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John C. Stennis Space Center
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COMPLIANCE IS MANDATORY

John C. Stennis Space Center
Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation

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APPROVAL/CONCURRENCE

Original Signature of File ***12/17/2019***

Gary Benton
Director, Safety and Mission Assurance
Directorate

Date

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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.
B	10/06/2012	Amy Rice 8-2972	Deleted configuration locks and tags, updated responsibilities of NASA SMA office and contractors, updated training requirements, clarified sections 5.0 – 11.0. Updated section 7.1 and deleted 7.3.
C	03/19/2014	D. Rodriguez 8-2499	Revised Section 2.0 b. to read SCWI-8715-0006. Added new requirement in Section 3.2 g. for new and overhauled equipment. Revised Section 4.0 b. and c. to include complex equipment/systems in the Hazardous Energized Control Procedures (HECP). Added new definition of Complex Equipment/Systems to Appendix B e. Administrative corrections.

Status/Change/ Revision	Change Date	Originator/ Phone	Description
D	6/23/14	D. Rodriguez 8-2499	Changed Periodic Inspections to Job Site Audits in sections 4.2 & 4.3. Combined Annual Audits with Periodic Inspecting to better define expectations, section 8.1. Administrative reformatting.
E	04/20/2015	D. Rodriguez 8-2499	Changed the tie-wrap used for attachment of LOTO labels to the color red in section 3.2 c. and e.
F	09/29/2016	D. Rodriguez 8-2499	Completely reworked.
G	02/11/2019	D. Rodriguez 8-2499	Added Section 7.3 Danger Tag (Defective/Unsafe Equipment) due to cancellation of SSP-8715-0001 – Safety and Health Handbook; Added ordering procedures in Notes under Section 7.2 and 7.3 for LOTO Tag – Danger Do Not Operate and Defective/Unsafe Equipment Tag – Danger Do Not Use. Revised Electronic SSC Form 847 – Removed third bullet on bottom of form that stated “Only the supervisor or shop leader can log in/out locked devices in the log sheet”.

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1.0 PURPOSE

This work instruction, hereafter referred to as the John C. Stennis Space Center (SSC) Lockout/Tagout (LOTO) Program, defines Lockout (LO) and 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 system energization could result in injury to personnel or equipment damage.

2.0 APPLICABILITY

This work instruction applies to all National Aeronautics Space Administration (NASA) SSC civil servants, NASA prime contractor (and their subcontractors), and construction personnel whose tasks could potentially expose personnel to hazardous energy or materials which could be unexpectedly energized or released. It applies to all NASA contractors at SSC, including while performing work at SSC for another agency or organization.

3.0 LOTO PROGRAM SCOPE

This work instruction complies with the requirements of the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.147, Control of Hazardous Energy (LOTO), and the provisions of OSHA's Electrical Safety-Related Work Practices Standards: 29 CFR 1910.331; 1910.332; 1910.333; 1910.334; and 1910.335.

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 and 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.

b. Service/maintenance activities performed on electric equipment connected to the energy source by a cord and plug, and both are under the exclusive control of the employee performing the service/maintenance. Cord and plug connected equipment does not require LOTO if all of the following conditions exist:

    (1) The Authorized Employee is within sight of the equipment.
    (2) Unplugging the equipment isolates the equipment from all energy sources.
    (3) The equipment has no stored energy.

c. Hot tap operation involving transmission and distribution systems for substances such as gas, steam, water, or petroleum products when they are performed on pressurized pipelines, provided that the SSC responsible organization demonstrates that:

(1) Continuity of service is essential;
(2) Shutdown of the system is impractical;
(3) Documented procedures are followed; and,
(4) Special equipment is used that will provide proven effective protection for employees.

d. Some facilities at SSC fall under the exclusive control of the electric utilities provider for the purpose of power generation, transmission, and distribution, including related equipment for communication or metering. The exposure of NASA/NASA prime contractor, and/or electric utilities provider 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).

Note: If all of the above conditions do not apply, or the equipment must be left unattended, the equipment must be locked and tagged out by attaching a tag to the activation switch and attaching a LO device to the plug to prevent it from being energized.

4.0 HAZARDOUS ENERGY TYPES

a. The types of hazardous energy sources to be controlled include, but not limited to:

(1) Electrical
(2) Mechanical
(3) Hydraulic
(4) Pneumatic
(5) Chemical
(6) Thermal

b. The following types of potentially hazardous stored or residual energy are also required to be relieved, disconnected, restrained, and otherwise rendered safe.

(1) Rotation (mechanical motion that can cause machine or equipment movement): flywheels, circular blades, etc.
(2) Gravitational Potential Energy (suspended material or parts that will move when energy is disconnected): elevators, etc.

(3) Mechanical Energy (stored mechanical energy that can cause machine or equipment movement): compressed or extended springs, etc.
(4) Thermal Energy (extreme heat above 140° F, or cold below 41° F): ovens, boiling water, chillers, etc.
(5) Electrical Energy (stored electricity): batteries, capacitors, etc.
(6) Hydraulic Energy (residual fluid pressure): tanks, accumulators, pipes, lines, cylinders, etc.
(7) Pneumatic (residual air/gas pressure): storage or surge tanks, pipes, lines, etc.

Note: The presence of hydraulic or pneumatic systems may necessitate the use of bleed valves to relieve pressure.

5.0 REFERENCES

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

a. 29 CFR 1910 Subpart O, *Machinery and Machine Guarding*

b. 29 CFR 1910 Subpart S, *Electrical*

c. 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*

d. 29 CFR 1910.269, *Electric Power Generation, Transmission, and Distribution*

e. NASA Desk Guide for Table of Disciplinary Offenses and Penalties

f. SCWI-3752-0001, *Disciplinary and Adverse Actions*

g. SCWI-1280-0002, *Corrective Action Request Process*

h. SCWI-8715-0006, *Electrical Safety Program*

i. SPR 1440.1, *Records Management Program Requirements*

j. SPR 8715.1, *Safety and Health Program Requirements*

k. SSP-8715-0001, *Safety and Health Handbook*

6.0 RESPONSIBILITIES

Execution of LOTO procedures can only be performed by Authorized Employees in accordance with the requirements of this program. Affected Employees are to be notified by the Authorized Employee prior to the application of and removal of LOTO devices. No other employee may remove another employee's lock, or attempt to start, energize, or use a machine or piece of equipment that is locked out or tagged out.

