



ENVIRONMENT, SAFETY & HEALTH DIVISION

Construction Safety Requirements Manual

SLAC-I-730-0A23L-003-R004
1 March 2024

Publication Data

This document was developed by the Subcontractor Safety program and published by ESH Publishing.

Document Title: Construction Safety Requirements Manual

Original Publication Date: 7 July 2016

Revision Date: 1 March 2024

Effective Date: 1 March 2024

Department: Environment, Safety & Health Division

Document Number: SLAC-I-730-0A23L-003-R004

Product ID: [765](#) | Revision ID: [2620](#)

URL: <https://www-group.slac.stanford.edu/esh/eshmanual/references/subcontractorCSRM.pdf>

This revision reflects SLAC's adoption of Cal/OSHA regulations in lieu of federal OSHA regulations.

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Prepared for the United States Department of Energy under contract DE-AC02-76SF00515.

Executive Summary

This Construction Safety Requirements Manual has been developed to summarize the minimum safety and health requirements for prime and sub-tier subcontractors performing construction activities at the SLAC National Accelerator Laboratory (SLAC). The requirements in this document, excerpted and summarized from SLAC ESH Manual chapters and other sources, will assist subcontractors in complying with the [SLAC Injury and Illness Prevention Program](#) (IIPP) or with the development of their own, SLAC-approved IIPP.

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Acronyms

AHJ	authority having jurisdiction
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BEI	biological exposure index
BPVC	<i>Boiler and Pressure Vessel Code</i>
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
CAZ	controlled access zone
CCR	<i>California Code of Regulations</i>
CFR	<i>Code of Federal Regulations</i>
CGA	Compressed Gas Association
CoHE	control of hazardous energy
CM	construction manager
CPR	cardiopulmonary resuscitation
CSSR	Construction Safety Services representative
dba	decibels-A-weighted scale
DOE	Department of Energy
DOT	Department of Transportation
ECT	equivalent chill temperature
EMS	environmental management system
ERT	emergency response team
ESH	environment, safety, and health
ESWP	elevated surface work plan
EWP	electrical work plan
FPP	fall protection plan
GFCI	ground fault circuit interrupter
HEPA	high-efficiency particulate absorbing
IH	industrial hygiene
IIPP	injury and illness prevention plan/program

ISEA	International Safety Equipment Association
ISEMS	integrated safety and environmental management system
ISM	integrated safety management
JSA	job safety analysis
LOTO	lockout/tagout
MEPFP	mechanical, electrical, plumbing, fire protection
NCCCO	National Commission for the Certification of Crane Operators
NEC	<i>National Electrical Code</i>
NFPA	National Fire Protection Association
NRTL	nationally recognized testing laboratory
NTP	notice to proceed
OSHA	Occupational Safety and Health Administration
PFAS	personal fall arrest system
PM	project manager
PPE	personal protective equipment
RCA	radiologically controlled area
RFP	request for proposal
RMMA	radioactive material management area
S/CI	suspect and counterfeit
SDS	safety data sheet
SIA	Scaffold Industry Association
SQF	safety qualification form
TLV	threshold limit value
TWA	time-weighted-average
UL	Underwriters Laboratories
WPC	work planning and control
ZVV	zero voltage verification

Definitions

code of safe practices. Instructions to each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to their work environment to control or eliminate any hazards or other exposure to illness or injury. Required for construction work by [8 CCR 1509\(b\)](#) and incorporated by reference in SLAC ESH Manual [Chapter 42, “Subcontractor Safety”](#).

competent person. Cal/OSHA defines a competent person as “one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them” ([8 CCR 1504](#))

construction work. The combination of erection, installation, assembly, demolition, or fabrication activities involved to create a new facility or to alter, add to, rehabilitate, dismantle, or remove an existing facility. It also includes the alteration and repair (including dredging, excavating, and painting) of buildings, structures, or other real property, as well as any construction, demolition, and excavation activities conducted as part of environmental restoration or remediation efforts.

data requirements, safety and health. A list of contractually required safety and health submittals such as plans, permits, reports, training records, and certifications

definable work activity. A construction phase or major task that is separate and distinct from other activities and has separate control requirements. A definable work activity may be identified by different trades or disciplines, or it may be work by the same trade in a different environment.

injury and illness prevention plan (IIPP). A written plan that describes various aspects of a company’s safety management program. Elements required by Cal/OSHA are described in [8 CCR 1509](#) and [8 CCR 3203](#); [additional requirements](#) are needed to make the IIPP compliant with the Department of Energy (DOE) Worker Safety and Health Program ([10 CFR 851](#)). (See also *written safety manual*.)

Note All SLAC prime subcontractors are required to meet the requirements of SLAC’s IIPP. Alternatively, subcontractors will be given the option to develop and submit their own IIPP for SLAC review and approval. Furthermore, SLAC requires prime subcontractors to flow these requirements down to their sub-tier subcontractors.

job safety analysis (JSA). Technique (and document) that identifies the tasks associated with a job and the related hazards and the controls to eliminate or reduce them to an acceptable risk level. The analysis focuses on the relationship between the worker, the task, the tools, and the work environment.

qualified person: A person who possesses the practical skills necessary to perform an activity in a safe and environmentally responsible manner. A qualified person is fully trained, certified, and licensed, as required.

qualified person, electrical (also qualified electrical worker). A person who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify and avoid the hazards involved

stop work. A definitive statement made openly that an imminent danger is present and all related activities must stop immediately or that an assigned task poses risk of death or serious injury and will not be performed until appropriate protective measures are established. A stop work situation can be a brief pause to resolve an issue or a lengthier pause including reviewing and editing the JSA, communicating the new controls, training to the new controls, or even issuing a stop work order.

subcontractor. Individual or firm that provides skilled or unskilled labor, repair and maintenance services, technical support, or job shop personnel to perform work at SLAC

subcontractor, construction. An individual or firm hired by SLAC to execute a construction project

subcontractor, prime. A subcontractor directly contracted to SLAC; may have sub-tier subcontractors; may be a general subcontractor or specialty subcontractor (also known as a *first-tier subcontractor*)

subcontractor, sub-tier. A subcontractor hired and under contract to the prime subcontractor or another sub-tier subcontractor

work planning and control (WPC). A standardized process, at SLAC, used to understand the scope of work, identify qualified workers, evaluate and control hazards, communicate hazards and controls to workers, authorize, coordinate and release work, and perform it within established controls

written safety manual. A subcontractor's comprehensive written document that includes a section, in either the body or the code of safe practices, for each area of its proposed work. The written safety manual must include the required elements of a California *injury and illness prevention plan (IIPP)* ([8 CCR 1509](#) and [8 CCR 3203](#)). For construction work the manual must include a *code of safe practices* ([8 CCR 1509\[b\]](#)) and, for work outdoors or in a warm interior environment, a heat illness prevention program ([8 CCR 3395](#)). A prime subcontractor that will supervise the work of one or more sub-tier contractors must have safety/health manual elements for each phase of its work and the work of its sub-tier contractors. (See also *injury and illness prevention plan [IIPP]*.)

Part I: Introduction

This part describes the purpose, scope and applicability, and organization of this manual.

1 Introduction

This Construction Safety Requirements Manual has been developed to summarize the minimum safety and health requirements for prime and sub-tier subcontractors performing construction activities at the SLAC National Accelerator Laboratory (SLAC). The requirements in this document, excerpted and summarized from SLAC ESH Manual chapters and other sources, will assist subcontractors in complying with the [SLAC Injury and Illness Prevention Program](#) (IIPP) or with the development of their own, SLAC-approved IIPP.

1.1 Purpose

It is SLAC policy that all subcontractors must provide a safe and healthful workplace for their personnel, as well as for SLAC and other affected personnel.

SLAC's goal is ZERO INCIDENTS. The prime subcontractor and each sub-tier subcontractor's line management are expected to promote and model this concept and develop, implement, and enforce a safety and health program that will result in a safe work environment.

It is the responsibility of the subcontractor to know and understand SLAC's requirements and to plan and perform work at SLAC accordingly.

1.2 Scope and Applicability

The requirements of this manual apply to all *prime* and *sub-tier subcontractors* (collectively referred to as *subcontractor* throughout this document) performing *construction activities* at SLAC. Specific responsibilities of prime subcontractors are delineated as such. Each subcontractor is responsible for ensuring compliance with all applicable requirements that govern their activities at SLAC, including any consensus standards incorporated by reference.

This manual is intended only as a guide. The regulations, standards, and SLAC documents (for example, ESH Manual chapters) referenced should be reviewed to ensure complete and up-to-date information. If this manual does not contain information relative to a particular safety and health topic, the subcontractor must ensure that the governing regulatory provisions or national consensus standards, as applicable, are implemented. If there is a conflict between requirements, the subcontractor is to apply the most stringent.

1.3 Layout of This Manual

This manual begins with an introduction (Section 1) and then presents requirements in (Section 2), policies (Section 3), and procedures (Section 4) for managing safety on SLAC construction projects. Subsequent sections (Section 5 and following) cover requirements for functional areas.

For each functional area, there is section listing the external requirements (regulations and standards, and relevant chapter of the ESH Manual) and another summarizing SLAC-specific requirements.

Sub-sections labelled “Safety and Health Data Requirements” list data, forms, and other documents subcontractors are required to submit to SLAC. These are summarized in the appendix.

“Resources” sections list relevant references; their use is not required.

Bracketed references (for example, [10 CFR 851, Appendix A.3]) indicate sections describing requirements from the Department of Energy (DOE) Worker Safety and Health Program ([10 CFR 851](#)) that are in addition to or more stringent than Cal/OSHA IIPP requirements ([8 CCR 1509](#) and [8 CCR 3203](#)). (See [Subcontractor Safety: Additional IIPP Requirements](#) for the differences.)

1.3.1 Maintenance and Approval

This manual will be reviewed and revised as necessary at least annually, or whenever changes in the underlying regulations, standards, or SLAC requirements require.

Revisions will be prepared by the SLAC construction safety services manager, reviewed by relevant SLAC staff, including ESH program managers, and approved by the Project Management Office design and construction services manager and ESH division director.

1.4 Roles and Responsibilities

1.4.1 Construction Manager (CM)

SLAC staff responsible for communicating requirements to construction subcontractors, ensuring the work planning and control (WPC) process is properly implemented, assisting subcontractors in obtaining necessary SLAC permits and developing acceptable safety plans, verifying documentation and training, and providing oversight and feedback.

1.4.2 Construction Safety Services Representative (CSSR)

SLAC staff responsible for assisting the CM with safety oversight and support. Reviews *job safety analyses (JSAs)*, safety plans, and related records. Performs frequent inspections of the job site and works with CM and subcontractor to correct identified hazards.

1.4.3 Project Manager (PM)

SLAC’s management representative with overall responsibility for a project

1.4.4 Proposer

The individual or company that responds to the SLAC request for proposal. When the subcontract is awarded the proposer becomes a SLAC *prime subcontractor*.

1.4.5 Procurement Specialist

Legal representative for SLAC on subcontracts and other business matters; the SLAC Purchasing / Supply Chain Management representative for business matters.

1.4.6 Safety Representative

A qualified professional assigned by the subcontractor to assist the on-site superintendent/foreman in managing and implementing safety and environmental compliance for a project.

1.4.7 Superintendent / Foreman

The qualified individual who is the subcontractor's on-site manager of day-to-day activities on a construction project. This person has the overall responsibility for work planning and control.

Part II: Safety and Health Program Management

This part describes overall safety and health program management requirements for both SLAC and its subcontractors.

2 Safety and Health Program Requirements

2.1 Purpose

This section describes regulatory and SLAC-specific requirements for safety program management. The purpose of the safety program, in accordance with SLAC and Department of Energy (DOE) requirements, is to provide a safe and healthful workplace.

2.2 External Requirements [10 CFR 851.23(a)] [10 CFR 851, Appendix A.3]

SLAC's construction subcontractors must comply with these specific safety and health standards. The most current version applies unless otherwise indicated. Additional regulatory and SLAC requirements are mentioned in the remainder of this manual.

- Title 10, *Code of Federal Regulations*, "Energy", Chapter 3, "Department of Energy", Part 851, "Worker Safety and Health Program" ([10 CFR 851](#)) (as described in [SLAC Injury and Illness Prevention Program](#) [SLAC-I-720-0A21B-001])
- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 3.2, "California Occupational Safety and Health Regulations (Cal/OSHA)", Subchapter 1, "Regulations of the Director of Industrial Relations", Article 4.5, "Multi-employer Worksites" ([8 CCR 336.10-336.11](#))
- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 4, "Division of Industrial Safety", Subchapter 4, "Construction Safety Orders", Article 3, "General", Section 1509, "Injury and Illness Prevention Program" ([8 CCR 1509](#))
- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 4, "Division of Industrial Safety", Subchapter 7, "General Industry Safety Orders", Group 1, "General Physical Conditions and Structures Orders", Section 3203, "Injury and Illness Prevention Program" ([8 CCR 3203](#))
- Site Compliance Plan for Department of Energy Order 232.2A, "Occurrence Reporting and Processing of Operations Information" ([DOE O 232.2A SCP](#)) (SLAC follows this order for its reporting; subcontractors should refer to [8 CCR 342](#).)

3 Safety and Health Program Policies

3.1 Purpose

This section describes the requirements and policies for identifying, controlling, and documenting hazards related to subcontractor construction work activities. Specific procedures may be found in Section 4.

3.2 Regulatory and SLAC Requirements

Subcontractors must identify, control, and document hazards associated with their work activities in accordance with the following requirements:

- SLAC terms and conditions utilized for the project
- [SLAC Injury and Illness Prevention Program \(IIPP\)](#) (or with own, SLAC-approved IIPP, see Section 4.3)
- SLAC ESH Manual [Chapter 2, “Work Planning and Control”](#), and [Chapter 42, “Subcontractor Safety”](#) (applicable portions)
- External requirements listed in Section 2.2
- Topic-specific regulatory and SLAC requirements called out in the following sections of this manual

3.3 Injury and Illness Prevention Program (IIPP)

The SLAC IIPP incorporates the DOE requirement for an integrated safety management system (ISM). SLAC has also incorporated its environmental management system (EMS) into ISM, thereby creating an integrated safety and environmental management system (ISEMS). (See Section 4.3 for details.)

3.4 Integrated Safety and Environmental Management System (ISEMS) and Work Planning and Control (WPC) [10 CFR 851.22(c)]

Subcontractors must incorporate the elements of SLAC’s ISEMS into their work planning and control (WPC) activities. The subcontractor must apply the core ISEMS functions in a continuous cycle. SLAC’s WPC program adds the concepts of authorization and release to the standard ISM functions. The SLAC ISEMS elements, with the added WPC steps, are the following:

- **Define the work.** Create or interpret drawings and specifications, statements of work, and project requirements, identify resources needed, create specific tasks/steps, set requirements and expectations, and identify and prioritize tasks.
- **Identify and analyze the hazards.** Identify, analyze, and categorize hazards and potential environmental, safety and health impacts associated with the work.
- **Develop and implement controls.** Identify and agree upon standards and requirements, identify controls to prevent/mitigate hazards, establish the ESH parameters, and implement controls.
- **Authorize work.** Affirmation by a supervisor that a worker is trained and qualified and has been informed of the hazards and controls of activities he or she has been assigned.

- **Release work.** Acknowledgement that proposed work activities: do not interfere with programmatic or conventional facilities; have been coordinated with adjacent building /area managers, as appropriate; affected occupants have been informed of potential disruption or inconvenience; worker(s) have been informed of unique hazards, controls, or limitations of the area; any boundary conditions have been communicated (see also authorization)
- **Perform work within controls.** Confirm readiness and perform work safely and in the prescribed manner to protect workers, the public, and the environment.
- **Feedback and continuous improvement.** Gather feedback on the adequacy of controls from workers and appropriate stakeholders, identify and implement opportunities for improvement, and conduct line management and independent oversight.

At SLAC, WPC is how ISEMS is implemented for all work performed. All work must first be planned, then authorized, and finally released. All subcontractors, at any level, will follow SLAC's WPC program. WPC is the use of formal, documented processes for identifying and mitigating risks when planning, authorizing, releasing, and performing work.

WPC is used to identify the hazards associated with the work activities outlined in the IIPP and manage those hazards. WPC ensures the ISEMS elements are incorporated in the plans, permits, and other documents needed for each definable work activity.

3.5 Training

SLAC contracts with qualified subcontractors. This includes evidence of completion of regulatory required training related to tasks in the scope of work for the project. Based on the tasks and hazards identified during planning, subcontractors may be required to complete additional SLAC-specific ESH training courses as determined by the CM.

The subcontractor must ensure that all workers are trained in the tasks and activities (work) they may perform. Some activities may require a license or certificate to perform. The subcontractor is required to provide that training and have personnel current in that training, at all levels.

3.6 Stop Work Authority (All Personnel)

If unanticipated/unsafe conditions are identified or non-compliant practices are observed during construction activities, subcontractor staff must be instructed to stop the work immediately and notify their supervisor and safety representative of this action. All workers at SLAC sites have the authority to stop work.

Note A stop work situation can be a brief pause to resolve an issue or a lengthier pause including reviewing and editing the JSA, communicating the new controls, training to the new controls, or even issuing a stop work order.

3.7 Incident / Emergency Response, Notification, and Investigation Policy

The prime subcontractor must prepare a project-specific emergency plan and ensure they have personnel and resources to implement it effectively. The prime subcontractor must report all emergencies immediately to 911 and to SLAC Site Security (ext. 5555 or 650-926-5555). All other incidents and near misses, no matter how minor, must be reported to the SLAC CM and PM as soon as the scene is stabilized, but in all cases notification must be made within 30 minutes of occurrence. Subcontractors must assist the SLAC assigned personnel with any investigation and reporting as detailed in the terms and conditions.

3.8 SLAC Site Rules and Prohibited Items

Refer to Division 1 Specifications, SECTION 013553 – SECURITY, SITE ACCESS, AND BADGING PROVISIONS, for information on this subject, including SLAC’s right to inspect persons, personal articles, and vehicles. Violations will result in disciplinary action.

3.8.1 Resources

- Division 1 Specifications, SECTION 013553 – SECURITY, SITE ACCESS, AND BADGING PROVISIONS

4 Safety and Health Program Procedures

4.1 Purpose

This section describes SLAC’s specific procedures for implementing the SLAC ISEMS and WPC programs on construction projects.

4.2 Prime Subcontractor Safety Pre-qualification Process (Pre-award)

Before a subcontractor can be awarded a construction contract, they must meet SLAC’s safety qualification criteria. This is not a project-related review but rather an evaluation of a company’s safety program and performance. The review is initiated by the submittal of a completed [Subcontractor Safety: Subcontractor Safety Qualification Form](#) (SQF), along with all the required supporting documents. The SLAC subcontractor safety program manager or their designee will determine if the submitted data, documents and programs are acceptable.

4.2.1 Safety and Health Data Requirements

- [Subcontractor Safety: Subcontractor Safety Qualification Form](#) (SLAC-I-730-0A21J-027)

4.3 Injury and Illness Prevention Plan Acknowledgement (Pre-award)

While their workers are physically located at SLAC, subcontractors to SLAC must comply with the requirements of the Department of Energy (DOE) Worker Safety and Health Program ([10 CFR 851](#)). These requirements are more stringent in some areas than Cal/OSHA IIPP requirements ([8 CCR 1509](#) and [8 CCR 3203](#)). (See [Subcontractor Safety: Additional IIPP Requirements](#) for the differences.)

Subcontractors have the option to adopt SLAC's 851-compliant [IIPP](#) or to submit their own 851-compliant IIPP to SLAC for review and approval. They indicate their choice by completing a [Subcontractor Safety: Injury and Illness Prevention Program Acknowledgement Form](#).

If opting to develop their own IIPP, subcontractors must submit it annually and whenever there are significant changes for review and approval by SLAC. [10 CFR 851.10(b)(2)]

Complying with the requirements of this manual should effectively result in compliance with SLAC's IIPP. The SLAC IIPP incorporates workplace safety and health standards as directed by DOE. If a contractor submits their own plan it also should incorporate workplace safety and health standards as directed by DOE. Furthermore, the subcontractor IIPP and related documents (standards, controls, and procedures) must be accessible to workers and the method for access must be specified in the IIPP. [10 CFR 851.20(b)(2)(ii) and (iii)]

All subcontractor IIPPs must include the standard hierarchy of controls that will be followed to mitigate a hazard. [10 CFR 851.22(b)]

The prime subcontractor is responsible for communicating to sub-tiers and their employees the elements of SLAC's IIPP and ensuring their compliance. At a minimum, the prime subcontractor will ensure the SLAC [Subcontractor Safety: Work Planning and Control Summary for Subcontractors](#) is provided as a resource to aid this communication.

