SAFETY AND HEALTH
RULES AND REGULATIONS
FOR
GEORGETOWN MUNICIPAL WATER & SEWER SERVICE

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MEMORANDUM

TO: All Employees

FROM: Billy Jenkins
General Manager

DATE: October 20, 2011

The Occupational Safety and Health Act (OSHA) of 1970 clearly states our common goal of safe and healthful working conditions. The safety and health of our employees continues to be the first consideration in the operation of this organization.

It is the intent of GMWSS to comply with all laws. To do this, we must constantly be aware of conditions in all work areas that can produce injuries. No employee is required to work at a job he or she knows is not safe or unhealthful. Your cooperation in detecting hazards and, in turn, controlling them is a condition of your employment. Inform your supervisor immediately of any situation beyond your ability or authority to correct.

The personal safety and health of each employee is of primary importance to GMWSS. The prevention of occupationally induced injuries and illnesses is of such consequence that it will be given precedence over operating productivity whenever necessary. To the greatest degree possible, management will provide all mechanical and physical facilities required for personal safety and health in keeping with the highest standards.

GMWSS will maintain a safety and health program conforming to the best practices of organizations of this type. To be successful, such a program must embody the proper attitudes toward injury and illness prevention on the part of supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisors and employees, but also between each employee and his or her co-workers. Only through such cooperative effort can a safety program in the best interest of all be established and preserved.

Our objective is a safety and health program that will reduce the number of injuries and illnesses to an absolute minimum, not merely in keeping with, but surpassing, the best experience of operations similar to ours. Our goal is zero accidents and injuries.

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Our safety and health program will include:

- Providing mechanical and physical safeguards to the maximum extent possible.
- Conducting inspections to find and eliminate unsafe working conditions or practices, to control health hazards, and to comply with the safety and health standards of every job.
- Training all employees in good safety and health practices.
- Providing necessary personal protective equipment and instructions for its use and care.
- Developing and enforcing safety and health rules and requiring that employees cooperate with these rules as a condition of employment.
- Investigating, promptly and thoroughly, every accident to find out what caused it and to correct the problem so that it will not happen again.
- Setting up a system of recognitions and awards for outstanding safety service or performance.

We recognize that the responsibilities for safety and health are shared:

- The employee accepts the responsibility for leadership of the safety and health program, for its effectiveness and improvement, and for providing the safeguards required to ensure safe conditions.
- Supervisors are responsible for developing the proper attitude toward safety and health in themselves and in those they supervise, and for ensuring that all operations are performed with the utmost regard for the safety and health of all personnel involved, including themselves.
- Employees are responsible for wholehearted, genuine cooperation with all aspects of the safety and health program including compliance with all rules and regulations and for continuously practicing safety while performing their duties.

CHAPTER ONE: INTRODUCTION

A. Purpose:

1. The Georgetown Municipal Water and Sewer Service (hereinafter referred to as GMWSS) is committed to the safety of its employees and customers. For this reason, GMWSS provides equipment, specifications, and working conditions designed to promote efficient operation and to eliminate job-related accidents, injuries and illnesses.

2. It shall be the responsibility of each employee to know, understand, and follow the GMWSS Safety and Health Rules and Regulations (hereinafter referred to as the Safety Manual), as well as current federal and state safety and health regulations. An understanding and strict observance of the rules by all employees, and strict enforcement by Supervisors and administrators, can do much to prevent occupational accidents, injuries and illnesses.

B. Scope and Applicability:

1. This policy shall be effective as of the date of issuance, and employees shall comply with the policy at all times.

2. Nothing in this policy shall prohibit departments from promulgating additional safety regulations to be followed by those persons working under the direction of the department.

3. Should a difference of opinion arise in the application or interpretation of this policy, the decision of the Supervisor shall be followed at the job site. An appeal to the Loss Control Administrator for a formal interpretation of the policy may be made at any time by submitting the request in writing through the employee's chain-of-command.

CHAPTER TWO: RESPONSIBILITIES

A. Compliance and Enforcement:

1. General Manager: The General Manager shall be responsible for the development and implementation of the safety policy, and for the appointment of members to the Safety Committee.

2. Loss Control Administrator: The Loss Control Administrator shall:

a. Have full authority and primary responsibility for maintaining safe and healthful working conditions throughout the organization.

b. Assume responsibility for insuring that all personnel receive required training.

c. Provide an initial orientation for new employees, insure that each new employee receives a copy of the Safety Manual, and insure that the employees know the Safety Policy as well as applicable federal and state safety requirements.

d. Conduct accident investigations and report findings to the Safety Committee.

e. Convey Safety Program information to all employees.

f. Conduct walk-through inspections randomly, or as requested by the General Manager or Supervisor.

g. Keep the General Manager apprised of the Safety Program.

3. Supervisors:

a. Each Supervisor shall have full authority and primary responsibility for maintaining safe and healthful working conditions within his/her Department. While personal exposure to hazards varies widely in the work activities, it is expected that an unrelenting effort will be directed toward controlling accidents, injuries, collision, liabilities, and waste of material.

b. Each Supervisor shall be familiar with all safety policies that apply to the Supervisor's work. The Supervisor shall be primarily responsible for the execution of the work in a safe manner, for the safety of all assigned employees, and for the safety of the general public in connection with the work of which the Supervisor is in charge.

c. Each Supervisor shall plan the work so as to eliminate the opportunity for accidents, giving consideration to the dangers involved and whether the employee, the tools, the materials, the safety devices, etc., are proper for doing the work in a safe manner. The supervisor shall instruct the employees how to do the work in a safe manner, and shall insure that the employees understand and follow instructions.

d. When new personnel are employed or assigned, each Supervisor shall:

(1) Consider any person recently employed or transferred under his or her authority, or an existing employee who has been assigned new job responsibilities, as a new employee, and shall conduct an orientation explaining the work that the employee will be doing and how the employee will conduct the work activities, including safety requirements.

(2) Inform the employee about appropriate clothing, necessary personal protection equipment, and safe work practices in a safe working environment.

(3) Place the new employee for a time under the charge of a safety-minded employee for instruction, giving the employee an opportunity to adjust to safe work procedures.

(4) Check to insure that the newly assigned employee is doing the job safely.

(5) Repeat the instructions, if necessary.

(6) Conduct walk-through inspections to insure ongoing safety measures.

e. On a continuing basis, each Supervisor shall:

(1) Insure that the Safety Policy is enforced.

(2) Support the policy through setting examples, planning safety into the daily operations of the department, and promoting safety at meetings and other gathering of department employees.

(3) Incorporate safety requirements into the department budget.

(4) Establish and conduct departmental safety meetings and inspections.

(5) Post safety objectives of department, and implement a safety plan within the department.

(6) Require departmental personnel to adhere to safe work practices and safety policies.

(7) Maintain first-aid kits and equipment, and see that each person is properly trained in first-aid.

(8) Use all responsible means to assure that each employee is mentally and physically prepared to perform assigned tasks.

(9) Insure that horseplay that could cause injury to an employee is

not practiced during working hours.

(10) Recommend disciplinary action for employees who do not follow on-the-job safety, including compliance with the provisions of the Safety Manual.

(11) Set a strong, positive example by taking sufficient time for safety.

(12) Require that personal protective equipment be properly maintained and that each assigned employee wear and/or use such equipment as prescribed.

f. The Supervisor shall insure that all assigned employees possess a copy of the safety manual.

g. When it is necessary to temporarily leave the job site, the Supervisor shall delegate the responsibility for the job to a qualified employee.

h. The Supervisor may conduct safety meetings.

4. Employees:

a. Each employee shall:

(1) Be held directly responsible for any accident in which the employee is involved to the extent of the employee's ability to prevent the accident.

(2) Be provided with a copy of the Safety Manual, and maintain the Manual while employed at GMWSS.

(3) Know, understand and follow the policies included in the Safety Manual.

b. Employees shall not participate in horseplay or practical jokes which may endanger fellow employees or themselves.

c. If an employee's duties bring the employee into the vicinity of equipment where there are dangers with which the employee is not familiar, the employee shall proceed with the work only when accompanied by a properly qualified employee whose instructions shall be strictly obeyed.

d. When working in high places, around moving machinery, in excavations or in elevated places, the employee shall consider the effect of each act and do nothing which may endanger the employee or others.

e. Employees shall cultivate the habit of being cautious. Fellow employees should be cautiously warned when seen in a dangerous situation so as to avoid confusing, startling or alarming the employee.

f. Before climbing ladders or structures, or before working on scaffolds, a

careful inspection should be made to ascertain if they are in a safe condition and properly supported.

g. In a case where an employee is called upon to do work which, in the employee's opinion, cannot be safely performed, the employee shall bring the matter to the attention of the Supervisor immediately without proceeding with the work.

h. Any employee who is ill when reporting for duty, or becomes ill while at work, shall be sent home if the Supervisor determines that the employee is not in a condition to work safely.

I. The use of illegal drugs or alcohol while on duty shall not be tolerated.

j. The employee's Supervisor shall be notified when an employee is taking prescription drugs. When possible, the employee shall request prescription medicine that does not cause drowsiness.

k. Employees assigned to operate a vehicle or other motorized equipment shall be responsible for its operating condition. Malfunctions shall be reported to the Supervisor immediately; if the malfunction causes the vehicle or equipment to be unsafe, the employee shall not operate the vehicle or equipment until it is repaired.

4. Safety Committee:

a. The Safety Committee shall be chaired by the Loss Control Administrator, and its members shall consist of Supervisors and employees from throughout the organization.

b. The Safety Committee shall be responsible for the following:

(1) Dissemination of information, both upward and downward throughout the organization.

(2) Identifying training needs throughout the organization and assisting with training for departments.

(3) The Safety Committee may investigate accidents and near-misses to determine corrective procedures.

c. The Safety Committee shall meet on a regular basis as required or requested.

d. The Safety Committee shall promote and reward safety.

CHAPTER THREE: ACCIDENTS/INJURIES AND NEAR MISSES

A. Non-Vehicle:

1. Reporting Procedures:

a. The accident reporting procedures are as follows:

(1) Employees injured on the job and require or request medical attention shall be taken to Bluegrass Business Health immediately, except that employees may be taken to the Hospital Emergency Room if after hours or if determined by the nature of the injury.

(2) The Supervisor shall be notified immediately, who shall report each significant accident to the Loss Control Administrator and/or General Manager.

(3) Where the accident involves a vehicle, the police shall be called to the scene of the accident to prepare an accident report. Upon notification, the Loss Control Administrator will secure a copy of the accident report.

(4) The Supervisor shall make a report to the Loss Control Administrator within 24 hours for the purpose of affecting workers' compensation and other insurance claims.

2. Investigation Procedures:

a. The accident investigation procedures are as follows:

(1) Each accident will be promptly and personally reported to the Loss Control Administrator by the Supervisor.

(2) Each significant accident will also be promptly and personally investigated by the Loss Control Administrator.

3. No Supervisor or employee is authorized to make an oral or written statement concerning an accident to the news media or anyone outside GMWSS except the police, or to sign an affidavit or any other document without prior approval of the General Manager.

4. Near misses shall be investigated and reported upon, following the procedures for accident investigations.

5. Following the investigation of an accident, the Supervisor will promptly take corrective action as determined.

B. Vehicle:

1. Reporting Procedures:

a. An accident involving a vehicle shall be reported as follows:

(1) Where applicable, all injuries shall be treated immediately by applying first-aid at the scene and, if necessary, arranging transportation to Bluegrass Business Health, or to the Hospital Emergency Room if after business hours of if determined by the nature of the injury;

(2) The police shall be notified immediately;

(3) The Loss Control Administrator shall be notified immediately, who shall report each accident to the General Manager;

(4) The employee, unless injured, shall not leave the scene of the accident and shall not move the vehicle until the police accident investigation is complete, if required, or unless the employee has been directed to do so by the police;

(5) The Loss Control Administrator, upon notification, will secure a copy of the accident report; and

(6) The Supervisor shall make a report to the administrative department within 24 hours to make workers' compensation and other claims.

2. Investigative Procedures:

a. The accident investigation procedures are as follows:

(1) Each accident will be promptly and personally reported to the Loss Control Administrator by the Supervisor.

(2) Each significant accident will also be promptly and personally investigated by the Loss Control Administrator.

3. No Supervisor or employee is authorized to make an oral or written statement concerning an accident to the news media or anyone else outside GMWSS except the police, or sign an affidavit or any other document without prior approval of the General Manager.

4. Following the investigation of an accident, the Supervisor will promptly take corrective and preventive action as determined.

5. Near misses shall be investigated and reported upon, following the procedures for accident and investigations.

GEORGETOWN MUNICIPAL WATER & SEWER SERVICE
EMPLOYEE/WITNESS ACCIDENT
INVESTIGATION REPORT

1. **EMPLOYEE INFORMATION**

   NAME_____ACCIDENT DATE_____

2. **TIME OF ACCIDENT** _____A.M._____P.M.

3. **CIRCLE DAY OF THE WEEK** MON TUES WEDS THURS FRI SAT SUN

4. **DEPARTMENT**_____

5. **WHERE DID THE ACCIDENT OCCUR?** OUR PROPERTY____YES_____NO
   LOCATION_____

   WITNESS #1 **WITNESS #2**

   NAME_____
   _____
   ADDRESS_____ _____
   PHONE NO._____
   _____
   EMPLOYEE_____YES_____NO _____YES_____NO

6. **ACTION TAKEN**
   FIRST AID_____ MEDICAL TREATMENT_____
   OTHER_____
   DESCRIBE ACTION TAKEN_____
   _____

7. **WHAT WERE YOU DOING WHEN THE ACCIDENT OR ILLNESS OCCURRED? BE SPECIFIC!!**

8. PART OF THE BODY INJURED

HEAD _____ CHEST _____
EYE _____ LUNGS _____
EAR _____ ABDOMEN _____
NECK _____ GROIN _____
SHOULDER _____ HIPS _____
ARM _____ KNEE _____
ELBOW _____ LEG _____
WRIST _____ ANKLE _____
HAND _____ FOOT _____
FINGER _____ TOES _____
BACK _____ BODY SYSTEM _____

9. TYPE OF ACCIDENT

OVEREXERTION _____
FALL - DIFF LEVEL _____
FALL - SAME LEVEL _____
STRUCK AGAINST _____
CAUGHT BETWEEN _____
STRUCK BY _____
VEHICLE _____
ELECTRICAL _____
TEMP EXTREME _____
REPETITIVE MOTION _____
ABSORPTION _____
SLIP (NO FALL) TWIST _____
FOREIGN BODY _____
MULTIPLE INJURY _____
CUMMULATIVE TRAUMA _____
OTHER _____

10. NATURE OF INJURY

BACK STRAIN/SPRAIN _____
OTHER STRAIN/SPRAIN _____
DISLOCATION _____
FRACTURE _____
CONTUSION _____
AMPUTATION _____
OPEN WOUND _____
BURN _____
ASPHYXIA _____
HEARING LOSS _____
DERMATITIS _____

11. DESCRIBE IN DETAIL THE INJURY OR ILLNESS _____

_____
_____
_____
_____
_____
_____

12. UNSAFE CONDITION

WET/SLIPPERY FLOORING _____
CUTTING INSTRUMENT _____
DEFECTIVE EQUIPMENT _____
NO SAFETY GEAR AVAILABLE _____
IMPROPER ILLUMINATION _____
UNSAFE DRESS _____
HAZARDOUS FUMES/GASES _____
EMPLOYEE INATTENTION _____
NO UNSAFE CONDITION _____
OTHER _____

ATTACH A DRAWING OF THE AREA SHOWING HOW THE ACCIDENT OCCURRED AND ATTACH A PICTURE OF THE AREA.

13. DESCRIBE HOW TO PREVENT ACCIDENT OR ILLNESS FROM OCCURRING AGAIN

_____
_____
_____

EMPLOYEE: _____
REVIEWED BY: _____
DATE: _____
DATE: _____

DISCLAIMER: No person shall knowingly file, or permit to be filed any false or fraudulent claim on his behalf to compensation or other benefits under this chapter, or by fraud, deceit, or misrepresentation procure or cause to be made or receive any payments of compensation or other benefits under this chapter to which the recipient is not lawfully entitled, or conspire with, aid or abet another to do so. No person shall by deceit or misrepresentation or with the intent to defraud cause procure or conspire with, aid or abet another in so causing or procuring any person entitled to compensation or other benefits under this chapter to omit to claim title thereto or to accept payment of a less sum that that to which he may be lawfully entitled to there under.

CHAPTER FOUR: TRAINING

A. Orientation for Newly Assigned Personnel:

Each new employee shall receive a general safety orientation prior to being assigned to duty, including, but not limited to, a review of general operating procedures and standard operating procedures for equipment assigned to the Department. The training shall be documented and placed in the employee's personnel folder.

Cross-reference:
Responsibility of Supervisor, Chapter 2

B. Employee Training:

1. An essential element of the safety program is employee training; it is the responsibility of the Supervisor to insure that employees receive training in all aspects of on-the-job safety, including, but not limited to, job responsibilities, proper methods and techniques, and the hazards associated with safe operations.

2. Employees have the responsibility to take safety training seriously, to learn the organization's safety policies and practices, to report all on-the-job injuries and illnesses, and to make suggestions that would improve on-the-job safety.

3. Employees who demonstrate, through an accident or continued unsafe acts, that the safety requirements of the job are not fully understood or are being ignored will be counseled by the Loss Control Administrator, who will document the counseling, including areas to be corrected and corrective action to be taken. Employees who continue to violate the safety policies may be subject to disciplinary action, up to and including termination of employment with GMWSS.

4. It shall be the responsibility of each Supervisor to eventually develop written job procedures for each type of job their employees do so that employees can reference a manual if there are questions as to how to properly perform a specific job. The written procedures should include the necessary personal protective equipment needed for each phase of the job. This may involve forming committees of employees to develop and record job procedures, job safety analysis, technical manuals, etc.

C. Record-keeping:

1. All training activities, including orientation programs, must be documented and placed in the employees' folder. Records shall include at least the following:

   a. Employee name.

   b. Type of training:

      (1) Program name.

(2) Hours of training.
(3) Location of training.
(4) Pass/Fail grade (if appropriate).

c. Other information appropriate in evaluating the employee's need for further training or reassignment due to training.

2. The training records must be maintained for a minimum of two years from the date of training.

CHAPTER FIVE: SELF-INSPECTION PROGRAM

A. Regular Safety Inspections:

1. As determined by the Loss Control Administrator, Supervisors shall make safety inspections of their respective areas of responsibility on a scheduled basis to aid in identification, elimination, and prevention of physical hazards and unsafe practices in the workplace.

2. These inspections should direct specific attention to:

   a. Employees work practices.

   b. Personal protective equipment (condition and use).

   c. Electrical equipment, appliances and machinery.

   d. Storage and use of flammables and combustibles.

   e. Storage and use of compressed gas cylinders.

   f. Fire fighting equipment.

   g. First-aid equipment.

   h. Labeling and storage of supplies and equipment.

   I. General equipment condition.

   j. General housekeeping conditions.

3. The Loss Control Administrator may direct that safety inspection of GMWSS facilities and operations be conducted.

4. A list of findings shall be prepared and forwarded to the Supervisor, who shall insure that corrective action is taken, and then report in writing to the Loss Control Administrator that all corrective actions have been taken. If corrective action has not been taken within two (2) weeks, the Supervisor shall give cause in writing as to why corrective action has not been taken.

CHAPTER SIX: GENERAL SAFETY

A. Personal Conduct:

1. All employees shall conduct themselves in a manner that assures maximum safety to all persons affected by their actions.

2. At no time shall employees engage in practical jokes, scuffling, horseplay, or misuse of GMWSS equipment.

3. The use of intoxicating beverages or drugs during working hours is prohibited. Violations of this policy may be sufficient cause for termination of employment.

4. In accordance with City of Georgetown Ordinance, smoking is not allowed in any City building, including buildings owned by GMWSS. In addition, employees who go outside to smoke shall be far enough from the exterior door and/or windows so that smoke does not enter the building.

5. Any source of ignition, including smoking, is prohibited in any area where a match, flame, spark, or careless disposal of lighted material constitutes a fire hazard.

6. Personal work clothing shall be suitable for the individual job and be of the type offering maximum protection from accidental injury. Loose clothing, jewelry, or hanging objects shall not be worn while working around moving equipment.

B. Hazards:

1. Every employee shall be alert for possible hazards that could result in accidents, and act promptly to eliminate the hazard. If the hazard cannot be corrected immediately, the hazard should be reported to the Supervisor.

2. All accidents, either injury or non-injury, shall be reported to the Supervisor immediately.

3. Supervisors shall promptly investigate all reported hazards. Hazards that could cause or contribute to accidents shall be immediately corrected. After correction, a follow-up inspection shall be scheduled to assure that corrections remain effective.

C: Housekeeping:

1. Loose materials or waste shall not be allowed to accumulate in the work area. This is particularly important in aisles and in the vicinity of ladders, ramps, stairs, machinery, and equipment.

2. All aisle ways shall be clearly defined and kept free of any hazardous obstructions.

3. Aisles in storage areas shall be kept clear for easy access to firefighting and emergency equipment and to enable emergency personnel to reach the scene. Areas shall

be kept clear around sprinkler control valves, fuse boxes, and electrical panels. These areas shall be clearly identified.

4. Water, oil, grease, gasoline, and other slippery substances spilled on floors and walkways shall be cleaned up immediately. Approved non-combustible absorbents shall be used to dry up spills, if needed.

5. Tools shall not be allowed to accumulate unnecessarily in the work area or left on overhead platforms.

6. All materials shall be neatly stacked and easily reached by adequate aisle ways. Cross ties, separators, or dunnage shall be used to guard against falling.

7. Materials shall not be stacked within 18 inches of ceiling fire sprinkler heads. Materials shall not be stacked in such a manner as to project into aisle ways.

8. Disposal of combustible waste and flammable materials subject to spontaneous combustion shall only be disposed in approved non-combustible metal containers with self-closing lids.

D. Protective Equipment:

1. Mandatory use - When the use of personal protective equipment has been specified for hazardous work, its use shall be mandatory as a condition of employment.

2. Head protection - Employees shall be required to wear protective helmets at all times when there is danger of head injury from impact, falling or flying objects and debris, electrical shock, and other times as they may be directed to do so by the Supervisor.

a. Protective helmets shall not be altered by drilling or cutting, and shall be checked periodically for cracks and other physical damage.

b. Damaged helmets shall be immediately replaced with a serviceable unit.

c. Head protection must be replaced prior to the expiration date.

