Langley Research Center

LPR 1710.10

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SAFETY CLEARANCE PROCEDURES FOR THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

National Aeronautics and Space Administration

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Responsible Office: Safety and Mission Assurance Office

PREFACE

P.1 PURPOSE

This Langley Research Center Procedural Requirements (LPR) sets forth detailed Lockout/Tagout (LOTO) requirements to ensure personnel and equipment safety by controlling hazardous energy sources during installation, maintenance, repair, inspections, or in any situation where an unexpected energization or start up of the machine or equipment or release of stored energy could cause injury to employees or damage to equipment. This LPR is a part of the LaRC safety program and is intended to assist supervisors and employees with their individual responsibility for safety.

P.2 APPLICABILITY

These procedures shall apply to all persons performing work at Langley Research Center (LaRC), including civil servants, contractors, research associates, and others. Non-compliance with this LPR will result in appropriate disciplinary action that may result in termination of a civil servant employee or exclusion from the Center for a contractor employee.

No person shall work on any electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., which requires a LOTO to control hazardous energy until the appropriate LOTO has been implemented in accordance with the requirements of this document including:

- Any task that requires an employee to remove or bypass a guard or safety device.
- Any task that requires an employee to place any part of his/her body in a point of operation or danger zone.

P.3 AUTHORITY

a. NPR 8715.3, “NASA Safety Manual.”

P.4 REFERENCES

a. CID 1150.2, "Boards, Panels, Committees, Councils, and Teams."
b. LAPD 1700.2, "Safety Assignments."
c. LPR 1710.6, "Electrical Safety."
d. LPR 1710.40, “Safety Regulations Covering Pressurized Systems."

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e. LPR 1740.6, “Personnel Safety Certification.”
f. NASA Langley Form 110, "Removal of Shop Machine Lockout or Craft Specific Lockout by the Facility Coordinator."
g. NASA Langley Form 241, "Non-personal Service (NPS) Contract Employee Shop Machine Lockout Appointment Form."
h. NASA Langley Form 402, "Civil Service Employee Shop Machine Lockout Appointment Form.”
i. NASA Langley Form 451, "Non-personal Service (NPS) Contract Employee Safety Operator Appointment Form."
j. NASA Langley Form 452, "Civil Service Employee Safety Operator Appointment Form."
k. NASA Langley Form 453, "NASA Langley Safety Operator's Permit."
l. NASA Langley Form 493, "Lockout/Tagout Release."
m. NASA Langley Form 495, "Safety Operations Clearance Procedure."
n. NASA Langley Form 496, "Lockout/Tagout Records."
o. NASA Langley Form 497, "Red Tag Receipt Records."
p. NASA Langley Form 519, "Civil Service Employee Safety Operator Field Verifier Appointment Form."
q. NASA Langley Form 520, "Non-personal Service (NPS) Contract Employee Safety Operator Field Verifier Appointment Form."

P.5 CANCELLATION

LPR 1710.10, dated November 10, 2004, is rescinded and should be destroyed.

original signed on file

Roy D. Bridges, Jr.
Director

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Chapter 1.

1. INTRODUCTION

1.1 PURPOSE

NASA LaRC LOTO shall be used to control hazardous energy associated with electrical systems, mechanical systems, fluid systems, equipment, machines, apparatus, etc., anytime the unexpected energization, start up, or the release of stored energy could cause personnel injury, death, or equipment damage.

1.2 PROGRAM OVERVIEW

Control of hazardous energy at LaRC shall be accomplished by one of three procedures: Red-Tag Lockout/Tagout (Red Tag LOTO), Shop-Machine Lockout (SML), and Craft-Specific Lockout (CSL). The appropriate procedure to be used and how to accomplish it are outlined in this document.

1.2.1 Red-Tag LOTO

Red-Tag LOTO is the primary LOTO procedure employed on LaRC to control hazardous energy. Red Tag LOTO can only be performed by a qualified Safety Operator (SO) and requires the SO to perform the LOTO using documented procedures, red locks, red tags, and associated lockout hardware in accordance with the requirements of Chapter 2. To initiate a red-tag LOTO, an employee shall contact the Facility Coordinator who is responsible for the system/equipment that requires LOTO.

Red-tag LOTO shall be used if any one of the following circumstances exists:

- At the start of the activity being performed, it is known that it will take more than one shift to complete the activity.
- The machine or equipment is fed from more than one energy source.
- Multiple lockout devices are required to achieve a locked-out condition.
- The machine or equipment has stored or residual energy or re-accumulation of stored energy could occur after shut down which could endanger employees.
- It is deemed necessary by the Facility Safety Head, Facility Coordinator, or Safety Manager.
- Work being performed could be accomplished using CSL or SML, but personnel performing the work are not CSL or SML certified.

It shall be permissible to use Red-tag LOTO in lieu of CSL or SML even though all criteria are met for the use of CSL or SML.

1.2.2 Craft Specific Lockout

Craft Specific Lockout (CSL) is a LOTO procedure used by specific crafts (e.g., electricians, HVAC technician, etc.) to control hazardous energy while performing

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maintenance, repairs, or minor modifications. CSL use is restricted to CSL certified Safety Operators using his/her special CSL blue lock and identification card to perform the CSL in accordance with the requirements of Chapter 3 of this document.

CSL shall be used in place of Red Tag LOTO only if all of the following are true:

- At the start of the activity it is not expected to take more than one shift to complete the activity.
- The machine or equipment has a single energy source that is readily identified and may be locked in the OFF position.
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- A single lockout device will achieve a locked-out condition.
- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- Each person protected by the LOTO is a CSL certified SO and has placed his/her CSL lock and identification card on the energy source prior to beginning task.

Two examples of the **proper use** of CSL are: (1) each member of a team of HVAC technicians, all of which are CSL certified SOs, place his/her lock on the appropriate disconnect while performing maintenance and (2) A CSL certified electrician places his/her lock on a circuit breaker while replacing receptacles.

Two examples of **improper use** of CSL are: (1) A CSL certified SO implements CSL by placing his/her lock on the disconnect for an HVAC unit and then allows several other workers to work on the HVAC unit and (2) the LOTO requires isolation of two energy sources so the maintenance team decides to have one SO place his/her lock on one device and a second SO place his/her lock on the other device.

1.2.3 Shop Machine Lockout

Shop Machine Lockout (SML) is a LOTO procedure used by SML trained machine operators to control hazardous energy to prevent unexpected startup while performing adjustments; replacement of blades, bits, and the like; and/or maintenance. SML use is restricted to shop machine operators who have been certified to perform SML using his/her special SML yellow lock and an identification card in accordance with the requirements of Chapter 4 of this document.

Shop machines include drill presses, bench grinders, lathes, milling machines, punch machines, band saws, table saws, and the like that are permanently located in one place. Shop machines do not include powered hand tools such as drills, screw guns, circular saws, portable band saws, and the like (Note: powered hand tools shall always be unplugged when changing tools, cleaning, adjusting, or when performing maintenance).

SML shall be used in place of Red Tag LOTO only if all of the following are true:

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- The shop machine has LOTO procedure posted on or near the shop machine in accordance with the requirements of Chapter 4 of this document.
- At the start of the activity, it is not expected to take more than one shift to complete the activity.
- The machine or equipment has a single energy source that can be readily identified and locked in the OFF position.
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- A single lockout device will achieve a locked-out condition.
- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- Each person protected by the LOTO is SML certified and has placed his/her SML lock and identification card on the energy source prior to beginning task.

An example of the proper use of SML is an SML certified machine operator performing a LOTO prior to the replacement of band saw blade.

An example of the improper use of SML would be an SML certified shop machine operator placing his/her SML lock and identification card on a shop machine for another employee to perform maintenance on the shop machine.

1.3 TERMINOLOGY

"***Blue Lock***" refers to the blue colored Safety and Facility Assurance Branch (SFAB) issued lock that is used by SO's who have been specially trained by SFAB in the performance of Craft Specific Lockout.

"Control of Hazardous Energy, Lockout/Tagout (LOTO)" refers to the procedure to control hazardous energy during installation, maintenance, repair, inspections, or in any situation where an unexpected energization or start up of the machine or equipment or release of stored energy could cause injury to employees or damage to equipment. LOTO includes Red Tag Lockout/Tagout, Craft Specific Lockout, and Shop Machine Lockout.

"***Craft Specific Lockout***" (CSL) refers to the LOTO procedure utilizing a SFAB issued blue lock and a pictured identification card that is used by SO's who have been specifically trained in CSL to control hazardous energy during the performance of maintenance on equipment that is fed from a single energy source.

"***Facility Coordinator***" (FC) means "Facility Coordinator," "Alternate Facility Coordinator," or authorized Designee.

"***Hasp***" refers to the device that is hung on an energy isolating device allowing the facility, equipment, system, apparatus, etc., to be locked out with multiple locks. It is used in the performance of certain LOTO procedures.

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"***Identified person"*** refers to the person who implemented a Craft Specific Lockout or a Shop Machine Lockout by placing his/her blue or yellow lock and identification card (both issued by SFAB) on the single energy isolation device and locking the device in the OFF position.

"***Identifying labels***" refers to the label that a Red Tag LOTO responsible person attaches to a personal lock to identify the protected person who hung the personal lock. The identifying label may be "stick-on" or the responsible person may use the permanent marking placed on personal locks by the FC if the permanent marking is unique to the personal lock. It is the responsibility of the responsible person to be able to identify the protected person who placed a personal lock on the lockbox or hasp in a group Red Tag LOTO.

"***Lock Box***" refers to the lockable box where red tag stubs are placed and on to which personal locks are affixed by responsible and/or protected persons as required by the Red Tag LOTO.

"***Personal Lock***" refers to the lock that is placed on a hasp or lock box by responsible persons and/or protected persons as required by the Red Tag LOTO. (LaRC provides personal locks and identifying labels for use on Center. However, a contractor may use company locks providing the locks fit the LaRC lock boxes or hasps and are not red, blue, or yellow in color.)

