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John C. Stennis Space Center (SSC)

Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation

APPROVAL/CONCURRENCE

Original Signature on File ***10/6/10***

Freddie Douglas III *Date*
Manager, Office of Safety and Mission Assurance

Original Signature on File ***10/6/10***

Mike Rewis *Date*

Office of Safety and Mission Assurance

Document History Log

Status/Change/ Revision	Change Date	Originator/ Phone	Description
Basic	7/17/09	Dave Lorance 8-1516	Transitioned all the information from the existing Safety and Health Handbook. Added Sections from each of the SSC Prime Contractor work instructions so that all aspects of Lockout, Tagout (LOTO) are addressed through this procedure. Added new forms: LOTO audit, LOTO Log Sheet, Hazardous Energy Control Procedure (HECP) and posted new LOTO related tags.
A	9/22/2010	Mike Rewis 8-2663	A grammatical change was made in section 2.0. Section 2.0 was also changed to reflect the proper referenced paragraph relating to a production LOTO environment. Changed Originator's signature block. General admin changes.

Table of Contents

1.0 Purpose 6

2.0 Applicability 6

3.0 References 7

4.0 Responsibilities 7

4.1 NASA SSC Civil Service Employees 7

4.2 Contractors (On-site Prime Contractors and Construction Contractors) 8

4.3 Resident Agencies and Tenants 8

4.4 Center Safety Organizations 8

4.5 Line Managers and Supervisors of Authorized Employees 9

4.6 Authorized Employees 9

4.7 Affected Employees 10

4.8 Engineers 10

4.9 Procurement and Purchasing Offices 10

5.0 LOTO Written Program 10

6.0 Enforcement /Reinforcement 11

7.0 Lock and Tag Specifications 12

7.1 Locks 12

7.2 Tags 12

7.3 Government-Issued Equipment 14

8.0 General Safety Requirements for Control of Hazardous Energy 14

8.1 Job Preparation 14

8.2 LOTO Application (Authorized Employees Only) 14

8.3 Preparation for Removal of LOTO 15

8.4 LOTO Removal 15

8.5 Temporary Removal of LOTO for Test and Alignment Purposes 16

8.6 Normal Production Operations 16

9.0 Group LOTO 16

10.0 Emergency Lock Removal 17

11.0 Shift or Personnel Changes 17

12.0 Inspections and Job Site Audits 19

12.1 Annual HECP Inspections 19

12.2 Job Site Audits 19

12.3 Annual LOTO Program Evaluations 19

13.0 Obsolete, Defective, Unsafe, or Decommissioned Equipment 20

14.0 Configuration Locks and Tags 22

15.0 Electrical Safety 24

16.0 Training 24

16.1 LOTO Certification Requirements 24

16.2 LOTO Training Records Management 25

16.3 New Employees 25

16.4 Refresher Training 25

16.5 Construction, Off-Site Contractors, Resident Agencies, and Tenants 26

17.0 Records and Forms 26

18.0 Acronyms and Definitions 27

18.1 Acronyms 27

18.2 Definitions 27

Figures

Figure 1. Approved SSC Lockout/Tagout Tag (SSC Form 808) 13

Figure 2. Approved SSC Danger Tag (SSC Form 856) 22

Figure 3. Approved SSC Configuration Tag (SSC Form 846) 24

1.0 Purpose

This instruction defines Lockout (LO) Tagout (TO) minimum requirements for positively locking and tagging out equipment. LOTO is required when performing service, maintenance, or systematic operations at SSC where the unexpected release of energy or energization could result in injury to personnel, facilities, or the environment. This includes energy in the form of but not limited to the following:

a. Electrical
b. Pressure
c. Mechanical
d. Chemical
e. Hydraulic
f. Stored
g. Pneumatic
h. Thermal

This Work Instruction provides uniform lock and tag equipment/system requirements across all SSC operations. To maintain the overall effectiveness of the LOTO program, a separate (but equally effective) program shall be documented and properly approved for long-term isolation of equipment/systems that may contain hazardous energy but are not undergoing service or maintenance activity.

WARNING: Documented hazardous energy control procedures shall be developed and utilized to protect persons from any condition where potentially hazardous energy may exist and contribute to personnel injury if unexpectedly released.

2.0 Applicability

This work instruction is applicable to all National Aeronautics Space Agency (NASA) Stennis Space Center (SSC) civil servants and contractor personnel whose tasks could potentially expose personnel to hazardous energy or materials, unexpectedly energized or released. It applies to all NASA contractors at SSC, including while performing work at SSC for another agency or organization.

Exception: LOTO requirements different from those described in this document for SSC controlled programs/projects being performed on property controlled by another NASA Center or government agency shall be clearly defined in a contract, grant, or written agreement between the two parties.

This document does **NOT** apply to the control of energy in the following conditions:

a. Service/maintenance activities, such as minor tool changes and adjustments that are routine, repetitive, and integral to the use of the equipment and that are conducted during normal production operations, are not regulated by 29 CFR 1910.147 if the safeguarding provisions of 29 CFR 1910 Subpart O (1910.211–219) and Subpart S (1910.301–335) or other applicable portions of 29 CFR 1910 are implemented to prevent worker exposure to the hazards created by the unexpected energization or startup of the equipment/system. See Section 8.6.

b. Service/maintenance activities performed on electric equipment connected to the energy source by a cord and the plug are under the exclusive control of the employee performing the service/maintenance. Reference Section 18.2 for a definition of “exclusive control” as applied to this instruction.

c. Some facilities at SSC fall under the exclusive control of electric utilities for the purpose of power generation, transmission, and distribution, including related equipment for communication or metering. The exposure of employees to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations is regulated by 29 CFR 1910.269 and 29 CFR 1910, Subpart S (301–335).