3. Hand protection - Employees shall be required to wear protective gloves at all times when there is danger of hand injury from puncture, laceration, pinching and like injuries, and at such other times as they may be directed to do so by the Supervisor. The gloves shall be of a type suited to the job assigned.

4. Foot protection – With the exception of office workers, all employees shall wear safety shoes at all times. The safety shoes shall meet nationally recognized standards. Employees shall not be allowed to wear shoes that have been split, have had holes cut out, or otherwise altered.

5. Eye and face protection - Approved eye and face protection shall be worn when warranted by the exposure, such as flying particles, use of corrosives, chipping and

dust producing conditions, and at such other times as directed by the Supervisor. Employees involved in welding and cutting operations shall wear burning goggles or hoods with lenses of the correct color density for the type of operation involved.

6. Ear and hearing protection - Ear plugs or earmuffs of an approved type shall be utilized to guard against prolonged exposure to noise exceeding the sound tolerance levels defined by law.

7. Respiratory protection - Approved respiratory protective devices properly designed for the hazard involved shall be used where airborne contaminants (smoke, fumes, dust, vapor, etc.) exist.

8. Reduced visibility protection - Reflective Class 3 vests or jackets to provide increased worker visibility and shall be used at all times when working in or around traffic lanes.

9. Protective clothing and/or equipment - The use of protective clothing and/or equipment not specifically set out herein may be required by the Supervisor to meet the requirements of special assignments.

10. Safety and guarding devices - Safety devices and guarding devices as provided shall be used at all times and shall not be removed or blocked by operating personnel.

11. Protective equipment maintenance - Protective equipment shall be kept clean and free from damage. Frequent inspections shall be performed to assure that the protective equipment offers the maximum available protection. Damaged or defective protective equipment and clothing shall not be used, and shall be repaired or replaced.

E. Handling of materials:

1. All employees are required to know and use the proper lifting techniques.

2. Where possible, mechanical equipment should be used on heavier materials. If mechanical assistance is not available, adequate manpower will be required.

3. Before an object is lifted, it shall be inspected for grease or slippery substances to insure that the object will not slip from a grip.

4. Long objects shall not be carried without assuring that the way is clear and vision is unobstructed to insure that other persons or objects will not be struck by the load.

5. When two or more persons carry a heavy object that is to be lowered or dropped, there shall be a prearranged signal for releasing the load.

6. When two or more persons are carrying an object, each person, if possible, shall face the direction in which the object is being carried.

F. Fire protection and equipment:

1. Employees shall be familiar with both the location and operation of all fire protection equipment in the vicinity of their work area.

2. Fire protection equipment shall be properly located at all times, and except for actual use of testing, employees shall not move or tamper with fire protection equipment.

3. After use, fire extinguishers shall be turned in for service. Partially used or empty fire extinguishers shall not be returned to their standby location.

4. Employees shall be familiar with the classes of fire and the proper extinguishing agent to be used:

a. Class A fires involve ordinary combustibles such as wood and paper; extinguishing agents include water and multipurpose dry chemicals.

b. Class A fires involve oils and flammable liquids; extinguishing agents include CO2 and dry chemicals.

c. Class A fires involve electrical equipment; extinguishing agents include CO2 and dry chemicals.

d. Class A fires involve combustible metals such as magnesium, sodium, titanium, etc.; special extinguishing agents are required. If these materials are stored, notify the Fire Marshal's office.

5. Immediately upon the discovery of a fire, an employee shall:

a. Cause the building area to be evacuated; and
b. Call the Fire Department.

6. Smoking shall be prohibited in all areas where quantities of flammable and combustible liquids, gases and materials are stored or are in use. In addition, smoking shall be prohibited in the vicinity of welding and cutting operations.

7. NO SMOKING signs should be posted in areas deemed as hazardous. However, absence of such signs shall not excuse smoking in dangerous areas.

8. Flammable liquids such as gasoline, lacquer, thinner, etc., shall not be used as general cleaning solvents. In any building, except ones designated for their storage, flammable liquids shall be limited in quantity to five U.S. gallons, and must be stored in properly labeled and approved containers.

Cross-reference:

See Chapter 10 for Fire Prevention, Fire Protection, and Emergency Control

G. Electrical safety:

1. Only use electrical equipment that is grounded, double insulated, or approved

by the Loss Control Administrator.

2. Do not work on electrical equipment unless you are authorized to do so and have been trained in arc flash safety.

3. Report electrical shocks, overloaded circuits, sparking or smoking to your Supervisor, cut off the power supply, and lockout and tagout immediately, if possible.

4. Keep electrical cords out of walkways, examine them for dry rotted or frayed insulation, cuts, or damaged strain reliefs, etc.

5. Pull on the plug, not the cord, when unplugging an electrical cord from the power source.

6. Know where the main power disconnect switch is located, and keep the path clear to the switch; do not block any electrical panel.

H. Machinery and equipment:

1. Report malfunctioning equipment to the Supervisor; do not attempt to repair the equipment unless you are qualified to do so.

2. Insure that guards are in place and no one is in the way before operating any machinery.

3. Do not tamper with guards, two-hand controls, interlocks, or any safety device.

4. Keep machines and equipment in the OFF position when not in use.

5. Never operate machines or equipment unless you are authorized to do so.

6. Always turn off machines before making adjustments, cleaning, etc. Wait until the machine comes to a complete stop; do not attempt to stop moving machinery with hands or a makeshift device. Use only approved solvents for cleaning machine parts.

7. Safety glasses must be worn when operating leaf blowers, snow blowers, weed eaters, lawn mowers, and any other equipment as deemed necessary.

8. With the exception of office workers, safety shoes must be worn at all times.

I. Hand tools:

1. Do not use defective tools or equipment; report defective tools or equipment to the Supervisor.

2. Use the correct size of hand tools for the particular job. If you feel that a tool is either too large or too small and creates a safety issue, you should report this to the Supervisor immediately.

J. Chemicals:

1. You should know the hazardous properties of chemicals before using; follow instructions on the label when using chemicals.

2. Flammable liquids:

   a. Keep away from heat, sparks and open flames.

   b. Use self-closing safety cans and do not store with other chemicals.

   c. Insure adequate ventilation before using.

3. Label all chemical containers.

4. Do not use solvents to clean hands. Avoid prolonged and repeated skin contact or breathing of vapors.

5. Corrosive chemicals, such as acids or caustic, require special handling. Check with your Supervisor in regard to the protective clothing required before using these chemicals.

6. Only qualified employees are authorized to mix or blend chemicals without instructions from the Supervisor.

7. Proper cleanup and disposal procedures must be followed.

8. The Supervisor must be notified immediately in the event of a chemical spill.

Cross-reference:

See Chapter 9 for Chemical Safety

CHAPTER SEVEN: INSPECTION PROCEDURES

A. Procedure for KOSHA Inspections.

1. In the event that an Officer of the Kentucky Department of Labor (KOSHA) comes to any of the GMWSS entrances, the Officer shall be directed to the office of the Loss Control Administrator.

2. The Loss Control Administrator will meet with the Officer and:

a. Determine the reason for the visit (routine, complaint, contractor, etc.)

b. Contact the General Manager, Attorney, Supervisors, etc., as needed, depending upon the need for their presence.

c. Designate the individuals to accompany the Officer as the Officer tours requested facilities

d. Handle requests for specific information.

e. Handle any requests to speak with employees individually and privately.

3. After the tour is completed, a debriefing conference will be held by the Officer. The Loss Control Administrator will note, in detail, the Officer's findings. In addition, the Loss Control Administrator will request an explanation of and specific standards for any alleged violations, along with corrective actions recommended.

4. The Loss Control Administrator will assure that corrective action is taken by persons responsible, if action is required as a result of the inspection. Corrective action should be implemented during the inspection, if appropriate and possible.

5. The Loss Control Administrator will provide a detailed written report within three working days. The report shall summarize the nature and extent of the inspection, describe any violations alleged along with corrective actions taken or planned, and describe any inspection-related issues which, in the judgment of location management, are significant or require additional assistance.

6. After approved by the Board and the Board's attorney, the report will be forwarded to the inspection agency.

B. Other Government Agencies.

1. In the event that an Officer of any of the following government agencies comes to any of the GMWSS entrances, the Loss Control Administrator shall be notified:

a. Environmental Protection Agency (EPA).

b. Kentucky Department of Natural Resources and Environmental

Protection:

(1) Division of Air Pollution Control.

(2) Division of Water Quality.

(3) Division of Solid Waste.

c. Kentucky Department for Human Resources Radiation Control Branch.

d. County/City Division of Sanitary Sewers or Water Pollution.

2. The Loss Control Administrator will greet the Officer and determine the reason for and nature of the visit.

3. If the visit is for routine information update or routine inspection, the Loss Control Administrator will assign a Supervisor knowledgeable in the area of interest to accompany the Officer during the visit.

4. The Loss Control Administrator and/or Supervisor will discuss sampling and monitoring location, technique, sample identification, parameters to be checked, methods and time of analysis. The Loss Control Administrator and/or Supervisor will accompany and assist the Officer in obtaining an accurate and representative sample; in addition, a duplicate sample will be obtained. All pertinent data concerning the sampling will be recorded immediately, and the Officer's information will be checked for accuracy. In the event of a known upset condition or unresolved disagreement concerning the appropriate sampling point, The Loss Control Administrator and/or Supervisor will obtain additional samples at the correct point to document the correction of the upset and/or the difference in results between the two sampling sources. All samples shall be of sufficient size to allow for both internal and third-party analysis. When appropriate, the Loss Control Administrator will request a copy of the analytical results obtained by the Officer from the Officer's samples.

5. Should any sampling of airborne chemicals, noise, dust, radiation, etc., be required by the Officer, the Loss Control Administrator and/or Supervisor will coordinate the sampling activity. The procedures as presented above will be followed.

6. At the conclusion of the Officer's visit, the Loss Control Administrator shall designate the appropriate personnel to prepare a summary report, including any analytical results. Copies of the report shall be forwarded to the Board and the Board's attorney.

CHAPTER EIGHT: LOCKOUT/TAGOUT PROGRAM

A. Purpose.

To establish the minimum OSHA requirements for the lockout/tagout of hazardous energy sources, the use of isolating devices, and to prevent the unexpected energization or start-up of equipment or release of stored energy.

B. Scope and application.

These requirements cover the maintenance of equipment where the unexpected energization, start-up, or release of stored energy could cause injury to employees. These requirements do not apply to the following:

1. Normal production operations where the employee is not required neither to remove nor bypass guards or safety devices, nor to place any part of the employee's body into a danger area during the equipment operating cycle.

2. Working on a cord and plug connected to electrical equipment for which exposure to the hazards of unexpected energization or start-up is effectively controlled by unplugging the equipment from the energy source and keeping the plug under the exclusive control of the employee performing the maintenance.

C. Definitions.

1. Affected Employee. An employee whose job requires either the operation of equipment or work in an area where lockout/tagout devices are used.

2. Authorized Employee. An employee who has been given the authority, responsibility and training by the employee's manager to implement a lockout/tagout procedure prior to starting maintenance on equipment.

3. Energy Isolating Device. A mechanical device that physically prevents the transmission or release of energy. Examples include manually operated electrical circuit breaker, disconnect switch, manually operated switch, slide gate, line valve, block, etc. (NOTE: Electrical energy isolating devices must simultaneously disconnect all underground supply conductors and interlocking circuits fed from all other sources.)

4. Energy Source. All sources of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy. Examples include energized electrical parts, hydraulic or pneumatic pressure, steam pressure, compressed or extended springs, pressure below atmospheric (vacuum systems), flywheels, batteries, capacitors, thermal energy (i.e., residual heat, low temperature), residual chemicals causing thermal or pressure buildups, gravity, static electricity.

5. Equipment. A term used in this document to denote tools, appliances, machines and other apparatus that utilize or produce energy.

6. Lockout. The placement of a lock on an energy isolating device in

accordance with an established procedure to ensure that the energy isolating device cannot be operated until the lock is removed.

7. Maintenance. A term used in this document to denote work place activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and servicing equipment. These activities include cleaning, lubricating or unjamming equipment and making adjustments or tool changes where employees may be exposed to unexpected energization or start-up of equipment or release of stored energy.

8. Tagout. The placement of a "do not operate" tag on an energy isolating device in accordance with an established procedure to indicate that the energy isolating device must not be operated until the tag is removed.

D. General Requirements.

1. Energy Control Program. The energy control program consists of a lockout/tagout procedure combined with employee training. The program intent is to ensure that hazardous energy sources are isolated and rendered inoperative prior to an employee performing maintenance on equipment where the unexpected energization, start-up or release of stored energy could cause injury.

2. Lockout/Tagout.

a. Energy isolating devices capable of being locked out shall be locked out and tagged according to the lockout/tagout procedure.

b. Energy isolating devices incapable of being locked out shall be tagged out according to the lockout/tagout procedure.

c. Whenever equipment is installed, relocated or undergoes major modification, renovation or repair, energy isolating devices capable of being locked out shall be installed.

3. Full Employee Protection.

a. A tagout device alone shall never be used on an energy isolating device that is capable of being locked out.

b. When a tagout device alone is used because an energy isolating device is incapable of being locked out, additional safety measures shall be taken to reduce the likelihood of inadvertent energization (e.g., removing an isolating circuit element, blocking of a controlling switch, removing a valve handle, opening an extra disconnecting device, etc.).

4. Energy Control (Lockout/Tagout) Procedure.

a. A procedure shall be developed, documented and utilized for the lockout/tagout of potentially hazardous energies during maintenance of each type of equipment, except that in certain limited situations, because of the simplicity of a particular piece of equipment and the lockout measures to be used, a documented procedure may

not be required when all of the following elements exist:

(1) The equipment has no potential for stored or residual energy.

(2) The equipment has a single, readily identified and isolated energy source.

(3) The isolation and lockout of that energy source will completely deenergize and deactivate the equipment.

(4) The equipment is isolated from that energy source and locked out during maintenance.

(5) A single lockout device will achieve a locked out condition.

(6) The lockout device is under the exclusive control of the authorized employee performing the maintenance.

(7) The maintenance does not create hazards for other employees.

(8) There have been no previous incidents involving the unexpected activation or reenergization of the equipment during maintenance.

b. The procedure shall clearly and distinctly outline the scope, purpose, authorization, rules, techniques to be applied, and the measures to enforce compliance, including the following:

(1) A specific statement of the intended use of the procedure.

(2) Specific steps for shutting down, isolating, blocking, and securing equipment to control hazardous energy sources.

(3) Specific steps for the placement, removal and transfer of lockout/tagout devices and the responsibility for them.

(4) Specific requirements for testing equipment to determine and verify the effectiveness of lockout/tagout devices, and other energy control measures.

5. Protective Materials and Hardware.

a. Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided for isolating, securing or blocking equipment and energy sources. Employees shall be provided their own lock for which they shall be solely responsible, and only the employee shall possess a key to his/her lock; supervisors shall not have a key to an employee's lock. Locks shall be clearly marked with the owner's name.

b. Locks and tagout devices shall be the only devices used for controlling energy and shall not be used for other purposes. Lockout/tagout devices shall meet the following requirements:

(1) Lockout/tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. Tagout devices shall withstand exposure to weather conditions and wet or damp locations without deteriorating or becoming illegible.

(2) Locks and tagout devices shall be standardized in color, shape or size. Tagout device print and format shall be standardized.

(3) Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. The attachment means shall be a self locking, non-reusable nylon cable tie.

(4) Locks and tagout devices shall indicate the identity of the employee applying the device(s).

6. Periodic inspection.

a. The annual Lockout/Tagout Inspection Form shall be used by Supervisors to conduct inspections of the lockout/tagout procedure, at least annually, to ensure that the procedure and the requirements of this standard are being followed. The inspection shall be conducted by an authorized employee other than the employee using the procedure being inspected. Inspection results shall be used to correct any deviations or inadequacies observed. The inspection shall include a review of responsibilities with each authorized employee. If "tagout" only is used for energy control, the inspection shall include a review of responsibilities with each affected and authorized employee.

b. Periodic inspections shall be certified. The certification shall identify the equipment on which the lockout/tagout procedure was being used, the inspection date, the employees included in the inspection, and the name of the person conducting the inspection.

7. Training and Communication.

a. Management must ensure that training is provided to ensure that the purpose and function of the energy control program is understood and that employees have the knowledge and skills required for the safe application, usage, and removal of energy controls. Training shall include the following:

(1) All employees shall be instructed in the significance of lockout/ tagout procedures by their Supervisor.

(2) Affected employees shall be instructed in the purpose and use of lockout/tagout procedures by their Supervisor.

(3) Authorized employees shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available, and the methods and means necessary for energy isolation and control.

b. Management must ensure employees are trained in the following

limitations of tags used without lockout devices:

(1) Tags are essentially warning devices and do not provide the physical restraint or the same level of safeness that is provided by a lock.

(2) Tags shall only be removed by the authorized employee who attached it or the employee's Supervisor. They shall never be bypassed, ignored or otherwise defeated.

(3) Tags shall be legible and understandable by all employees who are or may be in the area.

(4) Tags and their means of attachment shall be made of materials which will withstand the environmental conditions encountered in the work place.

(5) Tags may give a false sense of security, and their meaning needs to be understood.

(6) Tags shall be securely attached to energy isolating devices so they cannot be inadvertently or accidentally detached.

c. Management must ensure that retraining is provided for all authorized and affected employees whenever there is a change in their job assignment, a change in the equipment or process that presents a new hazard, a change in the lockout/tagout procedure, or whenever a periodic inspection reveals that there are deviations from or inadequacies in the employees' use of the procedure. Retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

d. Training records shall certify that employee training has been accomplished and is being kept up-to-date. The certification shall contain each employee's name and date(s) of training. These records must be retained by the employee's Supervisor as long as the employee is performing maintenance on the equipment.

8. Energy Isolation.

a. Implementation of the lockout/tagout procedure shall be performed only by an authorized employee.

b. The authorized employee shall notify all affected employees when lockout/tagout devices are applied or removed.

c. Each lockout/tagout procedure shall cover the following elements and actions, and shall be implemented in the following sequence.

(1) Before equipment is shut down, the authorized employee shall know the magnitude, source and hazards of and the methods or means to control each type of hazardous energy.

(2) Operating equipment shall be shut down using the normal

stopping procedure to avoid any additional or increased hazard.

(3) Energy isolating devices shall be located and operated such that the equipment is isolated from every energy source.

(4) A lockout/tagout device shall be affixed to each energy-isolating device by the authorized employee:

(a) The lockout device shall be affixed in a manner that will hold the energy isolating device in a safe or off position.

(b) A tagout device shall be affixed in a manner that will clearly indicate that the operation or movement of the energy isolating device from the safe or off position is prohibited. When the tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

d. All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the maintenance is completed, or until the possibility of such accumulation no longer exists.

e. Prior to starting work on equipment that has been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the equipment has been accomplished.

E. Release from Lockout/Tagout.

Before the lockout/tagout device is removed and energy is restored to the equipment, the lockout/tagout procedure shall be followed and actions shall be taken to ensure the following:

1. Equipment. The work area shall be inspected by the authorized employee to ensure that nonessential items have been removed and that the equipment components are operationally intact.

2. Employees. Affected employees shall be notified by the authorized employee that the lockout/tagout device is being removed and the work area shall be checked to ensure that all employees have been safely positioned or removed.

3. Lockout/tagout device removal. Each lockout/tagout device shall be removed from each energy-isolating device only by the employee who applied it. The employee shall:

a. Notify the supervisor and affected employees if the equipment will be out of service for an extended period.

b. Verify that it is safe to remove the device and restore the energy to the equipment.

F. Additional Requirements.

1. Testing or positioning of equipment or components.

When a lockout/tagout device must be temporarily removed from the energy isolating device and the equipment energized to test, position, or debug the equipment or a component thereof, the following sequence shall be followed:

a. Clear the equipment of tools and materials.

b. Remove employees from the equipment area.

c. Remove the lockout/tagout device.

d. Energize the equipment and proceed with testing, positioning or debugging.

e. Deenergize all systems and reapply energy control measures.

2. Outside personnel.

These requirements also apply to contract personnel. Contractors' tags and lockout/tagout procedures may vary; however, the same level of control shall be provided by the contractors' programs. Before maintenance work is started, the Supervisor of the area shall insure that all affected employees understand the contractors' lockout/tagout procedures. Contractors shall provide their own lockout/tagout equipment compatible with GMWSS equipment.

3. Group lockout/tagout.

When maintenance is performed by more than one employee, the lockout/tagout procedure used shall afford a level of protection equivalent to that provided by the implementation of a personal lockout/tagout device. The lockout/tagout procedure used shall comply with the following specific requirements in addition to D.4 above:

a. Each employee shall affix his/her personal lockout device to each group lockout device when the employee begins work, and shall remove his/her device when he/she stops working on the equipment.

4. Shift or personnel changes.

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout/tagout protection, including provision for the orderly transfer of lockout/tagout devices between outgoing and incoming employees, to minimize exposure to hazards from unexpected energization or start-up of equipment or release of stored energy.

5. Other hazards.

Materials having toxic, caustic, or asphyxiant properties can present serious

hazards beyond the scope of this program. If any employee has any question regarding workplace safety, the Loss Control Administrator should be consulted prior to beginning the work project.

