

DATE: May 9, 2016  
TO: Center Directives Manager  
Langley Research Center



FROM: Grant M. Watson  
Director, SMAO

SUBJECT: Memo Authorizing Continued Use of Expired Langley Directive  
LPR 1740.3 Facility Safety Head and Facility Coordinator Guide  
Expiration date: February 3, 2015

REF A: NASA Requirement Waiver for NPR 1400.1 (3.5.2.6), NRW 1400-37

In accordance with reference A, I authorize the continued use of the expired subject directive.

LPR 1740.3, Facility Safety Head and Facility Coordinator Guide

**The subject directive has been reviewed prior to the expiration date and a summary of the required changes is:**

The document is currently being updated to comply with NASA requirements which require major revisions.

**The directive was also assessed for the risk of continued use after expiration versus the risk of not having the directive available after expiration. The results of that risk assessment are:**

This LPR is part of the Langley Management system and it provides information to Facility Safety Heads (FSHs) and Facility Coordinators (FCs) relative to the LaRC Safety Program. There would be a high risk to the efficient and effective implementation of the LaRC Safety Program if this requirements document is not available in the LMS.

**Justification for the delay is:**

Due to the excessive amount of time spent on revising other LMS documents, these revisions took longer to complete than initially expected. There would be a high risk to the efficient and effective implementation of the LaRC Safety Program if this requirements document is not available in the LMS.

This document will be cancelled upon the Director's approval of LPR 1740.2 Facility Safety Requirements.

Please refer any questions or concerns regarding the continued use of this directive to Grant M. Watson, Director

Handwritten signature of Grant M. Watson in black ink.

Grant M. Watson, Director, SMAO

5/13/16

(Date)

cc:

218/K. C. Suddreth

304/LJNorthern:ljn 05/09/16 (44569)



Langley Research Center

**CID (LPR) 1740.3**

**Effective Date: February 4, 2014**

**Expiration Date: February 3, 2015**

**FACILITY SAFETY HEAD  
AND  
FACILITY COORDINATOR  
GUIDE**

LMS document 1740.3 is currently being updated to improve/enhance the requirements noted within these documents. During this period, if you have any questions/concerns regarding these requirements in accomplishing your job, please contact Jose Caraballo at 48994 or the Safety and Mission Assurance Office at 43361.

National Aeronautics and Space Administration

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## TABLE OF CONTENTS

Chapter	Page
<b>PREFACE</b> .....	<b>1-1</b>
<b>P.1 PURPOSE</b> .....	<b>1-1</b>
<b>P.2 APPLICABILITY</b> .....	<b>1-1</b>
<b>P.3 AUTHORITY</b> .....	<b>1-1</b>
<b>P.4 APPLICABLE DOCUMENTS</b> .....	<b>1-1</b>
<b>P.5 MEASUREMENT/VERIFICATION</b> .....	<b>1-2</b>
<b>P.6 CANCELLATION</b> .....	<b>1-2</b>
<b>1. GENERAL</b> .....	<b>1-3</b>
1.1 SAFETY RESPONSIBILITY AND AUTHORITY.....	1-3
1.2 LANGLEY RESEARCH CENTER SAFETY PHILOSOPHY .....	1-3
1.3 ACCESS TO BUILDINGS AND RESEARCH APPARATUS .....	1-6
1.4 SAFETY MEETINGS .....	1-8
1.5 SPECIFIC SAFETY TRAINING SESSIONS .....	1-9
1.6 ENFORCEMENT OF SAFETY REGULATIONS .....	1-9
1.7 HUMAN FACTORS.....	1-9
<b>2. IDENTIFICATION OF TYPICAL SAFETY HAZARDS</b> .....	<b>2-1</b>
2.1 SLIP, TRIP, AND FALL HAZARDS .....	2-1
2.2 OTHER FALL HAZARDS .....	2-1
2.3 LIFTING HAZARDS .....	2-1
2.4 PERSONAL SAFETY HAZARDS.....	2-2
2.5 PERSONAL PROTECTIVE EQUIPMENT.....	2-3
2.6 STRIKE AND COLLISION HAZARDS .....	2-4
2.7 HAZARDOUS MATERIALS .....	2-7
2.8 ELECTRICAL HAZARDS .....	2-7
<b>3. FIRE SAFETY</b> .....	<b>3-1</b>
3.1 GENERAL .....	3-1
3.2 EXIT ROUTES .....	3-1
3.3 EXIT IDENTIFICATION.....	3-2
3.4 FIRE DETECTION AND SUPPRESSION .....	3-2
3.5 EMERGENCY COORDINATION .....	3-2
3.6 FACILITY REENTRY .....	3-3
<b>4. SAFETY INSPECTIONS AND CORRECTIVE ACTION</b> .....	<b>4-1</b>
4.1 MANAGEMENT SAFETY INSPECTIONS .....	4-1
4.2 SFAB INSPECTIONS .....	4-1
4.3 FIRE PROTECTION AND LIFE SAFETY AUDIT .....	4-2
4.4 POTENTIALLY HAZARDOUS MATERIAL INSPECTIONS .....	4-2
4.5 UNSCHEDULED OR SPECIAL INSPECTIONS .....	4-2
4.6 COORDINATION OF INSPECTIONS .....	4-3
4.7 RESPONSE TO INSPECTION REPORTS .....	4-3
4.8 ACCIDENT REPORTING.....	4-5

- 4.9 REVIEW OF PURCHASE REQUESTS..... 4-5
- 5. SAFETY PROGRAM POLICY DOCUMENTS ..... 5-1**
  - 5.1 LaRC SAFETY PROGRAM..... 5-1
  - 5.2 SAFETY MANUAL ..... 5-1
  - 5.3 SAFETY PERMIT..... 5-1
  - 5.4 PROCUREMENT, INVENTORY, AND STORAGE OF HAZARDOUS MATERIAL ..... 5-2
  - 5.5 FACILITY RESUMES..... 5-2
- 6. FACILITY CONFIGURATION MANAGEMENT ..... 6-1**
  - 6.1 GENERAL ..... 6-1
  - 6.2 FACILITY CONFIGURATION MANAGEMENT PROGRAM ..... 6-1
  - 6.3 CHANGE NOTIFICATION SHEET (CNS)..... 6-2
  - 6.4 LABORATORY RISK EVALUATION PROGRAM (LREP) ..... 6-2
  - 6.5 ASBESTOS CONFIGURATION MANAGEMENT ..... 6-3
- 7. RECORDS..... 7-1**

**LIST OF FIGURES**

- FIGURE 6.1, CONFIGURATION MANAGED (CM) FACILITIES LIST. .... 6-4

## PREFACE

### P.1 PURPOSE

a. Langley Procedural Requirement (LPR) 1740.3 provides requirements and guidance for implementing the Safety Program as set forth in LAPD 1700.1.

### P.2 APPLICABILITY

a. This Langley Procedural Requirements (LPR) provides information to Facility Safety Heads (FSHs) and Facility Coordinators (FCs) relative to the LaRC Safety Program.

b. A staff of full-time safety professionals assigned to the Safety and Facility Assurance Branch (SFAB), Safety and Mission Assurance Office (SMAO), are available to assist Principal FSH, Organizational Facility Safety Heads (OFSH) and FC in carrying out their responsibilities.

### P.3 AUTHORITY

Compliance with the latest editions of the following standards and codes is a requirement of this document:

- a. Office of Safety and Health Administration (OSHA), Part 1910.178G
- b. National Electrical Code Article 480
- c. GSA Federal Standard 313A, Materials Safety Data Sheets
- d. National Fire Prevention Association Standards 101, Life Safety Code

### P.4 APPLICABLE DOCUMENTS AND FORMS

- a. LAPD 1150.2, "Councils, Boards, Panels, Committees, Teams, and Groups."
- b. LAPD 1700.1, "Safety Program."
- c. LAPD 1700.2, "Safety Assignments and Responsibilities."
- d. LPR 1710.5, "Ionizing Radiation."
- e. LPR 1710.7, "Safety Program for the Handling and Use of Explosives at Langley Research Center."
- f. LPR 1710.8, "Nonionizing Radiation."
- g. LPR 1710.12, "Potentially Hazardous Materials – Communication Standard."

- h. LPR 1740.4, "Facility Systems Safety Analysis and Configuration Management."
- i. LPR 1740.6, "Personnel Safety Certification."
- j. LMS-CP-4760, "Reporting Injuries, Illnesses, and Compensation Claims."
- k. Langley Form 44, "Hazardous Materials – Procurement, Inventory and Storage Record."
- l. Langley Form 69, "LaRC Work Request."
- m. Langley Form 95, "Supervisor's Report of Accident."
- n. Langley Form 453, "NASA Langley Safety Operators Permit"
- o. Langley Form 495, "Energy Control Procedures."

**P.5 MEASUREMENT/VERIFICATION**

None

**P.6 CANCELLATION**

CID (LPR) 1740.3, dated February 7, 2013, is rescinded and should be destroyed.

*Original signed on file*

Grant M. Watson  
OUM, Safety and Mission Assurance Office

**Distribution:**

Approved for public release via the Langley Management System; distribution is unlimited.

## 1. GENERAL

### 1.1 SAFETY RESPONSIBILITY AND AUTHORITY

1.1.1 Safety responsibilities cannot be separated from the other management and operational activities which continually occur in Center facilities and research apparatus.

1.1.2 This inseparability demands that safety management become an integral part of facility and research management.

1.1.3 Understanding this premise, Langley Research Center (LaRC) has established a safety process, which establishes responsibility and authority for safety at the line level of management.