6.1 NASA SSC Civil Service Employees

All NASA SSC civil service employees shall:

a. Comply with all requirements of this work instruction.

b. Follow all provisions of this document when required to perform the duties of an Authorized Employee.

c. Classify all LOTO procedures as SAFETY CRITICAL, in accordance with SPR 8715.1.

6.2 NASA SSC Contractors

Onsite prime contractors and construction contractors shall:

a. Comply with all requirements of this work instruction.

b. Classify all LOTO procedures as SAFETY CRITICAL, in accordance with SPR 8715.1.

c. Develop written Hazardous Energy Control Procedures (HECPs), which are reviewed and approved by a designated safety representative prior to initiating work.

d. Annually review HECPs and associated work instructions.

e. Ensure compliance with standards set forth in the LOTO Program by performing:

(1) An Annual periodic inspection of Equipment Specific procedures and document findings using audit form (SSC-849b or equivalent)
(2) An Annual HECP LOTO Audit and document findings using audit form (SSC-849a or equivalent)

f. Ensure only proficient Authorized Employees apply and remove locks and tags.

g. Ensure adequate quantities and types of LOTO supplies are readily available for Authorized Employee use.

h. Ensure Supervisors and Authorized Employees have the material and means necessary for maintaining LOTO supplies.

i. Ensure new or refurbished equipment and systems are capable of being locked out.

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

k. Ensure personnel performing LOTO activities are designated in writing and have received acceptable training/certification, and those personnel comply with all applicable LOTO requirements of this document.

l. Provide a copy of their LOTO Program and evidence their company has trained their Authorized and Affected Employees about LOTO before they are allowed to work at this facility.

m. Provide LOTO devices, which shall be maintained by the designated Authorized Employees(s).

Note: If outside contractors perform servicing or maintenance that requires LOTO, the responsible Cognizant Safety Office shall take the following steps:

(1) Inform the outside contractor of SSC's LOTO Program, procedures and supply them with a copy of this document.
(2) Review a copy of the outside contractor's LOTO procedures.

6.3 NASA SSC Safety and Mission Assurance Directorate (SMA)

SMA shall:

a. Establish requirements and general procedures for LOTO Program.

b. Review the SSC LOTO Program annually to identify areas for improvement.

c. Provide stringent controls and oversight of established LOTO operations to ensure compliance with requirements specified within this document.

d. Provide regulatory and safety expertise on LOTO to Safety Managers, Supervisors, Affected Employees, Authorized Employees, and others.

e. Monitor the Synergy Achieving Consolidated Operations and Maintenance (SACOM) training department to ensure up-to-date training in LOTO is established, maintained, and available for all Authorized and Affected Employees.

f. Monitor organization compliance with annual inspection of a random sampling of periodic inspections of Equipment Specific procedures and HECP LOTO audits.

6.4 SSC Safety Managers

Onsite Prime Contractors and Construction Contractors Safety Managers shall:

a. Ensure operations which require hazardous energy control are identified, and LOTO procedures are developed and implemented.

b. Ensure that supervisors and employees whose work operations are or may be in an area where LOTO procedures may be utilized receive the appropriate level of instruction and training.

c. Ensure LOTO annual periodic inspections are conducted and documented as required in accordance with Section 8.5 and 13 of this document.

d. Inform subcontractors of and require participation in SSC LOTO Program and review subcontractors' LOTO policy to ensure lock color and tag format utilized are in accordance with this document.

e. Develop a shift or personnel change procedure to ensure a safe and orderly transfer of LOTO control whenever it is necessary to continue LOTO across shifts in accordance with Section 11 of this document.

f. Ensure the Emergency Lock Removal process is used when the Authorized Employee who applied the LOTO device is not available to remove the device.

   Note: See Section 10 of this document for additional requirements.

6.5 Supervisors

Supervisors shall:

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

b. Provide appropriate site-specific LOTO equipment, as required, to Authorized Employees.
c. Ensure Authorized Employees use locks, tags, and associated equipment, according to the requirements prescribed in this document.

d. Perform an annual inventory of the LOTO locks and keys, and ensure the integrity of proper lock and tag management practices are maintained.

e. Hold employees accountable for each padlock and key they are provided.

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

g. Participate in developing and implementing Equipment Specific LOTO procedures as applicable in accordance with Section 8.5 of this document.

Note: This includes procedures for equipment owned by the controlling organization that is serviced and/or maintained by personnel outside the controlling organization.

h. Ensure that only technically qualified and appropriately trained Authorized Employees are assigned to execute LOTO procedures.

i. Monitor the activities of employees engaged in servicing and/or maintenance of the machine or equipment to ensure adherence to the LOTO Program.

j. Maintain LOTO records in accordance with Section 16 of this document.

6.6 Authorized Employees

Authorized Employees shall:

a. Complete required LOTO certification training for Authorized Employees and remain knowledgeable of LOTO procedures.

b. Perform LOTO activities in conformance to this procedure and compliant with OSHA requirements.

c. Provide notification to Affected Employees, contractors, and supervisors whenever LOTO procedures/activities are to be initiated and upon conclusion in their respective areas.

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

e. Develop, document, and follow Equipment Specific LOTO procedures when performing activities that are covered under this requirement.

f. Stop work and report any deficiencies and/or inadequacies in LOTO procedures or equipment.

g. Be prohibited from applying LOTO for another employee or subcontractor to perform work on machines, equipment, or processes.

h. Not permit anyone else to remove his/her lock and tag unless provisions of exception under Section 10 of this document are met.

6.7 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 and follow all LOTO guidelines and procedures presented in Section 15.

c. Ensure that machinery, other equipment, and/or LOTO devices are not approached or otherwise tampered with when LOTO procedures have been initiated.