G. Related documents.

1. ANSI Z244.1-2003 (R2008) (American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements)

2. NIOSH (National Institute for Occupational Safety and Health - Guidelines for Controlling Hazardous Energy during Maintenance and Servicing)

3. Kentucky and Federal OSHA 29 CFR 1910.147 (Occupational Safety and Health Administration - Control of Hazardous Energy Sources (Lockout/Tagout)

LOCKOUT/TAGOUT INSPECTION FORM

Equipment Identification Number:_____
Equipment Name:_____
Date of Inspection:_____
Name of Authorized Inspector:_____
_____
_____

1. Removal of equipment from service:

		Yes	No	N/A
a.	Were all affected employees notified that the machinery or equipment was going to be locked out/tagged out?	( )	( )	( )
b.	Were all the hazardous energy sources and the associated energy isolating devices correctly identified and located?	( )	( )	( )
c.	Was the equipment shutdown performed correctly?	( )	( )	( )
d.	Were the energy isolating devices operated So that the equipment was isolated from all hazardous energy sources?	( )	( )	( )
e.	Were lockout/tagout devices placed on all the energy isolating devices?	( )	( )	( )
f.	Were approved lockout/tagout devices used and listed in the procedure?	( )	( )	( )
g.	Were all potential hazardous stored energies relieved, restrained or otherwise rendered safe?	( )	( )	( )
h.	Was the isolation of hazardous energy sources verified to be effective by testing with appropriate instrumentation and by operating the normal equipment controls after ensuring that no personnel were exposed?	( )	( )	( )
i.	Were the equipment controls returned to the neutral or off position after verifying that the equipment would not start-up or cycle?	( )	( )	( )
j.	Were additional procedures dealing with shift or personnel change, group lockout/tagout and testing/positioning of equipment followed?	( )	( )	( )

		Yes	No	N/A
k.	Were unique lockout/tagout requirements for this equipment written in the procedures and followed?	( )	( )	( )

2. Release from lockout/tagout:

a.	Was the work area checked to ensure that all tools were removed, all shields were properly reinstalled, all interlocks were restored, and that the area was clear of hazards and personnel before the equipment was re-energized?	( )	( )	( )
b.	Were all affected employees notified that the equipment was going to be returned to service?	( )	( )	( )
c.	Were the lockout/tagout devices removed by authorized employee who attached them?	( )	( )	( )
d.	Were the energy isolating devices operated to restore energy to the equipment?	( )	( )	( )

3. General requirements:

a.	Does the lockout/tagout procedure provide adequate employee protection?	( )	( )	( )
b.	Did the authorized employee correctly explain their responsibilities under the lockout/tagout procedure before inspected?	( )	( )	( )
d.	Did the affected employees correctly explain their responsibilities under the lockout/tagout procedure being inspected?	( )	( )	( )

4. The following spaces shall be used to indicate the corrective action to be taken and the dates for completion for all "no" responses.

5. Supervisors shall retain the completed inspection forms for audit purposes.

_____

Inspector's Signature Date

CHAPTER NINE: CHEMICAL SAFETY

A. Program:

1. The control of chemicals is fundamental to an effective chemical safety program. The responsibility for chemical control extends through all levels of management and across departments. Chemicals must be controlled from selection, receipt and storage through distribution, work area storage and processing to environmental control of waste disposal. Special facilities, equipment and procedures are essential to provide a safe and healthful working environment. Further, these facilities and equipment must be properly maintained and personnel must be trained to ensure safety and health of all employees.

2. Each location of chemicals shall be organized and staffed to develop, communicate and implement a written chemical control program throughout the location. Departmental responsibilities must be clearly defined. The chemical control program shall include the responsibility of management and list requirements to be met by each department.

3. Coordination between departments is key to effective control of chemicals within a facility. Procedures shall be in place detailing which departments and support services (e.g., purchasing) are required to review requests for new chemicals. These procedures are designed to assist in determining and controlling exposures to employees or the environment from the manufacturing process, process usage, product maintenance, and product/process waste disposal.

Cross-reference:

See the Groundwater Protection Plan and Emergency Response Plan for GMWSS emergency plan

B. Responsibilities of Supervisor.

1. Selection and procurement of materials. The least hazardous material required to perform a task shall be selected. The hazardous properties of each material must be identified before procurement and use. Material Safety Data Sheets (MSDS) shall be kept in the workplace and must be readily accessible to employees during each shift when they are in their work areas. MSDS and the use of all chemicals require the approval of chemical coordination. A list of approved chemicals for use shall be maintained by each department.

2. Employee training.

a. All employees handling, storing, using or disposing of chemicals, and all employees with potential exposure in a foreseeable emergency, shall be trained prior to assignment to recognize and avoid the potential hazards of their specific job. The training shall include:

(1) Safety and health rules.

(2) Safe work practices.

(3) Use of personal protective equipment.

(4) Use of Material Safety Data Sheets.

(5) Chemical labeling.

(6) Physical and health hazards of chemicals used.

(7) Departmental procedures.

(8) Waste disposal procedures.

(9) Emergency procedures.

(10) Additional topics required by federal, state or local hazard communication "right to know" legislation.

b. As a minimum, additional training is required whenever a process changes or a new exposure is introduced. The frequency of additional retraining should be determined by management based on potential risk and exposure of the task. For example, with employees having a minimal exposure to chemicals or those exposed only in a foreseeable emergency, the frequency and scope of training may be reduced from the requirements imposed on employees that handle chemicals regularly. However, in all situations, management is responsible for ensuring that employees, at all times, have sufficient information and knowledge to avoid foreseeable occupational injury and illness.

3. Operating procedures. Written operating procedures which include requirements for personal protective equipment shall be provided for processes and manufacturing operations using chemicals. These procedures must include the requirements for personal protection equipment. Procedures shall also cover daily equipment inspection prior to start-up, process equipment start-up, normal and emergency shutdown, and preventive maintenance procedures. Information on using, handling, storing and disposing of chemicals shall be included in the operating procedures.

4. Inspections/safety audits. Supervisors shall ensure that regular checks for unsafe acts and potential hazards are conducted. Detailed self-audits of the department must be made to eliminate potential hazards. Records are to be kept of audit deficiencies noted and corrective actions taken. Any imminent hazards must be corrected and/or controlled without delay.

5. Incident reports. Any indication of an adverse employee reaction to a chemical will immediately be reported to Bluegrass Business Health and to the Loss Control Administrator by the responsible Supervisor. Personal protective equipment or any other items that have failed and caused the exposure should be kept for further investigation.

C. Chemical handling and storage.

1. Material Safety Data Sheets (MSDS) and labels. The chemical and physical properties of materials as documented in the MSDS and other reference sources will

determine the requirements for their safe handling and storage. MSDS or equivalent chemical precaution or chemical information sheets must be available for all chemicals. To ensure proper storage and handling, it is essential that all chemical containers, including waste containers, be properly labeled. Pipelines must be labeled with both the contents of the pipe and the direction of flow. Labels should be located at regular intervals along the length of the pipe, at all wall, floor, ceiling penetrations, at any tees or branches, and at all discharge points.

2. Unloading of bulk chemicals. Each fill pipe for a bulk chemical storage tank must be clearly marked with the name of the chemical stored in the tank. Fill pipes shall be locked or safeguarded to prevent wrong materials from being introduced into the storage tank. When a delivery vehicle arrives at the facility, the chemicals shall be checked according to the location procedure. Vehicles delivering flammable materials shall be grounded in an approved manner. Wheels on all vehicles shall be chocked before unloading. Chemical fill stations must be designed to safely handle any spills and overflows in accordance with applicable regulations.

3. Chemical handling. Truck docks used for the receipt of chemicals shall be equipped to safely handle the material, provide segregated temporary storage, and handle any spill emergencies. Common carrier shipments arriving damaged or leaking to the extent that delivery cannot be accepted must be off-loaded and repackaged to meet government compliance criteria before being returned to the vendor. All chemicals must be in accordance with the appropriate Environmental Protection Agency (EPA) and Department of Transportation (DOT) guidelines and specifications. Skid pallet loads of chemicals shall be checked for stability and banded or otherwise secured as necessary before being moved with power vehicles or hand trucks. Transport times and routes through occupied spaces shall be carefully selected to minimize personnel exposure.

4. Chemical storage and dispensing. In general, chemicals with different hazard classifications shall have segregated storage:

a. OSHA Class 1A flammable liquids shall not be handled, dispensed into or used from glass containers of more than one pint or 500 millimeter capacity. For Class 1B flammable liquids, glass containers of not more than 1 quart or 1000 millimeters shall be used. Glass lined metal containers of any size are acceptable if the metal container and its closing device can prevent spillage when the liner is broken.

b. Specially lined flammable liquid transport and storage cans may be used for Class 1A or 1B flammable liquids in processes and operations where a flammable liquid would be rendered unfit for its intended use by contact with metal, or would excessively corrode a metal container and the users process would require more than one pint of a Class 1A liquid or one quart of a Class 1B liquid used at one time. Exceptions may also be granted for analytical grade chemicals which are not available in less than one pint containers. Storage containers must be stored in flammable safety cabinets which meet the requirements of NFPA 30 and shall be labeled Flammable - Keep Fire Away. Flammable liquids must be stored in safety cabinets except when being used for the present work being conducted, unless the flammable liquids are in UL or FM approved safety cans.

c. Storage of flammable liquids within chemical distribution and storage

facilities shall be in flammable safety cabinets. If this is not practical due to the quantities present, a separate storage room must be provided, independent of all other flammable liquids storage and protected with the automatic sprinkler system specifically designed to protect flammable liquids. Other acceptable alternatives may be used so that these containers may be stored with other chemicals in the CDC provided such practices provide an equivalent level of safety and meet all government regulations.

d. Exceptions to the size limitations shall be approved by the Supervisor, and must not violate government regulations.

e. Appropriate personal equipment shall be available and used whenever chemicals are dispensed or stored.

f. Extremely toxic (poisonous) or unstable chemicals shall be stored in locked cabinets or compartments. In general, access to these chemicals must be restricted to authorized users and emergency response personnel. A current listing of authorized users of these materials shall be maintained. Records shall be kept of chemicals withdrawn showing amounts, dates, and signatures of authorized users. Supervisors of departments using chemicals with shelf life expiration dates shall ensure that proper identification of these materials and make certain that they are disposed of prior to the expiration date. Photo-resists, methyl methacrylate, and picric acid are examples of chemicals that, with age, can become unstable and potentially explosive.

g. Under no circumstances are ordinary refrigerators to be used for storage of flammable liquids. Explosion-proof refrigerators and freezers listed by UL or FM shall be used for storage of flammable liquids that require low temperature storage. Any refrigerator used for the storage of chemicals must be labeled to prohibit the storage of food or beverages within.

D. Emergency equipment.

1. General. Special emergency equipment may be required to meet reasonably foreseeable chemical emergencies. The need for such equipment shall be determined by the Supervisor in conjunction with the advice of appropriate staff personnel. This equipment shall be located to serve its purpose most effectively. Employees who work with chemicals or with chemical process equipment should be trained in emergency procedures. It is the responsibility of the Supervisor to ensure that employees have proper training.

2. Emergency control equipment. Emergency control equipment shall be selected to be both safe and effective in operation. Equipment that might be unsafe under certain conditions must have warning labels permanently attached to the equipment (e.g., water vacuums and portable exhaust fans that are not explosion-proof must not be used during flammable liquid spills.) After each use, the emergency equipment shall be promptly cleaned and restored to its original condition. Periodic inspections of control equipment should be performed to insure that it has not deteriorated due to aging, chemical attack or biological attack (e.g., mold or mildew.) All supplies used during an emergency should be promptly replaced.

3. Emergency showers and eyewash equipment.

a. Emergency showers and eyewash equipment must be available, accessible and operative where there is a potential for contamination of the eyes, face or body by irritant, corrosive, flammable, radioactive or other injurious materials. Immediate flooding with large amounts of water can minimize serious injury. Emergency showers may be omitted only when an eyewash fountain alone is judged adequate to treat injuries that can be reasonably expected to occur in the area.

b. All employees who might be exposed to chemical splashes shall be instructed in the proper use of the emergency showers and eyewashes.

c. The shower/eyewash units should be located as close as possible to the hazard without physically causing a hazard. The maximum time to reach a fixture should be determined by the potential hazardous effect or degree of hazard of the chemical itself. Normally, the maximum distance for the emergency fixture from the hazard is 25 feet (8 meters); however, if the situation justifies it, the distance can be extended up to 100 feet (30.5 meters). Emergency fixtures shall not be separated from the hazard by a wall or partition which would require an employee to pass through a doorway. If the potential hazard requires escape from the immediate area (e.g., spraying chemicals or inhalation concerns), the shower can be separated from the hazard. Free access to the fixtures must be maintained. Nothing that will inhibit access to or use of the equipment will be stored in the area.

d. Fixtures shall be clearly identified. It is recommended that each shower or eyewash location be identified with a highly visible sign and the area around or behind the fixture be painted a contrasting color and be well-lighted.

e. New equipment installations shall comply with ANSI Standard Z358.1 and meet the specifications below. Existing installations that do not meet these requirements shall be modified when facilities modifications or renovations occur. Maintenance requirements must be met for all installations.

f. A circle or square [at least 36 X 36 inches (1 X 1 meter) if feasible] should be clearly marked on the floor under the shower for delineation. Nothing shall be stored in this area nor shall access to this area be blocked.

g. Water piping for emergency showers shall be sufficient size to permit the shower head to discharge 30 gallons of water per minute under all operating conditions. Shutoff valves shall be arranged so that the supply of water will not be interrupted when the normal water service to the area is shut off. All valves used on supply lines shall be the indicating type and shall be clearly identified as to the type of service they control. Provisions should be made to prevent unauthorized shutoff. Drain systems should be installed where feasible; however, the chemical shall not enter the public sewer system without first being decontaminated.

h. The shower shall be tested at installation to verify flow rate and the diameter of the spray pattern shall be measured with the valve in the full open position. The water flow rate or the spray pattern shall be verified annually. In addition, emergency showers shall be activated quarterly to flush the line and to visually verify proper operation. Where the emergency shower is installed with supply lines separate from the eyewash, the shower must be tested monthly to verify proper operation and flush the line. A record of

these tests shall be maintained. The frequency of testing may be increased at the discretion of the Supervisor based on the nature of operations in the area.

l. Eyewash fountains require periodic testing to ensure proper flow and operation. The frequency of testing will vary depending on many factors such as risk, nature of operation, etc. The Supervisor of the department shall determine the frequency of testing; however, the time between tests shall not exceed one (1) month. The Supervisor is responsible for assuring that an inspection card is maintained and made available upon request. In facilities which are not normally occupied (such as remote storage areas), the eyewash shall be tested and the test recorded whenever someone enters the facility to perform any type of work where the potential for chemical exposure exists.

j. Eyewashes with spray rings along the bowl perimeter are not recommended. The spray ring eye washes already installed may remain, but these units should be discarded when facilities are renovated or refitted.

E. Compressed gases.

1. Hazards.

a. Handling. The potential for fire, explosion and personal injury exists when handling compressed gases. Explosion hazards can develop when compressed gases in cylinders are exposed to temperatures in excess of 125 degrees Fahrenheit (52 degrees Centigrade). Cylinders must not be placed close to heat-producing devices or open flame because the gas may expand, causing the over pressure vent to open or the tank to burst. Rough handling, jarring or dropping of cylinders may cause explosions or the release of toxic gases.

b. Leaks. Cylinders must be checked for leaks because many compressed gases can produce a suffocating hazard by displacing or diluting the air, leaving insufficient oxygen available to support life.

c. Fire or explosion. Fire hazards or explosions in confining enclosures can occur when flammable gases leak from cylinders, and many gases are toxic in small concentrations. Flammable and toxic gases shall be stored under roof in a secured area, but the area must be out of doors or in specially ventilated rooms or cabinets.

d. Toxic gases. Highly toxic or pyrophoric gases such as arsine, diborane, phosphine, and silane can create severe health exposures or the potential for explosions. Because of the severe potential of these gases, they should not be introduced into a facility, or into new areas of a facility, without the specific concurrence of the Supervisor. Special control guidelines must be in place and all involved personnel properly trained concerning the hazards and their controls before these materials can be used. Cylinders in storage or in use must be placed in cabinets with special exhaust systems and with a source of emergency power available to permit their continuous operation. Exhaust failure alarms and specialized training in evacuation procedures is required. Upon receipt in the receiving area, each compressed gas cylinder valve assembly shall be leak tested prior to being distributed or placed in storage. Cylinders of highly toxic gases shall be inspected or handled only by specially trained personnel wearing self-contained breathing apparatus. Signs shall be posted requiring that self-contained breathing equipment be used

in the event of an emergency involved with the use and storage of these gases. At least two units of self-contained breathing apparatus shall be located outside each area where these gases are located. For pyrophoric gases, personal protective equipment shall include full face shield and flame retardant gloves.

e. Oxygen. Oxygen cylinders should not be taken into confined spaces because of the potential for producing a higher than normal oxygen concentration. Oxygen can absorb into clothing and take as long as 15 minutes to disburse. This could lead to a flash clothing fire if the person came into contact with an ignition source.

2. Approved cylinders. The only gas cylinders accepted for GMWSS facilities bear a mark of approval by the DOT. These markings are stamped into the metal at the top of the cylinder and include the letters DOT (or ICC), and a series of numerals and a date which shows the month and year the cylinder was tested.

3. Outlet connections. Cylinders shall conform to the current American National Standards Institute (ANSI) Standard B57.1 on compressed gas cylinder valve outlet and inlet connections.

4. Gas identification markings.

a. All compressed gas cylinders shall be legibly marked with at least the chemical name or a commonly accepted name of the material being contained. Marking shall be made by stenciling or stamping. In the Untied States, cylinder marking shall conform to the current ANSI Standard Z48.1.

b. Cylinders that are not plainly marked or that do not have a protective valve cap shall not be accepted from the vendor. Cylinders must possess a removable tag containing the information required by law (see Material Safety Data Sheets and Labels.) For bulk storage areas, a placard or GMWSS chemical label for each gas may be posted (rather than individual tags) to provide warnings. However, the tags must be affixed to the cylinder during transportation and use. A tag indicating the condition of the cylinder (full/in use/empty) and the date placed in service must be affixed to the cylinder and prominently displayed when it is received for use.

5. Transportation.

a. Compressed gas cylinders should normally be transported in a vertical position, but they may be transported horizontally if needed (except for Acetylene cylinders, which must always be kept in a vertical position.) If it is necessary to transport a cylinder in the horizontal position because of its extreme height, the following shall apply:

(1) If the internal pressure of the compressed gas does not exceed 300 psi (21 kg/cm), it can be transported in the horizontal position.

(2) If the internal pressure of the cylinder exceeds 300 psi (21 kg/cm), the Loss Control Administrator should provide guidelines for the safe shipment of the compressed gas cylinder.

b. All compressed gas cylinders shall be secured during transportation to

prevent tipping, rolling or striking together. The protective valve caps must be securely in place at all times, except when in use. Toxic gas cylinders must be transported in open back trucks.

c. Delivery schedules and routes, particularly for toxic gases, shall be selected to ensure that potential exposure to employees is minimized. Employees transporting highly toxic gases must wear the appropriate protective equipment.

6. Storage.

a. Compressed gas cylinders shall be stored away from sources of heat or flames and secured to prevent tipping or striking of another cylinder. Those cylinders provided with a valve cap shall have the valve cap securely fastened (hand tight only).

b. To prevent rusting, the compressed gas cylinders shall be stored to protect against extremes of weather and from contact with the ground. The cylinders shall be protected against accumulations of ice and snow in winter and screened from the continuous direct rays of the sun in summer.

c. Cylinders which contain gases which have an affinity for one another and can form explosive mixtures (such as hydrogen and oxygen, oxygen and acetylene, acetylene and chlorine) shall be separated by at least 20 feet (6.1 meters) while in storage or separated by a fire barrier at least 5 feet (1.5 meters) high. Full and empty cylinders shall be stored separately. Cylinders shall be plainly marked to identify them as full, in use, or empty as the condition exists.

d. The distribution of compressed gases shall be on a first in, first out basis, especially where corrosive gases are involved.

7. General use.

a. Size. The smallest size of compressed gas cylinder available to suit the application shall be used.

b. Fastenings. Cylinders must be securely fastened in an upright position to a wall rack, welding gas transporter, or other substantial structure. (One-ton cylinders of chlorine represent an exception since the cylinders are stored in a horizontal position.)

c. Minimum pressure. Cylinders containing non-liquefied gases, except acetylene or refrigerants, shall be removed from service when the regulator pressure drops to 25 pounds per square inch (1.75 kg per square centimeter).

d. Leak testing. Leak testing of the valve assembly and all fittings shall be made after the connections have been completed. It is recommended that an approved leak detection fluid and instrument be used to perform the testing. (Soapy water, oil, grease and fats must not come in contact with cylinders containing chlorine or oxygen, as a violent reaction may occur.)

e. Regulators. The correct regulator must be used for the specified gas. Thread adapters which allow a regulator to fit another cylinder containing a different type

gas shall not be used.

f. Toxic gases. If a flammable or toxic gas cylinder develops a leak that cannot be controlled by closing the valve or tightening the valve stem packing nut, the cylinder must be moved by trained personnel to a safe location outdoors away from all personnel and sources of ignition. However, if the cylinder is in a gas cabinet, it should be left in the cabinet because the cabinet exhaust system will provide adequate ventilation.

g. Gas cabinets. All cylinders containing gases in a volume large enough to become a hazard to life shall be installed in an enclosure with special exhaust systems designed to eliminate the hazard. Emergency power and exhaust failure alarms are required on these types of installations.

h. Check valves. Check valves shall be installed between the cylinder valves and the regulators of oxygen acetylene welding equipment. These valves serve to prevent the flow of gas from one cylinder through the torch into the accompanying cylinder. The location of the check valves may be at the torch, in the hose, or on the hose side of the regulator.

8. Personal protective equipment. Protective clothing and full face protection shall be worn at all times where hazards to employees exist.

9. Emergency procedures. Procedures shall be developed at each location to handle emergencies caused by the malfunction of compressed gas cylinders and compressed gas systems. They shall be specifically designed for all types of problems which can be encountered in compressed gas cylinder installations. Approved self contained breathing equipment for use by trained emergency personnel shall e available and appropriately maintained. Special emergency procedures to handle leaking cylinders of highly toxic gases (arsine, phosphine, diborane, etc.) And pyrophoric gases (silane) are required.

F. Safe work practices.

1. General. Safe work practices can be expected only from knowledgeable employees who are supported by an effective and ongoing hazardous material training program. Employees shall not be assigned to any operations involving the handling of chemicals, including their use and proper disposal, until they have been adequately trained and qualified to perform the work. Qualification shall be based upon prior training plus experience under the close observation by qualified employees. The training must include the safe work practices established for each assignment by location management. Supervisors are responsible for ensuring that safe work practices are continually observed.

2. Personal protective equipment. The requirements for protective clothing and equipment must be detailed in writing for each assignment. Where special personal protection is required, no operation will be performed without its use. Worn or damaged articles of protective equipment shall be replaced immediately. If the protective equipment should fail, the cause should be determined. Training in personal protective equipment shall include selection, fitting, use, storage, cleaning and maintenance. Items that failed should be kept to aid in investigation of why it failed.

3. Regular equipment inspections. All equipment used in chemical operations, including personal protective equipment, shall be inspected regularly to ensure that it meets safety and health requirements.

4. Emergency procedures. Procedures shall be developed for handling emergencies in each assignment. Proper use of emergency showers and eyewashes, spill reporting and control, and emergency shut down of process equipment shall be included. Employees working in chemical areas must be capable of demonstrating a ready knowledge of emergency procedures.