The subcontractor must use qualified worker safety and health staff (for example, a certified industrial hygienist or safety professional) to direct and manage their IIPP. [10 CFR 851.20(a)(2)]

A submitted IIPP must incorporate the provision that workers have the right, without reprisal, to participate in activities described in the IIPP on official time (following safe work practices, training, and retraining, etc.). [10 CFR 851.20(b)(1)]

4.3.1 Additional Requirements

Subcontractors must incorporate into their IIPP that they will not conceal nor destroy any information concerning noncompliance or potential noncompliance with requirements of Cal/OSHA and [10 CFR 851](#). [10 CFR 851.26(a)(4)]

4.3.2 Safety and Health Data Requirements

- [Subcontractor Safety: Injury and Illness Prevention Program Acknowledgement Form](#) (SLAC-I-730-0A21J-032)

4.3.3 Resources

- [Subcontractor Safety: Additional IIPP Requirements](#) (SLAC-I-730-0A21S-062)
- [Subcontractor Safety: Work Planning and Control Summary for Subcontractors](#) (SLAC-I-730-0A21T-011)

4.4 Job Safety Analysis (JSA)

The subcontractor must develop a JSA for each separately *definable construction activity* (for example, excavations, foundations, structural steel, roofing, electrical, mechanical) before commencement of the activity. A definable work activity is a task which is separate and distinct from other tasks and has separate control requirements. It will be the responsibility of the subcontractor to determine the best breakdown of separately definable activities and the subsequent work steps to produce clear, concise, and effective JSAs. The subcontractor must stipulate in their IIPP that they will submit their JSAs to the SLAC CM. The CM will review the JSA and confirm that it has been properly developed, reviewed, and approved.. This includes analysis for hazards revealed by supplemental site information provided by the construction manager.

The subcontractor JSAs must be kept at the work site, in the construction folder, and available for review by SLAC. [10 CFR 851, Appendix A.1]

4.4.1 Safety and Health Data Requirements

- [Work Planning and Control: Construction Job Safety Analysis Form](#) (SLAC-I-730-0A21J-037)

4.5 Notice to Proceed / Work Commencement

SLAC's Supply Chain Management will issue the notice to proceed (NTP) after the prime subcontractor's initial JSA is approved. Notwithstanding the NTP, subcontractors may not proceed with on-site work until the work planning and control requirements outlined in Sections 3 and 4 are followed, in coordination with the CM.

4.6 Training and Documentation

- All subcontractor workers must obtain a SLAC subcontractor badge. There is specific SLAC training required to obtain the badge, including ESH Course 375, Construction Safety Orientation ([ESH Course 375](#)), and ESH Course 376R, SLAC COVID-19 Training for Onsite Contractors ([ESH Course 376R](#)).
- The prime subcontractor must also conduct their own worker safety orientation for each construction worker on the site. This must be completed before the worker commences on-site work.
- All subcontractors must ensure that bilingual supervisors and trainers are available as necessary for orientations, training, meetings, and workplace supervision to ensure effective communication is maintained for non-English speaking members of the workforce.
- Bilingual ESH posters, labels, signs, and barriers must be utilized as necessary to promote effective communication when members of the workforce are non-English speaking.
- Superintendents, foremen, and safety representatives must have completed OSHA 30-hour construction safety training.
- Photocopies of training certificates, certification cards, wallet IDs, etc., identifying the individual, the specific training, who conducted the training, and the date completed (and/or expiration date) are

accepted in lieu of originals. These documents will be kept with the project documents (construction folder) and are required before the worker can perform the work or task.

- Prime subcontractors must provide close oversight of new workers to confirm competence and address any deficiencies immediately.

4.6.1 Facilities Course 101, Subcontractor Safety Management Training ([FAC Course 101](#))

This three-hour in-person course is an orientation to SLAC's ESH program and work planning and control program. It is required for prime subcontractor superintendents/foremen, prime subcontractor safety representatives, and one sub-tier representative (superintendent and/or foreman) from the following trades: mechanical, electrical, plumbing, excavation/underground utilities, steel erection, framing and drywall. This training must be repeated every three years.

4.6.2 Resources

- ESH Course 375, Construction Safety Orientation ([ESH Course 375](#))
- ESH Course 376R, SLAC COVID-19 Training for Onsite Contractors ([ESH Course 376R](#))
- Facilities Course 101, Subcontractor Safety Management Training ([FAC Course 101](#))
- Division 1 Specifications, SECTION 013553 – SECURITY, SITE ACCESS, AND BADGING PROVISIONS
- SLAC ESH Manual [Chapter 55, "Site Access Control"](#)

4.7 Lower-tier Subcontractors Screening / Selection / Performance

The prime subcontractor is responsible and accountable for the performance of sub-tier subcontractors at all levels.

4.8 Disciplinary Action

The prime subcontractor must have a disciplinary action process that will ensure worker's compliance with the SLAC requirements and a communication plan that ensures all personnel understand the disciplinary program.

4.9 Safety Bulletin Boards

The prime subcontractor is responsible for installing and maintaining a safety bulletin board at the location where the majority of employees report to work per Title 8, *California Code of Regulations*, "Industrial Relations" requirements.

4.10 Safety Inspections / Tool and Equipment Inspections

The prime subcontractor must implement a site safety inspection program including the following:

- Daily inspections
- A weekly comprehensive inspection, formally documented including findings and corrective actions taken
- Inspections of all tools and equipment, documented on a tag or in a log/inspection sheet

Any identified defective or unsafe equipment, tools, and/or work site locations must be immediately corrected, tagged/barricaded, or removed from the job site and/or other effective interim control measures taken. [10 CFR 851, Appendix A.1]

4.10.1 Safety and Health Data Requirements

- Weekly comprehensive safety inspection
- Equipment inspections

4.11 Weekly and Monthly ESH Reports

Weekly ESH reports must be compiled and maintained as part of the project record and delivered to the SLAC PM and CM each Tuesday for the previous week. The report must contain the following information:

- List of ESH incidents (injuries, illnesses, first aids, property damage, fires, or near misses) for the week
- Listing of work hours, incident statistics for the project to date
- List of all completed site inspections and corrective actions, or a link to their location
- List of any personal sampling results (data sheets, laboratory analytical results, exposure calculation sheets, and direct reading monitoring results/reports)
- List of workers (including company name/trade) that completed site orientation/briefing (orientation outline and sign-in sheets)

4.11.1 Monthly ESH Report

The prime subcontractor must provide the on-site work hours for all subcontractors at any level to SLAC by the fifth day of the month for the previously worked month.

4.11.2 Safety and Health Data Requirements

- Weekly and monthly reports

4.12 Meetings and Work Coordination

Some projects will not require every meeting listed here. Refer to Division 1 Specifications, SECTION 013119 – MEETINGS, for the specific meetings applicable to a given project. The objective of the meetings, forms, and signatures described here is effective work planning, work coordination, hazard mitigation, work authorization, and work release.

4.12.1 Pre-start Safety Walkthrough

After bid award and before submitting JSAs, the prime subcontractor must schedule and participate in SLAC's pre-start job walkthrough to identify hazards at the job site. Hazards must be addressed in the subcontractor's JSAs. The subcontractor's attendees must include the subcontractor's superintendent, project safety representative, and principal foremen and/or sub-tier superintendents.

4.12.2 Pre-construction Meeting (Pre-kick-off / kick-off)

SLAC will schedule this meeting after notice of award and before notice to proceed. This meeting is described in detail in Division 1 Specifications, SECTION 013119 – MEETINGS.

4.12.3 Site Mobilization Meeting

Subcontractor must schedule and preside over a meeting before mobilizing on the construction site. Refer to specification Division 1 Specifications, SECTION 013119 – MEETINGS, for more information.

4.12.4 Pre-installation / Pre-mobilization Meetings for Critical Definable Work

The prime subcontractor must convene a pre-installation/pre-mobilization meeting before commencing work. These meetings are required when the job is complex, safety issues or the nature of a work activity require, or to ensure the means and methods are clear and agreed upon.

4.12.5 Pre-job Briefings

Pre-job briefings are required for construction work under the following conditions:

- Start of construction
- Start of a new subcontractor on the project
- Replacement of the superintendent
- Significant changes to work scope

The briefings are to be conducted by the CM and attended by the prime and sub-tier subcontractors and documented by the CM.

4.12.6 Daily Work Planning Coordination between SLAC CM and Superintendent

For all projects, the SLAC CM and the prime subcontractor's superintendent should be communicating each day about the work planned for the following day. For large projects, the CM and prime subcontractor superintendent should meet daily to review the work planned for the next day. It is recommended that the SLAC CSSR attend these meetings.

The prime subcontractor is responsible for meeting daily with the sub-tier foremen, either individually or collectively, to review their work plans as presented on the [Work Planning and Control: Construction Tailgate/Release Form](#) (or equivalent). When deemed acceptable, the prime superintendent will sign the construction tailgate/release forms, which is the initial step toward fully releasing each sub-tier to perform the tasks.

Note The prime subcontractor can use their own forms if deemed adequate by the SLAC CM and CSSR. Also, the CM and superintendent can scale/customize how the forms are used, provided effective work planning, coordination, authorization, and release are still realized.

The prime subcontractor and each sub-tier should identify and document all planned tasks on the construction tailgate/release forms. The level of detail must be appropriate to define all tasks that may present a hazard to people, property, or the environment. The JSAs associated with the tasks must be reviewed by the subcontractor as they prepare the daily forms. If the proposed activity does not have a corresponding JSA, then a new JSA will need to be developed and reviewed before the work is released.

The completed forms must be submitted by the prime subcontractor to the CM for review against conflicting operations, regulatory hold points, and required permits, and must include an acceptable level of detail. Once the CM deems the information to be satisfactory, they will sign the construction tailgate/release forms, thereby releasing the prime subcontractor to perform their own work tasks and oversee sub-tier tasks. This release is granted with the understanding that the prime subcontractor superintendent will meet with all sub-tier foremen, either individually or in a group setting, and sign the sub-tier forms, releasing the sub-tiers to perform their work scope.

4.12.7 Daily Tailgate / Work Coordination Meeting

Each day all workers and their foremen working on the project that day must attend the project daily tailgate/work coordination meeting before starting their work. The prime superintendent must present the major tasks while each foreman will, as appropriate, describe what they are doing and where, and the related hazards and controls as listed on their construction tailgate/release forms.

The purpose of the meeting is to review critical steps of that day's work and engage the workers in a discussion of what can go wrong and what can be done to prevent a mishap. The meeting must also address task coordination among trades and work groups, permits/plans in effect, and required inspections. The activities and tasks presented must only include those released by the prime subcontractor's superintendent, as evidenced by their signature on each construction tailgate/release form.

At the end of the tailgate meeting, all workers must sign their company's construction tailgate/release forms asserting their understanding of the day's work and associated hazards, and their commitment to implement the necessary controls. To finalize the work release, the sub-tier foreman will add his signature to the construction tailgate/release forms.

No work may occur before the meeting and workers must not commence with any work until they have attended the tailgate meeting and signed the construction tailgate/release forms.

No work may be performed that is not on the approved construction tailgate/release forms.

Note Subcontractors can structure the tailgate meeting in a manner that best supports their work processes. However, on large projects it is expected that all sub-tiers participate in this daily general meeting and that they also conduct their own daily tailgate meetings.

4.12.8 Safety and Health Data Requirements

- Construction tailgate/release forms: SLAC [Work Planning and Control: Construction Tailgate/Release Form](#) (SLAC-I-730-0A21J-037) or equivalent

4.12.9 Resources

- Division 1 Specifications, SECTION 013119 – MEETINGS

4.13 Occupational Medicine Requirements

All subcontractors, at any level, will make comprehensive occupational medicine services available to their workers as required by California regulations or by any contractual obligations with SLAC. This will be included in the subcontractor IIPP. [10 CFR 851, Appendix A.8]

4.14 Incident / Emergency Response, Notification, and Investigation Procedures

For all life-threatening emergencies or serious incidents, such as fires at the SLAC site, the subcontractor must contact 911. After 911 has been contacted, the subcontractor must

- Contact SLAC Site Security at (650) 926-5555 from a cell phone or ext. 5555 on a SLAC phone
- Contact the CM at the number provided
- Contact the project manager at the number provided

The prime subcontractor must prepare a project-specific emergency response plan. As part of their emergency plan, the subcontractor must designate a member(s) of their staff, who has the authority and is capable of directing emergency response on the job site. This individual will act as the communication point of contact for SLAC. This individual(s) will assist SLAC with specific site/building knowledge and communicating that knowledge to external agencies.

The prime subcontractor must provide and identify the method for prompt notification to SLAC Site Security via landline or cell phone.

A site map showing assembly points and directions to the prime subcontractor's authorized medical facility must be posted on the project bulletin board or in the site project office.

The prime subcontractor must report all incidents and near misses, no matter how minor, to the SLAC CM and PM as soon as the scene is stabilized, but in all cases notification must be made within thirty minutes of occurrence. This reporting time frame is necessary to ensure that SLAC can meet its DOE notifications obligations and that any necessary accident investigation, scene security, cleanup, traffic rerouting, etc. may promptly begin.

Subcontractors must assist the SLAC assigned personnel with investigation and reporting as stated in the Terms and Conditions, Article 19.

4.14.1 Safety and Health Data Requirements

- Project-specific emergency response plan

4.14.2 Resources

- Terms and Conditions, Article 19

4.14.3 SLAC Resources During Incidents and Emergencies

In the event of a minor injury or illness, the [SLAC Occupational Health Center](#) (located in Building 28) is available to assist with initial evaluation and treatment without any cost to the subcontractor. The facility is staffed with a physician's assistant and nurse daily from 8 am to 5 pm. Subcontractors may request that these medical professionals respond to the construction site at the time of an incident. The SLAC Occupational Health Center can be contacted at (650) 926-2281 or ext. 2281.

Upon notification of an emergency, SLAC will provide notification to external and internal responders. Internal responders include ESH construction points of contact, SLAC Site Security, and Emergency Response Team (ERT) personnel, and the CM. External responders will typically include Menlo Park Fire Protection District, Woodside Fire Department, and/or the local ambulance service.

Part III: Safety and Health Functional Area Requirements

This part provides regulatory and SLAC-specific requirements for specific functional areas such as electrical safety, excavation, and fall protection.

5 Control of Hazardous Energy (CoHE)

5.1 Applicability

The requirements of this section apply to all subcontractor work activities (for example, constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining, or servicing equipment) where the unexpected release of hazardous energy (electrical, hydraulic, pneumatic, chemical, thermal, compressed gases, mechanical and gravity) or startup of the machines, equipment, and systems could cause injury at SLAC.

5.2 Regulatory and SLAC Requirements

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 5, “Electrical Safety Orders”
 - Group 1, “Low-Voltage Electrical Safety Orders” ([8 CCR 2299–2599](#))
 - Group 2, “High-Voltage Electrical Safety Orders” ([8 CCR 2700–2989](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”
 - Group 2, “Safe Practices and Personal Protection”, Article 7, “Miscellaneous Safe Practices”, Section 3314, “The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, including Lockout/Tagout” ([8 CCR 3314](#))
- National Fire Protection Association (NFPA) 70E, “Standard for Electrical Safety in the Workplace” ([NFPA 70E](#))
- SLAC ESH Manual [Chapter 51, “Control of Hazardous Energy”](#) (pertinent content explained below)

5.3 SLAC-specific Requirements and Procedures

In addition to Section 5.2, all work activities requiring the use of lockout/tagout must meet the following SLAC-specific requirements.

Key elements are summarized here and discussed in greater detail below:

- Hazardous energy must be shut off, residual energy must be dissipated, lock and tag applied, zero energy verified. Until all these steps are completed, energy must be presumed to be present and appropriate precautions taken.

- The lead authorized worker for group lockout will always be a SLAC employee. SLAC always locks and tags first and subcontractors overlocks using a multi-hasps adapter or lockbox. Subcontractors must not operate disconnects, breakers, or valves. Subcontractors must plan ahead and allow sufficient time in their schedules for SLAC Facilities staff to perform the shutoff and initial lockout/tagout. Furthermore, the subcontractor must inform the CM well in advance to ensure timely coordination.
- Supervisor locks (one lock for a crew) are forbidden. Each worker must apply their own lock.
- Subcontractors must submit a written control of hazardous energy program as part of their submittals to SLAC for review.
- SLAC-specific forms are used for group lockouts/energy isolation plans and complex lockouts (sign on and off lockouts). SLAC will assist in preparation of the group lockout energy isolation plans and permits.

5.3.1 SLAC Control of Hazardous Energy for Equipment and Systems

The SLAC CM must control, coordinate, and approve lockout/tagout work being conducted on this equipment and systems and must ensure that subcontractors are aware of and comply with the requirements of the SLAC CoHE program. In all instances, any equipment that requires a lockout will first be locked and tagged by a SLAC authorized worker or operations group, then, when authorized by the subcontractor supervisor, the subcontractor's authorized workers will apply their personal LOTO locks.

5.3.2 Zero Voltage Verification (ZVV)

SLAC qualified electrical workers will perform ZVV for all subcontractor lockouts. Subcontractor workers can observe the ZVV to verify zero voltage, perform their own ZVV, or can accept the completed energy isolation plan as evidence of zero voltage. However, workers must be sure to comply with their own company policies.

In addition to the zero voltage verification, subcontractor electrical workers should use a proximity tester or other voltage testing device to periodically confirm absence of voltage at the work location (that is, liberal use of "test before touch") including after pauses in work or if the work site has been left unattended.

5.3.3 Lockout / Tagout Equipment

All necessary lockout/tagout equipment must be provided by the worker's employer. Locks must be uniquely identified and have only one key. The key must remain in control of the worker.

Lockout/tagout devices must be singularly identified, must be the only devices(s) used for locking and tagging energy isolating devices (for the purpose of control of hazardous energy during servicing and maintenance), must not be used for other purposes, and must meet the following requirements:

- When more than one individual is working on the same piece of equipment or project, a group lockbox or multi-lock hasps (gang hasp) must be used and each worker must apply his or her lock and tag. A SLAC lead authorized worker must be responsible for the group lockout.
- Tagout devices, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means must be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

5.3.4 Weekly Subcontractor Lockout / Tagout Inspection Procedures

As part of the weekly ESH report (Section 4.10), the subcontractor must ensure that weekly documented inspections are made for all active lockout/tagout applications. These inspections must be kept at the job site and made available for review by SLAC.

The subcontractor must also perform daily informal (undocumented) inspections to verify lockout/tagouts remain in place and the information on the tag is legible.

5.3.5 Hot Tapping of Process Piping

Hot tapping is the use of specialized drilling equipment to tap into in-service, pressurized process piping for attaching a mechanical or welded branch fitting.

Hot taps, for which all the following conditions are met, are exempt from CoHE requirements:

- Continuity of service is essential.
- Shutdown of the system is impractical.
- Documented procedures are followed.
- Special equipment is used that will provide proven, effective protection for workers.

Permission to hot tap a process system is limited to situations in which system shutdown is impossible (such as a leaking tank or other non-isolable leak) or where hot tapping is shown to be less hazardous than shutting down and locking out the system and performing a cold tap. In other words, the decision to hot tap must be safety-based. It must be shown that, on the whole, it is safer to perform the hot tap than to shut down, depressurize, and lock out the system. (See [Control of Hazardous Energy: General Requirements](#) for approval requirements.)

5.4 Safety and Health Data Requirements

- [Control of Hazardous Energy: Group Lockout Energy Isolation Plan Template](#) (SLAC-I-730-0A10J-005)
- [Control of Hazardous Energy: Complex Lockout Permit](#) (SLAC-I-730-0A10J-006)
- Control of Hazardous Energy Program: standalone document or information embedded in the subcontractor's IIPP

5.5 Resources

- [Control of Hazardous Energy: General Requirements](#) (SLAC-I-730-0A10S-004)

6 Electrical Safety

6.1 Applicability

Each subcontractor is responsible for the development, submission, and implementation of an electrical safety program for all phases of the construction project and this program must apply to all subcontractors' work activities performed at SLAC. The written electrical safety program must meet the requirements of [NFPA 70E](#). The program must address inspection of equipment, shock and arc flash hazard analysis, boundary conditions for energized electrical work (including testing), personal protective equipment selection, training, and other appropriate topics.

