



Langley Research Center

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**SAFETY CLEARANCE PROCEDURES
(LOCKOUT/TAGOUT)**

National Aeronautics and Space Administration

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Responsible Office: Office of Safety and Mission Assurance

Preface

P.1 PURPOSE

This Langley Research Center Procedural Requirements (LPR), included in the Langley Research Center (LaRC) Safety Manual, sets forth detailed safety clearance procedures. This LPR is one part of the LaRC safety program and is intended to assist supervisors and employees with their individual responsibility for safety.

These procedures shall be used to assure personnel or equipment safety during installation, maintenance, or in any situation where an equipment configuration must be temporarily maintained. Typically, the lockout/tagout (LOTO) is used to control: the position of electrical switches or circuit breakers; the position of valves controlling steam, compressed gas, vacuum sources, cryogenic materials, pressurized fluids, or toxic materials; or the configuration of ventilation systems for tanks or other spaces which may be oxygen deficient. The LOTO may be placed upon any device, which could, if actuated, cause personnel or property to be endangered. The LOTO may also be used to forbid entrance to dangerous areas.

P.2 APPLICABILITY

These procedures 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 include termination for a civil servant employee or exclusion from the Center for a contractor employee.

P.3 AUTHORITY

None.

P.4 REFERENCES

- a. LAPD 1150.2, "Boards, Panels, Committees, Councils, and Teams."
- b. LAPD 1700.2, "Safety Assignments."
- c. LPR 1740.6, "Personnel Safety Certification."
- d. LPR 1710.6, "Electrical Safety."

- e. LPR 1710.40, " Safety Regulations Covering Pressurized Systems."
- f. NASA Langley Form 451, "Non-personal Service (NPS) Contract Employee Safety Operator Appointment Form."
- g. NASA Langley Form 452, "Civil Service Employee Safety Operator Appointment Form."
- h. NASA Langley Form 453, "NASA Langley Safety Operator's Permit."
- i. NASA Langley Form 493, "Lockout/Tagout Release."
- j. NASA Langley Form 495, "Safety Operators Clearance Procedure."
- k. NASA Langley Form 496, "Lockout/Tagout Records."
- l. NASA Langley Form 497, "Red Tag Receipt Records."

P.5 CANCELLATION

LAPG 1710.10, dated October 10, 2001.

Delma C. Freeman
Deputy Director

DISTRIBUTION:

SDL 040, SDL 043, SDL 410, SDL 411, and SDL 412
429/Office of Safety and Facility Assurance (OSFA), Office of Safety and Mission Assurance (OSMA) (50 copies)

Chapter 1

1. INTRODUCTION

1.1 TERMINOLOGY

Throughout this document the terms "**lockout/tagout**", "**LOTO**", "**red-tag**", and "**to provide safety clearance**" are used interchangeably. These terms imply the full procedure of determining what is required to make a system safe; the action of making the system safe; and the placing of locks, locking devices and red tags to preclude changing from the safe configuration.

"**Red tag stub**" refers to the detachable portion of the red tag which is used as a receipt.

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

"**Safety Operator**" (SO) means the individual who has been qualified and certified to perform LOTO on the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., for which the 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.

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

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

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

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

"**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 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 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 and **ARE NOT RED IN COLOR.**)

“Hasp” refers to the device that is hung in place of a single lock allowing the facility, equipment, system, apparatus, etc., to be locked out with multiple locks. It is used in the performance of certain LOTO operations.

“Identifying labels” refers to the label that a 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 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.

1.2 PROGRAM OVERVIEW

When LOTO is required, the requestor contacts the FC who is responsible for the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the LOTO is required. The FC then contacts a qualified SO who performs the required LOTO. **At LaRC, the only persons authorized to perform LOTO are SO’s who have in their possession a current NASA Langley Form 453, “NASA Langley Safety Operator Permit” for the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the LOTO is to be performed.** Once the LOTO has been completed, the SO contacts the requestor, communicates the limits of the LOTO, demonstrates the effectiveness of the LOTO, and delivers red tag stub(s), lock box when required, and personal lock(s) to the requestor. No person shall be considered protected by a LOTO until he/she has placed a personal lock on the lock box or hasp as required by the LOTO. When the requestor no longer requires the protection of the LOTO, he/she signs the red tag stub(s) and delivers the signed red tag stub(s), the lock box if used, and personal lock(s) to the FC. The FC contacts the SO who clears the LOTO.