7.0 LOCKS AND TAGS REQUIREMENTS

7.1 Locks

a. LO devices, where used, shall be applied in such a manner that will hold the energy isolating devices in a “safe” or “off” position. (29 CFR 1910.147(d)(4)(ii))

b. Locks and keys shall be managed and controlled through supervisors or their authorized users.

c. LO devices shall be affixed to each energy device by Authorized Employees only.

d. All LOTO Program locks shall be singularly identified and RED in color for personal and Group LO tasks. These locks are to be used exclusively for the purpose of locking out equipment and/or system in conjunction with this program.

e. Locks used in conjunction with the LOTO Program can be purchased from a manufacturer with a RED case, red paint, or have a RED heat shrink sleeve installed over the lock case.

f. For each LO device assigned, the identification nomenclature and the employee who received/returned the LO device shall be documented on SSC Form-847 or equivalent.

Note: Form SSC-847 shall not contain any configuration lock information.

g. Locks shall have no more than one (1) key and remain in the possession of the Authorized Employee who applied the lock. If the key is lost, the individual must report it to his/her supervisor immediately.

h. LO devices shall be substantial enough to prevent removal without excessive force or unusual techniques, such as the use of bolt cutters or other metal tools.

i. Locks and tags used for LOTO, 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.

7.2 LOTO Tags

SSC standardized TO device shall be as specified according to print and format shown in Figure 1, containing exact wording, “Danger, Do Not Operate.”

Note: Tags are warning devices and do not provide physical restraint. The use of LOTO standardized TO device for any other purposes is prohibited. These tags can be ordered **through** the SSC Electronic Forms using NASA Electronic Search and the Hardcopy Request System (accessible via the NASA/SSC Intranet Portal).

a. The Authorized Employee who hangs the TO device to an energy-isolating device shall be the one who removes it unless otherwise exempted under Section 10.

Note: Tagout devices are never to be bypassed, ignored, or otherwise defeated.

b. TO devices and their means of attachment shall be made of materials that will withstand the environmental conditions encountered in the workplace.

c. TO devices shall be securely attached to energy isolating devices so that they cannot be inadvertently or accidently detached during use.

d. TO device attachments shall be of a non-reusable type, attached by hand, self-locking, non-releasable, with a minimum 50 pounds of pull, such as a nylon cable tie.

e. TO devices shall be affixed to each energy-isolating device by Authorized Employees only.

f. SSC Standardized TO device shall be completely filled out by the Authorized Employee.

g. Tags shall be entirely completed, maintained legible and understandable, using a fine or extra fine permanent marker.

h. TO devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the “safe” or “off” position is prohibited.

   (1) Where TO devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.
   (2) Where a 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.

i. If an energy isolating device is capable of being locked out, LO and TO devices shall be used unless exempted under Section 10 this document.

j. If a LO is not feasible due to the equipment design, a TO device only shall be utilized, provided the machine or equipment is isolated from the energy source and rendered inoperative.

k. Notes regarding sole use of TO devices:

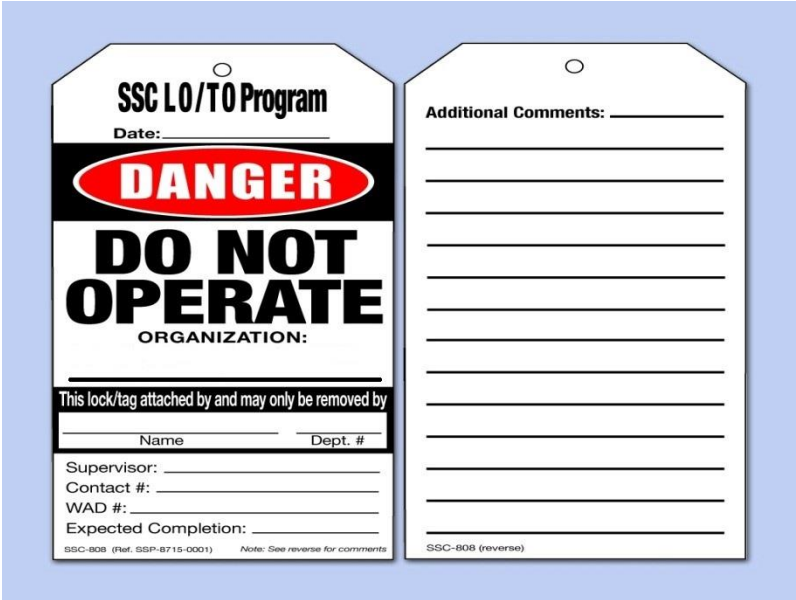
   (1) TO devices used without a lock in conjunction with this program are prohibited unless it is physically impossible to lock and tag the energy source(s), and supporting evidence proves that tagging alone can eliminate potential danger that may be associated with unexpected energization.
   (2) The responsible Safety Office shall inspect all instances where tagging without a lock will serve as the designated means for isolation and provide a signature of concurrence on such TO.

(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.

l. The use of control circuit devices, such as push buttons, E-stops, selector switches, and interlocks, as a sole mean for de-energizing circuit or equipment shall be prohibited.

Note: Control circuit devices are not considered energy isolating devices and can't be used as a substitute for proper LOTO procedures.

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



7.3 Danger Tag (Defective/Unsafe Equipment)

SSC standardized "DANGER – DO NOT USE" Tag with red stripes shall be as specified according to print and format shown in Figure 2, containing exact wording, "Danger, Do Not Use". This tag shall be used by all organizations at SSC.

Note: This procedure and sample tag **DOES NOT** apply to the lockout/tagout of hazardous energy/operations during maintenance, rework, and examination. These tags can be ordered **through** the SSC Electronic Forms using NASA Electronic Search and the Hardcopy Request System (accessible via the NASA/SSC Intranet Portal).

a. Danger Tag Definition and Use - DANGER tags shall be used on items outside of those placed in designated DO NOT USE locations only and will not be used for purposes other than to identify hazardous or unsafe equipment.

b. Attachment of Danger Tags - DANGER tags can be attached by any employee who discovers a defective or unsafe piece of equipment. Proper care shall be taken when affixing the tag. If the individual is not comfortable with or is uncertain about affixing a tag, he/she shall contact the area supervisor or the cognizant, safety office representative. The tag should be affixed on the equipment so that it is visible to anyone in the area.

c. DANGER – DO NOT USE Tag Notification - In the event a DANGER – DO NOT USE Tag is affixed to a piece of the equipment, the individual who affixed the tag shall immediately notify the affected/responsible supervisor of the finding and action(s) taken.