6.2 Regulatory and SLAC Requirements

Subcontractor electrical work activities must be conducted in accordance with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 5, “Electrical Safety Orders”
 - Group 1, “Low-Voltage Electrical Safety Orders” ([8 CCR 2299–2599](#))
 - Group 2, “High-Voltage Electrical Safety Orders” ([8 CCR 2700–2989](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”
 - Article 3, “General”, Section 1518, “Protection from Electric Shock” ([8 CCR 1518](#))
 - Article 33, “Electrical Requirements for Construction Work”, Section 1760, “Electrical Requirements for Construction Work” ([8 CCR 1760](#))
- National Fire Protection Association (NFPA) 70, *National Electrical Code (NEC)* ([NFPA 70](#))
- National Fire Protection Association (NFPA) 70E, “Standard for Electrical Safety in the Workplace” ([NFPA 70E](#))
- SLAC ESH Manual [Chapter 8, “Electrical Safety”](#) (pertinent content explained below)

Whenever there is a conflict between any requirements contained or referenced in this chapter, the most stringent requirement must apply. Contact the SLAC CM and CSSR for assistance.

6.3 SLAC-specific Requirements and Procedures

In addition to Section 6.2, the subcontractor electrical safety program must meet the following SLAC-specific requirements.

Important SLAC does not allow subcontractors to perform energized electrical work.

6.3.1 General Electrical Work Safety Requirements

Subcontractors must identify the electrical hazards associated within each definable work activity and establish the controls necessary to maintain an acceptable level of risk. Subcontractors must implement a

comprehensive electrical safety program appropriate for the activities at their site. This program must meet the applicable electrical safety codes and standards (see Section 6.2) and other SLAC requirements. To assist in the evaluation of electrical hazards, subcontractors must employ an electrical hazard analysis consistent with requirements of [NFPA 70E](#) for shock and arc flash hazards. [10 CFR 851, Appendix A.10]

Subcontractors are responsible for identifying, providing, and maintaining their own personal protective equipment (PPE). Maintenance of PPE includes the required testing and certification. Records of such testing must be made available for review.

PPE appropriate to the hazard present must be used. Electrical PPE may include insulated gloves, hearing protection, eye, face, and foot protection, non-conductive headgear, arc-flash protective clothing as required by [NFPA 70E](#), hot-sticks, and insulated tools.

6.3.1.1 Breakers and Disconnects

SLAC electricians will operate all circuit breakers and disconnects for the subcontractor once the equipment has been connected to SLAC's electrical system.

6.3.1.2 Qualified Electrical Worker

Only qualified workers who maintain the necessary skills and knowledge related to the construction and operation of electrical equipment, and the associated hazards are permitted to work on electrical systems at SLAC. A *qualified electrical worker* is a person who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved. Such a person is familiar with the proper use of precautionary techniques, personal protective equipment, insulating and shielding materials, insulated tools, and test equipment, in addition to SLAC-specific procedural requirements. All qualified electrical workers are required to have a letter from their employer asserting the employee's knowledge/training per [NFPA 70E](#) 110.2 and [8 CCR 2700](#).

In addition, all subcontractor journeyman electricians must be certified electricians in California.

Apprentice electricians must be registered with the state as electrician trainees or enrolled in a state-approved apprenticeship program. Apprentices must work under the supervision of a journeyman electrician and must have received the appropriate electrical safety training before being assigned work that involve electrical hazards. It is the responsibility of the journeyman electrician to assign work that is appropriate for the apprentice's experience, skill level, and training.

6.3.1.3 Ground Fault Circuit Interrupter (GFCI) Protection

Subcontractors must ensure that GFCIs are used on 120-volt circuits as specified below:

- In damp or wet (standing water) work areas
- For temporary power (for example, extension cords) during construction, remodeling, maintenance, repair or similar activities. Outdoor receptacles must be enclosed with weatherproof extra-duty covers.
- When using portable, electric hand tools and equipment with cord/plug connectors

The users of the GFCIs must test portable GFCIs using the test button provided before each use. If the GFCI fails the test, tag out of service with a DANGER — DO NOT USE tag and (if portable) remove from service. Do not reset or operate facility circuit breakers. Contact the SLAC CM for assistance.

6.3.1.4 Flexible Cords and Cables

Use nationally recognized testing laboratory ([NRTL](#))-listed flexible cords suitable for conditions of use and location of use. Flexible cord sets used with grounding-type equipment must contain an equipment grounding conductor. Protect flexible cords and cables from damage. Make a concerted effort to route cords in a manner that minimizes trip or snag hazards. Maintain clear walking aisles as much as possible. When possible, hang extension cord sets appropriately in the overhead to avoid tripping hazards and damage caused by foot traffic and equipment. Avoid sharp edges, pinching, or improper storage. Daisy chaining of extension cords or power strips is not allowed. Cube taps are not allowed. Cords sets that are damaged must be removed and discarded.

6.3.1.5 Electric Tool Use

Use only tools that are NRTL-approved, double-insulated type and/or grounded. Use tools only in conjunction with an approved ground fault circuit interrupter (GFCI). Inspect all tools and remove from service any tool with damaged or exposed cord or exposed wiring. Check cords regularly for fraying, insulation damage, insufficient strain relief, and missing or damaged ground pins. Protect cords from damage.

6.3.2 Energized Electrical Work

No energized electrical work other than energized testing and troubleshooting is allowed. The safe electrical work practices that are employed for energized testing/troubleshooting must prevent electric shock, burns, arc flash or other injuries that could result from either direct or indirect electrical contact. Remember that during zero voltage verification the circuits must be treated as energized and workers must be protected accordingly.

6.4 Safety and Health Data Requirements

- [Electrical Safety: Electrical Work Plan Form](#) (SLAC-I-730-0A11J-002)
- Electrical Safety Program: standalone document or information embedded in the subcontractor's IIPP

7 Electrical Energization and Electrical Demolition

7.1 Electrical Energization Plan and Readiness Review

The safety requirements for electrical energization of new equipment and systems are provided in this section.

The prime subcontractor must prepare an energization plan that complies with the following SLAC requirements. The subcontractor should incorporate preparation and execution of the energization plan into the project schedule.

The SLAC CM will provide to the project an electrical energization readiness checklist for each new or modified electrical system or equipment. The checklist will provide the energization readiness requirements for each scope or sub-scope to be energized. Small scope projects often require only a single energization. Large projects typically require multiple sub-scope energizations.

Installation of new electrical circuits and equipment must be substantially complete before first energization. For complex energizations or energizations that require a high degree of formality, the SLAC project manager, building official, or authority having jurisdiction (AHJ) for electrical installations may require a readiness review meeting. This includes, for example,

- Re-introducing electrical energy into facilities that had been placed in an electrically “cold and dark” condition.
- Whenever the energization process may present a significant hazard to personnel or the facility or present a risk to SLAC operations.

If an energization readiness review meeting is required, the prime and sub-tier electrical subcontractors must participate in the meeting.

Energization readiness requirements typically include the following:

- SLAC CM: confirmation that all circuits and equipment to be energized are installed in accordance with BIO authorized-for-construction drawings including post-award and construction-phase design changes
- Prime contractor: confirmation that all conductors have been continuity tested to confirm the correct configuration (the “from” and “to” match the BIO authorized-for-construction drawings)
- Prime contractor: confirmation that all other pre-energization requirements have been satisfied
- SLAC Facilities Electrical Power Department: premises wiring conductors to be energized have been confirmed by test to have correct configuration (from and to match BIO authorized-for-construction installation drawings)
- NEC required working space is clear of tools, materials, and other objects.
- Electrical enclosures are intact with all covers installed and doors secured (bolted or locked).
- Electrical room doors are locked with entry restricted to authorized personnel.
- SLAC review of electrical analyses is complete with comments dispositioned.
- Required arc flash hazard labels are affixed.
- Required testing/commissioning activities for equipment to be energized is complete and associated test reports have been reviewed and accepted by SLAC.
- SLAC BIO inspection of equipment to be energized is complete with no safety significant open items.
- SLAC Facilities inspections of electrical equipment to be energized is complete.
- Equipment hazard labels and ID labels are affixed.
- All exposed conductor ends are safed-off to eliminate exposed copper¹.

1 If conductor ends are not safed-off and workers encounter de-energized exposed copper, the following actions are required: 1) pause work, 2) contact the SLAC CM or SLAC electricians to locate the other end of the conductor(s); and, 3a) if terminated at a source of power then lock out and ZVV the exposed copper and safe off the conductor ends, or 3b) if not connected to an energy source then it's not hazardous, safe off the conductor ends and resume work. Refer to [29 CFR 1910.333\(b\)](#) and [8 CCR 2940.14](#). Note: this is a highly inefficient process that will delay work and increase cost.

Exception: exposed conductor ends in an active work location where electrical workers are restricting access to the conductor ends need not be safed-off. However, when work moves to a different location the remaining exposed ends, if any, must be safed-off.

7.2 Connection to Existing SLAC Utilities




The subcontractor must prepare and submit to the SLAC CM for approval plans for connection to existing SLAC utilities. Implementation of these plans must be compliant with Section 5. Plans must be developed for all affected SLAC utilities including mechanical, electrical, plumbing, fire protection (MEPFP) systems/infrastructure for tie in and/or during excavation within 18 inches of any live utility. The subcontractor will incorporate the details of these plans into the project schedule. The subcontractor will update these plans at each additional design submittal as necessary.

The subcontractor will work with the architect-engineer to coordinate the design with the utilities isolation plan(s). Any modifications to the design must also consider the maintainability of the systems and must minimize the required shutdown of equipment critical to the science mission during routine maintenance.

7.3 Electrical Demolition

Electrical demolition activities require rigorous planning and focused attention during execution to ensure workers are protected from hidden or unanticipated hazardous energies. This is particularly true for electrical demolition in which hidden conditions could result in incomplete energy isolation. Errors created during design and construction of the equipment to be demolished are especially difficult to identify. To address these concerns all electrical demolition must comply with the requirements of this section.

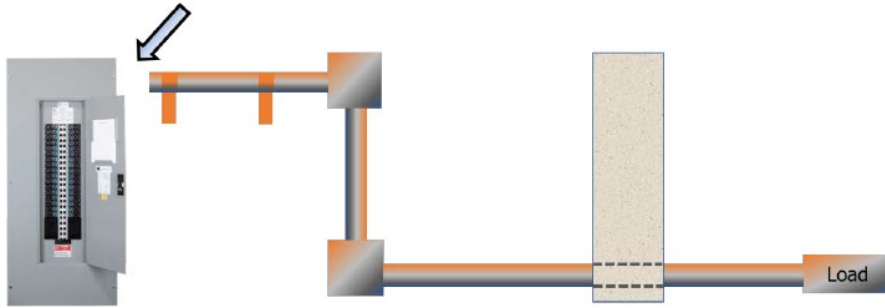
Table 1 Demolition Area Color Code

	Conduit and equipment containing energized circuits not to be demolished must be flagged with red danger tape.
	Conduit not to be demolished must be flagged with yellow caution tape or blank yellow tape (no text).
	Conduit and equipment to be demolished must marked or flagged with blank orange tape (no text) or orange paint or both.

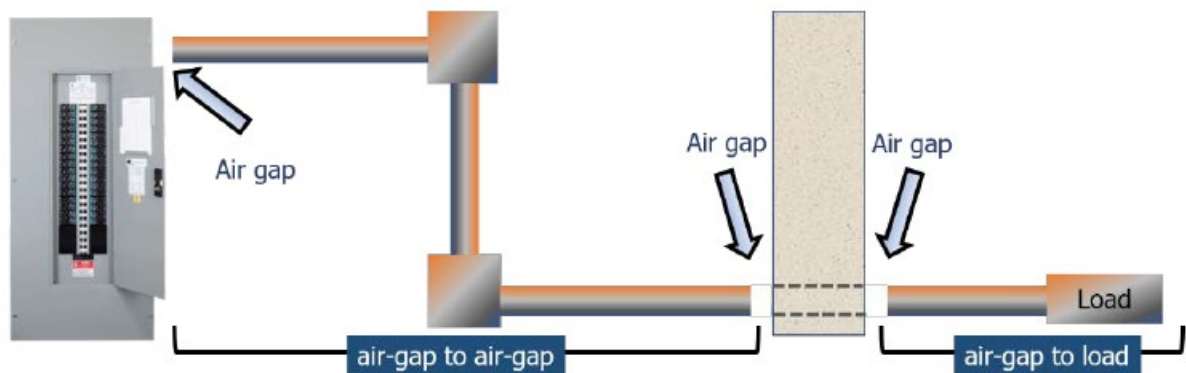
7.3.1 Electrical Demolition Requirements

1. Each demolition project is unique and must be planned accordingly.
2. Electrical demolition must be based on approved design documents.
3. SLAC electricians will perform establish a group lockout for the demolition project.
4. Conduit and equipment to be demolished will be air-gapped at the source by SLAC.

SLAC electricians will air-gap the source of supply



5. Tracing, flagging, and marking of equipment in the demolition will be performed by SLAC:
 - a. SLAC will lock out to the extent feasible circuits that are within the demolition area but are not to be demolished. These circuits will be conspicuously flagged with YELLOW tape.
 - b. SLAC will flag with RED DANGER tape any circuits in the demolition area that are in service and energized.
 - c. Conduit and equipment to be demolished will be conspicuously marked or flagged by SLAC with ORANGE paint or blank ORANGE tape or both.
 - d. Conduit that penetrates a wall, floor, or ceiling will be traced by SLAC using established tracing methods to confirm continuity of the conduit through the structural member.
 - e. Conduit that passes behind an obstacle or group of obstacles such as an HVAC duct, process piping, or other equipment must be traced by SLAC using established tracing methods to confirm continuity of the conduit as it passes behind the obstacle.
 - f. Conduit to be demolished by subcontractors must be 100 percent visible within the demolition area. SLAC will create additional air gaps for conduit segments that pass through walls, floors, or ceilings, or behind obstacles.



6. Subcontractor workers must join the demolition area lockout before starting work.
7. As part of the pre-job briefing/safety tailgate, subcontractor workers must walkdown the entire demolition area with SLAC electrical workers to confirm marking and flagging.

8. Subcontractors must demolish the visible portion of conduit from air gap to air gap or, at the end of a circuit, from air gap to the load served by the circuit.
9. No circuit, device, conduit, wiring, or equipment may be demolished unless the demolition worker has 100 percent certainty the circuit elements are safe for demolition.
10. Double-insulated tools must be used when cutting conduit.
11. Conduit must be cut at or near orange flags or markings to reduce the likelihood of cutting the wrong conduit.

7.3.2 Stop Work Conditions

1. If you or any coworker do not have 100 percent certainty that a circuit is safe for demolition.
2. Unexpected circuits, hazards, or other conditions are encountered.
3. There is a change in or departure from plans.
4. Work has not been properly released.
5. Circuits and equipment in the demolition area have not been marked as expected.
6. Circuits and equipment to be demolished have not been air-gapped as expected.
7. Guidance is not clear.
8. Roles or responsibilities are not clear.
9. If you or any coworker have a “gut feeling” something is not right.

7.4 Safety and Health Data Requirements

- Electrical Energization Plan
- Connection Plan

8 Penetrations

8.1 Applicability

The requirements of this section apply to all subcontractor work involving surface penetrations (an opening made by drilling, cutting, or otherwise piercing a wall, ceiling, or floor).

8.2 Regulatory and SLAC Requirements

The subcontractor penetrations must be conducted in accordance with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 2, “Safe Practices and Personal Protection”

- Article 10, “Personal Safety Devices and Safeguards”, Section 3390, “Protection from Electric Shock” ([8 CCR 3390](#))
- Article 7, “Miscellaneous Safe Practices”, Section 3314, “The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, including Lockout/Tagout” ([8 CCR 3314](#))
- National Fire Protection Association (NFPA) 70E, “Standard for Electrical Safety in the Workplace” ([NFPA 70E](#))
- SLAC ESH Manual [Chapter 44, “Penetration Safety”](#) (pertinent content explained below)

8.3 SLAC-specific Requirements and Procedures

In addition to Section 8.2, all subcontractor penetration activities must meet the following SLAC-specific requirements.

Subcontractors are required to obtain a [penetration permit](#), Class 1 or Class 2, before performing any surface penetration. A Class 1 penetration is defined as any penetration into hollow walls, hollow ceilings, or hollow floors, or a penetration into solid materials to a depth of two inches or less. A Class 2 penetration is defined as a Class 1 penetration deeper than two inches or all the way through solid materials. All penetrations within a radiologically controlled area (RCA), a radioactive material management area (RMMA), or part of radiation shielding (for example, the Accelerator Housing Structure, Klystron Gallery Floor) require a penetration permit with the “Radiological Safety” section of the permit completed by the Radiation Protection Department. Contact the SLAC CM for assistance with this permit. Allow three days for review of this permit.

No penetration work can occur until either a Class 1 or Class 2 permit has been approved for the work. The approved permit must be kept at the job site until the work is completed. Mark that the work was completed on the permit; provide the completed permit to the CM.

8.4 SLAC Special Emphasis

A thorough evaluation will be made to identify all hazards and utilities located behind or under surfaces. Measurements, detection equipment, and other means to identify these hazards will be used. Area, building, and space drawings will be used to assist in identifying these hazards. If a hazard is detected that is not on the drawings, a redline markup of the hazard will be made on the subcontractor’s drawing set. If the penetration is to be made into a solid load-bearing wall, use NDT before performing the penetration to ensure that it does not interrupt wall reinforcement.

For new construction, the subcontractor must develop a plan with the CM for how the SLAC penetration safety program will be implemented in reasonable fashion as walls are enclosed.

8.5 Safety and Health Data Requirements

- [Penetration Safety: Penetration Permit Form](#) (SLAC-I-730-0A23J-007)

9 Excavations

9.1 Applicability

The requirements of this section apply to all subcontractor work activities involving excavations, including ground disturbance activities (activities that may impact soil, such as core drilling, boring, jack hammering, and asphalt- or concrete-cutting placement, demolition, or removal).

9.2 Regulatory and SLAC Requirements

All subcontractor excavation activities must be conducted in accordance with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”, Article 6, “Excavations” ([8 CCR 1539–1947](#)) with the following exception: SLAC uses an internal permitting and notification system to control excavations in lieu of 8 CCR 1541, paragraph (2)
- *California Water Code*, Division 7, “Water Quality”, Chapter 10, “Water Wells and Cathodic Protection Wells” ([WAT 13700–13806](#))
- *San Mateo County Code*, Title 4, “Sanitation and Health”, Chapter 4.68, “Wells” ([SMCC 4.68.010–4.68.420](#))
- Title 24, *California Code of Regulations*, “California Building Standards Code”, Part 2, “California Building Code” ([24 CCR Part 2](#))
 - Chapter 32, “Encroachments into the Public Right-of-Way” (24 CCR Part 2, Chapter 32)
 - Chapter 33, “Safeguards during Construction” (24 CCR Part 2, Chapter 33)
- SLAC ESH Manual [Chapter 11, “Excavation Safety”](#) (pertinent content explained below)

9.3 SLAC-specific Requirements and Procedures

In addition to Section 9.2, all subcontractor excavation activities must meet the following SLAC-specific requirements.

A SLAC [excavation permit](#) is required when any of the following conditions are met: excavating (digging or drilling) to a depth of one foot or more; power tools are used; utilities are identified or suspected in the area of the excavation; and any hazardous condition is likely to be encountered. An excavation starts once the ground, surface, at grade, or other material is removed from the area or building.

Note SLAC uses an internal excavation permitting and notification system as opposed to the State of California process.

A written excavation plan must be prepared for any excavation five feet or more in depth. The plan must describe methods of identifying utilities, exposing utilities, benching, shoring, placement and disposal of spoils, location of heavy equipment, excavation egress, and fall protection considerations adjacent to the excavation. If the shoring plan varies from pre-engineered shoring system standards, a civil or structural engineer, registered in California, must prepare the plan and provide his registration stamp on it. Similarly,

if the depth is 20 feet or greater, a registered civil or structural engineer is required to design the shoring and stamp the design.

9.3.1 Locating Underground Utilities

The subcontractor will have a utility location survey performed of the area in which the excavation is to be performed. SLAC as-built drawings will be used as a reference for the excavation area. The area surveyed will extend three feet past the limit of the proposed excavation. All effort will be made to identify any utilities in the proposed excavation area. Any differences will be marked on the SLAC as-built drawings and the drawings will be submitted back to the SLAC CM as part of the excavation permit. The utility locator will follow the utility marking requirements and complete the [utility location results form](#).

