- Safety shoes or boots.
- Gloves.
- Respirators equipped with HEPA filters. The Competent Person shall conduct workplace air monitoring to decide the level of respiratory protection to be used, ranging from full-face, powered, air-purifying respirators (PAPR), to full-face, negative pressure respirators, to half face negative pressure respirators. Refer to the OSHA standard for protection factors and selection criteria of the types of respiratory protection. Employees shall be fit-tested for respirator use at least twice per year, using qualitative or quantitative fit test procedures. Disposable respirators shall not be used.

Personal protective equipment shall be decontaminated or disposed of as asbestos waste at the conclusion of the project.

VII. Medical Monitoring Procedures

All DGS employees who may be involved in Class I, Class II or Class III asbestos abatement shall be included in a medical monitoring program that meets the requirements of the OSHA standard 29 CFR 1926.1101, section (m). The medical program generally includes an annual medical review by a licensed medical professional, pulmonary function testing, and periodic chest x-rays and EKGs. The records of employee medical monitoring shall be maintained in the employee confidential personnel files. The Agency Safety Coordinator shall be informed if any employee is not medically fit to wear a respirator. Such employees shall be restricted from working on the DGS Environmental Crew.

VIII. Testing and Monitoring

A. Environmental Testing

The DGS Industrial Hygienist or Environmental Consultant shall conduct environmental monitoring during all asbestos abatement projects to verify asbestos is not released from the work area. The type and number of samples will be depend on the specific project, but will generally include the following types of samples:

- Background samples to measure fiber concentrations inside and outside the work area before the work begins.
- Perimeter samples taken during preparation and abatement.

- Clearance samples after the project is completed, but before the area is cleared for re-occupancy.

The field data sheet in Attachment 1 may be used to record the sampling data.

In Philadelphia, the Environmental Consultant shall be certified and licensed as an Asbestos Project Inspector (API).

Background and project air samples shall be analyzed by an AIHA accredited laboratory or by an analyst who is certified in the AIHA Asbestos Analyst Registry. Samples shall be analyzed by phase contrast microscopy (PCM).

Clearance samples shall be analyzed by PCM or transmission electron microscopy (TEM) if required by local regulations such as the City of Philadelphia Asbestos Control Regulations. The DGS Industrial Hygienist or Environmental Consultant may confirm any PCM clearance samples with additional TEM analysis.

B. Personnel Exposure Monitoring

The contractor's industrial hygienist, or Competent Person shall collect personnel air samples to measure employee exposures according to the requirements of 29 CFR 1926.1101(f). If the DGS Environmental Crew conducts abatement, the DGS Industrial Hygienist or the Supervisor will conduct the personnel monitoring. Representative sampling shall be conducted in each phase of the project including preparation, removal, and fine cleaning.

C. Collecting Bulk Samples

If bulk samples must be collected to determine whether materials contain asbestos, the following procedures shall be followed:

1. A licensed Asbestos Building Inspector shall collect the samples.
2. Mist the area to be sampled with amended water.
3. Collect a sample of thermal system insulation (TSI) or surfacing material by coring through all layers with a hollow bit or a cork borer. To prevent a fiber release, drill through a wet sponge to control the fibers. Collect at least three samples of each homogeneous material. Collect at least one cubic inch of material and seal it in a snap cap vial.
4. Seal the TSI sampling point with caulk and cover with duct tape. For future reference, label the sample location with the sample identification.
5. Seal sample locations of surfacing material by spraying with encapsulant.
6. For floor tiles, collect sample behind furniture or in damaged areas to prevent damaging finished surfaces.

7. Collect approximately 1 square inch of floor tile and ensure that the mastic is collected with the tile.
8. Submit the samples to an AIHA and NVLAP certified laboratory for analysis by polarized light microscopy. Floor tiles and mastic may need to be analyzed by transmission electron microscopy (TEM) to conclusively determine whether asbestos is present. Put all samples inside a zip-lock bag and submit with a completed chain of custody. Keep the chain of custody outside the bag of samples to prevent contamination of the paperwork.

IX. Contractors

Only Commonwealth of Pennsylvania licensed contractors shall be used to conduct asbestos abatement work. Other contractors must be informed of the locations of asbestos materials before they begin their work.

X. Recordkeeping/Documentations

Records of all asbestos abatement shall be maintained by the Building Manager. Surveys shall be updated to indicate the materials that were removed, or conditions that were changed. Records and documentation of any asbestos abatement shall be maintained.

The following records shall be maintained for 30 years following an abatement project:

- Copies of project design drawings or specifications.
- Copies of notifications and permits.
- Copies of air sampling data sheets and the daily site log maintained by the DGS Industrial Hygienist or Environmental Consultant throughout the project.
- Names and license numbers of abatement workers.
- Copies of clearance sampling reports.
- The original waste manifests certifying the waste was disposed at an EPA or Pennsylvania licensed asbestos landfill.

XI. Notifications/Reporting

Notifications shall be submitted to federal, state and local authorities for any large asbestos project. The abatement contractor is responsible to submit the notifications and should provide a copy of the notification to the Building Manager. A copy of the notification shall be posted at the project site.

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Chain & Wire Rope Safety

Currently Under Development

P-14 Cranes

Currently Under Development

P-15

Electrical Safety

I. Policy

This operating procedure provides the basic requirements for Electrical Safety for Qualified Persons working at facilities controlled and operated by the PA Department of General Services (DGS).

The Department policy is that only Qualified Persons will work on electrical equipment and installations. Work will be done on de-energized equipment whenever possible. If work must be done on energized equipment, Qualified Persons must use appropriate procedures, equipment and personnel protective equipment as described in this program and in the referenced documents. Unqualified Persons shall not be exposed to energized equipment.

II. References

The following documents are referred to in this procedure. The documents provide important information that is integral for the implementation of this procedure. It is not the intention of this procedure to restate all of the requirements of the referenced documents. It is also not the intent of this program to provide guidance on the methods of electrical wiring installations or connections. It is assumed that use of this program is by a qualified electrician with knowledge of the requirements of the National Electrical Code (NEC). The requirements of the referenced documents are adopted by reference herein.

- A. *OSHA 29 CFR 1910 Subpart S Electrical*
- B. *NFPA 70E- Standard For Electrical Safety in the Workplace*
- C. *NFPA 70 National Electrical Code (NEC)*
- D. *Department of General Services Lockout/Tag-out Program*

III. Responsibilities

- A. Supervisors shall ensure that employees who may work on energized systems are trained as Qualified Persons and have the proper safety equipment and personal protective equipment to do the required operations safely.
- B. Supervisors shall ensure their personnel are familiar with these procedures and adhere to its guidelines.
- C. Supervisors are responsible for the implementation of this program and for the annual inspection of all related equipment.
- D. Employees are responsible to know the hazards of electrical systems, understand the requirements of this program, and use the safety equipment and personal protective as required.
- E. The Safety Coordinator, Bureau Directors, and Consultant are available to provide guidance and the Bureau Directors are responsible for ensuring the implementation of this procedure throughout DGS.

IV. General Safety Requirements

A. Batteries and Battery Rooms

1. Restricted Access

Battery room access should be restricted to authorized personnel. The room should be kept locked unless occupied.

There should be no foreign piping or other equipment in the room that would require access by other personnel.

The battery rooms should not be used for storage.

2. Ventilation Requirements

Ventilation in the rooms should be sufficient to prevent liberated hydrogen gas from exceeding a concentration of 1 percent (10,000 ppm). Refer to NFPA 70E Section 320.4(C) for design requirements of the ventilation systems.

3. Personal Protective Equipment

The following personal protective equipment shall be available to employees performing battery maintenance:

- Goggles and face shield
- Chemical resistant gloves
- Protective aprons
- Protective overshoes or boots
- Portable or stationary eyewash facilities

4. Tools and Equipment

Tools and equipment for working on batteries should be non-sparking and voltage rated for the maximum working voltage.

B. High Voltage Electrical Rooms and Enclosures (More than 600 volts)

1. Restricted Access

Doors to high voltage electrical rooms must be kept locked at all times and access must be restricted to qualified and authorized personnel.

2. Enclosure Construction

Outdoor installations shall be enclosed with a fence that is 7 feet high or 6 feet high with three strands of barbed wire on top. Access to the fenced enclosure shall be controlled by a lock and key. For voltages of 601 to 13,799 volts, the minimum distance to live parts is 10 feet. For voltages up to 230,000, the minimum distance to live parts is 15 feet.

In indoor installations, all high voltage equipment shall be enclosed in metal cabinets inside locked fire-resistant rooms. The rooms shall have a minimum fire rating of 3 hours.

3. Separation from Low-Voltage Equipment

Where low voltage equipment such as switches, cutouts, or lighting panels are in rooms where there are exposed high voltage parts, the low voltage parts must be separated by a panel, fence or screen.

4. Warning Signs

Where voltages exceed 600 volts, equipment or rooms must be posted with permanent and conspicuous warning signs with the following language:

“DANGER---HIGH VOLTAGE---KEEP OUT”

C. Tools and Equipment

1. All tools, equipment and personal protective equipment must be must be voltage rated and provide protection for the voltages worked on. This includes all electrical test equipment.
2. All tools, equipment and personal protective equipment must be visually inspected before each use and at a minimum at least annually.
3. All tools, equipment and personal protective equipment must be electrically tested at least every three years.
4. Discard any equipment that is visually damaged, blistered, cracked, discolored, or fails the electrical testing.

V. Procedures

A. De-Energizing Electrical Systems

When possible, electrical parts must be de-energized and placed in an electrically safe work condition. The parts must be locked out according to the DGS Lockout/Tag-out program for low voltage equipment and by following equipment specific switching orders for high voltage equipment. The Qualified Person must verify the system is de-energized by voltage testing before beginning work on the part or equipment.

B. Hazard/Risk Evaluation

Before any work is started on or near live parts operating at 50 volts or more, or where an electrical hazard exists, the Supervisor or Foreman shall conduct a hazard/risk evaluation.

The hazard risk evaluation shall include a review of:

- Voltage of the equipment that will be worked on
- Potential for arc flash and/or electric shock
- Availability of appropriate protective equipment and clothing
- The knowledge and understanding of the hazards by the Qualified Persons

C. Pre-Job Briefing

Before starting each job, the Supervisor or Foreman shall conduct a job briefing that will include a discussion of:

- Hazards of the job or operation
- Work procedures
- Special precautions
- Energy source controls
- A review of whether energized equipment can be or is properly locked out
- Personal protective equipment

D. Selection of PPE (See Appendix B and Appendix C)

Table 130.7(C)(9)(a) in Appendix B is organized by Task and Hazard Category. The Hazard Category then defines the specific PPE that is required for the task in Table 130.(C)(10) in Appendix C. These tables can be used if a flash hazard analysis is not conducted by a Qualified Person. Sections E, F, and G below present some typical situations and the selection of appropriate tools and PPE. Refer to NFPA 70E for more details or for other specific situations. As the hazard increases, the requirements for more fire and flash resistant clothing go up.

- E. Working on Energized Panel boards (240 volts and below, including voltage testing)
1. Operating circuit breakers or fused switch operation with covers on or covers off:
 - Hazard Category 0
 - No voltage rated gloves or tools needed
 - Long sleeve shirts and long pants required
 - Safety glasses required
 2. Working on energized parts, including voltage testing, removing or installing circuit breakers:
 - Hazard Category 1
 - Voltage rated tools and gloves required
 - Fire rated shirt and blue jeans or fire rated pants required, or use fire rated coveralls.
 - Hard hat and safety glasses required
- F. Working on Energized Panel boards or Switchboards (>240 volts up to 600 volts)
1. Operating circuit breakers or fused switch operation with covers on
 - Hazard Category 0
 - No voltage rated gloves or tools needed
 - Long sleeve shirts and long pants required
 - Safety glasses required
 2. Operating circuit breakers or fused switch operation with covers off:
 - Hazard Category 1
 - Voltage rated tools and gloves not required
 - Fire rated shirt and blue jeans or fire rated pants required, or use fire rated coveralls.
 - Hard hat and safety glasses required
 3. Working on energized parts, including voltage testing
 - Hazard Category 2
 - Voltage rated tools and gloves required
 - T shirt, pants, fire rates coveralls required
 - Safety glasses or goggles required
 - Arc rated face shield or flash suit hood required
 - Ear plugs are required

- Leather gloves over the voltage rated gloves are required
- Leather work shoes are required
- Energized work permit required

G. Working on Equipment over 600 volts

1. Hazard Categories of 2, 3 and 4 are present depending on operation. (See Table 130.7(C)(9)(a) in Appendix B)

- Voltage rated tools and gloves required
- Fire resistant clothing required
- Hard hat, safety glasses or goggles, ear protection, leather gloves, leather shoes required
- Fire resistant hard hat liners required with Hazard Category 3 and 4
- Flash suit hood required with Hazard Category 3.
- Full multi-layer flash suit required with Hazard Category 4.

2. Permit System

All work on energized high voltage parts or equipment must be completed using an Energized Work Permit and authorized by a High Voltage Electrical Supervisor.

3. Switching Orders

All switching of high voltage electrical systems must be done according to specific Switching Orders developed by a High Voltage Electrical Supervisor. The switching orders will include step by step instructions for de-energizing, grounding, testing, and re-energizing equipment. The switching orders will include PPE requirements, two man policy, and notification requirements and permit requirements. All Switching Orders shall be retained in a file and shall be reviewed before each operation. The Supervisor shall audit the performance of the Switching Orders and shall review the procedures with Qualified Employees at least annually. The Switching Orders shall be reviewed and updated as necessary and at least annually.

4. Only Qualified Persons who are specifically trained in High Voltage Electrical Safety may do work on systems with over 600 volts energized parts. These employees must have and been trained in the specific work practices and PPE required for high voltage work. The employees must have the appropriate PPE and practice the use of the PPE before working on energized systems

V. Training

A. Qualified Persons

A qualified person shall be trained and knowledgeable of the construction and operation of equipment or a specific work method, and be trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method. Such persons shall also be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools and test equipment. A person can be considered qualified with respect to certain equipment and methods but still be considered unqualified for others. Such persons permitted to work within limited approach of exposed energized conductors and circuit parts shall, at a minimum, be additionally trained in all of the following:

- (a) The skills and techniques necessary to distinguish exposed energized parts from other parts of electric equipment
- (b) The skills and techniques necessary to determine the nominal voltage of exposed energized parts
- (c) The approach distances and the corresponding voltages to which the qualified person will be exposed
- (d) The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely
- (e) Periodicity of training is dependent on the level of hazard.

B. Unqualified Persons

Unqualified persons shall be trained in and be familiar with any of the electrical safety-related practices that might not be addressed specifically by Part II, but are necessary for their safety.

Appendix A Definitions

Definitions (From NFPA 70E)

De-energized – Free from any electrical connection to a source of potential difference and from electrical charge; not having a potential different from that of earth.

Electrical Hazard – A dangerous condition such that contact or equipment failure can result in electric shock, arc flash, burn, thermal burn, or blast.

Electrically Safe Work Condition – A state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked/tagged according to the DGS Lockout/Tag-out Program, tested to ensure the absence of voltage, and grounded if determined necessary.

Enclosed – Surrounded by a case, housing, fence or wall(s) that prevent persons from accidentally contacting energized parts.

Energized – Electrically connected to or having a source of voltage over 50 volts.

Exposed (as applied to live parts) – Capable of being inadvertently touched or approached nearer than a safe distance by a person. This applies to parts that are not suitably guarded, isolated or insulated.

Flame-Resistant (FR) – The property of clothing or protective equipment that prevents, terminates or inhibits combustion. For FR clothing, there are degrees of protection. See Appendix D.

Flash Protection Boundary – An approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur.

Flash Suit – A complete FR clothing and equipment system that includes pants, jacket, and hood with face shield.

High Voltage Electrical Work – Work on systems that may have nominal voltages exceeding 600 volts.

Limited Approach Boundary – An approach limit at a distance from an exposed live part within which a shock hazard exists.

Prohibited Approach Boundary – An approach limit at a distance from an exposed live part within which work is considered the same as making contact with the live part.

Qualified Person – One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved.

Appendix B

Hazard/Risk Category Classifications

NFPA 70E Table 130.7(C)(9)(a)

ARTICLE 130 — WORKING ON OR NEAR LIVE PARTS

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(9) Selection of Personal Protective Equipment.

(a) When Required for Various Tasks. When selected in lieu of the flash hazard analysis of 130.3(A), Table 130.7(C)(9)(a) shall be used to determine the hazard/risk category for a task. The assumed short-circuit current capacities and fault clearing times for various tasks are listed in the text and notes to Table 130.7(C)(9)(a). For tasks not listed, or for power systems with greater than the assumed short-circuit current capacity or with longer than the assumed fault clearing times, a flash hazard analysis shall be required in accordance with 130.3.

FPN No. 1: Both larger and smaller available short-circuit currents could result in higher available arc-flash energies. If the available short-circuit current increases without a decrease in the opening time of the overcurrent protective device, the arc-flash energy will increase. If the available short-circuit current decreases, resulting in a longer opening time for the overcurrent protective device, arc-flash energies could also increase.

FPN No. 2: Energized parts that operate at less than 50 volts are not required to be de-energized to satisfy an "electrically safe work condition." Consideration should be given to the capacity of the source, any overcurrent protection between the energy source and the worker, and whether the work task related to the source operating at less than 50 volts increases exposure to electrical burns or to explosion from an electric arc.

Table 130.7(C)(9)(a) Hazard/Risk Category Classifications

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
Panelboards Rated 240 V and Below — Notes 1 and 3			
Circuit breaker (CB) or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	0	N	N
Work on energized parts, including voltage testing	1	Y	Y
Remove/install CBs or fused switches	1	Y	Y
Removal of bolted covers (to expose bare, energized parts)	1	N	N
Opening hinged covers (to expose bare, energized parts)	0	N	N
Panelboards or Switchboards Rated >240 V and up to 600 V (with molded case or insulated case circuit breakers) — Notes 1 and 3			
CB or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	1	N	N
Work on energized parts, including voltage testing	2 [†]	Y	Y
600 V Class Motor Control Centers (MCCs) — Notes 2 (except as indicated) and 3			
CB or fused switch or starter operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch or starter operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2 [†]	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2 [†]	Y	Y
Insertion or removal of individual starter "buckets" from MCC — Note 4	3	Y	N
Application of safety grounds, after voltage test	2 [†]	Y	N
Removal of bolted covers (to expose bare, energized parts)	2 [†]	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N

Table 130.7(C)(9)(a) *Continued*

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
600 V Class Switchgear (with power circuit breakers or fused switches) — Notes 5 and 6			
CB or fused switch operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	3	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	3	N	N
Opening hinged covers (to expose bare, energized parts)	2	N	N
Other 600 V Class (277 V through 600 V, nominal) Equipment — Note 3			
Lighting or small power transformers (600 V, maximum)	—	—	—
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
Revenue meters (kW-hour, at primary voltage and current)	—	—	—
Insertion or removal	2*	Y	N
Cable trough or tray cover removal or installation	1	N	N
Miscellaneous equipment cover removal or installation	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
NEMA E2 (fused contactor) Motor Starters, 2.3 kV Through 7.2 kV			
Contactors operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
Contactors operation with enclosure doors open	2*	N	N
Work on energized parts, including voltage testing	3	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	3	Y	Y
Insertion or removal (racking) of starters from cubicles, doors open	3	N	N
Insertion or removal (racking) of starters from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	3	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N

Table 130.7(C)(9)(a) *Continued*

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
Metal Clad Switchgear, 1 kV and Above			
CB or fused switch operation with enclosure doors closed	2	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	4	N	N
Work on energized parts, including voltage testing	4	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	2	Y	Y
Work on control circuits with energized parts >120 V, exposed	4	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	4	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	4	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Opening voltage transformer or control power transformer compartments	4	N	N
Other Equipment 1 kV and Above			
Metal clad load interrupter switches, fused or unfused	—	—	—
Switch operation, doors closed	2	N	N
Work on energized parts, including voltage testing	4	Y	Y
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Outdoor disconnect switch operation (hookstick operated)	3	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	2	N	N
Insulated cable examination, in manhole or other confined space	4	Y	N
Insulated cable examination, in open area	2	Y	N

Note:

V-rated Gloves are gloves rated and tested for the maximum line-to-line voltage upon which work will be done.

V-rated Tools are tools rated and tested for the maximum line-to-line voltage upon which work will be done. 2* means that a double-layer switching hood and hearing protection are required for this task in addition to the other Hazard/Risk Category 2 requirements of Table 130.7(C)(10).

Y = yes (required)

N = no (not required)

Notes:

- 25 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
- 65 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
- For < 10 kA short circuit current available, the hazard/risk category required may be reduced by one number.
- 65 kA short circuit current available, 0.33 second (20 cycle) fault clearing time.
- 65 kA short circuit current available, up to 1.0 second (60 cycle) fault clearing time.
- For < 25 kA short circuit current available, the hazard/risk category required may be reduced by one number.

Appendix C

Protective Clothing and PPE Matrix

NFPA 70E Table 130.7(C)(10)

ARTICLE 130 — WORKING ON OR NEAR LIVE PARTS

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Table 130.7(C)(10) Protective Clothing and Personal Protective Equipment (PPE) Matrix

Protective Clothing and Equipment	Protective Systems for Hazard/Risk Category						
	Hazard/Risk Category Number	-1 (Note 3)	0	1	2	3	4
Non-melting (according to ASTM F 1506-00) or Untreated Natural Fiber							
a. T-shirt (short-sleeve)	X			X	X	X	
b. Shirt (long-sleeve)		X					
c. Pants (long)	X	X	X (Note 4)	X (Note 6)	X	X	X
FR Clothing (Note 1)							
a. Long-sleeve shirt			X	X	X (Note 9)	X	X
b. Pants			X (Note 4)	X (Note 6)	X (Note 9)	X (Note 9)	X
c. Coverall			X (Note 5)	X (Note 7)	X (Note 9)	X (Note 9)	X (Note 5)
d. Jacket, parka, or rainwear			AN	AN	AN	AN	AN
FR Protective Equipment							
a. Flash suit jacket (multilayer)							X
b. Flash suit pants (multilayer)							X
c. Head protection							
1. Hard hat			X	X	X	X	X
2. FR hard hat liner					AR	AR	AR
d. Eye protection							
1. Safety glasses	X	X	X	AL	AL	AL	AL
2. Safety goggles				AL	AL	AL	AL
e. Face and head area protection							
1. Arc-rated face shield, or flash suit hood				X (Note 8)			
2. Flash suit hood					X	X	X
3. Hearing protection (ear canal inserts)				X (Note 8)	X	X	X
f. Hand protection							
Leather gloves (Note 2)			AN	X	X	X	X
g. Foot protection							
Leather work shoes			AN	X	X	X	X

AN = As needed
AL = Select one in group
AR = As required
X = Minimum required

Notes:

- See Table 130.7(C)(11). Arc rating for a garment is expressed in cal/cm².
- If voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement.
- Hazard/Risk Category Number "-1" is only defined if determined by Notes 3 or 6 of Table 130.7(C)(9)(a).
- Regular weight (minimum 12 oz/yd² fabric weight), untreated, denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4.
- Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR shirt and FR pants.
- If the FR pants have a minimum arc rating of 8, long pants of non-melting or untreated natural fiber are not required beneath the FR pants.
- Alternate is to use FR coveralls (minimum arc rating of 4) over non-melting or untreated natural fiber pants and T-shirt.
- A faceshield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternatively, a flash suit hood), is required.
- Alternate is to use two sets of FR coveralls (the inner with a minimum arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing.