"***Protected Person***" refers to any person who after placing a personal lock on the Red Tag LOTO where required by the Red Tag LOTO becomes protected by the LOTO.

"***Red Lock***" refers to the red colored lock that is used by the SO in the performance of Red Tag LOTO. A red lock may only be hung or removed by a qualified SO.

*"**Red Tag Lockout/Tagout**"* refers to the Red Tag LOTO procedure performed by LaRC SO's utilizing Red Tags, red locks, and associated locking hardware to control hazardous energy during installation, maintenance, repair, inspections, or in any situation where an unexpected energization or start up of the machine or equipment or release of stored energy could cause injury to employees or damage to equipment. In Red Tag LOTO, protected persons are required to hang a personal lock on the hasp or lockbox as appropriate prior to being considered protected.

"***Red Tag Stub***" refers to the detachable portion of the red tag that is used as a receipt for the Red Tag in a Red Tag LOTO and is held by the protected person in an individual Red Tag LOTO or placed in the lock box in a group Red Tag LOTO.

"***Red Tag Record Book***" refers to the book kept in each facility by the FC where LOTO activities are documented. Applicable NASA Langley Forms are kept in this book.

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"***Requestor***" refers to the individual who requests the Red Tag LOTO. The requestor may be an individual who only has Red Tag LOTO responsibility for him/herself or may be the responsible person who has Red Tag LOTO responsibility for a group of protected persons.

"***Responsible Person***" refers to a person who has Red Tag LOTO responsibility for a group of protected persons.

"***Safety Operator***" (SO) means the individual who has been qualified and certified to perform Red Tag LOTO on the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., for which the Red Tag LOTO is requested and possesses a current NASA Langley Form 453, "NASA Langley Safety Operator's Permit". LaRC SO's are the only persons authorized to hang or remove red locks, red tags, and associated locking hardware. SO's are also the only persons permitted to perform CSL.

"***Shop Machine Lockout"*** (SML) refers to the LOTO procedure that utilizes a SFAB issued yellow lock and a pictured identification card that is used by certified machine operators who have been specifically trained in Shop Machine Lockout to control hazardous energy during the performance of adjustments; replacement of blades, bits, and the like; and/or maintenance on shop machines that are fed from a single energy source.

"***Yellow Lock***" refers to the yellow colored lock that is used by qualified shop machine operators who have been trained by SFAB in the performance of Shop Machine Lockout.

1.4 RESPONSIBILITIES

1.4.1 Organizational Unit Managers

Each Organizational Unit Manager (OUM) shall ensure that each unit employee who performs or may be called upon to perform duties described in this LPR understands that the latest version of this LPR is available from the Langley Management System on-line documentation library. The OUM shall determine that such employees are familiar with this LPR, and that there is strict compliance with the provisions of the procedures therein.

The OUM shall also ensure that other employees in the organization, including those who are temporary, under grants, summer hires and so forth, are aware of the LOTO safety requirements and that a LOTO shall not be violated.

1.4.2 Government Representative Overseeing Contractor Activities Responsibilities

This LPR shall be followed by all contractor/subcontractor employees who work on LaRC. Adherence shall be required by the specifications for the contract. Briefings and documentation relating to safety clearance procedures shall be provided by the

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Contracting Officer, NASA LaRC Inspector, Contract Monitor, Construction Manager, etc., assigned to monitor the contract. Briefings shall include specific reference to the requirement that contractor managers/supervisors inform all contractor and subcontractor employees of the LOTO safety requirements and that the LOTO shall not be violated.

1.4.3 Facility Safety Head (FSH) Responsibilities

The FSH is responsible for ensuring safety in the facility for which he or she has safety responsibility including the application of LOTO. The FSH shall approve SML procedures used on shop machines prior to first application of SML on a shop machine. Additionally, the FSH may appoint a SO in an emergency situation following the requirements established in Section 6.1.4 of this LPR.

1.4.4 Facility Coordinator (FC) Responsibilities

The Facility Coordinator responsibilities are listed below.

- Obtaining and having available sufficient red locks, personal locks, lock boxes, locking hardware, and Red Tags to meet the routine Red Tag LOTO scenarios for his/her electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc.
    - Red tags shall be obtained from the SFAB, SMAO.
        - When red tags are received, they shall be logged into the NASA Langley Form 497, "Red Tag Receipt Records".
        - The NASA Langley Form 497 shall be kept in the Red Tag Record Book.
    - The red locks, personal locks, lock boxes, and locking hardware shall be kept with the red tags and the Red Tag Record Book.
        - An initial supply of personal locks, personal lock identification labels, lock boxes, and red locks are available from the SFAB, SMAO.
        - Once the initial supply is exhausted, the FC shall obtain SFAB approved personal locks, personal lock identification labels, lock boxes, and red locks from vendors for use in his/her facility.
        - It shall be permissible for FC's to permanently identify personal locks for use in his/her facility so that the facility from which the lock was issued is identifiable.
        - It shall also be permissible for the FC to permanently mark each personal lock so that it is uniquely identifiable.
    - It shall be permissible for the FC to identify a location where the lock boxes currently in use in his/her facility are kept.
- Ensuring that the NASA Langley Form 496, "Lockout/Tagout Records," which shall be kept in the facility Red Tag Record Book, is maintained.
- Semiannually reviewing the NASA Langley Form 496 to verify the continuing need for any active Red Tag LOTO.
- Assisting in the development of the SML procedures.

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- Prior to the first SML implementation on a specific shop machine, the FC shall approve SML procedure and obtain the approval of the SML procedure from the FSH.
- The FC shall ensure that SML procedures are posted on the shop machines for use by the SML qualified shop machine operator.

1.5 PROTECTED PERSON RESPONSIBILITIES, RED TAG LOTO

The protected person has the responsibilities listed below.

- Placing his/her personal lock on the hasp or the lock box prior to performing any work on the locked out equipment/system. Upon placing his/her lock, the person becomes protected by the Red Tag LOTO.
    - In an individual Red Tag LOTO, the personal lock is obtained from the SO.
    - In a group Red Tag LOTO, the personal lock is obtained from the responsible person after a discussion with the responsible person of the limitation of the Red Tag LOTO.
- Performing pertinent safety checks such as voltage measurements or observing “0” pressure on a pressure gauge prior to beginning work on the system/equipment.
- Retaining possession of the key to his/her personal lock while protection by the Red Tag LOTO is required. The key shall not be given to any other employee for any reason.
- Removing his/her personal lock from the hasp or lock box when he/she “no longer requires the protection of the Red Tag LOTO”.
    - A person no longer requires protection when he/she stops working because his/her task is complete or he/she has been assigned to a different task that does not require the protection of the Red Tag LOTO.
    - In an individual Red Tag LOTO, if a protected person is not sure if he/she is required to remove his/her personal lock from the Red Tag LOTO, he/she shall contact the FC.
    - In a group Red Tag LOTO if a protected person is not sure if he/she is required to remove his/her personal lock from the lock box or hasp, the protected person shall ask the responsible person.
    - A protected person is not required to remove his/her personal lock when leaving the work area for short periods of time such as when going to lunch, taking a break, or leaving at the end of a work shift unless he/she will not be returning to the protection of the Red Tag LOTO
- Returning the lock to the appropriate person. At this point the person will be considered clear of the Red Tag LOTO.
    - For an individual Red Tag LOTO, the lock is returned to the FC.
    - For a group Red Tag LOTO, the lock is returned to the responsible person.

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1.6 IDENTIFIED PERSON RESPONSIBILITY, CRAFT SPECIFIC LOCKOUT

The identified person has the responsibilities listed below for a CSL.

- Placing his/her blue lock and identification card on the energy isolation device that has been placed in the “OFF” position when he/she becomes protected by a CSL.
- Performing pertinent safety checks such as attempting to start the equipment/system to ensure that it has been deactivated prior to beginning work on the system/equipment.
- Retaining possession of the key to his/her blue lock. The key shall not be given to any other employee for any reason.
- Verifying that the equipment/system is ready to be returned to service and if it is not, implementing Red Tag LOTO prior to removing his/her CSL lock.
- Removing his/her CSL lock from the equipment/system when he/she “no longer requires the protection of the CSL LOTO” after ensuring that the equipment/system is ready to be returned to service.
    - The identified person is not required to remove his/her blue CSL lock and identification card when leaving the work area for short periods of time such as when going to lunch or taking a break.
    - If the CSL identified person is reassigned to another task, one of two actions must be taken:
        - If another CSL certified SO has concurrently implemented CSL on the equipment/system, the reassigned CSL certified SO shall remove his/her CSL lock and identification after explaining the condition of the equipment/system providing that the remaining CSL SO agrees to assume CSL responsibility for the system/equipment, or
        - Implement Red Tag LOTO prior to removing his/her CSL lock
    - At the end of the shift when the CSL was performed and the task requiring the CSL has not been completed, one of two actions must be taken.
        - Transfer CSL to an oncoming shift as described in Paragraph 3.4 of this LPR, or
        - Implement Red Tag LOTO prior to removing his/her CSL lock
    - If the equipment/system is not ready to be returned to service, implement Red Tag LOTO prior to removing his/her CSL lock.
- CSL shall not be left on equipment when a CSL certified SO leaves the Center for the day.
- Retaining his/her blue lock and CSL identification card.

1.7 IDENTIFIED PERSON RESPONSIBILITY, SHOP MACHINE LOCKOUT

The identified person has the responsibilities listed below for an SML.