3.0 References

All references are assumed to be the latest version unless otherwise indicated.

a. SPR 8715.1, Safety and Health Program Requirements
b. SSP-8715-0001, Safety and Health Handbook
c. SPR-8715-0006, Electrical Safety Program
d. 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout)
e. 29 CFR 1910 Subpart O, Machinery and Machine Guarding
f. 29 CFR 1910 Subpart S, Electrical
g. 29 CFR 1910.269, Electric Power Generation, Transmission, and Distribution
h. SREF-3000-0020, NASA Desk Guide for Table of Disciplinary Offenses and Penalties
i. SPR 1440.1, Records Management Program Requirements
j. NPR 8715.3, NASA General Safety Program Requirements

4.0 Responsibilities

4.1 NASA SSC Civil Service Employees

All NASA SSC civil service employees shall:

a. Comply with all requirements of this work instruction where applicable.

b. Follow all provisions of this document if they are required to perform the duties of an Authorized person as defined by this work instruction.

c. Receive LOTO awareness training during New Employee Safety and Health Orientation.

4.2 Contractors (On-site Prime Contractors and Construction Contractors)

NASA SSC on-site prime contractors and construction contractors shall:

a. Classify all LOTO Procedures as SAFETY CRITICAL and require a written hazardous energy control procedure be reviewed and approved by a designated safety representative prior to initiation.

b. Follow the requirements of this work instruction.

c. Ensure that only Authorized employees apply and remove locks and tags. Ensure that employees who are found not to be proficient in LOTO do not perform those activities prior to retraining.

d. Ensure that all equipment used for LOTO is stocked and available in a safe state of readiness.

e. Ensure that employees whose locks are removed are formally notified prior to their return to work.

f. Construction contractors shall ensure that personnel performing LOTO activities have received acceptable training/certification and that personnel comply with all applicable LOTO requirements of this document.

SSP-8715-0001 lists specific responsibilities assigned to SSC and contractor organizations when they request offsite contractor services that could affect SSC's LOTO program requirements.

4.3 Resident Agencies and Tenants

Resident Agencies and Tenants shall:

a. Develop and implement a written LOTO program in accordance with the requirements of 29 CFR 1910.147 and this document. The program must include the necessary employee training.

b. Classify all LOTO procedures as SAFETY CRITICAL and require a written procedure reviewed and approved by a designated safety representative prior to initiation.

c. Follow the requirements of this work instruction or as specified by the Host/Tenant agreement.

4.4 Center Safety Organizations

SSC safety organizations shall:

a. Annually review Hazardous Energy Control Procedures and associated work instructions.

b. Ensure compliance with standards set forth in the program by performing unscheduled periodic spot inspections of LOTO operations and by documenting findings on an audit form (SSC Form 849).

c. Provide stringent controls and oversight of established LOTO operations, complying with all minimum requirements specified within this document.

d. Direct the Facility Operating Services Contractor (FOSC) training department to establish, maintain, and schedule up-to-date training in LOTO for all Authorized and Affected employees.

e. Serve as a resource for the interpretation of this document and current regulatory requirements that affect Center operations.

4.5 Line Managers and Supervisors of Authorized Employees

Line Managers and Supervisors of Authorized employees shall:

a. Attend LOTO training for Authorized employees and maintain certification.

b. Ensure that employees performing LOTO procedures are properly trained and certified in accordance with the requirements contained within this document.

c. Provide appropriate site-specific LOTO equipment (as required) to certified employees.

d. Ensure certified employees use locks, tags, and associated equipment according to the requirements prescribed in this document.

e. Ensure that this LOTO Work Instruction is available to all employees.

f. Perform at minimum an annual inventory of the LOTO locks and keys and ensure that the integrity of proper lock and tag management practices are maintained.

g. Hold employees accountable for each padlock and key that is provided to the employee.

h. Assure written coordination and concurrence of process/procedure when LOTO activity requires participation with another organization.

i. Randomly evaluate LOTO activities informally as necessary to ensure the requirements of this work instruction are being followed.

4.6 Authorized Employees

Authorized employees shall:

a. Complete required LOTO certification training for Authorized employees.

b. Perform LOTO activities in conformance to this procedure and compliant with Occupational Safety and Health Administration (OSHA) requirements.

c. Provide notification to affected employees, contractors, and supervisors of LOTO activities in their respective areas.

d. Remain knowledgeable of LOTO procedures and ensure machine-specific LOTO procedures are documented prior to the start of work.

e. Maintain all equipment associated with LOTO activities in good condition.

4.7 Affected Employees

Affected Employees shall:

a. Be aware and knowledgeable of the intent and requirements of the LOTO program.
b. Complete required LOTO training for affected employees.
c. Follow all LOTO guidelines and procedures presented in the training provided.

