Standard Work Practices	1
Marshall Municipal Utilities	l

Work Procedure

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DOCUMENT ID:

LOTO Program

Section-14

PURPOSE:

SUBJECT:

This LOTO Program is intended to protect employees and contractors performing service or maintenance on equipment or machinery where an unexpected start up or release of stored energy could cause injury.

DEFINITIONS AND ACRONYMS:

LOTO: Lockout/Tagout (the Control of Hazardous Energy)

OSHA: Occupational Safety and Health Administration

MMU: Marshall Municipal Utilities

NFPA: National Fire Protection Association

CFR: Code of Federal Regulations

APPA: American Public Power Association

<u>Affected Employee:</u> A person whose job requires them to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires them to work in an area in which such servicing or maintenance is being performed.

<u>Authorized Employee:</u> A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected person becomes an authorized person when that employee's duties include performing servicing or maintenance covered under OSHA 29 CFR 1910.147(a) (3). **Municipal:** Marshall: Utilities and its subsidiaries.

Energized: Connected to an energy source or containing residual or stored energy. Examples include: springs, high-pressure steam lines, hydraulic lines, capacitors, gas piping and electrical equipment.

Energy Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy.

NOTE: push buttons, selector switches and other control circuit type devices are not energy-isolating devices.

Energy Source: Any source of energy including, but not limited to, electrical, mechanical, hydraulic, pneumatic, chemical, or thermal.

Lockout: The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

<u>**Risk Assessment:**</u> A comprehensive evaluation of the probability and the degree of the possible injury or damage to health in a hazardous situation. The risk assessment is used to select appropriate safeguarding.

Servicing and/or Maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the person may be exposed to the unexpected energization or start up of the equipment or release of hazardous energy.

Tagout: The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

<u>**Tagout Device:**</u> A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy-isolating device in accordance with an established procedure to indicate that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed.

<u>Red "Individual" Lock:</u> A type of key lock that is used for no other purpose in the facility/operation, having one key, and for which master keys are not available. Such locks are individually assigned (personal lock) to <u>authorized</u>

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ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF
Daniel Morton	02/01/15	XX Month	Marshall Municipal	1	15
	APPROVED BY: BPW 12/31/14	XXXX	Utilities		

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

individuals, or can be obtained from a central repository of LOTO devices, whereupon they become personal locks while in use by an individual. LOTO Locks are typically colored red.

Black "Electricians" Lock: A type of key lock that is used for no other purpose in the facility/operation, having one key, and for which master keys are not available. Such locks are individually assigned (personal lock) to <u>authorized</u> <u>electricians</u>, or can be obtained from a central repository of LOTO devices, whereupon they become personal locks while in use by an individual. Electrician LOTO Locks are typically colored black.

<u>Red/White "Danger" Tag:</u> A tag used to indicate that a machine, equipment, process or circuit is out of service or inoperable and someone is working on the system. Danger tags should only be applied by authorized employees.

<u>Red/White "Danger" Tag "Electricians only":</u> A tag used to indicate that a machine, equipment, process or circuit is out of service or inoperable and an electrician is working on the system. Red/White "Electrician" tags will only be applied by authorized electricians.

Hot-Line tag: A type of control that is used for no other purpose in a facility/operation, having one authorized lineman communication with the power plant control room using SCADA. Second option: Manually applying hot-line tag in substation. Note: The Hot-Line Tag will not completely de-energize a circuit. A hot-line tag is a safety device used to protect lineman while working on energized <u>or de-energized</u> lines. (Please see Rubber Gloves and Sleeve Policy: Appendix A for more detail)

- When a Hot-Line Tag is <u>ON</u>, it will prevent <u>ANY type of close operation</u>-Remote, Manual <u>or Automatic reclose.</u>
- It switches the time current curve of the Relay to a **FASTER** curve when line is energized.

Group Lockout/Tagout: A Group LOTO is necessary when service/maintenance is performed by more than one individual. A procedure must be developed that outlines how a group LOTO will occur. This information should be identified on the LOTO Procedures form. Group LOTO can be accomplished through the use of a lockout device that accepts multiple locks or a group lockbox (stores all keys to locks used and can only be opened by one individual). One person from the authorized group should be selected to oversee the LOTO procedure. The group representative will be responsible for:

- Affixing the group lockout device or maintaining control of the lockbox
- Ensuring the lockout/tagout procedures are followed, including verifying that equipment is de-energized
- Continually monitoring the work to ensure that employees on the crew are not exposed to LOTO hazards
- Verifying that all procedures for returning the equipment back into service are completed **before** LOTO devices are removed.