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Appendix D

Protective Clothing Characteristics

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ARTICLE 130 — WORKING ON OR NEAR LIVE PARTS

Table 130.7(C)(11) Protective Clothing Characteristics

Typical Protective Clothing Systems		
Hazard/Risk Category	Clothing Description (Typical number of clothing layers is given in parentheses)	Required Minimum Arc Rating of PPE [J/cm ² (cal/cm ²)]
0	Non-melting, flammable materials (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight at least 4.5 oz/yd ² (1)	N/A
1	FR shirt and FR pants or FR coverall (1)	16.74 (4)
2	Cotton underwear — conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	167.36 (40)

Note: Arc rating is defined in Article 100 and can be either ATPV or E_{BT}. ATPV is defined in ASTM F 1959-99 as the incident energy on a fabric or material that results in sufficient heat transfer through the fabric or material to cause the onset of a second-degree burn based on the Stoll curve. E_{BT} is defined in ASTM F 1959-99 as the average of the five highest incident energy exposure values below the Stoll curve where the specimens do not exhibit breakopen. E_{BT} is reported when ATPV cannot be measured due to FR fabric breakopen.

(c) Hand Protection. Leather or FR gloves shall be worn where required for arc flash protection. Where insulating rubber gloves are used for shock protection, leather protectors shall be worn over the rubber gloves.

FPN: Insulating rubber gloves and gloves made from layers of flame-resistant material provide hand protection against the arc flash hazard. Heavy-duty leather (e.g., greater than 12 oz/yd²) gloves provide protection suitable up to Hazard/Risk Category 2. The leather protectors worn over insulating rubber gloves provide additional arc flash protection for the hands. During high arc flash exposures leather can shrink and cause a decrease in protection.

(d) Foot Protection. Heavy-duty leather work shoes provide some arc flash protection to the feet and shall be used in all tasks in Hazard/Risk Category 2 and higher.

(14) Clothing Material Characteristics. FR clothing shall meet the requirements described in 130.7(C)(14)(a) through 130.7(C)(15).

FPN: FR materials, such as flame-retardant treated cotton, meta-aramid, para-aramid, and poly-benzimidazole (PBI) fibers, provide thermal protection. These materials can ignite but will not continue to burn after the ignition source is removed. FR fabrics can reduce burn injuries during an arc flash exposure by providing a thermal barrier between the arc flash and the wearer. In aramid and PBI blends, para-aramid adds strength to a fabric to prevent the fabric from breaking open due to the blast shock wave and high thermal energy of the arc.

(a) Melting. Clothing made from flammable synthetic materials that melt at temperatures below 315°C (600°F), such as acetate, nylon, polyester, polypropylene, and spandex, either alone or in blends, shall not be used.

FPN: These materials melt as a result of arc flash exposure conditions, form intimate contact with the skin, and aggravate the burn injury.

Exception: Fiber blends that contain materials that melt, such as acetate, nylon, polyester, polypropylene, and spandex, shall be permitted if such blends in fabrics meet the requirements of ASTM F 1506, Standard Performance Specification for Textile Material for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards, and if such blends in fabrics do not exhibit evidence of a melting and sticking hazard during arc testing according to ASTM F 1959 [see also 130.7(C)(15)].

(b) Flammability. Clothing made from nonmelting flammable natural materials, such as cotton, wool, rayon, or silk, shall be permitted for Hazard/Risk Categories 0 and -1 considered acceptable if it is determined by flash hazard analysis that the exposure level is ≤3.6 J/cm² (2.0 cal/cm²) or less, and that the fabric will not ignite and continue to burn under the arc exposure hazard conditions to which it will be exposed (using data from tests done in accordance with ASTM F 1958.) See also 130.7(C)(12)(a) for layering requirements.

FPN No. 1: Non-FR cotton, polyester-cotton blends, nylon, nylon-cotton blends, silk, rayon, and wool fabrics are flammable. These fabrics could ignite and continue to burn on the body, resulting in serious burn injuries.

FPN No. 2: Rayon is a cellulose-based (wood pulp) synthetic fiber that is a flammable but nonmelting material.

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Appendix E

Sample Energized Electrical work Permit

ANNEX J

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Annex J Energized Electrical Work Permit

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.
J.1 Figure J.1 illustrates considerations for an Energized Electrical Work Permit.

ENERGIZED ELECTRICAL WORK PERMIT	
PART I: TO BE COMPLETED BY THE REQUESTER:	
(1) Description of circuit/equipment/job location: _____	Job/Work Order Number _____
(2) Description of work to be done: _____	
(3) Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage: _____	
Requester/Title _____	Date _____
PART II: TO BE COMPLETED BY THE ELECTRICALLY QUALIFIED PERSONS DOING THE WORK:	
(1) Detailed job description procedure to be used in performing the above detailed work: _____	Check when Complete <input type="checkbox"/>
(2) Description of the Safe Work Practices to be employed: _____	<input type="checkbox"/>
(3) Results of the Shock Hazard Analysis: _____	<input type="checkbox"/>
(4) Determination of Shock Protection Boundaries: _____	<input type="checkbox"/>
(5) Results of the Flash Hazard Analysis: _____	<input type="checkbox"/>
(6) Determination of the Flash Protection Boundary: _____	<input type="checkbox"/>
(7) Necessary personal protective equipment to safely perform the assigned task: _____	<input type="checkbox"/>
(8) Means employed to restrict the access of unqualified persons from the work area: _____	<input type="checkbox"/>
(9) Evidence of completion of a Job Briefing including discussion of any job-related hazards: _____	<input type="checkbox"/>
(10) Do you agree the above described work can be done safely? <input type="checkbox"/> Yes <input type="checkbox"/> No (If no, return to requester)	
Electrically Qualified Person(s) _____	Date _____
Electrically Qualified Person(s) _____	Date _____
PART III: APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:	
Manufacturing Manager _____	Maintenance/Engineering Manager _____
Safety Manager _____	Electrically Knowledgeable Person _____
General Manager _____	Date _____
Note: Once the work is complete, forward this form to the site Safety Department for review and retention.	
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Figure J.1 Sample Permit for Energized Electrical Work.

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Elevated Work and Platforms

Currently Under Development

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Ergonomics

Currently Under Development

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Excavation and Trenching

Currently Under Development

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Fall Hazard Prevention and Control

I. Policy

This operating procedure provides the minimum steps required to ensure that the Department of General Services (DGS) Fall Prevention and Control Program is successfully and consistently implemented throughout all DGS owned and operated buildings and worksites.

This procedure is designed to protect DGS employees who perform work on surfaces (either horizontal or vertical) with an unprotected side or edge, which is 4 feet or more above a lower level. It does not cover work on portable ladders, vehicles, man lifts, or trailers.

II. References

The following OSHA standards are provided for informational purposes. The standards provide guidelines for the administration of the DGS fall prevention and control program.

- A. *29 CFR 1910.23, Guarding Floor and Wall Openings and Holes* - Every open-sided floor or platform which is 4 feet or more above the adjacent floor or ground level must be guarded by a standard railing on all open sides except where there is an entrance to a ramp, stairway, or fixed ladder.
- B. *29 CFR 1910.24, Fixed Industrial Stairs* - Fixed industrial stairs must be provided for access from one structure level to another where operations require regular travel between levels and for access to operating platforms on any equipment which requires attention routinely during operations. Fixed industrial stairs includes any interior or exterior fixed stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits.
- C. *29 CFR 1910.27, Fixed Ladders* - Fixed ladders are required to meet minimum design requirements and maintain specific features such as cages, landing platforms and rung spacing. Ladders that exceed 20 feet in length must have specifically designed cages or wells. Ladder safety devices may be used on tower, water tank, and chimney ladders over 20 feet in unbroken length in lieu of cage protection.
- D. *29 CFR 1910.28, Safety Requirements for Scaffolding* - Scaffolds must be furnished and erected in accordance with this standard for persons engaged in work that cannot be done safely from the ground or from solid construction. Scaffolds must be provided with top rails and mid-rails if the scaffolds are more than four feet off the ground.
- E. *29 CFR 1910.29, Manually Propelled Mobile Ladder Stands and Scaffolds (towers)* - This section prescribes rules and requirements for the design, construction, and use of mobile work platforms (including ladder stands but not including aerial ladders) and rolling (mobile) scaffolds (towers).

- F. *29 CFR 1910.66, Powered Platforms for Building Maintenance* - This section sets requirements for powered platform installations permanently dedicated to interior or exterior building maintenance of a specific structure or group of structures. Building maintenance includes, but is not limited to, such tasks as window cleaning, caulking, metal polishing and re-glazing.
- G. *29 CFR 1910.67, Vehicle-Mounted Elevating and Rotating Work Platforms* -This section prescribes design and use requirements for all aerial devices. Aerial devices include the following types of vehicle-mounted aerial devices used to elevate personnel to jobsites above ground: (i) extensible boom platforms, (ii) aerial ladders, (iii) articulating boom platforms, (iv) vertical towers, and (v) a combination of any of the above.

III. Responsibilities

- A. Supervisors should evaluate their work areas to determine if work is performed on surfaces (either horizontal or vertical) with an unprotected side or edge, which is 4 feet or more above a lower level. If such fall hazards are identified they should be eliminated or controlled to ensure that all DGS employees are provided a workplace free of uncontrolled fall hazards.
- B. Supervisors should ensure their personnel are familiar with these procedures, adhere to its guidelines, and are provided necessary personal protective equipment. Supervisors are responsible for the implementation of this program and for the annual inspection of all equipment.
- C. Supervisors shall be responsible for initiating disciplinary action against employees who do not follow the procedures within this section.
- D. The Safety Coordinator, Bureau Directors, or Safety Consultants are available to provide guidance and are responsible for evaluating the administration of this procedure throughout DGS.

IV. Fall Hazard Evaluations

Competent Persons shall determine if DGS employees perform unprotected elevated work tasks. The Competent Person or the Supervisor should conduct fall hazard evaluations of each operation that may require work on elevated work platforms. An appraisal of each exposure should be made to determine the most effective prevention and control strategies. The following exposures are considered **Unprotected Elevated Work**.

These situations must be protected with an effective fall protection system of either engineering controls such as guardrails, administrative controls such as a Controlled Access Zone, or personal fall arrest systems.

Fixed Ladders - Ascending or descending fixed ladders which exceed 20 feet in height and are not equipped with a protective cage or ladder safety device.

Building or Tree Maintenance - Tasks that require climbing to a height of at least 4 feet to conduct maintenance or pruning of trees.

Leading Edges - Working within 6 feet of a leading edge that is 4 feet or more above a lower level.

Hoist Areas - Working near unprotected hoist areas, which may be a shaft or open edge of a floor.

Holes - Walking/working surfaces with holes more than 4 feet above lower levels. (A hole is defined as a gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.)

Excavations - Excavations 4 feet or more in depth not protected by the use of a guardrail system, fence, barricade or cover.

Roofing Work - Working on sloped roofs with unprotected sides or edges 4 feet or more above lower levels.

Wall Openings - Working on, at, above, or near a wall opening where the outside bottom edge of the wall opening is 4 feet or more above lower levels, and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface.

Unusual Applications - There may be unusual applications where other configurations not addressed in this procedure may be present.

V. Fall Hazard Prevention and Control

Fall hazard prevention and control programs should provide protection from all foreseeable fall hazards. Control strategies should be selected based on the following priority system:

- Eliminate fall hazard
- Prevent fall hazard
- Arrest falls
- Administratively protect employees

The following minimal controls should be implemented when fall hazards cannot be eliminated at DGS facilities.

A. Fall Prevention

1. Covers

Holes and excavations should be covered. Covers for holes in floors, roofs, and other walking/working surfaces must meet the following requirements:

- Covers located in roadways and vehicular aisles must be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
- All other covers must be capable of supporting, without failure, at least twice the weight of personnel, equipment, and materials that may be imposed on the cover at any one time. Floor covers on walking surfaces where no equipment is operated should be at least $\frac{3}{4}$ inch plywood, or 2 inch planking. The cover should be spray painted with the word 'HOLE' to identify it as covering an opening.
- All covers must be secured when installed so as to prevent accidental displacement by the wind, equipment, or personnel.

2. Guardrail Systems

Guardrail systems used at an unprotected surface, hole, or elevated work platform must meet the following requirements:

- Be erected on all unprotected sides of the scaffold, work surface, or edge of a hole.
- Have not more than two sides provided with removable guardrail system sections to allow the passage of materials.
- Be provided with a gate (at access points such as ladder ways), or be so offset that a person cannot walk directly into the hole or off the edge of a work surface.
- Guardrail systems must be so surfaced as to prevent injury to personnel from punctures or lacerations. Guardrail systems and their use must comply with the following requirements:
 - a. Top rails must be 42 inches \pm 3 inches above the walking/-working surface. The top rail must be capable of withstanding, without failure, a force of at least 200 pounds in any outward or downward direction, at any point along the top rail. If wire rope is used for top rails, it must be flagged at not more than 6-foot intervals with high-visibility material. Wire, manila, plastic or synthetic rope being used for top rails must be inspected frequently to ensure it continues to meet strength requirements.

- b. Mid-rails must be installed midway between the top rail and the walking/working surface. The mid-rail must be capable of withstanding, without failure, a force of at least 150 pounds applied in any outward or downward direction, at any point along the mid-rail. Wire, manila, plastic or synthetic rope being used for mid-rails must be inspected frequently to ensure it continues to meet strength requirements.
- c. Screens and mesh, when used, must extend from the rail to the walking/working surface and along the entire opening between top rail supports. The screen or mesh must be capable of withstanding, without failure, a force of at least 150 pounds applied in any outward or downward direction at any point along the mid-rail.

3. Falling Objects

When the potential exist for falling objects to create a hazard, each person at risk from falling objects must wear a hard hat **and one of the following measures must also be implemented.**

- Erect toe boards, screens, or a guardrail system to prevent objects from falling from higher levels.
- Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced.
- Barricade the area to which objects could fall, prohibit personnel from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

B. Personal Fall Arrest Systems

1. General Requirements

Fall arrest systems must be used whenever there is a fall hazard and employees are not protected with guardrails, hole covers, or some administrative control. Personal fall arrest systems and their use must comply with the minimum provisions below. Supervisors must ensure all aspects are completed, as applicable.

Inspection - The user must inspect personal fall arrest systems each day of use for wear, damage and other deterioration. The user is responsible for the safety equipment in his/her possession and all manufacturers' instructions must be followed. In addition, the Supervisor must inspect all fall arrest equipment at least annually, and document the inspection. Defective components must be tagged and removed from service.

System Requirements - *Personal fall arrest systems*, when stopping a fall must meet the following requirements:

- Limit maximum arresting force on personnel to 1,800 pounds when used with a body harness.
- Be rigged such that personnel can neither free-fall more than 6 feet or contact any lower level.
- Bring personnel to a complete stop and limit maximum deceleration distance a person travels to 3.5 feet.

Hoisting Areas - When a personal fall arrest system is used at hoist areas, it must be rigged to allow the movement of the personnel only as far as the edge of the walking/working Surface.

Equipment Used During Falls - Personal fall arrest systems and components subjected to impact loading must be immediately removed from service and must not be used again.

2. **Body Harnesses**

Body harnesses must be used only for personal protection (as part of a Personal Fall Arrest System restraint or positioning system) and not to hoist material.

Body harnesses must be worn properly, affording a snug, yet comfortable fit. (Body Belts may not be worn as a replacement for body harnesses.)

3. **Connectors: D-Rings and Snap hooks (Carabineers)**

D-rings and snap hooks (carabineers) must be of a locking type and must have a minimum tensile strength of 5,000 pounds and be proof-tested to a minimum tensile load of 3,600 pounds. All connectors must be drop-forged, pressed or formed steel, or made of equivalent materials. They must have a corrosion-resistant finish and all surfaces must be smooth to prevent damage to interfacing parts of the system.

4. **Lanyards and Lifelines**

Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds and must be protected against cuts or abrasions. Ropes and straps (webbing) used in lanyards must be made from synthetic fibers.

Each person must be attached to a separate lanyard or lifeline.

Lanyards must be secured properly to a body harness at the center of the wearer's back. Lanyards secured to a body harness (for fall protection) must be secured in the center of the wearer's back near shoulder level, or above the wearer's head.

Lanyards must be secured in such a manner to afford the least free-fall distance possible up to a maximum of 6 feet and must not allow contact with objects below.

Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete Personal Fall Arrest System, which maintains a safety factor of at least two to one, as determined by the Supervisor.

Self-retracting lifelines/lanyards (retract locks or safety blocks) that automatically limit free-fall distance to 2 feet or less must be capable of sustaining a minimum tensile load of 3,000 pounds. The use of an additional lanyard should be avoided when using self-retracting lifelines/lanyards. The latching device on the self-retracting lifelines/lanyards must be connected directly to the body harness, using the existing D-ring.

5. Anchorages

Personal fall arrest equipment must be independently attached to an anchorage capable of supporting at least 5,000 pounds per person.

In the absence of other suitable points, a crane hook can be used as an anchorage point for a lanyard or deceleration device provided that the hook can support at least 5,000 pounds, the load is not suspended (rigging can be in place but de-tensioned), and there is no hook movement (hoisting or lowering)

6. Positioning Device System

Positioning device systems must be rigged such that the free-fall distance is limited to a maximum of 2 feet and must be secured to an anchorage capable of supporting at least twice the potential impact load of a person's fall or 3,000 pounds, whichever is greater. A positioning device system, such as a body belt and lanyard, is usually used to prevent a fall, such as for workers in an extensible boom or movable work platform. The positioning system would prevent a person from leaning or climbing out of a basket. A positioning device system may also be used to prevent a person from getting to an unprotected edge.

7. Safety Net Systems

Safety nets must be provided when working more than 25 feet above the lower level and the use of ladders, scaffolds, temporary floors, safety lines or personal fall arrest systems are impractical. Safety nets must be installed as close as practical under the walking/working surface on which personnel are working, but in no case more than 30 feet below such level.

C. Administrative Procedures

1. Safety Monitoring System

A Safety Monitoring System is an alternative fall protection system in which the Supervisor designates a Safety Monitor who is responsible for recognizing and warning personnel of fall hazards. The Safety Monitor System is usually used for roofing operations on low-sloped roofs. The Safety Monitor must have completed fall protection education.

The duties of the Safety Monitor are:

- Be on the same walking/working surface as the monitored personnel, within visual sighting distance and close enough to communicate with the monitored personnel.
- Warn personnel when it appears that they are unaware of fall hazards or act in an unsafe manner, and notify their Supervisor accordingly.
- Not allow other responsibilities to encumber monitoring. If the Safety Monitor becomes encumbered with other responsibilities, the monitor must stop the job and notify the Supervisor.

2. Controlled Access Zone

A Controlled Access Zone is an area designated and clearly marked in which leading edge work steel construction, roofing or block laying may take place without the use of a guardrail system, a safety net system or personal fall arrest system. Control lines must be installed to prevent unauthorized personnel from entering the controlled access zone, and prevent unauthorized personnel from going within 6 feet of an unprotected edge. Control Access Zones must comply with the following provisions:

- a. Control lines must consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:
 - Each control line must be flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material.
 - Each control line must be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the walking/working surface and its highest point is not more than 45 inches from the walking/working surface.
 - Each control line must have a minimum breaking strength of 200 pounds.

- b. When used to control access to areas where leading edge and other operations are taking place, the Controlled Access Zone must be defined by a control line or by any other means that restricts access.
- c. When control lines are used, they must be erected not less than 6 feet nor more than 25 feet from the unprotected or leading edge.
- d. The control line must extend along the entire length of the unprotected or leading edge and must be approximately parallel to the unprotected or leading edge.

VI. Fall Protection Education

- A. Section chiefs/Supervisors must provide education for all personnel who might be exposed to fall hazards. The program must enable personnel to recognize the hazards of falling and must provide guidance in methods to minimize fall hazards.
- B. Circumstances where additional education is required include, but are not limited to:
 1. Changes in the work place cause new hazards to be created
 2. Types of fall protection systems or equipment to be used are changed
 3. Supervisors observe employees are not using fall protection correctly

VII. Procedure Review and Continuous Improvement

Section chiefs/Supervisors will evaluate Fall Prevention and Control Procedures at least annually to ensure the continued effectiveness. The evaluation will be performed to ensure that the procedures are current and provide the required level of protection.

VIII. Record keeping

Records maintained by Section Chiefs/Supervisors should include:

- Records of purchasing fall protection equipment, and records of certifications.
- Records of annual inspections of all fall protection equipment.
- Training records of employees who have received fall protection training.

APPENDIX A

Definitions

Anchorage - A secure point of attachment for lifelines, lanyards or deceleration devices.

Body Harness - Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Competent Person- A person that has received additional training on fall hazards and is very familiar with the requirements and equipment for fall protection.

Connector - A device, which is used to couple (connect) parts of the personal fall arrest system and positioning device system together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or Dee-ring sewn into a body harness or a snap hook spliced or sewn to a lanyard or self-retracting lifeline/lanyard).

Controlled Access Zone (CAZ) - A controlled access area in which certain work may take place without the use of guardrail systems, personal fall arrest systems, or safety-net systems.

Deceleration Device - Any mechanism, such as a rope-grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, automatic self-retracting lifeline/lanyard, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration Distance - The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Free Fall - The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free Fall Distance - The vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail System - A barrier erected to prevent employees from falling to lower levels.

Hole - A gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

Infeasible - Impossibility to perform work using a conventional fall protection system (i.e., guardrail system, safety net system or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Lanyard - A flexible line of rope, wire rope, or strap, which generally has a connector at each end for connecting the body, harness to a deceleration device, lifeline, or anchorage.

Leading Edge - The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck), which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an unprotected side and edge during periods when it is not actively and continuously under construction.

Lifeline - A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorage points at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower Levels - Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, water, equipment, structures, or portions thereof.

Low-Slope Roof - A roof having a slope less than or equal to 4 to 12 (vertical to horizontal).

Opening - A gap or void greater than or equal to 30 inches high and 18 inches wide, in a wall or partition, through which employees can fall to a lower level.

Personal Fall Arrest System - A system used to arrest an employee in a fall from a walking/working surface. It consists of an anchorage, connectors, and a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Positioning Device System - A body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Roof - The exterior surface on the top of a building. This does not include floors or formwork, which, because a building has not been completed, temporarily become the top surface of a building.

Roofing Work - The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Rope Grab - A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam-level locking, or both.