5. Incompatible chemicals. Periodic reviews of chemical areas where there is a potential for the mixing of incompatible chemicals in waste cans, tanks, ventilation systems, or pipes should be made; all waste streams should be kept separate when possible. Where wastes are combined, it is essential that not only the virgin chemicals be considered, but also any known contaminants.

6. Materials handling. Chemicals should not be stored in containers which weigh more than 35 pounds unless a formal risk assessment has shown the material handling task to meet safe lifting criteria. Otherwise material handling devices must be provided. Five gallon safety cans are of special concern since they may weigh as much as 70 pounds when filled with higher density liquids.

CHEMICAL AUDIT CHECKLIST

Personal Protective Equipment

1. When was the last time you reviewed with your employees the required use of protective equipment (eye protection, goggles, face shields, gloves? Date ___/___/___

2. For those employees who are approved and trained to wear respiratory protection, is the equipment kept and maintained in accordance with requirements stated in procedures? Yes_____No_____

3. Are eyewashes clean, adjusted properly, and flushed and recorded daily? Yes_____No_____ What were the dates for the last shower tests for proper operation of each shower? Date ___/___/___

4. Have you checked to insure that all your employees are in compliance with contact lens requirements? Yes_____No_____

5. If your department bends glassware, or handles hot parts, what type of protective equipment do you supply for your employees and when were they last examined for damage? Date ___/___/___

6. If your department requires personal protective gloves and aprons, what type do you supply for your employees? _____ When were they last checked for physical damage or contamination? Date ___/___/___

7. Does the personal protective equipment match the recommendations on the Material Safety Data Sheets for the chemicals being used? Yes_____No_____

8. Do your Operating Procedures reflect the latest changes in procedures and include all health and safety aspects of the operation? Yes_____No_____

Storage

9. Do you provide a step stool or a portable ladder for reaching high storage shelves? Yes____No___ Date you last inspected ladder or stool for good condition? Date ___/___/___

10. When was the last time your chemical storage area was examined to avoid intermixing of incompatible materials? Date ___/___/___ Corrective action taken? Date ___/___/___

11. Are all containers closed tightly? Yes_____No_____

12. Do you ensure that chemicals are not left out and are returned to the proper storage area? Yes_____No_____ Date last checked? Date ___/___/___

13. By inspection, how many containers did you find without proper labeling? _____Corrective action taken?_____
_____ Date ___/___/___

14. What was the date of the last review to ensure that all chemical safety data sheets are available and your current chemical list corresponds to your inventory? Date ___/___/___

15. Are only authorized personnel obtaining chemicals from your stores? Yes_____No_____ How did you determine your answer? _____

_____

Chemical Handling

16. Have all your employees completed the annual Hazard Communication Training? Yes_____No_____

17. Are the proper waste containers being used for chemicals, rage, aprons, and gloves? Yes_____No_____

18. Do you have and maintain an active shelf life program for chemicals? Yes_____No_____ Which chemicals are outdated? _____

_____

19. Date the last time your chemical storage and waste areas were purged of unwanted chemicals? Date ___/___/___

20. When were your written chemical handling procedures last updated? Date ___/___/___

21. How is pipetting accomplished by your employees? _____

22. Date of syringe inventory list reconciliation? Date ___/___/___

23. Are chemical containers which weigh more than 35 pounds used? Yes_____No_____ If yes, are formal risk acceptances in place showing the handling practices to meet safe lifting criterion? Yes_____No_____

Flammable Combustible Liquids

24. Are all flammable stored in a flammable cabinet or flammable storage room? Yes_____No_____ What chemicals are not? _____
_____Corrective action taken? _____ Date ___/___/___

Chemical Audit Guide

25. Are flammable storage cabinets vented properly for your application? Yes_____No_____

26. If your employees are using flammable liquids in glass containers, is the criteria required by the Safety Manual relating to container size being followed? Yes_____No_____

27. What measures have you taken to prevent static discharge when employees are transferring flammable liquids?_____

28. If your employees transfer chemicals from 55 gallon drums, do you require the use of approved hand pumps and/or self-closing drum faucets?
Yes_____No_____

29. Is the condition of the flash arrester in all drum funnels satisfactory?
Yes_____No_____

30. Are there any electrical devices used with flammable liquids (such as hot plates, pumps, etc.) that are not explosion proof? Yes_____No_____

Compressed Gases

31. Are all the compressed gases in your department individually secured?
Yes_____No_____

32. Are all compressed gases labeled, indicating contents, pressure, full, in use, or empty? Yes_____No_____

33. How do you move cylinders from one location to another?_____
_____

34. Are all cylinders delivered to your department tested for leaks?
Yes_____No_____

35. Are you using any adapters to attach the regulator or CGA fitting to your cylinders? Yes_____No_____How can you be assured that you have the proper CGA and regulator for your specific gas?_____
_____

36. Have all gas lines carrying toxic and flammable gases been labeled and/or properly identified? Yes_____No_____

37. Have all gas lines carrying toxic and flammable gases been pressure and leak checked? Yes_____No_____ Date ___/___/___

Department audited_____
Supervisor's Signature_____
Date of audit_____

DEPARTMENT SAFETY AND RISK PREVENTION CHECKLIST

1. Are all Material Safety Data Sheets (MSDS) stored in a central, readily accessible location within the department? Yes_____No_____

2. Do employees know where the MSDS are located?
Yes_____No_____

3. Does the department have MSDS for all potentially hazardous materials in the department? Yes_____No_____

4. Are labels on containers of potentially hazardous chemicals intact and easily readable? Yes_____No_____

5. What is the first thing you do in the event of a chemical spill in your department_____

6. Is any special equipment required for handling chemicals in your department? Yes_____No_____ If yes, is the equipment readily available? (required special equipment information may e found on the MSDS for the particular chemicals.)
Yes_____No_____ List equipment required and availability: _____
_____

7. Do you feel that your department adequately trains employees in hazardous materials and the Right to Know laws? Yes_____No_____ If NO, please explain
_____

CHAPTER TEN: FIRE PREVENTION, FIRE PROTECTION AND EMERGENCY CONTROL

A. Responsibilities.

1. The Loss Control Administrator is responsible for the development of fire prevention, fire protection and emergency control programs. The objectives are to ensure the safety of all employees, the protection of GMWSS assets, and the continuity of business operations.

2. The Supervisor is responsible for implementing the fire prevention, fire protection and emergency control programs within their environments. Their knowledge and control of departmental conditions, the training of employees, and their support of GMWSS activities are essential to effective programs.

3. The Supervisor shall:

a. Provide procedures, regulations and training appropriate to GMWSS fire prevention, fire protection and emergency control needs. Employees involved in these activities shall be trained to do their work safely and competently.

b. Ensure that all areas have appropriate fire protection equipment maintained in constant readiness. Backup protection and prompt restoration shall be provided when this equipment must be temporarily out of service.

c. Maintain an emergency control capability to meet the probable emergencies that can reasonably be expected to occur.

d. Ensure that proposed changes in facilities, occupancy, layout or process are fully reviewed for life safety, fire prevention, fire protection and emergency control considerations.

B. Fire prevention program.

1. The GMWSS shall develop and maintain a fire prevention program that includes written procedures, regulations, schedules and other materials needed to ensure the following objectives are met:

a. Inform Supervisors and employees of the causes, nature and consequences of fire.

b. Minimize combustible materials.

c. Control ignition sources.

d. Minimize the possibility that combustibles and ignition sources can be present at the same time.

e. Establish an audit system that ensures program effectiveness.

2. Fire prevention guidelines. The following guidelines should be used in the development and auditing of the GMWSS fire prevention program. They outline the necessary controls for combustibles and ignition sources. The GMWSS should add items that could pose fire problems and include them in its fire prevention program.

a. Common combustibles and their controls:

Combustibles	Controls
Trash, Used Packaging covers, litter	Frequent removal. Storage only in metal containers, approved compactors, or automatic sprinkler protection.
Paperwork, Drawings, Reference materials, Metal supplies	Limit the quantity of exposed material. Prevent exposure by storing in closed cabinets or files. Large quantities of exposed material require special protection.
New packaging materials	Limit quantities, isolate in separate area. Large quantities require special protection.
Flammable liquids	Store minimum quantities in properly labeled combustible liquids metal containers or labeled safety cans. Store containers or cans in special ventilated storage cabinets or in isolated specially protected rooms. Use under adequate exhaust. Flammable liquids shall not be used where there are open flames, sparks or ordinary electrical equipment within the possible path of vapor travel. Flammable liquid bulk storage and handling systems require special controls.
Flammable gases	For transport, storage and use, secure cylinders upright and maintain excellent ventilation; keep caps in place; no rough handling; keep separate from oxygen cylinders. Special fire protection required in storage or use area. Special controls required on bulk systems.
Plastics (solid or foamed)	Minimize quantities, isolate and provide special protection.
Soiled rags	Place in properly marked, covered metal containers and empty containers daily.

b. Common ignition sources and their controls:

Ignition Sources	Controls
Electrical arcing	Electrical maintenance. Keep all switch, outlet and junction boxes covered, electrical cabinet doors closed. Routinely check wiring, cords and plugs for proper insulation and strain relief.

Electrical motors	Lubricate and check driven equipment routinely for free running. Keep motors free of dust and oil accumulation. Provide thermal motor overload protection.
Electrical equipment	Keep combustibles clear of any electrical equipment and completely out of electrical equipment rooms and mechanical equipment rooms without sprinklers.
Light bulbs and tubes bulbs	Keep all material clear of light bulbs and light fixtures. Use wire mesh guards where necessary to protect and fixtures from damage or contact.
Process equipment	Provide maintenance on regular schedule to prevent accumulation of combustible materials or development of ignition sources. Install and maintain fail safe controls to shut down equipment in case of abnormal operation. Provide special fire protection if process warrants it.
Fuel fired equipment	Install and maintain approved combustion controls. Clean, inspect and maintain fuel systems, burners, combustion chambers, flues and stacks on regular schedule. Do not store combustibles in heater rooms or near fuel fired equipment.
Electric hot plates, coffee pots	Eliminate to greatest extent possible. Restrict use to kitchen or vending area, or other special area that is free of combustibles.
Fire in other areas	Maintain integrity of floors, walls and ceilings. Prevent passage of smoke, heat or flames by cementing all openings around pipes and conduits. Replace missing or broken ceiling tile promptly. Provide independent support for pipes passing though fire walls.
Contractor operations	Require contractors to meet GMWSS standards for fire prevention and protection. Control the use and storage of flammable or combustible materials including paints, thinners, varnishes and adhesives. Ensure continuous ventilation during application and drying periods and use permit system noted above. Prohibit smoking in work and storage areas when necessary. Require frequent cleanup of combustible trash. Advise contractor of special problems such as chemical or gas lines or tanks in area. Inspect work and storage areas frequently. Treat any torch work the same as cutting and welding.
Smoking	Enforce no smoking rules in storage, packing, battery charging, flammable liquids and similar areas. Provide

adequate ashtrays in other areas. Keep ashtrays refuse separate from other trash.

C. Fire protection program.

1. General.

a. Even though sound fire prevention practices are followed, there is still the need for fire protection equipment capable of controlling a fire. The most potential fuel available, the greater must be the capacity of the fire protection equipment. Periodic reviews of potential fuel loads versus fire protection capacity shall be made to ensure that adequate protection is always available.

b. Before initial occupancy of new or renovated facilities, all required fire protection equipment must be installed and under the control of GMWSS management.

2. Fire protection requirements.

a. Portable fire extinguishers. At a minimum, portable fire extinguishers shall be provided to protect all areas of all buildings in accordance with the requirements listed above. Recharging and periodic hydrostatic testing of extinguishers shall be in accord with manufacturer's specifications. Extinguishers removed for recharging or testing shall be replaced with spares.

b. Fixed fire protection equipment. Specific fire hazards or areas of hazard may require specialized protection of fixed equipment such as automatic sprinkler systems, smoke detectors, carbon dioxide, or dry powder flooding systems, etc. The general requirements for fixed equipment are contained in the Kentucky Building Code. Fixed equipment shall be designed in accordance with National Fire Protection Association (NFPA) codes, insurance carrier requirements, and government regulations. Designs shall be submitted to the insurance carriers for approval prior to installation. Where fixed equipment is installed, its operation shall be indicated in a control center.

D. Emergency control.

1. Principle of probable need. It is not possible to provide trained personnel and special equipment for every conceivable emergency. Therefore, the procedures, training and equipment shall be selected to meet the probable emergencies that can reasonably be expected to occur.

2. Planning for emergency control. In planning the emergency control capability, the broadest possible participation by Supervisors shall be encouraged to identify probable emergencies, to develop control procedures, to establish training and emergency equipment requirements, and to revise plans as conditions change. Full consideration shall be given to the availability of community emergency services and equipment such as fire department, ambulance, and emergency rescue services, medical facilities, etc. The Supervisor responsible for fire prevention and emergency control programs shall maintain liaison with and conduct tours for these community service organizations to assure an effective response should it be needed. Plans for emergencies requiring first aid or medical attention shall be approved by the Loss Control Administrator. For large scale emergencies

such as floods, tornadoes and hurricanes, emergency plans and equipment shall be provided principally for the protection of people.

E. Inspections and audits.

1. General. The Loss Control Administrator shall ensure that required equipment and area inspections and program audits are completed and that deficiencies are promptly corrected. The Loss Control Administrator shall also be the point of contact for inspectors representing the GMWSS insurance carriers.

2. Insurance company inspections. Representatives of fire insurance carriers conduct periodic inspections of GMWSS owned or leased facilities. Their recommendations warrant careful considerations. Every reasonable effort should be made to eliminate or minimize a condition they find unsatisfactory. Insurance carriers require a written response to each recommendation, and copies should be forwarded to those included on the inspection report transmittal letter.

3. Monthly inspections.

a. Fire doors include stairwell doors shall be inspected monthly to ensure that the doors and their required self-closing devices are undamaged and the doors are unobstructed and not blocked open. Fusible link hold open devices are not permitted on stairwell doors.

b. Fire extinguishers shall be visually inspected monthly, and a maintenance type inspection in accordance with manufacturer's recommendations shall be made annually.

c. Emergency control equipment shall be inspected monthly to determine its availability in its proper location. Functional tests of emergency control communications equipment shall be made at least monthly.

d. Building equipment rooms including telephone equipment rooms and all areas containing substantial fire hazards shall be inspected at least monthly. This would include all storage areas, janitor closets, trash rooms, all areas using flammable or combustible liquids or gases, and all areas containing fuel fired equipment.

e. If applicable, sprinkler control valves shall be inspected annually if secured with a lock. (If seals are used, weekly inspections are required.)

4. Other required inspections.

a. Exhaust and collector systems should be inspected and/or cleaned on an annual basis. The inspection frequency may be modified if justified by experience. Fire dampers in these systems shall be checked annually to ensure that they are operational.

b. All building areas shall be inspected at least semiannually to determine that appropriate fire prevention practices are being followed and that the fire protection provided is consistent with requirements.

c. Fire protection, fire detection and other emergency control equipment shall be inspected and maintained in accordance with manufacturer's recommendations but not less often than semiannually.

d. Fire extinguishers shall be given a maintenance type inspection annually in accordance with manufacturer's recommendations by an authorized extinguisher service company.

e. Fire doors, including stairwell doors, shall be given a maintenance type inspection annually. Doors shall close freely and fully engage in latch or keepers when closed. Fusible links and pressure trips shall not be painted. Self-closing devices shall be fully operational.

5. Annual audit. Audits of plans, procedures, practices, equipment, and training shall be conducted at least annually.

F. Types of fire extinguishers and travel distances.

1. Definitions:

a. Class A fire: A fire involving ordinary combustible materials such as paper, wood, cloth and some rubber and plastic materials.

b. Class B fire: A fire involving flammable or combustible liquids, flammable gases, greases and similar materials.

c. Class C fire: A fire involving energized electrical equipment where safety to the employee requires the use of electrically nonconductive extinguishing media. (Extinguishers shall be distributed on the basis of the appropriate pattern for existing Class A or Class B hazards.

d. Class D fire: A fire involving combustible metals such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

e. Dry Chemical: An extinguishing agent composed of very small particles of chemicals including, but not limited to, sodium bicarbonate, potassium bicarbonate, urea-based potassium carbonate, potassium chloride, or monoammonium phosphate supplemented by special treatment to provide resistance to packing and moisture absorption (caking) as well as to provide proper flow capabilities. Dry chemical does not include dry powders.

f. Dry Powder:" A compound used to extinguish or control Class D fires.

2. Travel distance to fire extinguishers:

Class A	75 feet
Class B	50 feet
Class C	SEE BELOW
Class D	75 feet

3. Employees shall be trained at least annually in the use of fire extinguishers.

CHAPTER TWELVE: LABORATORY SAFETY

A. General

1. The operation of wastewater treatment plants and pumping stations can be a dangerous occupation if proper safety procedures are not followed. Physical injuries and body infections are continual threats. Explosions and asphyxiation from gases or oxygen deficiency are constant hazards. The injury rate of wastewater collection and treatment personnel is relatively high compared to other industrial groupings.

2. Safety measures for operation and maintenance of wastewater treatment plants are effective if hazards are known and if proper safety precautions are followed. Personnel should be aware of hazards, preventive measures, and emergency procedures. Any accidents or injuries which occur should be immediately investigated and recorded. Safety meetings, formal and informal, should be held on a regular basis, and safety equipment must be maintained and tested routinely. It is desirable that all employees become safety conscious and develop a personal concern in preventing accidents at their plant.

3. The phone numbers of several physicians, the nearest hospital, the police and fire stations, and one or more ambulance services should be prominently posted at each plant phone.

4. Safety Responsibilities:

a. The supervisory personnel at the wastewater treatment plant have a key responsibility for safety within the plant. The chief operator has direct control of the work being done by other workers in the plant, whether they are full-time or part-time, permanent or temporary employees, or contracted service personnel. It is his responsibility to set work patterns and implement a safety program. This can be done by instructing employees on safe working habits, and reviewing their work for compliance with established safety regulations. The chief operator should also conduct periodic safety inspections covering the facilities and equipment throughout the plant.

b. All employees have a responsibility to themselves, their families, and their jobs to do everything they can to prevent personal injuries. This can be done by following established safety regulations and using proper safety equipment in the daily work routine. Human error is the most significant cause of accident, and it is the employee's responsibility to perform his job safely.

5. Typical Causes of Accidents:

a. Safety surveys performed by the Water Pollution Control Federation (WPCF) provide the following general statistics about injuries and accidents in the wastewater treatment industry.

(1) The majority of injuries are incurred by non-certified workers with less than five years of experience.

(2) Over 75% of all injuries involve strains, wounds or sprains.

(3) Over 53% of all injuries involve the back, hand or leg.
(4) 70% of all injuries occurred at facilities with flows greater than 10 MGD.
(5) 50% of all sources of injuries occurred at off-site locations, with sludge handling equipment, external housekeeping, and manholes.

b. Some situations which can cause accidents are:

(1) Failure to plan safety in an activity.
(2) Failure to give necessary and thorough instructions.
(3) Failure to assign safety responsibilities.
(4) Failure to check equipment and safety devices before beginning a task.
(5) Failure to use safe working procedures.
(6) Failure to provide adequate manpower.
(7) Failure to make safety inspections.
(8) Failure to use protective devices.
(9) Failure to use tools correctly.
(10) Failure to use equipment properly.

6. Accident Reporting And Investigation

a. Injuries and illnesses that may be work related must be reported to the plant management. Prompt and accurate reporting of injuries, regardless of severity, is an important step in preventing the same accident from occurring again. After an accident, some aspects to consider as to why the accident occurred are:

(1) Who was at the accident scene?
(2) What damage occurred?
(3) Who was injured?
(4) Who was in charge when the accident occurred?

B. Rules and Procedures

1. General:

a. A safety program is necessary for any utility, and this is especially true in sewage treatment plants. The purpose of this safety program should be to define the principles under which the work within the plant is to be done, and to make the plant employees aware of safe working procedures.

b. A safety suggestion program is an especially valuable means of acquiring safety training, since it not only provides a means of securing many worthwhile ideas for more effective safe work practices, but it also encourages the plant employees to think about safety.

c. One of the most effective methods of establishing and maintaining an effective safety program is to appoint a safety committee. The purpose of this committee would be to create an interest in safety among the workers at the plant and to emphasize the employees' responsibility for preventing accidents. The duties of this committee would

be as follows:

(1) To report unsafe conditions or practices to the superintendent and to municipal officials.
(2) To warn plant employees of dangerous practices.
(3) To instruct plant employees in safe practices.
(4) To investigate accidents and make recommendations.
(5) To stimulate an interest in safety.

2. Hygiene:

a. Wastewater prior to disinfection exposes personnel to hazards of water borne diseases such as typhoid, tetanus, amebic dysentery, infectious jaundice, and other intestinal and skin infections. Because the majority of these infections reach the body through the mouth, nose, ears, or eyes, personal hygiene and careful work habits are a must. The following hygiene rules should be practiced by the plant staff:

(1) Hands and fingers should be kept from the nose, mouth, ears, and eyes.
(2) Rubber gloves should be worn when coming in contact with wastewater or sludge.
(3) Wash hands thoroughly before eating or smoking.
(4) Store clean clothes separately from work clothes.

C. Operational Safety Considerations

1. The following is a minimum list of safety considerations for each major plant area:

a. Bar Screens: Verify that guards are in place; use electrical lock out when work is being performed on the units.

b. Grit Chamber: Adequate ventilation is required; there is a potential for the development of an explosive atmosphere if volatile material is present in the wastewater; proper housekeeping will help prevent slippery floors; use electrical lock out when performing maintenance on grit removal equipment.

c. Aeration Basins, Clarifiers, Thickeners, Aerobic Digesters, Contact Tanks and Other Open Basins: Verify that handrails are secure; safety equipment such as life vests and life lines should be properly maintained and readily available; keep walkways clear of debris, ice, snow, tools, etc.

d. Chlorine/Sulfur Dioxide: Keep water away from cylinders; do not store combustible material near cylinder; use the appropriate tools on cylinder valves; check joints and valves for leaks on a regular basis (at least weekly).

e. Sludge Conditioning: Polymer should have safety data sheets to document potential hazards; clean up polymer spills immediately with large amounts of water (polymer solvent may also be used) to prevent slippery conditions.

f. Belt Filter Presses: Keep hands, arms and loose clothing away from moving belts and rollers; verify that protective guards are in place during operation; keep work areas clear of water, sludge, debris, and tools; use electrical lock out when performing maintenance or cleaning equipment.