4.8 Engineers

Persons in engineering positions shall:

a. Ensure the equipment purchased or modified is capable of lockout for maintenance and service activities.
b. Ensure the design of new equipment and processes have safe accessibility to hazardous energy control points for the purpose of LOTO.
c. Notify and obtain approval from the Office of Safety & Mission Assurance (SMA) for any design changes that would affect LOTO or safe access to LOTO control points.

4.9 Procurement and Purchasing Offices

Procurement and Purchasing Offices shall ensure that new or used equipment purchase orders include provisions to ensure the equipment purchased is capable of lockout for maintenance and service activity. (Exception – Section 2, use of cord and plug.)

5.0 LOTO Written Program

This LOTO work instruction shall serve as the primary document for all LOTO tasks performed at NASA SSC. Secondary to this work instruction is the requirement for each contractor and construction contractor to develop and maintain Work Authorizing Documents (WAD). Where applicable, the WADs shall contain the machine-specific Hazardous Energy Control Procedures (HECPs) that will be used to ensure the control of hazardous energy.

The following requirements and instructions shall apply to HECPs:

a. HECPs shall be written only by employees who are knowledgeable about the process and fully understand the requirements of LOTO.
b. HECPs shall contain the identity of the equipment, the identity or location of the energy isolation points, a method to de-energize and secure equipment, and a method to verify successful de-energization.

c. The detail required in an HECP will depend upon the complexity of the equipment involved, the type of service or maintenance to be performed, and the control means used.

d. SSC Form 848 can be used to document an HECP. Use of this form is optional provided a similar form is used to document the HECP.

e. Similar machines or equipment can be covered with a single generic HECP if it adequately addresses the hazards to be encountered and steps to be taken during service and maintenance of all the machines and/or equipment covered by the procedure. Generic HECPs can be applied where the hazards, shutdown procedures, energy controls, etc. are identical for each piece of equipment. Where this is not the case, an individual HECP will be required.

f. An HECP is not required for a piece of equipment when **all** of the following elements exist:
   1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down that could endanger employees;
   2. The machine or equipment has a single energy source that can be readily identified and isolated;
   3. The isolation and locking out of that energy source completely de-energizes and deactivates the machine or equipment;
   4. The machine or equipment is isolated from that energy source and locked out during servicing or maintenance;
   5. A single LOTO device will achieve a locked-out condition;
   6. The LOTO device is under the exclusive control of the Authorized employee performing the servicing or maintenance;
   7. The servicing or maintenance does not create hazards for other employees; and
   8. NASA SSC and its contractors, in utilizing this exception, have had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

g. HECPs shall designate a means for notification of affected employees, as necessary.

h. HECPs shall be posted at the jobsite or readily available to Authorized and Affected employees.

6.0 Enforcement /Reinforcement

Employees discovered disturbing the controls, energy isolating devices, and/or energy sources for any equipment/system or component that has been locked or tagged out by someone else (SSC standardized LOTO devices or configuration locks or tags) shall be subject to disciplinary action as described below.

a. Civil service employees shall be subject to disciplinary action in accordance with SREF-3000-0020. (This document can be viewed on the SSC Intranet Portal under "Office of Human Capital–Employee Relations.")

b. Onsite and offsite contractor employees shall be subject to SSC disciplinary action as determined by the Contracting Officer and/or the Contracting Officer's Technical Representative, or possibly the organization requesting service.

7.0 Lock and Tag Specifications

7.1 Locks

a. All LOTO program locks shall be singularly identified and RED in color for personal and group lockout tasks. These locks are to be used exclusively for the purpose of locking out equipment (for service or maintenance activity) in conjunction with this program.

b. Locks shall have no more than one key for the Authorized employee. If the key is lost, the individual must report it to his/her supervisor immediately.

c. Locks used in conjunction with the LOTO program can be purchased from a manufacturer with a RED case, or a RED heat shrink sleeve can be installed over the lock case.

d. LOTO devices shall be replaced with configuration locks and tags if the hazardous service or maintenance activity halts beyond a five day period of time and the equipment/system energy remains hazardous to persons in the vicinity. This does not mean LOTO devices must be replaced with configuration devices when the estimated completion date is slightly extended as a result of unforeseen circumstance that delays the service or maintenance less than one week.

7.2 Tags

a. LOTO tags shall be singularly identified.

b. A pictorial of an approved SSC tag must be exhibited as an example in the program plan.

NOTE: SSC LOTO tags can be ordered through the SSC warehouse via a Material Request using the SSC Service Request System (accessible via the NASA/SSC Intranet Portal). The LOTO tag stock number is 769000N013923.

c. LOTO equipment not permanently assigned to individual employees (e.g., Area LOTO kits) shall be managed by the area supervisor for accurate accountability and utilization of the equipment. This must include a LOTO equipment log (SSC Form 847) requiring the equipment to be properly signed and dated in and out by the actual user upon removal from and return to the stored location.

   1. Each lock must be accompanied by a "DO NOT OPERATE" tag identifying:

      (a). Company/organization name.