<u>Supervisor Override:</u> The person who installed the lockout/tagout devices must remove them. In an emergency situation, however, if that person is not available, an authorized supervisor member of the line organization may remove the lockout/tagout device, provided an attempt to locate the person has been made. Removing the lockout/tagout device cannot expose a person to a hazard. The authorized supervisor member must follow all steps in the procedures to determine no hazard exists when lock is removed. If a supervisor member removes the lockout/tagout device, the person who installed the device must be informed that the lockout/tagout device has been removed before he/she returns to work.

APPLICATION:

- A. This procedure applies to all employees.
- B. This LOTO Program provides procedures to be followed in accordance with OSHA's Regulation Part 29 of CFR 1910.147- The Control of Hazardous Energy (LOTO) and NFPA 70E Article 120. It was developed as part of a Best Management Practice.
- C. This program establishes the minimum requirements for the risk assessment of energized company equipment or systems during maintenance or servicing.

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15	XX Month XXXX	Marshall Municipal Utilities	2		15
	APPROVED BY: BPW 12/31/14		e till tes			

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

- D. This program applies to all affected MMU employees, MMU contractors and customers who may be performing work within a facility or on a worksite. All contractors can be provided a copy of this written program if requested.
- E. Contractors will be notified of the requirement to follow this practice by personnel contracting their service, maintenance or safety dept. Contractors shall provide a written copy of their LOTO program to facilities, personnel contracting their services or safety personnel prior to starting work. Contractors will be responsible for providing their own risk assessment during application, on-site activities.

RESPONSIBILITY:

- A. Utilities employees and contractors are required to comply with the restrictions and limitations as set forth by OSHA, APPA, NESC and NFPA during the LOTO activities.
- B. Only authorized persons may implement LOTO procedures in accordance with this program. No employee or contractor may attempt to start, energize, or use a machine or piece of equipment that is locked out or tagged out.
- C. Each MMU facility/site conducting LOTO activities must complete Table 1, identifying current authorized company personnel and their designated LOTO responsibilities for the facility. Only these personnel may perform duties associated with LOTO Risk Assessment.
- D. Employees who identify violations of this or any other regulatory program or standard shall immediately report the violation to a safety or management representative.
- E. The electrical department is to visibly label all electrical disconnects with voltage and what the disconnect controls (typically in building distributions).
- F. Facility and worksite supervisors are responsible for labeling all other MMU facility equipment.
- G. As equipment is added, relocated, modified, or otherwise changed in a manner that affects the equipment's energy source, a LOTO equipment checklist (figure 2) is to be immediately generated or revised.
- H. Removing another employee's or contractor's lock is **<u>strictly prohibited</u>**/Exception: See "Supervisor Override" in the definition section.

REFERENCE DOCUMENTS:

- A. 29 CFR 1910.147- OSHA Standard, The control of hazardous energy (lockout/tagout)
- B. 29 CFR 1910.333- OSHA Standard, Selection and use of work practices
- C. NFPA (National Fire Protection Association) 70E Article 120
- D. APPA-Safety Manual 15th Edition: Section 202

ACTIVITIES EXEMPT FROM LOCKOUT/TAGOUT REQUIREMENTS AND ALTERNATIVE METHODS:

- A. Minor tool changes and adjustments (i.e., drill bits, sanding disks, or grinding wheels), and other minor servicing activities, which take place during normal operations, provided the activities are: routine, repetitive, and integral to the use of the equipment and performed using alternative measures which provide effective worker protection.
- B. Maintenance or servicing of cord and plug connected devices when the plug is under the control of the person performing the work.

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15	XX Month	Marshall Municipal	3		15
	APPROVED BY: BPW 12/31/14	XXXX	Utilities			

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

- C. Live parts that operate at less than 50 volts to ground do not need de-energized if there will be no increased exposure to electrical burns or to explosion due to electrical arcs (OSHA 29 CFR 1910.333(a) (1).
- D. Risk assessment shall be performed to determine alternative methods for maintenance tasks that do not require LOTO. The results of risk assessment include:
 - 1) Awareness of hazards related to the task to be performed
 - 2) Familiarity of hazards related to the task performed
 - 3) Availability of reference documents
 - 4) Identification of personal protective equipment for use during task performance.