D. Occupational Hazards

1. The hazards commonly associated with this type of wastewater treatment plant may be classified into the following broad categories.

a. Bacterial and Viral:

(1) Constant caution is necessary to prevent infection by the bacteria and viruses present in sewage. Workers are continually exposed to such waterborne diseases as typhoid fever, amoebic dysentery, and infectious hepatitis. Tetanus and skin diseases must also be guarded against. The local health department should be requested to notify plant personnel when cases of waterborne diseases are encountered. Some of the more basic, if not obvious, rules of safety are as follows:

(a) Personnel cleanliness cannot be stressed too strongly. Personnel must make a habit of frequently and thoroughly washing with soap and hot water, especially before meals and before leaving the plant.

(b) Wastewater and sludge on hands contaminates doorknobs and fixtures. Dirty clothing or careless hand washing may spread infection beyond the wastewater plant area.

(c) Emergency first aid must be promptly given to all minor cuts or injuries. A 2 percent tincture of iodine or tincture of merthiolate solution should be immediately applied to any wound or cut. Major injuries must be treated by a physician at once. As many persons as possible should have Red Cross first aid training.

(d) Rubber gloves should be worn when handling sludge, wastewater or similar materials. Special precautions should be taken to prevent wastewater from coming in contact with open cuts or other injuries. Fingers must be kept out of the nose, mouth, and eyes at all times.

(e) Drinking water from any source other than regular drinking fountains must be prohibited. Hands should be thoroughly washed before using the drinking fountains.

(f) Personnel should have typhoid and tetanus inoculations followed by booster shots at the appropriate intervals.

(g) There should be no smoking in sewers or in other areas in the vicinity of wastewater or sludge. It is impossible to avoid contamination of the ends of cigars, cigarettes or pipes.

(h) Cross connection inspections should be conducted frequently to prevent any accidental occurrence resulting in exposure of an operator to

waterborne disease.

2. Mechanical and Physical:

a. Some of the general safety precautions to take against mechanical and physical hazards follow:

(1) When employees repair or perform maintenance on automatic or remote controlled equipment, the power must be shut off so that equipment cannot be started. Lock out switches at the equipment motor should be off and marked with red tags. Where this procedure is impossible, power should be shut off at the motor control center or lighting panel as appropriate and the breaker marked with a red tag. The red tag should read "WORKMAN IS WORKING ON LINE" and be signed by the workman. The tag should be removed only by the person whose name is on the tag.

(2) Insofar as practicable, lubrication or adjustments should not be made on machinery in operation. If such services must be performed on operating machinery, a second man must be present and stationed at the stop start switch.

(3) Belt guards must be kept in place.

(4) Floors and stairways must be kept clean, dry, and free of grease, oil, and ice to prevent slipping.

(5) Tools must be picked up and manhole covers or hatch covers kept closed. If it is necessary for openings to be uncovered, they must be protected with guards and warning signals.

(6) Cleaning fluids with flash points below 100 degrees F should not be used.

(7) Hard hats should be worn by personnel working in areas where tools or other heavy items may be dropped from above.

(8) One of the most common injuries results from lifting objects improperly. All personnel should become familiar with correct lifting techniques, and should use hoists and power equipment wherever possible.

(9) Life preservers with throw lines should be attached to railings around open tanks. Also note that it is almost impossible for a person who falls into an aerated basin to swim due to the loss of buoyancy.

(10) Tools to be used in an empty tank should be lowered in a pail on a rope and removed in the same way.

(11) While washing floors, all personnel should wear rubber boots with good, threaded soles and heals.

(12) When an extension ladder is used to enter an empty tank, the

ladder should be lashed to a handrail.

(13) Clothes must not be hung on electrical disconnect handles, light switches or control panel knobs.

(14) A safety belt with a short rope and safety snap should be used by personnel when leaning out through the railings over any tank.

(15) Fire prevention is an important part of every safety program. Flammable materials should be kept in approved safety cans. Oily rags should be stored outdoors in a covered bin.

(16) Permanent warning signs should be placed at all hazardous locations and should be supplemented by temporary signs during emergency operation.

(17) Sharp projections or locations of low headroom should be padded and identified by being either marked clearly or painted with a contrasting color.

(18) Employees working in noisy areas for prolonged periods should wear ear protecting devices.

(19) Manhole covers, hat covers, gratings, etc. should be kept in place. Whenever the opening is exposed, it should be constantly attended by someone or be protected by removable standards.

3. Confined Spaces:

a. The air within confined spaces such as wetwells, tanks, and manholes can be deficient of oxygen or can contain noxious or toxic gases. Normal air contains about 21 percent oxygen by volume. Any atmosphere containing less than 21 percent oxygen will be dangerous to human beings and is termed "oxygen deficient". Such a situation may occur in any confined space if another gas displaces the oxygen. Oxygen deficiency may also occur in a confined space, such as a basement, where sludge or other organic material may have spilled. An oxygen deficiency indicator should be used to measure the amount of oxygen in an area. A portable air blower can be used to restore adequate ventilation. The discharge hose should extend well into the structure, the blower allowed to run for awhile, and the atmosphere retested before anyone attempts an entrance.

b. Noxious and toxic gases or vapors may also exist in enclosed area. The following are some of the more common hazardous situations found in treatment plants:

(1) Gas emitted by wastewater or sludge is explosive when mixed with certain proportions of air; it can be asphyxiating and is sometimes toxic. Methane is the main constituent of such gas mixtures and accounts for 60 to 70 percent of their volume. It is odorless and colorless and cannot be detected without testing equipment. Manholes, wetwells, and other enclosed or poorly ventilated spaces should not be entered for inspection or repairs until their atmosphere has been tested for flammable gas mixtures, for oxygen deficiency, and for hydrogen sulfide. If any doubt exists about the quality of air in a confined space, positive ventilation or self-contained breathing apparatus should be

used. Two other employees of ample strength should always be present in case of trouble.

(2) Hydrogen sulfide has an odor similar to rotten eggs and can be easily detected by smell in small concentrations. However, in strong concentrations, it causes impairment or temporary loss of sense of smell and may cause suffocation before one realizes what is happening. Manholes, wetwells, and other poorly ventilated spaces should not be entered if a hydrogen sulfide reading obtained by a detector is in excess of 0.005 percent.

(3) Gasoline and other flammable volatile substances find their way into the sewer systems from time to time. Such materials pose a serious fire and/or explosion hazard in sewers, wetwells, or wherever there is an open surface of wastewater. Smoking or open flames should be absolutely prohibited in such areas, and only explosion proof lights or flashlights should be permitted. Tools should be of the non sparking type.

(4) Materials releasing toxic gases may also enter the sewer occasionally and could cause hazards in the previously mentioned areas. Personnel should be alert to such danger and be sure that an area is purged of all foreign gases before entering. If irritation of the eyes, nose or throat is experienced, personnel should leave immediately.

(5) The first employee to enter a confined area should wear a safety harness and be "witnessed" by two employees of ample strength who can pull him to safety if necessary. A good rule to observe around treatment plants is never to go alone in a tank or other hazardous location. Someone should be present who can observe the worker's condition and who is equipped to give all necessary assistance in case of emergency.

(6) Smoking should be prohibited in or near hazardous areas such as manholes or wetwells.

(7) Responsible personnel should be familiar with the care and use of the oxygen deficiency detector, the combustible gas detector, the hydrogen sulfide detector, the self-contained breathing apparatus, the safety belt, and the safety harnesses.

(8) Painting in confined areas should be done only with proper ventilation.

c. To summarize the preceding list: If a condition exists where all test (combustible gases, hydrogen sulfide, carbon monoxide, and oxygen deficiency) show no hazardous conditions, then a workman in a safety harness may enter the potentially hazardous structure. Two men must be available outside the structure to assist. No one inside the structure should smoke. Always use non-sparking tools. Test the air at frequent intervals, as the composition of air in the structure may change. If tests show noxious gases or an oxygen deficiency, the structure should be thoroughly ventilated and retested until the tests prove negative. If tests show a hazardous condition and there is an emergency such as an unconscious workman, then other workmen must have the proper type of breathing apparatus to enter the structure. Works in an explosive or dangerous atmosphere must be aware of the dangers and of the proper procedures for encountering the dangers.

4. Plant Laboratory:

a. Only experienced or well instructed personnel should be permitted to work in the plant laboratory. The laboratory and its equipment should be used only for their intended purpose.

b. The following safety precautions should be taken in the laboratory:

(1) Store all strong acids and alkalis in clearly marked bottles where they can be conveniently reached without climbing.
(2) Use rubber bulbs on pipettes.
(3) Keep lab tables clear when not in use.
(4) Wear protective gloves, aprons, and goggles when handling hazardous materials.
(5) Use water-soluble jellies when making glass-to-hose or other similar connections.
(6) Keep labware clean.
(7) Discard any chemicals that cannot be identified.

5. First Aid:

a. Personnel should be familiar with first aid procedures. In case of serious injury, a doctor should be called or the injured person should be taken to a hospital by ambulance.

6. Safety Equipment:

a. Plant personnel should know how to use the safety equipment at this plant. Typical safety equipment includes:

(1) One self-contained breathing apparatus suitable for use for at least 30 minutes of severe service in hazardous areas. The unit should have a full visor face mask with a shatterproof glass eyepiece, a demand type regulator which keeps a positive static pressure in the mask, and a 45 c.f. air cylinder. The unit should have a carrying case and a spare charged air cylinder.
(2) 1 - Stretcher.
(3) 4 - Fire blankets.
(4) 1 - Safety harness with 50 feet of 3/4-inch rope.
(5) 1 - Hydrogen sulfide detector with carrying case.
(6) 1 - Combustible gas indicator with carrying straps, a five-foot ampling tube, and a probe tube.
(7) 1 - Oxygen deficiency indicator with sampling tube and carrying case.
(8) 1 - Safety lantern with battery.
(9) 6 - Explosion-proof 3-cell flashlight with batteries.
(10) 6 - Pairs of all purpose plastic coated work gloves.
(11) 2 - Protective helmets.
(12) 4 - Pair of heat-resistant gloves.
(13) 1 - Pair of phython neoprene gloves.
(14) 2 - Pair of natural rubber work gloves.

(15) 2 - Synthetic rubber-coated aprons.
(16) 6 - Chemical splash goggles with replacement lens.
(17) 3 - Air purifying respirator

7. Fire Hazards

a. Fires are a serious threat to the health and safety of treatment plant workers and to the structures and equipment at the plant. It is management's responsibility to instruct all employees in fire control methods, fire prevention practices, and fire hazard identification.

b. The ingredients of all ordinary fires are:
(1) Fuel: Paper, wood, oil, solvents, gas.
(2) Heat: Variable depending on flashpoint of fuel.
(3) Oxygen: Normally at least 15% of oxygen in the air is necessary to sustain a fire.

c. To extinguish a fire, it is necessary to remove only one of the above essentials by:

(1) Cooling: Temperature and heat control.
(2) Smothering: Oxygen control.
(3) Isolation: Fuel control.
(4) Locations of potential fire hazards include:
(5) Sewers and manholes
(6) Wetwells
(7) Sludge pumping stations
(8) Pipe Galleries
(9) Flammable storage areas
(10) Fuel tanks
(11) Maintenance garage
(12) Laboratory
(13) Any area being repainted
(14) Chemical storage areas

d. To reduce fire hazards, the following general procedures are recommended:

(1) Do not allow waste paper, rags and other combustible material to accumulate.
(2) Open flames and/or smoking should be restricted to designated areas only.
(3) Flammable liquids should be kept in approved safety cans and properly identified. Do not use flammable liquids for cleaning purposes.
(4) Remove dust accumulation with a vacuum cleaner.
(5) Use proper handling equipment (nozzles and containers) to avoid spilling chemicals. All chemicals should be labeled as to content and usage instructions.
(6) Employees should be familiar with the location and use of fire extinguishers. Periodically check extinguisher charge; recharge if required.

(7) Defective or inadequate electrical devices and wiring should be repaired, removed or replaced. Do not use oversized fuses. Keep electrical boxes closed during operation.

(8) Install warning signs near gasoline, natural gas and other fuel areas.

8. Materials Handling:

a. Mishandling materials accounts for approximately 20% of all occupational injuries such as strains, sprains, fractures and contusions. Improper lifting, incorrect gripping, failure to wear personal protective gear, failure to follow safe working practices, carrying too heavy a load, and incorrect handling of heavy barrels, drums, bags are some of the most common ways injuries occur.

b. Some general rules to help prevent injuries are:

(1) When lifting loads by hand: Feet should be parted, one foot alongside the load and one behind, the back foot provides body thrust to lift the load. The back should be straight and the knees bent. Hold the load close to the body.

(2) Objects that are too heavy or bulky should not be lifted without assistance.

(3) Check the object to be handled for sharp edges and slippery surfaces.

(4) Keep hands free of oil and grease.

9. Chemical Handling:

a. Some general rules to help prevent injuries and reduce chemical hazards are:

(1) Wear appropriate protective gear when handling chemicals.
(2) Observe all warning labels for the chemical being used.
(3) Keep chemical storage and mixing areas clean and free of debris.

10. Chlorine Hazards:

a. Chlorine gas is heavier than air and extremely toxic and corrosive in moist atmospheres. Dry chlorine is relatively safe in steel containers and piping, but with moisture it must be kept in corrosion resistant materials such as silver, glass, teflon, and certain plastics. The gas is irritating to mucous membranes of the nose, throat, and lungs; a small percentage of chlorine gas in the air causes coughing. Prolonged exposure at higher concentrations can be fatal.

b. Inhaling chlorine gas causes general restlessness, panic, severe throat irritation, sneezing, and excess saliva production. These symptoms are followed by coughing (at a concentration of approximately 30 ppm), vomiting and breathing difficulty. Concentrations of chlorine gas in excess of 1000 ppm may be fatal after a few breaths.

c. The following special precautions should be taken to reduce potential

hazards of chlorine handling:

(1) Instruction on emergency procedures, and use of emergency repair kits and self-containing breathing apparatus should be provided regularly.

(2) Practice safe working procedures when handling chlorine.
(3) Verify that leak detection equipment is operable.
(4) Do not attempt to repair a leak unless appropriate respiratory equipment is used.

11. Inadequate Ventilation Hazards:

a. Adequate ventilation is required to prevent the formation of explosive gas mixtures, and to maintain a safe working environment for employees.

b. Positive mechanical ventilation systems are provided in buildings, pumping stations, grit and sludge processing areas, and other locations where there is a risk of oxygen deficiency or mixture of explosive gases.

c. Portable blowers, air exhausters, and air compressors are alternative ventilation devices for manholes, sumps, pits, wetwells, and submerged areas where temporary forced ventilation may be needed to ensure a safe working atmosphere. Plant ventilation systems should be inspected and maintained regularly to provide continuous, uninterrupted operation.

d. A ventilation system should be operated continually if there is an open flow of untreated wastewater because of the potential presence of explosive or poisonous gases. Only explosion proof tools and equipment should be used in areas requiring ventilation to prevent explosive conditions.

e. The following general procedures will help reduce the possibility of inadequate ventilation hazards:

(1) Perform regular preventive maintenance.
(2) Inspect ductwork and filter housings for leaks or blockages.
(3) Check the ventilation system for adequate air distribution.
(4) Use gasoline or electrically driven portable blowers to provide forced ventilation of sewers and manholes. Ventilate sewers and structures by removing manhole covers upstream and downstream of the work area.

12. Electrical Hazards:

a. All plant employees must have a basic understanding of safety required around electricity. Under certain conditions (not footing around electrical current) even low voltage currents can kill. Lockout procedures discussed in this section are designed to prevent accidental starting of equipment while it is being worked on.

b. A victim of electrical shock must be freed from the live conductor by use of a dry stick or other nonconductor (never use bare hands to remove a live wire). After calling 911, artificial respiration should be supplied immediately and continuously until

breathing is restored or until a emergency rescue team arrives. Always assume a circuit is live unless it is positively known to be dead. The following are some general rules for electrical maintenance safety:

(1) Do not ground yourself inadvertently to piping or other metallic equipment when working on or in contact with electrical equipment or wiring. Do not pass tools to or otherwise touch a person who is grounded.

(2) Only qualified and authorized people should work on electrical equipment or perform electrical maintenance.

(3) Electrical controls should be kept in safe working order, accessible, and well marked.

(4) Keep wires from becoming a tripping hazard.

(5) Never use metal ladders or metal tape measures around electrical equipment.

(6) When working over a energized system, cover it with an electrical insulator.

(7) No safety device should be made inoperative by removing guards, using oversized fuses, or blocking or bypassing protective devices unless it is absolutely essential to the repair or maintenance activity.

c. Two employees should be required to work on energized equipment that operates at 440 volts or higher. Contact with 440 volts may be lethal. When two employees work together, one can double check the other, and there is always one person available to de-energize circuits, apply first aid, or summon help in case of an accident.

d. The most important safety requirement in electrical maintenance is to have and adhere to a lockout system when equipment is being repaired. A standard lockout system would be:

(1) Alert the operator.

(2) Before starting work on any power driven equipment, make sure it cannot be started without your knowledge.

(3) At the disconnect switch box, open the circuit and padlock the switch in the "off" position. Attach a tag with a description of the work being done, name, and date.

(4) When work is completed, remove padlock and tag.

e. Grounding: Before any work is performed on a line or bus that operates at a voltage of 440 or higher, in addition to being de-energized and locked out, it should be grounded. Before grounding the line or bus, verify that it is de-energized by testing with a volt meter.

f. Background: Precautions should be taken to verify that there is no possibility .of a backfeed on a de-energized circuit. Backfeed can occur from a tie with another electrical source; a control circuit that is interlocked with a control feed from another source; the high voltage side of a transformer that is not disconnected from the bus or the low voltage side of the transformer that becomes energized from another source acting as a step up transformer and energizing the bus at a high voltage; or from standby or emergency electrical power source.

g. Portable Electrical Tools: Tools that are not double insulated should be equipped with a separate electrical conductor that will ground the metallic case of the tool. Cords should be examined periodically to insure against leakage caused by wear, cut, or abrasion. Care should be used when working in wet locations. Portable electrical tools should not be used where an explosive hazard exists.

(1) Know what is behind or under material being drilled or cut with power tools. If the tool penetrates energized electrical wiring, the current can flow through the tool and the workers body to the ground. Accidents can be avoided by referring to electrical record drawings or inspecting surrounding electrical equipment for any unexposed wiring. If in doubt, de-energize the circuit in the work area.

h. Live Busses: Before working inside switchgear, motor control centers, and other locations where there are exposed energized busses, all conductors should be de-energized to the greatest degree practical. If some circuits remain energized, take the following precautions:

(1) Cover live busses with insulating blankets.
(2) Prevent accidental contact with live busses.
(3) Live parts should be touched only when absolutely necessary and then only when standing on a dry insulating surface, clear of all other conductors or grounding surfaces. Rubber safety gloves in good tested condition and approved for use on the voltage should be worn. Touch a circuit with only one hand.
(4) Prevent eye damage from possible high intensity arcing by wearing protective goggles when working on energized switchgear.
(5) Remove rings, watches, metal frame glasses, and other jewelry before working on energized switchgear.

i. Neutral Grounding: The general practice is to ground the neutral of plant distribution and utilization supply systems. This insures that the voltage between any phases and the ground is limited to the neutral voltage phase (86.6% of line voltage). If an accidental ground occurs in electrical equipment or wiring, ground fault current will flow, trip a circuit breaker, and separate the faulted circuit from the system.

j. Metallic Objects In The Work Area: A potential hazard in electrical work is small metallic objects such as tools, flashlights, and jewelry making contact with or shorting across live electrical parts. Pliers, screwdrivers, wrenches, or other tools used in electrical work should have insulated handles. The un-insulated working surfaces of these tools should be as small as practicable to minimize the possibility of metal contacting live parts.

k. Explosion Proof Equipment: Before breaking the seal on an explosion proof enclosure, verify that the work area has adequate ventilation. Check and monitor the area with a gas meter and use only non-sparking, nonferrous tools. When the work has been completed, verify that the explosion proof seal has been adequately resealed.

l. Current Transformers: The secondary circuit of a current transformer should not be opened while the primary circuit is energized, because high voltage may be set up in the secondary circuit. This high voltage may cause shock to personnel or result in failure of the insulation which could subject the secondary wiring to the high primary system

voltage.

m. High Voltage Equipment: Substations and transmission lines should be serviced by the electrical utility.

E. Personal Safety Equipment

1. Specific safety equipment will vary from plant to plant. All employees should be familiar and trained in the use and maintenance of the personal safety equipment that applies to their job. The following is a general list of personal safety equipment:

a. Hard hats
b. Goggles and face shields
c. Hearing protection
d. Appropriate foot gear
e. Rubber boots
f. Rubber gloves
g. Respiratory Protection

F. Safety Training

1. Periodic on the job safety training should be a part of plant procedure for all personnel. A large volume of safety training materials are available through the Water Pollution Control Federation (WPCF), Washington, D.C.

G. Accident Reports

1. Any injury, however slight, must be reported to, the supervisor by means of a standard form. This procedure gives some legal protection to both employee and employer. A suggested accident report form is shown at the end of this Chapter. However, if the insurance company has standard forms for this purpose, they should be used.

2. After an accident has occurred, an injury investigation (formal or informal) should be made to find the cause of the injury and to take steps to prevent a reoccurrence. If plant personnel are allowed to play a role in determining the cause of the injury, overall safety consciousness is likely to increase. Copies of accident reports should be made available to all employees for their review, in the hope that they will adjust their work habits to avoid similar injuries.

GMWSS ELECTRICAL SAFETY PROGRAM

PURPOSE

The Georgetown Municipal Water & Sewer Service (GMWSS) Electrical Safety Program (ESP) was established to meet or exceed minimum acceptable standards for electrical safety-related work practices as established by OSHA 1910.13 and NFPA 70E. The program includes requirements for comprehensive training of qualified and non-qualified workers at GMWSS regarding appropriate safe work procedures, personal protective equipment (PPE), proper use of tools while working near electrical apparatus, testing procedures, understanding working clearance and approach boundaries, determining nominal voltage and identifying exposed energized parts. The ESP is designed to protect GMWSS employees against electricity related hazards such as arc flash, arc blast, electrical shock, burns, and other potential electrical safety hazards. GMWSS requires working on equipment in a de-energized state unless de-energizing would cause an increased hazard or is deemed infeasible by employee and supervisor. If deemed infeasible, the cause will be noted on the Energized Work Permit and signed by employee and supervisor.