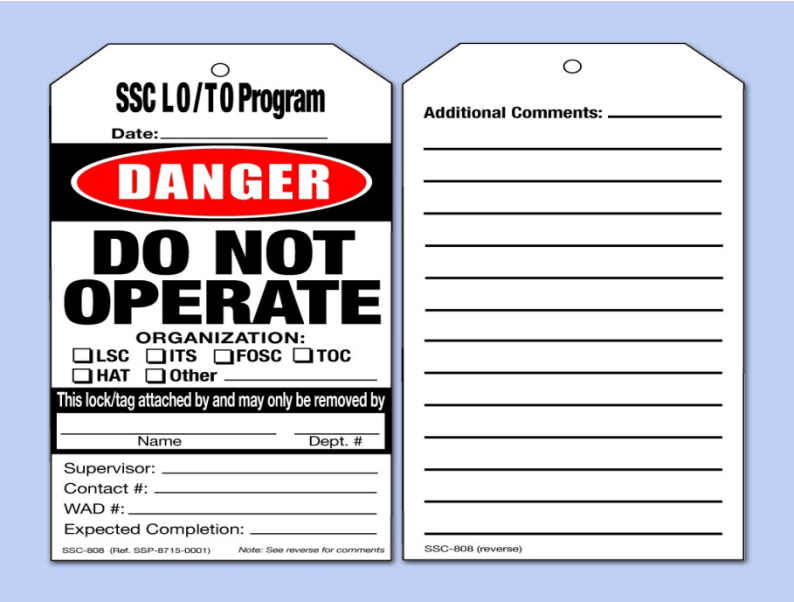
(b). Name and department of Authorized employee who installed lock.

(c). Supervisor's name and contact information.

(d). Realistic estimated removal date.

2. Tags must be legibly completed using fine or extra fine permanent marker. See Figure 1.

Figure 1. Approved SSC Lockout/Tagout Tag (SSC Form 808)



(SSC Standardized Lockout/Tagout Tags SSC Form 808, Warehouse Stock #769000N013923)

d. Notes regarding sole use of TO devices:

1. TO devices used without a lock in conjunction with this program are prohibited unless it is physically impossible to lock and tag the energy source(s) and supporting evidence proves that tagging alone can eliminate potential danger that may be associated with the unexpected energization.
2. The responsible safety office shall inspect all instances where tagging without a lock will serve as the designated means for isolation.
3. Additional safety measures, such as removing fuses or lifting wires, shall be exercised to provide added employee protection when tags are used without locks in this program.

7.3 Government-Issued Equipment

a. Locks and keys shall be managed and controlled through supervisors or their designees.

b. Only the supervisor or his/her designee is authorized to assign lockout devices or auxiliary lockout/tagout equipment.

c. A log book containing the following information shall be kept:

   1. Each lock shall be identified with a crew number and/or unique identification nomenclature that provides adequate traceability to the person who has responsibility of the device while out of the kit. Any unidentified lockout devices found by employees shall be submitted to the supervisor or shop leader so that all devices are accounted for.
   2. For each lockout device assigned, the crew number and/or identification nomenclature and the employee who received/returned the lockout device shall be documented in the log book.
   3. Any auxiliary lockout/tagout equipment, such as tagout devices, multi-lock hasps, locking guards, or group lock boxes, are not required to be documented in the log book.
   4. Only the supervisor or his/her designee shall log lockout devices in and out of the log book.

d. Locks and tags used for lockout/tagout with their means of attachment shall be returned to the respective supervisor/shop leader when the employee transfers to another crew, transfers to a job that does not require locking devices, or terminates employment.

8.0 General Safety Requirements for Control of Hazardous Energy

8.1 Job Preparation

a. The supervisor shall ensure all employees assigned to the work task are current with LOTO Certification training.

b. The Authorized employees must identify all energy sources for the task by reviewing the HECP for the activity to be performed. In the absence of an HECP, one must be developed and approved as a “Safety Critical” procedure that requires a sign off by a Safety Representative.

c. The Authorized employee shall notify affected employees of the LOTO activity.

d. The Authorized employee will shut off equipment by the normal stopping means.

8.2 LOTO Application (Authorized Employees Only)

a. Apply the lock and tag device so that the energy isolation device is locked in the off/de-energized position.

b. Dissipate, drain, or safely release any stored or residual energy in the system according to the instructions on the HECP.

c. Block any mechanical parts or lines and remove mechanical linkage as necessary to ensure safe completion of work.

d. If the LOTO is being applied to electrical equipment to prevent electric shock, the LOTO must be verified by an electrically qualified person using appropriate test equipment. A Qualified person shall use test equipment to test circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been de-energized and presumed to be safe. If the circuit tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and after this test.

e. Attempt to restart the equipment or systems in the normal or intended manner. If the equipment restarts, do not proceed until the cause of failure to de-energize is identified and corrected.

f. If attempts to restart fail, replace all selector switches and control devices back in the de-energized position.

The equipment should now be in a zero energy state and work can safely proceed.

8.3 Preparation for Removal of LOTO

a. Verify once again that operating controls are in a neutral position or “off” position.

b. Inspect the work area to ensure that nonessential items, tools, etc. are removed from the work area or danger zone.

c. Check that all guarding is properly reinstalled and ready for service.

d. Notify affected employees just prior to re-energizing equipment and ensure that all personnel are in a safe location.

8.4 LOTO Removal

a. Remove the lock and tag devices.

b. Re-energize the equipment.

c. Start equipment using normal start-up procedures.

d. Notify all affected employees that the equipment has been re-energized.