Maintenance of utility markings is critical throughout the excavation process; consideration must be given to the use of flags if painted pavement or dirt markings are removed as the work progresses.

9.3.1.1 Potholing Verification

The CM must work directly with the subcontractor who will hand dig or otherwise safely pothole (daylight) to verify location and depth of the various utilities which may conflict with the excavation activity. No machinery may be used within the exclusion zone; hand digging or specialized potholing equipment such as vacuum excavating or hydro and vacuum excavating combined is only allowed. The exclusion zone is defined as the outer circumference or the outer edge of the utility plus 18 inches, vertically and horizontally.

9.3.2 Confined Spaces

When the configuration of an excavation is such that the excavation is deemed to be a confined space, applicable confined space requirements must be followed. See Section 16.

9.3.3 Oversight

The prime subcontractor must assign someone to be physically present during excavations that are within five feet of underground services to ensure compliance with the approved plan.

9.3.4 Competent Person Requirements

The subcontractor is required to provide a qualified and competent person at the job site when excavation work is ongoing. The subcontractor must ensure that the competent person can demonstrate that their knowledge and skillsets match the excavation and protective system(s) that are in place. Subcontractor excavation competent persons that are trained and knowledgeable about soils analysis, the use of protective systems, identification of existing and predictable excavation hazards and the requirements of [8 CCR 1539-1947](#) will be considered as meeting the necessary excavation competent person training for working at SLAC. The subcontractor must provide proof of such training as part of the JSA for the work.

9.3.5 General Awareness Training Requirements

All subcontractors working in or around excavations must receive general excavation hazards awareness training. Evidence of this training will become part of the JSA and maintained on site.

9.4 Subcontractor Responsibilities

The subcontractor must be responsible for the following:

- Obtaining an approved SLAC [excavation permit](#)
- Preparing a written excavation plan (for depths of five feet or more) for review and approval by SLAC
- Implementing the approved excavation plan. Stopping work as needed if unexpected conditions are encountered
- Arranging, in coordination with SLAC, a pre-mobilization meeting to review the excavation plan
- Monitoring/daily inspections of excavation, trenching, and shoring operations
- Designating a competent person, who has had the training to act in this position; providing the competent person the authority to effectively discharge their duties
- Ensuring the requirements of this section are effectively communicated and enforced to lower tier subcontractors
- Investigating and reporting to the SLAC PM, CM, and CSSR all incidents, including any near miss, involving excavations, trenching, and shoring

9.5 Safety and Health Data Requirements

- [Excavation Safety: Excavation Permit Form](#) (SLAC-I-730-0A23J-006)
- [Excavation Safety: Daily Inspection Checklist](#) (SLAC-I-730-0A23J-003)
- [Excavation Safety: Mobile / Portable Drilling Rig Initial Inspection Form](#) (SLAC-I-730-0A23J-005)
- [Excavation Safety: Utility Location Results Form](#) (SLAC-I-730-0A23J-004)
- Written excavation plan (for any excavation five feet or more in depth)

10 Fire and Life Safety

10.1 Applicability

The general fire prevention and protection aspects of this section apply to all projects; the hot work requirements apply to many projects. SLAC has very specific requirements for fire prevention and protection.

10.2 Regulatory and SLAC Requirements

The subcontractor fire protection and prevention program must be conducted in accordance with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”, Article 36, “Fire Protection and Prevention” ([8 CCR 1920–1938](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”,

Group 10, “Gas Systems for Welding and Cutting”, Article 88, “Fire Prevention in Welding and Cutting Operations” ([8 CCR 4846-4848](#))

- Title 19, *California Code of Regulations*, “Public Safety”, Division 1, “State Fire Marshal”, Chapter 5, “Automatic Fire Extinguishing Systems”, Article 4, “Inspection, Testing and Maintenance Frequencies”, Sections 904.7, “Inspection, Testing, and Maintenance Requirements for Engineered and Pre-engineered Fixed Extinguishing Systems” ([19 CCR 904.7](#))
- Title 24, *California Code of Regulations*, “California Building Standards Code”
 - Part 2, “California Building Code” ([24 CCR Part 2](#))
 - Part 9, “California Fire Code” ([24 CCR Part 9](#))
- American National Standards Institute (ANSI) Z49.1, “Safety in Welding, Cutting and Allied Processes” (ANSI Z49.1)
- National Fire Protection Association (NFPA) consensus standards, as adopted by reference in 10 CFR 851. New editions of codes will be effective at SLAC on January 1 of the edition year.
- SLAC ESH Manual [Chapter 12, “Fire and Life Safety”](#) (pertinent sections described here)

10.3 SLAC-specific Requirements and Procedures

In addition to Section 10.2, the subcontractor fire protection and prevention program must meet the following SLAC-specific requirements.

10.3.1 General

- A fire prevention plan must be developed and submitted to SLAC for review and approval.
- Fire extinguishers must be placed throughout the construction site such that a worker does not need to travel more than 75 feet to reach one. These fire extinguishers must not be relocated by fire watches. Fire watches must be issued separate fire extinguishers specifically for fire watch use. Fire extinguishers must be inspected monthly and the inspection must be noted on an attached tag. Fire extinguishers must have been serviced within the past 12 months.
- Fire suppression system must be functional and accepted by SLAC’s Building Inspection Office before bringing furniture into a building.
- Once the fire suppression or alarm system is operational and accepted by SLAC, impairments to the system must be coordinated with the CM. Impairment must not be initiated until the CM confirms that the impairment is authorized.
- Free access must be maintained at all times to all exits, fire alarm boxes, fire extinguishing equipment, and any other emergency equipment. Free access means clear of all obstructions.

10.3.2 Safety and Health Data Requirements

- Fire prevention plan

10.3.3 Hot Work

- The CM or CSSR will obtain the permit and provide it to the subcontractor.
- Hot work permit is always required for any open flame or slag/spark throwing activity: pipe soldering, brazing, any type of welding, torch cutting, abrasive wheel cutting, metal grinding, etc.
- Hot work should be performed in subcontractor shops or designated areas (for example, pre-approved weld booths or shop areas) where practical.

- The subcontractor must ensure that hot work is performed within the requirements of the hot work permit. Completed hot work permits must be brought to the attention of the CM and CSSR. The document will become part of the construction folder.
- Combustible materials must be removed from hot work location or covered with fire blankets. Clear area must be 35 feet away from hot work or 50 feet if the hot work is occurring at an elevated location. Reduced clearances are authorized for low hazard hot work operations (for example, pipe soldering) by SLAC on a case-by-case basis.

10.3.3.1 Hot Work Permit

The subcontractor will submit a hot work permit request through the CM. Approval for the hot work permit will be by certain authorized SLAC personnel. The subcontractor will be responsible for providing all the required materials, personnel, and protective equipment to conduct all hot work within the requirements of the respective hot work permit.

Before the start of any hot work activity, the subcontractor must perform a walk-down of the work to verify hazard identification and control. The hot work permit is valid only for the specified task noted on the permit and for a maximum of eight days. Changes from the scope of work identified on the permit or JSA must be brought to the subcontractor supervisor, the CM, and the hot work approver.

10.3.3.2 Hot Work Location and Fire Prevention

The location of hot work must be determined by utilizing the following priorities:

- Protect openings in walls, floors, roofs, and ceilings where sparks can travel beyond the work area to inaccessible or unprotected areas. Openings or cracks in walls, floors, roofs, or ceilings within 35 feet of the site must be tightly covered with fire-retardant or noncombustible material to prevent the passage of sparks to adjacent areas.
- Beware of heat conduction through penetrations. Hot work that is performed on pipes or other metal that is in contact with combustible walls, partitions, ceilings, roofs, or other combustibles, must not be undertaken if the work is close enough to cause ignition by conduction.

10.3.3.3 Fire Watch

The subcontractor must establish a fire watch, as described in the hot work permit, to protect the safety of workers and assets. The fire watch observes workers conducting the welding, cutting, or grinding operations and monitors adjacent areas. The worker(s) assigned to this task of fire watch must have fire extinguishing equipment readily/immediately available.

Qualifications

- Able to recognize ignition hazards and understand fire prevention principles
- Fire extinguisher training
- Be knowledgeable of emergency reporting procedures and have necessary phone or radio to perform this task
- Assertiveness
- Attention to detail

Duties

- Ensure clear area 35 feet from hot work location (or 50 feet if the hot work is occurring at an elevated location) or ensure combustibles that cannot be moved are covered with a fire blanket
- Empowered to prevent the start of hot work or interrupt it, as needed, until the requirements are met (for example, combustibles removed or covered)
- Maintain continuous fire watch during hot work and for one hour afterwards or longer as specified on the hot work permit
- Other duties – fire watches may only do side tasks that are menial, support the hot worker, and don't take them out of the immediate area
- Multiple fire watches must be used as needed. One watch may cover multiple workers only if there is a direct view of each hot worker from one spot. If sparks or slag can be cast beyond the view or rapid accessibility of one fire watch, a separate fire watch will be required for those areas. If sparks or slag is cast to lower levels than a fire watch will be needed at each affected level. Openings in walls and floors should be considered in planning the fire watch.
- Contact 911 and SLAC ext. 5555 (650) 926-5555) in the event of an emergency.
- Before leaving the site, the fire watcher must verify that the possibility of fire does not exist.

Note All the fire watch requirements will be described on the hot work permit.

10.3.3.4 Fire Protection Equipment for Hot Work

Fire protection equipment must be sufficient for the hazards present. At a minimum, a 2A:20-B:C rated fire extinguisher is required for the worker performing hot work and for each fire watch. The fire extinguisher must be readily available in the immediate work area.

10.3.3.5 Hot Work Protective Clothing

Subcontractors must ensure that the personnel protective clothing selected for hot work minimizes the potential for ignition, burning, trapping hot sparks and electric shock as identified in SLAC ESH Manual [Chapter 19, "Personal Protective Equipment"](#), and ANSI Z49.1, "Safety in Welding, Cutting and Allied Processes", Sections 4.3 and E4.3.

10.3.3.6 Hot Work Required Inspections

In addition to the fire watch requirements, the subcontractor's authorized worker/permit holder must inspect the work area a minimum of once a day to verify compliance with permit requirements. Additionally, responsible subcontractor personnel must also perform periodic inspections to ensure continued compliance with the requirements of the permit. When inspections identify unsafe conditions or the scope of work departs from that defined in the permit, the hot work must be stopped immediately and the CM and CSSR notified.

10.3.3.7 Hot Work Outdoors

The subcontractor must ensure that vegetation and other combustibles are removed, cut back, or otherwise protected to prevent ignition during hot work outdoors. The requirements for performing hot work outside will be captured in the hot work permit. A high level of caution must be exercised to prevent wild land fire. If wind speeds exceed a constant velocity of 10 miles per hour, hot work is not permitted outdoors.

10.3.4 Safety and Health Data Requirements

- Hot Work Permit: obtained by CM and CSSR

10.3.5 Resources

- [Fire and Life Safety: Fire Prevention Hot Work Procedures](#) (SLAC-I-730-0A12C-001)

10.3.6 Fire Protection System Outages and Impairments

Subcontractors performing work must plan their work and take the necessary steps to minimize impairments of fire suppression, detection, or alarm systems. When impairments of pre-existing systems are necessary to perform a particular scope of work, they must be coordinated with the CM and approved by the SLAC fire marshal or designee.

10.3.7 Safety and Health Data Requirements

- Fire Protection System Impairment Authorization: obtained by CM and CSSR

10.3.8 Resources

- [Fire and Life Safety: Fire Protection System Impairment Procedures](#) (SLAC-I-730-0A12C-002)

10.3.9 Exits and Exit Access

The subcontractor must ensure that a clear path of at least 36 inches width and 6 feet 8 inches tall is maintained to exits on indoor projects. Exits must be marked by a readily visible sign. Access to exits must be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to workers. Review and approval by the SLAC fire marshal must be obtained before blocking any exit path for any amount of time.

10.3.10 Flammable and Combustible Liquids Storage

Flammable and combustible liquids must be stored in listed or approved containers and cabinets, and storage quantities must be minimized in accordance with SLAC's requirements and NFPA codes. Rags used to apply flammable liquids are to be disposed of in self-closing approved safety containers. The CM will assist the subcontractor with obtaining these containers.

10.3.11 Oxygen / Acetylene Safety

Oxygen/acetylene equipment must be in excellent condition including hoses, their attachments to regulators, cylinder valves, and cylinders cutting tip seating surface, etc. Cylinders must be stored upright on a cart or securely attached to a structural member. Carts must have a barrier panel between the two cylinders. Ensure clothing and equipment is free of grease and oil. Wear proper PPE including flame resistant clothing, protective gloves, sleeves, aprons, and safety shoes to protect from sparks and slag, and goggles or mask with tempered lenses. Ventilate work areas adequately. Wear respiratory protection if toxic fumes will be generated by welding or cutting.

10.3.12 Smoking / Wildfire

Smoking, if permitted by the subcontractor, must be restricted to SLAC fire marshal designated areas that incorporate appropriate facilities for the safe disposal of smoking materials. Due process and control must be employed to prevent wildfire.

10.3.13 Housekeeping / Trash

The subcontractor must inspect the work area frequently and maintain good housekeeping. Common garbage and other waste must be disposed of at frequent and regular intervals at a minimum before end of shift. Containers must be provided for the collection and separation of waste, trash, oily or used rags, and other refuse. Containers used for garbage and other oily, flammable, or hazardous wastes (such as caustics, acids, harmful dusts, or similar materials) must be equipped with covers. Chemical agents or substances, which might react to create a hazardous condition, must be stored and disposed of separately.

10.3.14 Portable Electric Heaters

The following requirements apply to portable electric heaters used on the job site:

- Portable electric heaters must be equipped with a tip-over switch.
- Locate portable electric heaters in areas that minimize their fire hazards.
- Do not use portable electric heaters near flammable materials/liquids.
- Follow manufacturer's literature for clearance of listed portable electric heaters from combustible materials.
- Never place portable electric heaters on an unstable surface.
- Use only portable electric heaters approved by Underwriters Laboratories, Inc. (UL) or another nationally recognized test laboratory (NRTL).
- Portable electric heaters must not be used with extension cords, as most extension cords are not rated for the higher power demands of space heaters and may become overloaded and catch fire).

10.3.15 Combustion-type Construction Site Heaters

Follow all instructions on operation. Use work planning and control to identify and control hazards associated with these heaters.

10.3.16 Fire Suppression and Alarm System Functionality before Furniture Installation

Before moving furniture into a building, the fire suppression and alarm system must be installed, tested, and approved for operation by the SLAC fire marshal and building inspector.

11 Hoisting and Rigging

11.1 Applicability

The requirements of this section apply to all subcontractor hoisting and rigging work activities at SLAC.

The equipment covered under this procedure includes hoisting and rigging devices and associated equipment such as slings, ropes, and chains, which provide mechanical assistance in raising and lowering a load. This includes either power or manually operated equipment. It includes the use of non-crane devices (forklifts, excavators, etc.) acting as a crane.

11.2 Regulatory and SLAC Requirements

All subcontractor hoisting and rigging activities must be conducted in accordance with the following regulatory requirements:

- Department of Energy Standard 1090, “Hoisting and Rigging” ([DOE-STD-1090](#)), and third-party standards referenced in it
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders” ([8 CCR 1500–1962](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 13, “Cranes and Other Hoisting Equipment” ([8 CCR 4884–5049](#))
- American Society of Mechanical Engineers (ASME) B30, “Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings” series (ASME B30)
- SLAC ESH Manual [Chapter 41, “Hoisting and Rigging”](#) (pertinent sections described here)

11.3 SLAC-specific Requirements and Procedures

In addition to Section 11.2, all subcontractor hoisting and rigging activities must meet the following SLAC-specific requirements.

Subcontractors bringing hoisting and rigging equipment on site must be able to demonstrate that their equipment is properly maintained, in safe operating condition, and that operators are experienced and qualified. Subcontractor crane operators are not permitted to operate SLAC hoisting and rigging equipment. Exceptions to this requirement will be reviewed and accepted or rejected by the SLAC hoisting and rigging program manager. All hoisting and rigging equipment brought on site must be in a new or like new condition free of hydraulic, oil, or fuel leaks.

11.3.1 Operator Training and Certification

Subcontractors who provide and operate hoisting and rigging equipment must provide the following:

- **Proof of training/certification.** SLAC requires proof of training, such as a National Commission for the Certification of Crane Operators (NCCCO) license or other licenses/certification that meet the

requirements in Section 11.2. This certification/license must be current for the crane type they will be operating (for example, mobile crane operator, tower crane operator).

- **Non-crane devices.** Proof of operator training is required for a forklift, excavator, etc., used as a crane. The operator will also be trained as a rigger, described in Section 11.3.2.
- **Medical Requirements.** Crane operators must meet ASME B30 physical requirements throughout their certification periods. The following meet the requirement:
 - NCCCO Physical Examination Form, valid for three years
 - A current Department of Transportation (DOT) Medical Examiner's Certificate, valid for two years

11.3.1.1 Rigger and Signal Person

A qualified professional rigger(s) and signal person(s) must be in continual possession of a valid certificate of competency by an accredited certifying entity for the type of rigging equipment and crane to be used. Certificate renewal is in accordance with the certifying entity's renewal schedule.

Copies of these certificates will be provided to the designated hoisting and rigging plan approver and included with the hoisting and rigging plan.

11.3.2 Hoisting and Rigging Operating Requirements

11.3.2.1 Planning and Approval

The subcontractor must evaluate and plan hoisting and rigging operations in advance as part of the WPC process. A competent person must identify the hazards and determine the controls necessary to maintain an acceptable level of risk. A documented plan is required for all lifts. The subcontractor must utilize the SLAC lift planning and control ([ordinary](#) or [critical](#)) form or other SLAC-accepted equivalent plan form. The lift plan will be developed with the assistance of the CM and CSSR.

Ordinary lift plans must be approved by someone with knowledge and experience in hoisting and rigging, and the superintendent, subcontractor safety representative (if any), CM, and CSSR.

Critical lift plans must also be approved by the SLAC PM and hoisting and rigging program manager, following review by a structural or mechanical engineer.

Critical lifts are defined as lifts for which the application of requirements applicable to ordinary lifts would not adequately eliminate or control the likelihood or severity of the following:

- Personnel injury or significant adverse health impact (on-site or off-site)
- Significant release of radioactivity or other hazardous material or other undesirable conditions
- Undetectable damage that would jeopardize future operations or the safety of a facility
- Damage that would result in delay to schedule or other significant program impact such as loss of vital data

Any lift that involves more than one crane or motorized lifting device is considered a critical lift.

11.3.2.2 Pre-lift Meeting

Before performing any lift, the subcontractor must conduct a pre-lift meeting with workers involved in the work activity. The following items must be reviewed:

- The scope and sequence of work
- Roles and responsibilities
- Hazards and controls
- Other relevant information identified in the hoisting and rigging lift plan

When performing lifts designated as critical lifts, this meeting must be documented using the construction tailgate/release forms. In addition to the signatures listed the SLAC designated person will be the final signature for acceptance.

11.3.2.3 Communication

The subcontractor must require the use of ANSI B30.5 standard hand signals or voice/radio communications during crane operations.

11.3.2.4 Access Control

The subcontractor must cordon off or manually control the lift area to prevent access by unauthorized workers by deploying barricades and warning signs and/or utilizing personnel to monitor and control access to the area. The subcontractor must cordon off the swing radius area for mobile crane bodies with red danger tape and stanchions or other equivalent barricade apparatus.

11.3.2.5 Protection of People

Do not place people in jeopardy by moving a suspended load over people, an occupied section of a facility, or potentially occupied section of a facility. Work beneath a suspended load is prohibited unless the load is supported by cribbing, jacks, or a solid footing that safely supports the entire weight. All personnel must remain clear of moving and shifting loads.

11.3.2.6 Rated Load Capacity

The rated load capacity of monorails and other hoisting and rigging structural elements, such as jibs, must match, at a minimum, the rated load capacity of a hoist placed upon it.

Fully extend outriggers or reduce the cranes rated load capacity as directed and allowed by the crane manufacturers operating manual.

An underground utility survey is required before setting up a mobile or other ground bearing crane. If a previous utility survey's marks are readily visible, the current working drawings are reviewed, and the as-built drawings have been reviewed, another utility survey is not required.