1.1.4 This is accomplished through a system that designates key personnel as Principal Facility Safety Heads (FSH's), Organizational Facility Safety Heads (OFSH's), and Facility Coordinators (FC's) at all facilities and research apparatus located on the Center.

1.1.5 The primary responsibility of the FSH is the safe operation of the research apparatus assigned to them and/or for the maintenance of a safe working environment for their staff.

1.1.6 The scope of this responsibility encompasses such elements as the establishment and use of normal and emergency operating procedures, configuration control, safety training and coordination, preventative maintenance, and the traditional institutional safety considerations such as fire prevention, hazard identification and removal, machine guarding, and the resolution of other workplace hazards.

1.1.7 In this regard, designated FSH's are responsible to ensure that operations within their facilities, or changes initiated to their facility and/or to their research equipment, are properly reviewed.

1.1.8 Reviews ensure that safety considerations and requirements have been incorporated into requested and approved changes to the resources under their control.

### 1.2 LANGLEY RESEARCH CENTER SAFETY PHILOSOPHY

1.2.1 LaRC safety philosophy centers around five key elements, which provide guidance to OFSH when establishing and maintaining a safe work environment.

1.2.2 The four elements of the LaRC Safety Philosophy are:

- a. Safety is a process which is designed and planned into all facilities and research apparatus,
- b. Safety design reviews and facility pre-operational reviews are essential elements in safety planning,
- c. Successful safety practices require that research operations be managed by standard operating procedures and configuration management processes,
- d. The use of trained safety operators is essential to facility safety, and

1.2.3 The use of a comprehensive audits and surveys system must include the following:

- a. Annual Facility Safety and Health Audits, and
- b. Regular surveys of operations which ensure compliance and facility self-discipline, accomplished accurately and on schedule.

1.2.4 Safety is a comprehensive process which, to be successful, requires the active support of all Center managers and employees.

1.2.4.1 The OFSH's and FC's have a wide range of duties that require this level of support.

1.2.4.2 Leadership is a key requirement for the individuals who serve as safety officials, since not all organizational elements that they must evaluate are in their chain of command or span of control.

1.2.4.3 Accordingly, the Center has established, either by policy directive or LaRC Safety Manual procedures, the mechanisms discussed in the following paragraphs to assist each OFSH and FC in meeting their responsibilities.

### **1.2.5 Safety Design/Design Review and Pre-Operational Reviews of Facilities and Research Apparatus**

1.2.5.1 The design of safety into a facility or research apparatus is essential to the long-term operational safety of any Center project. The design process is usually accomplished by line engineering organizations that have direct responsibility for the particular project.

1.2.5.2 Center policy directives specifically stipulate that a design review system will be incorporated into major efforts conducted on LaRC. One additional responsibility of

the FSH is to ensure that mandated safety and health audits are accomplished on schedule and in accordance with policy directives.

1.2.5.3 Minor modifications to facilities and apparatus are often initiated during ongoing research efforts, but these changes are still subject to review and require proper evaluation. Since these modifications usually go unaddressed by the formal design review system, they must be reviewed under a separate assurance process, i.e., by either being presented to the Standard Practice Engineers (SPE) or the Systems Operations Committee (SOC) for concurrence (See LAPD 1150.2 - Boards, Panels, Committees, Councils, and Teams.”)

## **1.2.6 Control by Procedures and Configuration Management**

1.2.6.1 LaRC has issued comprehensive, written policy directives, guidelines, and procedures to manage and control the operations on the Center in a safe and healthful manner. LaRC’s written procedures specify methods and requirements for the safe operations of Center facilities and research activities. These procedures (designed as a risk management technique to improve operational safety) are one of several safety initiatives promulgated by Center Management.

1.2.6.2 Additionally, LaRC high-risk facilities are included in a Configuration Management (CM) Program managed by SFAB. Each high-risk facility has a managed procedure for maintaining specified documentation associated with its operation. The CM process documents the pedigree, standard operating procedures, and checklists of Center research facilities and apparatus.

1.2.6.3 To support the CM process, the OFSH must accomplish the following:

- a. Ensure that documents are maintained and implemented,
- b. Ensure that controlled documents are current, and
- c. Request necessary assistance from SFAB and SMAO.

## **1.2.7 The Use of Trained Safety Operators (SO)**

1.2.7.1 The use of certified Safety Operators (SO) is a component of the LaRC Safety Program.

1.2.7.2 Each facility that requires equipment/devices to be maintained in a certain configuration for the protection of personnel or equipment shall assign a certified SO and use the NASA Lockout/Tagout system.

1.2.7.3 Each SO is required to be safety certified and to maintain a current Safety Operator’s Permit. More specifically, the Safety Operator’s Permit will indicate the exact equipment/system upon which the Safety Operator is currently certified.

1.2.7.4 The responsibility for training and certification of facility Safety Operators rests with the Center Operations Directorate (COD) and SMAO.

1.2.7.5 It is the responsibility of the OFSH to ensure that the facility Safety Operators are cognizant of their duties and responsibilities. If the OFSH has any reservations about the certification or training of a Safety Operator, these concerns are to be immediately brought to the attention of the COD and/or SMAO. For more information on this process, see LPR 1740.6, "Personnel Safety Certification."

### **1.2.8 Regular Audit and Survey of Operations**

1.2.8.1 At a minimum, all LaRC facilities and research apparatus will receive an annual safety survey/audit. However, LaRC operations that require a review by the industrial hygienists or health physicists may be audited more frequently.

1.2.8.2 Regardless of frequency, the results of all audits and surveys will be reported to the cognizant OFSH.

1.2.8.3 When deficiencies are cited in the audits, the OFSH shall initiate corrective action. These actions will address all noted deficiencies, ensuring the required changes are implemented.

## **1.3 ACCESS TO BUILDINGS AND RESEARCH APPARATUS**

1.3.1 One method of maintaining safety and security in the workplace is by implementing comprehensive security strategies. Proven strategies that improve security and safety include controlling and restricting access.

1.3.2 In support of strict security standards, access to the Center, Center buildings, and research apparatus should be strictly controlled. In support of security standards, the OFSH and the FC play a key role in ensuring that authorized access controls to their resources are properly established and maintained.

### **1.3.3 After-Hours**

1.3.3.1 After-hours access to buildings and facilities is strictly controlled by security procedures promulgated by the Security and Program Protection Services (SPPS).

1.3.3.2 Individuals accessing buildings after normal duty hours are required to possess the proper security badge and have the need for access.

1.3.3.2.1 If security areas exist within the facility or research apparatus, access and notification requirements shall be governed by secure area access procedures.

1.3.3.3 Occasionally, a situation will arise where a facility representative will need to be contacted after-hours. To facilitate the after-hours emergency contact process, the OFSH will post the names of two or more individuals at the main entrance door(s) of the building or facility. These individuals will respond to on-call emergencies and other after-hours facility requirements.

### **1.3.4 Kirk Key Controls**

1.3.4.1 The Kirk Key control system requires that a succession of actions be initiated in sequential order to ensure the safe operation of critical systems on LaRC.

1.3.4.2 The following Kirk Key System controls and procedures have been established to ensure the safe operation of Center resources:

- a. Duplicate keys are properly secured until they are required to be issued.
- b. Duplicate keys are color-coded "red" for the purpose of identifying them as duplicates when they are issued for field use.
- c. Duplicate keys will be issued to the FC, or alternate FC, by the responsible OFSH or alternate.
- d. Each FSH shall develop and approve a procedure governing the issuance and usage of Kirk Keys in their facility.
- e. A Kirk Key Issuance Log, which has been approved by the OFSH, will be maintained for each facility.
- f. An information copy of the facility Kirk Key procedure and date of key issuance log will be forwarded the LaRC Safety Manager.

### **1.3.5 Access to Roof Areas**

1.3.5.1 It is the responsibility of the FC to control access to potentially hazardous roof areas. To support the FC in this function, the following access procedures are established:

- a. All access to hazardous roof areas will be identified by appropriate warning signs.
- b. All personnel requiring access to roof areas will notify the FC and obtain approval prior to performing any roof activity.
- c. When structural integrity or permanent safety devices do not provide sufficient protection to confine the risk to the simple "high work" category, special security, safety equipment/procedures, and temporary structural requirements will be specified and conspicuously documented by the Facility.
- d. All Center personnel will assist the FC in identifying unauthorized interior and exterior roof access locations, which would allow unauthorized access to roof areas.
- e. Internal access to roofs will be secured by locks and keys, which will be controlled by the FC or alternate FC.

### **1.3.6 Posting of Facility Safety Personnel**

1.3.6.1 Each Center facility shall have the name of the Facility Safety Head and Facility Coordinator posted at all entrances to the facility to include the individuals name, telephone number, facility number (if not located in the facility), and room number.

1.3.6.2 If so designated, the names of all Alternate Facility Safety Heads, Alternate Facility Coordinators, Organizational Facility Safety Heads, Organizational Facility

Coordinators, Alternate Organizational Facility Safety Heads, and Organizational Facility Coordinators shall be included on the posted list.

## **1.4 SAFETY MEETINGS**

1.4.1 The LaRC Safety Program is supported by a comprehensive system of safety meetings, which are conducted at all organizational levels.

1.4.2 Safety meetings establish two-way communication between line and staff personnel on critical safety issues, ensuring the LaRC Safety Program functions properly.