1.3 RESPONSIBILITIES

1.3.1 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 this LPR is available on the Langley Management System. 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.

1.3.2 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 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.

1.3.3 FACILITY COORDINATOR RESPONSIBILITIES

It shall be the responsibility of the FC to obtain and have available sufficient red locks, personal locks, lock boxes, locking hardware, and red tags are available to meet the routine LOTO scenarios for his/her electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc. The red locks, personal locks, lock boxes, and locking hardware shall be kept with the red tags and the Red Tag Record Book. The FC may identify a location where the lock boxes currently in use in his/her facility are kept.

It shall also be the FC's responsibility to ensure that the NASA Langley Form 496, "Lockout/Tagout Records," which shall be kept in the facility Red Tag Record Book, is maintained. The NASA Langley Form 496 shall be reviewed on a semiannual basis by the FC to verify the continuing need for any active LOTO.

Red tags shall be obtained from the OSFA, OSMA. An initial supply of personal locks, personal lock identification labels, lock boxes, and red locks are available from the OSMA, OSMA. Once the initial supply is exhausted, the FC shall obtain OSFA approved personal locks, personal lock identification labels, lock boxes, and red locks from vendors for use in his/her facility. It is 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. Additionally, the FC may permanently mark each personal lock so that it is uniquely identifiable. When red tags are received, they shall be logged in on NASA Langley Form 497, "Red Tag Receipt Records," which shall also be kept in the Red Tag Record Book.

1.3.4 PROTECTED PERSON RESPONSIBILITIES

It shall also be the responsibility of the protected person to place his/her personal lock on the hasp or the lock box as appropriate when he/she becomes protected by the LOTO. The protected person shall retain possession of the key to his/her

personal lock. When a protected person no longer requires the protection of the LOTO, the protected person shall remove his/her personal lock from the hasp or the lock box and return the personal lock to the FC for an individual LOTO or to the responsible person for a group LOTO.

NOTE: A protected person removes his/her personal lock from the hasp or lock box signifying that he/she “no longer requires the protection of the LOTO” when he/she stops working because the task is completed or he/she has been assigned to a different task which does not require the protection of the LOTO. A protected person is the only person authorized to remove his/her personal lock. 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 LOTO. In a group 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. In an individual LOTO if a protected person is not sure if he/she is required to remove his/her personal lock from the LOTO, he/she shall contact the FC. Once a protected person returns his/her personal lock to the responsible person in a group LOTO or the FC in an individual LOTO, the protected person will be considered clear of the LOTO.

1.3.5 RESPONSIBLE PERSON RESPONSIBILITIES

It shall be the responsibility of a responsible person to understand the limits of the LOTO that he/she requested and to convey the limits of the LOTO to each protected person who becomes protected by the LOTO. The responsible person shall know the exposure status with regard to the LOTO of protected persons who are protected by the 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 LOTO and removes the personal lock from the lock box or hasp when the protection of the LOTO is no longer required. The responsible person 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 by a permanent method, stick-on labels are available from the FC.

When the responsible person determines that his/her group no longer requires the protection of the LOTO but prior to the removal of his/her personal lock from the lock box or hasp, he/she shall verify that all protected persons who were protected by the LOTO no longer require the protection of the 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 LOTO. The responsible person shall also inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the LOTO was performed to ensure that nonessential items have been removed and that components are operationally intact. Then and only then shall a responsible person remove his/her personal lock from the lock box or hasp. If the LOTO involved a single device, the responsible person shall sign 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 LOTO involved multiple devices, the responsible person shall retrieve the red tag stubs, sign the red tag stubs, and then return the red tag stubs, the personal locks received from the SO, and the lock box to the FC.