Safety Monitoring System - A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Safety Net System - Safety nets shall meet performance standards as determined by the regulation and be certified by the manufacturer. Edge ropes shall provide a minimum breaking strength of 5,000 pounds. Forged steel safety hooks or shackles shall be used to fasten the net to its support. Connections between net panels shall develop the full strength of the net.

Self-Retracting Lifeline/Lanyard - A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snap hook - A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.

Steep Roof- a roof having a slope greater than 4 to 12 (vertical to horizontal).

Toe board - A low protective barrier that will prevent the fall of materials and equipment to lower levels.

Unprotected Sides or Edges - Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches high.

Walking/Working Surface - Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties. Walking/working surfaces on which employees are to work shall have the strength and structural integrity to support employees safely.

Warning Line System - A barrier erected on a roof to warn employees that they are approaching an unprotected side or edge, and which designates an area in which work may take place without the use of a guardrail system, body harness, or safety net system to protect employees in the area.

P-20

Fleet / Driver Safety

Currently Under Development

P-21

Histoplasmosis

I. Purpose

The purpose of the Pennsylvania Department of General Services (DGS) Histoplasmosis Program is to reduce the risk of histoplasmosis infection for all employees that have the potential to come in contact with bat or bird feces.

II. References

Center for Disease Control and Prevention:

www.cdc.gov/nczved/dfbmd/disease_listing/histoplasmosis_gi.html

National Institute for Occupational Safety and Health:

www.cdc.gov/niosh/docs/2005-109/2005-109b.html#a

III. Definitions

Histoplasmosis: is a disease caused by the fungus *Histoplasma capsulatum*. Its symptoms vary greatly, but the disease primarily affects the lungs. Occasionally, other organs are affected. This form of the disease is called disseminated histoplasmosis, and it can be fatal if untreated.

Accumulated bird or bat droppings: For the purpose of this safety program; Accumulated bird or bat droppings will be defined as an amount of dropping that can easily be scooped up with a standard square point shovel.

IV. Responsibilities

Safety Coordinator:

1. Will provided guidelines and information to the Manager/Shop Supervisors when they or their employees are confronted with potential exposures to histoplasmosis.
2. The Safety Coordinator will evaluate any questionable situation and will provide direction to the Manager/Shop Supervisor.

Manager/Shop Supervisor

1. Inspect work area(s) to ensure that employees are not exposed to accumulated bird or bat droppings.

2. Ensure that employees follow the proper guidelines when exposed to accumulated bird or bat droppings.
3. If applicable, ensure employees are using the correct PPE and/or Respirator equipment to clean accumulated bird or bat droppings.

Employees

1. Notify their supervisor of any accumulated bird or bat droppings that they discover.
2. Follow the guidelines and procedures relating the exposure to accumulated bird or bat droppings.
3. Wear proper PPE and Respirator equipment as instructed.

V. Safe Operating Procedures

Upon the discovery of bird or bat droppings

1. Determine if the definition of Accumulated bird or bat droppings has been met.
 - 1.1. **Upon the discovery of Accumulated bird or bat droppings**
 - In the event that an employees' task would expose them to Accumulated bird or bat droppings the Manager/ Shop Supervisor should contact the DGS Fire Safety and Environmental Section for direction.
 - If possible, once the droppings are cleaned up all reasonable efforts should be taken to exclude birds or bats from the area.
2. If there is no "accumulation" but there are dropping that must be cleaned up:
 - 2.1. Don Personal Protective Equipment(see PPE and Respirator safety programs)
 - 2.2. Make sure that the droppings are carefully wetted with normal water (if possible try to spray dropping down a drain using a garden hose.)
 - 2.3. Scoop material with a shovel or trowel or wipe with disposable cloths and place droppings into a standard plastic bag.
 - 2.4. It is important to prevent the material from becoming particulates and airborne, so it is always important to wet the droppings before any clean up operation.
 - 2.5. Dispose of the dropping and any contaminated disposable rags in a normal trash bag and place the trash bag in a trash receptacle outside of the building.
 - 2.6. Clean all non disposable tools.

3. If any employees are/were exposed the manager/shop supervisor should instruct the employees to be aware of the symptoms of Histoplasmosis and report these symptoms to their supervisor as soon as they begin.

VI. Training

Training will consist of shop discussions and the applicable trades will receive an information sheet consisting of the highlights histoplasmosis exposure (Appendix A).

Appendix A: Histoplasmosis (from the CDC website)

What is histoplasmosis?

Histoplasmosis is a disease caused by the fungus *Histoplasma capsulatum*. Its symptoms vary greatly, but the disease primarily affect the lungs. Occasionally, other organs are affected. This form of the disease is called disseminated histoplasmosis, and it can be fatal if untreated.

Can anyone get histoplasmosis?

Yes. Positive histoplasmin skin tests occur in as many as 80% of the people living in areas where *H. capsulatum* is common, such as the eastern and central United States. Infants, young children, and older persons, in particular those with chronic lung disease are at increased risk for severe disease. Disseminated disease is more frequently seen in people with cancer, AIDS or other forms of immunosuppression.

How is someone infected with *H. capsulatum*?

H. capsulatum grows in soil and material contaminated with bat or bird droppings. Spores become airborne when contaminated soil is disturbed. Breathing the spores causes infection. The disease is not transmitted from an infected person to someone else.

What are the symptoms of histoplasmosis?

Most infected persons have no apparent ill effects. The acute respiratory disease is characterized by respiratory symptoms, a general ill feeling, fever, chest pains, and a dry or nonproductive cough. Distinct patterns may be seen on a chest x-ray. Chronic lung disease resembles tuberculosis and can worsen over months or years. The disseminated form is fatal unless treated.

When do symptoms start?

If symptoms occur, they will start within 3 to 17 days after exposure; the average is 10 days.

Is histoplasmosis treatable?

Yes. Antifungal medications are used to treat severe cases of acute histoplasmosis and all cases of chronic and disseminated disease. Mild disease usually resolves without treatment. Past infection results in partial protection against ill effects if reinfected.

Where is *H. capsulatum* found?

H. capsulatum is found throughout the world and is endemic in certain areas of the United States. The fungus has been found in poultry house litter, caves, areas harboring bats, and in bird roosts.

What can be done to prevent histoplasmosis?

It is not practical to test or decontaminate most sites that may be contaminated with *H. capsulatum*, but the following precautions can be taken to reduce a person's risk of exposure:

- Avoid areas that may harbor the fungus, e.g., accumulations of bird or bat droppings.
- Before starting a job or activity having a risk for exposure to *H. capsulatum*, consult the departmental Safety Coordinator

P-22

Hot Work Permit

P-23

Ladder Safety

I. Policy

This program provides the Department of General Services employees with the basic information for assuring a safe and healthful workplace free from recognized portable and fixed ladder hazards, which may cause serious injury. Each employee is expected to follow the guideline provided within this section. Supervisors shall be responsible for initiating disciplinary action against employees who do not follow the guidelines within this section.

II. References

There are numerous safety standards and regulations, which pertain to portable and fixed ladders including, but not limited to:

- American National Standards Institute (ANSI) Standards, ANSI A14.1 - ANSI A14.3, Safety Codes for Ladders
- Occupational Safety and Health Administration (OSHA) Standards
OSHA 29 CFR 1910, Subpart D – Walking-Working Surfaces

III. Guidance/Program

A. PROGRAM RESPONSIBILITIES

Safety Coordinator

The Safety Coordinator has the responsibility to:

- Maintain this written program.
- Provide the Supervisors with the knowledge and information to conduct required training as outlined in this program.
- Support and ensure that all elements of program are implemented completely for the protection of all employees.

Section Chiefs/Supervisors

The Section Chiefs have the responsibility to:

- Train employees to the requirements outlined in this program.
- Ensure the ladder inspections are being performed.
- Ensure that employees are not using defective or damaged ladders.
- Ensure that defective or damaged ladders are properly fixed or discarded.

Employee Responsibility

Employees have the responsibility to:

- Comply with all General Services_Safety rules and regulations concerning ladder safety.
- Perform basic ladder inspections before each use.
- Not use damaged or defective ladders.
- Contact their supervisor to report damaged or defective ladders.

GENERAL PROGRAM MANAGEMENT

This section describes the main elements of the General Services ladder safety program.

Only ladders approved by the Underwriters' Laboratories, and meeting ANSI A14.1 - ANSI A14.3, Safety Codes for Ladders, shall be used.

B. Inspection and Maintenance

Portable and fixed ladders will be formally inspected **once every six months** to ensure they are in good working condition. The Ladder Inspection Checklist located in **Appendix A** will be used when performing the inspection. Ladders that are need of repair or appear unsafe shall be tagged "Dangerous Do Not Use." These ladders will be taken out of service until properly repaired, replaced or thrown away.

1. Portable ladders are to be inspected by the employee prior to each use. The employee shall inspect for:
 - Broken or loose rungs
 - Rungs free of excess dirt and grease
 - Side rail cracks, splits, bruised, dry rot and loose nails
 - Hardware and fittings for secure attachment and damage
 - Proper operation of locking devices and safety feet
 - Damaged or worn non-slip base
 - Underwriter's label and proper markings
2. Fixed ladders are to be inspected by the employee prior to each use. The employee shall inspect for:
 - Broken, corroded, or loose rungs.
 - Rungs free of excess dirt and grease
 - Side rails for corrosion, fractures, and adequate anchoring at the base and top connection.
 - All hardware and fittings for secure attachment.

3. If any defects are discovered during the employee inspection the ladder shall be tagged “Dangerous Do Not Use.” The ladder will be taken out of service until properly repaired, replaced or thrown away.

C. Use

Employees should observe certain rules when placing, ascending, descending, and using ladders:

1. Do not use ladders in a horizontal position as runways or as scaffolds.
2. Never place a ladder in front of a door unless the door is blocked or guarded.
3. Do not place a ladder against a windowpane or sash.
4. Place the ladder so that both side rails have secure footing.
5. Place the ladder’s feet on a level solid base, not on moveable objects.
6. Never lean a ladder against unsecured backing, such as loose boxes or barrels.
7. When using a ladder for access to high places, secure the ladder to prevent it from slipping.
8. Extend the ladder 3 feet above the top of a landing.
9. Allow only one person at a time on a ladder.
10. Do not overload a ladder.
11. Use ladders of sufficient length and in proper position so that employees do not have to stretch or reach.
12. Do not use metal ladders around energized electrical circuits or equipment, or in places they may come in contact with electrical circuits.
13. Hold on with both hands when going up or down. If material must be handled, raise or lower it with a rope either before going down or after climbing to the desired level.
14. Carry tools on a tool belt, not in the hand
15. Always face a ladder when ascending or descending.
16. Never slide down a ladder.
17. Be sure shoes are not greasy, muddy, or slippery before climbing.
18. Do not climb higher than third rung from the top on a straight ladder or second tread from the top on a stepladder.

D. Storage

1. Store ladders where they will not be exposed to the weather and where there is good ventilation.
2. Do not store them near radiators, stoves, steam pipes, or in other places with excessive heat or dampness.
3. Fiberglass ladders should be protected from direct sunlight or other ultraviolet light sources.
4. Ladders should be stored neatly where they will not fall or cause a tripping hazard.
5. Keep ladder storage space free of obstructions and accessible at all times.

IV. Training

All employees will be trained on the use of ladders upon initial assignment. The training will consist of the information contained within this procedure. Retraining will be conducted when warranted by an accident or other evidence of the employee's lack of understanding or compliance with the program.

V. Appendices

Appendix A: Ladder Inspection Checklist

Appendix A

Ladder Inspection Checklist

Items To Be Checked

	Needs Repair	Condition O.K.
Portable Ladders		
Broken or loose rungs	<input type="checkbox"/>	<input type="checkbox"/>
Rungs free of excess dirt and grease	<input type="checkbox"/>	<input type="checkbox"/>
Side rails cracked, split, bruised, dry rot and loose nails	<input type="checkbox"/>	<input type="checkbox"/>
Hardware and fittings securely attached	<input type="checkbox"/>	<input type="checkbox"/>
Proper operation of locking device and safety feet	<input type="checkbox"/>	<input type="checkbox"/>
Damaged or worn non-slip base	<input type="checkbox"/>	<input type="checkbox"/>
Underwriter's label and proper markings legible	<input type="checkbox"/>	<input type="checkbox"/>
Fixed Ladders		
Broken, corroded, or loose rungs	<input type="checkbox"/>	<input type="checkbox"/>
Rungs free of excess dirt and grease	<input type="checkbox"/>	<input type="checkbox"/>
Side rails corroded, fractured	<input type="checkbox"/>	<input type="checkbox"/>
Side rails adequately anchored at the base and top connection	<input type="checkbox"/>	<input type="checkbox"/>
All hardware and fittings securely attached	<input type="checkbox"/>	<input type="checkbox"/>

Remarks:

Inspector's Signature _____

Date _____

P-24 Lead

I. Policy

This program provides the Department of General Services employees with the basic information to provide a safe and healthful procedure to remove or manipulate paint containing lead. Each employee is required to follow the guideline provided within this section. Supervisors shall be responsible for initiating disciplinary action against employees who do not follow the procedures within this section.

II. Scope

These procedures will only apply to exposures below the OSHA action levels for lead. If it is determined that an activity will produce exposures at or above the action level, specific safety procedures will need to be developed as well as additional training and certifications will be required. These procedures also do not apply to lead activities that occur in target housing, daycare facilities or schools.

III. References

- EPA 40 CFR Part 745 Lead; Renovation, Repair, and Painting Program; Lead Hazard Information Pamphlet; Notice of Availability; Final Rule
- Occupational Safety and Health Administration (OSHA) Standards
OSHA 29 CFR 1926. 62 lead

IV. Definitions

Action Level - is a specific level of exposure where the employer is required to provide further training, equipment and employee medical monitoring.

Best work practices - procedures that have been determined to be optimal to reduce the hazard exposures to the employee.

CONSTRUCTION, DEMOLITION, & LAND-CLEARING DEBRIS LANDFILL, a.k.a., "C&D Landfill" - A landfill that accepts certain construction & demolition debris, land-clearing debris & yard trash. These landfills can NOT accept waste painted with lead-based paint.

Impacting Paint containing lead - any work that disturbs any paint containing lead on any surface; including, but not limited to,; scraping, cutting, sanding, grinding, peeling, heating welding, brazing.

Lead awareness training - required annual training for any employee that is expected to impact paint that contains lead.

Lead Based paint - any paint that has more then 1% lead.

MUNICIPAL SOLID WASTE LANDFILL (MSWLF) - A lined landfill with a leachate collection system & ground water monitoring that accepts municipal solid waste (garbage). These landfills can accept waste painted with lead-based paint.

OSHA Action Level - the Action Level as defined by OSHA is 30 micrograms per cubic meter of air 8 Hour TWA.

OSHA P.E.L. - Permissible Exposure Limit is defined by OSHA as 50 micrograms per cubic meter of air 8 Hour TWA. The PEL is where the employees must wear the appropriate PPE and participate in the Medical monitoring program as well as maintain certain training/certifications.

PPE - Personal Protective equipment.

Paint containing Lead - Painted surfaces that has any amount of measurable lead.

Target housing - any facility that houses a child 6 years old or less for more than 60 hours a year.

V. RESPONSIBILITIES

Safety Coordinator

The Safety Coordinator has the responsibility to:

- Maintain and update this written program.
- Ensure that all elements of the program are implemented completely for the protection of all employees.
- Ensure that the applicable training is provided to the employees that are expected to impact paint containing lead.
- Ensure that characterization personal air samples are conducted for each activity annually.
- Test, or if necessary arrange testing, of any suspected paint for lead content.

Section Chiefs/Supervisors/Managers

The Section Chiefs/Supervisors/Managers have the responsibility to:

- Ensure that any employee that is expected to impact paint containing lead receive the lead awareness training.
- Ensure that all jobs impacting paint containing lead is within the limitations of the employees training.
- Ensure that no paint containing lead is impacted with in any of the daycare facilities or target housing.

Employee Responsibility

Employees have the responsibility to:

- Comply with all General Services Safety rules and regulations concerning lead hygiene.
- Perform all tasks following the “best work practices” as detailed: in this procedure, Lead awareness training and in the characterization(s).
- Cooperate with the safety personnel when personal air samples are conducted.
- Contact their supervisor to report any task that would outside the scope of this program.

VI. General Program Management

In any building constructed prior to 1978, any painted surface that may be impacted must be tested or verified to be lead free. If the paint is tested to be positive for lead, the best work practices must be followed to prevent employee exposure and possible contamination of the area. All efforts should be made to reduce the amount of dust created during the paint removal. Manual methods are preferred over mechanical methods (i.e. scraping vs. power sanders)

Best work practices for lead paint:

Removal

All areas where paint chips or dust can fall must be covered by 6 mil or better plastic sheeting, plus (if possible) an additional 6 feet if the removal is to occur indoors, and 10 feet if the removal is to occur outside.

Any employees conducting this work should wear disposable coveralls with booties and disposable gloves.

Only the paint removal methods that have been characterized are allowed to be conducted. There will be no dry scraping, sanding, heating, welding, plasma cutting or other similar activities conducted on paint containing lead.

Clean up

Once all paint has been removed the larger chips will be picked up and placed in a 6 mil poly trash bag. NO DRY SWEEPING.

All dust will be cleaned with a HEPA vacuum.

All plastic sheeting and disposable clothing will be disposed of in a 6 mil poly trash bag. The plastic sheeting cannot be reused. Plus an additional 2 feet of area shall be cleaned.

Disposal

With regard to disposal, all non-hazardous wastes painted with “lead-based paint” are still considered “solid waste” NOT “hazardous wastes.”

All waste paint with paint containing lead may be disposed in dumpsters that are to be picked up and delivered to Municipal Solid Waste Landfill.

When using chemical removal methods all paint and residual chemical is considered hazardous waste and will be disposed of in accordance to DEP and EPA regulations by a certified Hazmat disposal company.

The HEPA Vacuum use for lead paint projects should only be used to vacuum lead paint chips.

For Harrisburg operations:

Once the vacuum is full it shall be delivered to the DGS Fire Safety personnel to dispose of the collected material and any necessary service.

For areas outside Harrisburg:

Contact Fire Safety for guidance.

VII. Respirators (voluntary use)

Under the scope of the program the use of respirators is voluntary. P-95 respirators/dust masks will be provided to the employee for their use. However, prior to the use of these respirators the employee must read the information in Appendix D.

VIII. Employee training

All employees that are expected to impact paint containing lead will receive annual awareness training to include instruction, testing and a demonstration. This training is to be conducted by a person knowledgeable in lead hygiene.

Anyone that is expected to impact lead paint using methods that have not been characterized must have L&I's lead abatement worker and/or supervisor certification(s), enroll in the DGS respirator program and must have their blood lead levels tested annually.

IX. Appendices

- A. Results of exposure Characterizations**
- B. Training rosters**
- C. Employees that are part of the lead medical surveillance program**
- D. Information for Employees using respirators when not required**

Appendix D

Appendix D Information for Employees Using Respirators When Not Required

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

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Materials Handling & Storage

Introduction

Handling and storing materials involve diverse operations such as hoisting tons of steel with a crane; driving a truck loaded with concrete blocks; carrying bags or materials manually; and stacking palletized bricks or other materials such as drums, barrels, kegs, and lumber.

The efficient handling and storing of materials are vital to industry. In addition to raw materials, these operations provide a continuous flow of parts and assemblies through the workplace and ensure that materials are available when needed. Unfortunately, the improper handling and storing of materials have the potential to result in accidents and injuries.

Employees frequently cite the weight and bulkiness of objects that they lift as major contributing factor to their injuries. Other hazards include falling objects, improperly stacked materials, and various types of equipment. Potential injuries that can occur when manually moving materials, including the following:

- Strains and sprains from lifting loads improperly or from carrying loads that are either too large or too heavy,
- Fractures and bruises caused by being struck by materials or by being caught in pinch points, and
- Cuts and bruises caused by falling materials that have been improperly stored or by incorrectly cutting ties or other securing devices.

Definitions

Boom - A long, straight beam hinged at one end and used for lifting heavy objects by means of cables and/or hydraulics. Booms can be of lattice construction or be made of heavy tubular material.

Boom radius - The horizontal distance from the axis of rotation of a crane or derrick boom to the boom tip.

Bracing - A diagonal piece of structural material that serves to strengthen something.

Chassis - The frame upon which a vehicle's body is mounted.

Chock - A wedge or block for steadying a body and holding it motionless, for filling in excess space, or for preventing the movement of a wheel.

Competent person - one who can identify health and safety hazards in the workplace and has the authority to correct them.

Crib - To line or support with a framework of timber.

Cumulative trauma disorders - Injuries that result from continuous or repetitive motions over prolonged periods of time.

Outrigger - A projecting member that extends from a main structure to either provide additional stability or support.

Powered industrial trucks - Forklift trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrialized trucks powered by electrical or internal combustion engines.

PPE - Personal Protective equipment

Rigger - A worker who prepares heavy equipment or loads of material for lifting.

Responsibilities

Management

The bureau management has the responsibility to:

- Ensure that the Material Handling and Storage procedures are being implemented, maintained and enforced.

Departmental Safety Coordinator

The Departmental Safety Coordinator is responsible to:

- Conduct oversight inspections on a semiannual basis
- Update this safety program as necessary
- Assist area supervisors with their efforts to implement, maintain and enforce this program

Supervisor

Area/shop supervisors are responsible to:

- Ensure that all elements of this procedure are implemented completely for the protection of all affected employees.
- Conduct Inspect the area
- Ensure load/weight restrictions for handling equipment and shelving are identified and not exceeded
- Designate a competent person to conduct the necessary equipment inspections
- Ensure that the employees understand equipment, restrictions and weight limits
- Ensure that the equipment-rated capacity is displayed on each piece of equipment and is not exceeded except for load testing.
- Train employees in the proper use and limitations of the equipment they operate. In addition to powered industrial trucks, this includes knowing how to safely and effectively use equipment such as conveyors, cranes, and slings.
- Ensure that the required maintenance, inspections and load testing are completed on material handling and storage equipment.
- Maintain documentation of employee training and equipment testing and maintenance.
- Remove from service any damaged equipment until properly repaired.

Employees

All Employees shall:

- Properly use required PPE.
- Adhere to posted weight limits on material handling and storage equipment.
- Follow the procedures detailed in this safety program.
- Only work on equipment that they have been properly trained to operate and/or inspect.
- Notify supervisor of any faulty or inadequate material handling equipment or PPE.

Moving Materials-Manually

When moving materials manually, employees should attach handles or holders to loads. In addition, employees shall always wear appropriate personal protective equipment and use proper lifting techniques. To prevent injury from oversized loads, employees shall seek help in the following:

- When a load is so bulky that employees cannot properly grasp or lift it,
- When employees cannot see around or over a load, or
- When employees cannot safely handle a load.

Personal Protection Equipment

Using the following personal protective equipment prevents needless injuries when manually moving materials:

- Hand and forearm protection, such as gloves, for loads with sharp or rough edges.
- Eye protection.
- Steel-toed safety shoes or boots.
- Metal, fiber, or plastic metatarsal guards to protect the instep area from impact or compression.