1.4.3 The following paragraphs summarize the safety meetings required to be coordinated by the OFSH.

### **1.4.3.1 Employee Safety Meetings**

1.4.3.1.1 The objective of employee safety meetings is to maintain a high level of safety consciousness among the employees.

1.4.3.1.2 These meetings shall be held annually for employees working in administrative facilities and monthly for those employees working in laboratory, tunnel or other high-exposure research facilities.

1.4.3.1.3 Since the evaluation of employee attitudes cannot be made wholly on the basis of accident and injury records, the FSH's and FC's should observe the performances of individuals and groups in work areas.

1.4.3.1.4 These observations provide indications of the general attitudes of the employees toward safety and also provide a basis for establishing safety discussions in employee safety meetings.

1.4.3.1.5 The content, format, and frequency of employee safety meetings depends upon the following workplace variables:

- a. The size of the work force,
- b. The categories of work performed by the work force,
- c. The environmental conditions present in the workplace, and
- d. The current safety record of the facility.

1.4.3.1.5.1 However, as a minimum, topics to be covered shall include a review of all mishap and close-calls occurring within the facility since the last safety meeting, and relevant prevention techniques.

1.4.3.1.5.2 Minutes of the safety meetings shall be kept and are subject to audit review.

1.4.3.1.6 SFAB maintains an extensive inventory of safety awareness material and training aids, which are available for employee safety meetings. Also, safety personnel from SFAB are available to conduct Safety Programs requiring specific areas of expertise.

#### **1.4.3.2 Facility Safety Head and Facility Coordinator Meetings**

1.4.3.2.1 The Safety Manager encourages meetings between the FSH's and FC's to discuss safety problems encountered in their facility.

1.4.3.2.2 These meetings should be scheduled between them to discuss and review appropriate safety topics affecting their operation.

### **1.5 SPECIFIC SAFETY TRAINING SESSIONS**

1.5.1 There are specified work areas where mechanical devices or special environmental conditions require workers to perform tasks in the presence of hazards.

1.5.2 The Safety Manager will assist each FSH in providing training, which will address the specific work operations that are conducted in these areas. The objective of this training is to provide the employees with safe procedures.

### **1.6 ENFORCEMENT OF SAFETY REGULATIONS**

1.6.1 The FSH and FC are required to be familiar with all pertinent safety regulations and remain alert for safety violations or the careless operation of equipment in their areas of responsibility.

1.6.2 The LaRC Safety Manual contains the information necessary to perform these responsibilities.

1.6.3 FSH's and FC should review the LaRC Safety Manual and become familiar with the Center safety regulations applicable to their positions.

### **1.7 HUMAN FACTORS**

1.7.1 FSHs and FCs are required to be continually cognizant of worker's attitudes toward safety issues. In evaluating these attitudes, safety officials must appraise a variety of work actions taken by employees who function in various positions along the entire spectrum of the work force.

1.7.2 In supporting the Center's mission, LaRC workers perform a variety of work tasks that range from simple to complex. For this reason, safety officials must be vigilant in the research environment, recognize this phenomenon, and proactively initiate safety measures to prevent research mishaps.

### **1.7.3 Horseplay**

1.7.3.1 The term horseplay covers a complete spectrum of ill-advised physical misbehavior, which is banned in the workplace.

1.7.3.2 Employees are prohibited from engaging in any unruly behavior such as rough-housing, scuffling, or practical jokes.

1.7.3.3 Common sense dictates that these actions disrupt any work environment and are especially disruptive in the LaRC high-risk research environment.

1.7.3.4 OFSH's will be alert to stop any such behavior in all facilities or research apparatus that function under their safety requirements.

### **1.7.4 Carelessness and Preoccupation**

1.7.4.1 The OFSH ensures that all newly assigned employees are given a safety awareness briefing and cautioned concerning all known hazards in their work areas.

1.7.4.2 FSHs should remain alert for the emergence of new hazards that could present a danger to careless or preoccupied employees. Also, safety officials shall observe employees for continued patterns of careless behavior that can be isolated, identified, and remedied.

1.7.4.3 Once unsafe behavior is identified, the first step in improving safety is to make the employee(s) aware of their behavior. If undesirable behavior has been identified, the OFSH is authorized to use corrective measures or authorized sanctions.

1.7.4.4 Preoccupied employees in a research environment are dangerous and unpredictable. Their inattentiveness can lead directly to accidents or injury. Compounding this safety issue is the fact that accidents caused by preoccupation are difficult to predict and prevent.

1.7.4.5 The best policy to prevent accidents due to preoccupation is to continually remind personnel to watch out for the well-being of their fellow workers by being constantly vigilant for obvious hazards. For example, hazards such as slippery walkways and trip hazards should be posted with warning signs and observed hazards should be reported and corrected as quickly as possible.

## 2. IDENTIFICATION OF TYPICAL SAFETY HAZARDS

### 2.1 SLIP, TRIP, AND FALL HAZARDS

2.1.1 The loss of productive work time is frequently the result of employees suffering an injury from some type of fall.

2.1.2 A major cause of employee falls is unsafe or hazardous surfaces. For this reason, all underfoot surfaces such as floors, ramps, stairways, ladders, and vehicle beds should be constantly monitored for the presence of hazards.

2.1.3 Once unsafe floor conditions are discovered, they shall be immediately rectified by the Facility Coordinator and/or Facility Safety Head. Additionally, the proactive strategy of issuing periodic reminders and cautions to employees during wet weather is always recommended. These reminders should outline the dangers of wet footwear and wet walking surfaces. As an added precaution, "WET FLOOR" signs should be displayed whenever conditions warrant.

2.1.4 The elimination of trip hazards is a primary responsibility of facility safety officials. Facilities must be continually monitored to identify and eliminate the following trip hazards:

- a. Electrical extension cords on the floor,
- b. Floor duct covers that are loose or improperly fitted,
- c. Floor electrical and telephone outlets in walkways or aisles, and
- d. Materials, cartons, and equipment left in hallways.

### 2.2 OTHER FALL HAZARDS

Safety officials will be alert for all fall hazards that exist in their facility and ensure that the following types of fall hazards are addressed:

- a. Unguarded openings in flooring,
- b. Stairs that lack handrails,
- c. Faulty ladders,
- d. Missing or inadequate guardrails in lofts, towers, and balconies, and
- e. Using chairs, boxes, or other improper makeshift means for reaching high shelves and fixtures.

### 2.3 LIFTING HAZARDS

2.3.1 FSH's and FC shall provide guidance to workers on procedures to reduce injuries due to lifting hazards.

2.3.2 The following two paragraphs summarize the methods available to safety officials to accomplish the objective of reducing lifting hazards.

### **2.3.2.1 Incorrect Methods and Habits**

2.3.2.1.1 Safety officials shall provide guidance on techniques that will reduce the probability of workers suffering back injuries due to improper lifting. This guidance is important since back injury and pain in the lumbar region is one of the more frequent causes of workers losing time from their jobs. With very few exceptions, back trauma is the result of behavioral errors on the part of the injured person rather than the result of hazardous working conditions. For this reason, personnel should be frequently cautioned to follow safe lifting procedures.

2.3.2.1.2 Trauma to the back of an employee is generally caused by improperly lifting an object or by attempting to lift a load that is too heavy or awkward. SFAB can provide a number of awareness programs addressing these issues by providing instructions on proper lifting methods and other techniques to avoid back injury.

### **2.3.2.2 Planning Ahead to Avoid Twists and Jerks**

FSH's and FC should frequently remind personnel of the dangers of bending and twisting their backs. Back injuries do not always occur as a result of lifting heavy loads. They often result from relatively minor back stress, which might occur while stooping to pick up small items. Twisting the body while stooping or straightening can likely cause an injury, if the movement is too sudden or too strenuous. It is important for workers to understand that most back injuries can be avoided if they remember to bend their knees rather than their back, and to be careful when twisting.

## **2.4 PERSONAL SAFETY HAZARDS**

2.4.1 FSH's and FC's shall be alert to observe employee's personal items, such as clothing, footwear, and the grooming of hair, as safety concerns requiring safety management. When these personal items present a safety concern, the appropriate corrective action will be initiated by safety officials to alleviate unnecessary risks.

### **2.4.2 Clothing**

2.4.2.1 The FSH shall implement standards that restrict certain employees from wearing loosely fitting clothing.

2.4.2.2 Employees who operate or are exposed to fixed machine tools, hand tools, or rotating/reciprocating machinery shall be monitored for loosely fitting clothing. Closely fitted clothing should always be worn to optimize the safety of workers who operate machinery.

2.4.2.3 Also, specific restrictions apply to wearing neckties, loose shirt sleeves, or other clothing susceptible to being caught in a belt, pulley, between gears, in a revolving shaft, or in a revolving chuck.

2.4.2.4 Likewise, jewelry such as wristwatches, bracelets, necklaces, and rings will not be worn while operating this type of equipment or while working in proximity to energized electrical circuits. This policy is imperative, since many serious injuries

and/or fatalities have resulted in workplaces when these procedures were not subscribed to by management or complied with by workers.

### **2.4.3 Footwear**

Safety officials will ensure that employees wear approved footwear that is appropriate for the type of work being performed and the work environment of the employee. For example, open-toe or high-heel shoes, sandals, or thongs are not suitable for machine and repair shops, fabrication areas, laboratories, construction sites, or any work area in which supplies or equipment are handled or stored.