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- Placing his/her SML yellow lock and identification card on the shop machine energy isolation device that has been placed in the “OFF” position as indicated by the procedures posted on the shop machine when he/she becomes protected by a SML.
- Performing pertinent safety checks prior to beginning work on the system/equipment such as voltage measurements or attempting to start the shop machine to ensure that it is deactivated.
- Retaining possession of the key to his/her yellow lock. The key shall not be given to any other employee for any reason.
- Removing his/her SML lock from the equipment/system when he/she “no longer requires the protection of the SML LOTO” after ensuring that the equipment/system is ready to be returned to service.
    - The identified person is not required to remove his/her yellow SML lock and identification card when leaving the work area for short periods of time such as when going to lunch or taking a break.
    - If the SML identified person is reassigned to another task, one of two actions must be taken.
        - If another SML certified shop machine operator has concurrently implemented SML on the equipment/system, the reassigned SML certified shop machine operator shall remove his/her SML lock and identification after explaining the condition of the equipment/system providing that the remaining SML certified shop machine operator agrees to assume SML responsibility for the shop machine
        - Implement Red Tag LOTO prior to removing his/her SML lock
    - At the end of the shift when the SML was performed and the task requiring the SML has not been completed, one of two actions must be taken.
        - Transfer SML to an oncoming shift as described in Paragraph 4.5 of this LPR
        - Implement Red Tag LOTO prior to removing his/her SML lock
- Verifying that the shop machine is ready to be returned to service and if it is not, implementing Red Tag LOTO prior to removing his/her SML lock.
- SML lock and identification card shall not be left on a shop machine when a shop machine operator leaves the Center for the day.
- Retaining his/her yellow lock and SML identification card.

1.8 RESPONSIBLE PERSON RESPONSIBILITIES, RED TAG LOTO

A responsible person has the responsibilities listed below.

- Requesting Red Tag LOTO from the FC.
- Understanding the limits of the Red Tag LOTO that he/she requested as explained by the SO. (The individual is the requester, the responsible person, and the protected person in an individual Red Tag LOTO.)

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- Retaining possession of the red tag stub if the LOTO involves a single device or placing the red tag stubs in the lock box if the LOTO involves multiple devices.
- Placing his/her personal lock on the hasp or lock box when entering the protection of the Red Tag LOTO.
- Performing pertinent safety checks such as voltage measurements or observing “0” pressure on a pressure gauge prior to beginning work on the system/equipment.
- Removing his/her personal lock from the hasp or lock box when he/she no longer requires the protection of the Red Tag LOTO.
    - Prior to the removal of his/her personal lock from the lock box or hasp, he/she shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the Red Tag LOTO was performed to ensure that nonessential items have been removed and that components are operationally intact.
- If the Red Tag LOTO involved a single device, signing the red tag stub and returning the signed red tag stub along with the personal lock received from the SO to the FC.
- If the Red Tag LOTO involved multiple devices, retrieving the red tag stubs from the lock box, signing the red tag stubs, and then returning the red tag stubs, the personal lock received from the SO, and the lock box to the FC.

1.9 RESPONSIBLE PERSON RESPONSIBILITIES, GROUP RED TAG LOTO

A responsible person has the responsibilities listed below.

- Requesting Red Tag LOTO from the FC.
- Understanding the limits of the Red Tag LOTO that he/she requested as explained by the SO and to convey the limits to each protected person who becomes protected.
- Placing his/her personal lock on the hasp or lock box when entering the protection of the Red Tag LOTO
- Performing pertinent safety checks such as voltage measurements or observing “0” pressure on a pressure gauge prior to beginning or allowing protected persons to begin work on the system/equipment.
    - Knowing the exposure status with regard to the Red Tag LOTO of protected persons who are protected by the Red Tag LOTO for which he/she is responsible.
        - The exposure status of protected persons is maintained by ensuring that each protected person places a personal lock on the lock box or hasp when entering the protection of the Red Tag LOTO and removes the personal lock from the lock box or hasp when the protected person no longer requires the protection of the Red Tag LOTO.
        - Shall be able to identify the owner of a personal lock on his/her lock box or hasp.
        - If the facility has not uniquely identified personal lock by a permanent method, stick-on labels are available from the FC.

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- Removing his/her personal lock from the lock box or hasp signifying that his/her group no longer requires the protection of the Red Tag LOTO after verifying the following:
    - All protected persons who were protected by the Red Tag LOTO no longer require the protection of the Red Tag LOTO. (The removal of the personal lock from the lock box or hasp by the protected person signifies that the protected person no longer requires the protection of the Red Tag LOTO.)
    - Inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the Red Tag LOTO was performed to ensure that nonessential items have been removed and that components are operationally intact.
- If the Red Tag LOTO involved a single device, signing the red tag stub and return the signed red tag stub along with the personal locks received from the SO to the FC.
- If the Red Tag LOTO involved multiple devices, retrieving the red tag stubs from the lock box, signing the red tag stubs, and returning the signed red tag stubs, the personal locks received from the SO, and the lock box to the FC.

1.10 SAFETY OPERATOR RESPONSIBILITIES, RED TAG LOTO

A Safety Operator (SO) has the responsibilities listed below.

- When requested by the FC, taking such action as necessary to render electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., safe to be operated, repaired, replaced, modified, or moved by applying or removing as necessary, red locks, locking hardware, and red tag(s).
- Logging into the facility Red Tag Record Book all Red Tag LOTO activities that have been performed.
- Performing emergency Red Tag LOTO and ensuring that the FC is made aware of the application of a Red Tag LOTO within his/her facility as soon as possible via email, phone contact, or personal visit.
- Conveying the limits and demonstrating the effectiveness of the Red Tag LOTO
    - To the protected person in an individual Red Tag LOTO.
    - To the responsible person in a group Red Tag LOTO.
- In an individual Red Tag LOTO involving a single device, delivering to the protected person the red tag stub and a personal lock.
- In an individual Red Tag LOTO involving multiple devices, delivering the red tag stubs, a lock box, and a personal lock to the protected person.
- In a group Red Tag LOTO involving a single device, delivering to the responsible person the red tag stub and personal locks (one for the responsible person and one for each member of the group).

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- In a group Red Tag LOTO involving multiple devices, delivering to the responsible person the red tag stubs, personal locks (one for the responsible person and one for each member of the group), and a lock box.
- Ensuring that the responsible person understands the purpose and use of the lock box or hasp.
- Informing the responsible person of the dedicated location for lock boxes in facilities where the FC has so designated.
- Clearing the Red Tag LOTO when requested by the FC only after the following:
    - Receipt of the signed red tag stubs from the FC.
    - Being informed by the FC of the desired operational state for the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc. in the operational state requested by the FC.
    - Verifying that the signed/dated red tag stubs match the red tags on the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc.
    - Verifying that the electrical system, mechanical system, fluid system, equipment, apparatus, etc., is ready to be returned to service.
- Developing and using procedures as required in Chapter 2 of this LPR when performing Red Tag LOTO.
- ***Declaring disqualification*** when the SO has insufficient knowledge of the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., to perform Red Tag LOTO.

1.11 RECORDS

- NASA Langley Form 241, " Non-personal Service (NPS) Contract Employee Shop Machine Lockout Appointment Form."
- NASA Langley Form 402, “Civil Service Employee Shop Machine Lockout Appointment Form.”
- NASA Langley Form 519, “Civil Service Employee Safety Operator Field Verifier Appointment Form."
- NASA Langley Form 520, " Non-personal Service (NPS) Contract Employee Safety
- Operator Field Verifier Appointment Form."
- NASA Langley Form 451, " Non-personal Service (NPS) Contract Employee Safety
- Operator Appointment Form."
- NASA Langley Form 452, “Civil Service Employee Safety Operator Appointment Form."
- NASA Langley Form 453, "NASA Langley Safety Operator's Permit."
- NASA Langley Form 493, "Lockout/Tagout Release."
- NASA Langley Form 110, "Removal of Shop Machine Lockout or Craft Specific Lockout by the Facility Coordinator."
- NASA Langley Form 495, "Safety Operations Clearance Procedure."

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- NASA Langley Form 496, "Lockout/Tagout Records."
- NASA Langley Form 497, "Red Tag Receipt Records."

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Chapter 2

2. RED TAG LOCKOUT/TAGOUT

2.1 SECURING EQUIPMENT WITH RED TAG LOCKOUT/TAGOUTS

When, in accordance with Chapter 1, it is required that Red Tag LOTO be performed, the Red Tag LOTO requestor shall contact the FC for the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc. The FC shall contact a qualified SO and request the Red Tag LOTO. The qualified SO shall ensure proper shutdown and then take the necessary isolation actions including venting or grounding to make the electrical system, mechanical system, fluid system, equipment, apparatus, etc., safe. The SO shall apply the red locks, locking hardware and red tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. The SO shall verify safety of the electrical system, mechanical system, fluid system, equipment, apparatus, etc., by performing appropriate checks such as voltage measurements or zero pressure verifications.

Red locks and locking hardware shall be used with the red tag (one red lock for each red tag) where practical, unless the specific application cannot be made lockable without dismantling, rebuilding, replacing, or permanently altering the energy control capability of the device. When a lockout is not practical for the above reasons, a safety clearance procedure shall be developed and documented on NASA Langley Form 495, "Safety Operations Clearance Procedure". ***When the lockout is omitted, the NASA Langley Form 495 shall be used regardless of the system complexity or voltage and the red tag or tags shall be affixed to the equipment to alert personnel that the safety clearance procedure has been implemented.***

The requestor for whom the Red Tag LOTO is being placed shall be satisfied that the SO has performed all of the necessary Red Tag LOTO operations. The requestor for whom the Red Tag LOTO is being placed may request that the SO demonstrate that the system is properly configured and secure from all hazards.

Procedures for performing Red Tag LOTO shall be developed and used as required in Chapter 6 of this LPR.