d. DANGER – DO NOT USE Tag Log - Each responsible manager/supervisor will maintain a DANGER tag log for their assigned area(s) of responsibility. This log will include the date emplaced, exact location, reason, corrective action request (if required corrective action is not known), expected completion date, and date corrective action was actually completed and tag removed.

e. DANGER – DO NOT USE Tag Visibility - The DANGER tag will be clearly visible and securely affixed to the system, component, tools, equipment, processes, facilities, systems, materials, or tests that are considered defective or unsafe.

f. Defective /Unsafe Conditions - Defective/Unsafe conditions where DANGER tags shall be used to identify a hazardous condition(s) include, but are not limited to, the following:
   (1) Defective or malfunctioning equipment that would create a physical hazard
   (2) Defective tools and power/extension cords
   (3) Tools or equipment altered to circumvent the manufacturer-installed safety guards
   (4) Chemical and radioactive materials that present hazards
   (5) Possible articles involved in mishaps

g. Removal of DANGER Tags - Upon completion of the required corrective action, only the owner supervisor or manager can remove the DANGER Tag. When removing a Tag, the manager or supervisor shall notify the individual who placed the tag if the individual works in the specific area affected. Individuals who work in other departments or areas and would never have exposure to the hazard are not required to be notified.

h. Unauthorized Removal - If a DANGER tag is removed in an unauthorized manner, the cognizant, safety office will investigate to determine the responsibility for such action and will notify proper management for corrective action, including appropriate

disciplinary action. This will be documented in a memorandum for record forwarded to the cognizant, safety office as well as the NASA Safety and Mission Assurance Directorate.

Figure 2. Approved SSC "DANGER – DO NOT USE" Tag (SSC-808)

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. Authorized Employees must identify all energy sources for the task by reviewing the Equipment Specific LOTO procedure or HECP for the activity to be performed.

c. In the absence of HECP, one must be developed and approved as a SAFETY CRITICAL procedure that requires a sign off by a Safety Representative.

d. The Authorized Employee shall notify Affected Employees of the LOTO activity.

8.2 General LOTO Application (Authorized Employees Only)

The Authorized Employee(s) is/are responsible for performing the following elements and actions in the following sequence:

a. **Preparation for Shutdown** – Before an Authorized or Affected Employee turns off a machine or equipment, the Authorized Employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

b. **Machine or equipment shutdown** – The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown should be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

c. **Notify Affected Employees** – Using procedures established for that machine, equipment, and/or system.

d. **Machine or equipment isolation** – All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

   Note: Interlocks may not be used as a substitute for locking and tagging procedures.

e. **LO and TO Device application** – The Authorized Employee shall affix his or her personal RED lock, properly fill out the standardized SSC tag with all required information, and attach to the energy isolating device to hold it in a “safe” or “off” position.

f. **Stored Energy** – All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

   Note: If re-accumulation of stored energy to a hazardous level is possible in machinery or equipment being serviced, verification of energy isolation should continue while servicing and/or maintaining activities are being performed.

g. **Verification of Isolation** – Prior to starting work on machines or equipment that have been locked and tagged out, the Authorized Employee shall verify that isolation and de-energization of the machine or equipment have been accomplished by operating the appropriate button, switch, or other normal operating control to make certain that the equipment will not operate. After ensuring that the equipment is properly locked out, return operating controls to OFF position.

8.3 Testing or Positioning of Machine, Equipment or Components Thereof

In situations in which LOTO devices need to be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment, or component thereof, the following sequence of steps shall be followed by Authorized Employees:

a. Clear the machine or equipment of tools and materials.

b. Ensure that all employees have been removed from the work area or safely positioned.

c. When applicable, place barricades and warning signs to prevent employees from coming into contact with the machinery.

d. Remove LOTO devices.

e. Energize machinery and proceed with testing or positioning.

f. When finished with the testing or positioning of the equipment, reapply LOTO steps to continue the servicing and/or maintenance work.

8.4 Release from LOTO

Upon completion of the work, the Authorized Employee(s) shall take the following actions to restore the energy to the machine or equipment. (29 CFR 1910.147(e))

a. **Inspect Equipment and Area** – Determine that it is safe to energize the machine or equipment by ensuring that all nonessential items, such as tools, are removed and all employees are safely positioned or removed from the work area.

b. **Verify Equipment** – Check to ensure that machine or equipment components are operationally intact and there is no mechanical hazard. Replace all safety devices that may have been removed during maintenance, ensure all guards are secured, and ensure the machine/equipment is in proper operating condition before release for use.

c. **Remove LOTO devices** – Remove the lock and tag from each energy isolating device. LOTO devices should not be removed by anyone other than the Authorized Employee who installed it.

   Note: Refer to Section 10 of this document for exceptions.

d. **Notify** – Notify Affected Employees and others that the service and maintenance is completed and the equipment is ready to be energized.

e. **Conduct Normal Startup** – Proceed with machine or equipment normal startup procedure.

8.5 Equipment Specific Written LOTO Procedure

a. Particular servicing and/or maintenance work activities may be subject to requirements of an Equipment Specific LOTO procedure rather than those of the general LOTO procedure or LOTO with HECP.

b. Equipment Specific LOTO procedures shall be developed for the control of potentially hazardous energy when employees are engaged in activities covered by this section.

c. Equipment that possesses a single hazardous energy source that can be easily identified and isolated with a single lock and tag may be exempt from Equipment Specific procedures. The user need not document the required procedure for a particular machine or equipment when all of the following elements exist:

   (1) The machinery or equipment has a single-energy source that is readily identified and isolated.
   (2) There is no potential for stored, residual, or re-accumulation of hazardous energy.
   (3) The isolation and locking out of the energy source will completely de-energize and deactivate the machine or equipment.
   (4) The machine is isolated from the energy source and locked out during servicing or maintenance.
   (5) A single LO device will achieve a LO condition.
   (6) LO device is under exclusive control of the Authorized Employee performing servicing or maintenance.
   (7) The servicing or maintenance does not create potential hazards for other workers.
   (8) There have been no accidents involving the unexpected activation or energization of the machine or equipment during servicing or maintenance.

   Note: Contact SACOM Safety for consultation if uncertain the equipment is exempt from Equipment Specific LO procedures.

d. In accordance to 29 CFR 1910.147(c)(4)(ii)) requirements, Equipment Specific LOTO procedures need to be documented. Completion of LOTO Equipment Specific Procedure (SSC Form-848B) shall be required to document the Equipment Specific LOTO procedures.