Note: LOTO equipment can remain in place if service and maintenance activities will be exclusively performed by the Authorized employee(s).

8.5 Temporary Removal of LOTO for Test and Alignment Purposes

In situations where a lock and tag must be temporarily removed from the energy source and the equipment must be energized to test, align, position, or calibrate, the following actions apply:

a. Clear equipment of tools and materials.

b. Remove affected employees from the equipment area.

c. Remove lock and tag device(s).

d. Energize and proceed with testing, aligning, positioning, or calibrating of equipment.

e. Re-initiate LOTO procedures to isolate energy sources if further service or maintenance is required.

Note: Employees utilizing this exception must remain clear of equipment pinch points/danger zones, or must maintain absolute control over the hazardous energies during the testing, aligning, positioning, or calibrating.

8.6 Normal Production Operations

a. Normal Production Operations (NPO) includes minor tool changes and servicing activities– those that take place during normal production and are routine, repetitive, and integral to production. These actions are not covered by LOTO provided that the work is performed using an effective alternative means of protection.

b. An effective alternate means of protection requires that worker protection and safeguarding be maintained. In such cases, machine guarding must be provided in accordance with the provisions of OSHA's machinery and machine guarding standards.

c. If certain normal production operations require alternative means of protection to be taken prior to work, both the NPO activities and the alternative means of protection to be utilized must be documented on the HECP.

9.0 Group LOTO

Operations that require a large number of employees to apply RED locks and tags to equipment may utilize a Group LOTO system. A Group LOTO system utilizes either a Lock Box or a Multi-Lock Hasp. The requirements for a Group LOTO are defined below:

a. If an HECP for the operation does not exist, an HECP shall be developed by the craft, crew, or department assigned the primary responsibility for the service/maintenance activity.

b. The HECP shall have all the appropriate signatures for approval since it is deemed "Safety Critical," which requires signoff by a Safety Representative.

c. The Authorized employee or Supervisor responsible for developing the HECP is responsible for communicating it to all Affected and Authorized employees.

d. One Authorized employee assumes responsibility for the project and applies a lock and tag to each hazardous energy source identified in the HECP. The person who assumes responsibility for the project and applies the locks is typically referred to as the LOTO Coordinator.

e. The LOTO Coordinator will place all of the keys to the locks used in a lock box, and will affix his/her own lock and tag to the box. Thus the keys to the locks that actually isolate the various energy sources become secured inside of the lockbox.

f. The LOTO coordinator and each group member verify that the equipment/system is properly shut down, de-energized, and placed in a zero-energy state; that any stored or hazardous energy is released; and that the equipment/system is in safe working condition.

g. Each Authorized employee preparing to work on the project shall verify that the system is properly locked out by reviewing the HECP and by physically viewing each secured energy source.

h. Authorized employees preparing to work on the locked out system shall affix their own locks and tags to the lock box.

i. After all energy sources have been isolated, locked, and tagged out, and it has been ensured that personnel are not exposed to any type of hazardous energy, an attempt to start the equipment, machine, or system shall be made to verify it has been de-energized.

CAUTION: Return operating control(s) to NEUTRAL or OFF position after this verification.

j. Personnel shall not remove their locks and tags from the lockbox until they have completed their work.

k. After all work has been completed, the LOTO coordinator shall verify that the LOTO devices applied by other Authorized employees in the group activity are removed by those employees. If the Authorized employee who placed the LOTO devices is unable to remove them, the LOTO devices are to be removed in accordance with “emergency removal” guidelines contained in Section 10.0, Emergency Lock Removal.

l. Once all authorized employees have removed their applied devices, the LOTO Coordinator shall remove his/her own lock and tag and then remove each of the locks from the equipment energy isolation points.

10.0 Emergency Lock Removal

a. Removal of LOTO devices shall be limited to the employee who applied the devices. When the Authorized employee who applied the LOTO device is not available to remove the device, it may be

removed under the direction of the supervisor or designee. The level of safety must not be jeopardized in any way by this process.

b. The supervisor shall verify that the Authorized employee who applied the device is not at work. Verification must occur in the following manner:
   1. Make a reasonable effort to contact the Authorized employee to inform him/her that the LOTO devices are to be removed and verify that he/she is not able to return to work to remove it.
   2. If contact is not made, the supervisor must ensure that the Authorized employee has been informed of any actions taken prior to the employee's returning to and resuming work.

c. The Supervisor shall prepare and process a Discrepancy & Correction Report or Discrepancy Report (D&CR/DR).

d. The engineer, team lead, or supervisor shall perform a walk-down of the affected system and authorize removal of the lock/tag in the disposition section of the D&CR/DR or in the form of a letter, and shall process the D&CR/DR letter through S&MA.

e. The supervisor or designee shall check the machine or equipment and the adjacent area to ensure that all potentially hazardous items, if left in place, are removed and equipment is ready for reactivation.

f. The supervisor or designee shall confirm that equipment controls are in the neutral position.

g. All employees shall be safety positioned or removed from the impact area before system reactivation.

h. After reactivation, notify Affected employees and facility managers that the lock and tag process is complete and equipment/system is again functional.