2.2 RED TAG LOTO FOR AN INDIVIDUAL INVOLVING A SINGLE DEVICE

If the Red Tag LOTO is for an individual and involves a single device, the SO shall perform the Red Tag LOTO and hang a red tag, hasp, and a red lock on the device. The SO shall then deliver the red tag stub and a personal lock to the individual. (The individual is the requester, the responsible person, and the protected person in an individual Red Tag LOTO.) The SO shall explain the limits of the Red Tag LOTO to the individual. The individual shall hang his/her personal lock on the hasp where directed by the SO. The individual retains the key to his/her personal lock and the red tag stub. When the individual no longer requires the protection of the Red Tag LOTO, he/she

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shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that components are operationally intact and to ensure that nonessential items have been removed from the electrical system, mechanical system, fluid system, equipment, apparatus, etc, on which the Red Tag LOTO was performed. The individual then and only then removes his/her personal lock from the hasp, signs the red tag stub, and returns both to the FC. The FC shall contact the SO and request that the SO clear the Red Tag LOTO. The SO shall clear the Red Tag LOTO, leave the electrical system, mechanical system, fluid system, equipment, apparatus, etc., in the operational state requested by the FC, and return the red lock and the hasp to the FC.

NOTE: The individual Red Tag LOTO involving a single device may be converted to a group Red Tag LOTO involving a single device as described in Paragraph 2.1.2 of this LPR providing that the individual assumes the responsibilities of the responsible person and that each additional protected person utilizes a personal lock obtained from the FC as required.

2.3 RED TAG LOTO FOR A GROUP INVOLVING A SINGLE DEVICE

If the Red Tag LOTO is for a group and involves a single device, the SO shall perform the Red Tag LOTO and hang a red tag, hasp, and a red lock on the device. The SO shall then deliver the red tag stub and personal locks to the responsible person, one personal lock for the responsible person and one personal lock for each protected person in the group. The SO shall explain the limits of the Red Tag LOTO to the responsible person. The responsible person shall hang his/her personal lock on the hasp where directed by the SO and retain the key to his/her personal lock as well as the red tag stub.

After conveying the limits of the Red Tag LOTO to each protected person in the group, the responsible person shall present a personal lock (received from the SO) to each protected person. The protected person shall place his/her personal lock on the hasp where directed by the responsible person. Each protected person retains the key to his/her personal lock. When a protected person no longer requires the protection of the Red Tag LOTO, the protected person shall remove his/her personal lock from the hasp and return the personal lock to the responsible person. When the responsible person determines that his/her group no longer requires the protection of the Red Tag LOTO, he/she shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that components are operationally intact and to ensure that nonessential items have been removed from the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the Red Tag LOTO was performed. The responsible person shall also verify that no protected persons under his/her responsibility continue to require the protection of the Red Tag LOTO, and that all personal locks belonging to protected persons in his/ her group have been removed from the hasp. Then and only then shall the responsible person remove his/her personal lock from the hasp, sign the red tag stub, and return the signed red tag stub and all personal locks to the FC.

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The FC shall contact the SO and request that the SO clear the Red Tag LOTO. The SO shall clear the Red Tag LOTO, leave the electrical system, mechanical system, fluid system, equipment, apparatus, etc., in the operational state requested by the FC, and return the red lock and the hasp to the FC.

2.4 RED TAG LOTO FOR AN INDIVIDUAL INVOLVING MULTIPLE DEVICES

If the Red Tag LOTO is for an individual and involves multiple devices, the SO shall perform Red Tag LOTO. The SO shall then deliver the red tag stubs, a lock box, and a personal lock to the individual. The SO shall explain the limits of the Red Tag LOTO to the individual.

The individual shall place the red tag stubs in the lock box and secure the lock box with his/her personal lock. The individual retains the key to his/her personal lock. When the individual no longer requires the protection of the Red Tag LOTO, he/she shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the Red Tag LOTO was performed to ensure that components are operationally intact and to ensure that nonessential items have been removed from the electrical system, mechanical system, fluid system, equipment, apparatus, etc. Then and only then shall the individual remove his/her personal lock from the lock box, retrieve the red tag stubs, sign the red tag stubs, and return the lock box, the personal lock, and the signed red tag stubs to the FC.

The FC shall contact the SO and request that the SO clear the Red Tag LOTO. The SO shall clear the Red Tag LOTO, leave the electrical system, mechanical system, fluid system, equipment, apparatus, etc., in the operational state requested by the FC, and return the red locks, locking hardware, and the lock box the FC.

NOTE: The individual Red Tag LOTO involving multiple devices may be converted to a Group Red Tag LOTO involving multiple devices as described in Paragraph 4.1.4 of this LPR provided the individual assumes the responsibilities of the responsible person and that each additional protected person a personal lock on the lock box as described in Paragraph 2.5 below.

2.5 RED TAG LOTO FOR A GROUP INVOLVING MULTIPLE DEVICES

If the Red Tag LOTO is for a group and involves multiple devices, the SO shall perform Red Tag LOTO. The SO shall then deliver to the responsible person the red tag stubs, a lock box, a personal lock for the responsible person, and a personal lock for each protected person in the group. The SO shall explain the limits of the Red Tag LOTO to the responsible person.

The responsible person shall place the red tag stubs into the lock box and secure the lock box with his/her personal lock. After conveying the limits of the Red Tag LOTO to each protected person in the group, the responsible person shall present a personal lock (received from the SO) to each protected person. The protected person shall place

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his/her personal lock on the lock box where directed by the responsible person. Each protected person retains the key to his/her personal lock. When a protected person no longer requires the protection of the Red Tag LOTO, he/she shall remove his/her personal lock from the lock box and return his/her personal lock to the responsible person. When the responsible person determines that the group no longer requires the protection of the Red Tag LOTO, the responsible person shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the Red Tag LOTO was performed to ensure that components are operationally intact and to ensure that nonessential items have been removed from the electrical system, mechanical system, fluid system, equipment, apparatus, etc. The responsible person shall also verify that no protected persons under his/her responsibility continue to require the protection of the Red Tag LOTO, and that all personal locks belonging to protected persons in his/ her group have been removed from his/her lock box. Then and only then shall the responsible person remove his/her personal lock from the lock box and retrieve the red tag stubs. The responsible person shall sign the red tag stubs and return the red tag stubs, all personal locks, and the lock box to the FC.

The FC shall contact the SO and request that the SO clear the Red Tag LOTO. The SO shall clear the Red Tag LOTO, leave the electrical system, mechanical system, fluid system, equipment, apparatus, etc., in the operational state requested by the FC, and return the red locks and associated Red Tag LOTO hardware to the FC.

2.6 SPECIAL CONSIDERATIONS

2.6.1 Red Tag LOTO On Electrical Circuits By Mechanical SO's

Qualified mechanical SO's shall be authorized to perform electrical Red Tag LOTO for non-electrical type work on electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., if both of the following are true:

- The equipment operates at less than 600 volts.
- There exists a current NASA Langley Form 495 on file at the facility that states the procedure may be used by mechanical SOs for LOTO for non-electrical type work.
- The disconnect device(s) controlling the power to the equipment are easily correlated and clearly marked.

IT IS THE RESPONSIBILITY OF A SAFETY OPERATOR TO KNOW THE LIMITS OF HIS/HER LOCKOUT/TAGOUT AUTHORITY. If a Mechanical Safety Operator is unsure if his/her Safety Operator Permit allows Red Tag LOTO for both electrical and mechanical work, he/she shall contact the Safety and Facility Assurance Branch for clarification.

See Appendix A for frequently asked questions relative to mechanical SOs performing Red Tag LOTO for electrical work.

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2.6.2 Second Person Red Tag LOTO Checks

A second person, acceptable to the SO as being familiar with the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., shall check all locking and tagging operations under either of the following conditions:

- Where, in the opinion of the SO, complex interconnections are involved to the extent that an error could reasonably be made.
- Where electrical equipment operating over 600 volts is involved.

2.7 OTHER CONSIDERATIONS

Each protected person in a group Red Tag LOTO shall affix his/her personal lock to the hasp in a single device group Red Tag LOTO or to the lock box in a multiple device group Red Tag LOTO. When more than one group requires Red Tag LOTO protection on the same devices at the same time, the SO shall perform an additional Red Tag LOTO for the responsible person for each group. The responsible person for each group shall be provided a lock box and a personal lock for each protected person in his/her group.

NOTE: In lieu of multiple Red Tag LOTO's on the same devices at the same time for several small groups each with a responsible person, it is permissible to form a single larger group with one responsible person. There is no limit to the number of persons who may be protected by a Red Tag LOTO providing that each protected person hangs a personal lock on the hasp or lock box and that the responsible person can determine the status with regard to the Red Tag LOTO of each protected person.

If the work is to be performed by non-Civil Service employees, the Government Representative (Contract Monitor, inspector, construction manager, etc.) may request and shall be given a separate Red Tag LOTO. In lieu of a separate Red Tag LOTO, the Contract Monitor, inspector, construction manager, etc., may be issued a personal lock that would be placed on the lock box. The personal lock belonging to the Contract Monitor, inspector, construction manager, etc., ensures that the Red Tag LOTO for the electrical system, mechanical system, fluid system, equipment, apparatus, etc., will not be cleared without the approval of the Contract Monitor, inspector, construction manager, etc.

Any person who requires protection under an existing Red Tag LOTO shall contact the responsible person for the Red Tag LOTO. If, after understanding the limits of the Red Tag LOTO and if the responsible person accepts the responsibility of the additional person(s), the additional person(s) may become protected person(s) protected by the Red Tag LOTO. Each additional protected person(s) shall place and remove his/her personal lock as required by the group Red Tag LOTO. No person shall be considered protected by a Red Tag LOTO until he/she has placed a personal lock on the lock box or hasp as required by the Red Tag LOTO. The responsible person shall contact the FC for the additional personal lock(s).

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2.8 DOCUMENTATION OF SAFETY CLEARANCE PROCEDURES

SO's shall document Red Tag LOTO procedures on a NASA Langley Form 495. Red Tag LOTO procedure **shall always to be used when performing Red Tag LOTO** on electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., unless **ALL** of the following exist:

- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- The machine or equipment has a single energy source that can be readily identified and isolated.
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- The machine or equipment is isolated from that energy source and locked out during servicing or maintenance
- A single lockout device will achieve a locked-out condition.
- The servicing or maintenance does not create hazards for other employees.