   Note: Other forms are acceptable upon approval by NASA SMA, but all procedures must provide an equal level of protection.

e. Equipment Specific LOTO procedure shall include, but not be limited to, the following elements:
   (1) Specific steps for shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy;
   (2) Specific steps for placement and removal of LOTO devices;
   (3) Specific steps for releasing stored hazardous energy from all sources; and,
   (4) Specific steps for testing a machine or equipment to determine and verify the absence of the hazardous energy.

f. Each Equipment Specific LOTO procedure shall be inspected annually in accordance with Section 13 of this document. (29 CFR 1910.147(c)(6))

g. Equipment Specific LOTO procedures shall be kept current and accessible to the Authorized Employees who are servicing the equipment.

   Note: Partial or localized LOTO procedures may be utilized on complex machinery, equipment, processes, and circuits where it is necessary to isolate power or motion for a specific component while maintaining power to other systems.

8.6 Hazardous Energy Control Procedures (HECP)

a. Each contractor and/or construction contractors shall develop HECPs for complicated systems (Electrical Power Grid, Piping Systems, Test Facilities Systems, etc.) where it impractical to develop a standard Equipment Specific LOTO procedure in advance because of changing conditions. A qualified person (High Voltage Engineer, Low Voltage System Engineer, Test Engineer, Instrumentation Engineer and/or Control Engineer, etc.) shall document a detailed, one-time-use LOTO procedure based on the condition of the system.

   Note: Partial or localized LOTO procedures may be utilized on complex machinery, equipment, processes, and circuits where it is necessary to isolate power or motion for a specific component while maintaining power to other systems.

b. The following requirements and instructions shall apply to HECPs:

   (1) Only employees who are qualified and knowledgeable about the process and fully understand the requirements of LOTO shall write HECPs.
   (2) The HECP shall be maintained in an accessible location for the Affected and the Authorized Employees.
   (3) HECPs shall contain the identity of the equipment and/or systems; the identity or location of the hazardous energy isolation points; a method to de-energize and

secure equipment and/or system; and a method to verify successful de-energization. The detail required in an HECP will depend upon the complexity of the system involved, the type of service or maintenance to be performed, and the control means used.

(4) Form SSC-848A can be used to document the HECP. If Form SSC-848A is not used, the alternative document for the HECP shall provide comparable information to the Form SSC-848A.

(5) In some cases of work during a planned maintenance, repair, and/or construction, HECPs are embedded in Work Authorizing Documents (WADs). The HECP in the WAD shall at a minimum contain all requirements (elements) from Form SSC-848A in the work steps.

(6) HECP shall be a SAFETY CRITICAL procedure that requires a signoff by a Safety and Quality Representative.

9.0 GROUP LOCKOUT/TAGOUT

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 Lockbox or a Multi-Lock Hasp. In addition to all of the other requirements, the following requirements apply for a Group LOTO:

a. If an HECP for the operation does not exist, an HECP shall be developed by qualified person assigned as the primary responsibility for the service/maintenance activity.

b. The Authorized Employee or Supervisor responsible for developing the HECP is responsible for communicating it to all Affected and Authorized Employees.

Note: Group LOTO procedures may need to be tailored to the specific industrial operation.

c. The LOTO Coordinator assumes responsibility for the project and applies a lock and tag to each hazardous energy source identified in the HECP.

Note: If more than one group is involved, the LOTO Cooordinator should coordinate with the groups of Affected Employees to ensure continuity for protection of all.

d. The LOTO Coordinator will place all of the keys to the locks used in a lockbox 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.

e. The LOTO Coordinator and each group member verifies the equipment/system is properly shut down, de-energized, and placed in a zero (0) energy state; any stored or hazardous energy is released; and the equipment/system is in safe working condition.

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

g. Authorized Employees preparing to work on the locked out system shall affix their own locks and tags to the lockbox.

h. After all energy sources have been isolated, locked, and tagged out, and it has been ensured 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.

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

j. After all work has been completed, the LOTO Coordinator shall verify the LOTO devices applied by other Authorized Employees in the group activity were 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, Emergency Lock Removal.

k. 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 devices is not available to remove the devices, they 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 the Authorized Employee who applied the devices 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 the LOTO devices are to be removed and verify he/she is not able to return to work to remove them.
(2) If contact is not made, the supervisor must ensure the Authorized Employee has been informed of any actions taken prior to the employee's returning to and resuming work.

c. The need to remove the lock shall be documented as a nonconformance in the appropriate system per SPR 8730.1.

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 of the nonconformance.

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

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

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

h. After reactivation, notify Affected Employees and Facility Managers 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 devices 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 (2) options are allowed to transfer LOTO devices between off-going and on-coming employees.

a. There shall be 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 or work is planned such that the zero energy state must be maintained over a continuous period of time 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 or crew lead shall install a crew lock or system lock to maintain a zero (0) energy state.
(2) Each employee must still remove their personal lock at the beginning and the end of their work shift in that area, verifying each time that the crew or system lock is still in place and that there have been no configuration changes prior to beginning work.
(3) The supervisor shall be present when the new crew arrives to LO the system.

12.0 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 shall be subject to disciplinary action as described below.

a. Civil service employees shall be subject to disciplinary action in accordance with the NASA Desk Guide for Table of Disciplinary Offenses and Penalties and SCWI-3752-0001.

b. Contractors' employees found in violation of the above requirements shall be subject to disciplinary action per their organization.

13.0 INSPECTIONS AND AUDITS

13.1 Annual Periodic Inspections

a. The annual periodic inspection of Equipment Specific LOTO procedure(s) is required to evaluate their continued effectiveness and determine necessity for updating the written procedure(s).

b. The Periodic inspection of Equipment Specific LOTO procedure(s) shall be conducted at least annually by each responsible organization.

c. The periodic inspection must ensure each procedure is adequate in providing effective protection to personnel during servicing and/or maintenance of machines, equipment, and/or systems operations. If Authorized Employees are deviating from the procedures, the employees involved must be retrained, and the training must be documented.

d. The periodic inspection of the LOTO procedure(s) shall be conducted to correct any deviations or inadequacies identified by the inspector who is an Authorized Employee other than the one(s) utilizing the LOTO procedures being inspected.
e. The periodic inspection shall include a review between the inspector and each Authorized Employee of that employee's responsibilities under written LOTO procedure being inspected.

f. Each responsible organization shall certify that periodic inspections have been performed by completing and signing the LOTO Periodic Inspection for Equipment Specific procedures, Form SSC-849b.