SCOPE

The GMWSS ESP applies to all qualified and non-qualified employees of GMWSS, as well as all employees contracted to do work for GMWSS, and all work performed by employees regardless of job site location, with exposure to electricity through inspection, testing, troubleshooting, installation of equipment, operation of switches, controllers, lockout procedures, power supply installations, or maintenance with direct exposure to energized parts. GMWSS is committed to providing a safe and healthy work environment and to protecting employees from injury or death caused by uncontrolled electrical hazards in the workplace. GMWSS' Electrical Safety Program is to establish work policies, practices, and procedures to train employees in basic electrical hazard recognition and safe work practices.

ADMINISTRATIVE DUTIES

GMWSS is responsible for full implementation of the Electrical Safety Program (ESP). Loss Control Administrator will maintain, review and update the ESP at least annually, and whenever necessary to include new or modified tasks and procedures. Contact location/phone number: Barb Bowman, Loss Control Administrator/HR Officer; 1000 W Main Street, Georgetown KY, 502-863-7816.

APPROVED BY GMWSS BOARD OF DIRECTORS SEPTMEBER 19, 2017

RESPONSIBILITIES

GMWSS Loss Control Administer, with the cooperation of the General Manager and Operations Manager, and Department Supervisors, is responsible for providing employee safety training, including Arc Flash training, conducting electrical safety audits, correcting all electrical safety hazards, and ensuring that all new electrical equipment and components comply with codes and regulations.

Department Supervisors are required to conduct quarterly inspections using the Worksite Observation Form to ensure safe work practices are followed. These need to be turned in to the Loss Control Administrator quarterly. Also, Department Supervisors are responsible for discussing hazards with employees as determined form the Worksite Observation Form. The Department Supervisor, with the help of the Loss Control Administrator, is responsible for ensuring the proper protective equipment is available and tested as required by manufacturer.

Employees are responsible for the immediate reporting of electrical safety hazards (fill out the GMWSS Employee Report on Unsafe Conditions and turn in to the Loss Control Administrator or the Operations Manager), for not working on electrical equipment without proper training and authorization, and for inspecting equipment prior to using it.

DEFINITIONS

Arc Blast – high-pressured sound wave caused by a sudden arc fault (arc flash)

Arc Blast Impacts – the heating of air and vaporization of metal creates a pressure wave that can damage hearing and cause memory loss, and other injuries. Flying metal parts are also a hazard.

Arc Flash – An extremely high-temperature discharge produced by an electrical fault in the air.

Arc Flash Burns – Severe skin burns caused by direct heat exposure and igniting clothing due to arc flash.

Approach Distances – Must be established whenever work is to be conducted on electrical systems or components not in an electrically safe work condition.

Limited Approach Boundary – Shock protection boundary designed to keep nonqualified persons at a safe distance away from exposed electrical components. Only qualified workers are allowed within this boundary.

Restricted Approach Boundary – Secondary shock protection measure whereby accidental movement can put a body part or conductive object in contact with live parts. Approach distances shall be indicated on the Arc Flash Label.

Competent Person – A person meeting all the requirements of a qualified person, and, in addition is responsible for all work activities or safety procedures related to custom or special equipment, and has detailed knowledge regarding the electrical hazard exposure, the appropriate control for mitigating these hazards and implementation of those controls.

De-energized Electrical Work – Electrical work that is performed on equipment that has been previously de-energized and is now free from any electrical connections to a source of potential difference or electrical charges and has been locked out/tagged out.

Electrically Safe Work Condition – A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked out/tagged out in accordance with established standards, tested to ensure absence of voltage, and grounded if determined necessary.

Qualified Worker – A qualified person is one who has received training in and demonstrates skills and knowledge in a specific work method and is trained to recognize and avoid hazards that might be present.

-A Qualified Electrical Worker shall be familiar with proper use of PPE, including Arc Flash clothing, shielding materials, and insulated tools and testing equipment. Only a Qualified Electrical Worker shall be allowed to work on energized or de-energized circuits within the Limited Approach and Arc Flash Boundaries as determined by the qualified worker in accordance with labeling, proof of job briefing, and energized work-Permit, as required.

-A Qualified Electrical Worker shall NEVER be assigned to work alone, except for replacing fuses, operating switch, or other operations that do not require employee to contact energized voltage conductors or energized parts of equipment.

PRINCIPLES (ARTICLE 110.1(D))

Electricity is dangerous when used without proper training, knowledge and planning. The basic electrical principles listed below provide GMWSS employees guidelines to use before engaging in electrical work.

- **Training** – all employees that will perform electrical work must be trained to make them qualified for the job they are expected to perform.
- **Plan the job** – Each job must be planned before beginning. Discuss the hazards and procedures for each job. All new procedures shall be documented and employees shall be trained and warned of potential hazards. All lockout tagout points shall be identified. Proper PPE and emergency response procedures shall be identified before work begins.
- **Inspect** – Evaluate all electrical equipment before work begins.
- **Identify hazards** – A hazard analysis shall be performed before work begins. Workers should identify the steps that could create electrical shock or arc flash.
- **Minimize hazards** – All equipment must be de-energized unless doing so would create additional hazards or increased risk as defined by qualified worker.
- **De-energize if possible** – An Energized Work Permit is required to do any energized work beyond testing and troubleshooting upon completion of the job briefing and justification.
- **Employee responsibility** – Employees are required to use proper PPE and the proper tools to work with electrical equipment.

CONTROLS (Article 110.1(E))

TRAINING

- **Lock out/tag out** – Employees must be trained on lock out/tag out procedures. (See Lock out/tag out safety procedures)
- **Arc Flash** – Employees expected to do electrical work will be trained to recognize arc flash hazards, risks, and appropriate PPE and equipment requirements. Employees must also demonstrate the ability to safely perform the assigned task.
- **Health and Safety** – Employees shall be trained bi-yearly to recognize the signs and symptoms of electric shock, heart fibrillations, and electric burns. This training will coincide with First Aid/Safety/AED training bi-yearly.
- **Type of Training** – The training may be of the classroom or on-the-job type. The degree of training provided must be determined by the risk to the employee.
- **Content of Training** – Qualified employees shall be trained in and familiar with the safety-related work practices that pertain to their respective job assignments.

- **Frequency of Training** – New hires shall be trained upon assignment. Refresher training shall be done if a deficiency is identified during an audit, but shall not exceed three (3) years. Training shall be documented.
- **Demonstration of Training** – A demonstration of employee's knowledge shall be documented. This can be done by a written test, documentation of successful completion of training, and by on-site demonstration of understanding through work place observation.
- **Retraining** – Employees shall be retrained if any employee is not in compliance with GMWSS' safe work practices or if there is a change in the workplace that requires different work practices than what has normally been used.

PROCEDURES (Article 110.1 (F))

The following control methods will be used to prevent occurrence of electricity-related incidents:

Engineering Controls

- All electrical distribution panels, breakers, disconnects, switches and junction boxes must be completely enclosed;
- Water-tight enclosures must be used if any of these components could possibly be exposed to moisture;
- Structural barriers must be used to prevent accidental contact and damage to electrical components;
- Conduits must be supported for their entire length, and non-electrical attachments to conduits are prohibited;
- Non-rigid electrical cords must have strain relief wherever necessary to avoid damage to the cord and eliminate shock hazards.
- No work on or near exposed live parts is permissible without proper illumination.

Administrative Controls

- Only trained, qualified employees may repair or service electrical equipment;
- Contractors must be licensed and show proof of qualified training associated with the task they are authorized to perform;
- When exposed, energized parts are present, physical barriers must be used to prevent unauthorized persons from entering areas where new installation or repair of electrical components or equipment is being performed;
- Only authorized employees under the supervision of qualified person may enter electrical distribution rooms;
- All electrical control devices must be labeled properly;
- Management must authorize any work on energized electrical circuits.

- Management must authorize any work on energized circuits by use of permit job briefing and energized permit system.

Work Practice Controls

- Employees covered under this policy must wear electrically rated safety shoes or boots;
- Use only tools that are properly insulated;
- Non-conductive gloves will be available for testing and de-energizing of electrical equipment;
- Employees will wear any additional PPE deemed necessary to perform electrical work based on the hazard analysis of the particular job;
- Employees working in confined spaces shall de-energize or effectively barricade with protective shields or barriers any exposed live parts. Doors or hinged panel shall be secured to prevent swinging freely;
- Conductive apparel such as chains, watches, and rings shall not be worn while working within the limited approach boundary;
- Working on energized parts rated at 50-600 volts shall only be performed by qualified personnel who have had specific training on the particular parts and equipment to be worked on. The qualified person's supervisor shall be contacted and an energized work permit shall be completed before starting work on energized equipment with exceptions including testing, troubleshooting and inspections;
- Unqualified personnel are restricted from access to exposed energized parts of greater voltage than 50 volts;
- Blind reaching is NOT allowed in any electrical panels or equipment.

DEPARTMENT PROCEDURES:

COLLECTIONS DEPARTMENT SPECIFIC TASKS:

- Replacing fuses from 5 amp through 10 amp mains;
- Testing and troubleshooting (using meter on all electrical components, including breakers, contactors, fuses, wiring, etc.);
- Replacing components, including breakers, contactors, overloads, wiring, relays, etc. in non-energized state only.
- Pump installation and removal – Only after lock-out/tag-out has been applied.
- Calibrating transducers;
- Replacing floats;
- Replacing controllers (timemarks, GR screens, HMI and PLC controllers)
- Troubleshooting Scada issues and battery backup on each station;
- Installing Mission communication units and troubleshooting them.

COLLECTIONS DEPARTMENT PROCEDURES:

- Always work in a 0 energy state, unless doing so would cause increased hazard or is infeasible, unless troubleshooting components or testing pumps. Anything other than stated tasks must be documented in a hazard analysis and signed by supervisor before work begins.
- Always test meter to a known source (outlet) before using it.
- Electrical gloves and safety glasses shall be worn if inside panel while it is energized.
- Two employees must be present when electrical work is being conducted.

WATER TREATMENT PLANT SPECIFIC TASKS:

- Troubleshooting equipment with meters
- Replacing fuses, wiring, contactors, breakers, pumps, and wiring to and from all of these shall be done in a non-energized state.
- Installing and removing pumps, transducers, electrical valves (which includes performing these tasks with equipment energized). All energized tasks must be done by use of permit job briefing and energized work permit system.
- Installing lighting, switches, and outlets as needed.

WATER TREATMENT PROCEDURES:

- Inform all co-workers of the task being performed, the area of the work, and the approximate time needed to complete task.
- Lockout/Tagout for every feasible task. Refer to Lockout/Tagout policy in your safety manual.

WASTEWATER TREATMENT PLANT #1 & #3 SPECIFIC TASKS:

- Ordering, removing and installing equipment
- Troubleshooting

WASTEWATER TREATMENT PLANT #1 & #3 PROCEDURES:

- Lockout/Tagout any energized device that is being worked on or removed.
- Use a meter to check that power going to or from a motor or pump is off.
- Unwire equipment and remove old equipment.
- Place new equipment in place and wire for high or low voltage.
- Replace all covers and shields.
- Remove Lockout tag, turn on power, and check for proper operation.
- When troubleshooting, look, listen, and smell for anything abnormal.
- If electrical component is burned out, lock out panel to device and remove component.
- If you suspect electrical trouble, watch the machine run and determine at which action it stops.

- Look at electrical schematic.
- Lockout/tagout, then open panel to use meter test controls.
- Every employ shall test for power even after device is locked out.
- If the repair is beyond the scope of the qualified person in department, call electrical contractor who has been trained and provide qualifications acceptable within GMWSS' written Electrical Safety Policy.

WASTEWATER TREATMENT PLANT #2 SPECIFIC TASKS:

- Generator Room - Check breakers and reset if needed.
- Plant Wide - Electric Heater replacement in de-energized state.
- O.D. Room – Check Control panel; check breakers in low voltage panel
- Clarifier Pump – Wire pumps and check level transducer
- Residential Building – Check breakers and reset; reset SCADA
- Filter Building – Replace fuses and wire in new pumps
- Business Park Pump Station – Replace VFD fans
- Solids Building – Check fuses on breakers
- UV Building – Replace light ballast, bulbs; reset breakers

WASTEWATER TREATMENT PLANT #2 SPECIFIC PROCEDURES:

- If any electrical work shall be done, device must be locked out and tagged out before work begins.
- All electrical devices shall be tested even after being locked out/tagged out.
- If the repair is beyond the scope of the qualified person in department, call electrical contractor who has been trained and provide qualifications acceptable within GMWSS' written Electrical Safety Policy.

ELECTRICAL EQUIPMENT INSPECTIONS

See "Workplace Safety Observation Form"

PERSONAL PROTECTIVE EQUIPMENT

Article 130.7(A) of NFPA 70E – "Employees working in the areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed."

GMWSS will provide personal protective equipment for use by employees working in areas where they could be exposed to electrical hazards. The level of PPE used shall be determined by conducting a hazard assessment and choosing a level of protection that significantly reduces or eliminates the risk of injury related to a hazard. PPE provided includes, but is not limited to, the following:

- Hard hat
- Face shield
- Safety glasses
- Hood
- Ear Protection
- Shirts (ATPV – Level of protection provided by Flame Resistant (AR) clothing)
- Pants - (ATPV – Level of protection provided by Flame Resistant (AR) clothing)
- Gloves - See chart below
- Boots

Voltage Classifications for Rubber Gloves				
Tag Color	Class	Proof Test Voltage AC / DC	Max. Usage Voltage AC / DC	Glove Tag
Beige	00	2,500 / 10,000	500 / 750	
Red	0	5,000 / 20,000	1,000 / 1,500	
White	1	10,000 / 40,000	7,500 / 11,250	
Yellow	2	20,000 / 50,000	17,000 / 25,500	
Green	3	30,000 / 60,000	26,500 / 39,750	
Orange	4	40,000 / 70,000	36,000 / 54,000	

Undergarments:

Allowed: Natural clothing, fiber cotton, wool
Not Allowed: Synthetic clothing that melts, acetate, nylon, polyester, polypropylene, spandex

Arc Rated Clothing:

All clothing will be Arc Rated or AR, per NFPA 70E 2012. AR refers to the incident energy and is given in cal/cm2 and can be found on the clothing label or stitched somewhere on the outside of garment. Clothing will be chosen based on the safety rating on the labels provided from the Electrical Risk Assessment.

Layering:

- Layering is allowed, but all outer garments must be arc rated.
- Layering may be lighter than a single heavy garment.
- Manufacturer must provide the new combined arc rating afforded by layers.
- Clothing must be fastened at wrists, closed at neck, and tucked in.

Tools:

- Must be rated for the voltage on which they are used;
- Must be designed and constructed for the environment and manner in which they are used;
- Use and Care of Insulated Hand Tools:
  - Keep tools clean and dry
  - Inspect insulation before each use
  - If you doubt the integrity of the insulation, destroy the tool or have it retested
  - Follow the manufacturer's temperature recommendations for use
  - Have a qualified person inspect and recertify tools annually for safe use
  - Use other personal protective equipment as necessary

EMPLOYEE TRAINING

Qualified Employees

Training for those employees qualified to perform electrical work will consist of:

- Specific equipment procedures;
- The training requirements outlined in OSHA standard 29 CFR 1910.331 to 1910.339.

Unqualified Employees

Employees not qualified or authorized to perform work on electrical equipment and components will be trained in general electrical safety precautions for the purpose of hazard awareness.

The following electrical safety rules also apply to **unqualified** employees:

- Do not conduct any electrical repairs;
- Report all electrical hazards to your supervisor;
- Do not operate equipment if you believe there is an electrical hazard;
- Do not allow electrical equipment or components to contact water;
- Remember that even low-voltage electricity can be physically harmful;
- Do not use cords or plugs that are missing the 'ground' prong;
- Do not overload electrical receptacles.

COMPLIANCE:

- All electrical work shall be done to electrical standards. No short-cuts shall be permitted.
- Electrical work shall be done by qualified personnel only.
- On-site training will be conducted for qualified personnel.
- Observance of all electrical safety procedures is required of all qualified and non-qualified personnel; neglect of this may subject the individual to serious injury. Failure to follow these procedures may result in disciplinary action, up to and including termination.

GMWSS CONFINED SPACE PROGRAM

Policy Statement

As a means to keep GMWSS employees free from injury or unsafe conditions, we have developed a Confined Space Entry Program. This program identifies all confined spaces, where they are permit-required confined spaces, hazards to be aware of, and the proper way to enter and exit a confined space. This program will also allow employees to work safely in confined spaces and educate them on how to handle emergency situations. Confined Space training will be facilitated by the Loss Control Administrator on a yearly basis.

Definitions

Attendant: An individual stationed outside a permitted space that monitors the authorized entrants and who will perform all attendant duties as outlined in the policy.

Authorized Entrant: An employee authorized by the entry supervisor to enter a permitted space and will perform all authorized entrant duties.

Confined Space: Any space which is large enough for an authorized entrant to enter and perform work, has limited means for entry and exit, is not designed for continuous authorized entrant occupancy, and ventilation of the space could be lacking or inadequate, allowing for the potential accumulation of toxic air contaminants, flammable or explosive agents, and/or depletion of oxygen.

Emergency Entry: Entry into a confined space necessitated by a sudden and unexpected condition requiring immediate action.

Engulfment: The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance 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: The action by which a person passes through an opening into a permit-required or non-permit required confined space. Entry includes ensuring work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit: The written or printed document that is provided by entry supervisor to allow and control entry into a permit-required space.

Entry Supervisor: The person on-site responsible for determining if acceptable entry conditions are present at a permit space where entry is planned. This person is responsible for authorizing entry, overseeing entry operations, and for terminating entry as required and all other supervisor duties as outlined in policy.

Hazardous Atmosphere: An atmosphere that may expose authorized entrants to the risks of incapacitation, impairment of authorized entrants to the risk or incapacitation, impairment of authorized entrant to escape unaided from an permit-required space, injury, illness or death.

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.

Non-permit Confined Space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen Deficient Atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

Permit-Required Confined Space – A confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; or
- Contains any other recognized serious safety or health hazard as determined by the Confined Space Entry team.

PERMIT REQUIRED CONFINED SPACE POLICY:

(A) **EQUIPMENT REQUIRED FOR ENTRY**

- Testing and Monitoring Equipment
- Ventilation Equipment
- Communications equipment for authorized entry and attendants.
- A Tug-Line
- Personal Protective equipment
- Barriers as shields for entrance
- Ladder
- Rescue and emergency equipment (Georgetown Fire Department)
- Chest or body harness
- Lifting device to be used with harness.

(B) **UNIFORM PRECAUTIONS TO BE TAKEN:**

- No smoking within a twenty foot radius of a confined space.
- No smoking in the confined space.

(C) **CONFINED SPACE ENTRY – EMERGENCY**

- Georgetown Fire Department must be notified before a permit-required confined space is entered.
- Authorized rescue entrant(s) may be allowed to enter only with appropriate respiratory protection and other necessary protective equipment.

(D) PERMIT-REQUIRED **CONFINED SPACE ENTRY:**

ENTRY INTO A PERMIT-REQUIRED CONFINED SPACE SHALL NOT BE MADE UNLESS THE FOLLOWING PROCEDURES HAVE BEEN ACCOMPLISHED:

- Upon arrival at a work site which involves a confined space, entry supervisor shall conduct a Confined Space Pre-Entry Check List. (See Permit) Once this has been completed, the entrance cover, if applicable, shall be removed. If there is any condition which would make it unsafe to remove the cover, the condition shall be eliminated before the cover is

removed. Once the cover is removed, the opening shall be immediately guarded by a railing, temporary cover, or other temporary barrier that will prevent a fall through the opening and will also protect the authorized entrants from foreign objects entering the space.

- The next step to be taken is to verify that the entry supervisor on site has proper communication with rescue and emergency services. This may be achieved by using a mobile telephone that is on site, or by using a two-way radio. If a mobile phone is not on site, and a two-way radio must be used, the entry supervisor must establish communication with someone stationed at a telephone. The entry supervisor should inform the contact person of the location of the confined space to be entered, and periodically give the contact person an update on their progress. The contact persons stationed at the telephone must remain there for the purpose of notifying rescue and emergency services until all necessary personnel have vacated the permit-required confined space. If there is a mobile telephone on site, the entry supervisor may contact rescue and emergency services, should the need arise to call for assistance.

- When applicable, all pumps and lines which may reasonably cause contaminants to flow into the space shall be disconnected, blinded, and locked out, or effectively isolated by other means to prevent development of dangerous air contamination or engulfment. Not all laterals to sewers require blocking; however, where experience or knowledge of the industrial use indicates there is a reasonable potential for contamination of air or engulfment in the occupied sewer, then all affected laterals shall be blocked.

- When applicable, fixed mechanical devices and/or equipment that are capable of causing injury shall be placed at a 0 mechanical state. The electrical equipment, excluding lighting, shall be locked out and/or tagged out in accordance with GMWSS Lockout/Tagout policy.

- Once this has been accomplished, and before any entry is made into the permit-required confined space, written communication must be made by the entry supervisor, using the Permit Form, that the space is safe for entry. One of the first items to be completed on this form is the atmospheric check. This check is to be made with a calibrated direct-reading instrument. This check shall be done before any authorized entrant enters any confined space. The following conditions will be

checked in the order listed below. It is necessary to test all areas of the confined space (top, middle, bottom) because different gases settle in different areas of the space (1) Oxygen Content; (2) Flammable Gases and Vapors; (3) Potential Toxic Air Contaminants

- If any alarms are received on the above conditions, entry SHALL NOT be made. The confined space shall be ventilated until the unsafe condition(s) are eliminated. No authorized entrant shall enter the space until the forced air ventilation has eliminated any hazardous atmosphere.

- Upon receiving no alarms on the above conditions, entry may begin, and continuous forced air ventilation shall continue. Air supply for the forced air ventilation shall be from a clean source and shall not increase the hazards in the space. It shall be directed so the immediate area where authorized entrants will be present will be ventilated and will continue until all authorized entrants have left the space.

- In the case of a manhole, both the manhole downstream and the manhole upstream shall be open. Make all attempts to locate both the upstream and downstream manholes, but if this is not possible (due to being covered, etc.) open at least one additional manhole. Ventilate the confined space with a portable blower discharging near the bottom of the manhole (NEVER use pure oxygen).

- The remainder of the Permit Form shall be checked and completed before any entry is made. The completed permit will be available on-site and made available to each authorized entrant before entry.