11.0 Shift or Personnel Changes

During shift or personnel changes, the Authorized employee who initially applied the LOTO device shall ensure the continuity of LOTO protection between off-going and on-coming employees to minimize exposure to hazards from the unexpected energizing, start-up of the machine/equipment/system, or release of stored energy. At SSC, only the following two options are allowed to transfer LOTO devices between off-going and on-coming employees:

a. A physical transfer between off-going and on-coming Authorized employees. Both Authorized employees shall be present at the worksite at the same time to replace the off-going employee's lock and tag with the on-coming employee's lock and tag.

b. If there is a gap between shifts and a physical transfer is not possible, the responsible supervisory personnel and other Authorized employees who have placed their locks on the equipment or system shall make the transfer in the following manner:
   1. The supervisor shall install a configuration lock and then remove his/her lockout device(s) to maintain a zero energy state.

2. The off-going employees shall remove their personal LOTO devices.
3. The supervisor shall verify all employees have removed their locks.
4. The supervisor shall be present when the new crew arrives to lock out the system.

c. For removal of configuration locks, see Section 14.0.

12.0 Inspections and Job Site Audits

12.1 Annual HECP Inspections

a. An annual internal inspection of each approved HECP shall be performed.

b. The periodic inspection shall be performed by an Authorized employee who is not utilizing the energy control procedure being inspected.

c. The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

d. Where lockout is used for energy control, the periodic inspection shall include a review between the inspector and each Authorized employee of that employee's responsibilities under the energy control procedure being inspected.

e. The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

f. Where WADs are reviewed, modified, and/or updated for each and every situation and where an HECP is applicable, this inspection is acceptably accomplished.

g. Where an HECP is created in the field and is signed off by a Safety Representative to achieve a “Safety Critical” review, this inspection is also considered acceptably accomplished.

h. In cases where an HECP is posted on a piece of equipment and inspections are not performed, an annual inspection of the HECP is required as stated in steps a through e, above.

12.2 Job Site Audits

a. Random job site audits are required by each Safety and Health Office. NASA SSC Form 849, or equivalent form, shall be used to document job site audits.

b. Findings that result from a job site audit shall be corrected immediately.

c. Completed audit forms shall be maintained so they are available for review.

12.3 Annual LOTO Program Evaluations

a. An Annual LOTO program inspection shall also be summarized and reported in the Annual VPP Self Evaluation under the element Hazard Prevention and Controls, Work Practice Controls, as required by SPR 8715.1, Safety and Health Program Requirements.

b. The audit shall be performed by a qualified representative of the affected Safety and Health organization.

c. Objective evidence of LOTO program inspection results and corrective action plans shall be maintained on file by the inspected organization for a minimum period of 3 years from the actual last finding closure date reflected in the LOTO inspection Corrective Action Plan (CAP).

d. Corrective action plans must be developed by the audited organization and properly managed to reflect closure rationales, all closure dates, and actual implemented corrective actions and dates (if different from the original).

e. LOTO inspection CAPs shall be tracked until completed through the safety recommendation section of the Annual VPP Self Evaluation.

13.0 Obsolete, Defective, Unsafe, or Decommissioned Equipment

a. Equipment that is obsolete or decommissioned shall be removed from the work area if at all possible.

b. Obsolete and/or decommissioned equipment that is left in the area need not be tagged unless it poses a safety and health hazard, regardless of its operational state.

c. Obsolete and/or decommissioned equipment that is connected to a power source or presents a hazard if used or energized shall be locked with a configuration lock and tag.

d. Equipment such as portable tools, power cords, floor fans, etc. that are found to defective or unsafe shall be tagged with a “Danger - Do Not Use” tag as shown in

e.

f. Figure **2**.

NOTE: SSC Danger tags can be ordered through the SSC warehouse via a Material Request using the SSC Service Request System (accessible via the NASA/SSC Intranet Portal). The Danger tag stock number is 769000N017485.

Figure 2. Approved SSC Danger Tag (SSC Form 856).

(SSC Danger Tag SSC Form 856, Warehouse Stock # 769000N017485)

14.0 Configuration Locks and Tags

Configuration Lockout/Tagout Procedure shall be utilized when hazardous energy needs to be locked in a controlled manner to prevent injury or unsafe operation without any planned service/maintenance activities. The requirements for Configuration locks include:

a. Configuration lock keys shall be inventoried, managed, logged, and positively controlled by supervisory personnel.

b. A configuration log sheet shall be used to manage and control configuration locks (SSC Form 851).

c. All configuration program locks shall be singularly identified, and each contractor shall choose a standardized color (other than RED).

d. Keys shall be kept in a location accessible only by the supervisor.

e. Configuration locks and tags may be used if no employees are working on the equipment/system and the control of hazardous energy is required under the following circumstances:
   1. Work has not been completed on the equipment/system and it is not in a condition permitting a safe return to service by the end of the estimated completion date.
   2. The equipment/system is not undergoing service/maintenance activity, but hazardous energy must be positively controlled.
   3. Delays have occurred that significantly (i.e., more than a week beyond the original Estimated Completion Date) impact service/maintenance completion.
   4. The equipment/system must be placed in the “off” position if it is not safe to operate.
   5. The equipment/system must be placed in the “on” position to prevent someone from inadvertently turning it off.
   6. It is necessary to ensure that unauthorized employees do not operate the equipment/system.

f. All locks used to maintain configuration of equipment/system shall be accompanied by a configuration tag.

