Division 01 Construction Specifications

General Requirements

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Authorizing Individual

Robert Frederick Warther
Department Head
Project Management, Engineering, & Construction (PMEC)

Digitally signed by Robert Frederick Warther
Date: 2018.12.27 14:12:17 -08'00'

Responsible Individual

Carol A. Shearer
Engineering Services Group Leader
Project Management, Engineering, & Construction (PMEC)

Digitally signed by Carol A. Shearer
Date: 2018.12.27 16:53:44 -08'00'
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PART 1 - GENERAL

1.01 SUBMITTAL PROCEDURES

A. Substitutes for Specified Items

Wherever catalog numbers and specific brands or trade names followed by the designation “or equal” are used in conjunction with a designated material, product, thing, or service mentioned in these specifications, they are used to establish the standards of quality, utility, and appearance required. LLNS generally discourages substitutions unless the specified product is unavailable or there is benefit to LLNS. LLNS may approve substitutions that are equal in quality, utility, and appearance to those specified, unless the specification indicates “no substitutions.” Substitutions are subject to the following provisions:

1. LLNS will only consider substitution requests submitted after the bid date when circumstances do not allow products or methods to be met as defined in the subcontract documents.

2. Submit substitution requests in writing to the Subcontract Technical Representative (STR) and contract analyst for LLNS approval. Requests from manufacturers are not considered. List and describe each proposed substitute item or material with sufficient data to support that the substitution is equal.

3. LLNS will approve or reject, in writing, proposed substitutions. LLNS requires at least 3 days to respond depending upon the size of the project. LLNS approval will not relieve the Subcontractor from complying with the requirements of the drawings and specifications. The Subcontractor is responsible at its own expense for changes resulting from proposed substitutions that affect other parts of its own work or the work of other subcontractors.

4. If the use of substitute products or materials involves redesign of other parts of the work, LLNS will charge Subcontractor for the cost of redesign. If this substitution affects the work of others on the project, LLNS will charge the Subcontractor for the cost of the associated additional work of others.

5. Submitting a substitution request does not relieve the Subcontractor from schedule commitments. It is the Subcontractor’s responsibility to recognize in a timely manner if materials are not readily available.

6. The STR may reject incomplete substitution requests.

1.02 DOCUMENTATION PROCEDURES

A. Provide an itemized comparison of proposed substitution to the item specified. Tabulate the differences, where appropriate, in materials, size, finish, estimated life, estimated maintenance, availability of spare parts and repair services, energy consumption, performance capacity, salvageability, and manufacturer’s warranties. Include the following:

1. Identification of the specification section or detail reference where the proposed substitution applies.
2. Identification of materials, products or supplies, including manufacturer’s name, catalog name and number, and the manufacturer’s address and telephone number

3. Installation characteristics, installation drawings and manufacturer’s literature, including product description, performance and test data, and reference standards if pertinent

4. Effect of change on project schedule; demonstrate redesign due to substitution will not adversely impact project schedule

5. Accurate cost data for the proposed substitution in comparison with the product specified

6. Equitable adjustment and credit that the Subcontractor proposes to offer LLNS, including accounting of costs incurred by LLNS due to redesign or evaluation services, increased cost of other LLNS construction, and similar considerations.

7. Description of how this substitution impacts other related systems and work of others

B. When applicable or requested by LLNS, provide off-the-shelf samples of the specified item and the proposed substitution.

NOTE. Previous approval by LLNS should not be used as a basis for submitting an RFS. Do not assume that LLNS will accept an RFS just because we accepted it on another project.

1.03 SUBCONTRACTOR CERTIFICATIONS

A. Investigate the proposed item and certify that it is equivalent, or superior to that shown or specified. Update proposed item supporting information as new or different data becomes available.

B. Certify that the same guarantee applies for the substitution as for the product specified.

C. Accept responsibility for installation of the accepted substitution into the work. Make changes, subject to LLNS approval, as required to complete the work.

D. Certify waiver of claims for additional costs related to the substitution

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION 01 25 00
SECTION 01 26 00
REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 DEFINITIONS

Request for Information. A document submitted by the Subcontractor requesting clarification of a portion of the subcontract documents. Referred to as an RFI.

1.02 SUBCONTRACTOR’S REQUESTS FOR INFORMATION (RFI)

A. Should Subcontractor be unable to determine from the subcontract documents the exact material, process, or system to be installed; or when elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the subcontract documents; request that LLNS make an interpretation of the requirements of the subcontract documents to resolve such matters. Comply with procedures specified in this section to make requests for interpretation.

B. Prepare and submit RFIs on the form provided in the LLNL construction management software application. Completely fill in the RFI form. By submitting the RFI in the software application, the Subcontractor attests that the Subcontractor made a good faith effort to determine from the subcontract documents the requested information.