### **2.4.4 Hair**

2.4.4.1 Safety officials will ensure that the following safeguards are in place regarding the manner in which employees maintain their hair. Employees who operate machining tools or other equipment, and who wear their hair long enough to become entangled in the equipment, are required to wear a safety cap completely covering their hair.

2.4.4.2 This policy is intended to prevent situations where workers become partially or entirely scalped when their hair becomes entangled in machinery.

2.4.4.3 Male employees who work in areas where they may be required or expected to use respiratory protection will be expected to trim their facial hair. Facial hair should be trimmed to ensure that the face mask will fit properly with a tight seal.

## **2.5 PERSONAL PROTECTIVE EQUIPMENT**

LaRC safety policy requires that specified workers wear personal protective equipment while performing specific functions in the workplace.

### **2.5.1 Hard Hats**

Protective headgear shall be worn in any environment where there is a reasonable possibility of people receiving head injuries as a result of falling objects, laterally moving materials and equipment, or personnel striking their heads against protrusions.

### **2.5.2 Goggles, Safety Glasses, and Face Shields**

The appropriate protection shall be worn wherever eye or face hazards exist in the work environment. Examples of these hazards are:

- a. Flash or glare hazards that exist in the vicinity of welding and cutting operations, arc lights, or other light sources,
- b. When working with or near tools and operations (i.e., grinding wheels, hammers, drills, and sandblasting tools) that have the potential to propel particles,
- c. When working in an open-air environment where wind or moving air may cause dust or other foreign matter to become a hazard,
- d. When working with high-pressure fluid (gas or liquid) systems where the potential exists for an inadvertently released stream or blast of fluid, and
- e. Where hazardous chemicals may be splashed or injected into the eyes or face.

### **2.5.3 Gloves**

Gloves shall be worn whenever the task exposes the hands to injurious textures, materials, or temperatures. The following are typical tasks that require workers who perform such duties to wear gloves for protection:

- a. Chemical laboratory operations,
- b. Metals fabrication operations,
- c. Cryogenic operations, and
- d. Operations where workers handle bulky, rough materials.

### **2.5.4 Safety Shoes**

Safety officials will ensure that safety shoes are worn by all employees who perform tasks that expose their feet to hazards. The typical areas where safety shoes will be required are:

- a. Construction sites,
- b. Fabrication workshops,
- c. Warehouses,
- d. Loading docks, and
- e. Locations where gas bottles are handled and/or stored.

### **2.5.5 Respiratory Protection Devices**

2.5.5.1 Respiratory protection devices should be worn whenever needed to eliminate the inhalation of hazardous levels of airborne contaminants.

2.5.5.2 Safety officials shall coordinate with the LaRC Industrial Hygienist who will assist in selection of the proper equipment and the training of personnel.

### **2.5.6 Specialized Protective Needs**

When a work hazard develops that may require the use of specialized protective gear or equipment, safety officials shall take the appropriate actions to solve the problem. If new or specialized protective gear or equipment is needed, contact SFAB for help in evaluating the situation and obtaining the necessary items to eliminate the hazard.

## **2.6 STRIKE AND COLLISION HAZARDS**

Safety officials should be vigilant for the development of strike and collision hazards in the workplace. These hazards develop as workers accomplish the day-to-day activities of their work responsibilities. For this reason safety officials should be observant for the development of the hazards discussed in paragraphs 2.6.1 through 2.6.4.

### **2.6.1 Worn or Improperly Used Tools**

2.6.1.1 Tools that become worn in the course of normal operations can become workplace hazards. For this reason, all tools should be routinely checked for wear that could cause them to contribute to a workplace accident. For example, worn wrenches,

loose hammerheads, worn ratchets and jacks, or other mechanisms that have exceeded their life span should be considered workplace hazards.

2.6.1.2 Additionally, tools or other mechanisms that are misused by workers can cause workplace accidents. Workers should not subject tools to excessive stresses, such as using tools for purposes for which they were not designed.

2.6.1.3 Safety officials should be observant for worn or misused tools and they should issue necessary reminders reinforcing the requirement of using the proper tools for the job being performed.

## **2.6.2 Overhead Hazards**

2.6.2.1 Wherever equipment is suspended above the workplace, personnel working in the area should be made aware of the hazard. Also, warning signs should be placed in conspicuous locations informing personnel of overhead hazards.

2.6.2.2 Safety standards will be instituted to prevent accidents from occurring when objects are stored overhead or work is being performed at elevated levels.

2.6.2.3 Material and equipment kept in overhead storage or work areas will be secured, preventing it from falling to lower levels.

2.6.2.4 Personnel working in overhead areas should be frequently reminded of their responsibility to safeguard individuals who are passing beneath.

2.6.2.5 When work is being performed in overhead areas, personnel will use the following equipment as required:

- a. Safety harnesses,
- b. Lifelines while working on open beams or framing, and
- c. Tool lanyards.

## **2.6.3 Missing and Improperly Installed Mechanical Guards**

Safety officials shall be observant for hazards caused by unguarded machinery or other equipment that could contribute to the injury of an employee. Corrective action should be implemented when this type of hazard exists. The following are examples of this type of hazard:

- a. Improperly adjusted tool rests on grinders,
- b. Blade guards on circular and band saws moved out of service, and
- c. Belt and pulley guards removed on air compressors, air handlers, and other rotating machinery.

## 2.6.4 Collision Hazards

2.6.4.1 Collision hazards are caused by low overheads or objects that protrude into work-areas and passageways. Examples of collision hazards are piping, wiring conduits, and other structural components such as lower-than-normal doorways.

2.6.4.2 These hazards should be removed or altered when possible to eliminate the possibility of employees injuring themselves. Most importantly, objects that protrude and pose a danger to employees' heads or pose a trip hazard should be removed. These types of hazards include furniture, such as coat-racks, that is situated along passageways.

2.6.4.3 Furniture and equipment may have protrusions that extend out at eye level, with nothing below the hazard to provide visual warning. In addition, surplus furniture, equipment, and boxes should not be temporarily stored in hallways, passageways, or near doorways.

2.6.4.4 In general, personnel should be alert to hazardous objects that they might accidentally encounter. Hazards should be removed if possible or identified with a warning device at a minimum. Some of the approved warning devices are high visibility warning tape, contrasting colors, and warning signs.

2.6.4.5 The following general guidelines are approved safety practices:

- a. File cabinets and storage cabinets will be bolted together or fastened to the wall or floor if their load, location, or style represents a tipping hazard.
- b. Bookcase units will not be stacked higher than four units without additional safeguards.
- c. All new stairways, aisles, and exits must comply with National Fire Prevention Association (NFPA) Standards 101, Life Safety Code, and OSHA requirements. Existing units will conform with the intent of these requirements by using operational constraints.
- d. File drawers will not open into aisles unless sufficient space for a free and unobstructed aisle-way remains with the drawer open.
- e. Telephone or electric cords are not permitted on the floor in the chair area, in walkways around desks, or in crosswalks.
- f. Self-adhesive rubber ramps, which serve to cover or permit walking over telephone or electric cords, will not be used at LaRC in walkways or access paths.
- g. When electric or telephone service is needed in the center of an office area, overhead service and power poles from ceiling to floor will be installed beside the desk or table.

2.6.4.6 Equipment that is not in use should be placed in a position, which does not create a collision hazard to employees. When equipment is in a non-operational mode it should be positioned safely. For example, crane hooks should be stopped above head level when the crane is not being operated.

## **2.7 HAZARDOUS MATERIALS**

2.7.1 The proper control of hazardous materials is a primary concern of Center management.

2.7.2 Safety officials will ensure that their facility is in compliance with the LaRC standards for hazardous material management. OFSH's will become familiar with LPR 1710.12, "Potentially Hazardous Materials," as the document applies to their facility. Also, safety officials, supervisors, and employees should become familiar with the various hazardous materials located in their facility.

2.7.3 Personnel are instructed to report any improper handling, labeling, or storage of hazardous materials. This includes materials that are flammable, explosive, or injurious if inhaled, ingested, or otherwise comes into contact with the body.

2.7.4 The SFAB Industrial Hygienist is available for assistance or to provide additional information concerning hazardous materials.

### **2.7.5 Pyrotechnics and Explosives**

2.7.5.1 LaRC policy requires that all pyrotechnics and explosive material, including residual quantities, be controlled throughout the entire cycle of procurement, storage, and disposition.

2.7.5.2 LAPD 1700.2, "Safety Assignments and Responsibilities," require that all matters concerning the use of pyrotechnics be coordinated through the OFSH. This includes all research, design verification testing, and operations involving pyrotechnic devices.

### **2.7.6 Asbestos Removal or Repair**

2.7.6.1 Prior to any operation involving removal, repair, or any other procedure that may result in the release of airborne asbestos, an inspection is required to evaluate the hazard and recommend appropriate control techniques

2.7.6.2 An inspection team shall be formed for this purpose that will include the following individuals:

- a. The LaRC Industrial Hygienist,
- b. The contractor safety official,
- c. The contractor operational supervisor (competent person as defined by OSHA regulations), and
- d. A Facility Representative (either the OFSH or FC).

## **2.8 ELECTRICAL HAZARDS**

Electrical hazards exist whenever electrical current is exposed (uninsulated) and the potential exists for personnel to make contact with the electrical current.

## 2.8.1 Extension Cords

2.8.1.1 Extension cords are the most common cause of unsafe electrical wiring. Often these conditions occur during the normal operation of electrical hand tools. The hazard is compounded if the employee is using an improper load-rated extension cord. Extension cords with metal, knock-out plug receptacles are not to be used.