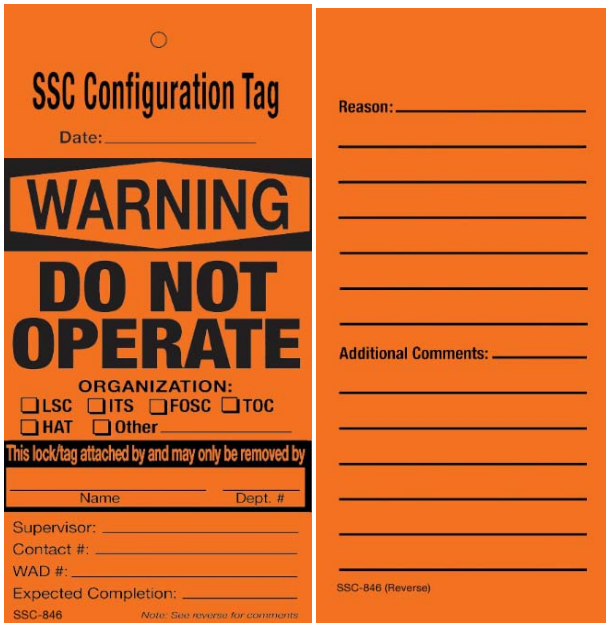
g. Configuration tags are to include the following information:
   1. Name of the employee who placed the tag.
   2. Organizational code that placed the lock.
   3. Contact phone number.
   4. Work authorizing document and number.

h. A configuration lock shall always be installed if the energy isolation device is capable of accepting a locking device.

i. Configuration tags shall be ORANGE in color. See figure 3.

NOTE: SSC Configuration tags can be ordered through the SSC warehouse via a Material Request using the SSC Service Request System (accessible via the NASA/SSC Intranet Portal).

Figure 3. Approved SSC Configuration Tag (SSC Form 846)



(SSC Configuration Tag SSC Form 846, Warehouse Stock # 769000N017484)

15.0 Electrical Safety

See SCWI-8715-0006 Electrical Safety Program.

16.0 Training

16.1 LOTO Certification Requirements

a. All onsite LOTO certification programs shall be officially administered via the FOSC.

b. The training must demonstrate that each employee understands the purpose and function of the SSC LOTO program, and that those employees possess the knowledge and skills to work safely on or in the vicinity of systems/equipment that could be impacted by the LOTO program.

c. “Control of Hazardous Energy” (LOTO course #QG-609-FOS) and NSTC 814 are approved as designated courses for obtaining certification in the SSC LOTO program. Each organization’s safety office shall coordinate LOTO training for its respective employees.

16.2 LOTO Training Records Management

a. Onsite SSC Authorized employees' certification records shall be maintained current in the NASA SSC Training Certification Records System.

b. The SSC LOTO certification program requires a 3-year periodicity cycle. However, Authorized employees must complete an annual LOTO refresher training to maintain proper certification. Refresher training can be provided by the FOSC or by the respective organization's safety office.

c. Supervisors shall identify affected employees and ensure that those employees receive the necessary training relating to recognition of this program and its limitations.

d. Personnel certification records shall be maintained for at least 5 years after separation of employee and then destroyed when no longer needed.

16.3 New Employees

a. New employees will receive LOTO instructions during their "New Employee Safety and Health Orientation."

b. Testing or other means of verification will demonstrate that each employee understands the purpose and function of the SSC LOTO program.

c. Training will be organized for two categories of employees:

   1. AUTHORIZED EMPLOYEE - An employee who is qualified, certified, and trained under the provision of this procedure and designated by the employer to perform work on a machine, equipment, or system. An Authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on any machine, equipment, or system that must be locked and/or tagged out. These employees will receive Control of Hazardous Energy training (LOTO Course #QG-609-FOS).

   2. AFFECTED EMPLOYEE - An employee whose job requires operation or use of a machine, equipment, or system on which servicing or maintenance is being performed under lockout and/or tagout or whose job requires work in an area in which such servicing or maintenance is being performed.

16.4 Refresher Training

a. Supervisors shall identify employees whose work operations may be in an area where energy control procedures may be utilized and shall ensure that those employees are properly trained.

b. Authorized and Affected employees shall receive annual refresher training.

c. In light of the serious nature of this subject, Authorized employees shall also receive annual LOTO refresher training to maintain certification. The refresher training shall be provided and documented by each contractor's safety department or designated department.

d. Each contractor group safety department or designated department shall maintain these records to ensure that all Authorized employees maintain current certification.

e. If necessary, the Authorized employee shall receive refresher training by the supervisor or shop leader whenever a change in job assignments occurs; a change in machines, equipment, or processes that present a new hazard; or a change in the energy control procedures are a recognized violation of this work instruction.

f. Authorized employees of the onsite prime contractors and NASA SSC shall be re-certified at least every 3 years by the FOSC.