NOTE: The responsible person removes his/her personal lock from the lock box or hasp signifying that his/her group “no longer requires the protection of the LOTO” when his/her group stops working because the task is completed or the group is assigned to a different task which does not require the protection of the requested LOTO. When the responsible person returns to the FC the signed red tag stub(s), the lock box if the LOTO was for a multiple device LOTO, and all personal locks received from the SO, the responsible person’s group is considered clear of the LOTO.

1.3.6 SAFETY OPERATOR RESPONSIBILITIES

It shall be the responsibility of the SO when requested by the FC to take such action as necessary to render electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., safe to be operated, repaired, replaced, modified, or moved. The SO shall apply or remove as necessary, red locks, locking hardware, and red tag(s). **LaRC SO’s are the only persons authorized to apply or remove red locks, red tags, and locking hardware.** The SO shall convey the limits and the effectiveness of the LOTO to the protected person in an individual LOTO or to the responsible person in a group LOTO. After conveying the limits and the effectiveness of the LOTO, the SO shall deliver the red tag stub and a personal lock to the protected person for an individual LOTO or the red tag stub(s), a personal lock for each protected person, and a lock box if required to the responsible person for a group LOTO. The SO shall ensure that the responsible person understands the purpose and use of the lock box or hasp and that each protected person is required to place his/her personal lock onto the lock box or hasp when they become protected by the LOTO and remove his/her person lock when they no longer require the protection of the LOTO. If the FC has designated a location for the lock boxes currently in use in his/her facility, the SO shall inform the responsible person of the location.

The SO shall also be responsible for logging into the facility Red Tag Record Book all LOTO activities that have been performed. Except in emergencies, FC shall contact the SO to request the performance of LOTO. In an emergency, the SO shall perform LOTO and shall ensure that the FC is made aware of the application of a LOTO within his/her facility as soon as possible via email, phone contact, or personal visit.

The SO shall develop and use procedures as required in Chapter 6 of this LPR when performing LOTO.

The SO ***shall declare disqualification*** when the SO has insufficient knowledge of the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., to provide safety clearance.

1.4 RECORDS

Completed forms:

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 495, "Safety Operations Clearance Procedure."

NASA Langley Form 496, "Lockout/Tagout Records."

NASA Langley Form 497, "Red Tag Receipt Records."

Red Tag Record Book

Chapter 2**2. FACILITY COORDINATOR AND SAFETY OPERATOR APPOINTMENT PROCESS****2.1 FACILITY COORDINATOR APPOINTMENT PROCESS**

The FC appointment process and responsibilities are defined in LAPD 1700.2, "Safety Assignments."

2.2 SAFETY OPERATOR APPOINTMENT PROCESS

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 support services contractor to become a SO shall be forwarded through the appropriate Contracting Officer or designee 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 to permit preparation of a NASA Langley Form 453. The permit shall define the electrical systems, mechanical systems, fluid systems, and/or equipment, apparatus, etc., on which the SO is qualified to provide safety clearance. 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 4, paragraph 4.2. 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.

2.3 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, (LAPD 1150.2, "Boards, Panels, Committees, Councils, and Teams") and the LaRC Safety Manager within three working days of the emergency appointment.

Chapter 3

3. PROTECTION BY NASA-LARC LOCKOUT/TAGOUT

The NASA LaRC LOTO shall be used wherever necessary to assure that electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., shall not be operated when such operation could result in injury to personnel or damage to equipment.

No person, ***regardless of position or authority***, shall operate any switch, valve, or equipment with LOTO attached to it, nor shall such LOTO be removed except as provided by Chapter 5 of this LPR. Removal of any device from its system while the device is "locked and tagged" is not permitted. **A qualified SO is the only person who has the authority to remove a red lock, red tag, and associated locking hardware.**

No person shall work on any electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., which requires a LOTO unless the employee has placed his/her personal lock on the hasp for an individual LOTO or on the lock box for a group LOTO. It is the responsibility of the protected person to understand the limits of the LOTO. In an individual LOTO, the SO shall explain the limits of the LOTO to the protected person. In a group LOTO, the SO shall explain the limits of the LOTO to the responsible person who then explains the limits of the LOTO to the protected persons.