2.8.1.2 In office areas, such cords become a hazard when they are under foot, draped across metal furniture, or used in positions where they are subject to wear, cutting, pinching, and pulling. These activities damage the insulation or cause the wire covering to be pulled back at the ends, leaving bare wire, which results in a hazard to the worker.

## 2.8.2 Working On or Around Electrical Circuits

2.8.2.1 A life-threatening hazard results if employees drill or cut into walls, partitions, cabinets, or equipment containing live electric wires or cables. Safety procedures require that all electric current to wires or cables be turned off while drilling or cutting activities are occurring.

2.8.2.2 It is imperative that wires and cables be located or removed to preclude the possibility of contact during the drilling or cutting operations. Additionally, work performed on electrically operated equipment will begin only after circuit breakers or switches have been locked out using the Lockout/Tagout system.

## 2.8.3 Operating Electrical Equipment

2.8.3.1 Personnel are restricted at all times from abusing electrical equipment. Also, they are required to immediately report any electrical equipment that is suspected of having an electrical malfunction. Electrical outlets will be checked periodically to ensure that the "third-wire" ground terminal is connected to the building ground. The operation of electrical hand tools in damp or wet locations will be avoided to the extent possible. If this is not possible, ground-fault circuit interrupters will be used to provide a high degree of protection against electrical shock.

### 3. FIRE SAFETY

#### 3.1 GENERAL

The purpose of this Chapter is to acquaint FSHs and FCs with fire safety requirements for facilities on LaRC. This familiarization will include the proper identification of building egress, fire detection and/or suppression systems, and other fire safety requirements.

#### 3.2 EXIT ROUTES

- a. One of the key elements of fire safety is to ensure that individuals have an unobstructed avenue to exit buildings in the case of an emergency.
- b. When LaRC buildings are open, exits must be maintained in a manner that provides free and unobstructed egress.
- c. Most importantly, no lock or fastening shall be installed which would prevent escape from any building.

##### 3.2.1 Passageways and Doors

- a. Safety personnel will routinely inspect passageways and doorways to ensure that they are free from obstructions. It is imperative that no obstruction be placed in a location that would prevent employees from exiting a building in the case of an emergency.
- b. Doorways shall not be blocked by stored materials or equipment or converted into wall space.
- c. Hallways shall not be converted into storerooms for cartons of records, stacks of construction materials, or other items that would block or impede personnel attempting to evacuate a building or facility.

##### 3.2.2 Two Means of Egress

- a. Every work area, building, and facility on LaRC is required to have at least two means of emergency egress. These exits will be located as remotely from each other as possible.
- b. This arrangement will increase the likelihood that free access is available to personnel during an emergency when fire or smoke is present in the building.

##### 3.2.3 Enclosure of Between-Floor Openings

- a. Vertical openings between floors of a building, such as stairwells, elevator shafts, and pipe chases, shall be suitably enclosed or protected against the spread of fire, smoke, or fumes during an emergency.

- b. These structural designs will prevent fire hazards from spreading to other floors of the building and will afford reasonable safety to building occupants while exiting the building.
- c. Doors to these protected vertical openings shall not be blocked open or allowed to remain open, unless they are equipped with an approved door-closing device, and have magnetic door holders with smoke detection for closure.

### **3.3 EXIT IDENTIFICATION**

- a. All exits are required to be clearly visible and routes to them must be conspicuously marked.
- b. Adherence to this procedure ensures that the occupants of buildings know the direction of escape from any point in a building.
- c. Doors and passageways that are not exit routes, but which may be mistaken for exit routes, shall be marked (i.e., "NOT AN EXIT"). These markings will preclude such doors and passageways from being mistaken for an exit, thereby endangering persons by entrapping them in a dead-end space.
- d. Adequate and reliable illumination shall be provided for all exits.
- e. Emergency lighting shall be provided in accordance with National Fire Protection Association (NFPA) 101, latest revision, Life Safety Code.

### **3.4 FIRE DETECTION AND SUPPRESSION**

- a. Fire detection and alarm systems shall be provided where needed to warn occupants of a fire emergency.
- b. Safety personnel will ensure that fire alarm "pull boxes" are not blocked or obscured by physical obstructions. One method of enforcing this policy is by restricting the storage of any materials or equipment near or in front of "pull boxes."
- c. Policy requires that both fixed and portable fire suppression systems be easily accessible. This access requirement specifies that fire equipment be maintained free from visual or physical obstructions.
- d. Fire regulations require the use of prominent markings that indicate the location of fire apparatus. These markings indicate the locations of portable fire extinguishers and the controls for fixed manual systems.

### **3.5 EMERGENCY COORDINATION**

- a. When an emergency occurs and a facility is evacuated, occupants are required to move to a safe area away from the scene. This will ensure that emergency personnel have free access to provide emergency services.

- b. Due to their direct knowledge of their facility, the FSH and FC should be the main persons to coordinate with the emergency response teams concerning the cause of the alarm or other building hazards.

### **3.6 FACILITY REENTRY**

- a. The FSH and FC have the responsibility to ensure that their building or facility is properly evacuated during an emergency.
- b. The evacuation procedure requires that all personnel remain outside the building in a designated safe area until reentry is authorized. Furthermore, reentry to a facility can only be authorized by the Fire Department.

## **4. SAFETY INSPECTIONS AND CORRECTIVE ACTION**

### **4.1 MANAGEMENT SAFETY INSPECTIONS**

4.1.1 Safety practices on LaRC are a joint responsibility of all levels of management. According to LAPD 1700.1, "Safety Program," the success of the safety measures used on LaRC depends directly upon the involvement of line managers.

4.1.2 Facility inspections by management personnel and follow-up corrective actions are critical to the safe operation of LaRC facilities.

4.1.3 Safety discrepancies shall be addressed in an expeditious manner, since the timely resolution of issues will contribute to the success of the Center Safety Program.

#### **4.1.4 Assignment of Responsibilities**

4.1.4.1 Directors, program managers, off-site managers, facility managers, organizational unit managers, supervisors, and test conductors are encouraged to make periodic inspections of their facilities.

4.1.4.2 When items requiring corrective action are observed or reported, they shall be immediately brought to the attention of the FSH.

4.1.4.3 To rectify the discrepancy, the FSH will contact the appropriate individual or organization responsible for bringing the issue to closure.

### **4.2 SFAB INSPECTIONS**

4.2.1 An annual Safety and Health Audit is performed by SFAB personnel on each LaRC facility. These audits are performed to ensure compliance with the appropriate Occupational Safety and Health Administration (OSHA) and LaRC regulations.

4.2.2 The results of the Safety and Health Audit shall be documented.

4.2.3 These findings shall include an outline of any discrepancies that were encountered during the inspection.

4.2.4 The audits shall also include suggested methods to rectify discrepancies in order to bring them to closure.

4.2.5 These audit findings shall be forwarded to the appropriate FSH of each facility for proper coordination and disposition.

4.2.6 Closure of these discrepancies shall be a coordinated effort between the FSH and FC.

4.2.7 The initial identification of floor load standards for each LaRC facility shall be established by the annual OSHA inspection.

4.2.8 Thereafter, each OFSH and/or FC is responsible for assuring that appropriate floor loading signs are displayed and the floor loading specifications are not exceeded.

### **4.3 FIRE PROTECTION AND LIFE SAFETY AUDIT**

4.3.1 An annual Fire Protection and Life Safety Audit shall be performed on each LaRC facility. These audits are performed by the LaRC Fire Department and coordinated by the LaRC Fire Protection Specialist.

4.3.2 The process for documenting these audits and addressing identified discrepancies is the same as for the Safety and Health Audits.

### **4.4 POTENTIALLY HAZARDOUS MATERIAL INSPECTIONS**

4.4.1 In facilities where research is carried on there may be a requirement to conduct special inspections. These special inspections shall be completed when the use of potentially hazardous materials or ionizing and/or nonionizing radiation is used in the facility.

4.4.2 These inspections shall be performed by the LaRC Industrial Hygienist and/or Health Physicist.

4.4.3 The frequency of these audits (monthly, quarterly, or annually) is determined by the following factors:

- a. Type of work performed,
- b. Frequency of operations,
- c. Degree of hazard involved,
- d. Number of personnel involved,
- e. Type and quantity of materials stored or used, and
- f. The history of discrepancies reported.

### **4.5 UNSCHEDULED OR SPECIAL INSPECTIONS**

4.5.1 Any building, facility, or associated area may be inspected on an unscheduled basis, due to the operation of an unusual activity.

4.5.2 Unscheduled or special inspections are conducted when the assigned safety inspector determines that they are necessary. This determination shall occur when any operation or activity warrants immediate or special attention, which cannot be delayed until the next regularly scheduled inspection.

4.5.3 Special operations involving manned flight support, manned chamber tests, and tests where a high hazard potential exists are examples of activities that could warrant an unscheduled or special inspection.

## **4.6 COORDINATION OF INSPECTIONS**

4.6.1 Prior to conducting any safety inspection, the appropriate FSH or FC shall be contacted and invited to participate.

4.6.2 At the conclusion of the inspection, these officials shall be briefed concerning any discrepancies observed by the inspector.

4.6.3 A written report shall be forwarded to the responsible FSH so that necessary corrective action(s) can be initiated.

## **4.7 RESPONSE TO INSPECTION REPORTS**

4.7.1 When responding to inspection reports, the FSH shall take corrective action to resolve the noted safety discrepancies or hazardous conditions.