Safe Lifting Techniques

Employees should use the following lifting techniques for most objects, light or heavy:

- Before lifting ensure that you understand the weight of the material before you commit to lifting it
 - If the object is too heavy for the employee to lift, then either obtain assistance from another employee or gain access to a material lifting device (hand jack, dolly, cart, etc.).
- Before lifting, make sure that the walkway is open and free from obstructions, door ways are open, and that there are no slippery or wet surfaces in the employee's path
- When Lifting
 - DO NOT lift with your back.
 - If possible use handles or grips instead of base/bottom of the object
 - Ensure that you have a good grasp on the object before performing the lift
 - Kneel close to the load before lifting
 - Lift with your legs and arms, and try not to put most of the load on your back
 - When lifting the object, try to keep object close to the body
 - When carrying the object try to minimize twisting and leaning as much as possible
 - When carrying the object be aware of your surrounding and any changes to the path of travel
 - When setting down the object, kneel slowly and use your arms and legs to lower the object. Never stoop or use your back when putting down an object
 - **Remember, Sprains and Strains caused by improper lifting techniques are one of the most common injuries found in industry. Don't be afraid to ask for help!**

Moving Materials-Mechanically

Employees shall avoid overloading equipment when moving materials mechanically by letting the weight, size, and shape of the material being moved dictate the type of equipment used.

When picking up items with a powered industrial truck, employees must do the following:

- Center the load on the forks as close to the mast as possible to minimize the potential for the truck tipping or the load falling,
- Avoid overloading a lift truck because it impairs control and causes tipping over,
- Do not place extra weight on the rear of a counterbalanced forklift to allow an overload,
- Adjust the load to the lowest position when traveling,
- Follow the truck manufacturer's operational requirements, and
- Pile and cross-tier all stacked loads correctly when possible.
- Follow all applicable rules and requirement in the Powered Industrial Truck Program.

Storage and Stacking

To prevent creating hazards when storing materials:

- Flammable and combustible material must be stored according to the National Fire Protection Association
- Keep storage areas free from accumulated materials that cause tripping, fires, or explosions, or that may contribute to the harboring of rats and other pests;
- Separate non compatible material
- Place bound material on racks, and secure it by stacking, blocking, or interlocking to prevent it from sliding, falling, or collapsing.
- Stack lumber no more than 16 feet high if it is handled manually, and no more than 20 feet if using a forklift;
- Remove all nails from used lumber before stacking;
- Stack and level lumber on solidly supported bracing;
- Ensure that stacks are stable and self-supporting;
- Do not store pipes and bars in racks that face main aisles to avoid creating a hazard to passersby when removing supplies;
- Stack bags and bundles in interlocking rows to keep them secure; and
- Stack bagged material by stepping back the layers and cross-keying the bags at least every ten layers (to remove bags from the stack, start from the top row first).
- Store baled paper and rags inside a building no closer than 18 inches to the walls, partitions, or sprinkler heads;
- Band boxed materials or secure them with cross-ties or shrink plastic fiber;
- Stack drums, barrels, and kegs symmetrically;
- Block the bottom tiers of drums, barrels, and kegs to keep them from rolling if stored on their sides.
- Place planks, sheets of plywood dunnage, or pallets between each tier of drums, barrels, and kegs to make a firm, flat, stacking surface when stacking on end;
- Chock the bottom tier of drums, barrels, and kegs on each side to prevent shifting in either direction when stacking two or more tiers high; and

- Stack and block poles as well as structural steel, bar stock, and other cylindrical materials to prevent spreading or tilting unless they are in racks.
- Paint walls or posts with stripes to indicate maximum stacking heights for quick reference;
- Observe height limitations when stacking materials.
- Stack loose bricks no more than 7 feet in height. (When these stacks reach a height of 4 feet, taper them back 2 inches for every foot of height above the 4-foot level. When masonry blocks are stacked higher than 6 feet, taper the stacks back one-half block for each tier above the 6-foot level.)
- Aisles at loading docks, through doorways, wherever turns must be made, and in other parts of the workplace must be kept clear of stored material, debris, obstructions and tripping hazards.
- Permanent aisles and passageways must be marked appropriately.

Conveyors

To prevent or reduce the severity of an injury:

- Install an emergency button or pull cord designed to stop the conveyor at the employee's work station.
- Install emergency stop cables that extend the entire length of continuously accessible conveyor belts so that the cables can be accessed from any location along the conveyor.
- Design the emergency stop switch so that it must be reset before the conveyor can be restarted.
- Ensure that appropriate personnel inspect the conveyor and clear the stoppage before restarting a conveyor that has stopped due to an overload.
- Prohibit employees from riding on a materials-handling conveyor.
- Provide guards where conveyors pass over work areas or aisles to keep employees from being struck by falling material. (If the crossover is low enough for employees to run into it, mark the guard with a warning sign or paint it a bright color to protect employees.)
- Cover screw conveyors completely except at loading and discharging points. (At those points, guards must protect employees against contacting the moving screw. The guards are movable, and they must be interlocked to prevent conveyor movement when the guards are not in place.)

Cranes

- Only thoroughly trained and competent employees shall be permitted to operate cranes.
- Operators should know what they are lifting and what it weighs.
 - For example, the rated capacity of mobile cranes varies with the length of the boom and the boom radius. When a crane has a telescoping boom, a load may be safe to lift at a short boom length or a short boom radius, but may overload the crane when the boom is extended and the radius increases.
- All cranes that have adjustable booms shall be equipped with boom angle indicators.
- Cranes with telescoping booms with some means to determine boom lengths shall be provided unless the load rating is independent of the boom length.
- Load rating charts shall be posted in the cab of cab-operated cranes. (All cranes do not have uniform capacities for the same boom length and radius in all directions around the chassis of the vehicle.)
- Employees will always check the crane's load chart to ensure that the crane will not be overloaded by operating conditions.
- Employees will plan lifts before starting them to ensure that they are safe.
- Employees will take additional precautions and exercise extra care when operating around power lines.

- Outriggers on mobile cranes must rest on firm ground, on timbers, or be sufficiently cribbed to spread the weight of the crane and the load over a large enough area. (Some mobile cranes cannot operate with outriggers in the traveling position.)
- Employees will always keep hoisting chains and ropes free of kinks or twists and never wrapped around a load.
- Employees will attach loads to the load hook by slings, fixtures, and other devices that have the capacity to support the load on the hook.
- Employees will pad sharp edges of loads to prevent cutting slings.
- Employees will maintain proper sling angles so that slings are not loaded in excess of their capacity.
- All cranes must be inspected frequently by persons thoroughly familiar with the crane, the methods of inspecting the crane, and what can make the crane unserviceable. Crane activity, the severity of use, and environmental conditions should determine inspection schedules.
- The critical parts of a crane—such as crane operating mechanisms, hooks, air, or hydraulic system components and other load-carrying components—are to be inspected prior to use or daily for any maladjustment, deterioration, leakage, deformation, or other damage.

Slings

The following precautions must be followed when working with slings:

- A designated competent person will conduct inspections of slings before and during use, especially when service conditions warrant.
- Damaged or defective slings will be immediately removed from service.
- Slings will not be shortened with knots or bolts or other makeshift devices.
- Do not kink sling legs.
- Do not load slings beyond their rated capacity.
- Keep suspended loads clear of all obstructions.
- Remain clear of loads about to be lifted and suspended.
- Do not engage in shock loading.
- Avoid sudden crane acceleration and deceleration when moving suspended loads.

Powered industrial trucks

Employees who handle and store materials often use fork trucks, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electrical motors or internal combustion engines. Supervisors must make these employees aware of the safety requirements pertaining to the design, maintenance, and use of these trucks. Additionally, all employees must follow the rules and regulations detailed in the Powered Industrial Truck Program.

Training



Supervisors must provide education for all personnel who are responsible for Material Handling and Storage. The program must enable personnel to recognize the associated with Material Handling and Storage and guidance in methods to minimize these hazards.

Circumstances where additional education is required include, but are not limited to:

- Changes in the work place cause new hazards to be created
- Types of equipment to be used are changed
- Supervisors observe employees are not following the Material Handling and Storage procedures correct.

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Powered Industrial Trucks

I. Policy

The purpose of the Pennsylvania Department of General Services (DGS) Powered Industrial Truck Program is to insure that safe operating procedures for forklifts are identified and implemented. It is not only the intent of DGS to fully comply with the OSHA Powered Industrial Truck Standard 1910.178, but also to improve the overall safety of General Service's employees. A successful Industrial Powered Truck Program will reduce potential injuries and property damage.

This program will be available to all employees and their designated representatives for review and/or copy upon request.

II. References

- OSHA 29 CFR 1910.178

III. Responsibilities

The Powered Industrial Truck Program is administered by the responsible Supervisor who controls the operation of Powered Industrial Trucks.

The Safety Coordinator is responsible for maintaining the program and ensuring training is obtained for employees.

Supervisors are responsible for identifying training needs and insuring their employees' compliance with this program.

Employees are responsible for complying with this program.

IV. Guidance/Program

A. Elements

This written Powered Industrial Truck Program consists of the following elements:

- Types of powered industrial trucks
- Truck uses
- Operator training
- Truck inspection
- Truck maintenance
- Safe operating procedures

B. Types of Powered Industrial Trucks

All DGS Powered industrial trucks consist of a standard forklift trucks. The powered industrial trucks are either electric powered, diesel or liquid petroleum gas powered. There are no forklifts in any DGS buildings which are intrinsically designed to be used in high hazard (flammable) environments. A list of the trucks is contained in Appendix A.

C. Forklift Uses

Power industrial trucks are used at multiple locations in and around DGS owned and operated buildings; however, a majority are used at DGS warehouse locations, 18th and Herr Complex, and the DGS Annex Complex.

D. Forklift Inspections

Powered industrial trucks are required to be inspected at the beginning of each shift that they are used. Any authorized truck operator may conduct the inspection.

- The employee operating the truck at any time is responsible for ensuring that an inspection has been conducted on that shift. If one has not been conducted, the employee will conduct the inspection before operating the truck.
- The “Driver’s Daily Checklist” as shown in Appendix B shall be filled out during the inspection.
- Operators shall check the
 - Engine oil level,
 - Radiator water level,
 - Fuel or battery connection and level,
 - Tire condition,
 - Head and tail light condition,
 - The hour meter, and other gauges or instruments,
 - The function of the horn,
 - Back-up alarms,
 - Steering,
 - Service brakes, parking brake,
 - Lift and tilt controls,
 - Forward and reverse controls,
 - Gauges
- Instructions for checking each of these items can be found in the operating manuals located on each of the trucks.

If any safety problems are found such as problems with the horn, steering, or brakes; the truck will be removed from service until the problem is fixed. Any other minor maintenance problems will be noted on the “Driver’s Daily Checklist.” At the end of the operator’s shift, the operator will complete the checklist and turn it in to their supervisor. Supervisors will review the checklist and give it to the responsible Supervisor. The supervisor will schedule any necessary repairs.

E. Forklift Maintenance

Maintenance will only be conducted by trained, authorized persons or outside contractors

Maintenance employees or contractors will repair trucks in unsafe operating condition as soon as possible. Minor repairs indicated on the “Driver’s Daily Checklist” will also be conducted in a timely manner.

Any repairs to fuel and ignition systems that might involve fire hazards shall be conducted only in the maintenance shop or off-site at the contractor’s facilities. LP gas tanks will be removed from trucks in the maintenance shop for repairs.

V. Training

Training will be provided to all powered industrial truck operators in accordance with the OSHA standard 29 CFR 1910.178. Training will be provided by an outside contractor or by a supervisor who is a certified operator.

All operators are required to participate in both classroom and practical training. They must pass both a written and driving test. Employees who pass both tests will be issued a driver’s license. Employees who do not pass both of these tests will not be permitted to operate a truck.

Employees who have not received training will not be permitted to operate powered industrial trucks except in designated locations, under the supervision of a trained operator, and only for the purpose of training.

Training will be conducted at the time of their initial assignment and at least **every 3 years** thereafter. Retraining will also be conducted when warranted by an accident or other evidence of the operator’s lack of understanding or compliance with the program. The forklift operator’s performance shall be evaluated annually using the checklist in Appendix C. The annual evaluation may be conducted by the Supervisor who is a certified operator.

Training documentation and a written certification of demonstrated competency to operate the specified powered industrial truck will be maintained by the Supervisor for a period of 6 years. The completed checklist in Appendix C can be used to demonstrate competency.

Training will consist of:

Truck Related Topics

- All operating instructions, warnings, and precautions for the types of trucks the operator will be authorized to operate
- Similarities to and differences from automobiles
- Controls and instrument location; what they do and how they work
- Power plan operation and maintenance
- Steering and visibility
- Fork and attachment adaptation, operation, and the limitations of their utilization



- Vehicle capacity
- Vehicle stability
- Vehicle inspection and maintenance
- Refueling or recharging of batteries
- Operating limitations
- Any other operating instructions, warning, or precautions listed in the operator's manual for the type of vehicle which the employee is being trained to operate

Workplace Related Topics

- Surface conditions where the vehicle will be operated
- Composition of probable loads and load stability
- Load manipulation, stacking and un-stacking
- Pedestrian traffic
- Narrow aisles and other restricted places of operation
- Operating the truck on ramps and other sloped surfaces that could affect the stability of the load
- Other unique or potentially hazardous environmental conditions that exist or may exist in the workplace
- Operating the vehicle in closed environments and other areas where insufficient ventilation could cause a buildup of carbon monoxide or diesel exhaust

VI. Safe Operating Procedures

A. General

1. Only trained and licensed employees will be permitted to operate a powered industrial truck.
2. Fire aisles, exits, access to stairways, and fire equipment shall be kept clear.
3. All accidents involving a forklift shall be reported immediately to the Supervisor and Safety Coordinator.
4. Eating and drinking are prohibited while driving a forklift.
5. A safe distance shall be maintained between forklifts when traveling in the same direction – approximately three truck lengths from the truck ahead.
6. The truck shall be kept under control at all times.
7. Other trucks traveling in the same direction at intersections, blind spots, and other dangerous locations shall not be passed.
8. The driver shall slow down and sound the horn at cross aisles and other locations where vision is obstructed.
9. Railroad tracks shall be crossed diagonally whenever possible.
10. Trucks shall be parked no closer than 8 feet from the center of railroad tracks
11. The driver shall look in the direction of, and keep a clear view of the path of travel.
12. The truck shall be driven with the forks low to the floor.
13. The driver shall insure that there is sufficient clearance under overhead installations, lights, pipes, sprinkler systems, etc.



14. Drivers shall use caution when traveling from bright daylight areas to dimly lit areas, and vice versa.
15. Under all travel conditions, the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
16. Stunt driving and horseplay are not permitted.
17. The driver shall slow down for wet and slippery floors.
18. Running over loose objects on the road surface shall be avoided.
19. While negotiating turns, speed shall be reduced to a safe level.
20. Grades shall be ascended or descended slowly.
21. When ascending or descending grades in excess of 10%, loaded trucks shall be driven with the load upgrade.
22. On all grades, the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.
23. Trucks shall be driven straight up or down ramps to prevent tipping.
24. The mast shall not be raised or lowered while the truck is traveling.
25. If the load being carried obstructs the forward view, the driver shall be required to travel with the load trailing. However, the driver shall only travel in reverse when the load obstructs his view.
26. Only an approved safety platform will be used to lift employees who need to perform work overhead. The platform must be securely fastened to the mast and/or forks. A means shall be provided whereby the personnel must stay at the controls at all times when someone is on the platform.
27. When a driver dismounts the truck that remains in his view within 25 feet, he/she shall fully lower the load engaging means, neutralize the controls, and set the parking brake to prevent movement.
28. When a driver dismounts the truck that does not remain within his view or within 25 feet, the truck is unattended and the driver shall fully lower the load engaging means, neutralize the controls, set the parking brake, and turn off the power.
29. Forklift operators are not permitted to carry passengers.
30. Arms and legs are prohibited from being placed between the uprights of the mast or outside the running lines of the truck.
31. Operators shall keep the operator's compartment free from foreign objects, oil, grease, mud and snow to minimize the danger of slipping or stumbling.
32. If the forklift has a seatbelt, the operator shall wear it. Removing seat belts is prohibited.
33. Operators shall sound their horn whenever an object blocks their vision or when approaching blind spots such as corners.
34. Operators shall give pedestrians the right of way.
35. The operator shall not be permitted to drive up to another person standing in front of a bench or other hard surface.
36. No person shall be permitted to stand or pass under the elevated portion of any truck whether loaded or empty.
37. Batteries shall be changed by trained, authorized employees only.
38. LP tanks shall be changed by the operator.
39. Operators shall know or approximate the weight of the load and check the forklift's rated capacity before raising the load.
40. Operators shall conduct an inspection of their truck at the beginning of each shift and shall complete a "Driver's Daily Checklist".
41. Operators shall inspect the load for stability, projections, poor stacking, and damaged skids or pallets before lifting it.



42. The forklift's controls shall only be operated from the driver's seat.
43. The mast shall be tilted back slightly when traveling with a load.
44. Unstable or leaning stacks shall be restacked.
45. The forks shall not be used to push or ram loads.
46. Loads shall be stacked no closer than 18 inches below the sprinkler heads.
47. If an LP powered truck is idle in the maintenance shop for more than 30 minutes, the tank shall be removed and stored in the designated racks.
48. Smoking shall not be permitted on forklifts, in the battery charging area, or in the LP tank storage area.

B. Loading/Unloading Trailers

1. Operators shall check that the dock plate is secured before driving on it.
2. Operators shall check the condition of the trailer before entering.
3. The operator shall not exceed the rated capacity of the dock plate.
4. Forklifts shall not be used to open or close freight doors.
5. A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, platform, or freight car.
6. Before entering a trailer, the brakes on the trailer shall be set and both back wheels chocked.
7. If the trailer is not coupled to a tractor, it shall have a fixed jack for support.
8. The forklift operator is responsible for insuring that the trailer is properly chocked and supported.

VII. Appendices

Appendix A Powered Industrial Truck Inventory

Appendix B Driver's Daily Checklist

Appendix C Powered Industrial Truck Safe Operation Certification

Appendix A Powered Industrial Truck Inventory

Make	Model	Serial #	Equipment #	Year	Engine Type	Building-Location	Inspection Date
Hyster	E40XM2S	D114N01746Z			Electric	Warehouse – 1549 Bobali	
Hyster	E30XL	C114V06966R			Electric	Warehouse – 1549 Bobali	
Yale	ERP040TGN36TF078	E807N05005A			Electric	Warehouse – 1549 Bobali	
Daewoo	BC25S-2	CK-00062			Electric	Warehouse – 1549 Bobali	
Yale	NR035	B815N01525V			Electric	Warehouse – 1549 Bobali	
Hyster	W60XT	E135H03375V			Electric	Warehouse – 1549 Bobali	
Hyster	W40Z	B218N02302Z			Electric	Warehouse – 1549 Bobali	
Clark	WP40	WP40-0512-PM8022			Electric	Warehouse – 1549 Bobali	
Yale	ERP035TFN36TQ077	B807N02639V			Electric	Warehouse – Gibson(Revenue)	
Yale	ERP040TGN36TF078	E807N02647X			Electric	Warehouse – 905 Elmerton	
Yale	NR035	C815N05172C			Electric	Warehouse – 905 Elmerton	
Crown	PE3000	6A130211			Electric	Warehouse – 905 Elmerton	
Hyster	W40XT	A218H06624X			Electric	Warehouse – 905 Elmerton	
Cushman	Stock Chaser	98003960			Electric	Warehouse – 905 Elmerton	
Yale	CS030	A801N06974U			Electric	Warehouse – 905 Elmerton	
Yale	NR035	A815N05174C			Electric	Warehouse – 905 Elmerton	
Yale	CS030	A801N06922U			Electric	Warehouse – 905 Elmerton	
Clark	GCS20	G138I-0219-6811			Propane	Warehouse – 905 Elmerton	
Daewoo(DEKA)	BC18T	BM-00023			Electric	Warehouse – 22 nd & Forster	
Hyster	S40XL	D177G46204V	TP120		Propane	Warehouse – 22 nd & Forster	
Hyster	S40XL	A187V16457L			Propane	Warehouse – 22 nd & Forster	
Hyster	W40XT	A218H06628X			Electric	Warehouse – 22 nd & Forster	
BT Prime-Mover	HMX65	HMX6525307002			Electric	Warehouse – 22 nd & Forster	

Daewoo(DEKA)	BC25S	28-00988			Electric	State Surplus – 22 nd & Forster	
Hyster	E60MM	F108G09795U			Gasoline	Garage - 22 nd & Forster	
Hyster	S35XL	B010B3662F			Propane	Federal Surplus – 22 nd & Forster	
Hyster	S40XL	C187V10031R			Propane	Federal Surplus – 22 nd & Forster	
Hyster	S40XL	A187G088505	8224	1988	Propane	Federal Surplus – 22 nd & Forster	
Hyster	Military H5OXL	D177G20239X	D177G20239X		Gasoline	Federal Surplus – 22 nd & Forster	
Allis Chalmers	ACP150 (military)	132730	83E-101		Diesel	Federal Surplus – 22 nd & Forster	
Hyster	H155XL	F006G05578M			Diesel	Federal Surplus – 22 nd & Forster	
Mitsubishi	30	2FBC30			Electric	Metrology Lab- 22 nd & Forster	
Clark	GCS30-S		G138MS-0177-5521FA-8-85		Propane	Publications-10th & Market	
Allis Chalmers	ACE 30 B	ALR526188			Electric	East Wing (NOB Upper Dock)	
Clark	G50S				Diesel	18 th & Herr – Lower Lot	
Clark	TM20	TM247-0015-9344			Electric	18th & Herr - Arsenal Bldg	
Hyster	65	SH1778H2436A		2003		Annex-Garage Bldg #51	
Linde	E15	324G10102751			Electric	annex-Maintenance Bldg #55	

Appendix B

Operators Daily Checklist

Check Before the Start of Each Shift

Circle One: Gas, LPG, Diesel, Electric		Truck Number	
Truck Number	Operator	Supervisor	
Hour Meter Reading	Start of Day	End of Day	
Check Boxes Accordingly: <input type="checkbox"/> Okay <input type="radio"/> Needs attention or Repair			
VISUAL CHECKS		OPERATIONAL CHECKS	
Tire Condition	<input type="checkbox"/> <input type="radio"/>	Horn	<input type="checkbox"/> <input type="radio"/>
Head and Tail Lights	<input type="checkbox"/> <input type="radio"/>	Steering	<input type="checkbox"/> <input type="radio"/>
Warning Lights	<input type="checkbox"/> <input type="radio"/>	Service Brakes	<input type="checkbox"/> <input type="radio"/>
Hour Meter	<input type="checkbox"/> <input type="radio"/>	Parking Brakes	<input type="checkbox"/> <input type="radio"/>
Other Gauges	<input type="checkbox"/> <input type="radio"/>	Hydraulic Controls	<input type="checkbox"/> <input type="radio"/>
Obvious Damage/Leaks	<input type="checkbox"/> <input type="radio"/>	Seat Brake	<input type="checkbox"/> <input type="radio"/>
Engine Oil Level	<input type="checkbox"/> <input type="radio"/>	Battery Load Test	<input type="checkbox"/> <input type="radio"/>
Radiator Water Level	<input type="checkbox"/> <input type="radio"/>	Note: Watch Battery Indicator While Holding Tilt Lever on Full Back Tilt. If Needle Falls to Red Area, Battery Doesn't Have Sufficient Charge to Operate Truck Properly.	
Fuel Level	<input type="checkbox"/> <input type="radio"/>		
Battery Plug Connection	<input type="checkbox"/> <input type="radio"/>	Battery Discharge Indicator	<input type="checkbox"/> <input type="radio"/>
Note: Be Sure Connection is Tight.		Note: Key on Needle Should Indicate Green Area.	