The completed NASA Langley Form 495's shall be filed in the facility's Red Tag Record Book.

Additionally, safety clearance procedures **shall be documented** on a NASA Langley Form 495 for electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., that **operate at a potential exceeding 600 volts or when a locking device cannot be used** as per Chapter 4, Paragraph 4.1 of this LPR.

2.9 RECORDING SAFETY CLEARANCE PROCEDURES ON NASA Langley Form 495

Detailed procedures shall be recorded on NASA Langley Form 495 and note the devices opened or closed and any other applicable steps necessary (grounds installed, hardware required, vent valves opened, mechanical devices installed, and so forth) to assure safety. The SO shall ensure that the procedure covers the particular system involved to the extent of the clearance intended. The safety clearance procedure shall as a minimum include:

- A specific statement of the intended use of the procedure.
- Specific procedural steps for shutting down, isolating, blocking and securing the facility, equipment, system, apparatus, etc.
- Specific procedural steps for the placement of the red tag, red lock, and associated locking hardware.

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- Documentation of additional details required to verify the effectiveness of the Red Tag LOTO.
- Specific procedural steps for the removal of the Red Tag LOTO.

The completed NASA Langley Form 495 shall be placed in the Red Tag Record Book so that it is available to the qualified SO placing the equipment back into service or providing subsequent safety clearances.

2.10 SECOND PERSON VERIFICATION OF SAFETY CLEARANCE PROCEDURES

Mechanical safety clearance procedures shall be developed and documented on the NASA Langley Form 495 by a mechanical SO who is certified to perform Red Tag LOTO on the mechanical system, fluid system, equipment, apparatus, etc. A second person acceptable to the SO as being familiar with the mechanical systems, fluid systems, equipment, apparatus, etc., or a second mechanical SO who is certified to perform Red Tag LOTO on the mechanical system, fluid system, equipment, apparatus, etc., shall verify and approve the safety clearance procedure.

Electrical safety clearance procedures shall be developed and documented on the NASA Langley Form 495 by an electrical SO who is certified to perform Red Tag LOTO on the electrical system. A second person acceptable to the SO as being familiar with the electrical system or a second electrical SO who is certified to perform Red Tag LOTO on the electrical system shall verify and approve the safety clearance procedure.

2.11 USE OF SAFETY CLEARANCE PROCEDURES

Safety Clearance Procedures shall be used when performing Red Tag LOTO.

Existing Safety Clearance Procedures shall be verified by the SO each and every time used. ***The existing Safety Clearance Procedures do not relieve the SO of the responsibility to assure that the measures taken for safety clearance are correct and sufficient to make the particular facility, equipment, system, apparatus, etc., safe.***

On any deviations from the existing procedure documented on the NASA Langley Form 495, the SO shall develop a new procedure and record the new procedure on NASA Langley Form 495 as described in Paragraph 2.3.1 of this Chapter. The NASA Langley Form 495 shall be completed and filed in the Red Tag Record Book prior to performing the safety clearance.

In instances where Safety Clearance Procedures do not exist, the SO shall develop a new procedure and record the new procedure on a NASA Langley Form 495 as described in Paragraph 2.3.1 of this Chapter. The NASA Langley Form 495 shall be completed and filed in the Red Tag Record Book prior to performing the safety clearance.

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Chapter 3

3. CRAFT SPECIFIC LOCKOUT

3.1 CRAFT SPECIFIC LOCKOUT (CSL)

Craft Specific Lockout (CSL) is a LOTO procedure used in place of Red Tag LOTO by specific crafts (e.g., electricians, HVAC technician, etc.) to control hazardous energy while performing maintenance, repairs, or minor modifications. CSL use is restricted to CSL certified SO's using his/her special CSL blue lock and identification card to perform the CSL in accordance with the requirements of this chapter.

CSL shall be implemented only by LaRC SO's who have been specifically trained in CSL by the SFAB. CSL shall be implemented during maintenance of machinery and equipment that is supplied from a readily identifiable single energy source which is lockable in the OFF position. A CSL certified SO is not considered protected during the application of CSL until he/she has locked the energy isolation device in the "OFF" position with his/her blue CSL lock and identification card and has possession of the key to his/her blue CSL lock. CSL MAY ONLY BE USED BY SO's WHO HAVE BEEN SPECIFICALLY TRAINED BY SFAB IN CSL.

3.2 PROCEDURE FOR SAFETY OPERATORS TO BECOME CRAFT SPECIFIC LOCKOUT QUALIFIED

To become qualified to implement CSL, an employee shall go through the Safety Operator Appointment Procedure and indicate on the Civil Service Employee or Non-Personal Service Employee Safety Operator Appointment Form (NASA Langley Form 452 or 451) that he or she would like to become CSL qualified. After passing the field verification and the written tests, the SO Candidate shall attend an SFAB CSL training session. At the conclusion of the SFAB training session, the CSL qualified SO will be issued a blue CSL lock and CSL identification card. The CSL lock is only for the protection of the person whose picture is on the CSL identification card and shall not be used as a personal lock in the application of Red Tag LOTO described in Chapter 2 of this LPR.

3.3 CRAFT SPECIFIC LOCKOUT IMPLEMENTATION

CSL shall be implemented in place of Red Tag LOTO only if **all** of the follow exist:

- At the start of the task, it is not expected to take more that one shift complete.
- The machine or equipment has a single energy source that is readily identified and may be locked in the OFF position.
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- A single lockout device will achieve a locked-out condition.

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- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- Each person protected by the LOTO is a CSL certified SO and has placed his/her CSL lock and identification card on the energy source prior to beginning the task.

CSL shall only be used by maintenance personnel who are LaRC SO's specifically trained by SFAB in CSL during maintenance performed and completed in one shift. CSL shall be implemented as follows:

- CSL certified SO's performing maintenance on the machine or equipment shall place his/her CSL lock and identification card on the energy isolation device prior to beginning work.
    - If any worker in the group is not CSL qualified, the Red Tag LOTO described in Chapter 2 of this LPR shall be implemented.
    - CSL certified SO's shall retain the key to his/her CSL lock in his/her possession.
- CSL certified SO's shall perform pertinent safety checks such as voltage measurements or attempting to activate the equipment to ensure proper application of the CSL.
- When the CSL certified SO has completed his/her task and no longer requires the protection of the CSL, he/she shall remove his/her CSL lock and identification card
- The person whose picture is on the CSL identification card is the only person authorized to remove their CSL lock.
- The last person removing his/her CSL lock and identification card shall ensure that all persons are clear of the machine or equipment and that the machine or equipment is ready to be returned to service.
    - If the machine or equipment is not ready to be returned to service, implement Red Tag LOTO prior to the removal of the CSL lock and identification card.
- If the work on the machine or equipment cannot be completed by the end of the shift in which it was begun, the CSL shall be transferred to an oncoming shift CSL qualified SO(s) or Red Tag LOTO shall be implemented before the CSL qualified SO removes his/her lock.
    - It shall be the responsibility of the last off-going shift person removing his/her CSL lock and identification card to ensure that the CSL was properly transferred to the on-coming shift or that the Red Tag LOTO has been implemented.
    - Under no circumstance shall a SO leave his/her blue CSL lock and identification card on the equipment single energy source disconnecting means at the end of his/her shift. Failure to adhere to this rule will result in the revocation of a SO's blue CSL lock and identification card.
- The person whose picture is on the CSL identification card is not required to remove his/her personal lock when leaving the work area for short periods of time such as when going to lunch or taking a break.

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3.4 TRANSFER OF CSL TO THE NEXT SHIFT

CSL may be transferred once to a CSL qualified SO or group of qualified SO's from an off-going shift to an oncoming shift. The transfer requires the off-going shift to explain the condition of the machine to the oncoming shift. The transfer of the CSL is complete when the off-going shift SO(s) removes his/her CSL lock(s) and identification card(s) and the oncoming shift SO(s) places his/her CSL lock(s) and identification card(s) on the single energy source disconnecting means without changing the disconnecting means from the OFF position. If the task cannot be completed by the end of the second shift when it was begun, the Red Tag LOTO procedure described in Chapter 2 of this LPR shall be implemented.

3.5 REMOVAL OF CSL

The person whose picture is on the CSL identification card is the only person authorized to remove his/her CSL lock from the energy isolation device, however, a CSL lock may be removed from the energy isolation device by the Facility Coordinator for either of the following reasons:

- The identified person has lost the key to his/her CSL lock or
- The identified person is not available and cannot be contacted.

The lock shall be removed in accordance with the requirements of Chapter 5.

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Chapter 4

4. SHOP MACHINE LOCKOUT

4.1 SHOP MACHINE LOCKOUT

Shop Machine Lockout (SML) is a LOTO procedure used by SML certified shop machine operators in place of Red Tag LOTO to control hazardous energy on shop machines where the machine is supplied from a single disconnect that is readily identifiable and may be locked in the OFF position. Shop machines include but are not limited to drill presses, bench grinders, lathes, milling machines, punch machines, band saws, table saws, and the like that are permanently installed or primarily used in one location.

SML shall be implemented only by shop machine operators who have been specifically trained to perform SML by the SFAB. Once trained, SML certified shop machine operators will be issued a yellow SML lock and identification card. A certified shop machine operator is not considered protected during the application of SML until he/she has locked the energy isolation device in the “OFF” position with his/her yellow SML lock and identification card where indicated by the procedure posted on the shop machine and has possession of the key to his/her yellow SML lock.

4.2 PROCEDURE TO BECOME CERTIFIED TO PERFORM SHOP MACHINE LOCKOUT

For a shop machine operator to become certified to implement SML, he or she shall complete a NASA Langley Form 241, Non-personal Service (NPS) Contract Employee Shop Machine Lockout Appointment Form for NPS contract employees or a NASA Langley Form 402, Civil Service Employee Shop Machine Lockout Appointment Form for civil service employees, and obtain the required approvals. Once the shop machine operator has obtained the approvals on the Form 241 or 402, he/she shall contact the SFAB to arrange for SML training. At the conclusion of the SFAB training session, the SML certified person will be issued a yellow SML lock and a pictured identification card for use in the performance of the SML. The SML qualification shall be valid for four years. At the end of the four years, the SML certified person shall be re-certified.