LOCKOUT/TAGOUT DEVICES:

A. Tagout Device: The standard tag is the only tag to be used as a tagout device (Figure 1). The companyauthorized person must enter their name, department, date, and brief work description on the tag.

B. Lockout Device: Lockout devices used at company facilities and work sites must be individually keyed, with only one key per lock, unique from all other locks at the site and standardized by color, shape, or size. The key must remain with the individual installing the lock.

C. LOTO tags and locks may only be used as energy-isolating devices. The tags and locks are attached to controlled equipment to prevent injury to personnel. Use of LOTO devices for any other purpose (i.e., to identify defective tools or to be used as information tags) is strictly prohibited.

D. Only one authorized person may sign and date LOTO tag. When more than one authorized person performs work on the same piece of equipment, multiple LOTO tags and individual locks must be attached to the isolating device.

E. Operation of LOTO equipment is prohibited under any circumstances until all tags have been removed. In the case of an electric device, the company's electrician tag is to be the last tag removed.

F. Authorized employees removing tags are responsible for the satisfactory completion of their portion of work. This includes re-installation of guards and verification that all persons affected or potentially affected by the lock and/or tag being removed are so informed and warned.

G. Note: Do not rely on other authorized employee's lockout/tagout. Always verify, place and/or remove your own locks and tags.

PROCEDURE: (AVAILABLE FOR USE)

- A. Equipment Risk Assessment for Alternative Methods
 - i. Risk assessment shall be performed to determine alternative methods for non-servicing and/or maintenance tasks that do not require LOTO. Risk assessment determines an overall safety strategy for a machine, equipment, process or circuit that does not require LOTO. The results of risk assessment include(s):
 - 1. Awareness of hazards related to the task to be performed;
 - 2. Familiarity with the task process;
 - 3. Availability of reference documents (risk assessment forms);
 - 4. Identification of personal protective equipment for use during task performance.
 - ii. Hierarchy of Alternative Control Implementation
 - 1. A hierarchical process shall be employed in the selection of alternative control methodologies
 - in the following order of preference:
 - a. Eliminate the hazard through design;
 - b. Use administrative controls (such as safe work procedures, practices, and training) as specified.
 - 2. When the alternative methodology has been determined, appropriate communication and training of individuals shall be developed and provided.

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15	XX Month XXXX	Marshall Municipal Utilities	4		15
	APPROVED BY: BPW 12/31/14	ΛΛΛΛ	Ounties			

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

TRAINING:

A. Personnel participating in the LOTO program will receive initial training by the lockout/tagout supervisor, safety dept. or qualified trainer. Training will be provided at the time of employment, with at least an annual review of the site's LOTO programs. Personnel will be retrained for changes in equipment or programs, job assignments, or noted violation/deficiencies. Training records shall be maintained for a period of at least three (3) years.

INSPECTIONS:

- A. Management will conduct inspections of this LOTO program at least annually to ensure that the program follows current OSHA regulations and that MMU personnel are following the procedures set forth in this program and the OSHA requirements.
- B. An authorized person, other than the one(s) utilizing the energy control program being inspected, will perform the inspection. The periodic inspection must be conducted to identify and correct any deviations or inadequacies identified.
- C. Where LOTO is used for energy control, the initiator of LOTO and everyone who is involved in that specific process should look over the procedure with the inspector. LOTO procedure for task performed and those who are authorized to perform that specific procedure will be subject to an inspection.
- D. The inspection will be documented using the Authorized Employee LOTO Annual Certification checklist (Figure 4) and Periodic LOTO Inspection Checklist (Figure 5). Completed forms will be filed with the EHS department. The documentation must include:
 - 1. The machine or equipment on which the inspection was performed,
 - 2. The date of the inspection,
 - 3. The names of the employees included in the inspection, and
 - 4. The name and signature of the authorized person performing the inspection.
- E. Information gathered during the periodic inspections can be used to make changes/updates to the program.
- F. <u>Reciprocal LOTO demonstrations</u>: Where two authorized employees inspect each other in succession by switching roles to complete two inspections, no two persons are allowed to conduct the LOTO demonstration within a 24-hour period on the same piece of equipment/LOTO device.

DISCIPLINARY ACTION:

A. Any unauthorized person who operates a valve, switch, or device to which LOTO tags and/or locks are attached, or removes LOTO tags or labels which are not their own, will be subject to immediate disciplinary action, up to and including termination.