Remarks: Explain all items needing attention or repair. Use back as necessary.

**Appendix C
Powered Industrial Truck
Performance Evaluation**

Department: _____
Operator Name: _____

Date: _____
Truck Number: _____

	Good	Fair	Poor	N/A
1. Inspects equipment at the start of a shift?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Lowers forks when driving without a load?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Keeps forks spaced as widely as possible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Sounds horn at blind curves and at intersections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Slows down at curves and intersections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Lifts loads smoothly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Stacks loads properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Turns key off, lowers forks and sets parking brake when leaving forklift?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Parks without blocking EXITS and fire lanes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Places dock plate properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Negotiates curves and ramps with two-tier load?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Drives between skids without touching?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Slows down when pedestrians are present?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Refuels/recharges equipment safely?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Transports loads at a minimal distance from floor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- The above named operator has shown the ability to safely operate the specified powered industrial truck.
- The above named operator has not performed satisfactorily and is referred for retraining.

Trainer's Name: _____ Title: _____ Date: _____

P-27

Radiation

Currently Under Development

P-28

Respiratory Protection

Policy

The purpose of this Respiratory Protection Program is to coordinate the proper use and maintenance of respiratory protective equipment. These devices may be necessary to reduce employee exposure to airborne contaminants, allowing employees to work safely in potentially hazardous work environments. This respiratory protection procedure complies with OSHA 29CFR1910-134, Respiratory Protection. This procedure affects all DGS employees that wear respiratory protection.

I. References

- A. OSHA 29 CFR Subpart I 1910.134 – Respiratory Protection, and Appendices
- B. 3M Respirator Service Life Program
- C. American National Standard Practice for Respiratory Protection Z88.2-1980
- D. 1990 NIOSH Pocket Guide
- E. 1998 ACGIH Guide to Occupational Exposure Values
- F. OSHA IDLH Memorandum – May 21, 1996

II. Definitions

Air-purifying respirator (APR): A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF): The overall protection afforded by a certain type of respirator as defined by the ratio of the concentration of contaminant outside a face mask or hood to that inside the mask while in a contaminated atmosphere.

Atmosphere-supplying respirator: A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge: A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Ceiling: The exposure level that must not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure (unless otherwise specified).

Dust Mask: See filtering face-piece

Emergency situation: Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure: Exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI): A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator: A respirator intended to be used only for emergency escape from the contaminated environment.

Filter or air purifying element: A component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering face-piece (dust mask): A negative pressure particulate respirator with a filter as an integral part of the face-piece or with the entire face-piece composed of the filtering medium (with no exhalation valves present).

Fit factor: A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator.

Fit test: The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet: A rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter: A filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood: A respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH): An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Maximum use concentration (MUC): The highest concentration of a contaminant that a specified respirator and filter cartridge can provide adequate protection against.

Negative pressure respirator (tight fitting): A respirator in which the air pressure inside the face-piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere: An atmosphere with an oxygen content below 19.5%, by volume.

Permissible Exposure Limit (PEL): The exposure limit set for exposure to a hazardous substance and enforced by OSHA as a legal standard. Based on time-weighted average concentrations for a normal 8 hour workday and 40 hour work week.

Peak (PEAK): The OSHA standard that sets the maximum concentration of a contaminant a worker may be exposed to. A “peak level” is defined as one “that can be applied to certain substances for brief designated periods and for a strictly limited number of times during the work shift, with a designated time interval between peaks.” The ‘peak’ concept places a limit on the intermittent higher exposures

Physician or other licensed health care professional (PLHCP): An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by 1910.134.

Positive pressure respirator: A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR): An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator: A positive pressure atmosphere-supplying respirator that admits breathing air to the face-piece when the positive pressure is reduced inside the face-piece by inhalation.

Qualitative fit test (QLFT): A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT): An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Recommended Exposure Limit (REL): The recommended airborne concentration of a substance and the conditions under which it is believed to be protective of worker health over a working lifetime. This value is not enforceable by OSHA and constitutes a time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek.

Respiratory inlet covering: That portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a face-piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA): An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life: means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Short Term Exposure Limit (STEL): Usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV-TWA, PEL-TWA, or REL-TWA.

Supplied-air respirator (SAR) or airline respirator: Means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Threshold Limit Values (TLVs): The airborne concentration of a substance and the conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. This value constitutes a time-weighted average concentration for an 8 hour work period and can be enforceable by OSHA.

Tight-fitting face-piece: A respiratory inlet covering that forms a complete seal with the face.

Time-Weighted Average (TWA): The exposure concentration for a conventional 8-hour (TLV, PEL) or up to a 10-hour (REL) workday and a 40-hour work week.

User seal check: An action conducted by the respirator user to determine if the respirator is properly seated to the face.

III. Guidance/Program

A. PROGRAM RESPONSIBILITIES

1. Departmental Safety Coordinator Responsibility

The Departmental Safety Coordinator is responsible for the following:

- Auditing of the Respiratory Protection Program to assure it's continued functioning and effectiveness
- Ensure that all elements of this procedure are implemented completely for the protection of all affected employees.
- Providing technical assistance to the managers and supervisors
- Maintaining the Respirator policy
- Assist area supervisors with their efforts to implement, maintain and enforce this program;
- Assist in ensuring Respiratory Standard Operating Procedures are being implemented and enforced; and
- Assist in ensuring employees that are required to wear respirators have obtained medical evaluations, proper fit testing, and required training prior to wearing a respirator.
- Establishment of medical screening programs/procedures for employees assigned to wear respiratory protective equipment

2. Manager/Supervisor Responsibility

Managers/Supervisors have the responsibility to:

- Ensure that all elements of this procedure are implemented completely for the protection of all affected employees.
- Ensure employees that are required to wear respirators have obtained medical evaluations, proper fit testing and required training prior to wearing a respirator; and
- Conduct audits at least semiannually to inspect each employee's respirator to assure that respirators are properly used, stored, maintained and cleaned.
- Ensure that the employees are provided with the selected Respirator.
- Supervision of the respirator selection procedure;
- Establishment of training sessions regarding respiratory protective equipment for employees;
- Establishment of a continuing program of cleaning and inspection of equipment;
- Designation of proper storage areas for respiratory protective equipment;
- Establishment of issuance and accounting procedures for use of respiratory protective equipment;
- Maintain written information regarding medical respirator clearance, fit testing, and other required recordkeeping.
- Remove from service any damaged respiratory equipment for repair.
- Ensure that Respirator Standard Operating Procedures are being implemented, maintained and enforced.

3. Employee Responsibility

Employees have the responsibility to:

- Participate in respiratory protection training;
- Complete the medical evaluation questionnaire and obtain a written medical evaluation before being fit tested;
- Participate in fit testing of respiratory equipment;
- Clean and disinfect their respirator to keep it in good working condition and to prevent contamination;
- Store the respirator as instructed, to prolong the life of the equipment and maximize its effectiveness;
- Follow the procedures and guidelines outlined in this program, as they pertain to their defined duties;
- Properly wear and use the respiratory protection as required
- Use only the provided respiratory protective equipment that is provided by the commonwealth
- Contact their Supervisor if there are any questions or concerns in regards to procedures defined in the program.
- Notify Manager/Supervisor of any damaged respiratory equipment.
- When required to wear a respirator, the employee must shave (within 24 hours) all of the necessary respirator seal points to ensure a proper fit and protection factor.

B. EVALUATION OF HAZARDS

The Material Safety Data Sheets (MSDS) and the Safety Coordinator can be consulted to determine if the use of a respirator is required. Additional exposure monitoring of employee groups and/or processes pertinent to DGS operations must be conducted at the direction of the Safety Coordinator for contaminant(s) as applicable.

The Safety Coordinator will follow the following steps to determine if respiratory protection is necessary:

1. Review the Chemical/hazardous material documentation to include the MSDS,
2. Review the federal/state guidelines for exposure levels associated with the anticipated activity
3. Determine if characterization air samples have been recorded for the specific activity
4. Recommend respirator type to the supervisors for the employee(s).

Note: When chemical concentrations exceed the most conservative exposure values (PELs, RELs, or TLVs), administration or engineering controls will be used to reduce the exposure potential, whenever feasible. When such measures are not feasible or are in the process of being implemented, personal protective equipment, including respirators, will be used to protect employees.

C. RESPIRATOR SELECTION

Respiratory protective equipment is quite effective at preventing the inhalation of airborne contaminants, but only when properly selected and used. Proper selection is dependent on

a number of factors that are included in an assessment of the work environment. Any number of variables can affect the choice of respiratory protection and must be evaluated in writing for each identified hazard using **Attachment A – Respirator Selection Form**. Each Respirator Selection Form must be retained with the Safety Coordinator and updated as outlined in this procedure.

General Services’ Employees will only use respiratory equipment that was purchased by the Commonwealth of Pennsylvania.

D. RESPIRATORY REQUIREMENTS FOR EMPLOYEES WITH FACIAL HAIR

If an employee who is required to wear a respirator can not shave because of a medically documented reason or for religious reasons to be properly protected, the following must occur:

- The employee may shave only the area of the face where the face to face-piece seal must occur.
- Or a Powered air-purifying respirator (PAPR) respirator can be used.

E. OTHER DEPARTMENTS

1. Job Tasks Requiring Respiratory Protection and Affected Personnel

Personal air sampling may identify additional tasks that require respiratory protection. The table located in **Attachment C** lists those job tasks requiring respiratory protection, affected personnel, chemical(s) of concern, respirator and respirator cartridge type.

2. Respiratory Protection for Exposure to Dust

Past results of personal air sampling have identified areas where total particulate levels are well within OSHA PELs, e.g., 15 mg/m³ total dust over an 8-hour TWA. However, employees may request a dust mask for general nuisance dust. **Attachment D** indicates job tasks, the personnel likely to perform those job tasks, and the type of disposable dust mask that can be used.

3. Respiratory Protection Used By Employees When Not Required*

**It is NOT standard practice to provide voluntary respiratory protection with the exception of dust mask respirators without written direction from the employee's physician and evaluation by the Safety Coordinator.*

Supervisors/Managers will provide dust mask respirators at the request of employees even when they are not required, as long as such respirator does not create a hazard itself. Supervisors/Managers will provide the information contained in 29 CFR 1910.134 to employees requesting and using respirators on a voluntary basis.

4. Identification of Filters, Cartridges and Canisters

All filters, cartridges and canisters used must be labeled and color coded with the NIOSH approval label. This label must not be removed and must remain legible.

5. Cartridge Change Schedule

There are many factors that can reduce cartridge and/or filter service life which include, but are not limited to:

- Duration of exposure:
 - ⇒ Longer durations spent in the work area will require cartridges/filters to be changed more frequently.
- Ambient contamination concentration:
 - ⇒ Employee exposure to greater contaminant concentrations in the work area will decrease cartridge/filter service life.
- Humidity in the air:
 - ⇒ Most, but not all cartridges, have shorter life with increased humidity.
- Temperature:
 - ⇒ Warmer air decreases absorptive capacity.
- Cartridge variability:
 - ⇒ Some cartridges do last longer than others.
- Worker exertion level:
 - ⇒ Work activity will alter cartridge service life.
- Presence of oil mist:
 - ⇒ Respirator filter effectiveness varies with the presence of oil mist components.
- Multiple contaminants:
 - ⇒ Other exposures can alter service life and cause release.
- Storage:
 - ⇒ Partially used cartridges/filters have a different service life compared to new ones.

Based on the identified hazards and typical environmental conditions, a filter cartridge change-out schedule has been developed and attached to this program in **Attachment E**. Methods for creating additional filter change-out schedules are also outlined in this

attachment. Based on the type of the respirator and filter cartridges used, the manufacturer must be contacted in order to complete an accurate filter cartridge change-out schedule. A list of filter cartridge and respirator manufacturers is attached as **Attachment F**. The plant specific filter cartridge change-out schedules that are created will be placed into **Attachment F**.

6. Procedures for IDLH Atmospheres

An atmosphere is immediately dangerous to life and health (IDLH) when it poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. An atmosphere considered IDLH may be any one or a combination of the following:

- **Oxygen deficient or oxygen rich:** Atmosphere with less than 19.5 % or greater than 23.5 % oxygen, by volume.
- **Explosive:** Atmosphere in excess of the Lower Explosive Limit (LEL).
- **Toxic Atmosphere:** Varies based on contaminant, however, any atmosphere with an airborne contaminant concentration above establish exposure values, if the concentration or contaminant is unknown, or if the concentration (at a minimum) is that of the 1990 NIOSH IDLH exposure value.
- If atmospheric concentrations consistently equal or exceed 1990 NIOSH IDLH exposure values.

The procedure for respirator use in Immediately Dangerous to Life and Health (IDLH) atmospheres that are not confined spaces, is as follows:

- The Supervisor/Manager via guidelines established in this program must select the proper respirator.
 - ⇒ A full face piece pressure demand Self-contained Breathing Apparatus (SCBA) certified by NIOSH for a minimum service life of 30 minutes or
 - ⇒ A combination full face piece pressure demand Supplied-air respirator (SAR) with auxiliary self-contained escape air supply.
- At least one trained individual must serve as a standby person and remain outside of the hazardous atmosphere. The standby person must be equipped with the same personal protective equipment as the entrant, including a supplied-air respirator with a 5-minute emergency escape cylinder (unless a SCBA is used). The entrant, for rescue purposes and to avoid entry rescue, should wear a harness and lanyard.
 - Communication must be maintained at all times (voice, visual, or signal line) between all individuals present.
 - Proper rescue equipment must be in place in case of an emergency; therefore, non-entry rescue must be attempted prior to entry rescue. However, if entry is necessary, the standby person must notify the Supervisor/Manager prior to entering the space. In turn, the informed individual will arrange to have emergency assistance sent to the site. The standby person will then wait for back up personnel before any entry rescue is attempted.

- Please refer to the Confined Space Program for more information.

F. FIT TESTING PROCEDURES

Fit testing is required under the following circumstances:

- Prior to initial use of a negative or positive pressure tight-fitting respirator and annually thereafter.
- Whenever a different respirator face-piece is used.
- Whenever the employee reports, or Safety coordinator or the PLHCP makes a visual observation of, changes in the employee's physical condition that could affect fit, e.g. facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight, etc.

DGS employees will be fit tested with the same make, model, style, and size negative or positive pressure tight fitting face-piece prior to any use in the workplace. Fit tests must be administered using OSHA-accepted qualitative fit-test (QLFT) or quantitative fit-test (QNFT) protocols and procedures, as contained in OSHA's Respiratory Protection Standard, 29 CFR 1910.134. *Quantitative fit testing must be used if exposure monitoring results are 5 times the OSHA PEL for any contaminant.*

Fit testing protocols that are acceptable are:

- QLFT Protocols:
 - ⇒ Bitrex
 - ⇒ Irritant smoke
- QNFT Protocols:
 - ⇒ Condensation Nuclei Counter (PortaCount)

The following procedures must be followed by DGS employees when performing a fit test with Bitrex:

- Whenever Bitrex is used to perform a qualitative fit test, an N95 rated particulate filter must be used.
- These filters can be attached to the face-piece during the fit test, and removed immediately following the fit test and replaced with the cartridge type that will be used when in the workplace, if different (i.e. Organic Vapor Acid Gas cartridge).
- N95 rated particulate filters may then be re-used during subsequent fit tests. Therefore, each facility must buy N95 rated particulate filters for fit testing purposes only (if Bitrex is used), which may be re-used for numerous fit tests.

The following procedures must be followed by DGS employees when performing a fit test with Irritant Smoke (Stannic Chloride):

- Whenever Irritant Smoke (Stannic Chloride) is used to perform a qualitative fit test, a HEPA or P100 series filter must be used.
- These filters can be attached to the facepiece during the fit test, and removed immediately following the fit test and replaced with the cartridge type that will be used when in the workplace, if different (i.e. Organic Vapor Acid Gas cartridge).
- HEPA or P100 series filters may then be reused during subsequent fit tests. Therefore, each facility must buy HEPA or P100 rated particulate filters for fit testing purposes only (if Irritant Smoke is used), which may be re-used for numerous fit tests.
- A hood may not be used when performing a fit test using irritant smoke.

All other components of 1910.134 must be adhered to when performing any specific fit test (i.e. Bitrex or Irritant Smoke).

Employees must perform a user seal check (negative and positive pressure test) each time they don the respirator using the procedures in the Donning and Use section of this program or those procedures described in 1910.134. Procedures recommended by respirator manufacturers will only be used if the Safety coordinator can determine that they are as effective as those in 1910.134.

All fit tests administered to employees will be documented on **Attachment G - Qualitative/Quantitative Fit Testing Form**. The form will include the following information:

- The name or identification of the employee tested
- The type of fit test performed
- Specific make, model, style, and size of respirator tested
- Date of test
- The pass/fail results for QLFTs

Note: Facial hair that lies along the sealing area of a respirator, such as beards, sideburns, moustaches, or more than 24 hours of stubble, are not permitted on employees who are required to wear respirators that rely on a tight fitting face-piece to face seal to achieve maximum protection.

G. RESPIRATOR USE

Donning and doffing instructions for each respirator type identified below are located in **Attachment H** of this program.

1. Dust Masks

When performing tasks such as grinding and buffing, which may result in the generation of particles or shavings that are within the most conservative exposure values for total dust and respirable dust, a dust mask may be used if requested by an employee. Dust masks must not be used for protection against concentrations that exceed the most conservative exposure guidelines, unless so directed by the Safety Committee. Any employee who wants to wear a dust mask must first read and understand 1910.134 prior to use in the workplace.

2. Half-Face Respirators

Only those employees that have undergone medical assessment, fit testing, training and have been authorized to wear a half-face respirator can wear one.

3. Full-Face Respirators (APRs and PAPRs)

Only those employees that have undergone medical assessment, fit testing, training and have been authorized to wear a full-face respirator can wear one.

4. Self-Contained Breathing Apparatus (SCBA)

Only those employees that have undergone medical assessment, fit testing, training and have been authorized to wear a SCBA respirator can wear one.

5. Limitations for Dust Mask, Half-Face and Full-Face APRs and PAPRs

The following list explains the limitations of dust mask, half-face and full-face respirators:

- They are not designed for use in atmospheres containing less than 19.5% oxygen, by volume.
- They do not supply oxygen. They should only be used in adequately ventilated areas containing sufficient oxygen to support life. Employees should immediately leave the area they are working in if:
 - ⇒ Breathing becomes difficult.
 - ⇒ Dizziness or other distress occurs.
- They are not designed for atmospheres where concentrations of contaminants are immediately dangerous to life and health (IDLH). They should only be used in accordance with instructions and with regard to the limitations pertaining to that type of respirator.
- They should never be altered or modified.

Note: Half-face and full-face APR or PAPR must be equipped with cartridges carefully selected for the specific contaminant(s) that will be encountered. Consult the supervisor/manager or Safety consultant for the correct cartridge to use.

H. RESPIRATOR MAINTENANCE

1. Cleaning

Individually assigned respirators must be thoroughly cleaned and disinfected as often as necessary to remain sanitary based on duration of use and task specific conditions. Respirators may not be shared. The cleaning and disinfecting procedure that DGS will use is as follows:

- Remove filters, cartridges, or canisters (Do not expose to moisture). Disassemble face-piece by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer.
- Wash components in warm (about 110 degrees F) clean water with a mild detergent-sanitizing solution*, a cleaner recommended by the manufacturer or a Hypochlorite solution (one milliliter of laundry bleach to one liter of water). A stiff brush (not wire) may be used to remove dirt.
- Rinse in warm (about 110 degrees F) clean water. This clean water rinse is particularly important because traces of sanitizer left on the mask can cause skin irritation and/or dermatitis.
- Dry on a rack (inside of a locker) or hang from a clothesline. In either case, position the respirator so that the face-piece is in a non-distorted position. Components may be hand-dried with a clean lint-free cloth.
- When not in use, respiratory equipment must be placed in sealable (zip lock or otherwise closeable) plastic bags and stored in a single layer in a non-distorted position. The respirator must be dry before being placed into the plastic bag.

The sanitizer must only be used in the recommended dilution because a more concentrated dilution could cause corrosion. Cleaning and sanitizing at the recommended 110 degrees F temperature will avoid overheating and distortion of parts and thus prevent unnecessary replacement.

***Sanitizing solution is harmful or fatal if swallowed and may cause burns or damage if contact is made with the eyes. Prolonged skin contact should also be avoided. Wear appropriate PPE, i.e. chemical gloves. Refer to the Commonwealth of Pennsylvania PPE Program HS 270 for more information.**

Respirator cleaning and sanitizing procedures described in 1910.134 will be acceptable. Procedures recommended by respirator manufacturers will only be used if the Safety coordinator can determine that they are as effective as those of 1910.134.

2. Storage

Employees will store their respirators in a secure location (i.e. personal locker) in a clean respirator storage bag. Employees must ensure their respirator is protected from:

- Damage and contamination.
- Dust, sunlight and extreme temperatures and moisture.
- Damaging chemicals.
- Deformation of the face-piece and exhalation valve.

Emergency respirators will be kept accessible and stored in compartments that are clearly marked as containing emergency respirators.

3. Inspection

Respirators must be inspected before each use and during cleaning.

Note: Inspection procedures for each respirator type identified below are located in **Attachment I** of this program.

Dust Masks

Dust masks must be inspected before each use. Any dust mask that shows excessive wear or appears defective in any way must be disposed of properly and replaced. Dust masks must be disposed of at the end of the work shift or any time breathing becomes difficult.

Air-purifying respirators (APR) (half-face and full-face)

Half-face and full-face respirators must be inspected before each use. Defective respiratory equipment must not be used until it is properly repaired or replaced.

Emergency Respirators

- Emergency respirators will be inspected monthly in accordance with manufacturer recommendations. Supervisors/Managers will document the monthly inspection on **Attachment J - Respirator Inspection Form**.

Self-Contained Breathing Apparatus (SCBAs)

Self-Contained Breathing Apparatuses will be inspected weekly. Air and oxygen cylinders must be maintained in a fully charged state and must be recharged when pressure falls to 90 % of the manufacturer's recommended pressure level. The Supervisors/Managers will document the weekly inspection on **Attachment K - Self-Contained Breathing Apparatuses and Cylinder Inspection Form**.