In providing safety clearance, positive interruption or blockage of all energy sources shall be assured. The application of LOTO's to interlocking devices, control pressure devices, or control switches ***shall not*** be relied on for safety clearance. The primary energy source interruption device (supply breaker, pressure or fluid supply valve, for example) shall be the item to which the LOTO is applied, except where electrical clearance may be provided by removal of the breaker from the compartment or by placing the breaker in the drawout position. In such instances, the breaker shall be precluded from being reinserted into the operating position by the addition of a removable mechanical stop, which is locked and tagged to prevent its removal, or by locking and tagging the lifting mechanism.

SAFETY ALERT – The following exception to the use of lockout/tagout (LOTO) is rescinded, effective immediately. The use of this exception has been revoked because it is in direct violation of OSHA 29 CFR 1910.147, "The control of hazardous energy (lockout/tagout)." Please see Langley Research Center Safety Alert, [SA-05-03, "Changes to LaRC's Lockout/Tagout System."](#)

Chapter 4

4. SECURING EQUIPMENT WITH LOCKOUT/TAGOUTS AND THE USE OF PERSONAL LOCKS AND LOCK BOXES**4.1 PROVIDING SAFETY CLEARANCE**

When, in accordance with Chapter 3, it is required that LOTO be performed, the 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 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 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.

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

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

4.1.1 LOTO FOR AN INDIVIDUAL INVOLVING A SINGLE DEVICE

If the LOTO is for an individual and involves a single device, the SO shall perform the 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 who is the protected person in this scenario. The SO shall explain the limits of the 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 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 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 LOTO. The SO shall clear the LOTO and return the red lock and the hasp to the FC.

NOTE: The individual LOTO involving a single device may be converted to a group LOTO involving a single device as described in Paragraph 4.1.2 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.

4.1.2 LOTO FOR A GROUP INVOLVING A SINGLE DEVICE

If the LOTO is for a group and involves a single device, the SO shall perform the 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 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 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 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 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 LOTO was performed. The responsible person shall also verify that no protected persons under his/her responsibility continue to require the protection of the 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. The FC shall contact the SO and request that the SO clear the LOTO. The SO shall clear the LOTO and return the red lock and the hasp to the FC.

4.1.3 LOTO FOR AN INDIVIDUAL INVOLVING MULTIPLE DEVICES

If the LOTO is for an individual and involves multiple devices, the SO shall perform 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 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 LOTO, he/she shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the 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 LOTO. The SO shall clear the LOTO and return the red locks, locking hardware, and the lock box to the FC.

NOTE: The individual LOTO involving multiple devices may be converted to a Group 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 utilizes a personal lock as required.

4.1.4 LOTO FOR A GROUP INVOLVING MULTIPLE DEVICES

If the LOTO is for a group and involves multiple devices, the SO shall perform 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 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 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 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 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 LOTO, the responsible person shall inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., on which the 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 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 LOTO. The SO shall clear the LOTO and return the red locks and associated LOTO hardware to the FC.

4.2 SPECIAL CONSIDERATIONS

4.2.1 LOTO ON ELECTRICAL CIRCUITS BY MECHANICAL SO's

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

- a. The equipment operates at less than 600 volts.
- b. There exists a current NASA Langley Form 495 on file at the facility and the disconnect device(s) controlling the power to the equipment are easily correlated and clearly marked

4.2.2 Second person 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 the following conditions:

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

4.3 OTHER CONSIDERATIONS

Each protected person in a group LOTO shall affix his/her personal lock to the hasp in a single device group LOTO or to the lock box in a multiple device group LOTO. When more than one group requires LOTO protection on the same devices at the same time, the SO shall perform an additional 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 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 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 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 LOTO. In lieu of a separate 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 electrical system, mechanical system, fluid system, equipment, apparatus, etc., LOTO will not be cleared without the approval of the Contract Monitor, inspector, construction manager, etc.