FIGURE LIST:

- A. Table 1- listing of authorized employees
- B. Appendix A- Risk Assessment and Risk Reduction
- C. Figure 1- Risk Assessment Form
- D. Figure 2: Authorized employee LOTO annual certification
- E. Figure 3: Periodic LOTO inspection checklist
- F. Figure 4: LOTO equipment checklist

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15 APPROVED BY: BPW 12/31/14	XX Month XXXX	Marshall Municipal Utilities	5		15

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE:	MMU INTERNAL CONTROLLED COPY
Work Procedure	
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

Table 1: Lockout/Tagout Authorized Person(s) (Each department will hold an active list of current authorized person(s)

Worksite Name:	
Authorized Person(s)	

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15	XX Month	Marshall Municipal	6		15
	APPROVED BY: BPW 12/31/14	XXXX	Utilities			

Marshall Municipal Utilities

DOCUMENT TYPE:

SUBJECT:

MMU INTERNAL

CONTROLLED COPY

Work Procedure

DOCUMENT ID:

LOTO Program

Section-14

Appendix A: Risk Assessment and Risk Reduction

Risk assessment is an analytical tool consisting of a number of discrete steps intended to ensure that hazards are properly identified, that associated risks are evaluated and that appropriate measures are taken to reduce those risks to an acceptable level. (Risk assessment and reduction tool will be used in setting up procedures or when new equipment is installed or existing equipment is moved or updated.)

An element of a risk assessment process includes the following steps:

- 1) Identify all tasks: All tasks and activities should be considered. Examples of activities for which tasks should be identified include set up, installation, removal, maintenance, operating, adjusting, cleaning, troubleshooting, and programming.
- Identify hazards: Hazards associated with each task such as; mechanical, electrical, thermal, 2) pneumatic, hydraulic, radiation, residual or stored energy, motion, fuels, and human factors should be considered. Associated hazards for a particular task not related to hazardous energy release may also need to be reviewed. Consideration should include human error, management system deficiencies and foreseeable improper use of equipment.
- Assess the severity of the harm: Severity of the harm addresses the degree of injury or illness that 3) could occur. The degrees are based on extent of injury or illness (from death to no injury), and extent of treatment involved.

The following is an example of severity levels:

Catastrophic- Death or permanently disabling injury or illness (unable to return to work) Serious- Severe debilitating injury or illness (able to return to work at some point) **Moderate**- Significant injury or illness requiring more than first aid (able to return to the same job) **Minor**- No injury or slight injury requiring more than first aid (little or no lost work time)

4) Assess the probability of occurrence of harm: Probability of occurrence of harm is estimated by taking into account the frequency, duration and extent of exposure, training and awareness, and the presentation of the hazard.

The following is an example of **probability** levels:

Very likely- near certain to occur Likely- may occur Unlikely- not likely to occur Remote- so unlikely as to be near zero

When estimating probability, the highest credible level of probability is to be selected. The following factors are considered important in estimating the probability of occurrence of harm:

- Exposure to hazard
- Personnel who perform task
- Machine/task history
- Workplace environment
- Human factors
- Reliability of safety functions
- Possibility to defeat or circumvent protective measures
- Ability to maintain protective measures

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15 APPROVED BY: BPW 12/31/14	XX Month XXXX	Marshall Municipal Utilities	7		15
	APPROVED B1: BPW 12/31/14					

Standard Work Practices Marshall Municipal Utilities	MMU INTERNAL
DOCUMENT TYPE: Work Procedure	CONTROLLED COPY
SUBJECT: LOTO Program	DOCUMENT ID: Section-14

5) Evaluate the risk: based on the results of Steps 3 and 4 above, the level of risk is estimated by applying the level of severity of harm and the probability of occurrence of that harm to table A-1

Risk Reduction (Implementation)

Risk reduction is a hierarchical process employed to reduce or control risk by the following:

- Elimination through design
- Use of engineered safeguards
- Awareness means including warning and alerting techniques
- Administrative controls including safe work procedures and training
- Use of personal protective equipment
- Training

Often, for any particular machine, equipment, process and circuit, the solution may include aspects of each of these elements. The risk reduction process should involve the affected personnel, should be documented and should adhere to the process outlined below:

The following questions should be asked to determine the adequacy of the risk reduction process:

Is the safety level adequate? Can the task be performed without causing injury or damage to health?