4.7.2 This shall include responding to reports from SFAB inspectors and other safety inspection teams.

### **4.7.1 Direct Action**

4.7.1.1 When a Safety Inspection Report is received which contains safety discrepancies or hazards, the FSH shall make an assessment of the resources required to rectify the discrepancies.

4.7.1.2 The FSH shall determine whether the correction can be made without outside assistance or authority.

4.7.1.3 If the discrepancy can be rectified in this manner, the FSH shall contact the cognizant authority within the organization and initiate the corrective action.

4.7.1.4 If the discrepancies cannot be internally rectified, the FSH shall use the Work Request System.

### **4.7.2 Submission of Work Requests**

4.7.2.1 If the work required to rectify a discrepancy is beyond the scope or capability of facility personnel, a work request shall be initiated.

4.7.2.2 A LF 69, "Work Request," shall be submitted to the Zone Maintenance Manager to initiate this process.

4.7.2.3 The Work Request should include a description of the corrective action required, a justification to establish the priority of the request, and a statement that the work is required to address a safety issue.

### **4.7.3 Prioritizing of Safety-Related Work Requests**

4.7.3.1 The LaRC Zone Maintenance Manager shall receive and log all safety-related Work Requests and forward the requests to the Head, SFAB, for review and prioritization.

4.7.3.2 The Head, SFAB, will prioritize safety-related work requests as shown in the following three paragraphs.

#### **4.7.3.3 Urgent Priority**

4.7.3.3.1 Urgent priority requests shall be reserved for work area deficiencies that represent an imminent danger to workers.

4.7.3.3.2 In an urgent priority situation, the SFAB shall ensure that work is abated in the activity, facility, or area from which the request was generated.

4.7.3.3.3 At the direction of the SFAB, the area shall be properly "posted" and work activities restricted. The work area will remain under this circumscription until the deficiency has been corrected.

4.7.3.3.4 The SFAB shall coordinate the work schedule required to address an urgent safety discrepancy.

4.7.3.3.5 This work schedule shall be coordinated with, established, and approved by the LaRC Safety Manager. Including the Zone Maintenance Manager into the planning process is a prime factor in coordinating an effective work schedule.

#### **4.7.3.4 High Priority**

- a. High priority discrepancies indicate that a serious safety violation, which is in need of repair, exists in a work area. During the period of repair, the facility or activity that necessitated the issuance of a High Priority Work Request must be administratively and/or procedurally controlled. These controls will remain in place until the deficiency has been corrected.
- b. The schedule of work to correct the deficiency shall be coordinated by the OFSH.
- c. The work activities shall be established by the LaRC Safety Manager in concert with the Zone Maintenance Manager and the FSH.
- d. The affected area shall be "posted" by SFAB, indicating the existence of the deficiency, and remain posted pending completion of the required work.

#### **4.7.3.3 Normal Priority**

Normal priority discrepancies indicate that a minor safety deficiency exists in a work area but the probability of an accident occurring is unlikely. A normal priority safety

condition is usually rectified by a rapidly implemented corrective procedure. This procedure may routinely take eight or less hours to complete and should be initiated as quickly as possible or reasonable. In instances where a rapid abatement of the hazard is not possible and the projected schedule for abatement will exceed 3 months, the OFSH will coordinate the work activities and completion date. In these instances, the Safety Manager will approve the work schedule and will coordinate the schedule with the Zone Maintenance Manager and the OFSH.

#### **4.8 ACCIDENT REPORTING**

Any personnel who observe an accident or injury on LaRC which requires a response by the security force or fire department should report the incident immediately by calling 911. All accidents that occur on LaRC involving a personnel injury or damage to government or personnel property are required to be reported through the formal LaRC reporting process. The type and extent of documentation required depends upon the type of incident and the extent of damage or injury incurred. The procedures for reporting such injuries and accidents to the appropriate officials are specified in LMS-CP-4760, "Reporting Injuries, Illnesses, Compensation Claims, and Unsafe Working Conditions."

##### **4.8.1 Reporting to the Facility Safety Head**

The FSH is not specifically assigned the task of dealing with the process of formally reporting accidents, injuries, or incidents that occur on the Center. Neither is the FSH responsible for conducting the investigation of the incident. However, because of their overall responsibilities, the FSH should be immediately notified of any accident or injury that occurs in their facility.

##### **4.8.2 Medical Treatment of Injuries**

All employees at LaRC are required to seek proper medical attention and treatment for any injury, which is received as a result of their employment. When minor accidents occur, both civil service and contracts employees may receive emergency treatment at the Occupational Health Clinic. If an injury occurs that is serious enough to warrant the transportation of the injured person to a hospital, the City of Hampton Fire Department will respond and transport the individual to a local hospital.

##### **4.8.3 Supervisory Reporting of Accidents**

The supervisor of any employee injured on the Center is required to accurately report the incident by completing Langley Form 95, "Supervisor's Report of Accident." This form provides information regarding how the injury occurred and any corrective actions, which are required to prevent similar accidents or injuries from occurring.

#### **4.9 REVIEW OF PURCHASE REQUESTS**

The FSH and FC should review purchase requests issued for the procurement of new safety equipment. This process will ensure that safety officials are aware of the intended use of new equipment and support the requirements for its purchase. Due to the overall safety responsibilities of the FSH's, it is essential that they pay specific

**February 4, 2014**

**CID (LPR) 1740.3**

attention to these purchases. If questions arise concerning the purchase of safety equipment, the OFSH will be the point of contact concerning the necessity for the equipment and the requirements supporting its purchase. Individuals with inquiries concerning the purchasing requirements for safety equipment should contact the cognizant OFSH.

## 5. SAFETY PROGRAM POLICY DOCUMENTS

### 5.1 LaRC SAFETY PROGRAM

5.1.1 The responsibility for providing a safe and healthful working environment on LaRC rests with the Center Director and the Center's management staff. In support, the SMAO Safety Manager implements the day-to-day operation of the LaRC Safety Program. Most importantly, the LaRC Safety Program is designed to provide a systematic approach that involves all employees and managers in the Center safety management.

5.1.2 The objective of the LaRC Safety Program is to ensure each employee has a safe and healthful working environment, engineered to be free from unacceptable hazards. The LaRC Safety Program is a systematic process designed to support this objective by ensuring the safe operation of the Center. It is designed to proactively identify and abate hazards that could contribute to accidents causing property damage, personal injuries, or fatalities.

### 5.2 SAFETY MANUAL

5.2.1 The LaRC Safety Manual contains directives, procedures, and guidelines necessary for LaRC safety officials to execute their safety responsibilities. The Safety Manual is furnished to Associate Directors, Organizational Unit Managers, FSH's, FC's, and other individuals assigned safety responsibilities. In summary, the LaRC Safety Manual implements the LaRC Safety Program and provides policy guidance for safety management on the Center.

5.2.2 Refer to the LaRC Safety Manual contents for more information on particular functional areas.

### 5.3 SAFETY PERMIT

5.3.1 A Safety Permit is generally required for operations, which may pose significant hazards in the workplace. Safety Permits are required to document procedures, the use of specific equipment, precautions that are in-place, and the personnel who will be conducting the operations. This process will also assure that the OSHA with direct knowledge of the operation is available to monitor the operation. Additionally, the Safety Permit process assures that an independent, third-party review is conducted and assures personnel conducting the operation are adequately trained and qualified for their positions.

5.3.2 Safety Permits are required for specific operations and a complete description and applicability of the operations are specified in the following LPR's:

- a. LPR 1710.8, "Nonionizing Radiation" (Laser, Microwaves)
- b. LPR 1710.5, "Ionizing Radiation" (X-Rays or Radioactive Materials)
- c. LPR 1710.7, "Handling and Use of Explosives"

- d. LPR 1710.12, "Potentially Hazardous Materials-Hazard Communication Standard" (Toxics, Flammable, etc.)

5.3.3 Additionally, depending upon the type of hazardous material being used at a facility and the scope of the activities, Principal FSH's and OFSH's will have additional responsibilities. The above LPR's are the prescribing documents that outline these additional responsibilities.

#### **5.4 PROCUREMENT, INVENTORY, AND STORAGE OF HAZARDOUS MATERIAL**

5.4.1 The OFSH shall approve all requests for the procurement, inventory, and storage of Hazardous Material. This process requires the use of specific forms, which must be processed through an approval procedure.

5.4.2 The purchase of hazardous materials requires the processing of Langley Form 44, "Hazardous Material - Procurement, Inventory, and Storage Record." This form requires the signatures of safety officials to ensure they are in agreement with the acquisition of this material. The OFSH shall approve the form to certify that approval has been obtained for any acquisition of hazardous materials. In addition, the approval process for the form requires the signature of the LaRC Safety Manager.

5.4.3 Under GSA Federal Standard 313A, Safety Data Sheets (SDS), shall be used for the purchase, inventory, and transfer of a wide variety of toxic chemicals, flammables, and other materials. Under normal conditions, some of these chemicals might not be considered hazardous. Because of the operational environment on LaRC, however, they do require documentation. The SFAB Industrial Hygienist is the point of contact for questions concerning these issues.

5.4.4 The OFSH shall contact SFAB concerning questions or if additional information is needed.

5.4.5 Individuals who require further details concerning the procurement, inventory, and storage of Hazardous Material should reference LPR 1710.12, "Potentially Hazardous Materials-Hazard Communication Standard."

#### **5.5 FACILITY RESUMES**

5.5.1 All research facilities shall implement and maintain a Facility Resume (FR). The implementation and update of the FR is the responsibility of the FSH, with concurrence by the FC.