11.3.2.7 Electrical Distribution Lines

Watch for overhead electrical distribution and transmission lines and maintain a safe working clearance of at least 10 feet or as required from energized electrical lines. Any overhead wire must be considered an energized line unless it has been locked out and zero-voltage verified. Exercise caution when working near

overhead lines having long spans as they tend to move laterally or vertically due to the wind, which could cause them to breach the safety zone.

11.3.2.8 Environmental Factors

Environmental factors, such as weather and terrain, can adversely affect a lift. When performing outdoor lifts, the following environmental factors must be considered.

High Winds

Lifts must be suspended if prevailing wind conditions may adversely affect the lift. Generally, this applies to wind speeds of 25 miles per hour or more. However, based on the nature of the load – such as size, surface area, or fragility – a lower wind speed limit may warrant suspension of a lift. The hoisting and rigging plan approver will review with the operator the behavior of the load in prevailing winds and the stresses placed upon hoisting and rigging equipment to the extent necessary to safely complete the lift.

Freezing Surfaces

Check surface conditions to determine if the load may be frozen to the ground. Do not use hoisting and rigging equipment to free a load that is frozen to the ground. This subjects the equipment to severe and unintended loads.

Ground Conditions

Check ground conditions around the hoisting equipment for proper support, including settling under and around outriggers, ground water accumulation or other similar conditions. Refer to Section 11.3.2.6 for underground utility requirements.

11.3.3 Crane Inspection, Maintenance, and Testing

11.3.3.1 Crane Inspection

Before being placed into service, all subcontractors owned and/or rented cranes must meet the requirements in [8 CCR 5031](#). These inspections will be documented and made available to SLAC using SLAC or equivalent inspection forms. They will be attached to the lift plan which the crane will be used for. These inspections include periodic (four times per year), annual, and quadrennial. In some circumstances, monthly inspections are also required (see Section 11.3.3.4).

All crane inspection deficiencies must be identified, documented, and mitigated before the crane's arrival at SLAC. If a deficiency is identified at SLAC, the crane will be taken out of service until the deficiency is rectified. The subcontractor must maintain the original copy of the inspection report and place it with the lift plan which the crane was used for.

11.3.3.2 Daily Pre-operational Inspections

All cranes will be inspected before first use for that shift. Records are required.

11.3.3.3 Deficiencies

Crane operators, hoisting and rigging inspectors, riggers, and other designated qualified workers must examine deficiencies and determine whether the equipment should be removed from service or if a more detailed inspection is required.

11.3.3.4 Monthly Inspections

Cranes active on the site for periods extending beyond one month must receive monthly documented inspections. The manufacturer's recommendations will be followed. The competent person must at a minimum visually inspect the following items for damage, wear, or other deficiency that might reduce capacity or adversely affect the safety of the crane:

Signed and dated inspection records must be kept on file and must be readily available. Before the crane is returned to service, correct deficiencies that could reduce its capacity or adversely affect its safety.

11.3.3.5 Annual Inspections

Annual crane inspections must conform to the requirements in [8 CCR 5031](#) and as recommended by the manufacturer. Documentation of these inspections must be available for review by SLAC.

11.3.3.6 Idle Equipment

Hoisting and rigging equipment that is idle for a period of greater than one month (fully operational but not used) does not require monthly inspections. Idle equipment must be removed from service and tagged with an administrative CAUTION – DO NOT OPERATE label to alert potential users of the start-up inspection requirements to include the requirements contained in the daily and monthly inspections. Documentation of these inspections must be available for review by SLAC.

11.3.3.7 Maintenance

A preventive maintenance program must be established and based on the recommendation of the crane manufacturer. If equipment maintenance procedures deviate from published manufacturer's recommendations, the alternate procedures must be approved in advance by the manufacturer or another qualified person and be kept readily available. Dated maintenance records should be kept readily available to appointed personnel. Replacement parts must be at least equal to the original manufacturer's specifications.

11.3.3.8 Rated Load Test

Before initial use, all cranes in which load sustaining parts have been modified, replaced, or repaired must be load-tested by a qualified inspector or under the direction of that inspector. All rated load tests must be performed in accordance with manufacturer's recommendations.

11.3.4 Rigging Safety Requirements

11.3.4.1 Rigging Component Procurement

Rigging components must be obtained from reliable sources and must be rated for hoisting and rigging applications. Do not use damaged or suspect rigging. All hoisting and rigging hardware must meet SLAC

requirements, ASME B30.20, “Below-the-Hook lifting Devices”, and ASME B30.26, “Rigging Hardware”. Hoisting and rigging equipment that does not meet these requirements must be removed off site. Chinese-made shackles are not permitted to be used. See Section 11.4.2 for additional information on suspect and counterfeit rigging and hoisting requirements.

11.3.4.2 Storage and Maintenance

Rigging equipment must be stored and maintained in accordance with the manufacturer’s recommendations. Protect rigging hardware from weathering and harsh environments. Rust, corrosion, and/or ultraviolet damage can degrade rigging performance.

11.3.4.3 Labeling

Rigging hardware must be labeled for identification purposes with a durable tag.

11.3.4.4 Rigging Safe Work Practices

The subcontractor must ensure that the following safe work practices are utilized when rigging a load:

- Determine the weight of the load. Do not guess. The weight of the load must be within the rated load capacity of the rigging.
- Determine the proper size for slings and components. Refer to the manufacturer’s literature and the [DOE-STD-1090](#) for details.
- Select slings so that the rated load capacity is adequate when the appropriate de-ratings are applied based on sling angle and/or hitch angle considerations (choker angle de-rating, in all directions of pull).
- Verify that shouldered eyebolts are installed in accordance with the manufacturer’s recommendations. Beware of side pull applications. Eyebolts must be de-rated, per the manufacturer’s requirements, when subject to side loads.
- Do not use shoulder less eyebolts for lifting purposes.
- Eye nuts are used in vertical pull only unless otherwise specified by the manufacturer.
- Use safety hoist rings (swivel eyes) as a preferred substitute for eyebolts when possible.
- Pad sharp and small diameter edges to protect slings. Machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under load. Dense foam, tire rubber, or other dense, pliable materials may be suitable for padding.
- Do not use slings, eyebolts, shackles, hooks, or other hardware that appear to have been cut, welded, brazed, or is otherwise suspect.
- Determine the center of gravity and balance the load before moving it. Keep the attachment points of rigging accessories as far above the center of gravity as possible.
- Lift the load initially just a few inches to test the rigging and balance.
- Place blocks beneath loads before setting down the load to allow removal of the sling, where applicable.

11.3.5 Inspection Criteria for Slings, Below-the-Hook Lifting Devices, and Rigging Hardware

11.3.5.1 Before Use Inspection

At the beginning of each shift or before use, if it has not been in regular service, the competent person must visually inspect the rigging equipment (slings, below-the-hook devices, and rigging hardware) in accordance with the appropriate ASME/ANSI standard or according to the manufacturer's instruction, whichever is more stringent. Defective rigging equipment must be removed from service and destroyed to prevent reuse.

11.3.5.2 Periodic Inspections

Rigging equipment must be inspected periodically in accordance with SLAC, DOE, and ASME/ANSI standard or according to the manufacturer's instruction, whichever is more stringent; no less than annually. This inspection must be performed by a qualified inspector and have a documented inspection history, with records readily available.

11.3.6 Personnel Hoisting

11.3.6.1 Personnel Platform Lift Plan

The use of hoisting and rigging equipment to hoist workers onto a platform is generally prohibited, except when the use of a conventional means of reaching the work area, such as a ladder, scaffold, or man lift, would be more hazardous or is not possible because of structural design or work site conditions. Personnel lifts must be properly planned and executed. This type of lift meets the requirements of a critical lift and the lift will be performed within those constraints. A SLAC lift plan or approved equivalent will document the planning and execution of a personnel lift. The lift plan will document why the other means are not usable.

11.3.6.2 Pre-lift Meeting

A pre-lift meeting must be conducted before initiating a personnel lift. Workers involved in the work activity must attend the pre-lift meeting, including the CM, CSSR, lift plan approver, subcontractors, man basket occupants, and the crane operator.

11.4 SLAC Special Emphasis

11.4.1 Department of Energy Hoisting and Rigging Standard

SLAC follows the Department of Energy (DOE) Hoisting and Rigging Standard ([DOE-STD-1090](#)), a DOE-wide consensus standard for rigging, crane, and hoist operations. It references applicable industry standards and regulations governing this type of work. The standard contains detailed information on hoisting and rigging inspection, testing, maintenance, and operational requirements.

11.4.2 Suspect and Counterfeit (S/CI) Rigging and Hoisting Components

Per SLAC requirements all shackles must meet or exceed the requirements of ASME B30.26. Each shackle body must be permanently and legibly marked in raised or stamped letters on the side of the bow and must be used to show:

- Manufacturer's name or trademark
- Size
- Safe working load or working load limit

Shackle pins must be permanently and legibly marked in raised or stamped letters.

- Manufacturer's name or trademark
- Material type or load rating

The ASME B30.26 standard for hooks requires that the manufacturer's identification be forged, cast, or die-stamped on a low-stress or non-wearing area of the hook.

11.5 Safety and Health Data Requirements

- [Hoisting and Rigging: Ordinary Lift Planning and Control Form](#) (SLAC-I-730-0A21J-022) or equivalent
- [Hoisting and Rigging: Critical Lift Planning and Control Form](#) (SLAC-I-730-0A21J-058) or equivalent
- Crane Inspections: daily/pre-use; monthly, periodic (4x/year), annual, and quadrennial
- Maintenance records
- Proof of training/certification
- NCCCO Physical Examination Form
- Department of Transportation (DOT) Medical Examiner's Certificate

12 Fall Protection

12.1 Applicability

The requirements of this section apply to all subcontractor work activities that require personnel to work at or potentially be exposed to unprotected heights of six feet or more at SLAC. This includes working at unprotected heights of six feet or more during excavation and trenching activities.

12.2 Regulatory and SLAC Requirements

The subcontractor fall protection program must be conducted in accordance with the following regulatory requirements:

- Title 29, *Code of Federal Regulations*, "Labor", Subtitle B, "Regulations Relating to Labor" (Continued), Chapter 17, "Occupational Safety and Health Administration, Department of Labor"

(Continued), Part 1926, “Safety and Health Regulations for Construction”, Subpart M, “Fall Protection”, Section 1926.501, “Duty to Have Fall Protection” ([29 CFR 1926.501\[b\]\[1\]](#))

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”, Article 24, “Fall Protection” ([8 CCR 1669–1671.2](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 1, “General Physical Conditions and Structures”, Article 2, “Standard Specifications”
 - Section 3209, “Standard Guardrails” ([8 CCR 3209](#))
 - Section 3210, “Guardrails at Elevated Locations” ([8 CCR 3210](#))
 - Section 3212, “Floor Openings, Floor Holes, Skylights and Roofs” ([8 CCR 3212](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 1, “General Physical Conditions and Structures”, Article 4, “Access, Work Space, and Work Areas” ([8 CCR 3270–3280](#))
- ANSI/ASSE standards as cited in SLAC ESH Manual [Chapter 45, “Fall Protection”](#)
- SLAC ESH Manual [Chapter 45, “Fall Protection”](#) (pertinent sections described here)

12.3 SLAC-specific Requirements and Procedures

In addition to Section 12.2, all subcontractor fall protection activities must meet the following SLAC-specific requirements.

SLAC requires 100 percent fall protection above six feet:

- All workers who are constructing a leading or unprotected edge, six feet or more above lower levels, must be protected from falling by guardrail systems, safety net systems, or personal fall restraint or arrest systems. No exceptions allowed.
- The height allowances permitted for fall protection on steel erection and other trade-related exceptions to Cal/OSHA regulations do not apply at SLAC.

12.3.1 Fall Protection Program

Subcontractors, performing activities at heights of six feet or more, must have a fall protection program that meets the requirements of this section. The program must identify the following key personnel as identified in ANSI/ASSP Z359.1 who maintain the requisite knowledge and responsibility for the successful implementation of the program at the project:

- Program administrator
- Qualified person
- Competent person

Additionally, the subcontractor must ensure personnel that are required to utilize fall protection meet the qualification of an authorized person as defined by ANSI/ASSE Z359.2.

Note Employees trained by a competent person in accordance with the requirements identified in the ANSI/ASSP Z359.1 will be considered meeting the necessary fall protection training for an authorized person.

12.3.2 Elevated Surface Work Plan (ESWP)

An ESWP (SLAC's [ESWP form](#) or approved alternative) must be used to document any activity requiring work to be performed above six feet above a lower level that does not have guardrails or their equivalent. Use of scaffolding, ladders, and mobile elevated work platforms are exempt from this requirement. (Note use of ladders within six feet of a leading edge does require an ESWP.)

The ESWP will address the hazards, mitigations, and conditions under which a worker(s) will access and perform work on, an elevated surface. The ESWP will be filled out completely including height and payout calculations. Also, equipment cut-sheets must be provided for the actual equipment that will be used (for example, self-retracting lanyard, anchor, etc.). The mitigations of the hazards will follow the fall protection hierarchy outlined below.

If fall arrest is chosen as the method of protecting workers from working on an unprotected elevated work surface, a description of why guardrails and fall restraint cannot be used will be included on the ESWP. The name/date/signature of the subcontractor's author and competent person will be recorded on the ESWP before its review and acceptance by a designated SLAC competent or qualified person. The ESWP is in addition to the JSA for the work being performed and becomes part of the construction folder for the work/project.

ESWPs must be submitted to the SLAC CM for review at least ten working days before needed.

The subcontractor must incorporate the following hierarchy of control when selecting methods to eliminate or mitigate fall hazards:

- **Hazard elimination.** First consider eliminating fall hazards. This might involve moving the work surface to ground level or changing a task so that workers do not approach the fall hazard.
- **Alternative means.** Using boom or scissor lifts (mobile elevated work platforms) or scaffolding to remove workers from a fall hazard.
- **Passive fall protection.** Take actions that isolate or effectively separate the hazard from workers, such as installing floor coverings or handrail/guardrail systems.
- **Fall restraint.** Establish a travel restraint system that prevents a worker from accessing a position from which he or she could fall.
- **Fall arrest.** Configure a personal fall arrest system (PFAS) designed to arrest a fall after it has begun.
- **Administrative fall protection system (Fall Protection Plan).** Establish controlled-access zones and safety-monitoring systems. All other means of protecting workers must be exhausted before a fall protection plan can be considered for use at SLAC. The fall protection plan must be written by a qualified person and approved by SLAC's chief safety officer and the DOE site manager.

12.3.3 Fall Protection Equipment System Requirements

Fall protection equipment and systems must be used in accordance with the manufacturer's recommendations and the requirements of this procedure. Misapplication or use of this equipment in a way contrary to those requirements is prohibited. The subcontractor's competent person must supervise the work and verify that the fall protection system is properly established and maintained. A qualified person will be required for fall protection equipment use, where leading edge work is required. Special attention must be afforded to: (a) swing radius if fall might start at an angle to the anchor point; (b) use of self-retracting lanyards tied off horizontally (equipment must be rated for horizontal use and all necessary accessories provided); (c) anchor locations that are not above the dorsal D-ring location between shoulder blades.

12.3.3.1 Personal Fall Arrest System Strength Requirements

Subcontractors must ensure that the strength and testing requirements for personal fall arrest systems, components, and subsystems must comply with the provisions of ANSI/ASSE Z359.4, “Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components”. All other applicable fall protection equipment and system requirements must at a minimum meet the requirements of ANSI/ASSE A10.32, “Personal Fall Protection Used in Construction and Demolition Operations”, used in construction and demolition operations.

12.3.3.2 Personal Fall Arrest System (PFAS) Inspections and Storage

Routine Inspection

PFAS equipment must be inspected by the authorized worker using the equipment before each use. Equipment inspections must follow the guidelines established by the manufacturer. Damaged or questionable equipment must be immediately removed from service and tagged accordingly. Equipment that cannot be repaired must be destroyed.

Post-fall Inspection

PFAS components subject to a fall must be immediately removed from service and destroyed or returned to the manufacturer for inspection, repair, and re-certification. Contact the manufacturer to determine the available options.

Periodic Inspection

A competent person, other than the user, must periodically inspect PFAS equipment. This inspection must follow the intervals and guidelines established by the manufacturer but must not be greater than six months. The results of these inspections must be recorded and available for review by SLAC.

Equipment Storage

Fall protection equipment must be stored in a manner that protects it from exposure to adverse conditions, such as ultraviolet light or harsh weather, that could result in damage or diminished performance and/or other specific requirements established by the manufacturer.

12.3.3.3 Safety Net Systems

The use of safety net systems as the means of fall protection is not anticipated at SLAC unless used in conjunction with other accepted means of fall protection and compliance with other regulatory requirements. Contact the SLAC CSSR for additional information on safety net systems.

12.3.4 Portable Ladders

12.3.4.1 General Requirements

- Portable ladders must be set up and used in accordance with [8 CCR 3276](#) and manufacturer requirements and be a minimum Type I, Heavy Duty. The ladder must be manufactured to the ANSI ASC A14 series standards. Light- and medium-duty class ladders are prohibited.
- Type 1A and 1AA (Extra Heavy Duty and Special Duty) portable ladders are strongly recommended.

- Extension or straight ladders must be tied/secured off to prevent displacement.
- Ladder users must maintain three-point control (three limbs maintain contact on the ladder) while ascending and descending the ladder.
- Job-made ladders when constructed and used must be built in accordance with ANSI A14.1, “Wood Safety Requirements”. Job-made ladders must receive daily visual before use and weekly documented inspections.

12.3.4.2 Fall Protection

Fall protection is not required when using portable ladders in accordance with the following requirements:

- The work can be performed without the employee having to reach (the employee’s hips remain within the plane of the vertical side rails).
- Ladder users are not subject to a fall to a level lower than the base of ladder they are working from. If ladders are used in this condition, then the fall protection requirements of this section must apply.
- The ladder work activity has been evaluated by a competent person who has made the determination that the work activity meets all the requirements of this section.

12.3.5 Scaffold Use

Refer to [Ladder and Scaffold Safety: Scaffold Use Procedure](#) (SLAC-I-730-0A21C-029)

12.3.6 Fall Protection on Roofs

Work on low-slope (a maximum slope of four vertical to 12 horizontal) roofs must be managed in like manner to horizontal surfaces. Roofs with more pitch are considered a fall hazard immediately when accessed, no matter how far the work location is from the leading edge.

12.3.7 Subcontractor Training Requirements

Subcontractors that are trained in accordance with the requirements identified in ANSI/ASSE Z359 will be considered as meeting the necessary fall protection training requirements for working at SLAC. The Subcontractor must provide proof of such training. This documentation will become part of the JSA for that work. The subcontractor is required to provide authorized and competent persons (as defined in ANSI/ASSP Z359.1) at the job site.

12.4 SLAC Special Emphasis

12.4.1 Fall Protection Plan

A fall protection plan (FPP) is required for performing work on an unprotected elevated work area where conventional fall protection methods, scaffolding, or other means are impractical. All other fall protection means must be exhausted before a FPP is considered. A FPP must

- Demonstrate why conventional fall protection cannot or should not be used
- Be prepared and changed only by a qualified person and developed specifically for the site where the work is being performed
- Name the qualified person who developed the plan

- Be approved in writing by the SLAC chief safety officer and the Department of Energy (DOE) site manager or designee
- Be kept up to date as the project progresses or conditions change
- Be kept at the job site
- Be implemented under the supervision of a competent person in fall protection, who must be identified in the plan
- Include written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection provided by conventional fall protection systems
- Identify locations where conventional fall protection methods cannot be used and designate these locations as controlled access zones (CAZs), cordon them off using a control line (see Figure 1), and identify each worker allowed to work in the CAZ. Other workers may work within the control line, in the designated area, under an elevated surface work plan.
- Implement a safety monitoring system when workers are in the CAZ, including making sure workers work in teams of two or more

See Figure 1 for controlled access zone requirements.