- Ladders, or other safe means, shall be used to enter and exit the permit-required confined spaces exceeding four feet in depth.

- Persons entering the permit-required confined space shall be required to use or wear protective clothing and equipment that the entry supervisor or foreman thinks is appropriate for the conditions.

- Persons entering a permit-required confined space shall be required to wear a safety harness and a retrieval device, i.e. rope, cable, etc.

- Proper man lifting equipment (if applicable) shall be used so that a person entering a confined space may be lifted out, should the person become weak or unconscious for any reason.

- The atmosphere within the space shall be continuously tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

- If a hazard is detected during entry: Each authorized entrant shall leave the space immediately; the space shall be evaluated to determine how the atmosphere developed; measures shall be implemented to protect employees from hazardous atmosphere before subsequent entry takes place.

- There must be an **ENTRY SUPERVISOR** present on the job site as long as there are authorized entrants in the confined space. The duties of the **Entry Supervisor** are as follows:

    (1) Knowing the hazards that may be faced during entry, including information on the signs or symptoms and consequences of exposure.

    (2) Verifies, by checking, that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

    (3) Removes unauthorized individuals who enter, or attempt to enter, the permit-required space during entry operations.

    (4) Determines, whenever responsibility for a permit-required entry operations is transferred and as intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

    (5) Must be certified as passing First Aid/CPR course

- There must be at least **TWO ATTENDANTS** outside the permit-required confined space as long as there are authorized entrants inside. The number of people remaining outside of the permit-required confined space is determined by the requirements that they are able to lift the authorized entrants out of the confined space with the use of the proper equipment. The duties of the Attendants shall include:

  (1) Knowing what hazards may be encountered during the entry into permit-required confined space.

  (2) Is aware of possible effects of hazardous exposure.

  (3) Continuously maintains an accurate count of authorized entrants in the permit-required confined space.

  (4) Will remain outside the permit-required confined space until relieved by another attendant or all authorized entrants exit the confined space.

  (5) Must have a way to communicate with authorized entrants in the permit-required confined space to monitor their status and to alert them to the need to evacuate the space. Communications may be visual, voice and/or other means. A back-up tug-line communications should be utilized when the authorized entrant goes beyond the 10 feet of the permit-required confined space opening. Two (2) tugs of the line will indicate that the authorized entrant wants to leave the confined space immediately.

  (6) Monitors inside and outside the space to determine if it is safe for authorized entrants inside the permit-required confined space to remain in the confined space.

  (7) Will summon rescue or other emergency services as they determine that the authorized entrants may need assistance to escape from the permit-required confined space.

  (8) Inform rescue service of the hazards they may confront when called to perform rescue service.

(9) The outside attendant shall order all authorized entrants out of the permit-required confined space if he or she detects a prohibited condition; if effects of the hazardous exposure are detected in any authorized entrant; situation is detected outside the space that could endanger authorized entrants; or if the attendant cannot effectively and safely perform all of the duties required above.

- All entrants must be AUTHORIZED by Entry Supervisor before entering the permit-required confined space. The AUTHORIZED ENTRANT duties include:

(1) Knowing the hazards that may be faced during entry, including information on the signs or symptoms, and consequences of the exposure.

(2) Be trained to properly use all equipment required.

(3) Communicate with the attendants as necessary to enable the attendants to monitor authorized entrant status and to enable the attendants to alert authorized entrants of the need to evacuate the space as required.

(4) The authorized attendant shall alert the attendant whenever:

A. An authorized entrant recognizes any warning sign or symptom of a dangerous situation.

B. When a prohibited condition is detected.

C. An order to evacuate is given by attendant or entry supervisor.

D. When any sign or symptom of exposure to a dangerous situation is recognized.

E. When an evacuation alarm is activated.

- The duration of the permit may not exceed the time required to complete the assigned task or job as identified on the Confined Space Permit.

- Before each new entry, a Confined Space Permit shall be completed by Entry Supervisor.

- Entry Supervisor will turn completed confined space permits into department supervisor daily. Supervisor will retain completed permits on file for a minimum of one year.

(E) **RESCUE:**

- Should a situation arise, the Entry Supervisor will direct the attendants to begin removing all authorized entrants using the harness system worn by the authorized entrants.

- The Entry Supervisor shall immediately notify the person stationed by the telephone that rescue and emergency services are needed. The person stationed at the telephone should then call 911 and request rescue and emergency services respond to the location of the crew. If a mobile telephone is on site, the attendant will call 911 immediately and request that rescue and emergency services respond to work site.

- While the attendants remove the authorized entrants, the Entry Supervisor will begin administering first aid and CPR as needed, and shall continue until rescue and emergency service arrive.

(F) **NON-PERMIT CONFINED SPACE ENTRY:**

- A space classified by the Entry Supervisor as a permit-required confined space may be reclassified as a non-permit space under the following procedure:

  (1) If the permit space poses no actual or potential atmospheric hazards, and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the atmospheric hazards remain eliminated.

  (2) If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed in accordance with the permit-required Confined Space entry procedures in this policy. If testing and inspection during the entry demonstrate that the hazards within the

permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.

- The Entry Supervisor shall document the basis for determining that all hazards in a permit-required space have been eliminated, through a certification that contains the date, location of space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space.

- Once a confined space has been classified as a non-permit confined space, continuous ventilation shall be used, and the entrants may enter the confined space without using a harness system. The air supply for the forced ventilation shall be from a clean source and may not increase the hazards in the space. Also, the atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

Collections Department
Permit-Required Confined Spaces: Pump stations:

These pump stations have a wet well and a valve vault where the sewer is collected and then pumped to the next pump station or sewer plant for treatment. These structures sometimes must be entered for inspection, maintenance, or repairs. It is important to know the hazards involved with these structures before entry is attempted. The hazards include:

- Atmospheric hazards (low oxygen, toxic or flammable gasses)
- Slips, trips, and falls
- Engulfment or drowning
- Electrocution
- Injury from falling objects
- Injury from sharp or heavy objects in the wet well
- Loud environment may result in temporary or permanent hearing loss

PERMIT-REQUIRED CONFINED SPACE ENTRY:

Pump station Name	Pump station Location
1. Lancaster PS (#22)	Right on Pocahontas, Left on Redding, last driveway on the right
2. Armstrong PS (#30)	Decommissioned station has been filled
3. Canewood 2	West main, right on Canewood Center Dr. 1/2 mile station on the left between 108 and 110
4. Canewood 3	Canewood Subdivision, Right on Gen John Payne, follow to the end and station is located on the right
5. Canewood 4	Canewood Subdivision, Right on Gen John Payne,
6 #2 Pump station	West Main St (Frankfort Rd) towards Frankfort, turn left on Elizabeth, station on the left
7. Ward Hall	West main, Left at McClelland Cir, station on the right
8. Western	West main, (Frankfort Rd) Right on Canewood Center Dr., ¼ mile station on the left
9. Admin	Location at 125 West Clinton
10. Bradford 1	Located at 308 McClelland Cir.
11. Bradford 2	Bradford subdivision, located at 157 Ransom Trace

12. Dorchester (#11)	Mount Vernon Subdivision, Located at 1321 Dorchester drive
13. Speedway (#19)	US25 to Southgate, station at 111 Southgate drive
14. Aberdine (#20)	US25 to Southgate, left on Berkshire, station at 179 Berkshire
15. Etterwood	located at 752 McClelland Cir., station is at the end of the driveway
16. U.S 62 (#16)	West main street to (Frankfort Rd) Paynes Depot Road, station is located 1 mile on the left
17. College	East main extended to 944 East Main Ext.
18. Connector RD (#8)	East Main to Paris Pike, located at the corner of Connector Rd. and Paris Pike
19. Clabber bottom	McClelland Cir. to Lemons Mill Rd., station is located at 1219 Lemons Mill
20. Cherry blossom	Located at Cherry Blossom Golf Course, behind the club house
21. Luv Homes	Connector Rd., located beside Clayton Homes, at 292 Connector Rd.
22. Pleasant Valley	Pleasant Valley subdivision, follow Schneider and make a right on John Davis Dr.
23. Syphon (#7)	Located at 100 Eastside Drive, off Paris Pike across from Southern States
24. N.E Interceptor (#9)	located at 1166 Degaris Mill Rd., off Champion Way
25. Brown & Young (#12)	US25 North, right on Gano Ave., left on N Hamilton, right on Young St., the station is at the bottom of the hill
26. Elm Street (#14)	US25 north, right on Gano Ave., left on N Hamilton. Left on Poplar St., right on Elm St, station is on the left (at 315 Elm)
27. Billy Perkins	US25 North, right on Payne St., station is located at Billy Perkins Apts, at the end of Payne
28. Stables	Champion way to Stables 1 entrance, left on Beveled Glass Lane, right on Carriage Lane, station is at 153 Carriage Lane
29. Peninsula	US25 North, right on Payne, Left on Rough River Run, Left on Barren River Blvd., Left on Taylorsville Tr., station is at 153
30. Colony	US25 North, to The Colony, left on Colony Blvd, Left at Castleford, Left at King George, right on Cornwallis, station is at 133
31. Derby	US25 North, left on Long Lick Pike, Left on Secretariat, Left on South Bold Forbes, station is located behind 151
32. Anne Mason	US25 North, station is located at 1441
33. Rogers Gap	US25 North, left on Rogers Gap Rd., first driveway after the underpass to the right , located before 169
34. K.U	West Main Street to right on Stamping ground Rd., follow 8 miles, station located on the left at 3524 Main Street
35. Buffalo Springs	West Main Street to right on Stamping Ground Rd., follow 8 miles, right on Springview Drive, right on Elk Drive, station is on the right
36. Edgewood	West Main Street to right on Stamping Ground Rd., follow 8 miles, left on Edgewood Drive
37. Double Culvert 1	US25 North to Double Culvert Road on the right, station at 483 Double Culvert Rd.
38. Double Culvert 2	US25 North to Double Culvert Road on the right, station at 485 Double Culvert Rd. (turn in the landfill stay to the right)
39. Marks	US25 North, station is on the corner of Double Culvert Rd.
40. Sims 1	US25 North, right on Cherry Blossom Way, Left on Sims Pike, station is 3 miles on the right, located at 813

41. Sims 2	US25 North, right on Cherry Blossom Way, Left on Sims Pike, station is 3 miles on the right, located at 813
42. Sims 3	US25 North, right on Cherry Blossom Way, Left on Sims Pike, station is 3 miles on the right, located at 813
43. KY32	US25 North to Sadieville Ky. Station is located on the corner of US25 and KY32
44. Eagle Bend	Located in Sadieville Ky., Sadievile Rd. (KY32), left in Eagle Bend Subdivision, station is on the right
45. Eagle Creek	Located in Sadieville Ky., KY32 to 350 Sadieville Rd.
46. Main Street (tracks PS)	Located in Sadieville Ky., KY32, left on Main Street, located just past 311 Main Street
47. Sadieville Plant (Playground)	Located in Sadieville Ky., KY32, right on Pike Street, station located at 859 (police dept.)
48. Tech School	West Main street (Frankfort Rd) to 2001 Frankfort Rd. on the right, station is at the end of the driveway
49. Lake Forest	McClelland Cir. to Lemons Mill Rd., right on Harmony Ridge, left on Bay Shore, right on Lake Forest, left on Rose Street
50. FieldHouse	Station is located at the Scott County Middle School football field
51. Porter Rd	I75 North to Sadieville exit, left off ramp, past Loves, station located at 464
52. Mallard Point	US25 North left at Mallard Point subdivision, follow 1 mile, station is on the right
53. Wrights Lane	Us25 North to Wrights Lane on the left, station is on the corner
54. Pant 1 PS	located at WWTP1 (632 North Broadway)
55. Plant 2 PS	located at WWTP2 (900 Cherry Blossom Way)
56. Harbor Village	US25 North, left into Harbor Village, station is on the left
57. Sebree PS	West Main Street to right on Stamping Ground Rd., follow 8 miles, right on Sebree Rd., station is behind 308

GMWSS PRACTICES FOR ENTERING A PERMIT-REQUIRED CONFINED SPACE:

- It is standard practice for employees to remove all liquids and debris from the confined space by pumping or vacuuming with our vacuum truck.
- All incoming flow lines shall be plugged to prevent filling to minimize drowning or engulfment hazards. These plugs must be inspected before and after each use to ensure they're in working condition and safe for use. All must be equipped with an air gauge to show that they are holding the correct amount of air throughout the entry.
- Entry shall only be made with a zero energy state. The main electric disconnect and the panel breakers are placed into the off position and must be locked.
- Pre-entry air tests are performed with an OSHA certified gas detector and entry can be made only when the atmosphere is safe. If the air is unsafe, ventilation with a blower should be applied and the air continuously monitored until it is safe for entry. If tests yield atmospheric hazards such as toxic or flammable gasses, or bad oxygen levels, entry shall **not** be attempted.
- The area around the confined space is inspected to insure no slip, or trip hazards.
- A ladder is used for all entries as well as a harness, with a tripod and winch attached. While descending the winch operator shall not free spool the winch but slowly lower the winch as the

entrant descends. At no time during the entry is it acceptable to remove the winch cable from their harness.

- The entrant or entrants are required to wear a hard hat and gas detector at all times during the confined space entry.
- Any tools lowered down to the entrants must be placed inside of a bucket and lowered down with a safety rope. Battery operated tools are used to prevent major electrocution risks while inside these structures.
- At no time shall power be restored to the station while an entry is being made.
- The air must be monitored throughout the entire entry by the confined space supervisor and logged on the confined space entry permit.
- There shall always be one attendant manning each winch that is attached to an entrant and that person may leave for no reason. If tools or supplies are needed another employee or runner must be used.
- Once the work is complete, the entrant shall ascend with the winch man cranking up the slack.
- Once both of the entrants' feet are off the ladder on solid ground, the winch safety cable connection can be removed.
- The equipment can now be removed and the station can be returned to normal operating conditions if no further repairs are needed.

CONFINED SPACE IDENTIFICATION
WASTEWATER PLANT 2

Possible Hazards:

- Atmospheric hazards (low oxygen, toxic or flammable gasses)
- Slips, trips and falls
- Engulfment or drowning
- Electrocution
- Injury from falling objects
- Injury from sharp or heavy objects in the wet well
- Loud environment may result in temporary or permanent hearing loss

Confined Space	Type of Space	Permit or Non-Permit	Location: WWTP #2
Industrial Influent	Manhole	Permit Required	Ahead of Ind. Inf. Channel
Sanitary Influent	Manhole	Permit Required	Ahead of San. Inf. Channel
Electrical Access	Manhole	Permit Required	Residential Parking Area
Life Station Influent	Manhole	Permit Required	At Business Park pump sta.
Oxidation Ditch Influent	Distribution Box	Permit Required	Ahead of ditch
Clarifier Influent	Distribution Box	Permit Required	Ahead of Clarifiers
Clarifier Effluent	Distribution Box	Permit Required	After Clarifiers
Sludge Thickener	Distribution Box	Permit Required	Ahead of thickeners
U.V. Bypass	Distribution Box	Permit Required	Ahead of UV
Industrial Channel	Below floor level	Permit Required	TMM Screen Room
Sanitary Channel	Below floor level	Permit Required	TMM Screen Room
Chemical Storage Vessel	3,000 gal tanks	Permit Required	Chemical Room
Influent Channel	Below floor level	Permit Required	Residential Screen Room
Influent Chamber	Below floor level	Permit Required	Residential Screen Room
Pista Grit Classifier	enclosed tank	Permit Required	Residential Screen Room
Discharge Channel	Below floor level	Permit Required	Residential Screen Room

Discharge Chamber (Outside Handrail)	Walk Way	Non-permit Required	Residential Distribution Box
Discharge Chamber (Inside Handrail)	Tank	Permit Required	Residential Distribution Box
Oxidatation Ditches	Tank	Non-permit Required	Ditch Area
Clarifiers	Tank	Non-permit Required	Clarifier Area
Clarifier Pump Station	Wet Well	Permit Required	Clarifier Area
Sand Filter Influent Channel	Below floor level	Non-permit Required	Filter Building
Carbon Filter Pump Influent Channel	Below floor level	Non-permit Required	Filter Building
Carbon Filter Pump Wet Well	Wet Well	Permit Required	Filter Building
Carbon Vessel A	Enclosed tank	Permit Required	Filter Building
Carbon Vessel B	Enclosed tank	Permit Required	Filter Building
Resin Vessel A	Enclosed tank	Permit Required	Filter Building
Resin Vessel B	Enclosed tank	Permit Required	Filter Building
Wet Well	Wet well	Permit Required	Industrial Park Pump Sta
Sludge Thickeners	Tank	Non-permit Required	Thickener area
Post Aeration Tanks	Tank	Non-permit Required	Post Aer Area
U.V. Disinfection	Below floor level	Non-permit Required	UV Building
Odor Control Unit	Above ground Tank	Permit Required	Residential Building
Odor Control Unit	Below ground Tank	Permit Required	Industrial Park Pump Station

RESIDENTIAL SCREEN ROOM - Permit Entry Only

- Alarms (visual and audible)

- Air circulating continuous
- Air monitored continuously

OXIDATION DITCHES – Non-permit entry

Ditches cannot be entered unless they have been valved off and drained. (Lock or tag valve) They are only entered for inspection of the structure, flapper valves, or for cleaning out the sand and grit with machines. When entering the ditch, a ladder is necessary so fall protection and hard hats must be utilized.

CLARIFIERS - Non-permit entry

Clarifiers cannot be entered unless they have been valved off and drained. (Lock or tag valve) They are only entered for structural inspection, inspection of the flapper valves, or pressure relief valves, or for maintenance of the rake mechanism. When entering the clarifier a ladder is necessary so fall protection and hard hats must be utilized.

CLARIFIER PUMP STATION - Permit Entry Only

The Clarifier pump station utilizes submersible pumps located in a wet well that is considered to be a confined space. It is not routine for operators to enter this wet well. The pump station valve vault is also considered to be a confined space. It is not routine for operators to enter this space.

SLUDGE THICKENERS - Non-permit Entry

Sludge Thickeners cannot be entered unless they have been valved off and drained. (Lock or tag valve) They are only entered for structural inspection or maintenance. When entering the Thickener a ladder is necessary, so fall protection and hard hats must be utilized.

POST AERATION TANKS - Non-permit Entry

The Post Aeration Tanks cannot be entered unless they have been valved off and drained. (Lock or tag valve) They are only entered for structural inspection or equipment maintenance. When entering the basin a ladder is necessary, so fall protection and hard hats must be utilized.

U.V. DISINFECTION - Non-permit Entry

The U.V. disinfection channel cannot be entered unless it has been bypassed by opening the bypass valve. (Lock or tag valve).

GMWSS PRACTICES FOR ENTERING CONFINED SPACE:

- It is standard practice for employees to remove all liquids and debris from the confined space by pumping or vacuuming with our vacuum truck.

- All incoming flow lines shall be plugged to prevent filling to minimize drowning or engulfment hazards. These plugs must be inspected before and after each use to ensure they're in working condition and safe for use. All must be equipped with an air gauge to show that they are holding the correct amount of air throughout the entry.
- Entry shall only be made with a zero energy state. The main electric disconnect and the panel breakers are placed into the off position and must be locked.
- Pre-entry air tests are performed with an OSHA certified gas detector and entry can be made only when the atmosphere is safe. If the air is unsafe, ventilation with a blower should be applied and the air continuously monitored until it is safe for entry. If tests yield atmospheric hazards such as toxic or flammable gasses, or bad oxygen levels, entry shall not be attempted.
- The area around the confined space is inspected to insure no slip, or trip hazards.
- A ladder is used for all entries as well as a harness, with a tripod and winch attached. While descending the winch operator shall not free spool the winch but slowly lower the winch as the entrant descends. At no time during the entry is it acceptable to remove the winch cable from their harness.
- The entrant or entrants are required to wear a hard hat and gas detector at all times during the confined space entry.
- Any tools lowered down to the entrants must be placed inside of a bucket and lowered down with a safety rope. Battery operated tools are used to prevent major electrocution risks while inside these structures.
- At no time shall power be restored
- while an entry is being made.
- The air must be monitored throughout the entire entry by the confined space supervisor and logged on the confined space entry permit.
- There shall always be one attendant manning each winch that is attached to an entrant and that person may leave for no reason. If tools or supplies are needed another employee or runner must be used.
- Once the work is complete, the entrant shall ascend with the winch man cranking up the slack.
- Once both of the entrants' feet are off the ladder on solid ground, the winch safety cable connection can be removed.
- The equipment can now be removed and the station can be returned to normal operating conditions if no further repairs are needed.