C. Review and attach RFIs from lower-tier subcontracts and suppliers to a new RFI prepared and submitted as described above for Subcontractor-initiated RFIs. LLNS will promptly close RFIs submitted directly by lower-tier subcontractors and suppliers without response.

   1. Review lower-tier subcontractor and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing, and layout of the work.

   2. LLNS will promptly close, without response, RFIs submitted to request clarification of issues related to means, methods, techniques, and sequences of construction or for establishing trade jurisdictions and scopes of lower-tier subcontracts. Such issues, unless stated otherwise in the subcontract documents, are solely the Subcontractor’s responsibility.

   3. Subcontractor is responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

D. Study the subcontract documents to ensure that information sufficient for interpretation of requirements of the subcontract documents is not included. LLNS will close RFIs that request information that is clearly indicated in the subcontract documents.

   1. In cases in which RFIs request clarification of issues related to means, methods, techniques, and sequences of construction (e.g. pipe and duct routing, clearances, specific locations of work shown diagrammatically, and apparent interferences), furnish complete information required for LLNS to analyze and understand the circumstances causing the RFI and for LLNS to prepare a clarification or direction as to how the Subcontractor should proceed.

   2. LLNS will promptly close, without response, RFIs submitted with insufficient information.

E. Do not use RFIs for the following purposes; LLNS will promptly close them, without response.
1. To request approval of submittals (use procedures specified in section 01 33 00 – Submittals)

2. To request approval of substitutions (use procedures specified in section 01 25 00 – Substitutions)

3. To request subcontract changes such as cost, schedule, design, or work performance. (Use change procedures in the subcontract documents.)

F. If the Subcontractor believes that a clarification (official response) by LLNS or the design professional results in additional cost or time, do not proceed with the work indicated by the RFI until authorized by LLNS in accordance with the General Provisions of the subcontract.

G. LLNS will respond to RFIs within 14 calendar days.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION 01 26 00
PART 1 - GENERAL

1.01 ARRANGEMENT OF DOCUMENTS

A. The drawings and specifications may not specifically show or mention every item necessarily required. Provide complete and operable systems and equipment unless expressly stated otherwise.

B. These subcontract documents introduce titles and headings to divisions, sections, and paragraphs for convenience. Do not assume that they are a correct or complete segregation of the several units of materials and labor.

C. The terms of the Subcontract, General Provisions, and Project Requirements Document apply to each section of these specifications as fully as if repeated within that division. The Subcontract documents are complimentary, and what is required by one is as binding as if required by all; performance by the Subcontractor is required only to the extent consistent with the Subcontract Documents and reasonably inferable from them as being necessary to produce the indicated results.

D. Items listed within each division (or section) of the specifications are not necessarily all inclusive. The Subcontractor is responsible for performance and completion of the work in accordance with the scope of work detailed in Project Requirements Document (PRD) and the subcontract documents.

E. Portions of these specifications are of the abbreviated, simplified type and may include incomplete sentences. Omissions of words or phrases such as “the Subcontractor shall,” “in conformity with,” “shall be,” “as noted on the drawings,” “in accordance with details,” “a,” “the” and “all” are intentional. Omitted words or phrases are supplied by inference in the same manner as they are when a “note” occurs on the drawings.

1.02 DEFINITIONS

A. And/or. If used, this means that either or both of the items so joined are required.

B. Applicable. As appropriate for the particular condition, circumstance, or situation.

C. Equal or equivalent. As determined by the STR as being equivalent considering such attributes as durability, finish, function, suitability, quality, utility, performance, capacity, physical size and weight, and aesthetic features.

D. Furnish. Supply and deliver to the site ready for use or installation and in usable or operable condition.

E. Indicated. Refers to graphic representations, notes, or schedules on the drawings, or other paragraphs or schedules in the specifications, and similar requirements in the subcontract documents.

F. Install. Receive, unload, transport, and temporarily store products at the site of the work and perform the assembly, fitting, installation, application, erection, and similar actions as necessary to incorporate products complete in place and ready for use. Includes furnishing of necessary labor, materials, tools, equipment, and transportation. Includes testing and inspection necessary for proper installation, application, erection, and similar actions, and for verification of the quality of the work, as provided in the subcontract documents.
G. **Provide.** Furnish and install complete and ready for intended use.

H. **Regulation.** Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of work.

I. **Required.** Necessary for performance of the work in conformance with the requirements of the subcontract documents, excluding matters regarding the means, methods, techniques, sequences, and procedures of construction, such as:
   
   1. Regulatory requirements of authorities having jurisdiction
   2. Requirements of referenced standards
   3. Requirements generally recognized as accepted construction practices
   4. Notes, schedules, and graphic representations on the drawings
   5. Requirements specified or referenced in the specifications
   6. Duties and responsibilities stated in the bidding and contract requirements

J. **Shall.** Used about acts and actions of the subcontractor.

K. **Will.** Used about acts and actions required of LLNS.

L. Such terms as “approved,” “approved equal,” “as directed,” “as required,” “as permitted,” “acceptable,” “satisfactory,” mean by or to LLNS.