16.5 Construction, Off-Site Contractors, Resident Agencies, and Tenants

a. Construction contractors, off-site contractors, resident agencies, and tenants shall ensure that their Authorized and Affected employees are trained in accordance with 29 CFR 1910.147 and the requirements of this work instruction.

b. Authorized and Affected employees shall receive initial training upon hire and annual refresher training thereafter.

c. The training must demonstrate that each employee understands the purpose and function of the SSC LOTO program, and that those employees possess the knowledge and skills to work safely on or in the vicinity of systems/equipment that could be impacted by the LOTO program.

d. Construction contractors, off-site contractors, resident agencies, and tenants shall independently maintain accurate and up-to-date training/certification records for its respective employees.

17.0 Records and Forms

The following records shall be retained in accordance with this procedure. All records and forms are assumed to be the latest version unless otherwise indicated. Quality records are identified in the SSC Master Records Index. Records generated by this SCWI shall be maintained in accordance with applicable requirements of SPR 1440.1.

a. SSC-339, Discrepancy & Correction Report

b. SSC-723, Discrepancy Report

c. SSC-808, SSC Lockout/Tagout Tag

d. SSC-847, Lockout/Tagout Equipment Log Sheet

e. SSC-848, Hazardous Energy Control Procedure (or applicable Contractor Form)

f. SSC-849, LOTO Job Site Audit Form

g. SSC-851, Configuration Log Sheet

h. Training Records: Lockout/Tagout, Authorized and Affected Employee Refresher Training, New Employee, Personnel Certification Records

18.0 Acronyms and Definitions

18.1 Acronyms

CAP	Corrective Action Plan
D&CR	Discrepancy & Correction Report
DR	Discrepancy Report
FOSC	Facility Operating Services Contractor
HECP	Hazardous Energy Control Procedure
LO	Lockout
NASA	National Aeronautics Space Agency
NPO	Normal Production Operations
OSHA	Occupational Safety and Health Administration
SMA	Safety & Mission Assurance
SSC	Stennis Space Center
TO	Tagout
VPP	Voluntary Protection Program
WAD	Work Authorizing Documents

18.2 Definitions

a. **Affected Employee**: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under LOTO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

b. **Alternative Means of Protection**: Methods utilized, where allowed, to provide effective protection to personnel performing certain NPO activities when neither standard equipment guarding nor complete LOTO is feasible.

c. **Authorized Employee**: An employee who locks out or tags out machines or equipment to perform servicing or maintenance on that machine or equipment.

d. **Capable of Being Locked Out**: Having a built-in locking mechanism or having a hasp or other means of attachment that will accept a lock.

e. **Configuration Lock**: A lock used on equipment, if needed, to ensure that the equipment is not inadvertently started. Examples where a Configuration lock may be utilized include safeguarding equipment between LOTO activities, safeguarding decommissioned equipment, or preventing equipment tampering. A Configuration lock is not acceptable for LOTO purposes.

f. **Cognizant Safety Office**: Safety office of the on-site prime or construction contractor.

g. **Designated Safety Person**: Person(s) who are certified by the cognizant safety office as competent in 29 CFR 1910.147, this procedure, and all LOTO requirements.

h. **Energized**: Connected to an energy source or containing residual or stored energy.

i. **Energy Isolating Device**: A mechanical device that physically prevents the transmission or release of energy. Examples: Disconnect switch, circuit breaker, pneumatic valve, line valve, block, and any other similar device used to block or isolate energy.

j. **Exclusive Control**: The lock and key are controlled by the person who placed the lock.

k. **Hazardous Energy Control Procedure**: A machine-specific or system-specific procedure identifying all known energy sources present on a particular piece of equipment or system. The procedure indicates the location of energy isolation points and the sequence of steps to be taken to properly lock out the equipment. If certain normal production operations require alternative means of protection to be taken prior to work, both the NPO activities and the alternative means of protection to be utilized must be documented on the HECP.

l. **Lock Box**: An approved box or container into which a key or set of keys can be placed. Lock boxes shall be substantial enough to prevent entry without the use of excessive force or unusual techniques. Lock boxes must be capable of being locked with a hasp or other means of attachment to which a lock can be affixed.

m. **LOTO Device**: A device that holds an energy-isolating device in the de-energized position and prevents the ability to be energized.

n. **Normal Production Operations**: The utilization of a machine or equipment to perform its intended production operation. Note: Electrical work is not included as a normal production operation.

o. **Qualified Person**: A person who has training in avoiding the electrical hazards of working on or near exposed energized parts, and who is familiar with the construction and operation of the equipment and hazards involved.

p. **Servicing and/or Maintenance**: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining machinery or equipment. These activities include lubrication, cleaning, making adjustments, changing tools, or unjamming machinery or equipment.

q. **Tagout Device**: A durable, distinctive warning tag that can be attached to all locked out energy-isolation devices. The tag must indicate the identity of the user.

r. **Work Authorizing Document**: A control document that authorizes and clearly outlines the scope, purposes, authorization, rules, requirements, techniques, and specific steps to accomplish a work task. Examples include, but are not limited to, Process Plans, Test Preparation Sheet, Discrepancy and Correction Report, Troubleshooting and Inspection Report, Safe Plan of Action, and Engineering Change Request. Where applicable, WADs shall contain the machine-specific HECP that will be used to ensure the control of hazardous energy.

s. **Zero Energy State**: The release of all stored energy from a power source so that it is at rest or in a neutral position without any stored or potential energy.