4.3 SHOP MACHINE LOCKOUT IMPLEMENTATION

4.3.1 When Can SML be implemented?

SML may be implemented in place of Red Tag LOTO only if **all** of the following exist:

- The shop machine has LOTO procedure posted on or near the shop machine in accordance with the requirements of Chapter 4.

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- At the start of the activity, it is not expected to take more than one shift to complete the activity.
- The machine or equipment has a single energy source that can be readily identified and locked in the OFF position.
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- A single lockout device will achieve a locked-out condition.
- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.
- Each person protected by the LOTO is SML certified and has placed his/her SML lock and identification card on the energy source prior to beginning task.

4.3.2 How to Implement SML

SML shall be used by shop machine operators who have been specifically trained by the SFAB in SML to control hazardous energy to prevent unexpected startup while performing adjustments; replacement of blades, bits, and the like; and/or maintenance. SML shall be implemented as follows:

- The SML certified shop machine operator performing the SML shall verify that the procedure posted on or near the shop machine is for the shop machine to which SML is being implemented.
- SML certified shop machine operator performing task shall place his/her SML lock and identification card on the shop machine energy isolation device where indicated by the procedure posted on or near the shop machine prior to beginning work.
    - If any worker in the group is not SML certified, the Red Tag LOTO described in Chapter 2 of this LPR shall be implemented.
    - SML certified shop machine operators shall retain the key to his/her SML lock in his/her possession.
    - The SML certified shop machine operator is only considered protected when he or she has locked the shop machine single energy source in the OFF position and has the key to his/her SML lock is his/her possession.
- SML certified shop machine operators shall perform pertinent safety checks such as voltage measurements or attempting to activate the equipment to ensure proper application of the SML.
- When the SML certified shop machine operator has completed his/her task and no longer requires the protection of the SML, he/she shall remove his/her SML lock and identification card
- The person whose picture is on the SML identification card is the only person authorized to remove the SML lock.
- The last person removing his/her SML lock and identification card shall ensure that all persons are clear of the shop machine and that the shop machine is ready to be returned to service.

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- If the shop machine is not ready to be returned to service, implement Red Tag LOTO prior to the removal of the SML lock and identification card from the shop machine.
- If the work on the shop machine cannot be completed by the end of the shift in which it was begun, the SML shall be transferred to an oncoming shift SML certified shop machine operator or Red Tag LOTO shall be implemented before the SML certified shop machine operator removes his/her lock.
    - It shall be the responsibility of the last off-going shift person removing his/her SML lock and identification card to ensure that the SML was properly transferred to the on-coming shift or that the Red Tag LOTO has been implemented.
- Under no circumstance shall a shop machine operator leave his/her SML yellow lock and identification card on the shop machine single energy source disconnecting means at the end of his/her shift. Failure to adhere to this rule will result in the revocation of a shop machine operator to perform SML.
- The person whose picture is on the SML identification card is not required to remove his/her personal lock when leaving the work area for short periods of time such as when going to lunch or taking a break, however, the SML shall be converted to a Red Tag LOTO or transferred to the next shift when the shop machine operator who implemented the SML leaves at the end of his/her shift.

4.4 SML PROCEDURES

SML procedures shall be developed, posted on or near the shop machine, and used as follows:

- SML procedures for securing the single energy source from the shop machine shall be documented and posted on or near the machine.
- Procedures shall be developed by shop machine operators and approved by the Facility Coordinator and the Facility Safety Head prior to posting on or near the shop machine.
    - Procedures shall clearly identify the shop machine for which written and the precise location of the single energy isolation device.
    - Procedures shall identify any required hardware such as “clam shells” and where the hardware is located.
    - Procedures shall require the person performing the SML to ensure that the shop machine has been de-energized by attempting to start the machine prior to beginning any task.
    - Procedures shall be dated and reviewed annually.

4.5 TRANSFER OF SML TO THE NEXT SHIFT

SML may be transferred once to a SML certified shop machine operator on an oncoming shift. The transfer requires the off-going shift shop machine operator to explain the condition of the machine to the oncoming shift shop machine operator. The

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transfer of the SML is complete when the off-going shift shop machine operator removes his/her SML lock and identification card after the oncoming shift shop machine operator places his/her SML lock and identification card on the single energy source disconnecting means without changing disconnecting means from the OFF position. When the adjustments; replacement of blades, bits, and the like; and/or maintenance cannot be completed by the end of the second shift when it was begun, the Red Tag LOTO procedure described in Chapter 2 of this LPR shall be implemented.

4.6 REMOVAL OF SML

The person whose picture is on the SML identification card is the only person authorized to remove his/her SML lock from the energy isolation device, however, a CSL lock may be removed from the energy isolation device by the Facility Coordinator for either of the following reasons:

- The identified person has lost the key to his/her SML lock **or**
- The identified person is not available and cannot be contacted.

The lock shall be removed in accordance with the requirements of Chapter 5.

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Chapter 5.

5. REMOVAL OF LOCKOUT/TAGOUT

5.1 REMOVAL OF LOTO

5.1.1 Removal Of Red Tag LOTO

The SO shall be responsible for clearing the Red Tag LOTO, logging the clearance of the Red Tag LOTO into the NASA Langley Form 496, and returning to the FC the used red tag(s) with the signed red tag stub(s) attached. The used red tag(s) with stub(s) attached shall be retained in the FC's file and shall be returned to the SFAB, within two years of clearance. A red tag shall not be reused.

5.1.2 Removal Of SML Lock By Other Than the Identified Person

Except as described in Paragraph 5.4 below, the employee identified on the card hung with the SML lock is the only person authorized to remove the his/her SML lock and identification card. The SML certified shop machine operator shall retain his/her yellow lock and identification card for future SML use.

5.1.3 Removal Of CSL Lock By Other Than the Identified Person

Except as described in Paragraph 5.5 below, the employee identified on the card hung with the CSL lock is the only person authorized to remove the CSL. The CSL certified SO shall retain his/her blue lock and identification card for future CSL use.

5.2 REMOVAL OF A PERSONAL LOCK BY OTHER THAN THE PROTECTED PERSON

The protected person is the only person authorized to remove his/her personal lock from a hasp or lock box. However, a personal lock may be removed from a hasp or lock box by the FC for any of the following reasons after the receipt of a signed NASA Langley Form 493:

- The protected person has lost the key to his/her personal lock.
- The protected person has become incapacitated.
- The protected person is on vacation, or
- The protected person is not available and cannot be contacted.

The NASA Langley Form 493 shall state the reason why the protected person cannot remove his/her personal lock and shall be signed by the protected person if he/she is available. If the protected person is not available, the protected person’s direct supervisor shall visit the site and personally verify that the protected person is clear of the Red Tag LOTO. After verification that the protected person is clear of the Red Tag LOTO, the protected person’s direct supervisor shall sign NASA Langley Form 493. The

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protected person's supervisor shall take the necessary actions to ensure that when the protected person returns to LaRC he/she is aware that his/her personal lock has been removed from the Red Tag LOTO and that he/she is no longer protected by the Red Tag LOTO.

The FC shall forward a copy of the signed NASA Langley Form 493 to the LaRC Safety Manager within 48 hours. The NASA Langley Form 493 shall be kept in the facility Red Tag Record Book and forwarded to the SFAB with the associated red tags.

5.3 REMOVAL OF A RED TAG LOTO WHEN RED TAG STUBS ARE MISSING

The SO shall clear a Red Tag LOTO upon receipt of a signed NASA Langley Form 493 in lieu of a signed red tag stub if the red tag stub is not available for any of the following reasons:

- The red tag stub has been lost.
- The red tag stub has been destroyed.
- The requestor has become incapacitated.
- The requestor is on vacation, or
- The requestor is not available and cannot be contacted.

The NASA Langley Form 493 shall document the reason why the red tag stub cannot be produced, and shall be signed by the requestor if available. If the requestor is not available, the requestor's direct supervisor shall visit the site and personally check the condition of the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., that were locked/tagged. If the circuits, systems, and/or equipment related to the work are ready to be returned to normal or to the energized state and the person is clear, the supervisor shall sign NASA Langley Form 493. The supervisor shall take the necessary actions to ensure that when the protected person returns to LaRC, the protected person is aware that the Red Tag LOTO has been cleared.

The FC and SO shall accept the signed NASA Langley Form 493 as equivalent to the missing red tag stub, authorizing release of the Red Tag LOTO. The FC shall forward a copy of the signed NASA Langley Form 493 to the LaRC Safety Manager within 48 hours.

5.4 REMOVAL OF A SHOP MACHINE LOCKOUT BY OTHER THAN THE IDENTIFIED PERSON

The person who is identified on the Shop Machine Lockout identification card is the only person authorized to remove his/her yellow lock from the single energy isolation device. However, a yellow lock and identification card may be removed from the single energy isolation device by the FC for the following reasons after the receipt of a signed NASA Langley Form 110:

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- The identified person has lost the key to his/her personal lock, **or**
- The identified person is not available and cannot be contacted.

The NASA Langley Form 110 shall be signed by the identified person if he/she has lost the key to his/her yellow SML lock. If the identified person is not available, the identified person's direct supervisor shall visit the site and personally verify that the identified person is clear of the SML. After verification that the identified person is clear of the SML, the identified person's direct supervisor shall sign NASA Langley Form 110. The identified person's supervisor shall take the necessary actions to ensure that when the identified person returns to LaRC he/she is aware that his/her yellow lock has been removed from the shop machine and that he/she is no longer protected by the Shop Machine Lockout. The identified person's direct supervisor shall be responsible for returning the pictured identification card to the identified person.