4. Repair

Only the manufacturer or individual trained by the manufacturer may repair defective respirators. *Respirator parts from different manufacturers are not interchangeable.* The NIOSH approval will be invalid if an air hose, gasket or any other part has been replaced from a different brand of respirator.

I. PROGRAM EVALUATION

Every six months the Supervisors/Managers will consult their employees required to use respirators to assess the employees' view on the program effectiveness, to identify any problems and to ensure respirators are being used properly. If there are any problems identified during this assessment, they will be corrected in a timely manner. **Attachment M - Employee Program Evaluation Questionnaire** will be used to document the evaluation. Factors to be assessed include, but are not limited to:

- The employee's view on the program effectiveness.
- The fit of their personal respirator (problems, concerns, questions).
- The employee's knowledge of respirator selection for the hazard(s) to which they are exposed.
- The employee's knowledge of the proper respirator use under the workplace conditions that they may encounter.
- The employee's knowledge of proper respirator maintenance.

The Safety Coordinator will annually evaluate this written program to identify and correct deficiencies. The annual evaluation will include, but not be limited to, the following:

- Compliance with any new OSHA changes to the respirator standard.
- Adequacy of the written respirator program.
- An assessment of the respirator selection criteria, e.g., are the respirators being used for the appropriate hazards?
- Are the respirators being used, stored and maintained properly?
- Adequacy of training program.
- Adequacy of record-keeping.

J. PROGRAM REVIEW AND UPDATE

The Respiratory Protection Program will be reviewed and/or updated under these circumstances:

- Annually.

- Following a drill/exercise or actual event where it has been determined that established procedures were not effective or were inaccurate.
- Whenever new inhalation hazards are introduced into the work area that may affect the types of respiratory protection used.
- Whenever Federal OSHA, State OSHA, and/or Commonwealth of Pennsylvania require additional provisions to remain in compliance with new or revised standards.

IV. Training

A. Initial

As part of the Respiratory Protection Program, employees who wear respiratory protective equipment will be given initial training based on the procedures outlined in this written procedure. Each employee who is required to use an air-purifying respirator (APR), powered air-purifying respirator (PAPR), supplied air respirator (SAR) or self-contained breathing apparatus (SCBA) will receive the following information and training relating to the Respiratory Protection Procedure:

Information

Employees must be informed of:

- Their individual roles and responsibilities under this program.
- The specific nature of the hazards for which respiratory protection is needed.
- The function of the respiratory protection equipment to be used, including the limitations.
- The identification of medical signs and symptoms that may affect the employee's ability to safely use a respirator.
- The procedures for maintenance and storage of the respirator.
- The health implications of not wearing respiratory protective equipment in the proper manner.
- How improper fit, usage, and/or maintenance can compromise the protective effect of the respirator.

Training

Employee training must include the following at a minimum:

- The correct way to put on, remove and wear a respirator, and the conditions which affect the mask to face seal including: temple bars of eyeglasses, dentures, facial hair, facial characteristics, and safety equipment, e.g., chemical goggles, hard hats, etc.

- The proper way to seal check the respirator (positive pressure and negative pressure seal checks).
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
- The proper way to inspect, clean, and maintain the equipment.

Each employee that requests a dust mask when performing tasks such as grinding, buffing or working in the folder of a press, which may result in the generation of particles or shavings that do not exceed OSHA Permissible Exposure Limits, will receive the following information and training:

Information

Employees must be informed of:

- The function of the respiratory protection equipment to be used, including the limitations.
- The procedures for maintenance and storage of the respirator.
- How improper fit, usage and/or maintenance can compromise the protective effect of the respirator.
- Proper disposal.

Training

Employee training must include the following at a minimum:

- The correct way to put on, remove and wear a respirator, and the conditions which affect the mask to face seal including: temple bars of eyeglasses, dentures, facial hair, facial characteristics, and safety equipment (chemical goggles and hard hats).
- The proper way to inspect and maintain the respirator.

B. Refresher

As part of the Respiratory Protection Program, refresher training will be conducted under the following circumstances:

- Annually after initial assignment.
- Whenever changes in the workplace render previous training obsolete.
- When inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or when any other situations arise in which retraining appears necessary to ensure safe respirator use.
- Whenever **Employee Program Evaluation Questionnaires** (Attachment M) identify inadequacies in an affected employee's knowledge of their responsibilities defined in this program.
- When the type(s) of respiratory protection used by employee changes.
- Whenever this program changes.

Note: Refresher training should incorporate all of the topics discussed during the initial training. Emphasis should be made on any inadequacies/concerns which are noted on the Employee Program Evaluation Questionnaire.

V. Testing/Monitoring

A. Health and Safety

Employee Medical

Medical assessments will be conducted by a physician or licensed health care professional (PLHCP) to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace.

1. Initial Medical Assessment

An initial medical assessment will be conducted by a physician or licensed health care professional (PLHCP) at no cost to the employee. This assessment will be performed using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire (*the acting PLHCP will make the determination as to which method will be used*). (**Attachment N**) Only those individuals medically capable of wearing respiratory protective equipment, as determined by a PLHCP, can use respirators. Such an assessment may include any combination of the following, based on the determination of the acting PLHCP:

- Medical questionnaire, including complete medical history.
- Physical dimensions.
- Blood pressure and pulse measurement.
- Pulmonary Function Test.
- Chest X-ray, conducted at the discretion of the physician.
- Sputum cytology, conducted at the discretion of the physician.

The medical assessment and questionnaire will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. Records of medical assessments will be maintained and made available in accordance with 29 CFR 1910.1020 - Access to Employee Exposure and Medical Records.

2. Supplemental Information for the PLHCP

The Safety Coordinator or Supervisor/Manager will provide the PLHCP with **Attachment N - Respirator Use Information for PLHCP** to assist in assessing an employee's ability to wear a respirator (to be provided by the Safety Committee):

- The type and weight of the respirator to be used by the employee.

- The duration and frequency of respirator use (including use for rescue and escape).
- The expected physical work effort.
- Personal protective clothing and equipment to be worn.
- Temperature and humidity extremes that may be encountered.

The Commonwealth of Pennsylvania will provide existing and replaced PLHCPs with a copy of this written respiratory procedure and a copy of section CFR 1910.134(e).

3. Follow-up Medical Assessments

Employees must obtain a follow-up medical assessment if:

- A positive response to any question among questions 1 through 8 in Section 2, Part A of Attachment N of 1910.134 medical questionnaire.
- The initial medical assessment demonstrates the need for a follow-up medical assessment.

4. Additional Medical Assessments

Additional medical assessments are required when:

- An employee reports medical signs or symptoms that are related to their inability to use a respirator.
- A PLHCP, supervisor, or Safety Coordinator informs an employee that they need to be re-evaluated.
- Comments on **Attachment L - Employee Program Evaluation Questionnaire** indicate a need for re-evaluation.
- An abnormal observation is made during fit testing, e.g. difficulty breathing.
- Changes occur in the workplace conditions, e.g. physical work effort, protective clothing, and temperature, that may result in a substantial increase in the physiological burden placed on an employee.
- Noticeable change(s), (e.g., weight gain) in the physical condition of the employee required to wear a respirator.

VI. Contractors

Temporary (contingent) employees and contractors will be permitted to wear respiratory protection only if :

- The temporary agency or contractor has their own respiratory protection program which is at least as stringent as the DGS Respiratory Protection Program (as determined by on-site EHS); their employees have been trained to the provisions of the respiratory standard,

medically evaluated and fit-tested (all appropriate documentation must be provided to DGS prior to any respiratory use).

Temporary (contingent) employees will be permitted to wear a dust mask, which will be provided by the agency. Any employee who wants to wear a dust mask must read and understand 1910.134.

VII. Recordkeeping/Documentation

The following records will be maintained:

- Records of medical evaluations (must be made available per 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records) will be maintained for the employee’s duration of employment, plus an additional 30 years after employment.
- Records of most current fit tests for a minimum of one year from the date the fit test was completed.
- Documented air sampling results for those tasks which require the use of a respirator must be retained indefinitely.
- Documented air sampling results for any tasks sampled which do not require a respirator must be retained indefinitely.
- Documentation of low volume pump and rotameter calibrations must be maintained indefinitely.
- Employee training records and certifications must be retained in the employee’s training file for the duration of employment in any position requiring such training.
- The most recent copy of this written program.

VIII. Reporting

All employees must be notified, if requested, of any results from personal air sampling that was conducted.

Attachment A

Respirator Selection Form

(Note: If more than one employee performs this task, list all employees on a separate sheet for record-keeping purposes)

Employee Name(s): _____

Department: _____

Employee #(s): _____

Supervisor: _____

Date: _____

Hazard Evaluation

1. Chemical Contaminant(s): _____
2. What are the occupational exposure values for the contaminant:

CONTAM- INANT	OSHA PELs		NIOSH RELs		ACGIH TLVs	
	TWA	STEL/CEIL	TWA	STEL/CEIL	TWA	STEL/CEIL

3. Is air sampling necessary YES NO
If no, proceed to Nature of Task.

4. What where the sampling results:

Note: Air sampling may not be necessary because of handling procedures, nature of the task and many other variables. The Program Administer will use professional judgment when determining if air sampling is necessary.

CONTAM- INANT	OSHA PELs		NIOSH RELS		ACGIH TLV'S	
	TWA	STEL/CEIL	TWA	STEL/CEIL	TWA	STEL/CEIL

5. Did sampling results exceed the most conservative level? Yes No
6. Is an IDLH level defined for this contaminant? Yes No
7. Did any peak levels exceed this IDLH level (if applicable)? Yes No

Nature of the Task

1. How long will the worker be exposed to each hazard: _____
2. Please describe work task: _____

Characteristics of the Work Area

1. Please describe ventilation: _____

2. Is it a confined space? Yes No

3. What will be the air temperature: _____

4. Could a mixture of hazards occur (describe): _____

5. Describe the work process: _____

6. Are chemicals being combined, heated, treated or applied? Yes No

7. What is the physical nature of the contaminant?

Vapor Dust Liquid Gas

8. Are there any eye hazards associated with the contaminant (describe)? _____

Recommended Respirator and Cartridge

Respirator Type	Filter Cartridge Type

Reviewed and Approved by: _____
Supervisor

Attachment B

Job Tasks Requiring Respiratory Protection and Affected Personnel

Activities Requiring Mandatory Respiratory Protection

Bureau	Affected Personnel	Job Task Description	Contaminant	Respirator and Respirator Cartridge Type
BFM	Special projects crew	Removal of ACM	Asbestos Particulates	MSA half face-HEPA
BFM	Special Projects Crew	Abatement of Mold	Mold particulates	MSA half face-HEPA
BFM	Special Projects crew	Removal of Lead paint	Lead dust	MSA half face-
BFM	Grounds Crew	Spraying of pesticides	Pesticide	
BFM	Painters	Spray painting	Organic vapors	Organic vapor cartridge
BPW	inspectors	inspections	Asbestos	

Note:

*Under no circumstances shall the maximum use concentration listed on the respirator be exceeded.

*All respirators must be NIOSH approved.

*Additional PPE (hooded Nomex, harness, and safety lanyard) retrieval equipment, standby personnel and adherence to procedures pertaining to IDLH atmospheres may be necessary.

*For confine space entry, the Company's Confined Space Entry Procedure must be strictly followed.

*APR - Air-purifying respirator.

*PAPR - Powered air-purifying respirator.

*SCBA - Self-contained breathing apparatus.

*SAR - Supplied-air respirator.

As a guide, the following table provides information pertaining to the required respiratory protection based on toluene (Rescol) concentration levels:

Toluene Concentration Level	Respirator Type	Cartridge/Filter
> 1000 ppm but < 1999	Half-mask or full-face-piece air-purifying respirator (APR).	Organic vapor cartridge. (color assigned is black)
>1000 ppm but < 5000 ppm for potential exposure periods less than 2 minutes (applies to polishing or other similar press activities only)	Full-face-piece air-purifying respirator (APR).	Organic vapor cartridge. (color assigned is black)
> 1999 ppm for periods of potential exposure exceeding 2 minutes (applies to polishing or other similar press activities only)	Self-contained breathing apparatus (SCBA in pressure-demand mode or a combination full-face-piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.	N/A

Attachment D

Anticipated Voluntary Dust Mask Activities

Department	Affected Personnel	Job Task Description	Type of Disposable Respirator
Maintenance Operations	Machinists, Hoist pool, Electricians, Vibration Mechanics, Safety Technicians and Electronic Technicians	Grinding and buffing. (general nuisance dust, below PELs)	Disposable Respirator (N, R, or P 95, 99 or 100)
Maintenance Operations	Carpenters	Sanding, cutting	Disposable Respirator (N, R, or P 95, 99 or 100)
Building Operations	Building maintenance (A)	Lawn mowing and Sweeping. (general nuisance dust, below PELs)	Disposable Respirator (N, R, or P 95, 99 or 100)
Building Operation	Building Maintenance (A)	Grinding and buffing. (general nuisance dust, below PELs)	Disposable Respirator (N, R, or P 95, 99 or 100)

Attachment D (Continued)

Hand out

Information for Employees Using Respirators When Not Required

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Attachment E

Example Filter Cartridge Change-Out Schedule and Methods for Creating a Filter Change-Out Schedule

Organic Vapor Cartridges

The Commonwealth of Pennsylvania primarily uses 3M No. 7251 organic vapor cartridges for their APRs and PAPRs to protect against Toluene. These organic vapor cartridges must be changed in accordance with the following table:

Respirator Type	Maximum Recsol Concentration for Respirator type (ppm)	Cartridge	Estimated Temperature (approx. degrees F + or -)	Environment	Estimated Service Time (min)
Half-face (APR)	1000	3 M No. 7251 (OV)	86	Medium	206
Half-face (APR)	1000	3 M No. 7251 (OV)	86	Heavy	138
Half-face (APR)	1000	3 M No. 7251 (OV)	104	Medium	198
Half-face (APR)	1000	3 M No. 7251 (OV)	104	Heavy	132
Full-Face (APR)	1999	3 M No. 7251 (OV)	86	Medium	106
Half-face (APR)	1999	3 M No. 7251 (OV)	86	Heavy	71
Half-face (APR)	1999	3 M No. 7251 (OV)	104	Medium	103
Full-Face (APR)	1999	3 M No. 7251 (OV)	104	Heavy	69
Half-face & Full-Face (PAPR)	1999	3 M No. 7251 (OV)	86	Medium	Insufficient information (Need flow rate?)
Half-face & Full-Face (PAPR)	1999	3 M No. 7251 (OV)	86	Heavy	Insufficient information (Need flow rate?)
Half-face & Full-Face (PAPR)	1999	3 M No. 7251 (OV)	104	Medium	Insufficient information (Need flow rate?)
Half-face & Full-Face (PAPR)	1999	3 M No. 7251 (OV)	104	Heavy	Insufficient information (Need flow rate?)

*This table was derived from the 3M Respirator Service Life program found at www.3M.com/occsafety. The results of this table are estimates only and must be used with caution. These values are based on 100% toluene. Based on the constituents of Recsol (90-98 % toluene) these estimated service times are most likely accurate service times for protection against Recsol, but must be used with caution.

*Atmospheric Pressure (ATM): 1

*Estimated Humidity: <65%

*Breakthrough Level: ½ Threshold Limit Value (TLV).

*Note estimated service times for PAPR organic vapor cartridges have not been estimated because PAPR flow rates are not available at this time.

3M No. 7251 organic vapor cartridges must be changed in accordance with the table above **or after each shift that the cartridges are used**, whichever is more stringent. Temperatures fluctuate though out the year and the work environment (work activity) fluctuates from person to person and task to task. On average:

- ◆ Half-face APR organic vapor cartridge should be changed after 168 minutes of use.
- ◆ Full-face APR organic vapor cartridge should be changed after 87 minutes of use.

The amount of cartridge sorbent, exposure duration, airborne contaminant concentration, humidity, and chemical characteristics will affect the useful life of the cartridge.

Note: If the estimated humidity level is greater than 65%, please refer to the 3M Respirator Service Life Program or contact the respirator manufacturer on how to assign a “correction factor” when determining the filter change-out schedule, as **humidity levels greater than 65%** can have a dramatic effect on the service life of organic vapor chemical cartridges.

If a chemical odor can be detected during use (breakthrough), immediately go to an area free of airborne contaminants and change the cartridges. Cartridges removed from the manufacturer’s packaging must not be used if stored for longer than one year. As a result, cartridges must be dated when first taken out of the package and used. Cartridges must not be used past the expiration date specified by the manufacturer.

Creating a Filter Change-out Schedule for Brands Other Than 3M

The above referenced 3M Respirator Service Life Program and associated cartridge change out table can be applied to 3M brand cartridges and respirators only. If a different brand of respirator and cartridge is used, then the following steps must be taken:

1. Obtain the following information:
 - Names of the airborne contaminant(s).
 - Concentrations of those contaminants (in parts per million or ppm).
 - Humidity level in the work area.
 - Work Rate.
2. Contact the manufacturer of the respirators you plan to use. A list of filter cartridge and respirator manufacturers with associated contact names and phone numbers can be located in **Attachment F - List of Filter Cartridge and Respirator Manufacturers**. If your filter cartridge and respirator supplier is not present on this list, then this information can be obtained through the company from which the equipment was purchased.
3. Provide the manufacturer with the following information:
 - Name of the respirator model.
 - Information from step 1.

4. Request the cartridge service life as well as the exact objective information they relied upon to project that service life.
5. Create a written schedule for the cartridges. This schedule must be added to **Attachment G - Filter Cartridge Change-Out Schedule(s)**.

Attachment F

List of Filter Cartridge and Respirator Manufacturers

<p>3M COMPANY OCCUPATIONAL HEALTH & ENVIRONMENTAL SAFETY AGENCY Building 275-6W-01 3M Center St. Paul MN 55133-3275 Contact: Phil Hage Communications Manager 651-733-7297 651-736-6677 "Fax" occsafety@mmm.com www.mmm.com/occsafety</p>	<p>AEARO COMPANY 5457 79th Street Indianapolis IN 46268 Contact: Dan O'Connor Vice President, Sales 317-692-6980 317-692-6784 "Fax" mailto:www.aearo.com</p>
<p>AFASSCO, INC. P.O. Box 1767 Carson City NV 89702 Contact: Jim Grant Sales & Marketing 800-441-6774 800-232-7726 "Fax"</p>	<p>DALLOZ SAFETY P.O. Box 622 Reading PA 19603-0622 Contact: Christine Ciabattone Marketing Services Manager 800-345-4112 610-371-7725 "Fax" lantry@talon.net www.cdalloz.com</p>
<p>DRAEGER SAFETY, INC. 101 Technology Drive Pittsburgh PA 15275 Contact: Shelli Cosmides Manager of Communications 412-787-8383 412-787-2207 "Fax" mailto:www.draeger.net</p>	<p>ENCON SAFETY PRODUCTS, INC. 6825 W. Sam Houston Parkway N. Houston TX 77041 Contact: Kim Mumby Marketing Manager 713-466-1449 713-466-1819 "Fax"</p>
<p>FIBRE METAL PRODUCTS COMPANY Route 1 & Brinton Lake Road P.O. Box 248 Concordville PA 19331 Contact: Lisa MacFadyen Marketing Service Manager 800-523-7048 610-459-9446 "Fax" sales2@fibre-metal.com www.fibre-metal.com</p>	<p>GENTEX CORPORATION P.O. Box 315 Carbondale PA 18407 Contact: Charles Rudolf Director of Marketing 570-282-8212 570-282-8555 "Fax"</p>
<p>GERSON COMPANY 15 Sproat Street Middleboro MA 02346 Contact: Bill Petres Director of Sales and Marketing 800-225-8623 800-4-GERSON "Fax"</p>	<p>INTERNATIONAL SAFETY INSTRUMENTS, INC. 922 Hurricane Shoals Road Lawrenceville GA 30043 Contact: Customer Service 888-ISI-SAFE 770-963-2797 "Fax" info@intsafety.com www.intsafety.com</p>
<p>JACKSON PRODUCTS, INC. 2997 Clarkson Road Chesterfield MO 63017 Contact: Steve Kickham Director of Marketing 636-207-2700 636-207-2810 "Fax" mailto:www.jacksonproducts.com</p>	<p>KIMBERLY-CLARK CORPORATION 1400 Holcomb Bridge Road Roswell GA 30076 Contact: Ginger Cloud Customer Service Department 800-255-6401 770-587-7762 "Fax"</p>
<p>MICRONEL SAFETY, INC.</p>	<p>MOLDEX-METRIC, INC.</p>

<p>5703 Industry Lane Frederick MD 21704 Contact: Michael Hoague 888/744-6462 888/624-5600 "Fax" mailto:www.micronelsafety.com</p>	<p>10111 West Jefferson Boulevard Culver City CA 90232 Contact: Fred Ryan Vice President, Sales 800-421-0668 310-837-9563 "Fax" sales@moldex.com www.moldex.com</p>
<p>MSA P.O. Box 426 Pittsburgh PA 15230 Contact: Customer Service Department 800-MSA-2222 800-967-0398 "Fax" Info@MSAnet.com www.MSAnet.com</p>	<p>NORTH SAFETY PRODUCTS 2000 Plainfield Pike Cranston RI 02921 Contact: Customer Service 800-430-4110 800-572-6346 "Fax" mailto:www.northsafety.com</p>
<p>PRO-TECH RESPIRATORS, INC. 3001 South Susan Street Santa Ana CA 92704 Contact: Lisa Mork APR Product Manager 888-APR-SCBA 714-850-0299 "Fax" mailto:www.survivair.com</p>	<p>SCOTT HEALTH & SAFETY 309 West Crowell Street Monroe NC 28110 Contact: Robert Lodi Director of Marketing 704-282-8420 704-282-8424 "Fax" rlodi@scottaviation.com www.scottaviation.com</p>
<p>SELLSTROM MANUFACTURING CO. One Sellstrom Drive Palatine IL 60067 Contact: Customer Service Manager 800-323-7402 847-358-8564 "Fax" sellstrom@sellstrom.com www.sellstrom.com/www.fallprotection.com</p>	<p>SHALON CHEMICAL INDUSTRIES, LTD. 25 Nachmani Street Tel Aviv 65794 Contact: Kenneth Samet Quality Assurance Manager 972-76-81-1095 972-76-81-1115 "Fax"</p>
<p>SURVIVAIR A Agency of Bacou USA Safety, Inc. 3001 South Susan Street Santa Ana CA 92704 Contact: Lisa Mork APR Product Manager 800-APR-SCBA 714-850-0299 "Fax" techcomm@deltanet.com www.survivair.com</p>	<p>U.S. SAFETY P.O. Box 15965 Lenexa KS 66285-5965 Contact: Douglas Brahl Marketing Manager 800-821-5218 800-252-5002 "Fax" info@ussafety.com www.ussafety.com</p>
<p>ZEE MEDICAL, INC. 22 Corporate Park Irvine CA 92714 Contact: Ellie Dimarucut Manager, Marketing/Communications 949-252-9500 949-252-9649 "Fax" mailto:www.zeeservice.com</p>	

Attachment H

Qualitative/Quantitative Fit Testing Form

Employee Name: _____ Date: _____
 Employee #: _____
 Department: _____
 Supervisor: _____
 NIOSH Approval #: _____

Type of Fit Test: Qualitative (QLFT) Quantitative (QNFT) Irritant Smoke Bitrex

Note: A quantitative fit test is required if the environment to be entered is likely to contain contaminant levels greater than 10 times the PEL.