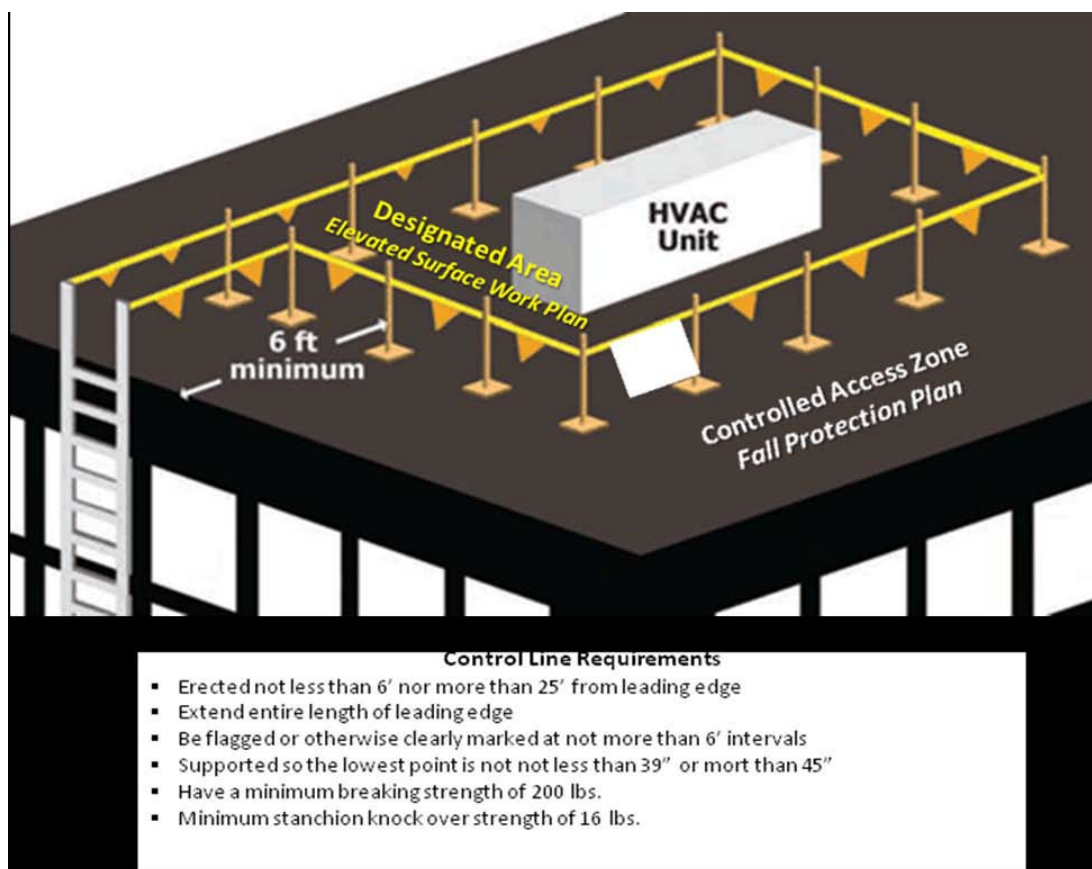


Figure 1 Control Line Requirements

12.5 Safety and Health Data Requirements

- Elevated surface work plan, using [Fall Protection: Elevated Surface Work Plan Form](#) (SLAC-I-730-0A21J-047) or equivalent
- Fall protection plan
- Cut-sheets of equipment must be submitted to the SLAC CM for review and approval before use
- Training records
- Fall protection program

13 Industrial Hygiene

13.1 Applicability

The requirements of this section apply to all subcontractor work activities involving industrial hygiene matters as they relate to construction activities at SLAC.

This section defines the requirements and responsibilities for anticipating, recognizing, evaluating, and controlling employee exposures to chemical, physical, and biological agents encountered during construction activities. The subcontractor industrial hygiene (IH) program must address the following elements, as applicable:

- Noise
- Hazardous materials
- Carcinogen control
- Subcontractor work site dust control
- Sanitation
- Temperature extremes
 - Heat stress
 - Cold stress
- Lighting and illumination
- Local exhaust ventilation
- Silica exposure
- Lead
- Hexavalent chrome
- Asbestos
- Lasers
- Safety showers and eyewash apparatus
- Ionizing radiation
- Personal exposure monitoring
- Respiratory protection
- Blood-borne pathogens
- Other significant project-related hazards

The subcontractor must provide personnel adequately trained/qualified to manage and implement their industrial hygiene program to a level required for the scope of work.

13.2 Regulatory and SLAC Requirements

The subcontractor industrial hygiene program must be conducted in accordance with the following regulatory requirements:

- Title 10, *Code of Federal Regulations*, “Energy”, Chapter 3, “Department of Energy”, Part 851, “Worker Safety and Health Program” ([10 CFR 851](#)) (as described in [SLAC Injury and Illness Prevention Program](#) [SLAC-I-720-0A21B-001])
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 3.2, “California Occupational Safety and Health Regulations (Cal/OSHA)”, Subchapter 1, “Regulations of the Director of Industrial Relations”, Article 4.5, “Multi-employer Worksites” ([8 CCR 336.10–336.11](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”, Article 3, “General”, Section 1509, “Injury and Illness Prevention Program” ([8 CCR 1509](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 1, “General Physical Conditions and Structures Orders”, Section 3203, “Injury and Illness Prevention Program” ([8 CCR 3203](#))
- American Conference of Governmental Industrial Hygienists (ACGIH). *Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* (ACGIH TLVs and BEIs)
- American Conference of Governmental Industrial Hygienists (ACGIH)
 - *Industrial Ventilation: A Manual of Recommended Practice for Design*
 - *Industrial Ventilation: A Manual of Recommended Practice for Operation and Maintenance*

Additional regulatory requirements can be found in specific SLAC ESH Manual chapters cited below.

13.3 SLAC-specific Requirements and Procedures

In addition to the requirements in Section 13.2, the subcontractor industrial hygiene program must meet the following SLAC requirements.

The subcontractor IIPP must include a comprehensive industrial hygiene program, including coordination with cognizant occupational medical, environmental, health physics, and work planning professionals. [10 CFR 851, Appendix A.6]

13.3.1 General Requirements

13.3.1.1 Identification of Health Hazards

The subcontractor must identify and document, as part of the JSAs, existing and potential physical, chemical, and biological health hazards. The JSAs must include any additional hazards revealed by supplemental site information provided by SLAC (for example, site characterization data, as-built

drawings, information regarding adjacent operations, etc.) and should be kept updated to reflect changes in exposure potential, new information, monitoring data, etc.

13.3.1.2 Control Measures

The subcontractor's industrial hygiene program must require that controls be implemented to eliminate or reduce employee exposures to below-recognized occupational exposure limits (Cal/OSHA PELs and ACGIH TLVs). Control measures to eliminate or reduce industrial hygiene-related exposures must be identified during the pre-job planning process, captured in the IIPP and delineated in the JSAs.

The implementation of control measures must follow the following hierarchy:

1. Substitute to a less hazardous material if possible
2. Use engineering controls
3. Use administrative controls
4. Use personal protective equipment (PPE)

In the absence of monitoring data, subcontractors must always take a conservative approach.

13.3.1.3 Exposure Assessment

The subcontractor must perform monitoring as necessary to document employee exposures to chemical and physical hazards when required by regulation (for example, asbestos or lead). Subcontractors must be prepared to justify the adequacy of their selected controls.

Workers must be informed of monitoring results as soon as the results have been returned to Subcontractor, within the Cal/OSHA-specified timeframe. Co-located workers (who have similar exposure potential as those who were monitored) must also be informed of the results, after removing any personal/confidential information.

The subcontractor must notify the CM and CSSR of the results of monitoring as soon as they are obtained, and provide SLAC with copies of the results, field notes, and other associated documentation.

SLAC reserves the right to perform monitoring of any subcontractor construction activity.

13.3.2 Noise (Hearing Conservation)

Subcontractor hearing conservation program must comply with requirements of the following:

- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 3.2, "California Occupational Safety and Health Regulations (Cal/OSHA)", Subchapter 7, "General Industry Safety Orders", Group 15, "Occupational Noise", Article 105, "Control of Noise Exposure" ([8 CCR 5095–5100](#))
- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 3.2, "California Occupational Safety and Health Regulations (Cal/OSHA)", Subchapter 4, "Construction Safety Orders", Article 3, "General", Section 1521, "Ear Protection" ([8 CCR 1521](#))
- American Conference of Governmental Industrial Hygienists (ACGIH). Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) (ACGIH TLVs and BEIs)

Every feasible effort must be made to engineer out noise exposures greater than or equal to an eight-hour time-weighted-average (TWA) sound level of 85 decibels (dBA) or impact/impulse noise exceeding 140 dBA peak sound pressure, before using personal hearing protection as a noise attenuation device. For TWA exposures greater than or equal to 85 dBA, 3 dB doubling is required at SLAC. For example, an 88 dBA exposure cannot be exceeded for more than four hours. When controls are not feasible or fail to reduce noise to acceptable levels, hearing protection must be required. Additionally, if work is to be performed in an environment that is suspected to exceed the allowable noise exposures, but no measurements have been taken to identify levels, mandatory hearing protection requirements must be implemented.

The subcontractor must survey and evaluate suspected high noise areas and work efforts. Periodic noise measurements must be taken to confirm hazards are understood and controls are adequate. Employees may observe surveys and evaluations, and the results must be made available to employees.

- Workers routinely exposed to high noise should be included in the subcontractor's medical monitoring program. Refer to Section 4.13 for more detail.
- Worker use of hearing protection must be reinforced daily.
- High noise areas must be posted with appropriate warning signs at all entrances.
- Workers must not use audio ear buds while on the construction site.

Per Cal/OSHA and ACGIH guidance there are circumstances where earmuffs or earplugs alone are not adequate to achieve required noise reduction and both must be worn to achieve the acceptable level of noise reduction. SLAC requires such double protection for high noise operations such as jackhammering and saw cutting. No noise-cancelling devices may be worn at SLAC unless they have an NRR (Noise Reduction Rating) included in the users-manual sufficient to reduce the noise level at the job site below 85dBA.

Refer to SLAC ESH Manual [Chapter 18, "Hearing Conservation"](#), for more information.

13.3.3 Control of Hazardous Materials

A hazardous material is any substance that presents a physical or health hazard to humans. Hazardous material exposures should be maintained at the lowest exposure levels practical. A chemical must not be used in any situation unless an individual has information indicating how the material can be used safely. Control measures to prevent overexposure to chemicals must be incorporated into the JSA as necessary.

Refer to SLAC ESH Manual [Chapter 40, "Chemical Lifecycle Management"](#), and [Chapter 53, "Chemical Safety"](#), for more information.

13.3.4 Carcinogen Control

The subcontractor must make every attempt to substitute less hazardous substances for any carcinogenic material (as defined by [8 CCR 5194](#)). If hazardous materials containing carcinogenic components are used, the subcontractor must ensure that exposures are eliminated or effectively maintained as low as reasonably achievable (ALARA).

Where the subcontractor's use of carcinogens may impact SLAC workers, SLAC may impose additional, specific controls upon the subcontractor.

13.3.5 Subcontractor Work site Dust Control

All subcontractor projects must address dust control during pre-job planning. Outdoor areas to be cleared for construction must be limited to keep dust generation to a minimum. Earthwork must be suspended when winds exceed 25 mph. Fugitive dust emissions resulting from grading and/or wind must be controlled. During construction, frequent watering must be provided to roadways and disturbed areas that are not otherwise treated. The subcontractor may need to perform worker exposure monitoring at much lower levels to demonstrate negative exposures to silica.

During facility renovation activities barriers are to be installed as needed to prevent dust migration from construction areas to other occupied space. Sufficient equipment must be kept at the job site to control dust whenever a nuisance or hazard occurs. Indoors, dry sweeping is discouraged.

Refer to Division 1 Specifications, SECTION 015000, TEMPORARY FACILITIES AND CONTROLS, for more information.

13.3.6 Sanitation

Housekeeping must be performed daily. All work areas, shops and offices must be kept clean to the extent the nature of the work allows. Walking/working surfaces must be maintained, so far as practicable, in a dry condition. Waste receptacles that do not leak and may be thoroughly cleaned and maintained in a sanitary condition must be used. All sweepings, wastes, refuse, and garbage must be removed in a timely and sanitary manner. Cleaning and sweeping must be done in a manner that minimizes the contamination of the air with dust or particulate matter. Building entrances and openings must be maintained to minimize the entry of vermin.

When provided, water facilities and containers must be maintained, cleaned, and sanitized in accordance with applicable regulations. Use of common utensils (for example, sharing the same cup) is prohibited. Adequate and fully equipped toilets and wash stations must be readily accessible to workers and maintained in a sanitary manner at all times. Separate toilets must be provided for men and women in accordance with [8 CCR 1526](#).

13.3.7 Temperature Extremes

Provisions to prevent heat stress and cold stress must be incorporated into the project JSAs when work conditions may reasonably be expected to present such hazards. The thermal stress section of the ACGIH TLVs must be the governing guidelines.

13.3.7.1 Heat Stress

The subcontractor must provide appropriate mitigating measures before heat stress becoming an issue. The ACGIH Heat Stress TLV must be followed for developing and implementing heat stress mitigation strategies. The use of heat stress controls must be addressed during the planning stages for all work that is to be performed in elevated temperature environments, and whenever impermeable clothing or multiple layers of clothing must be worn to conduct work.

Refer to SLAC ESH Manual [Chapter 57, “Heat Illness Prevention”](#), for more information.

13.3.7.2 Cold Stress

The ACGIH Cold Stress TLV is the prescribed standard for cold exposure. When work involves continuous employee exposure to an equivalent chill temperature (ECT) below 10° F, the following safe work practices must be observed:

- Workers are instructed on symptoms of frostbite and hypothermia, and appropriate preventive and first aid measures.
- Warming areas are conveniently available and workers must be allowed to access the warming areas at will.
- Work is conducted using the buddy system or under continued supervision.
- Non-emergency work is curtailed when the ECT in the work area is below -25° F. Workers who experience physical illness or injury from cold exposure are to be immediately moved to a warm area, and then examined by a physician.

13.3.8 Lighting and Illumination

The minimum lighting level for construction areas both indoors and outdoors must be an average of 5 foot-candles measured 30 inches above the floor. Illumination for general construction plant and shop areas must maintain an average lighting level of 10 foot-candles. Auxiliary lighting must be used when needed for task specific activities. Care must be exercised with the use of halogen lamps so that fire hazards are not created.

13.3.9 Local Exhaust Ventilation

Local exhaust ventilation is a primary engineering control and is required to reduce concentrations of hazardous, irritating, and odiferous air contaminants below allowable exposure limits (where feasible). The operability of such systems must be evaluated before the start of the work. The ACGIH Industrial Ventilation manuals are the references of standard for the design and operation of ventilation systems. Ventilation systems requiring HEPA filtration should be challenge-tested at least annually to verify their effectiveness.

Refer to SLAC ESH Manual [Chapter 53, “Chemical Safety”](#), for more information.

13.3.10 Silica Exposure

The subcontractor must comply with [8 CCR 5204](#), [29 CFR 1926.1153\(c\)\(1\)](#), [Table 1](#), and the additional SLAC vacuum cleaner requirements described below. Engineering controls such as wet methods and/or HEPA filtration should be employed whenever dust-producing activities are anticipated.

Refer to SLAC ESH Manual [Chapter 56, “Respirable Crystalline Silica”](#), for more information..

Subcontractors must

- Designate a respirable crystalline silica competent person and ensure that person carries out all required duties.
- Have their own [8 CCR 5204](#)-compliant written silica exposure control plan for their employees potentially exposed due to work. This plan must be submitted to SLAC as part of their IIPP.
- Train workers in silica control as required by [8 CCR 5204](#).
- When required by [8 CCR 5204](#), implement a medical surveillance program for their own employees.

- Ensure silica control equipment is properly maintained and utilized.
- If vacuuming is the control method selected, vacuums with HEPA filtration are required.

13.3.10.1 HEPA Vacuums

High-efficiency particulate absorbing (HEPA) vacuums used for silica control must undergo annual empty oil aerosol or equivalent challenge testing and be certified as in passing condition before work commencing. Vacuum testing must include checking around the exhaust vents and the canister/filter housing seals. Before a third-party vendor performs HEPA filter testing, it is advised that the vacuum cleaner owner change the collection bag and inspect the unit for wear and damage.

Subcontractors must have their silica-control HEPA vacuum cleaners undergo HEPA filter efficiency testing, as described above, before use at SLAC. The date of the vacuum testing must be no earlier than a year before the end of the SLAC project. Documentation of third-party certification of HEPA filter efficiency must be provided to the SLAC project manager.

13.3.11 Lead

Refer to Division 2 Specifications, SECTION 028300 – LEAD-RELATED CONSTRUCTION AND REMEDIATION, if lead containing materials are part of the construction scope.

13.3.12 Hexavalent Chrome

The Construction Industry Chromium (VI) Standard ([8 CCR 1532.2](#)) will apply to all work performed by the subcontractor that may expose workers to airborne hexavalent chromium. The subcontractor must be responsible for compliance with all requirements of the standard.

13.3.13 Asbestos

Refer to Division 2 Specifications, SECTION 028200 – ASBESTOS REMEDIATION, if asbestos containing materials are part of the construction scope.

13.3.14 Lasers

Class 1 laser systems incorporated into commercially available devices for use by the general public are exempt from these requirements, unless opened, serviced, or modified. Laser equipment must bear a conspicuously displayed label to indicate hazard classification.

Users of Class 1, Class 2, or Class 3R lasers must be trained and the training must be documented. The documentation will be kept with the construction folder. Before a Class 2 or 3R laser is put into operation an area hazard warning signs will be posted. This sign must indicate type of laser, wavelength, power, and classification. The signal word on the sign for Class 2 lasers: CAUTION. The signal word on the sign for Class 3R lasers: DANGER. The CM can provide warning sign templates.

Laser pointers have a 5mW limit. Allowable laser pointers at SLAC are labeled Class 2, Class 3a, or Class 3R. Others are not permitted.

Class 3B and Class 4 lasers must not be used at SLAC.

Refer to SLAC ESH Manual [Chapter 10, “Laser Safety”](#), for more information.

13.3.15 Safety Showers and Eyewashes

Suitable facilities for quick drenching or flushing of the eyes and body (eyewash/shower apparatus) must be provided within the work area for immediate emergency use where the eyes or body of any person may be exposed to injurious corrosive materials, (for example, corrosives, skin sensitizers, etc.). An eyewash/shower apparatus must be located such that it would require no more than 10 seconds to reach from the hazard. Access must be free of any impediments. For battery handling areas, facilities for quick drenching of the eyes and body must be provided within 25 feet.

Employees who may have a need for an eyewash/shower apparatus must know where the nearest eyewash/shower apparatus is located and how to operate it. Monthly functional testing of eyewash/shower apparatus must be documented. Portable eyewash stations are only allowed where a plumbed water source is not available. The potable water provided for a portable eyewash/shower apparatus must be flushed or changed according to manufacturer’s specifications.

Refer to SLAC ESH Manual [Chapter 53, “Chemical Safety”](#), for more information.

13.3.16 Ionizing Radiation

As described in the Terms and Conditions, Article 18, radioactive materials, sealed radioactive sources, or devices that generate ionizing radiation must not be brought on the SLAC site without express written permission of the SLAC subcontract administrator and Radiation Protection Department. Any subcontractor needing to bring radioactive material, sources, or radiation-generating devices onto SLAC property must allow sufficient lead time in their schedule for SLAC’s review and approval. Subcontractors must coordinate submittal of the necessary information with the CM.

Work at SLAC, designated as radiological work, must follow the SLAC [Radiological Control Manual](#).

Refer to SLAC ESH Manual [Chapter 9, “Radiological Safety”](#), for more information.

13.3.16.1 Safety and Health Data Requirements

- None

13.3.16.2 Resources

- Terms and Conditions, Article 18, Environmental Protection Requirements
- [Materials Restrictions](#) (Radiation Related)
- [Radiological Control Manual](#) (SLAC-I-720-0A05Z-001)

13.3.17 Respiratory Protection

Refer to SLAC ESH Manual [Chapter 29, “Respiratory Protection”](#), for more information.

13.3.18 Blood-borne Pathogens

Employees who may reasonably be expected to be exposed to blood or other body fluids must comply with [8 CCR 5193](#). First aid kits must contain universal precaution items, including chemical splash goggles,

medical gloves, cardiopulmonary resuscitation (CPR) masks (with one-way valve), antiseptic hand cleaner, drying cloths, sharps containers, and red bags labeled BIOHAZARD. Medical waste generated by first aid response must be placed in labeled red bags, and disposal coordinated through the [SLAC Occupational Health Center](#).

Refer to SLAC ESH Manual [Chapter 46, “Blood-borne Pathogens”](#), for more information.

13.3.19 Other Health Hazards

Other hazards that may be present during the subcontractor’s work not specifically addressed in this manual must be identified by the subcontractor and addressed in their JSAs. Subcontractors are encouraged to discuss their potential hazards in advance with the PM, CM, and CSSR to ensure minimal impact to the project schedule and the smooth coordination of logistics.

13.3.20 Hazard Communication

See Section 15.