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

Chapter 5

5. REMOVAL OF LOCKOUT/TAGOUT**5.1 REMOVAL OF LOTO**

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

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 the following reasons after the receipt of signed NASA Langley Form 493:

- a. The protected person has lost the key to his/her personal lock, or
- b. The protected person has become incapacitated, or
- c. The protected person is on vacation, or
- d. 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 LOTO. After verification that the protected person is clear of the LOTO, the protected person's direct supervisor shall sign NASA Langley Form 493. The 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 LOTO and that he/she is no longer protected by the 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 OSFA with the associated red tags.

5.3 REMOVAL OF A LOTO WHEN RED TAG STUBS ARE MISSING

The SO shall clear a 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 the following reasons:

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

The NASA Langley Form 493 shall state 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, 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 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 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 LOTO PERFORMED FOR AN "OUTSIDE" CONTRACTOR

The NASA Langley Form 493 shall not be used to document the removal of a LOTO when the requestor was a construction contractor.

If a 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 the job, the NASA LaRC Inspector, Contract Monitor, construction manager, etc., with approval of OSFA, OSMA, shall coordinate the 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 LOTO, copies of the letter shall be forwarded to the LaRC Safety Manager, the FC, and the Contracting Officer's Technical Representative. The Contracting Officer shall be responsible for informing the contractor of the removal of the LOTO.

A copy of the letter describing in detail the reasons and conditions for the 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 LOTO shall be performed.

Chapter 6

6. DOCUMENTATION OF SAFETY CLEARANCE PROCEDURES

6.1 GENERAL

SO's shall document **all** safety clearance procedures on a NASA Langley Form 495 unless the electrical system, mechanical system, fluid system, equipment, apparatus, etc., has a single energy source that can be readily identified, isolated, and locked out. 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.

6.2 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. A specific statement of the intended use of the procedure.
- b. Specific procedural steps for shutting down, isolating, blocking and securing the facility, equipment, system, apparatus, etc.
- c. Specific procedural steps for the placement of the red tag, red lock, and associated locking hardware.
- d. Documentation of additional details required to verify the effectiveness of the LOTO.
- e. Specific procedural steps for the removal of the 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.

6.3 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 LOTO on the electrical system, mechanical system, fluid system, equipment, apparatus, etc. A second person acceptable to the SO as being familiar with the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., or a second mechanical SO who is certified to perform 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 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 LOTO on the electrical system shall verify and approve the safety clearance procedure.

6.4 USE OF SAFETY CLEARANCE PROCEDURES

Safety Clearance Procedures shall be used when performing LOTO. The Safety Clearance Procedures shall be verified by the SO each and every time used. ***The 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 6.2 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.

Chapter 7**7. INSTRUCTIONS FOR SAFETY OPERATORS****7.1 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."

7.2 SPECIFIC REQUIREMENTS FOR ELECTRICALLY OPERATED EQUIPMENT

Before 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 work conditions.

7.2.1 VERIFICATION OF AIR GAP BETWEEN THE LINE AND LOAD CONTACTS ON ELECTRICAL DISCONNECT SWITCHES USED IN THE PERFORMANCE OF 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 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 can not 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.

7.2.2 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."

7.3 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:

- a. Pressurized or vacuum systems shall be properly vented to completely relieve any differential pressure.
- b. Main supply valve(s) shall be locked and tagged closed and vent valve(s) shall be locked and tagged open.
- c. 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.
- d. 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.
- e. The SO shall not exceed change of pressure or temperature ratios during safety clearance procedure venting processes.
- f. The SO shall not dispense hazardous material into the environment.

7.4 SO VERIFICATIONS PRIOR TO REMOVAL OF LOTO

After being requested to clear the 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:

- a. 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.
- b. Verify that the red tag stubs have been signed and match the red tags being removed.
- c. Inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that nonessential items have been removed.
- d. Inspect the electrical system, mechanical system, fluid system, equipment, apparatus, etc., to ensure that components are operationally intact.

- e. Notify personnel in the area of the electrical systems, mechanical systems, fluid systems, equipment, apparatus, etc., the LOTO is being cleared.