13.2 Annual HECP Audits

An Audit of HECP(s) shall be conducted at least annually by each responsible organization and the audit shall be documented using Form SSC-849a.

13.3 Construction Jobsite Inspections and LOTO Audits

The NASA SMA Support Contractor shall:

a. Perform weekly construction jobsite inspections and document using Form SSC-879.

b. Perform monthly jobsite LOTO audit and document using Form SSC-852.

c. Record that result from jobsite inspection(s) and audit(s) shall be recorded in the Safety, Health, and Environmental-Finding, Tracking System (SHEtrak) and assigned the appropriate Corrective Action Report.

d. Maintain completed construction jobsite inspection and LOTO audit forms shall be maintained, so they are available for review and/or utilized for evaluation purposes during the Annual LOTO Program Evaluation.

13.4 Annual LOTO Program Evaluations

a. An Annual LOTO Program assessment shall also be summarized and reported in the Annual Voluntary Protection Program (VPP) Self-Evaluation as required by SPR 8715.1, *Safety and Health Program Requirements.*

b. The LOTO Programs are audited each year for NASA and NASA Prime Contractors. Non-compliances are recorded and tracked to closure per SCWI-1280-0002.

c. A trained and qualified representative of the affected Safety and Health Organization shall perform the audit.

14.0 ELECTRICAL SAFETY

See SCWI-8715-0006, *Electrical Safety Program*.

15.0 TRAINING

15.1 LOTO Certification Requirements

a. All onsite LOTO certification training shall be officially administered via SACOM.

b. The training must demonstrate each employee understands the purpose and function of the SSC LOTO Program, and 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 NASA Safety Training Center 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.

15.2 LOTO Training Records Management

a. Onsite SSC Authorized Employees' certification records shall be maintained current in the NASA SSC training record database.

b. The SSC LOTO certification program requires a three (3) year periodicity cycle.

c. Supervisors shall identify Affected Employees, and ensure 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 five (5) years after separation of employee, and then may be destroyed when no longer needed.

15.3 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 each employee understands the purpose and function of the SSC LOTO Program.

15.4 Authorized Employee

An Authorized Employee is 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). In addition to the general LOTO requirements, training for an Authorized Employee shall ensure these employees are able to:

a. Distinguish various types of hazardous energy sources.

b. Identify the hazardous energy sources present in the workplace.

c. Understand dangers presented by workplace energy sources.

d. Understand and follow workplace LOTO procedures.

e. Demonstrate each employee understands the purpose and function of the SSC LOTO Program through testing or other means of verification.

Authorized Employees of the onsite prime contractors and NASA SSC shall be recertified at least every three (3) years by SACOM.

15.5 Affected Employee

a. An employee whose job requires operation or use of a machine, equipment or system on which servicing or maintenance is being performed under LO and/or TO or whose job requires work in an area in which such servicing or maintenance is being performed.

b. In addition to the general LOTO training requirements, training for Affected Employees shall ensure these employees are able to:

(1) Recognize when LOTO procedures have been implemented.
(2) Understand and follow workplace LOTO procedures.
(3) Understand the importance of not attempting to startup or use equipment/machinery that has been locked and/or tagged out.

c. Employees who may have a reason to enter or work in the area where LOTO may be implemented shall be instructed regarding the purpose of LOTO procedures and informed

of the prohibition against restarting or reenergizing equipment that is locked and/or tagged out.

d. Testing or other means of verification will demonstrate each employee understands the purpose and function of the SSC LOTO Program.

15.6 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. Each contractor group's Safety Department or designated department shall maintain these records to ensure all Authorized Employees maintain current certification.

c. If necessary, the Affected and Authorized Employee shall receive refresher training by the supervisor or shop leader whenever:
   (1) A change in job assignments has occurred;
   (2) A change in machines, equipment, or processes has presented a new hazard; or,
   (3) A change in the energy control procedures has occurred that is a recognized violation of this work instruction.

15.7 Construction, Offsite Contractors, Resident Agencies, and Tenants

a. Construction contractors, offsite contractors, resident agencies, and tenants shall ensure 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 a 3 year refresher training thereafter.

c. The training must demonstrate 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, offsite contractors, resident agencies, and tenants shall independently maintain accurate and up-to-date training/certification records for its respective employees.

16.0 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 work instruction shall be maintained in accordance with applicable requirements of SPR 1440.1, *Records Management Program Requirements*.

a. SSC-339, *Discrepancy & Correction Report*

b. SSC-808, *SSC Lockout/Tagout Tag*

c. SSC-847, *Lockout/Tagout Equipment Log Sheet*

d. SSC-848A, *Hazardous Energy Control Procedure* (or equivalent)

e. SSC-848B, *LOTO Equipment Specific Procedure* (or equivalent)

f. SSC-849A, *HECP LOTO Audit Form*

g. SSC-849B, *LOTO Periodic Inspection Form and Instructions*

h. SSC-852, *NASA SSC Construction Safety and Health Job Site Audit*

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

17.0 CONFIGURATION LOCKING

There is a definite distinction between LOTO and various other locking practices, collectively referred to as Configuration Locking. The LOTO practice is specifically reserved for those instances in which a Zero Energy State should be ensured to allow personnel to service/ maintain, or modify equipment. Configuration locking is used primarily for operational control, and is not a substitute for LOTO.

Configuration locking is distinguished from LOTO in both practice and purpose. A group rather than an individual may control a configuration lock. SSC-designated LOTO lock (RED in color) or specified format LOTO tags shall be prohibited in a configuration application. (29 CFR 1910.147(c)(5)(ii))

NASA Direct Contractors and SACOM can use different color configuration locks and tags provided their procedures are documented and approved by NASA SMA.

Note: Configuration locking may be performed for many reasons, including equipment security, programmatic purposes, or general safety.