13.4 Subcontractor Responsibilities

The subcontractor must be responsible for implementing an effective industrial hygiene program that

- Identifies, evaluates, and controls potential and existing hazards/agents in the workplace through the pre-job safety planning process
- Determines that engineering devices, administrative controls, and personal protective equipment are available, appropriate, tested, and utilized by employees
- Determines employees are trained as required
- Stops work that is not being safely performed
- Reports occupational exposure data to affected employees in a timely manner

14 Personal Protective Equipment (PPE)

14.1 Applicability

This section provides the requirements for the use of personal protective equipment (PPE). The requirements of this section apply to all construction subcontractor work activities at SLAC.

14.2 Regulatory and SLAC Requirements

The selection, use, and design of PPE must comply with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 2, “Safe Practices and Personal Protection”, Article 10, “Personal Safety Devices and Safeguards”

- Section 3380, “Personal Protective Devices” ([8 CCR 3380](#))
- Section 3381, “Head Protection” ([8 CCR 3381](#))
- Section 3382, “Eye and Face Protection” ([8 CCR 3382](#))
- Section 3383, “Body Protection” ([8 CCR 3383](#))
- Section 3384, “Hand Protection” ([8 CCR 3384](#))
- Section 3385, “Foot Protection” ([8 CCR 3385](#))
- Section 3387, “Sanitation” ([8 CCR 3387](#))
- Section 3390, “Protection from Electric Shock” ([8 CCR 3390](#))
- American National Standards Institute (ANSI) Z87.1, “Practice for Occupational and Educational Eye and Face Protection” (ANSI Z87.1)
- American National Standards Institute (ANSI) Z89.1, “Personal Protection Protective Headwear for Industrial Workers” (ANSI Z89.1)
- American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) 107, “High Visibility Safety Apparel” (ANSI/ISEA 107)
- ASTM International (ASTM) F2413, “Standard Specification for Performance Requirements for Foot Protection” (ASTM F2413)
- SLAC ESH Manual [Chapter 19, “Personal Protective Equipment”](#) (pertinent sections described here)

14.3 SLAC-specific Requirements and Procedures

In addition to the requirements in Section 14.2, subcontractors must meet the following SLAC requirements.

14.3.1 General Requirements

Personal protective equipment (PPE) is not a substitute for engineering and administrative controls. These controls must be implemented, to the extent feasible, to mitigate the hazard so that the need for PPE is reduced or eliminated. Subcontractors must provide PPE to its employees in accordance with Cal/OSHA requirements.

At a minimum, all subcontractor personnel must wear sturdy work shoes, long pants, and shirts with four-inch sleeves. Personnel working on construction activities or entering the demarcated construction zone must also wear safety toe boots, hard hats, safety glasses with rigid side-shields and reflective, high visibility traffic safety vests (minimum ANSI Class 2).

These requirements apply to all personnel, including delivery persons who exit vehicles and design professionals (for example, architects and engineers).

The subcontractor is responsible for supplying and requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions and/or where this manual indicates the need for using such equipment to reduce the hazards to the employees.

14.3.2 Training

Subcontractors must provide training to each employee who is required to use PPE. Each affected employee must show understanding of training to their specific PPE. Retraining may be necessary if work activities change or the employee exhibits lack of understanding of the PPE.

14.3.3 PPE Hazard Assessment and Selection

The appropriate PPE for the work being performed must be specified in the applicable JSA. The PPE selection must be based on the hazard assessment results conducted for the work activity.

15 Hazard Communication

15.1 Applicability

The requirements of this section apply to all subcontractor work activities involving hazardous materials as they relate to the construction activities at SLAC. This section defines the requirements and responsibilities for the subcontractors who use, apply, store, or generate hazardous materials at SLAC.

15.2 Regulatory and SLAC Requirements

The subcontractor's program must comply the following regulatory requirements:

- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 4, "Division of Industrial Safety", Subchapter 7, "General Industry Safety Orders", Group 16, "Control of Hazardous Substances", Article 109, "Hazardous Substances and Processes", Section 5194 "Hazard Communication" ([8 CCR 5194](#))
- SLAC ESH Manual [Chapter 40, "Chemical Lifecycle Management"](#) (pertinent sections described here)
- SLAC ESH Manual [Chapter 53, "Chemical Safety"](#) (pertinent sections described here)

15.3 SLAC-specific Requirements and Procedures

In addition to the requirements in Section 15.2, the subcontractor's hazard communication program must meet the following SLAC requirements.

15.3.1 General Requirements

The subcontractor's hazard communication program must include hazard determination, safety data sheets (SDSs), labels and other forms of warning, employee information training, and a written hazard communication program.

The subcontractor must provide a list of hazardous materials, and the SDSs for those materials, to the CM, before bringing the product on site. The submittal will be reviewed and accepted or denied before the work begins.

The subcontractor is responsible for maintaining an up-to-date chemical inventory and copies of safety data sheets (only of those chemicals brought on site). These must be maintained with the construction folder and made readily available for review by site workers, SLAC staff, and DOE staff.

Before using any newly introduced hazardous material or product, the subcontractor must obtain a copy of the appropriate SDS and submit the SDS to the CM and CSSR for review and approval. Approval is required before the material being brought to SLAC. The subcontractor, CM, and CSSR must review the JSA to determine if the steps and controls are adequate for the new hazardous material. The JSA will be updated and communicated to the workers, SLAC personnel, and other affected personnel.

15.3.2 Specific Communication Requirements

The subcontractor must determine, with review by the CM and CSSR, if their use of hazardous materials may affect (expose or pose a potential danger in the event of an emergency) other subcontractor or SLAC employees. If the hazardous materials form or the way it will be used creates a potential for affecting other employees, the subcontractor must take appropriate notification steps. The subcontractor must inform the other employer(s) of any precautionary measures that need to be taken to protect other subcontractor and/or SLAC employees from inadvertent/unnecessary exposure to the subcontractor's hazardous materials during normal operating conditions and in foreseeable emergencies.

Work areas where chemical and/or biological hazards are known to pose an exposure potential must be clearly designated as such (with signs, placards, postings, etc.) along with control requirements (PPE requirements, ventilation, authorization for access required, etc.).

15.4 SLAC Special Emphasis

Some chemicals have additional requirements for bringing on SLAC property. These include the following:

- Alkali metals
- Beryllium
- Perchloric acid and other peroxide-forming chemicals
- Unstable, reactive, pyrophoric, or explosive chemicals
- Hydrofluoric acid
- Radioactive materials
- Highly toxic chemicals and reproductive toxins (depending upon the form, the quantity and method of application or use)
- Pesticides/herbicides
- Bio-chemicals

Use of these chemicals at SLAC may necessitate additional control mechanisms such as establishing dedicated use areas, specific postings/warning signs, notification to adjacent workers, ventilation controls, decontamination procedures, personal hygiene facilities, etc. The subcontractor must notify the CM and CSSR before bringing any of these materials on site.

15.5 Subcontractor Responsibilities

The subcontractor must be responsible for

- Administering their hazard communication program
- Maintaining an on-site list of hazardous materials and SDSs to be used on the project

15.6 Safety and Health Data Requirements

- Hazard communication program
- On-site list of hazardous materials and SDSs to be used on the project

16 Confined Space

16.1 Applicability

The requirements of this section apply to all subcontractor work activities that requires personnel to work in permit-required and non-permit-required confined spaces at SLAC.

16.2 Regulatory and SLAC Requirements

The subcontractor confined space entry program and the associated work activities conducted in permit-required and non-permit-required confined spaces must be accordance with the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 16, “Control of Hazardous Substances”, Article 108, “Confined Spaces”, Section 5157, “Permit-Required Confined Spaces” ([8 CCR 5157](#))
 - Appendix A, “Permit-Required Confined Space Decision Flow Chart” ([8 CCR 5157 Appendix A](#))
 - Appendix B, “Procedures for Atmospheric Testing” ([8 CCR 5157 Appendix B](#))
 - Appendix C, “Examples of Permit-required Confined Space Programs” ([8 CCR 5157 Appendix C](#))
 - Appendix D1, “Confined Space Entry Permit” ([8 CCR 5157 Appendix D1](#))
 - Appendix D2, “Entry Permit” ([8 CCR 5157 Appendix D2](#))
 - Appendix E, “Sewer System Entry” ([8 CCR 5157 Appendix E](#))
- SLAC ESH Manual [Chapter 6, “Confined Space”](#) (pertinent sections described here)

16.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 16.2, all work activities conducted in permit-required and non-permit-required confined spaces must meet the following SLAC requirements.

Note *Confined space rescue is non-entry at SLAC and non-entry rescue procedures must be in place.*

16.3.1 Confined Space Work at SLAC – General

If known at the time of contracting, SLAC will include information on the need for confined space entry in the request for proposal (RFP). SLAC will describe the confined space, whether it is permit-required or non-permit-required, the known hazards of the space, and the purpose for entry. Subcontractors who will be required to enter a confined space must have a confined space program as part of their IIPP. This program will be reviewed for compliance with regulatory requirements and SLAC's program. SLAC will require the subcontractor to have a competent confined space person, workers who are properly trained in confined space entry (entrants and attendants), and all the necessary equipment to perform work in the confined space. Compliance verification is further described in Section 16.3.4.

SLAC's confined space permits and forms (or equivalent SLAC-approved forms) must be used:

- [Entry Permit](#)
- [Alternate Entry Form](#)
- [Non-permit-required Confined Space Entry Form](#)
- [Temporary Declassification Form](#)

16.3.2 Confined Space Classification

Confined spaces are classified as permit-required or non-permit-required based on the actual and/or potential hazards related to entry into the space. Before entry, all confined spaces will be evaluated and classified based on the actual and/or potential hazards related to entry into the space. Confined space classification is performed in advance of entries by the subcontractor communicating with the CM, the CSSR, and the SLAC confined space program manager.

16.3.2.1 Labeling and Signage

Existing confined spaces are labeled as permit-required or non-permit required. Constructed or fabricated confined spaces will be labeled by the subcontractor, following SLAC's requirements.

16.3.3 New or Previously Unidentified Confined Spaces

There is a possibility that construction activities may create new confined spaces (such as new utility vaults, manholes, ventilation ducts, tanks, sumps, and/or elevator pits). It is also possible that, during construction, subcontractors may encounter a confined space that had not been previously identified. During project design, SLAC will attempt to identify situations that may result in the creation of new confined spaces; however, it is not always possible to anticipate every potential confined space.

It is the subcontractor's responsibility to watch for new or previously unidentified confined spaces and to inform the SLAC CM and CSSR whenever new confined spaces are identified or created.

16.3.3.1 Identifying a Confined Space

A confined space

- Is large enough and so configured that an employee can bodily enter
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.)
- Is not designed for continuous employee occupancy

16.3.3.2 Hazard Recognition

Confined spaces will be considered hazardous until determined to be otherwise. Hazards will be identified and evaluated by a competent person before entry. The subcontractor will continuously evaluate of confined space conditions and will stop work if hazards increase or change. Additional controls must be implemented to control the new hazards.

16.3.4 SLAC Verification of Subcontractor's Compliance with Confined Space Entry

SLAC will require verification that the subcontractor is able to safely perform confined space entries. SLAC will verify that the subcontractor has the following:

- Confined space competent person
- Adequate number of workers to staff an entry team including entry supervisor, attendant, and entrant
- Current and documented confined space training
- Functioning, calibrated monitoring equipment and staff familiar with the use of the equipment
- Appropriate PPE, ventilation equipment, supplemental lighting if necessary, rescue equipment/plan
- Appropriate confined space entry form

16.3.4.1 Confined Space Entry Controls

Entries into confined spaces must be controlled either through administrative controls for non-permit confined spaces or through the permit procedure for permit-required confined spaces. Controls for confined space entries include the following:

- Mechanical ventilation
- Use of energy isolation procedures (LOTO)
- Cleaning of confined space
- Electrical precautions
- Fire precautions
- Pre-entry monitoring of the air in the confined space (this applies both to permit and non-permit required spaces)
- Continuous monitoring of air during entry into permit-required confined spaces
- PPE
- Communication procedures

The careful and accurate use of the various entry forms will aid in managing the entry properly.

16.3.5 Confined Space Entry Notification

The subcontractor will coordinate with the CM and CSSR for confined space entries. The SLAC confined space program manager is available to provide guidance and direction.

16.3.6 Subcontractor Training Requirements

Subcontractors that are trained in accordance with the requirements identified in [8 CCR 5157](#) will be considered as meeting the necessary confined space entry training requirements for working at SLAC. The subcontractor must provide SLAC proof of such training before the work is performed.

16.4 Safety and Health Data Requirements

Following SLAC forms, or SLAC-approved equivalents:

- [Confined Space: Entry Permit](#) (SLAC-I-730-0A21J-002)
- [Confined Space: Alternate Entry Form](#) (SLAC-I-730-0A21J-010)
- [Confined Space: Non-permit-required Confined Space Entry Form](#) (SLAC-I-730-0A21J-006)
- [Confined Space: Temporary Declassification Form](#) (SLAC-I-730-0A21J-009)
- Training records

17 Industrial Trucks

17.1 Applicability

The requirements of this section apply to all subcontractor work activities involving the operation of industrial trucks, such as forklifts and extended-reach forklifts.

17.2 Regulatory and SLAC Requirements

Use of industrial trucks must adhere to the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 4, “General Mobile Equipment and Auxiliaries”, Article 25, “Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment” ([8 CCR 3649–3669](#))
- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 16, “Control of Hazardous Substances”, Article 109, “Hazardous Substances and Processes”, Section 5185, “Changing and Charging Storage Batteries” ([8 CCR 5185](#))
- Department of Energy Standard 1090, “Hoisting and Rigging” ([DOE-STD-1090](#))
- Applicable standards as cited in SLAC ESH Manual [Chapter 48, “Industrial Trucks”](#)
- SLAC ESH Manual [Chapter 48, “Industrial Trucks”](#) (pertinent sections described here)

17.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 17.2, all work activities involving the operation of industrial trucks must meet the following SLAC requirements (see SLAC ESH Manual [Chapter 48, “Industrial Trucks”](#) for more detail):

- Operator must be trained and proficient in industrial truck operation. Documentation of training must be provided to SLAC.
- Lifts will be carefully planned to ensure success. If any doubt, do a practice run without a load.
- Operator must ensure the area below the load is secured (for example, danger tape, spotter).
- Operator and other workers involved in the lift must determine if a load needs to be secured to the forks or backrest. If necessary, ensure the load is stable and well secured.
- A spotter is required when the operator’s view is obstructed by the load or when operating in a congested area (due to people, work activities, or obstructions/tight spaces).
- A material receiver is required when the load is to be lifted to or from a second floor or higher.
- If a spotter or receiver is required, the operator and spotter or receiver must conduct a pre-lift review. operator, receiver, and spotter (if any) must conduct a pre-lift review to evaluate and resolve any concerns and agree on communication methods (for example, hand signals).
- Areas must be barricaded or a spotter used to keep people out of areas beneath lifts.
- Forks cannot be used as a hoist without specific fixture engineered for that purpose. Putting rigging straps directly on forks is prohibited. Use of such fixtures is encouraged but does requires a lift plan (see Section 11.3). If such use is anticipated throughout a job, preparing a lift plan for its use up to the maximum allowable load is advised.
- If traveling on SLAC roadways, load must be secured to pallet rest or backrest.
- Industrial trucks must meet applicable standards, be maintained and stored properly, be inspected by the subcontractor when first brought on site and be inspected before use each shift.
- Operators in violation of safety requirements must have their authorization to operate revoked until they are retrained.

17.4 Safety and Health Data Requirements

- Inspection records

18 Heavy Equipment Operation

18.1 Applicability

The requirements of this section apply to all subcontractor work activities involving the operation of heavy construction equipment such as backhoes, loaders, excavator, and dump trucks.

18.2 Regulatory and SLAC Requirements

Use of heavy equipment must adhere to the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders”, Article 10, “Haulage and Earth Moving” ([8 CCR 1590–1596](#))

18.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 18.2, all work activities involving the operation of heavy equipment must meet the following SLAC requirements:

- Prime subcontractors must provide close oversight of heavy equipment operators at the start of their work on the project site to ensure they are adequately skilled. Any concerns about competence must be immediately addressed. Subcontractor must stop the operator’s operation of the equipment until the matter is resolved.
- Operators must have been trained on the equipment they will use.
- Operators must be apprentice or journeyman operating engineers (construction equipment operators). Documentation of certification must be provided and kept in the construction folder.
- All vehicles must be in good repair and all brakes, lights, horns, backup signal, etc. fully functional.
- Vehicles must be checked at the beginning of each shift to ensure that the parts, equipment, and accessories are in safe operating condition. Any defective parts or equipment must be repaired or replaced before use.
- Equipment operators must be aware of workers on foot, and employees on foot must be aware of heavy equipment and maintain eye contact with the operator when passing in front.
- Seatbelts must be in good working order and must be used.

18.4 Safety and Health Data Requirements

- Equipment inspection documentation

19 Traffic Safety

19.1 Applicability

The requirements of this section apply to all subcontractor work activities involving the operation of motor vehicles at SLAC.

19.2 Regulatory and SLAC Requirements

Use of motor vehicles must adhere to the following regulatory requirements:

- Title 10, *Code of Federal Regulations*, “Energy”, Chapter 3, “Department of Energy”, Part 851, “Worker Safety and Health Program”, Subpart E, “Enforcement Process”, Appendix A, “Worker Safety and Health Functional Areas”, Section 9, “Motor Vehicle Safety” ([10 CFR 851, Appendix A.9](#))

- Title 16, *Code of Federal Regulations*, “Commercial Practices”, Chapter 2, “Consumer Product Safety Commission”, Subchapter B, “Consumer Product Safety Act Regulations”, Part 1203, “Safety Standard for Bicycle Helmets” ([16 CFR 1203](#))
- Title 49, *Code of Federal Regulations*, “Transportation”, Subtitle B, “Other Regulations Relating to Transportation”, Chapter 5, “National Highway Traffic Safety Administration, Department of Transportation”, Part 571, “Federal Motor Vehicle Safety Standards”, Subpart B, “Federal Motor Vehicle Safety Standards”
 - Section 3, “Definitions” ([49 CFR 571.3](#))
 - Section 218, “Motorcycle Helmets” ([49 CFR 571.218](#))
 - Section 500, “Low-speed Vehicles” ([49 CFR 571.500](#))
- *California Vehicle Code* ([VEH](#))
- California Department of Transportation. *California Manual on Uniform Traffic Control Devices*, Part 6, “Temporary Traffic Control” ([California MUTCD, Part 6](#))
- American National Standards Institute (ANSI) B56.8, “Safety Standard for Personnel and Burden Carriers” (ANSI B56.8)
- SLAC ESH Manual [Chapter 13, “Traffic and Vehicular Safety”](#) (pertinent sections described here)

19.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 19.2, all work activities involving the operation of motor vehicles must meet the following SLAC requirements.

19.3.1 Motor Vehicle Safety Program

The subcontractor’s IIPP must include a motor vehicle safety program to protect the safety and health of all drivers and passengers in motor vehicles and industrial trucks and equipment (forklifts, tractors, platform lift trucks, and other similar specialized equipment powered by an electric motor or an internal combustion engine).

The motor vehicle safety program must address, as applicable to the subcontractor’s operations:

- Minimum licensing requirements (including appropriate testing and medical qualification) for personnel operating motor vehicles and powered industrial equipment
- Requirements for the use of seat belts and provision of other safety devices
- Training for specialty vehicle operators
- Requirements for motor vehicle maintenance and inspection
- Uniform traffic and pedestrian control devices and road signs
- On-site speed limits and other traffic rules
- Awareness campaigns and incentive programs to encourage safe driving
- Enforcement provisions [10 CFR 851, Appendix A.9]

19.3.2 Traffic Control Plan

When construction operations affect SLAC’s roads, traffic control measures must be implanted in accordance with standard practice on California roads ([California MUTCD, Part 6](#)) and the [Traffic and Vehicular Safety: Temporary Traffic Control Plan Procedure](#).

For further information, refer to the traffic control requirements in Division 1 Specification SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS.

19.3.3 Low-speed Vehicles

Vehicles used to carry personnel and equipment, outside the federally compliant passenger vehicle or light truck designation, must meet the requirements of ANSI B56.8 or [49 CFR 571.500](#) as applicable. This clause is referring to “golf carts” and similar low-speed vehicles.