The FC shall forward a copy of the signed NASA Langley Form 110 to the LaRC Safety Manager within 48 hours. The NASA Langley Form 110 shall be kept in the facility Red Tag Record Book. The NASA Langley Form 110's shall be retained in the facilities Red Tag Record Book and be returned to the SFAB, SMAO periodically with the used Red Tags.

5.5 REMOVAL OF A CSL LOCK BY OTHER THAN THE IDENTIFIED PERSON

The person whose picture is on the CSL identification card is the only person authorized to remove his/her CSL lock from the energy isolation device. However, a CSL lock may be removed from the energy isolation device by the FC for any of the following reasons after the receipt of a signed NASA Langley Form 110.

- The identified person has lost the key to his/her CSL lock or
- The identified person is not available and cannot be contacted.

The NASA Langley Form 110 shall be signed by the identified person if he/she has lost the key to his/her blue CSL lock. If the identified person is not available, the identified person's direct supervisor shall visit the site and personally verify that the identified person is clear of the CSL. After verification that the identified person is clear of the CSL, the identified person's direct supervisor shall sign NASA Langley Form 110. The identified person's supervisor shall take the necessary actions to ensure that when the identified person returns to LaRC he/she is aware that his/her CSL lock has been removed from the energy isolation device and that he/she is no longer protected by the CSL. The identified person's direct supervisor shall retain the pictured identification card and shall be responsible for returning the card to the identified person.

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The FC shall forward a copy of the signed NASA LaRC Form 110 to the LaRC Safety Manager within 48 hours. The NASA LaRC Form 110 Shall be kept in the facility Red Tag Record book. The NASA LaRC Form 110'S shall be retained in the facilities red tag record book and be returned to the SFAB, SMAO periodically with the used red tags.

5.6 REMOVAL OF A RED TAG LOTO PERFORMED FOR AN "OUTSIDE" CONTRACTOR

The NASA Langley Form 493 shall not be used to document the removal of a Red Tag LOTO when the requestor is an outside contractor.

If a Red Tag LOTO performed for an outside contractor (such as a construction contractor or other short duration contractor) must be removed in the interest of the Government and the contractor is not on Center, the NASA LaRC Inspector, Contract Monitor, construction manager, etc., with approval of SFAB, SMAO, shall coordinate the Red Tag LOTO removal and inform the contractor. The NASA LaRC Inspector, Contract Monitor, construction manager, etc., shall prepare a letter describing in detail the reasons (including the disposition of lock boxes and personal locks) and conditions requiring this method of removal. The letter shall include the contract number, date, and time. Within 48 hours of the removal of the Red Tag LOTO, copies of the letter shall be forwarded to the LaRC Safety Manager, the FC, and the Contracting Officer's Technical Representative (COTR). The COTR shall be responsible for informing the contractor of the removal of the Red Tag LOTO.

A copy of the letter describing in detail the reasons and conditions for removal of the Red Tag LOTO shall be attached to the used red tag and the removal of the red tag(s) and personal lock(s) noted on the NASA Langley Form 496 in the facility Red Tag Record Book. Upon the contractor's return and prior to the continuation of the contractor's work, a new Red Tag LOTO shall be performed.

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Chapter 6.

6. SAFETY OPERATORS

6.1 SAFETY OPERATOR APPOINTMENT PROCEDURE

The recommendation for a civil service employee to become a SO shall be forwarded through line organizations to the LaRC Safety Manager on NASA Langley Form 452, "Civil Service Employee Safety Operator Appointment Form." The recommendation for an employee of a non-personal services contractor to become a SO shall be forwarded through the appropriate Contracting Officer Technical Representative to the LaRC Safety Manager on NASA Langley Form 451, "Non-personal Service (NPS) Contract Employee Safety Operator Appointment Form." Recommendations shall be in sufficient detail and define the electrical systems, mechanical systems, fluid systems, and/or equipment, apparatus, etc., on which the SO will be certified to provide safety clearance. The Form 451 or 452 shall also indicate if the SO is requesting certification to perform Craft Specific Lockout.

The information on the Form 451 or 452 will be used in the preparation of the NASA Langley Form 453, NASA Langley Safety Operator's Permit. Examples of SO qualifications on a NASA Langley Form 453 are: (a) 600 volts and above, (b) below 600 volts, (c) mechanical, (d) mechanical with limited electrical as defined in Chapter 2, paragraph 2.6.1 and (e) specific systems, apparatus, or equipment such as laser systems. The permit shall be issued to the individual and shall permit the individual to perform the functions of SO. The permit shall expire 4 years from the date of issue. The SO shall possess a current permit, and have it on-hand or readily accessible, as proof of his/her certification, while performing applicable tasks.

6.1.1 Safety Operator Qualifications

A SO shall be a civil servant or an “on site” non-personal services contractor who has experience on the equipment or type of equipment to which Red Tag LOTO will be performed. Evidence to support qualification as a SO shall be by one of the following:

- Licensed as a Journeyman Tradesman in the State of Virginia or other governmental jurisdiction with licensing requirements equivalent to the State of Virginia. In addition to the Journeyman License, a SO shall have one year of relevant experience after the date of first licensing on equipment or type of equipment to which Red Tag LOTO will be performed. The experience shall be acceptable to the Contract Manager for NPS contractor employees or the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.

- Completion of a United States Department of Labor apprenticeship as evidenced by a Certificate of Completion of Apprenticeship. In addition to the Certificate of Completion of Apprenticeship, a SO shall have one year of relevant experience after the date of completion of the apprenticeship on equipment or type of

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equipment to which Red Tag LOTO will be performed. The experience shall be acceptable to the Contract Manager for NPS contractor employees or the Organizational Unit Manager or his designee for civil servants and concurred with by the LaRC Safety Manager.

- Six years of relevant practical experience on the equipment or type of equipment to which Red Tag LOTO will be performed. The experience shall be acceptable to the Contract Manager for NPS contractor employees or the Organizational Unit Manager or his designee for civil servants and concurred with by the LaRC Safety Manager.

- Direct involvement in the development and construction or assembly of a particular research apparatus or facility with appropriate knowledge of the research apparatus or facility that would allow the individual to safely perform lockout/tagout on the particular research apparatus or facility. The direct involvement shall be acceptable to the Contract Manager for NPS contractor employees or the Organizational Unit Manager or his designee for civil servants and concurred with by the LaRC Safety Manager.

Copies of the license, Certificate of Completion of Apprenticeship, and/or relevant experience acceptable to the Contract Manager for a contractor employee or to the Organizational Unit Manager or designee for a civil servant shall be forwarded to the SFAB with the completed Safety Operator Appointment Form.

6.1.2 Safety Operator Certification Procedure

In addition to the SO Qualifications, a SO shall:

- Be recommended by their supervisor.
- Complete a Safety Operator Appointment Form 451 or 452
- Demonstrate to an approved LaRC Safety Operator Field Verifier the practical ability to perform Red Tag LOTO on the equipment or type of equipment on which lockout/tagout will be performed.
- Pass a written test that is administered by the SFAB on the procedure for performing lockout/tagout.
- Be approved by the LaRC Safety Manager.
- Be re-certified every four years.

6.1.3 Safety Operator Appointment In An Emergency Situation

In an emergency situation, where a SO is not available, the Facility Safety Head (FSH) may authorize a qualified person to serve as the SO. A written explanation of actions taken shall be forwarded to the Chairperson, Executive Safety Board, (CID 1150.2, "Boards, Panels, Committees, Councils, and Teams") and the LaRC Safety Manager within three working days of the emergency appointment.

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6.2 SAFETY OPERATOR FIELD VERIFIFER QUALIFICATIONS

A Safety Operator Field Verifier may be a civil servant or an “on-site” non-personal services contractor who is a technical subject matter expert in the field that Safety Operator Candidates are to be certified. A Safety Operator Field Verifier shall be a current NASA SO. Evidence to support qualification as a technical subject matter expert shall be by *one of the following*:

- Licensed as a Master Tradesman in the State of Virginia or other governmental jurisdiction with licensing requirements equivalent to the State of Virginia. In addition to the license as a Master Tradesman in the State of Virginia, the Safety Operator Field Verifier shall have two years of relevant experience after the date of first licensing on equipment or type of equipment to which SO candidates will be certified to perform Red Tag LOTO. The experience shall be acceptable to the Contract Manager for NPS contractor employees or to the Organizational Unit Manager or his designee for civil servants and concurred with by the LaRC Safety Manager.

- Completion of a United States Department of Labor apprenticeship as evidenced by a Certificate of Completion of Apprenticeship. In addition to the Certificate of Completion of Apprenticeship, the Safety Operator Field Verifier shall have three years of relevant experience after completion of the apprenticeship on equipment or the type of equipment on which SO candidates will be certified to perform Red Tag LOTO. The experience shall be acceptable to the Contract Manager for an NPS contractor employee or to the Organizational Unit Manager or designee for a civil servant and concurred with by the LaRC Safety Manager.

- Ten years of relevant experience acceptable to the Contract Manager for an NPS contractor employee or to the Organizational Unit Manager or designee for a civil servant on the equipment or type of equipment to which SO candidates will be certified to perform Lockout/Tagout. The experience shall be concurred with by the LaRC Safety Manager.

- Ten years of a combination of education (30 college credits substituted for one year of relevant experience) and relevant experience on the equipment or type of equipment to which SO candidates will be certified to perform Lockout/Tagout that is acceptable to the Contract Manager for an NPS contractor employee or to the Organizational Unit Manager or designee for a civil servant. The experience shall be concurred with by the LaRC Safety Manager.

Copies of the license, Certificate of Completion of Apprenticeship, proof of education, and/or relevant experience acceptable to the Contract Manager for an NPS contractor or to the Organizational Unit Manager or designee for a civil servant shall be forwarded to the SFAB with the completed and signed NASA Langley Form 520, ”Non-Personal Services Contract Employee Safety Operator Field Verifier Form” for NPS

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contract employees or NASA Langley Form 519, ”Civil Service Employee Safety Operator Field Verifier Form”.