5.5.2 As a minimum, FR's for facilities currently under the Configuration Management (CM) program shall contain the following items:

- a. Facility Emergency Procedures including the location of isolation devices (valves, breakers, etc.) for all energy sources located in the facility for systems such as

water, air, hydraulic, electrical, and gases. A copy of these procedures may be obtained from the LaRC Fire Chief.

- b. A statement indicating a list of all relief devices and valves located within the facility can be found in the Computerized Maintenance Management System (CMMS) (a.k.a. MAXIMO).
- c. A description of the process used to certify and recertify Qualified Operators.
- d. A current list of all Qualified Operators.
- e. A statement indicating (a) the FSH and FC responsible for coordinating and approving the facilities lockout/tagout energy control procedures and (b) the physical location of the lockout/tagout records.
- f. A description of systems located within the facility. This should include a brief summary identifying the type of system(s) and research conducted within the facility. High-risk facilities shall provide information within the resume pertaining to the Safety Analysis Report (SAR) and other documentation available in the Configuration Management On-Line (CMOL).
- g. A statement indicating a current copy of the Facility Baseline List is available in CMOL and with the facilities working master documentation, located in the facility (location shall be indicated by building and room number).
- h. A statement indicating the location of the facility's Material Safety Data Sheets (MSDS's) book.
- i. A statement indicating the chemical inventory of the facility is available in the LaRC Chemical Tracking System (CMTS).
- j. A copy of the facility's winterization plan.
- k. A statement indicating the location of facility's calibration process and calibration records (i.e. web site address or specific room number and file cabinet).

5.5.3 As a minimum, FR's for facilities not currently under the CM program, including Laboratory Risk Evaluation Program (LREP) facilities, shall contain the following items:

- a. Facility Emergency Procedures including the location of isolation devices (valves, breakers, etc.) for all energy sources located in the facility for systems such as water, air, hydraulic, electrical, and gases. A copy of these procedures may be obtained from the LaRC Fire Chief.
- b. A statement indicating a list of all relief devices and valves located within the facility can be found in the CMMS.
- c. A description of the process used to certify and recertify Qualified Operators.
- d. A current list of all Qualified Operators.
- e. A statement indicating (a) the FSH and FC responsible for coordinating and approving the facilities lockout/tagout energy control procedures and (b) the physical location of the lockout/tagout records.
- f. A description of systems located within the facility. This should include a brief summary identifying the type of system(s) and research conducted within the facility. A listing of pertinent documentation (drawings, procedures, etc.) pertaining to the operation of the facility.
- g. A statement indicating the location of the facility's Material Safety Data Sheet (MSDS) book.

- h. A statement indicating the chemical inventory of the facility is available in the LaRC CMTS.
- i. A copy of the facility's winterization plan.
- j. A statement indicating the location of facility's calibration process and calibration records (i.e. web site address or specific room number and file cabinet).

5.5.4 Facility Resumes for facilities currently under the CM program may be maintained in CMOL.

5.5.5 The FSH shall make this decision with concurrence from the FC.

5.5.6 If the FR is not maintained in CMOL, then a copy of the FR shall be maintained within the facility.

5.5.7 Facility Resumes for facilities not currently in the CM program shall be maintained within the facility.

5.5.8 All FR's shall be updated when any major system changes are implemented within the facility. Minor changes, such as qualified operator changes, may be redlined and updated in CMOL annually.

5.5.9 All FR's shall be verified annually.

*NOTE: Facility calibration information is not a safety requirement. This requirement fulfills a Langley Management System requirement indicating the location of documentation describing the facility calibration process and the location of the calibration records.*

## 6. FACILITY CONFIGURATION MANAGEMENT

### 6.1 GENERAL

6.1.1 The LaRC Facility System Safety Analysis Program exists to ensure the safe and continuous operation of selected ground-based LaRC facilities. This program is described in detail in LPR 1740.4, "Facility Systems Safety Analysis and Configuration Management." It is composed of the engineering, research, and facility analytical processes and their resultant supporting documentation. It consists of three separate programs with two subprograms. They are the:

- a. Facility Configuration Management (CM) Program, which includes:
  1. Pressure Systems Configuration Management (PSCM)
  2. Software Configuration Management (SWCM)
- b. Laboratory Risk Evaluation Program (LREP)
- c. Asbestos CM Program (ACMP)

6.1.2 The LaRC facilities within the Facility CM Program have been assigned unique Effort Code (EC) numbers to aid in tracking their configuration controlled documentation. Those facilities and their EC numbers are listed in Figure 6-1, "Configuration Management Facility List."

6.1.3 The objectives of the Facility System Safety Analysis Program are to ensure that:

- a. The appropriate level of safety analysis has been conducted for each facility.
- b. The baseline for controlled documents for those facilities has been established.
- c. Those analyses and supporting documents are kept current through active CM Programs.

6.1.1 The objectives of the CM Program are to:

- a. Document and provide procedural and risk information to both management and operating personnel.
- b. Record and maintain the current status of equipment and services within the covered facilities.

### 6.2 FACILITY CONFIGURATION MANAGEMENT PROGRAM

The LaRC Facilities Configuration Management (CM) Program covers LaRC high-risk facilities. A complete list of these facilities is contained in Table 6.1, Configuration Management Facility List. Each facility that is under CM is required to maintain a series of documents, which record the pedigree of the facility or research apparatus. These

documents are divided into four primary categories: Safety Analysis Report (SAR), Standard Operating Procedures (SOP), FR, and Facility Baseline List (FBL).

### **6.2.1 The Safety Analysis Report**

The SAR documents potential undesired events that have been identified in that facility. Also, the SAR specifies the methods that are in place to adequately control these hazards. Finally, it assures that the systems design and operation does not expose personnel or equipment to unacceptable risk due to the existence of a credible single point failure. The SAR is a Configuration Controlled Document (CCD).

### **6.2.2 Standard Operating Procedures (SOPs)**

Standard Operating Procedures specify the methods and standards of facility operations, which are currently in effect. They govern the safe operation of the facility or research apparatus, which is under CM. Specifically, SOP's specify the detailed operational sequences to be used to ensure safe operations. Also, SOP's are CCD's.

### **6.2.3 Facility Resumes**

Facility Resumes are also CCD's, that include, as a minimum, emergency procedures, a list of all relief devices and valves, qualified operator certifications, lockout/tagout procedures, system descriptions, chemical inventory and facility winterization plans. Paragraph 5.5 outlines the specific requirements for FR's.

### **6.2.4 The Facility Baseline List**

The Facility Baseline List (FBL), also a CCD, shows the CCD's that are required to be maintained for each facility and research apparatus which is maintained under CM. The proper maintenance of the FBL is critical in supporting the safe operation of a CM facility or research apparatus.

## **6.3 CHANGE NOTIFICATION SHEET (CNS)**

6.2.1.1 Facilities in the LaRC CM Program shall submit a CNS when there is a change to the facility and/or its controlled documentation.

6.2.1.2 These changes shall be incorporated into the necessary facility documentation. The changes will provide necessary risk classification information.

6.2.1.3 Risk assessment shall be provided by the FSH and the Safety Manager or designated SFAB personnel.

## **6.4 LABORATORY RISK EVALUATION PROGRAM (LREP)**

Over 120 laboratories on LaRC are covered by this program. The Program's objectives are to:

- a. Establish a separate CM Program for laboratories at LaRC, which are neither currently under the existing CM Program nor covered under Safety Permit.
- b. Increase safety awareness at the operator level at those facilities.

- c. Enhance the capability of SMAO in monitoring the safety aspects of Laboratory operations and assisting in the resolution of unsafe practices.

## **6.5 ASBESTOS CONFIGURATION MANAGEMENT**

6.5.1 The Asbestos CM Program (ACMP) objectives are:

- a. Establish a program that will enable the Center to comply with the myriad clean air emission regulations established by the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Commonwealth of Virginia.
- b. Increase safety awareness and minimize the risk of asbestos exposure to personnel.
- c. Institute controls to prevent the release of asbestos fibers, restrict future asbestos use, and develop surveillance and control of known, existing asbestos applications in Center Facilities.

6.5.2 Over 250 LaRC facilities participate in the ACMP. Each facility was inspected to identify friable and nonfriable asbestos-containing building material (ACBM) and written inspection reports were provided to the FSH's. These reports are on file at the facilities and are the baseline documents for the ACMP.

6.5.3 It is LaRC policy that prior to any operation involving removal, repairs, or any other procedure, which may release airborne asbestos, an inspection must be completed to evaluate potential hazards and recommend appropriate controls. Additionally, an inspection team, one member being the FSH or FC of the affected facility, will establish operational control procedures to be documented through issuance of an "Asbestos Safety Permit."