CONFINED SPACE IDENTIFICATION
Wastewater Treatment Plants 1 & 3

Possible Hazards:

- Atmospheric hazards (low oxygen, toxic or flammable gasses)
- Slips, trips and falls
- Engulfment or drowning
- Electrocution
- Injury from falling objects
- Injury from sharp or heavy objects in the wet well
- Loud environment may result in temporary or permanent hearing loss

WWTP #1			
CONFINED SPACE	TYPE OF SPACE	PERMIT OR NON-PERMIT	LOCATION
Bar screen Troughs		Non-permit	Bar screen Room WWTP #1
Influent Box	Manhole	Permit Required	South Side WWTP #1
Influent Box	Manhole	Permit Required	Head House WWTP #1
Influent Box	Manhole	Permit Required	Head House WWTP #1
Influent Wet Well	Manhole	Permit Required	Head House WWTP #1
Influent basement	Manhole	Non-permit	Head House WWTP #1
Influent Valve Pit	Pit	Non-permit	Head House WWTP #1
Batch Reactor		Permit Required	WWTP #1
Final Clarifier		Non-permit	WWTP #1
Large Digester		Non-permit	WWTP #1
Small Digester		Non-permit	WWTP #1
Square Digester		Non-permit	WWTP #1
RBC		Permit Required	WWTP #1
Final Valve Pit		Permit Required	WWTP #1
Final Valves Blue Box		Permit Required	WWTP #1
Old CL2 Contact		Non-permit	WWTP #1
Batch Drain		Non-permit	WWTP #1
Press Drain		Non-permit	Sludge Bay WWTP#1
Shop Drain		Non-permit	WWTP #1
Plant Pumpstation		Permit Required	WWTP #1
Plant City Water/Shut off valve	Manhole	Non-permit	WWTP #1

Digester Manhole	Manhole	Permit Required	WWTP #1
Squares Manhole	Manhole	Permit Required	WWTP #1
Effluent Valve Pit	Pit	Permit Required	WWTP #1
Plant Water Wet Well	Wet Well	Permit Required	WWTP #1
Press Water Wet Well	Wet Well	Permit Required	WWTP #1
Effluent Flow Trough		Permit Required	Outside Building WWTP#1
Effluent Flow Trough x2		Permit Required	Inside Building WWTP #1
Effluent Clarifier to Effluent Box		Permit Required	WWTP #1
Ras Valve Pit	Pit	Permit Required	WWTP #1
Was Wet Well	Wet Well	Permit Required	WWTP #1
Ras Wet Well	Wet Well	Permit Required	WWTP #1
Ras Valve Pit	Pit	Permit Required	WWTP #1
Clarifier #1		Non-permit	WWTP #1
Clarifier #1		Non-permit	WWTP #1
Clarifier Splitter Box		Permit Required	WWTP #1
Ditch		Permit Required	WWTP #1
Pista Grit Trough		Permit Required	Pista Grit Building WWTP#1
Trough Between Pista Grit and Barscreen		Permit Required	WWTP #1
Trough Behind Bar Screen		Permit Required	WWTP #1
Influent Manhole	Manhole	Non-permit	WWTP #1
Odor Control Outside		Non-permit	WWTP #1
Odor Control Ditchside		Non-permit	WWTP #1
Tunnel Beneath RBC	Tunnel	Non-permit	WWTP #1
WWTP #3			
CONFINED SPACE	TYPE OF SPACE	PERMIT OR NON-PERMIT	LOCATION
Barscreen		Non-Permit	Head House WWTP #3
Ras Influent Splitter Box		Non-Permit	WWTP #3
Ditch #1		Permit Required	WWTP #3
Ditch #2		Permit Required	WWTP #3
Shop Drain		Permit Required	WWTP #3
Digester		Permit Required	WWTP #3
Digester Hatch		Permit Required	WWTP #3
Clarifier #1		Non-Permit	WWTP #3
Clarifier #2		Non-Permit	WWTP #3
Clarifier Splitter Box		Permit Required	WWTP #3
UB Trough		Non-Permit	WWTP #3
Decant Wet Well	Wet Well	Permit Required	WWTP #3
Drainage Well	Well	Permit Required	WWTP #3

GMWSS PRACTICES FOR ENTERING CONFINED SPACE

- It is standard practice for employees to remove all liquids and debris from the confined space by pumping or vacuuming with our vacuum truck.
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- The entrant or entrants are required to wear a hard hat and gas detector at all times during the confined space entry.
- Any tools lowered down to the entrants must be placed inside of a bucket and lowered down with a safety rope. Battery operated tools are used to prevent major electrocution risks while inside these structures.
- At no time shall power be restored while an entry is being made.
- The air must be monitored throughout the entire entry by the confined space supervisor and logged on the confined space entry permit.
- There shall always be one person manning each winch that is attached to an entrant and that person may leave for no reason. If tools or supplies are needed another employee or runner must be used.
- Once the work is complete, the entrant shall ascend with the winch man cranking up the slack.
- Once both of the entrants' feet are off the ladder on solid ground, the winch safety cable connection can be removed.
- The equipment can now be removed and the station can be returned to normal operating conditions if no further repairs are needed.

CONFINED SPACE IDENTIFICATION
WATER TREATMENT PLANT

Possible Hazards:

- Atmospheric hazards (low oxygen, toxic or flammable gasses)
- Slips, trips and falls
- Engulfment or drowning
- Electrocution
- Injury from falling objects
- Loud environment may result in temporary or permanent hearing loss

Water Treatment Plant			
CONFINED SPACE	**TYPE OF SPACE**	**PERMIT/NON-PERMIT**	**LOCATION - WTP**
Chlorine Ammonia Injection	Manhole	Permit-required	Back Driveway
UV Vault	Concrete Vault	Non-permit	UV Building
Circular Clearwell	Concrete Tank	Permit-required	Hatch on clearwell
Rectangular Clearwell	Concrete Tank	Permit-required	Hatch on clearwell
Pipe Gallery	Below Floor Level	Non-permit	Basement WTP

GMWSS PRACTICES FOR ENTERING CONFINED SPACE

- It is standard practice for employees to remove all liquids and debris from the confined space by pumping or vacuuming with our vacuum truck.
- All incoming flow lines shall be plugged to prevent filling to minimize drowning or engulfment hazards. These plugs must be inspected before and after each use to ensure they're in working condition and safe for use. All must be equipped with an air gauge to show that they are holding the correct amount of air throughout the entry.

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- The area around the confined space is inspected to insure no slip, or trip hazards.
- A ladder is used for all entries as well as a harness, with a tripod and winch attached. While descending the winch operator shall not free spool the winch but slowly lower the winch as the entrant descends. At no time during the entry is it acceptable to remove the winch cable from their harness.
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- Once both of the entrants' feet are off the ladder on solid ground, the winch safety cable connection can be removed.
- The equipment can now be removed and the station can be returned to normal operating conditions if no further repairs are needed.

Fall Protection Plan
Georgetown Municipal Water & Sewer Service

OBJECTIVE

Georgetown Municipal Water & Sewer Service (GMWSS) is committed to providing a safe and healthy working environment for all employees. To continue this practice, the following Fall Protection plan is provided to eliminate or minimize risk of injuries due to slips, trips, and falls.

When performance of any task would allow a worker to fall a distance of four feet or more to a lower level, the project requires pre-planning in order that fall hazards are identified, evaluated, and controlled. The employee must receive adequate training and be protected from falling. The controlling regulations are 29 CFR 1910, Subpart D of the General Industry Standard (Walking Working Surfaces) hereinafter referred to as the Fall Protection Standard.

In an effort to comply with the Occupational Safety and Health Administration Standards (OSHA), this written program has been established for ***Georgetown Municipal Water & Sewer Service***. All GMWSS departments are covered by this plan and must comply with the rules and regulations stated in this program. Copies of this written program will be given to each employee to add to their safety manual. A copy of the OSHA Standard is available for review by any employee.

ASSIGNMENT OF RESPONSIBILITY

The Loss Control Administrator, Barbara Bowman, is responsible for:

- providing oversight and technical support,
- securing the resources necessary to implement this program;
- ensuring that routine safety checks of work operations are performed;
- conducting an annual review of this program, including an inspection of systems
- updates (as needed) to ensure the effectiveness of the program; and,
- ensuring that proper reporting and record keeping is executed.

Department Supervisors (Engineering: Daryl Mulder; Distribution: Jonathan Walters; Water Treatment Plant: James Long; WWTP #1 & #3: Brad Parrent; Collections: Calvin Rodgers; and WWTP #2 – Rick Mulberry) are responsible for:

- compliance with this program at project sites under their supervision.
- performing routine safety checks of work operations;
- correcting any unsafe practices or conditions immediately;

- ensuring employees have the proper tools and personal protective equipment for working on elevated work surfaces;
- coordinating employee schedules for training;
- notifying the Loss Control Administrator of potential hazards requiring assessments, or improvements to the program.

GMWSS employees are responsible for:

- complying with all aspects of this program; and,
- cooperating in all safety and health matters;
- reporting incidents related to fall protection to your supervisor/foreman immediately;
- wearing all required personal protective equipment – there are no exceptions;
- inspecting the equipment in accordance with manufacturer's guidelines and instructions; and,
- reporting hazardous conditions or other health and safety concerns immediately to your supervisor/foreman/project manager.

The program is reviewed at least annually to ensure both the safety of the company employees and compliance with the OSHA Fall Protection standards, as well as any state and local requirements.

FALL PROTECTION PROCEDURES

Basic Fall Protection

The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition.

Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practicable.

Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, through doorways, and wherever turns or passage must be made.

Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard.

Every stairway floor opening shall be guarded by a standard railing constructed in accordance with applicable OSHA requirements. The railing shall be provided on all exposed sides (except at entrance to stairway).

Every platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening).

Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.

TASKS AND WORK AREAS REQUIRING FALL PROTECTION

Wastewater Treatment Plant #1:

Cleaning Clarifiers: WWTP #1 shall use collection's tripod and winch (primarily used for confined spaces) that require the hoist. While cleaning out the clarifier, employees shall use a harness and an EZ stop shock absorber by Sala to clip on with while moving around the clarifier during cleaning.

General:

Hoist Areas

Guardrail systems or personal fall arrest systems will be used in hoist areas when an employee may fall four (4) feet or more. If guardrail systems must be removed for hoisting, employees are required to use personal fall arrest systems.

Ladders

Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play.

Ladders shall be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use." If ladder is not repairable, it should be destroyed immediately and parts thrown away.

Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment shall not be used; improvised repairs shall not be made. Ladders should be destroyed immediately.

Rungs should be kept free of grease and oil.

Portable ladders shall be so placed that the side rails have a secure footing.

Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked upon, locked, or guarded.

Ladders shall not be placed on boxes, barrels, or other unstable bases to obtain additional height.

Tops of the ordinary types of stepladders shall not be used as steps.

No ladder should be used to gain access to a roof unless the top of the ladder shall extend at least 3 feet above the point of support, at eave, gutter, or roofline.

A simple rule for setting up a ladder at the proper angle is to place the base a distance from the vertical wall equal to one-fourth the working length of the ladder.

Portable ladders are designed as a one-man working ladder based on a 200-pound load.

The ladder base section must be placed with a secure footing.

When ascending, or descending, the climber must face the ladder.

Employees should not lean too far over the side rails of a ladder such that is causes a fall hazard. A good "rule of thumb" is that employees keep their belt buckle within the side rails at all times.

Scaffolds

The following are basic procedures that apply to most scaffolds. There are many different types of scaffolds (see list below) and each type may have specific requirements. Only trained personnel will be permitted to assemble, disassemble, and work from any scaffold.

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds or planks.

Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.

Scaffolds and other devices mentioned or described in this section shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are in use or occupied.

Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

Scaffolds shall not be loaded in excess of the working load for which they are intended.

All planking or platforms shall be overlapped (minimum 12 inches) or secured from movement.

An access ladder or equivalent safe access shall be provided.

Scaffold planks shall extend over their end supports not less than 6 inches nor more than 18 inches.

The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

Materials being hoisted onto a scaffold shall have a tag line.

Overhead protection shall be provided for employees on a scaffold exposed to overhead hazards.

Scaffolds shall be provided with a screen between the toeboard and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard Wire one-half-inch mesh or the equivalent, where persons are required to work or pass under the scaffolds. Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

Scaffolds shall be secured to permanent structures, through use of anchor bolts, reveal bolts, or other equivalent means.

Protection Against Falling Objects

The fall protection regulation is not only designed to protect workers from falls, but also to protect workers from having objects fall on them. The use of toeboards is one method of complying with the requirements for overhead protection. The toeboard should be used as an element of the guardrail system. It is a rail placed at the walking/working surface level.

Toeboards are required to withstand a force of 50 pounds and are generally made of 2x4s. In areas where material is to be stored and the stack is higher than the toeboard, a screen or panel should be placed from the toeboard to either the midrail or top rail, whichever is higher than the stored material, to prevent materials from slipping through.

It is wise to store materials away from the edges of floors or roofs and away from any holes. Even small holes, such as those for heating or cooling ducts, should have covers placed on them and secured to prevent materials or tools from falling through and injuring someone on a lower level.

The key to providing a safer workplace for employees is ensuring that there is a good housekeeping program. If materials and debris are properly cleaned up and tools are put in proper storage areas, the hazard of falling objects can be greatly reduced.

Fall Protection Systems

Only the Loss Control Administrator and the immediate supervisor can make decisions on the proper fall protection system to be used for any specific application. Fall protection systems will only be utilized after careful consideration and task / project review.

Covers

All hole and wall covers are secured to prevent accidental displacement.

- Covers shall bear the markings "HOLE" or "COVER".
- Covers are able to support twice the weight of employees, equipment, and materials that might cross them.
- Covers located in roadways are able to support twice the axle load of the largest vehicle that might cross them.

Guardrail Systems

Guardrail systems are erected at unprotected edges, ramps, runways, or holes where it is determined by the supervisor\foremen that erecting such systems will not cause an increased hazard to employees. The following specifications are followed in the erection of guardrail systems.
Toprails are:

- at least ¼ inch in diameter (steel or plastic banding is unacceptable);
- flagged every six (6) feet or less with a high visibility material if wire rope is used;
- inspected by supervisor as frequently as necessary to ensure strength and stability;
- forty-two (42) inches (plus or minus three (3) inches) above the walking/working level; and
- adjusted to accommodate the height of stilts, if they are in use.

Midrails, screens, mesh, intermediate vertical members, and solid panels are erected in accordance with the OSHA Fall Protection Standard. Gates or removable guardrail sections are placed across openings of hoisting areas or holes when they are not in use to prevent access.

A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches, nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing.

The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

A standard toeboard shall be 4 inches, nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.

Personal Fall Arrest Systems

Personal fall arrest systems are issued to and used by employees as determined by the Loss Control Administrator and may consist of anchorage, connectors, body harness, deceleration device, lifeline, or suitable combinations.
Personal fall arrest systems:

- limit the maximum arresting force to 1800 pounds;
- are rigged so an employee cannot free fall more than six (6) feet or contact any lower level;
- bring an employee to a complete stop and limit the maximum deceleration distance traveled to three and a half (3 ½) feet;
- are strong enough to withstand twice the potential impact energy of an employee free falling six (6) feet (or the free fall distance permitted by the system, whichever is less);
- are inspected prior to each use for damage and deterioration; and
- are removed from service if any damaged components are detected.

All components of a fall arrest system meet the specifications of the OSHA Fall Protection Standard, and are used in accordance with the manufacturer's instructions.

The use of non-locking snaphooks is prohibited.

Dee-rings and locking snaphooks:

- have a minimum tensile strength of 5000 pounds; and
- are proof-tested to a minimum tensile load of 3600 pounds without cracking, breaking, or suffering permanent deformation.

Lifelines are:

- designed, installed, and used under the supervision of a qualified person – one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully

demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- protected against cuts and abrasions; and
- equipped with horizontal lifeline connection devices capable of locking in both directions on the lifeline when used on suspended scaffolds or similar work platforms that have horizontal lifelines that may become vertical lifelines.
- Self-retracting lifelines and lanyards have ropes and straps (webbing) made of synthetic fibers, and
- sustain a minimum tensile load of 3600 pounds if they automatically limit free fall distance to two (2) feet; or
- sustain a minimum tensile load of 5000 pounds (includes ripstitch, tearing, and deforming lanyards).

Anchorages support at least 5000 pounds per person attached and are:

- designed, installed, and used under the supervision of a qualified person
- capable of supporting twice the weight expected to be imposed on it; and
- independent of any anchorage used to support or suspend platforms.

Positioning Device Restraint Systems

Body belt or body harness systems are set up so that an employee can free fall no farther than two (2) feet, and are secured to an anchorage capable of supporting twice the potential impact load or 3000 pounds, whichever is greater. Requirements for snaphooks, dee-rings, and other connectors are the same as detailed in this Program under *Personal Fall Arrest Systems.*

Safety Monitoring Systems

In situations when no other fall protection has been implemented, department supervisors monitor the safety of employees in these work areas.
The supervisor is:
- competent in the recognition of fall hazards;
- capable of warning workers of fall hazard dangers;
- operating on the same walking/working surfaces as the employees and able to see them;
- close enough to work operations to communicate orally with employees; and
- free of other job duties that might distract them from the monitoring function.

No employees other than those engaged in the work being performed under the Safety Monitoring System are allowed in the area. All employees under a Safety Monitoring System are required to promptly comply with the fall hazard warnings of the supervisor.

Warning Line Systems

Warning line systems consisting of supporting stanchions and ropes, wires, or chains are erected around all sides of open edged work areas.

- Lines are flagged at no more than six (6) foot intervals with high-visibility materials.
- The lowest point of the line (including sag) is between 34 and 39 inches from the walking/working surface.
- Stanchions of warning line systems are capable of resisting at least 16 pounds of force.
- Ropes, wires, or chains have a minimum tensile strength of 500 pounds.
- Warning line systems are erected at least six (6) feet from the edge, except in areas where mechanical equipment is in use. When mechanical equipment is in use, warning line systems are erected at least six (6) feet from the parallel edge, and at least ten (10) feet from the perpendicular edge.

TRAINING

All employees are trained in and familiar with hazards related to falls, and how to use proper procedures to minimize these hazards. Specifically, training must include, at a minimum:

- nature of the fall hazards employees may be exposed to;
- correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
- use and operation of controlled access zones, guardrails, personal fall arrest systems, warning lines, and safety monitoring systems;
- role of each employee in the safety monitoring system (if one is used);
- correct procedures for equipment and materials handling, and storage and erection of overhead protection;
- role of each employee in alternative fall protection plans (if used); and,
- requirements of the OSHA Fall Protection Standard.

In addition, retraining must be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge necessary for the safe performance of specific tasks needing to be conducted by that individual.

Additional training is provided:

- when there is a change in job responsibilities;
- a change in equipment that present a new hazard; or,
- when their work takes them into hazardous areas.

Additional retraining is also provided whenever a periodic inspection reveals, or whenever there is reason to believe there are deviations from or inadequacies in an employee's knowledge of known hazards.

Following each training session, the employee is required to sign and date the training record verifying attendance.

TERMS AND DEFINITIONS

Anchorage: a secure point of attachment for lifelines, lanyards, or deceleration devices.

Body belt: a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness: straps that may be secured about the person in a manner that distributes the fall-arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Connector: A device that is used to couple (connect) parts of a personal fall arrest system or positioning device system together.

Deceleration device: any mechanism, such as a rope, grab, ripstitch lanyard, specially-woven lanyard, tearing lanyard, deforming lanyard, or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance: the additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Guardrail system: a barrier erected to prevent employees from falling to lower levels.

Hole: a void or gap two (2) inches (5.1 centimeters) or more in the least dimension in a floor, roof, or other walking/working surface.

Lanyard: a flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body belt or 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 a deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed.

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 anchorages at both ends to stretch horizontally (horizontal lifeline), that serves as a means for connecting other components of a personal fall arrest system to an anchorage.

Opening: a gap or void 30 inches (76 centimeters) or more high and 18 inches (46 centimeters) or more wide, in a wall or partition through which employees can fall to a lower level.

Personal fall arrest system: a system including but not limited to an anchorage, connectors, and a body harness used to arrest an employee in a fall from a working level.

Positioning device system: a body belt or 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 backwards.

Rope grab: a deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Safety monitoring system: a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-retracting lifeline/lanyard: a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal employee movement and which, after onset of a fall, automatically locks the drum and arrests the fall.

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

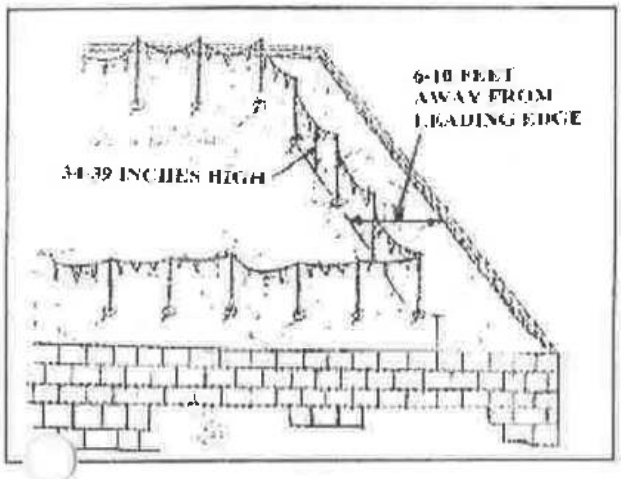
Steep roof: a roof having a slope greater than 4 in 12 (vertical to horizontal).

Toeboard: a low protective barrier that prevents material and equipment from falling to lower levels and which protects personnel from falling.

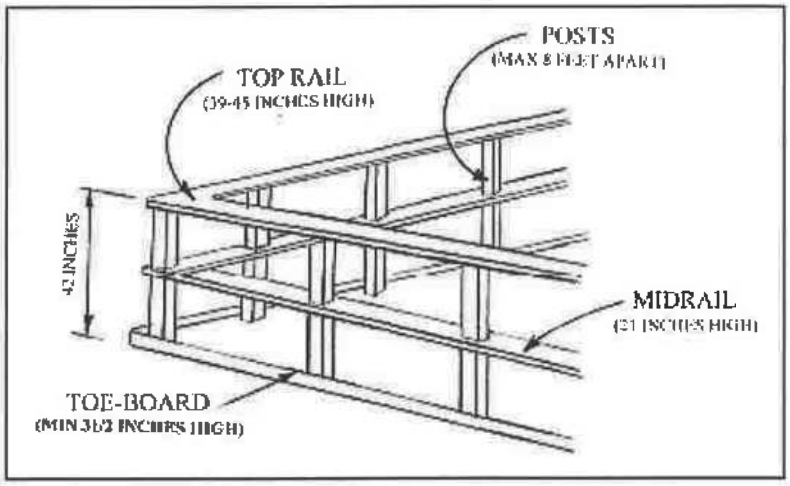
Unprotected sides and edges: any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches (1 meter) high.

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. Does not include ladders, vehicles, or trailers on which employees must be located to perform their work duties.

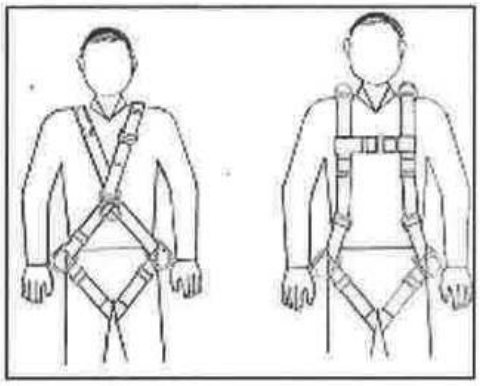
Warning line system: a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.



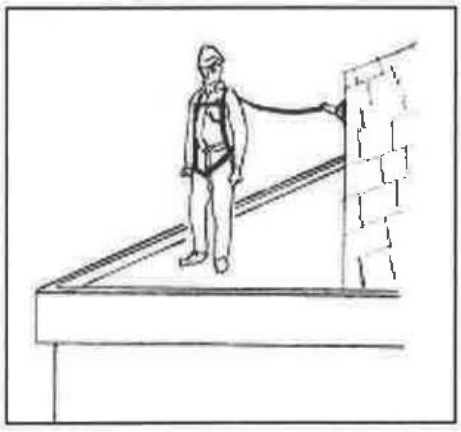
Warning Line System



Specifications for Standard Railings



Full Body Harness



Body Restraint System