19.4 Safety and Health Data Requirements

- [Traffic and Vehicular Safety: Temporary Traffic Control Plan Approval Form](#) (SLAC-I-720-0A21J-004)

19.5 Resources

- [Traffic and Vehicular Safety: Temporary Traffic Control Plan Procedure](#) (SLAC-I-720-0A21C-004)
- Division 1 Specification SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

20 Aerial Lifts (Scissor, Boom)

20.1 Applicability

The requirements of this section apply to all subcontractor work activities involving the operation of aerial lifts (or mobile elevating work platforms, such as scissor and boom lifts) at SLAC.

20.2 Regulatory and SLAC Requirements

Use of aerial lifts must adhere to the following regulatory requirements:

- Title 8, *California Code of Regulations*, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 4, “General Mobile Equipment and Auxiliaries”, Article 24, “Elevating Work Platforms and Aerial Devices” ([8 CCR 3636–3648](#))
- American National Standards Institute (ANSI)/Scaffold Industry Association (SIA)
 - ANSI/SIA A92.2, “Vehicle-mounted Elevating and Rotating Aerial Devices” (ANSI/SIA A92.2)
 - ANSI/SIA A92.3, “Manually Propelled Elevating Aerial Platforms” (ANSI/SIA A92.3)
 - ANSI/SIA A92.5, “Boom-supported Elevating Work Platforms” (ANSI/SIA A92.5)
 - ANSI/SIA A92.6, “Self-propelled Elevating Work Platforms” (ANSI/SIA A92.6)
- SLAC ESH Manual [Chapter 47, “Mobile Elevating Work Platforms”](#) (pertinent sections described here)

20.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 20.2, all work activities involving the operation of aerial lifts must meet the following SLAC requirements:

- Lift operators must be trained and qualified to operate the lift in accordance with [8 CCR 3636–3648](#). A certificate of training must be provided to SLAC before such work starts.
- Toe boards must be in place.
- Areas beneath the work location must be secured (barricade or spotter) to prevent injury from dropped material or tools.
- Full body harness and fall restraint fixed lanyard must be used in boom lifts.
- Equipment must be inspected daily.

20.4 Safety and Health Data Requirements

- Operator trainer certification
- Equipment inspection documentation

21 Material Handling – Manual

21.1 Applicability

The requirements of this section apply to all subcontractor work activities involving manual handling, moving, and lifting of material and equipment.

21.2 Regulatory and SLAC Requirements

Manual material handling must adhere to the following requirements:

- American Conference of Governmental Industrial Hygienists (ACGIH). *Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* (ACGIH TLVs and BEIs)
- SLAC ESH Manual [Chapter 54, “Ergonomics”](#) (pertinent sections described here)

21.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 21.2, all work activities involving manual material handling must meet the following SLAC requirements:

- Manual material handling must be included in JSAs and daily tailgate forms and reinforced in daily pre-task meetings with workers.
- Lifting hazard analysis must conform to the ACGIH TLVs for lifting. Lifts greater than 30 pounds are of particular concern.
- To analyze lift hazards, know the weight, how it will be picked up, the starting and ending location of the lift, and the frequency of the lift.

- The identified controls must be included.
- Lifting aids, two-person lifts, and careful selection of workers are all important considerations.

22 Pressure Systems Safety

22.1 Applicability

The requirements of this section apply to all prime and sub-tier subcontractors' work activities involving pressure system design, construction / installation, examination, testing, commissioning, maintenance / repair, and operation.

22.2 Regulatory and SLAC Requirements

Pressure system design, construction / installation, examination, testing, commissioning, maintenance / repair, and operation must adhere to the applicable regulatory requirements and standards cited in SLAC ESH Manual [Chapter 14, "Pressure Systems", including but not limited to:](#)

- Title 24, *California Code of Regulations*, "California Building Standards Code"
 - Part 4, "California Mechanical Code", Part 4 ([24 CCR Part 4](#))
 - Part 5, "California Plumbing Code", Part 5 ([24 CCR Part 5](#))
- American Society of Mechanical Engineers (ASME). *Boiler and Pressure Vessel Code (BPVC)* (ASME BPVC)
- ASME *Code for Pressure Piping* (ASME B31), including applicable addenda and code cases
- National Board Inspection Code (NBIC)
- Compressed Gas Association (CGA) Standards

Refer to the contract documents (scope, specifications, etc) for more information.

22.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 22.2, all work activities involving pressure systems must meet the following SLAC requirements.

Subcontractors must establish policies and procedures in their IIPP to ensure that pressure systems are designed, constructed / installed, examined, tested, commissioned, maintained / repaired, and operated by trained and qualified personnel in accordance with applicable and sound engineering principles.

When conformance to the requirements of consensus codes is neither possible nor feasible, measures must be implemented to provide equivalent protection at a level of safety comparable to that achieved by complying with the requirements of these national consensus codes. [Pressure Systems: Alternate Pressure Systems Qualification Requirements](#) will be used to provide a method of qualifying pressure systems that includes engineering evaluation, peer review, and management concurrence tailored to the complexity of the system, risks, and consequence of a failure. [10 CFR 851, Appendix A.4]

Pressure tests must be planned carefully. Submit pressure test plans before any pressure tests for pressure vessels and piping. The plans must be approved by SLAC's pressure safety program manager or designee. Coordinate the review with the CM.

- Hydraulic tests are required. Pneumatic tests are approved on an exception basis.
- Utilize safe work practices as described in the [Pressure Systems: Pressure Test Procedures](#).
- Subcontractors must also coordinate with SLAC for review and inspection of pressure systems:
- Submit specifications and catalogs of pressure systems for SLAC review before placing orders.
- Submit installation and maintenance manuals of pressure systems for SLAC review before installation.
- Offer pressure systems for SLAC inspection and registration after installation.

22.4 Safety and Health Data Requirements

- [Pressure Systems: Pressure Test Plan Form](#) (SLAC-I-730-0A21J-044)
- [Pressure Systems: Pressure Test Record Form](#) (SLAC-I-730-0A21J-045)

22.5 Resources

- [Pressure Systems: Alternate Pressure Systems Qualification Requirements](#) (SLAC-I-730-0A21S-065)
- [Pressure Systems: Pressure Test Procedures](#) (SLAC-I-730-0A21C-033)

23 Barricading Hazardous Areas

23.1 Applicability

The requirements of this section apply to all subcontractor work activities involving setting up and maintaining barricades related to site hazards.

23.2 Regulatory and SLAC Requirements

Setting up and maintaining barricades must adhere to the following regulatory requirements:

- TBD

23.3 SLAC-specific Requirements and Procedures

In addition to meeting the requirements in Section 23.2, all work activities involving manual material handling must meet the following SLAC requirements:

- The subcontractor must implement an effective barricade program to reduce the likelihood of injury due to someone inadvertently entering a hazardous construction zone. Moveable barricades, temporary guardrails, and stanchions with caution or danger tape are all examples of barricade methods. Yellow tape must be used to communicate caution and red tape danger.

- A sign must be placed on any barricade with the name and cellphone of the person responsible for the barrier, the reason for the barrier, and the primary hazard.
- A worker may cross a yellow barrier provided he or she is aware of the hazards and necessary controls.
- No one may cross a red barrier until permission and escort is granted by the subcontractor's superintendent.

24 Decommissioning and Demolition

Refer to Section 7.4 for electrical demolition requirements for demolition associated with construction projects.

During the decommissioning phase, all buildings, utility systems, infrastructure systems and related facilities at SLAC will be dismantled and/or demolished safely and efficiently using appropriate personnel, procedures and work controls.

Refer to the following Division 1 Specifications sections, or other related, for more information:

- SECTION 017419 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
- SECTION 024113 – SELECTIVE SITE DEMOLITION
- SECTION 024116 – STRUCTURE DEMOLITION
- SECTION 013543 – ENVIRONMENTAL PROTECTION

25 Environmental Protection

Refer to Division 1 Specification SECTION 013543 – ENVIRONMENTAL PROTECTION for environmental protection requirements.

Appendix: Safety and Health Data Requirements List

The following list of data requirements is a guide only and may not be comprehensive. Some data requirements will not apply to certain projects according to the project scope and risk. The subcontractor is responsible for providing all data required by the subcontract.

- ID – Sequential number to uniquely identify the entry
- Title – Title (description) of item with hyperlink
- References – Location of data requirement/information in this manual specifications, terms and conditions, etc.
- Date of First Submittal – Initial date of submission (yy/mm/dd)
- Submittal Frequency
- Distribution List – Titles/names of recipients
- Remarks – Additional information as needed

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
1.	Subcontractor Safety Qualification Form (SQF) and attachments (safety manual, OSHA logs for 3 yrs., EMR proof, citations, explanations, Calif. contractor licenses)	CSRM Section 4.2	Prior to award	Once	SCM	Prime subcontractor only. Not required if SLAC already has an approved SQF for the company on file.
2.	Injury and Illness Prevention Program Acknowledgment Form	CSRM Section 4.3	Pre-award	Once	SCM	If opting to develop own IIPP, subcontractor must submit annually for SLAC approval.
3.	Construction Job Safety Analysis Form	CSRM Section 4.4	Before work begins	As needed; update as changes occur	PM, CM, CSSR	A JSA is required for each definable work activity.
4.	Training Records, Certificates, Competent Person Letters	CSRM Section 4.6	Submitted with JSA or prior to the work activity	As needed	PM, CM, CSSR	Records must be maintained throughout the project as new staff join.

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
5.	OSHA 30-hour Construction Safety Training – superintendents, foremen, safety representatives	CSRM Section 4.6	Submitted with the JSA or prior to start of work	Once	SCM, PM, CM, CSSR	Training certificate submitted
6.	ESH Course 375 , Construction Safety Orientation	CSRM Section 4.6	Post award, before start of work	Annual	CM	Must complete before obtaining badge. Need SLAC CM to assist in obtaining SLAC ID so worker will receive credit.
7.	Facilities Course 101 , Subcontractor Safety Management Training	CSRM Section 4.6	Post award, before start of work	Refresher required every 3 years	CM	Required for all prime subcontractor superintendents/foremen and safety representatives (if required)
8.	ESH Course 376R , SLAC COVID-19 Training for Onsite Contractors	CSRM Section 4.6	Post award, before start of work	Once	CM	Must complete before obtaining badge. Need SLAC CM to assist in obtaining SLAC ID so worker will receive credit
9.	Safety Bulletin Board	CSRM Section 4.9	Before work begins	Once	N/A	Include other postings per CSRM 4.9
10.	Safety Inspections – weekly comprehensive – documented	CSRM Section 4.10	End of first week of mobilization	Weekly	PM, CM, CSSR	
11.	Equipment Inspection Records (tag or log)	CSRM Section 4.10	Before use	Daily	CM, CSSR	
12.	Subcontractor Safety Representative Daily Report	Division 1 Specifications – submittals; project management.	Close of each work day	Daily	PM, CM, CSSR	
13.	Weekly ESH Report	CSRM Section 4.11	End of first week of mobilization	Weekly	PM, CM, CSSR	Completed by subcontractor safety representative; available each Tuesday. Contents presented at safety stewardship meeting.
14.	Monthly Field Project Report	CSRM Section 4.11	First month after NTP	Monthly: fifth business day of the month	PM, CM, CSSR	Including man-hours, incident/injury, and property damage reports. Submitted to SLAC on a monthly basis within 5 days of the last working day of the month.

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
15.	Coordination/Tailgate Release Form	CSRM Section 4.12.5	Before work begins	Daily	CM, CSSR	Prime superintendent and sub-tier foremen daily work planning meeting(s); prime releases work to each sub-tier foreman
16.	Daily Tailgate/Work Coordination Meeting	CSRM Section 4.12.7	Before work begins	Daily	CM, CSSR	Daily meeting at start of day; prime superintendent leads and all sub-tier foreman and all workers participate
17.	Occupational Medicine Program	CSRM Section 4.13	Before construction activity	Once	PM, CM, CSSR	Part of IIPP submittal
18.	Medical Surveillance Documentation	CSRM – various sections	With submission of the IIPP	Once	CM, CSSR	As required for specific hazards/work (asbestos, lead, hazardous waste work, respirator use, hearing, etc)
19.	Three to Six Week Look-ahead Schedule	CSRM Section 4.12.9	Before start of work	Weekly	PM, CM, CSSR	Presented at weekly safety stewardship meeting by subcontractor's safety representative
20.	Safety Stewardship Meeting	CSRM Section 4.12.9	Week after mobilization	Weekly	PM, CM, CSSR	Content of ESH report presented; 3-6 week look-ahead discussed; etc
21.	Project-specific Emergency Response Plan	CSRM Section 4.14	Post-award; prior to NTP	Once	PM, CM, CSSR	Part of IIPP submittal
22.	Incidents and near misses – immediate notification; subsequent reports	CSRM Section 4.14 Ts and Cs, Article 19	Notification: within 30 minutes. Reports: Within 24 hours	As needed	PM, CM, CSSR	SLAC Occupational Health Center is available for first aid, initial treatment, and diagnosis. CM will coordinate required SLAC reporting forms.
23.	Control of Hazardous Energy Program	CSRM Section 5	Some prior to award; some as part of submittals	Once	PM, CM, CSSR,	Applies to prime subcontractor and/or sub-tiers as appropriate

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
24.	Group Lockout/Energy Isolation Plan	CSRM Section 5.3	Before work begins	Once	CM, CSSR, Facilities System Owner	CM and Facilities staff will manage the lockout/energy isolation plan. Subcontractor will assist in preparation.
25.	Complex Lockout Permit (sign on and off lockouts)	CSRM Section 5.3	Before work begins	Once	CM, CSSR, Facilities System Owner	SLAC CM and Facilities staff will manage the Complex Lockout Permit. Subcontractor will sign on/off.
26.	Electrical Safety Program	CSRM Section 6	Before work begins	Once	PM, CM, CSSR	Applies to prime subcontractor and/or sub-tiers as appropriate
27.	Electrical Work Plan (EWP)	CSRM Section 6.3.1	Before work begins	Once	CM, CSSR, Facilities EE	Subcontractor may prepare method of procedure which SLAC will then use to prepare the EWP. May require review by the SLAC electrical safety officer.
28.	Electrical Energization Plan	CSRM Section 7.1	Before transition to permanent power	Once	PM, CM, CSSR, Facilities EE	Installation of new electrical circuits and equipment shall be substantially complete.
29.	Penetration Permit	CSRM Section 8.3.1	Before performing task	Once	CM, CSSR	2 types of penetrations: Class 1: up to 2 inches Class 2: greater than 2 inches
30.	Excavation Permit	CSRM Section 9.3	Minimum 14 days before excavating	Once	CM, CSSR SLAC Excavation Safety Program Manager	
31.	Utility Locate Results Form	CSRM Section 9.3	Minimum 14 days before excavating	Once	CM, CSSR SLAC Excavation Safety Program Manager	
32.	Mobile/Portable Drilling Rig Inspection Form	CSRM Section 9.3	Before use on site	Once	CM, CSSR	

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
					SLAC Excavation Safety Program Manager	
33.	Excavation Daily Inspection Checklist	CSRM Section 9.3	First day of excavating	Daily	CM, CSSR SLAC Excavation Safety Program Manager	Required on days excavation will be accessed.
34.	Excavation Plan (written / drawn)	CSRM Section 9.3	10 working days before excavating	Once	PM, CM, CSSR	Excavations greater than or equal to 5 feet
35.	Fire Prevention Plan	CSRM Section 10.3.1	Post-award; prior to NTP	Once	PM, CM, CSSR	Part of IIPP submittal
36.	Hot Work Permit	CSRM Section 10.3.3	Before any hot work performed	Max: 8 days unless renewed	CM, CSSR	Spark generating, open flame, welding (arc, MIG, TIG, etc.) Coordinate permit with CM and CSSR
37.	Fire Protection System Impairment Authorization	CSRM Section 10.3.6	Minimum 24 hours before work	Once	CM, CSSR	Coordinate with CM and CSSR
38.	Crane Operators, Riggers, and Signal Person Certification	CSRM Section 11.3.1	Before the beginning of work	As needed	CM, CSSR	
39.	Ordinary Lift Planning and Control Form (hoisting and rigging plan)	CSRM Section 11.3.2.1	10 working days before lift is performed	Once	CM, CSSR SLAC Hoisting and Rigging Program Manager	

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
40.	Critical Lift Planning and Control Form (hoisting and rigging plan)	CSRM Section 11.3.2.1	10 working days before lift is performed	Once	CM, CSSR SLAC Hoisting and Rigging Program Manager	
41.	Crane Quarterly, Annual and Quadrennial Inspection Certifications	CSRM Section 11.3.3.1	Before crane mobilization	As needed	CM, CSSR	
42.	Crane Inspections – pre-shift operational	CSRM Section 11.3.3.2	Before use that day	Daily	CM, CSSR	
43.	Crane Operations: Setup Location Utility Survey	CSRM Section 11.3.2.6	Before setting up the crane	As needed	CM, CSSR	If the location survey marks are not readable or identifiable by the time the crane or crane substitute is setup an additional survey will be completed before that setup.
44.	Fall Protection Program	CSRM Section 12	Prior to any elevated surface work	Once	PM, CM, CSSR	May be part of IIPP submittal. Applies to prime subcontractor and/or sub-tiers as appropriate
45.	Elevated Surface Work Plan Include cut sheets of all equipment to be used.	CSRM Section 12.3.2	10 working days before any elevated work	Conditions change, new work/area/task	CM, CSSR	An approved elevated surface work plan is required before any worker accesses an unprotected elevated work area.
46.	Radioactive materials and radiation generating devices: written approval before bringing on site	CSRM Section 13.3.16 Materials Restrictions (Radiation Related)/	5 days before on site	Varies	PM, CM, CSSR, SLAC RP	
47.	Hearing Conservation Program	CSRM Section 13.3.2	Prior to high noise activity	Once	PM, CM, CSSR	Applies to prime subcontractor and/or sub-tiers as appropriate
48.	Heat Illness Prevention Plan	CSRM Section 13.3.7	Prior to hot weather work	Once	PM, CM, CSSR	Applies to prime subcontractor and/or sub-tiers as appropriate
49.	Respiratory Protection Program	CSRM Section 13.3.8	Prior to required respirator work	Once	PM, CM, CSSR	Applies to prime subcontractor and/or sub-tiers as appropriate

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
50.	Project-specific Hazard Communication Plan	CSRM Section 15	Prior to hazardous material use	Once	SCM/PM/CSSR	Including list of hazardous materials and the SDSs for those materials
51.	Confined Space Entry: Entry Permit , Alternate Entry Form , Non-Permit Confined Space Entry , Temporary Declassification Form	CSRM Section 16.3.1	Before entry	Once	CM, CSSR SLAC Confined Space Program Manager	.
52.	Equipment Inspection Documentation: <ul style="list-style-type: none"> Industrial Trucks (forklifts) Heavy Equipment Aerial lifts Drill rigs 	CSRM Sections 17, 18, 20	Upon delivery; Before first use; daily check	Daily	CM, CSSR	Forklift, crane, heavy equipment, scissor lift, , boom lift, drilling rig, etc
53.	Temporary Traffic Control Plan Approval Form	CSRM Section 20	Before work impacting traffic commences	Once	CM, CSSR, Site Security Manager	
54.	Pressure Test Plan Pressure Test Record	CSRM Section 22	10 days prior to planned pressure test	Once	CM, CSSR SLAC Pressure Systems Safety Program Manager	
55.	Demolition Plan	CSRM Section 24	After award, before work can commence	As needed	PM, CM, CSSR	Incorporates ESH Manual Chapter 27, 20, and 17 aspects.
56.	Spill Response Plan	CSRM Section 25	Some prior to award; some as part of submittals	Once	PM, CM, CSSR	Applies to prime subcontractor and/or sub-tiers as appropriate
57.	Final Report	CSRM Section 25	20 days after the completion	Once	PM, CM	1. Summary of the overall performance of safety and health (accidents or incidents

ID	Title	References	Date of First Submittal	Submittal Frequency	Distribution List	Remarks
		Division 1 Specifications, Section 017419 – Construction Waste Management and Disposal Division 1 Specifications, Section 017823 – Operation and Maintenance Data	of work and acceptance			including near misses, unusual events, lessons learned, etc.) 2. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and on-site facilities. 3. Complete summary of personnel monitoring. 4. Complete summary of air monitoring accomplished during the project (if applicable).
58.	Powder Actuated Tools Plan	8 CCR 1684–1692	Before the planned use	As needed	PM, CM, CSSR, Facilities EE	The subcontractor must establish and implement a plan for the use of powder actuated tools, if used on the job site. This must be stated in the IIPP.