1.03 SITE STAFFING AND WORK HOURS

A. Site Staffing: As a minimum, provide the following staff positions:

1. **Construction Superintendent** – Unless specified otherwise in the PRD, LLNS requires the presence of the Subcontractors’ construction superintendent at the jobsite, including overtime hours and shift work hours, at all times when the Subcontractor or lower-tier subcontractors perform work.
   
   a. The construction superintendent is responsible for assuring work is performed in accordance with contractual requirements and effectively directing and coordinating trades to assure safe and efficient progress of the work.
   
   b. If the job requires more than one craft discipline working at the same time then the superintendent may not perform work.
   
   c. If the Subcontractor's superintendent leaves the jobsite while the Subcontractor or lower-tier subcontractor performs work, LLNS will stop work. The Subcontractor is solely responsible for any costs incurred due to the work stoppage.
   
   d. LLNS requires that the construction superintendent be knowledgeable of the project's hazards and have full authority to act on behalf of the Subcontractor.
   
   e. The superintendent may temporarily delegate their duties and responsibilities to a subordinate during a planned absence from the job site. Promptly notify the LLNS subcontract technical representative (STR) at the time of delegation.
f. LLNS requires that the construction superintendent make frequent and regular inspections of the construction jobsite to identify and correct instances of noncompliance with project safety and health requirements.

g. During the periodic absences of the safety officer, the construction superintendent may serve as the safety officer, provided he or she does not perform construction work during the same timeframe.

2. **Project Manager/Quality Control Manager** – The project manager/quality control manager can be a corporate resource that oversees work on this project on a part-time basis and can delegate full-time responsibility to other individuals unless stated otherwise in the PRD.

3. **Safety Officer** – The safety officer can be a corporate resource that oversees the work of this project on a part time basis or the construction superintendent can assume this role, unless stated otherwise in the PRD. The safety officer may not perform work.

**B. Work Hours**

1. Site 200: Standard work hours at site 200 are Monday through Friday from 7:00 am to 6:00 pm, except LLNL holidays.

2. Site 300: Standard work hours at site 300 are Monday through Thursday from 7:00 am to 5:30 pm, except LLNL holidays.

3. LLNS is open to earlier start times during summer months due to summer temperatures.

4. Submit requests for nonstandard work hours to the STR at least 48 hours in advance.

**1.04 SECURITY ESCORTS**

A. If escorts are required by subcontract the following applies:

1. Responsibilities of Escorted Personnel.

   Escort ratio: 1 escort to 5 uncleared subcontractors’ ratio unless a security plan has been approved. If personnel have no required security clearance than remain within line of sight of the escort. Should opaque barriers, fences, impervious barriers or other instances where work areas are subdivided, the ratio will remain at 1 to 5. If no clear line of sight is achievable, additional escort resources are required in such instances.

   Sign in / out of the project security log book

   Those who fail to follow security protocols are subject to immediate termination from LLNL site.

   Individuals being escorted must maintain a professional relationship with Protective Force Officers and security escorts.

   Coordinate with the STR the route of travel into and out of the limited area.
2. Notification.

Request additional or reduction in escort support 48hrs in advance. Notifications received with less than 48hrs advanced notification could potentially result in no additional resources and may delay work.

3. Hours and Overtime.

Standard escort hours: Monday- Friday 7am-3:30pm.

Coordinate requests for weekday overtime, off-hour and week-end work with the STR, requests received with less than 48hrs advanced notification could potentially result in no extended overtime hours.


Attach clearly visible contractors placard showing the contractors business name and license number on vehicles entering limited areas. Those without placards will not be allowed into limited areas. Non-delivery, personal vehicles or other non-essential vehicles must remain outside of the limited areas. Subcontractors can use security access portals and or carpool to enter limited areas.

Request escorts if making deliveries into the Limited Areas. Coordinate deliveries with the STR to ensure adequate escort remains at the project when a delivery is entering the limited areas.

Turn on vehicle emergency flashers when entering the limited areas under security escort. Security escorts will follow deliveries to the project location. 1 to 5 ratio remains in effect when escorting vehicles.

Do not park in labeled government vehicle only parking stalls. Do not park in landscaping areas without prior authorization. Do not block emergency access lanes, driveways, or pedestrian sidewalks. Vehicles parked in red zones, government vehicles stalls, landscaping areas (without authorization) or in violation of California traffic laws are subject to penalty.