Specific make, model, style, and size of respirator tested: _____

Assessment of Comfort Visual inspection

Position of mask on the nose: Pass Fail (Check One)
 Room for eye protection: Pass Fail (Check One)
 Room to talk: Pass Fail (Check One)
 Position of mask on face and cheeks: Pass Fail (Check One)

Visual Observation

Positive Pressure Leak Test: Pass Fail (Check One)
 Negative Pressure Leak Test: Pass Fail (Check One)
 Facial Hair: Pass Fail (Check One)

QLFT and QNFT Fit Test Exercises (minimum one minute) Attach PortaCount Printout if Applicable

Breath Normally: Pass Fail (Check One)
 Breathe Deeply: Pass Fail (Check One)
 Remain Still: Pass Fail (Check One)
 Move Head From Side-to-Side: Pass Fail (Check One)
 Move Head Up-and-Down: Pass Fail (Check One)
 Talk: Pass Fail (Check One)
 Jog Lightly in Place: Pass Fail (Check One)
 Recite Passage: Pass Fail (Check One)

Additional QNFT Exercises (minimum 15 minutes)

Grimace: Smile or Frowning: Pass Fail (Check One)

Rainbow Passage:

When the sunlight strikes raindrops in the air, they act like prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its' two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

Quantitative Fit Factor: _____ (if applicable)

Signatures

Employee: _____ Date: _____

Fit Tested By: _____ Date: _____

Employees must perform a user seal check (negative and positive pressure test) each time they put on the respirator using the procedures recommended by the respirator manufacture that have been demonstrated as effective.

Attachment I

Respirator Donning and Doffing Instructions

Dust Masks

- Cup the respirator in your hand, allowing the head bands to hang freely below the hand.
- Cup the respirator under your chin with the nosepiece up and pull the top band with your other hand. Position it at the back of your head.
- With one hand, hold the bottom of the dust mask. Take your free hand and pull the bottom headband over your head. Position the headband around the neck below the ears.
- Using both hands, mold the metal nosepiece to the shape of your nose by pushing inward while moving your finger tips down both sides of the nosepiece. Pinching the nosepiece using one hand may cause a bad fit and result in less effective filtering performance.
- Perform a negative pressure seal check by:
 - ⇒ Cupping both hands over the face-piece without pushing it against your face. Inhale gently. Minimal air should come in through the filter and the respirator should have formed a good seal around the perimeter of the respirator.
- Perform a positive pressure seal check by;
 - ⇒ Placing the palms of your hands over the exhaust valve and exhale. When using a dust mask without an exhalation valve, cup both hands over the face-piece and gently exhale. There should be a positive pressure inside the respirator that caused it to swell, but only allowed minimal air out.

Half-Face Respirators

- Cup the nosepiece in your hand, allowing the headbands to hang freely below your hand.
- Grasp the bottom straps of the respirator and connect them behind your neck.
- While holding the respirator to your face with one hand, take the harness and pull it on the crown of your head.
- Adjust the respirator so it is comfortable on the face.
- Pull the straps to tighten the face-piece so the fit is snug. Do not over tighten.
- Perform a negative pressure seal check by:
 - ⇒ Placing the palms of your hands over the filter cartridges without pushing it against your face. Inhale gently for 10 seconds. No air should come in through the filter and the respirator should have formed a good seal around the perimeter of the respirator.
- Perform a positive user seal check by;

- ⇒ Place the palms of your hands over the exhaust valve and exhale. There should be a positive pressure inside the respirator that caused the face piece to swell, but didn't let any air out.

Full-Face Respirators (APRs and PAPRs)

- Cup the face shield in your hand and position the head harness so the inside face-piece is exposed.
- Gently place the inside face-piece to your face.
- While holding the respirator to your face with one hand, take the harness and pull it over the crown of your head.
- Adjust the respirator so it is comfortable on your face.
- Pull the straps to tighten the face-piece so the fit is snug. Do not over tighten.
- Perform a negative pressure seal check by:
 - ⇒ Place the palms of your hands over the filter cartridges without pushing it against your face. Inhale gently for 10 seconds. No air should come in through the filter and the respirator should have formed a good seal around the perimeter of the respirator.
- Perform a positive pressure seal check by:
 - ⇒ Place the palms of your hands over the exhaust valve and exhale. There should be a positive pressure inside the respirator that caused it to swell, but didn't let any air out.

Self-Contained Breathing Apparatus (SCBA)

- Put on backpack harness and open the cylinder valve fully.
- Cup the face shield in your hand and position the head harness so the inside face-piece is exposed.
- Gently place the inside face-piece to your face.
- While holding the respirator to your face with one hand, take the harness and pull it over the crown of your head.
- Adjust the respirator so it is comfortable on your face.
- Pull the straps to tighten the face-piece so the fit is snug. Do not over tighten.

Attachment J

Respirator Inspection Procedures

Dust Masks

Dust masks must be inspected before each use. General inspection items should include:

- Integrity of the filter (for tears, holes, broken straps, cleanliness).
- Straps (for elasticity and deterioration).
- Metal nose clip for deterioration (if applicable).

Any dust mask that shows excessive wear or appears defective in any way must be disposed of properly and replaced. Dust masks must be disposed of at the end of the work shift or any time breathing becomes difficult. A new dust mask will be issued upon employee request at the discretion of the departmental supervisor present.

Air-purifying respirators (APR) (half-face and full-face)

Half-face and full-face respirators must be inspected before each use. General inspection items should include:

- Rubber face-piece, check for:
 - ⇒ Excessive dirt, cracks, tears or holes.
 - ⇒ Distortion from improper storage.
 - ⇒ Cracked, scratched or loose fitting lens (full face-piece).
 - ⇒ Broken or missing mounting clips.
- Head straps, check for:
 - ⇒ Breaks.
 - ⇒ Loss of elasticity.
 - ⇒ Broken or malfunctioning buckles and attachments.
 - ⇒ Excessively worn serrations of the harness that might allow the face piece to slip off (full face-piece only).
- Inhalation valve, exhalation valve, check for:
 - ⇒ Detergent residues, dust particles, or dirt on valve or valve seat.
 - ⇒ Cracks, tears, or distortion in the valve material or valve seat.
 - ⇒ Missing or defective valve cover.
- Filter element(s), check for:
 - ⇒ Proper filter for the hazard.
 - ⇒ Approval designation (NIOSH).
 - ⇒ Ensure the filter cartridge matches the brand of mask for which it is constructed .
 - ⇒ Missing or worn gaskets.
 - ⇒ Worn threads - both filter threads and face-piece threads.
 - ⇒ Cracks or dents in filter housing.
 - ⇒ Deterioration of harness.

If you notice any irregularities, report them immediately to your supervisor. ***Do not proceed into a contaminated zone*** until your respiratory equipment is properly repaired or replaced.

Attachment L

Self-Contained Breathing Apparatus (SCBA) and Cylinder Inspection Form

Inspector Name: _____
 Inspector Signature: _____
 Inspection Date: _____
 SCBA Location: _____
 Serial or ID # of SCBA: _____
 Cylinder Location: _____
 Serial or ID # of Cylinder: _____

Tightness of Connections: **Pass** **Fail (Check One)**

Rubber Face Piece: **Pass** **Fail (Check One)**
 Excessive dirt, cracks, tears, or holes Yes No (Check One)
 Distortion from improper storage Yes No (Check One)
 Cracked, scratched or loose fitting lens (full-face piece) Yes No (Check One)
 Broken or missing mounting clips Yes No (Check One)

Head Straps: **Pass** **Fail (Check One)**
 Breaks Yes No (Check One)
 Loss of elasticity Yes No (Check One)
 Broken or malfunctioning buckles of attachments Yes No (Check One)
 Excessively worn serrations of the harness which might allow the face piece to slip off (full-facepiece only) Yes No (Check One)

Inhalation Valve: **Pass** **Fail (Check One)**
 Detergent residue, dust particles, or dirt on valve or valve set Yes No (Check One)
 Cracks, tears, or distortion in the valve material, or valve set Yes No (Check One)
 Missing or defective valve cover Yes No (Check One)

Exhalation Valve: **Pass** **Fail (Check One)**
 Detergent residue, dust particles, or dirt on valve or valve set Yes No (Check One)
 Cracks, tears, or distortion in the valve material, or valve set Yes No (Check One)
 Missing or defective valve cover Yes No (Check One)

Filter Element(s): **Pass** **Fail (Check One)**
 Proper filter for the hazard Yes No (Check One)
 Approval designation (NIOSH) Yes No (Check One)
 Missing or worn gaskets Yes No (Check One)
 Worn threads - both filter threads and face piece threads Yes No (Check One)
 Cracks or dents in filter housing Yes No (Check One)
 Deterioration of harness Yes No (Check One)

Corrugated Breathing Tube (gas masks): **Pass** **Fail (Check One)**

Cracks	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Missing or loose hose clamps	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Broken or missing connectors	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Worn threads (cylinder or face piece threads)	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)

Cylinder

Meets US Pharmacopoeia requirements	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Meets Grade D breathing air (ANSI/Compressed Gas Association	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Commodity Specification for Air, G-7.1-1998.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Fully charged (not < 90 % of manufactures recommended pressure)	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)
Hydrostatic Testing Performed Within Last 5 Years	<input type="checkbox"/> Yes	<input type="checkbox"/> No (Check One)

(Check with manufacturer for cylinder specific requirements)

NOTE: When pressure falls to 90 % of the manufacturer’s recommended pressure level the cylinder must be recharged.

COMMENT: _____

REMEDIAL ACTIONS: _____

Date Respirator Removed From Service: _____ (if problem noted)

Date Respirator Repaired: . _____

Repaired By: _____

Attachment M

Employee Program Evaluation Questionnaire

Employee Name: _____
Employee #: _____
Department: _____
Supervisor: _____
Date: _____

1. Has the Respiratory Protection Procedure HS350 been effective in:

- Yes No Reducing your exposure to airborne contaminants
- Yes No Explaining the proper use and selection of respirators
- Yes No Explaining why respiratory protection is necessary
- Yes No Explaining how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
- Yes No Explaining how to inspect, put on and remove, use and check the seals of a respirator.
- Yes No Explaining the Medical evaluation procedure
- Yes No Explaining respirator maintenance
- Yes No Explaining medical signs and symptoms that may limit or prevent the effective use of respirators

Comments: _____

2. Are there any problems, concerns or questions in regards to the fit of your personnel respirator:

Comments: _____

Attachment N

MEDICAL QUESTIONNAIRE

Part A. Section 1. The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
 2. Name: _____
 3. Age: _____
 4. Sex (circle one): Male Female
 5. Height: _____ ft. _____ in.
 6. Weight: _____ lbs.
 7. Job title: _____
 8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
 9. The best time to phone you at this number: _____
 10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes No
 11. Check the type of respirator you will use (you can check more than one category):
 - a) _____ N,R, or P disposable respirator (filter-mask, non-cartridge type only).
 - b) _____ Half or full-facepiece type
 - c) _____ Powered-air purifying
 - d) _____ Supplied-air, self-contained breathing apparatus
 12. Have you worn a respirator (circle one): Yes No
- If "yes" what type(s): _____

Part A. Section 2 Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you **currently** smoke tobacco, or have you smoked tobacco in the last month: Yes No
2. Have you **ever had** any of the following conditions?

a) Seizures (fits)	Yes	No
b) Diabetes (sugar disease)	Yes	No
c) Allergic reactions that interfere with your breathing	Yes	No
d) Claustrophobia (fear of closed-in places)	Yes	No
e) Trouble smelling odors	Yes	No

3. Have you **ever had** any of the following pulmonary or lung problems?

- | | | |
|---|-----|----|
| a) Asbestosis | Yes | No |
| b) Asthma | Yes | No |
| c) Chronic bronchitis | Yes | No |
| d) Emphysema: | Yes | No |
| e) Pneumonia | Yes | No |
| f) Tuberculosis | Yes | No |
| g) Silicosis | Yes | No |
| h) Pneumothorax (collapsed lung) | Yes | No |
| i) Lung cancer | Yes | No |
| j) Broken ribs | Yes | No |
| k) Any chest injuries or surgeries | Yes | No |
| l) Any other lung problem that you've been told about | Yes | No |

4. Do you **currently** have any of the following symptoms of pulmonary or lung disease?

- | | | |
|--|-----|----|
| a) Shortness of breath | Yes | No |
| b) Shortness of breath when walking fast on level ground or walking up a light hill or incline | Yes | No |
| c) Shortness of breath when walking with other people at an ordinary pace on level ground | Yes | No |
| d) Have to stop for breath when walking at your own pace on level ground | Yes | No |
| e) Shortness of breath when washing/dressing yourself | Yes | No |
| f) Shortness of breath that interferes with your job | Yes | No |
| g) Coughing that produces phlegm (thick sputum) | Yes | No |
| h) Coughing that wakes you early in the morning | Yes | No |
| i) Coughing that occurs mostly when you are lying down | Yes | No |
| j) Coughing up blood in the last month | Yes | No |
| k) Wheezing | Yes | No |
| l) Wheezing that interferes with your job | Yes | No |
| m) Chest pain when you breathe deeply | Yes | No |
| n) Any other symptoms that you think may be related to lung problems | Yes | No |

5. Have you **ever had** any of the following cardiovascular or heart problems?

- | | | |
|--|-----|----|
| a) Heart attack | Yes | No |
| b) Stroke | Yes | No |
| c) Angina | Yes | No |
| d) Heart failure | Yes | No |
| e) Swelling in your legs or feet (not caused by walking) | Yes | No |
| f) Heart arrhythmia (heart beating irregularly) | Yes | No |
| g) High blood pressure | Yes | No |
| h) Any other heart problem that you've been told about | Yes | No |

6. Have you **ever had** any of the following cardiovascular or heart symptoms?

- | | | |
|--|-----|----|
| a) Frequent pain or tightness in your chest | Yes | No |
| b) Pain or tightness in your chest during physical activity | Yes | No |
| c) Pain or tightness in your chest that interferes with your job | Yes | No |
| d) In the past 2 years, have you noticed your heart skipping or missing a beat | Yes | No |
| e) Heartburn or indigestion that is not related to eating | Yes | No |
| f) Any other symptoms that you think may be related to | | |

heart or circulation problems Yes No

7. Do you **currently** take medication for any of the following problems:

- | | | |
|-------------------------------|-----|----|
| a) Breathing or lung problems | Yes | No |
| b) Heart trouble | Yes | No |
| c) Blood Pressure | Yes | No |
| d) Seizures (fits) | Yes | No |

8. If you've used a respirator, have you **ever had** any of the following problems?
(If you've never used a respirator, check the following space and go to question 9)

- | | | |
|--|-----|----|
| a) Eye irritation | Yes | No |
| b) Skin allergies or rashes | Yes | No |
| c) Anxiety | Yes | No |
| d) General weakness or fatigue | Yes | No |
| e) Any other problem that interferes with your use of a respirator | Yes | No |

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes No

Questions 10 – 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you **ever lost** vision in either eye (temporarily or permanently): Yes No

11. Do you **currently** have any of the following vision problems:

- | | | |
|------------------------------------|-----|----|
| a) Wear contact lenses | Yes | No |
| b) Wear glasses | Yes | No |
| c) Color blindness | Yes | No |
| d) Any other eye or vision problem | Yes | No |

12. Have you ever had an injury to your ears, including a broken ear drum Yes No

13. Do you **currently** have any of the following hearing problems

- | | | |
|--------------------------------------|-----|----|
| a) Difficulty hearing | Yes | No |
| b) Wear a hearing aid | Yes | No |
| c) Any other hearing or ear problems | Yes | No |

14. Have you **ever had** a back injury Yes No

15. Do you **currently** have any of the following musculoskeletal problems:

- | | | |
|---|-----|----|
| a) Weakness in any of your arms, hands, legs, or feet | Yes | No |
| b) Back pain | Yes | No |
| c) Difficulty fully moving your arms and legs | Yes | No |
| d) Pain or stiffness when you lean forward or backward at the waist | Yes | No |
| e) Difficulty moving your head up or down | Yes | No |
| f) Difficulty moving your head side to side | Yes | No |
| g) Difficulty bending at your knees | Yes | No |
| h) Difficulty squatting to the ground | Yes | No |

- | | | |
|---|-----|----|
| i) Climbing a flight of stairs or a ladder carrying more than 25 lbs. | Yes | No |
| j) Any other muscle or skeletal problem that interferes with using a respirator | Yes | No |

Part B. Any of the following questions, and other questions not listed, may be asked at the discretion of the health care professional who will review the questionnaire.

1. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust, or have you come into skin contact with hazardous chemicals:)
- | | | |
|--|-----|----|
| | Yes | No |
|--|-----|----|

If yes, name the chemical is you know them: _____

2. Have you ever worked with any of the following materials, or under any of the conditions listed below:

- | | | |
|--|-----|----|
| a) Asbestos | Yes | No |
| b) Silica (e.g., in sandblasting) | Yes | No |
| c) Tungsten/cobalt (e.g., grinding or welding this material) | Yes | No |
| d) Beryllium | Yes | No |
| e) Aluminum | Yes | No |
| f) Coal (for example, mining) | Yes | No |
| g) Iron | Yes | No |
| h) Tin | Yes | No |
| i) Dusty environment | Yes | No |
| j) Any other hazardous exposures | Yes | No |

If "yes", describe these exposures: _____

3. List any second jobs or side businesses you have: _____

4. List your previous occupations: _____

5. List your current and previous hobbies: _____

- | | | |
|--|-----|----|
| 6. Have you been in the military services: | Yes | No |
|--|-----|----|

If "yes", were you exposed to biological or chemical agents (either in training or combat):

	Yes	No
--	-----	----

- | | | |
|---|-----|----|
| 7. Have you ever worked on a HAZMAT team: | Yes | No |
|---|-----|----|

- | | | |
|---|-----|----|
| 8. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): | Yes | No |
|---|-----|----|

If "yes" name the medications if you know them: _____

9. Will you be using any of the following items with your respirator(s)?

- | | | |
|---------------------------------------|-----|----|
| a) HEPA Filters | Yes | No |
| b) Canisters (for example, gas masks) | Yes | No |
| c) Cartridges | Yes | No |

10. How often are you expected to use the respirator(s) (circle “yes” or “no” for all answers that apply to you?)

- | | | |
|--------------------------------------|-----|----|
| a) Escape only (no rescue) | Yes | No |
| b) Emergency rescue only | Yes | No |
| c) Less than 5 hours per week | Yes | No |
| d) Less than 2 hours per day | Yes | No |
| e) 2 to 4 hours per day | Yes | No |
| f) Over 4 hours per day | Yes | No |

11. During the period you are using the respirator(s), is your work effort:

- | | | |
|---|-----|----|
| a. Light (less than 200 kcal per hour) | Yes | No |
|---|-----|----|

If “yes” how long does this period last during the average shift:
_____ hrs. _____ mins.

Examples of a light work effort are **sitting** while writing, typing, drafting, or performing light assembly work; or **standing** while operating a drill press (1-3 lbs.) or controlling machines.

- | | | |
|---|-----|----|
| b. Moderate (200 to 350 kcal per hour) | Yes | No |
|---|-----|----|

If “yes” how long does this period last during the average shift:
_____ hrs. _____ mins.

Examples of moderate work effort are **sitting** while nailing or filing; **driving** a truck or bus in urban traffic; **standing** while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; **walking** on a level surface about 2 mph or down a 5-degree grade about 3 mph; or **pushing** a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

- | | | |
|---|-----|----|
| c. Heavy (about 350 kcal per hour) | Yes | No |
|---|-----|----|

If “yes” how long does this period last during the average shift:
_____ hrs. _____ mins.

Examples of heavy work are **lifting** a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; **shoveling**; **standing** while bricklaying or chipping castings; **walking** up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.)

12. Will you be wearing protective clothing and/or equipment (other than the respirator) when you’re using your respirator

Yes	No
-----	----

If “yes” describe this protective clothing and/or equipment: _____

13. Will you be working under hot conditions (temperature exceeding 77 deg F) Yes No

14. Will you be working under humid conditions: Yes No

15. Describe the work you’ll be doing while you’re using your respirator(s): _____

16. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

17. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator(s): _____

18. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

Attachment O

Respirator Use Information for PLHCP (To be completed by the Supervisor/Manager)

Employee Name: _____
Employee #: _____
Department: _____
Supervisor: _____
Date: _____

1. The employee named above is using the following type(s) of respirator(s):

- Half-Mask Respirator, Weight _____ lb.
- Full-Face Respirator, Weight _____ lb.
- Self Contained Breathing Apparatus (SCBA), Weight _____ lb.
- Other, Please indicate: _____

2. The duration and frequency of respirator use (including use, rescue and escape):

- < 5 minutes
- >5 minutes, but < 30 minutes
- >30 minutes, but < 1 hour
- > 1 hour, but < 2 hours
- Other, Please indicate: _____

3. The expected physical work effort:

- Light
- Light to Moderate
- Moderate
- Moderate to Heavy
- Heavy
- Extreme

Briefly describe activity: _____

4. Personal protective clothing and equipment that will be worn:

- Light weight chemical apron
- Tyvek or Tychem suit (full body)
- Haz-Mat response suit (full body and hood)
- Other, Please indicate: _____

5. The temperature and humidity extremes that may be encountered are:

Supervisor/Manager Signature: _____

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Scaffolding Safety

Currently Under Development

P-30

Thermal Stress

COLD STRESS

The cold stress TLVs® are intended to protect workers from the severe effects of cold stress (hypothermia) and cold temperature injuries and to describe acceptable cold temperature working conditions where workers should not have any long term negative effects. The TLV® objective is to prevent the deep body temperature from falling below 36°C (96.8°F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body determined by conventional methods for rectal temperature measurements). For a single, occasional exposure to a cold environment, a drop in core temperature to no lower than 35°C (95°F) should be permitted. In addition to provisions for total body protection, the TLV® objective is to protect all parts of the body with emphasis on hands, feet, and head from cold injury.

Introduction

Fatal exposures to cold temperatures among workers have almost always resulted from accidental exposures involving failure to escape from low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body. The clinical presentations of victims of hypothermia are shown in table 1. Workers should be protected from exposure to cold temperatures so that the deep core temperature does not fall below 36°C (96.8°F); lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision-making, or loss of consciousness with the threat of fatal consequences.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 35°C (95°F) or below. This must be taken as a sign of danger to the workers and if worker's show signs of over exposure to cold temperature he/she should immediately be removed from that environment. Useful physical or mental work is limited when severe shivering occurs.

Since prolonged exposure to cold air or to immersion in cold water, at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided.