Examples of configuration locking are:

a. Locked fences around critical equipment

b. Locks on overhead-crane disconnect switches

c. A locked door to a laboratory that contains hazardous equipment

d. A water valve locked in the open position

e. Test facilities operations

APPENDIX A. ACRONYMS

CAP	Corrective Action Plan
CFR	Code of Federal Regulations
HECP	Hazardous Energy Control Procedure
LO	Lockout
LOTO	Lockout/Tagout
NASA	National Aeronautics and Space Administration
OSHA	Occupational Safety and Health Administration
NPR	NASA Procedural Requirement
SACOM	Synergy Achieving Consolidated Operations and Maintenance
SCWI	Stennis Common Work Instruction
SHETrak	Safety, Health, and Environmental-Finding, Tracking System
SMA	Safety Mission Assurance Directorate
SPR	Stennis Procedural Requirements
SSC	John C. Stennis Space Center
SSP	Stennis Safety Procedure
TO	Tagout
VPP	Voluntary Protection Program
WAD	Work Authorizing Documents

RELEASED - Printed documents may be obsolete; validate prior to use.

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

c. **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.

d. **Cognizant Safety Office:** Safety Office of the onsite prime or construction contractor.

e. **Complex Equipment/System:** Equipment/systems that have multiple (more than one (1)) energy sources required to be de-energized to place the equipment in a safe, working condition, and which have a specific sequence of steps required to safely shutdown and startup.

f. **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.

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

h. **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.

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

j. **Hazardous Energy Control Procedure:** A 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.

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

RELEASED - Printed documents may be obsolete; validate prior to use.

l. **Locked Out Conditions:** The placement of a lock on an energy isolation device, in accordance with an established procedure, ensuring the energy isolating device and the equipment being controlled cannot be operated until the device is removed.

m. **LOTO Coordinator:** An Authorized Employee who is responsible for all employees working under the protection of the Group LO/TO; to coordinate affected workforces; and to ensure continuity of protection.

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

o. **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.

p. **TO 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.

q. **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, and Troubleshooting and Inspection Report. Where applicable, WAD shall contain the system-specific HECP that will be used to ensure the control of hazardous energy.

r. **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.

APPENDIX C. HAZARDOUS ENERGY CONTROL PROCEDURE (HECP) - SSC-848A

National Aeronautics and
Space Administration
John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

HAZARDOUS ENERGY CONTROL PROCEDURE (HECP)

HECP Preparer: _____ **Date:** _____

Area/Building	Equipment Location	Equipment Name	Operated & Controlled From

Controls	Pneumatic	Electrical	Chemical	Stored Energy	Hydraulic

Location of Energy Sources	Type of LO/TO Device

Shutdown of Energy Sources

Test (Shutdown Verification)

Start Up Procedures

Exceptions or Alternative Control Methods

Authorization	
Authorized Person Print Name Below:	Safety Representative Sign Name Below:
Date:	Date:

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APPENDIX D. LOTO EQUIPMENT SPECIFIC PROCEDURE – SSC-848B

National Aeronautics and Space Administration
John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

LOTO EQUIPMENT SPECIFIC PROCEDURE
(Only trained Authorized Employees can perform Lockout/Tagout)

Strictly follow this procedure to protect all persons involved. Failure to follow this procedure could result in disciplinary action. See the requirement (SCWI-8715,0013, Lockout/Tagout) for definitions, explanations, and requirements.

Step 1: Identify equipment.

Equipment Name	Equipment ID: Mfr., Model	Equipment Location

EQUIPMENT SHUT DOWN/LOCKOUT/TAGOUT PROCEDURE

Step 2: Notify all Affected Employees and others that a Lockout/Tagout is in effect.

Step 3: Shut down the equipment energy source(s) listed below according to normal equipment shutdown procedures.

Energy Source Type/Magnitude	Shut-off Point	Location

Step 4: Isolate equipment from the energy source(s) listed below.

Energy Source	Energy Isolating Device	Location

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Continued on next page.

Step 5: Apply lock and tag to each energy isolating device listed in Step 4. If equipment cannot be locked out, perform a Job Safety Analysis (JSA) and follow Section 7.2 Tag requirements.

Step 6: Release or control stored or residual energy (if applicable).

Type of Energy Source	Method to Release/Control Energy

Step 7: Verify zero energy state (isolation of the equipment). Attempt to operate the equipment to verify equipment cannot be operated.

CAUTION: Return operating control(s) to neutral or off position after verifying isolation of the equipment.

Step 8: Perform required work in a safe manner.

RESTORING EQUIPMENT TO SERVICE

Step 9: Verify the area is clear of tools and test equipment, and all personnel are accounted for prior to lockout removal.

Step 10: Ensure all equipment components are operationally intact, including guards and safety devices.

Step 11: Each Authorized Employee shall remove their own locking device(s).

Step 12: Notify all Affected Employees and others that Lockout/Tagout is cleared, and power is being restored to equipment.

Step 13: Restore energy sources(s) and verify proper equipment operation.

	Name	Signature	Date
Prepared By			
Approved By			

Forward form to appropriate safety department upon completion.

SSC-848B (10/2016)

APPENDIX E. HECP LOTO AUDIT FORM – SSC-849A

National Aeronautics and
Space Administration
John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

HECP LOTO AUDIT

Location of Equipment and/or System Being Locked Out: _____

Name of Equipment and/or System Being Locked Out: _____

Date: _____ Time: _____ ☐ AM ☐ PM

Purpose of LO/TO Activity:

Authorized Persons Working	Immediate Supervisor

	YES	NO
1. Verify the Work Authorizing Document (WAD) has a Hazardous Energy Control Procedure (HECP) for the equipment and/or system.	☐	☐
2. Verify HECP was developed by a qualified, Authorized Employee who is knowledgeable in the process and who fully understands the requirements of the SSC Lockout/Tagout Program.	☐	☐
3. Verify the WAD indicates safety critical procedure, and the document is signed off by a Safety and Quality Representative.	☐	☐
4. Verify the HECP is in a location readily available to the workers, and that the Affected Employees were notified.	☐	☐
5. Verify all energy sources were identified, locked out with a RED lock(s), and tagged out per the HECP.	☐	☐
6. Verify the energy sources are labeled using SSC Form 808, Lockout/Tagout Tag, "Do Not Operate". The LOTO tag(s) should be legibly marked with a fine pen with Authorized Employee's name and Department #, Supervisor's name and Contact #, Work Authorizing Document (WAD) #, and Estimated Completion Date.	☐	☐
7. Verify associated SSC Form 847, LOTO Equipment Log Sheet, is properly populated with item (WAD#) Lock#, Supervisor or Shop Leader, Date Assigned, Employee Assigned, and Date Returned.	☐	☐
8. Verify each employee performing work is protected by their own Lock(s) and Tag(s) on each energy source.	☐	☐
9. Verify only employees who have received LOTO Authorized Person Training are participating in the service/maintenance activity.	☐	☐
10. Verify affected persons were notified prior to LOTO.	☐	☐
11. All discrepancies were reviewed with the Authorized Persons.	☐	☐

List and describe deficiencies requiring corrective action and record findings in SHEtrak:

Name of Authorized Employee Interviewed and Who Performed Lockout: _____

Name of Inspector: _____ Date of Inspection: _____

Forward form to appropriate safety department upon completion.

SSC-849A (10/2016)

APPENDIX F. LOTO PERIODIC INSPECTION FORM & INSTRUCTIONS – SSC-849B

National Aeronautics and
Space Administration
John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

LOTO Periodic Inspection

This inspection must be conducted at least annually. (See instructions, Page 2.) The inspector must be an Authorized Employee or person other than the one(s) utilizing the **equipment specific procedure** being inspected. The inspector must evaluate an actual equipment lockout in progress. The person performing the inspection shall communicate with the Safety Manager to have any identified deficiencies corrected prior to releasing the equipment back into operation. See SCWI-8715-0013, *SSC Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation*, for definitions, explanations, and requirements.

Name or Identification of Equipment for which the lockout/tagout (LOTO) procedure is being inspected:

Equipment Name: _____

Equipment Location: _____

	YES	NO
1. Can the Authorized Employee, when questioned, produce the written procedures?	☐	☐
2. Is the Authorized Employee designated in writing?	☐	☐
3. Is the documentation on SSC Form 847, *LockOut/TagOut Equipment Log Sheet*, and/or equivalent correct?	☐	☐
4. Are the locks used for LOTO red locks uniquely identified, uniquely keyed, and only used for the purpose of lockout?	☐	☐
5. Is the tag used with the lock the standard SSC Form 808, *LOTO Tag*, as defined in the SSC LOTO Program, identifying the name of the Authorized Employee who placed the lock, and stating **"Do Not Operate"**?	☐	☐
6. Have Affected Employees been notified of the lockout?	☐	☐
7. Can Authorized Employee working in the hazard zone, when questioned, describe his/her responsibilities during each part of the lockout process to include: verification that all types of stored energy have been identified, identification of the energy control point(s), the reason for the unique lockout hardware, the required steps after the lock is applied (e.g., block, lock blocking in place, dissipate, test, or try to restart, warning of Affected Employees, etc.), and the proper safe steps to restore the equipment to operation?	☐	☐

List and describe deficiencies requiring corrective action and record findings in SHEtrak:

Name of Authorized Employee Interviewed and Who Performed Lockout: _____

Name of Inspector: _____ Date of Inspection: _____

Forward form to appropriate safety department upon completion.

SSC-849B (10/2016)

Continued on next page.

Instructions

Provide the name, ID (if applicable), and location of the equipment whose procedure is being inspected.

Answer the questions listed by checking either the "Yes" or "No" box.

Question 1: When asked, the Authorized Employee should be able to show the inspector where the written lockout/tagout procedures for the tool or equipment are kept. They should be readily available and updated within the previous year. Ensure that these procedures cover all types of hazardous energies and location of the tool or equipment.

Question 2: Check to see that the Authorized Employee performing the lockout/tagout has written proof of this designation from an Authorized SSC representative, such as his/her Supervisor. Verify training has been completed for all Authorized and Affected Employees involved with LOTO procedure.

Question 3: Is SSC Form 847, *LockOut/TagOut Equipment Log Sheet*, or equivalent properly filled out with Item/WAD, Lock #, Supervisor or Shop Leader, Date Assigned, Authorized Employee Assigned, and Date Returned.

Question 4: Inspect the locks used by the Authorized Employee. They should conform to the requirements set forth in the SSC Lockout/Tagout Program. The locks should be red locks, uniquely identified as lockout/tagout locks, of the "one-lock, one-key" type, assigned to only one employee, and that employee should be in possession of the key.

Question 5: Inspect the tags used by the Authorized Employee. They should conform to the requirements set forth in the SSC Lockout/Tagout Program. The tag should be durable, legibly marked with a fine pen with Authorized Employee's name and Department #, Supervisor's name and Contact #, Work Authorizing Document (WAD) #, and Estimated Completion Date.

Question 6: During the lockout/tagout demonstration itself, the Authorized Employee should have notified Affected Employees in the area that lockout/tagout/blockout is taking place. Ensure this has happened by either witnessing the communication or by interviewing the Affected Employees.

Question 7: Observe the Authorized Employee during the lockout/tagout process. Ask him/her to describe his/her responsibilities for each step as it is completed, and to provide explanations where applicable. Examples may include:

- ☐ Notified all Affected Employees and others that a Lockout/Tagout is in effect.
- ☐ Safe shut down of equipment.
- ☐ Identification of isolation points for each type of hazardous energy.
- ☐ Converting isolation points to a de-energized state.
- ☐ Verification that hazardous energy (either live or stored) has been dissipated and locked/blocked after the energy control points have been locked and tagged.
- ☐ The reason for the unique hardware and tags. (Regulatory requirement, to make it known that lockout/tagout is safety related, that someone's personal safety depends on personnel complying with the requirements, to make the lockout/tagout/blockout process easily identifiable, etc.)
- ☐ Steps required for returning the equipment to normal production operations.
- ☐ Notified all Affected Employees and others that a Lockout/Tagout is over.

List and describe the deficiencies requiring corrective action and verify findings were recorded in SHEtrak.

Print the name of the Authorized Employee interviewed during the procedure inspection.

Print the name of the inspector (also an Authorized Employee) and the date the inspection occurred.

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RELEASED - Printed documents may be obsolete; validate prior to use.