Have appropriate safety measures been taken for all tasks or activities? Are the measures taken compatible with each other?

Do the safety measures generate any new, unexpected hazards or problems?

Risk Reduction by Design:

Risk reduction should first attempt to eliminate the hazard through design. The primary objective in implementing design features is to eliminate hazards or reduce their risk by substitution.

Risk Reduction by Use of Engineered Safeguards:

Safeguards or safety devices should be used to protect personnel from hazards that cannot be reasonably eliminated or sufficiently reduced by design. Safeguards or safety devices and the safety control system (electrical, pneumatic, hydraulic, etc) should be of a suitable reliability for the risk reduction that is required. **NOTE:** Examples of engineered safeguards include guards (both fixed and interlocked), trapped key devices, and trip devices (light curtains, laser scanners, pressure mats, safety rated switches, etc.). Safety devices include emergency stop buttons, enabling or hold-to-run devices, etc.

Risk Reduction by Use of Warning and Alerting Techniques:

Warning and alerting techniques should be used to protect personnel from hazards that cannot be reasonably eliminated or sufficiently reduced by design, engineered, safeguards, or a combination of these elements. **NOTE:** Examples of warning and alerting techniques include attendants, audible and visual signals, barricades, signs, and tags.

Risk Reduction by use of Administrative Controls:

Additional risk reduction is achieved by the use of administrative controls including safe work procedures, standard practices, checklist, and training. These should be used to control risk that cannot be reasonably eliminated or

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	iel Morton 02/01/15 X APPROVED BY: BPW 12/31/14 X		Marshall Municipal	8	1	15
			Utilities			

Standard Work Practices Marshall Municipal Utilities	MMU INTERNAL
DOCUMENT TYPE: Work Procedure	CONTROLLED COPY
SUBJECT: LOTO Program	DOCUMENT ID: Section-14

sufficiently reduced by the use of design, engineered safeguards, warning and alerting techniques or a combination of these elements. Training should be used as a complement to all the risk reduction methods described here. <u>NOTE</u>: Examples of safe work procedures, practices, and training include standard operating instructions, illumination, pre-job review, and establishing safe distances from a hazard. Examples of types of training that can be used to develop proficiency of authorized individuals may include computer-based simulation, drills, classroom programs or exercise(s).

Risk Reduction by use of Personal Protective Equipment:

Additional risk reduction is achieved by effective use of prescribed personal protective equipment (PPE). Strong administrative procedures must be in place for the PPE to be an effective safeguard. **NOTE:** Personal protective equipment can include safety eyewear or shields, footwear, protective gloves (insulating or cut resistant) and protective headgear.

Review the Risk Assessment and Risk Reduction:

The risk assessment and risk reduction should be reviewed at the following times:

- Following its implementation to ensure solutions are effective and in place
- Following an incident of near miss
- Whenever new tasks or activities are required
- Whenever there are modifications to the machine, equipment, process or circuit
- On a periodic basis

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15 Approved by: bpw 12/31/14	XX Month XXXX	Marshall Municipal Utilities	9		15

Marshall Municipal Utilities

DOCUMENT TYPE:

Work Procedure

MMU INTERNAL

CONTROLLED COPY

SUBJECT: LOTO Program DOCUMENT ID:

Section-14

Figure 1- Risk Assessment Form

Equipment Risk Assessment Form for Alternative Methods

Location; including building, workstation machine, make & model):

Prepared Date:

Before Risk Reduction or after Risk Reduction:

of people exposed to risk:

Frequency (1-10)

1 2 3 4 5 6 7 8 9 10

Consequence (1-10)

1 2 3 4 5 6 7 8 9 10

Risk Score Magnitude:

Alternative Methods/Protective Measures

Frequency (1-10)

1	2	3	4	5	6	7	8	9	10
Co	nseque	ence (1-	10)						
1	2	3	4	5	6	7	8	9	10

Risk Score Magnitude

LOTO required? Yes No

Identify all tasks that are routine, repetitive, and integral to the process but are exposed to hazards, require guards to be removed or bypassing of interlocks.