<u>EC</u>	<u>FACILITY NAME</u>	<u>FAC. NO.</u>	<u>ADDRESS</u>
01	High Pressure Air System	1247D/E & 1215	7E East Reid Street
02	Hypersonic CF <sub>4</sub> Tunnel	1275	20 Lewis Loop
03	8-Foot High Temperature Tunnel	1265	10 East Reid Street
04	1- X 3-Foot High Enthalpy Aerothermal Tunnel	1265	10 East Reid Street
05	Hypersonic Blowdown Tunnels (8):	1247D	10D East Reid Street
	• 20" Mach 6 Tunnel		
	• Nozzle Test Chamber		
	• 12" Mach 6 High Reynolds Number Tunnel		
	• Gas Mixing Apparatus		
	• 18" Mach 8 Tunnel		
	• 1/2 Meter Quiet Tunnel		
	• 20" Supersonic Wind Tunnel		
	• Probe Calibration Tunnel		
07	Hypersonic N <sub>2</sub> Tunnel	1247	1B East Reid Street
12	Entry Structures Facility	1267	6 East Reid Street
13	Visual Motion Simulator	1268A	24 West Taylor Street
14	Drive Control	1241	9 West Taylor Street
16	31-Inch Mach 10 Tunnel	1251A	16A Victory Street
17	15-Inch Mach 6 High Temperature Tunnel	1251A	16A Victory Street
18	Transonic Dynamics Tunnel	648	226 Dodd Boulevard
19	14- X 22-Foot Subsonic Tunnel	1212C	17C West Taylor Street
21	16-Foot Transonic Tunnel	1146	11A West Taylor Street
22	Aircraft Noise Reduction Laboratory	1208	2 North Dryden Street
23	Hypersonic Materials Test Apparatus	1148	8 West Taylor Street
24	Unitary Wind Tunnel	1251	16A Victory Street
25	Scramjet Test Facility	1247B	1B East Reid Street
26	High Reynolds Number Helium Tunnel Complex	1247H	2H East Marvin Street
27	High Reynolds Number Helium Recovery System	1247B	1B East Reid Street
28	Hypersonic Helium Tunnel Facility	1247B	1B East Reid Street
29	Aircraft Landing Dynamics Facility	1257-1262	2 West Bush Road
33	Impact Dynamics Research Facility	1297	12 West Bush Road
34	0.3-Meter Transonic Cryogenic Tunnel	1242	7 West Taylor Street
35	Anechoic Noise Facility	1218A	3A South Wright Street
36	Jet Noise Apparatus	1221A	12A Langley Boulevard
37	Thermal Acoustic Fatigue Apparatus	1221A	12A Langley Boulevard
40	Low Turbulence Pressure Tunnel	582A	582A Thornell Avenue
50	Vacuum Sphere Control and 60-Foot Space Simulator	1295B-D	2B South Warner Street
58	Impact and Projectile Range	1275	20 Lewis Loop
61	12-Foot Low Speed Tunnel	644	644 Andrews Street
62	20-Foot Vertical Spin Tunnel	645	645 Andrews Street
66	Differential Maneuvering Simulator	1268A	24 West Taylor Street
67	General Purpose Fighter Simulator	1220	1 South Wright Street
68	General Aviation Simulator	1268A	24 West Taylor Street
69	7-Inch High Temperature Tunnel	1264	17 North Marvin Street
71	Vitiated Heater, Test Cell #2	1221C	12C Langley Boulevard
80	Combustion and Mixing Research Apparatus, Test Cell #1	1221C	12C Langley Boulevard
84	Hangar Water Deluge System	1244	6 East Taylor Street
85	Heavy-Duty Brazing Vacuum Furnace	1232A	6A Langley Boulevard
86	16-Meter Thermal Vacuum Chamber	1293B	4B West Taylor Street
89	Autoclaves	1267A	6A East Reid Street
91	Composite Shop Autoclave	1238B	3B East Durand Street
92	Hypersonic Helium Tunnel Recovery System	1247B	1B East Reid Street
97	Space Systems Structures Research Laboratory	1293A	6A West Taylor Street
98	Steam Distribution System	1215	14 West Taylor Street
99	National Transonic Facility (NTF)	1236	5 West Taylor Street

**Figure 6.1, Configuration Management (CM) Facility List.**

## **7. SAFETY PERMITS CONFIGURATION REQUIREMENTS**

### **7.1 INTRODUCTION**

7.1.1 The purpose of this chapter is to establish the process for the development, implementation, and revision of Safety Permits supporting documentation and any Standard Operating Procedures (SOPs) covered under a safety permit.

7.1.2 This instruction shall be followed when issuing any Safety Permit (Laser, PHM, Explosives and developing any SOPs under those Safety Permits. Deviations from this instruction may be permitted to enhance clarity but must be approved by the Safety and Facility Assurance Branch (SFAB).

### **7.2 GENERAL**

7.2.1 For the purpose of this instruction, SOPs are defined as detailed, written, formal instructions for operators to use during operation of a laboratory, laser, explosives, equipment or facility under a Safety Permit.

7.2.2 The Permit "Knowledgeable Person" shall have a configuration control process to control the permit and any related SOPs.

### **7.3 Safety Permits Configuration Control**

7.3.1 All the safety permits supporting documentation, part of the permit, shall have the following information at the bottom of each page; 1) Permit Number; 2) Revision Number; and 3) Expiration Date

### **7.4 Standard Operating Procedures**

7.4.1 Any procedure developed to operate or support a Safety Permit shall have the following sections:

#### **7.4.1.1 PRE- OPERATIONAL**

The Pre-Operational section includes all activities required to bring systems/subsystems from a dormant or safe condition to a condition ready for operation, personnel required to operate the systems/subsystems and may include pre-op maintenance and safety checks.

#### **7.4.1.2 OPERATIONAL**

The Operational section includes all activities required during active operations of the facility/system. This also includes all activities required to turn around or recycle the facility/system for additional runs.

### 7.4.1.3 **POST-OPERATIONAL**

The Post-Operational section includes all activities required to bring the facility from an operational condition to a dormant or safe condition.

### 7.4.2 **TASK AND/ OR SUB-TASKS**

The complexity of the system dictates the detail and number of tasks and sub- tasks required.

### 7.4.3 **LINE ITEMS OR STEPS**

Line items or steps define actions that must be performed to accomplish a task or sub-task. The steps are to be presented in a chronological order and will be sufficiently detailed to permit an operator to safely operate the facility/system. Each line item or step should be signed-off/initialed by the operator performing that step. Steps that have been deemed “Not Applicable” by an operator should be signed-off/initialed by the “Knowledgeable Person”, including the date of the approval.

## 7.5 **SOP STANDARDIZATION**

### 7.5.1 **SOP IDENTIFICATION**

Each SOP under a Safety Permit shall have an identification designation. An example of an identification designation for a Safety Permit SOP is “Permit Num-###-ltr”. Each of the parts of the identification designation is defined below:

- a. “Permit Num-” Identifies the permit number that controls this procedure.
- b. “###” - Identifies the SOP. Even if is only one SOP for the safety permit, the SOP needs to be identified and revision controlled.
- c. “ltr” - Identifies SOP revision.

### 7.5.2 **PAGE IDENTIFICATION**

7.5.2.1 The SOP Identification should be entered in the upper right-hand corner of each page.

7.5.2.2 Page numbers should be entered at the bottom center of each page.

7.5.2.3 The statement, “Configuration Controlled Document”, should be entered at the top center of each page.

### 7.5.3 **STEP FORMAT**

7.5.3.1 The following instructions are to be used when writing steps in the tasks or sub- tasks of SOPs.

7.5.3.2 Steps that must be performed sequentially are to be identified numerically and must be performed in order (e.g., Step 1 must be completed before beginning Step 2, or Step 1.2 must be completed before beginning Step 1.3).

7.5.3.3 Steps that may be performed in any order are to be identified alphabetically (e.g., Step 3 (b) may be performed prior to or concurrently with Step 3 (a) at the discretion of the operator).

7.5.3.4 A step shall describe the action required to complete the step (e.g., verify, position, inspect).

7.5.3.5 The equipment commanded will identify the switch, light, pushbutton, circuit breaker; disconnect switch, or component that is to be operated. If the equipment commanded has a label, the label should be entered into the step just as it appears on the control panel or piece of equipment and then underlined.

7.5.3.6 The final state and/ or reaction of the equipment will be stated in capital letters (e.g., ILLUMINATED, EXTINGUISHED, CLOSED, OPEN). If the final state of the equipment is also the label on the equipment, then the label should be entered into the step as it appears on the equipment and underlined (e.g., "Position the switch to ON." ON is the label on the switch). If the final state of the equipment is given in general terms and applies to a group of equipment, all capital letters may not be required (e.g., "Clear the test chambers of all personnel, close the test chamber door, etc.").

#### 7.5.4 NOTES, CAUTIONS, AND WARNINGS

7.5.4.1 Notes, Cautions, and Warnings are used to delineate steps as follows:

- a. NOTES may be used when all sequences in the steps cannot be clearly defined.
- b. A NOTE is a step delineator; it is not a step replacement.
- c. A NOTE may precede a step or series of steps in order to explain the required action.
- d. A NOTE may be used to identify the location where a step is performed.
- e. A NOTE may precede a step that, if performed erroneously, would invalidate previous system tests or acceptance.
- f. A NOTE may precede a step that requires specific instructions.
- g. A NOTE WILL NOT BE USED TO IDENTIFY HAZARDS TO PERSONNEL OR EQUIPMENT. SEE CAUTION AND WARNINGS BELOW.
- h. A NOTE will be enclosed in the manner shown below:

#### NOTE

This operating procedure requires special emphasis for successful completion of the task

7.5.4.2 A CAUTION statement will precede any step or series of steps that if performed improperly, could damage equipment. A CAUTION statement will be enclosed in the manner shown below:

**CAUTION**

This operating procedure requires special emphasis for  
successful completion of the task

7.5.4.3 A WARNING statement will precede any step or series of steps that if performed improperly, could endanger personnel. A WARNING statement will be enclosed in the manner shown below:

**WARNING**

This operating procedure requires special emphasis for  
successful completion of the task