1. Adequate insulating dry clothing to maintain core temperatures above 36°C (96.8°F) must be provided to workers if work is performed in air temperatures below 4°C (39.2°F). Wind chill cooling rate and the cooling power of air are critical factors. [Wind chill cooling rate is defined as heat loss from a body expressed in watts per meter squared which is a function of the air temperature and wind velocity upon the exposed body.] The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required. An equivalent chill temperature chart relating the actual dry bulb air temperature and the wind velocity is presented in Table 2. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep core temperature.

TABLE1. Progressive Clinical Presentations of Hypothermia*

Core		
Temperature		
°C	°F	Clinical Signs
37.6	99.6	“Normal” rectal temperature
37	98.6	“Normal” oral temperature
36	96.8	Metabolic rate increases in an attempt to compensate for heat loss
35	95.0	Maximum shivering
34	93.2	Victim conscious and responsive, with normal blood pressure
33	91.4	Severe hypothermia below this temperature
32}	89.6}	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated but react to light; shivering ceases
31}	87.8}	
30}	86.0}	
29}	84.2}	Progressive loss of consciousness; muscular rigidity increases; pulse and blood pressure difficult to obtain; respiratory rate decreases
28	82.4	Ventricular fibrillation possible with myocardial irritability
27	80.6	Voluntary motion ceases; pupils nonreactive to light; deep tendon and superficial reflexes absent
26	78.8	Victim seldom conscious
25	77.0	Ventricular fibrillation may occur spontaneously
24	75.2	Pulmonary edema
22}	71.6}	Maximum risk of ventricular fibrillation
21}	69.8}	
20	68.0	
18	64.4	Cardiac standstill
17	62.6	Lowest accidental hypothermia victim to recover
17	62.6	Isoelectric electroencephalogram
9	48.2	Lowest artificially cooled hypothermia patient to recover

2. Unless there are unusual or extenuating circumstances, cold injury (other than hands, feet and head) is not likely to occur without the development of the initial signs of hypothermia. Older workers or workers with circulatory problems require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions which should be considered. The precautionary actions to be taken will depend upon the physical condition of the worker and should be determined with the advice of the physician with knowledge of the cold stress factors and the medical condition of the worker.

Evaluation and Control

For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent chill temperature of -32°C (-25.6°F). Superficial or deep local tissue freezing will occur only at temperatures below -1°C (30.2°F) regardless of wind speed.

At air temperatures of 2°C (35.6°F) or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

TLVs® recommended for properly clothed workers for periods of work at temperatures below freezing are shown in Table 3.

Special protection of the hands is required to maintain manual dexterity for the prevention of accidents:

1. If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 16°C (60.8°F), special provisions should be established for keeping the workers' hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized. Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below -1°C (30.2°F).
2. If the air temperature falls below 16°C (60.8°F) for sedentary, 4°C (39.2°F) for light, -7°C (19.4°F) for moderate work, and fine manual dexterity is not required, than gloves should be used by the workers.

To prevent contact frostbite, the workers should wear anti-contact gloves.

1. When cold surfaces below -7°C (19.4°F) are within reach, a warning should be given to each worker to prevent inadvertent contact by bare skin.
2. If the air temperature is -17.5°C (0°F) or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.

Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). The workers should wear cold protective clothing appropriate for the level of cold and physical activity:

1. If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing and easily removable windbreak garment.
2. If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layers by sweat. If work is done at normal temperatures or in a

- hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating. If clothing is wet, the employee should change into dry clothes before entering cold area. The workers should change socks and any removable felt insoles at regular daily intervals or use vapor barrier boots. The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
3. If exposed areas of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should be supplied in auxiliary heated versions.
 4. If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
 5. Workers handling evaporative liquid (gasoline, alcohol or cleaning fluids) at air temperatures below 4°C (39.2°F) should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of "cryogenic fluids" or those liquids with a boiling point that is just above ambient temperature.

Work-Warming Regimen

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below -7°C (19.4°F), heated warming shelters (tents, cabins, restrooms, etc.) should be made available nearby. The workers should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onset of heavy shivering, minor frostbite (frost-nip), the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation or a change of dry work clothing provided. A change of dry work clothing should be provided as necessary to prevent workers from returning to work with wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effects.

For work practices at or below -12°C (10.4°F) ECT, the following should apply:

1. The worker should be under constant protective observation (buddy system or supervision).
2. The work rate should not be so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods should be taken in heated shelters and opportunity for changing into dry clothing should be provided.

3. New employees should not be required to work fulltime in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
4. The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
5. The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should be used. The worker should be protected from drafts to the greatest extent possible.
6. The workers should be instructed in safety and health procedures. The training program should include as a minimum instruction in:
 - a. Proper re-warming procedures and appropriate first aid treatment.
 - b. Proper clothing practices.
 - c. Proper eating and drinking habits.
 - d. Recognition of impending frostbite.
 - e. Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
 - f. Safe work practices.

Special Workplace Recommendations

Special design requirements for refrigerator rooms include the following:

1. In refrigerator rooms, the air velocity should be minimized as much as possible and should not exceed 1 meter/sec (200 fpm) at the job site. This can be achieved by properly designed air distribution systems.
2. Special wind protective clothing should be provided based upon existing air velocities to which workers are exposed.

Special caution should be exercised when working with toxic substances and when workers are exposed to vibration. Cold exposure may require reduced exposure limits.

Eye protection for workers employed out-of-doors in a snow and/or ice-covered terrain should be supplied. Special safety goggles to protect against ultraviolet light and glare (which can produce temporary conjunctivitis and/or temporary loss of vision) and blowing ice crystals should be required when there is an expanse of snow coverage causing a potential eye exposure hazard.

Workplace monitoring is required as follows:

1. Suitable thermometry should be arranged at any workplace where the environmental temperature is below 16°C (60.8°F) so that overall compliance with the requirements of the TLV® can be maintained.
2. Whenever the air temperature at a workplace falls below -1° (30.2°F), the dry bulb temperature should be measured and recorded at least every 4 hours.
3. In indoor workplaces, the wind speed should also be recorded at least every 4 hours whenever the rate of air movement exceeds 2 meters per second (5 mph).
4. In outdoor work situations, the wind speed should be measured and recorded together with the air temperature whenever the air temperature is below -1°C (30.2°F).
5. The equivalent chill temperature should be obtained from Table 2 in all cases where air movement measurements are required; it should be recorded with the other data whenever the equivalent chill temperature is below -7°C (19.4°F).

Employees should be excluded from work in cold at -1°C (30.2°F) or below if they are suffering from diseases or taking medication which interferes with normal body temperature regulation or reduces tolerance to work in cold environments. Workers who are routinely exposed to temperatures below -24°C (-11.2°F) with wind speeds less than five miles per hour, or air temperatures below -17.5°C (0°F) with wind speeds above five miles per hour, should be medically certified as a suitable for such exposures.

Trauma sustained in freezing or subzero conditions requires special attention because an injured worker is predisposed to cold injury. Special provisions should be made to prevent hypothermia and freezing of damaged tissues in addition to providing for first aid treatment.

HEAT STRESS AND HEAT STRAIN

Assessment of both heat stress and heat strain can be used for evaluating the risk to worker safety and health. A decision-making process such as that shown in Figure 1 is required. The guidance provided in figure 1 and in the associated documentation of the TLV® represents conditions under which it is believed that nearly all adequately hydrated, un-medicated, healthy workers may be repeatedly exposed without adverse health effects. The guidance is not a fine line between safe and dangerous levels. Professional judgment and a program of heat stress management are required to ensure adequate protection for each situation.

**TABLE 1. Additions to Measured WBGT Values (°C)
For Some Clothing Ensembles**

Clothing Type	WBGT Addition*
Summer work uniform	0
Cloth (woven material) overalls	+3.5
Double-cloth overalls	+5

*These values must not be used for encapsulating suits or garments that are impermeable or highly resistant to water vapor or air movement through fabrics.

Heat Stress is the net heat load to which a worker may be exposed from the combined contributions of metabolic cost of work, environmental factors (i.e., air temperature, humidity, air movement, and radiant heat exchange) and clothing requirements. A mild or moderate heat stress may cause discomfort and may adversely affect performance and safety, but it is not harmful to health. As the heat stress approaches human tolerance limits, the risk of heat-related disorders increases.

Heat strain is the overall physiological response resulting from heat stress. The physiological adjustments are dedicated to dissipating excess heat from the body. Acclimatization is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress.

The decision process should be started if there are reports of discomfort due to heat stress or when professional judgment indicates it.

Section 1: Clothing. Ideally, free movement of cool, dry air over the skin's surface maximizes heat removal by both evaporation and convection. Evaporation of sweat from the skin is usually the predominant heat removal mechanism. Water-vapor-impermeable, air-impermeable, and thermally insulating clothing, severely restrict heat removal. With heat removal hampered by clothing, metabolic heat may produce life-threatening heat strain even when ambient conditions are considered cool.

Figure 1 requires a decision about clothing and how it might affect heat loss. The WBGT-based heat exposure assessment was developed for a traditional work uniform of a long-sleeved shirt and pants. If the required clothing is adequately described by one of the ensembles in Table 1, then the YES branch can be taken.

If workers are required to wear clothing not represented by an ensemble in Table 1, then the NO branch should be taken. This decision is especially applicable for clothing ensembles that are 1) barriers to water vapor or air movement, 2) encapsulating suits, or 3) multiple layers. For these kinds of ensembles, Table 2 is not a useful screening method to determine a threshold for heat stress management actions and some risk must be assumed. Physiological and behavioral monitoring described in Section 4 and Table 4 should be followed to assess the exposure, unless a detailed analysis method appropriate to the clothing requirements is available.

Section 2: Screening Threshold Based on Wet Bulb, Globe Temperature (WBGT). The WBGT offers a useful, first-order index of the environmental contribution to heat stress. It is influenced by air temperature, radiant heat, and humidity. As an approximation, it does not fully account for all the interactions between a person and the environment and cannot account for special conditions such as heating from a radiofrequency/microwave source.

WBGT values are calculated using one of the following equations:

- With direct exposure to sunlight:

$$\text{WBGT}_{\text{out}} = 0.7T_{\text{nwb}} + 0.2T_{\text{g}} + 0.1T_{\text{db}}$$

- Without direct exposure to the sun:

$$\text{WBGT}_{\text{in}} = 0.7T_{\text{nwb}} + 0.3T_{\text{g}}$$

Where: T_{nwb} = natural wet bulb temperature (sometimes called NWB)

T_{g} = globe temperature (sometimes called GT)

T_{db} = dry bulb (air) temperature (sometimes called DB)

Because WBGT is only an index of the environment, the screening criteria are adjusted for the contributions of work demands and clothing as well as state of acclimatization. Table 2 provides WBGT criteria suitable for screening purposes. For clothing adjustment factors are added to the environmental WBGT.

Acclimatization is a set of physiological adaptations, the development and loss of which are described in the Documentation. Full-heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Its loss begins when the activity under those heat-stress conditions is discontinued, and a noticeable loss occurs after 4 days. With a recent history of heat-stress exposures (e.g. 5 of the last 7 days), a worker can be considered acclimatized for the purpose of using Table 2.

To determine the degree of heat-stress exposure, the work pattern and demands must be considered. If the work (and rest) is distributed over more than one location, then a time-weighted WBGT should be used for comparison to Table 2 limits.

As metabolic rate increases (i.e. work demand increase), the criteria values in Table 2 decrease to ensure that most workers will not experience a core body temperature above 38°C. Correct assessment of work rate is of equal importance to environmental

assessment in evaluating heat stress. Table 3 provides broad guidance for selecting the work rate category to be used in Table 2. Often there are natural or prescribed rest breaks within an hour of work, and Table 2 provides the screening criteria for three allocations of work and rest.

Based on acclimatization state, metabolic rate category for the work, and the approximate proportion of work within an hour, a WBGT criterion can be found in Table 2. If the measured time-weighted WBGT adjusted for clothing is less than the table value, the NO branch in Figure 1 is taken, and there is little risk of excessive exposures to heat stress. Nevertheless, if there are reports of the symptoms of heat-related disorders such as fatigue, nausea, dizziness, and lightheadedness, then the analysis should be reconsidered.

If the work conditions are above the criteria in Table 2, then a further analysis is required following the YES branch.

Section 3: Detailed Analysis. Table 2 is intended to be used as a screening step. It is possible that a condition may be above the criteria provided in Table 2 and still not represent an unacceptable exposure. To make this determination, a detailed analysis is required. Methods are fully described in the Documentation, in industrial hygiene and safety books, and in other sources.

TABLE 2. Screening Criteria for Heat Stress Exposure (WBGT values in °C (°F))

Work Demands	Acclimatized				Unacclimatized			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
100 % Work	29 (84.2)	27 (80.6)	26 (78.8)		27 (80.6)	25 (77)	22 (71.6)	
75% Work; 25% Rest	30 (86)	28 (82.4)	27 (80.6)		29 (84.2)	26 (78.8)	24 (75.2)	
50% Work; 50% Rest	31 (87.8)	29 (84.2)	28 (82.4)	27 (80.6)	30 (86)	28 (82.4)	26 (78.8)	25 (77)
25% Work; 75% Rest	32 (89.6)	31 (87.8)	30 (86)	29 (84.2)	31 (87.8)	29 (84.2)	28 (82.4)	26 (78.8)

Notes:

- See Table 3 and the Documentation for work demand categories.
- WBGT values are expressed in °C, and represent thresholds near the upper limit of the metabolic rate category.
- If work and rest environments are different, hourly time-weighted averages (TWA) should be calculated and used. TWAs for work rates should also be used when the work demands vary within the hour.
- Values in this table are applied by reference to the “Work-Rest Regimen” section of the Documentation and assume 8-hour workdays in a 5-day workweek with conventional breaks, as discussed in the Documentation. When workdays are extended, consult the “Application of the TVL®” section of the Documentation.
- Because of the physiological strain associated with Very Heavy work among less fit workers regardless of WBGT, criteria values are not provided for continuous work and for up to 25% rest in an hour. The screening criteria are not recommended, and a detailed analysis and/or physiological monitoring should be used.

Table 3. Examples of Activities within Metabolic Rate Categories

Categories	Example Activities
Resting	<u>Sitting quietly</u> Sitting with moderate arm movements
Light	<u>Sitting with moderate arm and leg movements</u> <u>Standing with light work at machine or bench while using mostly arms</u> <u>Using table saw</u> Standing with light or moderate work at machine or bench and some walking about
Moderate	<u>Scrubbing in a standing position</u> <u>Walking about with moderate lifting or pushing</u> Walking on level at 6 Km/hr while carrying 3 Kg weight load
Heavy	<u>Carpenter sawing by hand</u> <u>Shoveling dry sand</u> <u>Heavy assembly work on a noncontinuous basis</u> Intermittent heavy lifting with pushing or pulling (e.g., pick –and-shovel work)
Very Heavy	Shoveling wet sand

Provided that there is adequate information on the heat stress effects of the required clothing, the first level of detailed analysis is a task analysis that includes a time-weighted average of the WBGT and the metabolic rate. Some clothing adjustment factors have been suggested in Table 1. Factors for other clothing ensembles appearing in the literature can be used in similar fashion following good professional judgment. The TLVs® for acclimatized and unacclimatized workers are provided in the Documentation, which, respectively, are the same as Recommended Exposure Limit (REL) and the Recommended Action Limit (RAL) recommended by NIOSH in 1989.⁽¹⁾ The second level of detailed analysis would follow a rational model of heat stress, such as the International Standards Organization (ISO) required sweat rate.⁽²⁾ While a rational method (versus the empirically derived WBGT thresholds) is computationally more difficult, it permits a better understanding of the sources of the heat stress and is a means to appreciate the benefits of proposed modifications in the exposure. Guidance to the ISO method is provided in the Documentation and elsewhere, and other rational methods are described in the literature.

The screening criteria require the minimal set of data to make a determination. Detailed analyses require more data about the exposures. Following Figure 1, the next question asks about the availability of data for a detailed analysis. If these data are not available, the NO branch takes the evaluation to physiological monitoring to assess the degree of heat strain.

TABLE 4. Guidelines for Limiting Heat Strain

Monitoring signs and symptoms of heat-stressed workers is sound industrial hygiene practice, especially when clothing may significantly reduce heat loss. For surveillance purposes, a pattern of workers exceeding the limits is indicative of a need to control the exposures. On an individual basis, the limits represent a time to cease an exposure until recovery is complete.

Excessive heat strain may be marked by one or more of the following measures, and an individual's exposure to heat stress should be discontinued when any of the following occur:

- Sustained (several minutes) heart rate is in excess of 180 bpm (beats per minute) minus the individual's age in years (180-age), for individuals with assessed normal cardiac performance; or
- Body core temperature is greater than 38.5°C (101.3°F) for medically selected and acclimatized personnel; or greater than 38°C (100.4°F) in unselected, Unacclimatized workers; or
- Recovery heart rate at one minute after a peak work effort is greater than 110 bpm; or
- There are symptoms of sudden and severe fatigue, nausea, dizziness, or lightheadedness.

An individual may be at greater risk if:

- Profuse sweating is sustained over hours; or
- Weight loss over a shift is greater than 1.5% of body weight; or
- 24-hour urinary sodium excretion is less than 50 moles

If a worker appears to be disoriented or confused, or suffers inexplicable irritability, malaise, or flu-like symptoms, the worker should be removed for rest in a cool location with rapidly circulating air and kept under skilled observation. Immediate emergency care may be necessary. If sweating stops and the skin becomes hot and dry immediate emergency care with hospitalization is essential.

If the data are available, the next step in Figure 1 is the detailed analysis. If the exposure does not exceed the criteria for the appropriate detailed analysis (e.g., WBGT analysis, another empirical method, or a rational method), then the NO branch can be taken. Because the criteria in Table 2 have been exceeded, general heat stress controls are appropriate. General controls include training for workers and supervisors, heat stress hygiene practices, and medical surveillance. If the exposure exceeds the limits in the detailed analysis, the YES branch leads to physiological monitoring as the only alternative to demonstrate that adequate protection is provided.

Section 4: Heat Strain. The risk and severity of excessive heat strain will vary widely among people, even under identical heat stress conditions. The normal physiological responses to heat stress provide an opportunity to monitor heat strain among workers and to use this information to assess the level of heat strain present in the workforce, to control exposures, and to assess the effectiveness of implemented controls. Table 4 provides guidance for acceptable limits of heat strain.

Following good industrial hygiene sampling practice, which considers likely extremes and the less tolerant workers, the absence of any of these limiting observations indicates acceptable management of the heat stress exposures. With acceptable levels of heat strain, the NO branch in Figure 1 is taken. Nevertheless, if the heat strain among is considered acceptable at the time, the general controls are necessary. In addition, periodic physiological monitoring should be continued to ensure acceptable levels of heat strain.

If limiting heat strain is found during the physiological assessments, then the YES branch is taken. This means that suitable job-specific controls must be considered and implemented to a sufficient extent to control heat strain. The job-specific controls include engineering controls, administrative controls, and personal protection. After implementation of the job-specific control, it is necessary to assess their effectiveness, and to adjust them as needed. The decision tree in Figure 1 returns to the detailed analysis step, and in the absence of detailed information, then the only method to ensure protection is to return to physiological monitoring.

Section 5: Heat Stress Management and Controls. The requirement to initiate a heat stress management program is marked by 1) heat stress levels that exceed the criteria in Table 2 or 2) work in clothing ensembles that limit heat loss. In either case, workers should be covered by a general controls (see Table 5).

Heat stress hygiene practices are particularly important because they reduce the risk that an individual may suffer a heat-related disorder. The key elements are fluid replacement, self-determination of exposures, health status monitoring, maintenance of a healthy life-style, and adjustment of expectations based on acclimatization state. The hygiene practices require the full cooperation of supervision and workers.

In addition to general controls, appropriate job-specific controls are often required to provide adequate protection. During the consideration of job-specific controls, Table 2, along with Tables 1 and 3, provide a framework to appreciate the interactions among acclimatization state, metabolic rate, work/rest cycles, and clothing. Among administrative control, Table 4 provides acceptable physiological and behavioral limits. The mix of job-specific controls can only be selected and implemented after a review of the demands and constraints of any particular situation. Once implemented, their effectiveness must be confirmed and the controls maintained.

TABLE 5. Guidelines for Heat Stress Management

- Monitor heat stress (e.g., WBGT Screening Criteria in Table 2) and heat strain (Table 4) to confirm adequate control.

General Controls

- Provide accurate verbal and written instructions, frequent training programs, and other information about heat stress and strain.
- Encourage drinking small volumes (approximately 1 cup) of cool, palatable water about every 20 minutes (refer to Documentation for choice of the contents provided in drinks for fluid replacement).
- Permit self-limitation of exposures and encourage co-worker observation to detect signs and symptoms to heat strain in others.
- Counsel and monitor those who take medications that may compromise normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions; and those who abuse or are recovering from the abuse of alcohol or other intoxicants.
- Encourage healthy life-styles, ideal body weight and electrolyte balance.
- Adjust expectations of those returning to work after absence from hot exposure situations and encourage consumption of salty foods (with approval of physician if on a salt-restricted diet).
- Consider pre-placement medical screening to identify those susceptible to systemic heat injury.

Job-Specific Controls

- Consider engineering controls that reduce the metabolic rate, provide general air movement, reduce process heat and water-vapor release, and shield radiant heat sources, among others.
- Consider administrative controls that set acceptable exposure times, allow sufficient recovery, and limit physiological strain.
- Consider personal protection that is demonstrated effective for the specific work practices and conditions at the location.

--NEVER ignore anyone's signs or symptoms of heat-related disorders--

In all cases, the prime objective of heat stress management is the prevention of heat stroke, which is life-threatening and the most serious of the heat-related disorders. Heat stroke develops when thermoregulation has been overwhelmed, and the body has lost its major defenses to combat hyperthermia. The heat stroke victim is often manic, disoriented, confused, delirious, or unconscious. The victim's skin may be hot or dry, sweating has ceased, and the body core temperature is greater than 40°C (104°F). Immediate, appropriate, emergency care and hospitalization are essential if signs of heat stroke develop. The prompt treatment of other heat-related disorders generally results in full recovery, but medical advice should be sought for treatment and return-to-work

protocols. It is worth noting that the possibility of accidents and injury increases with the level of heat stress. Prolonged increases in deep body temperatures and chronic exposures to high levels of heat stress are associated with other disorders such as temporary infertility (male and female), elevated heart rate, sleep disturbance, fatigue and irritability. During the first trimester of pregnancy, a sustained core temperature greater than 39°C (102.2°F) may endanger the fetus.

References:

1. U.S. National Institute for Occupational Safety and Health: Criteria for a Recommended Standard – Occupational Exposure to Hot Environments (Revised); 1986. In: NIOSH Criteria Documents Plus CD-ROM, Disk 2. DHHS (NIOSH) Pub. No. 97-106; NTIS Pub. No. PB-502082. National Technical Information Service, Springfield, VA (1997).
2. International Organization for Standardization (ISO): Hot Environments – Analytical Determination and Interpretation of Thermal Stress Using Calculation of Required Sweat Rate. ISO 7933: (1989). ISO Geneva (1989)

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Walking,

Working Surfaces