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF
Daniel Morton	02/01/15	XX Month	Marshall Municipal	10	15
	APPROVED BY: BPW 12/31/14		Utilities		

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14



DANGER TAG and Individual Lock and key



Electricians DANGER TAG and Individual Lock and key

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF
Daniel Morton	02/01/15	XX Month XXXX	Marshall Municipal Utilities	11	15
	APPROVED BY: BPW 12/31/14				

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

FIGURE 2: AUTHORIZED EMPLOYEE LOTO ANNUAL CERTIFICATION

	orized Employee v elected piece of equi		Ũ	.ockout/Tagout	(LOTO)
Facility:					
Date:/	/				
		from		dep	partment,
successfully	conducted	а	lockout/tagout	of	the
			equipment in accore	dance with the	site

LOTO plan using the outlined checklist provided below:

INSTALLATION OF LOCK AND TAG

- Notified Affected Employee(s)
- Followed equipment checklist/procedure for LOTO
- Isolated all energy sources to the equipment
- Locked and Tagged energy controls
- Released stored energy and/or residual energy
- Verified controls to ensure inadvertent startup

RESTORATION

- Notified affected employee(s)
- Checked equipment to ensure that all guards in place and tools were removed
- Ensured controls were in the neutral or off position
- Properly removed locks and tags
- Changes or recommendation in procedure or observation:

Inspector Name (Print)

Inspector Signature

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE OF	7
Daniel Morton	02/01/15	XX Month	Marshall Municipal	12	15
	APPROVED BY: BPW 12/31/14	XXXX	Utilities		

Standard Work Practices Marshall Municipal Utilities	MMU INTERNAL
DOCUMENT TYPE: Work Procedure	CONTROLLED COPY
SUBJECT: LOTO Program	DOCUMENT ID: Section-14

FIGURE 3: PERIODIC LOTO INSPECTION CHECKLIST

Facility:	
Date	
Equipment	_
Authorized Employee	
Inspector Name (Print)	
Inspector Signature	

LOTO/HOT TAG CHECKLIST

♥Verify that authorized employees have received initial LOTO training

◆Each current Authorized employee(s) is incorporated into the LOTO Organization Chart

Each Authorized employee has been issued an individual lock and key

Tags observed include the authorized person, department, date, and time

Assigned LOTO locks are used solely for the purpose of LOTO

Individual checklists are found at all designated machines or pieces of equipment with the individual LOTO procedure

♦Verify that locking devices are provided and are sufficient for securing switches, valves, etc.

Verify controls to ensure inadvertent startup

Affected employee(s) are notified by Authorized employee(s) prior to LOTO

Locks and tags are removed at the end of each work shift

 $\clubsuit Disciplinary actions are in place for employee(s) who operate valves, switches, or other devices associated under a LOTO$

Changes or recommendation in procedure or observation:

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE OF	
Daniel Morton	02/01/15 XX Month	Marshall Municipal	13	15	
	APPROVED BY: BPW 12/31/14	XXXX	Utilities		

Standard Work F Marshall Municipal Utilities	Practices		MMU	INTERNAL
DOCUMENT TYPE: Work Procedure			CONTR	OLLED COPY
SUBJECT: LOTO Program		DO	CUMENT ID:	ection-14
FIGURE 4: LOTO	EQUIPMENT CHE	ECKLIST		
LOCKOUT/TAGOUT	CHECKLIST			
Facility/Worksite Nan	ne:			
Date:				
Equipment ID:				
Location:				_
Description:				
Energy Source: Electrical	Pneumatic	Water		Air Under Pressure
Hydraulic	Gas	Chemical		Oil Under Pressure
Springs	Steam	Stored		Water Under Pressure
Thermal	Mechanical	Gravity		Gas Under Pressure
Other:				
Lockout Procedure:				
Number of Locks Require Lockout Devices Require PPE Required: Safety Glasses Safety Goggles Hearing Protection Leather Gloves Half Face Respirator Other		ld r Gloves s	 Hard Hat Coveralls Dust Mask Apron 	

Attach a picture/diagram or description of equipment and lockout device locations.

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE	OF	
Daniel Morton	02/01/15 Approved by: bpw 12/31/14	XX Month XXXX	Marshall Municipal Utilities	14		15

Standard Work Practices Marshall Municipal Utilities DOCUMENT TYPE: Work Procedure	MMU INTERNAL CONTROLLED COPY
SUBJECT:	DOCUMENT ID:
LOTO Program	Section-14

Notes/Recommended Changes

ORIGINATED/REVISED BY:	ISSUE DATE:	REVIEW DATE:	OWNER:	PAGE OF	
Daniel Morton	02/01/15	XX Month	Marshall Municipal	15	15
	APPROVED BY: BPW 12/31/14	XXXX	Utilities		