6.2.1 Safety Operator Field Verifier Certification Procedure

The procedure for certification as a Safety Operator Field Verifier:

- Be recommended by their supervisor.
- Be approved by the Contract Manager for an NPS contractor employee or to the Organizational Unit Manager or designee for a civil servant.
- Complete a Safety Operator Field Verifier Appointment Form 519 or 520.
- Be a current LaRC Safety Operator.
- Be approved by the LaRC Safety Manager.

6.3 INSTRUCTIONS FOR SAFETY OPERATORS

6.3.1 General

SO’s shall ensure compliance with the Safety Operations Clearance Procedures stated in LPR 1710.6, "Electrical Safety," and LPR 1710.40, "Safety Regulations Covering Pressurized Systems."

6.3.2 Specific Requirements For Electrically Operated Equipment

Before Red Tag LOTO is completed on electrically operated equipment, the circuit or circuits shall be secured in a de-energized condition. Identification markings on facility lights and power branch circuits shall not be relied on for establishing safe working conditions.

6.3.3 Verification of Air Gap Between the Line and Load Contacts on Electrical Disconnect Switches Used in the Performance of Red Tag LOTO

When performing electrical safety clearance, the SO shall place the electrical disconnect switch that isolates the electrical power from facility, equipment, system, apparatus, etc., in the open position and observe that an air gap exists between the line and load contacts of the switch prior to presenting the requestor the red tag stub(s).

If the required air gap between the line and load contacts of the switch cannot be observed, the SO shall first start the facility, equipment, system, apparatus, etc., in a normal or manual operating mode, and then de-energize by opening the breaker or disconnect switch that supplies electrical power. The SO shall perform appropriate measurements to verify electrical isolation of the facility, equipment, system, apparatus, etc., prior to presenting the requestor the red tag stub(s).

On manually controlled equipment, the qualified SO shall start the facility, equipment, system, apparatus, etc., open either the disconnect switch or branch circuit breaker, and verify shut down. The SO shall perform appropriate measurements to ensure that the

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energy source has been isolated from the facility, equipment, system, apparatus, etc., prior to presenting the requestor the red tag stub(s).

When the facility, equipment, system, apparatus, etc., has malfunctioned and cannot be restarted, the SO shall open either the disconnect device or circuit breaker that feeds the facility, equipment, system, apparatus, etc. The SO shall perform appropriate measurements to ensure that the source has been isolated from the equipment.

6.3.4 Red Tag LOTO for Electrical Work on Circuits at or Above 600 Volts or In Close Proximity to Energized Circuits at Any Voltage

For work on electrical circuits 600 volts and above or in close proximity to energized circuits, the SO shall comply with safety clearance procedures delineated in LPR 1710.6, "Electrical Safety."

6.3.5 Mechanical or Fluid Systems

Before clearance shall be given on mechanical or fluid systems, the apparatus, valves, or systems shall be secured in a safe condition with appropriate vents, pins, or other devices, as follows:

- Pressurized or vacuum systems shall be properly vented to completely relieve any differential pressure.
- Main supply valve(s) shall be locked and tagged closed and vent valve(s) shall be locked and tagged open.
- Where dangerous gas or liquid systems are involved or in areas where the environment may be oxygen deficient, systems or areas shall be purged, adequately ventilated, or otherwise made safe.
- The SO and the protected person shall assure that the venting system provided shall remain intact so that pressure cannot build up in the system during progress of the work.
- The SO shall not exceed change of pressure or temperature ratios during safety clearance procedure venting processes.
- The SO shall not dispense hazardous material into the environment.

6.3.6 LOTO of Heating, Ventilation, and Air Conditioning (HVAC)

HVAC safety operators who are specifically certified on his/her LaRC Safety Operator's Permit may perform mechanical and electrical LOTO and implement Craft Specific Lockout associated with HVAC equipment:

- For installing, servicing, and repairing of the mechanical components of the HVAC equipment including duct fabrication, any part of the refrigeration cycle, cutting and joining pipe with threaded and soldered joints, and temperature controls.

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- For installing, servicing, and repairing of the electrical components of the HVAC equipment within the confines of the HVAC equipment including compressor motors, fan motors, relays, contactors, and other HVAC control components.
- For trouble shooting the mechanical components associated with the HVAC equipment or the electrical components within the confines of the HVAC equipment.

6.3.7 SO Verifications Prior to Removal of Red Tag LOTO

After being requested to clear the Red Tag LOTO from electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., by the FC but prior to removing the red tag and the associated locking hardware, the SO shall:

- Request from the FC the operational state desired for electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., i.e., are disconnects to be positioned on or left off, are isolation valves to be opened or left closed, are vent valves to be closed or left open, etc.
- Verify that the red tag stubs have been signed and match the red tags being removed.
- Inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that nonessential items have been removed.

- Inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that components are operationally intact.

Notify personnel in the area of the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., that the Red Tag LOTO is being cleared.

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APPENDIX A FREQUENTLY ASKED QUESTIONS

FAQ #1 -- Can a mechanical SO perform Red Tag LOTO on a system for electrical work?

A mechanical SO who is only certified on his/her Safety Operators Permit to perform mechanical Red Tag LOTO, may not perform Red Tag LOTO on a system for electrical work. For example, a mechanical SO may establish Red Tag LOTO on the disconnect that prevents a pump from starting while mechanical work is being performed on the pump. The Red Tag LOTO would state that the purpose of the LOTO was to perform mechanical work. If electrical work were required, an electrical certified SO would be required to perform another Red Tag LOTO for the electrical work.

The reasoning behind not permitting a mechanical SO to perform Red Tag LOTO for electrical work is that the mechanical SO may not have the electrical knowledge to safe a system for electrical work. There could be several circuits that feed a device that a mechanical SO may not be aware. For instance, securing the disconnect that feeds power to the actuator of a Limi-torque type valve will keep the valve from being opened. However, there may be monitoring circuits that are powered by a different power source. Securing the disconnect that feeds the actuator would preclude the valve from opening which would ensure that a person was safe while performing mechanical work on the valve but it would not be safe for electrical work on the actuator drive until the power to the monitoring circuitry was also secured.

FAQ #2 -- Can a SO be certified to perform both electrical and mechanical Red Tag LOTO?

A SO may be certified to perform both electrical and mechanical Red Tag LOTO by requesting to be certified to perform both electrical and mechanical LOTO. For example, a SO who works in Facility 1148 may be certified to perform Red Tag LOTO for the machines located in Facility 1148 for both electrical and mechanical work. To become certified to perform both electrical and mechanical Red Tag LOTO for the machines in Facility 1148, a Safety Operator Candidate would indicate on the Safety Operator Appointment Form that he/she is seeking to be certified to perform electrical and mechanical Red Tag LOTO for the equipment located in Facility 1148. The form would also list in detail the qualifications of the candidate to perform the Red Tag LOTO. The Safety Operator Candidate would be required to demonstrate his/her knowledge to both an electrical field verifier and a mechanical field verifier as well as take both the mechanical and the electrical Safety Operators test which are administered by the Safety Office. After the Safety Operator Candidate had been verified by both the electrical and mechanical verifiers and passed both the electrical and mechanical written tests, the Langley Safety Operators permit would be issued and would indicate that the SO is certified to perform Red Tag LOTO for both electrical and mechanical work on machines in Facility 1148.

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APPENDIX B EXAMPLES OF CRAFT SPECIFIC LOCKOUT

An HVAC repair team is performing maintenance on an HVAC compressor. The HVAC compressor is electrically fed from a single readily identifiable disconnect switch and all of the conditions stated in Paragraph 3.3 above are met. Each member of the team is a CSL trained SO. Prior to beginning the maintenance, each worker shall place his/her CSL lock and identification card on the disconnect and retain the key to the CSL lock. The CSL lock shall be left in place until the maintenance is completed or the end of the shift when it is either transferred to an oncoming shift CSL qualified SO(s) or the CSL is converted to a Red Tag LOTO by a LaRC SO.

A crane repair team (with each team member being a CSL qualified SO) is performing maintenance on a 5 Ton overhead crane that is fed from a readily identifiable single energy source that may be locked in the OFF position and all conditions listed in Paragraph 3.3 above are met. The CSL may be implemented during maintenance on the crane by positioning the readily identifiable single energy source in the OFF position and each team member placing his/her blue CSL lock and identification card on the disconnect. The CSL lock shall be left in place until the maintenance is completed or the end of the shift when it is transferred to an oncoming shift CSL qualified SO(s) or Red Tag LOTO is implemented prior to the last CSL qualified SO removing his/her CSL lock. The removal of the CSL lock by the protected person indicates that they are clear of the crane prior to operations. It is permissible for the CSL to be implemented and cleared as required during the performance of the maintenance providing each person removes his/her own CSL lock.

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APPENDIX C EXAMPLES OF SHOP MACHINE LOCKOUT

A band saw has SML procedures posted on or near the machine. A SML certified shop machine operator may implement SML while changing the blade by following the posted procedure. A shop machine operator who is not SML certified shall have the Red Tag LOTO procedure described in Chapter 2 of this LPR implemented prior to changing the blade on the band saw.

A milling machine has SML procedures posted on the machine. A first shift shop machine operator who is SML certified implemented SML on the milling machine to change a bit by following the posted procedure. The SML certified shop machine operator was not able to complete the bit change by the end of his/her shift. The SML may be transferred to the second shift shop machine operator who will be completing the bit change providing he or she is SML certified. The transfer to the oncoming shift requires the off-going shift to explain the condition of the machine and is completed when the off-going shop machine operator removes his/her yellow SML lock and identification card after the on-coming shop machine operator places his/her yellow SML lock and identification card on the disconnect while leaving the disconnect in the OFF position. At the end of the second sift, if the bit change has not been completed, the SML shall be replaced with a Red Tag LOTO as described in Chapter 2 of this LPR.

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