1.05 ACCURACY OF DATA

A. The data in the PRD, these specifications, and on drawings are as exact as could be secured, but LLNS cannot guarantee their accuracy. The data are for the assistance and guidance of the Subcontractor. The work governs the exact locations, distances, levels, and like items.

B. Before starting the work, check lines, levels, and dimensions shown on the drawings against field conditions. Report discrepancies to the STR immediately. In the event of discrepancies, do not proceed with the work until the STR gives direction.

C. Investigate the structural and finish conditions affecting the work and arrange work accordingly. Provide fittings, equipment, accessories, and like items to accommodate such conditions.

1.06 SURVEY DATA

Where applicable, LLNS has provided on the drawings, the location of horizontal and vertical control points in the vicinity of the site. Transfer said data to the site for the proper execution of the work.
1.07 **SALVABLE AND EXCESS MATERIALS**

A. Do not use salvable material dismantled from existing work in new construction unless specifically indicated otherwise in the drawings, specifications, or PRD.

B. The Subcontractor is responsible for the condition of dismantled materials until re-installation by the Subcontractor, and LLNS reviews and accepts the final installation.

C. The Subcontractor is responsible for the condition of dismantled, salvaged, and to remain the property of LLNS” until accepted by LLNS.

D. Immediately remove other materials dismantled from existing work and released through LLNS to the Subcontractor as Subcontractor's property.

1.08 **EMERGENCY REPAIRS**

LLNS reserves the right to make emergency repairs as required to keep equipment in operation without voiding the Subcontractor's guarantee or relieving the Subcontractor of its responsibilities.

1.09 **LLNS PARTIAL OCCUPANCY OR USE**

A. LLNS reserves the right to occupy completed or partially completed portions of the work provided LLNS and the Subcontractor have accepted the responsibilities assigned to each of them for the following, in writing:

1. Payments; retainage (if any); security; maintenance; utilities; damage to the work; and insurance.

2. The period for correction of the work and commencement of warranties required by the subcontract documents for such portions of the work partially used or occupied by LLNS.

B. In the event that the Subcontractor and LLNS are unable to agree upon the matters above, LLNS may nevertheless use or occupy completed or partially completed portion of the work. Immediately prior to such partial occupancy or use of the work LLNS and the Subcontractor will jointly inspect the portions of the work that LLNS intends to occupy or to determine and record the condition of the work.

1.10 **BASIS FOR ACCEPTANCE**

The basis for inspection/acceptance is compliance with the requirements set forth in the subcontract and terms and conditions of the subcontract. LLNS will reject non-conforming products or services. Correct deficiencies within 14 calendar days of the rejection notice in accordance with the applicable clauses. If the Subcontractor cannot correct deficiencies within 14 calendar days, immediately notify the STR of the reason for the delay and provide a proposed corrective action plan within the 14 calendar days.

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

Not Used
SECTION 01 31 19
COORDINATION AND MEETINGS

PART 1 - GENERAL

1.01 COORDINATION AND PROJECT CONDITIONS

A. Coordinate and schedule the work of tiered subcontractors, and provide information required by them for proper scheduling and execution of the work. In the same manner, coordinate work with LLNS and other Subcontractor(s) operating in the area or as directed by the STR, including reasonable adjustments of schedule in order to allow other Subcontractor(s) or LLNS to do their work.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities supplied and installed by others. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate installations

D. Coordinate scheduled work with other Subcontractors on jobsite.

1.02 PRECONSTRUCTION MEETING

A. The contract analyst will schedule a meeting after notice of award and prior to notice to proceed.

B. Attendance is required by the Subcontractor and tiered subcontractors.

C. Agenda

1. Safety submittals and training requirements

2. Submission of proposed preliminary project schedule

3. Designation of personnel representing the subcontract parties

4. Use of premises by LLNS and Subcontractor

5. LLNS' requirements and partial occupancy

6. Temporary facilities and controls provided by LLNS

7. Discussion of procedures and processing of field decisions, safety, submittals, substitutions, applications for payments, proposal request, change orders, request for information, and project closeout procedures

8. Discussion of documents that must be maintained at the site. (copy of the Drawings, Specifications, Addenda, Change Orders, field orders, approved Shop Drawings, Architect’s Supplementary Instructions, requests for information and other Subcontract-related documents and Modifications

9. Scheduling, sequence of construction, and scheduling of inspection and testing

10. Surveying
11. Security and housekeeping procedures

12. Procedures for maintaining project record documents (e.g. as-built drawings)

13. Requirements for start-up of equipment

D. The STR will record minutes and distribute copies as soon as practical after the meeting to each participant and those affected by decisions made.

1.03 CONSTRUCTION COORDINATION MEETINGS

A. The STR will arrange and conduct weekly coordination meetings with the purpose of discussing progress of the work, jobsite safety, coordination issues between prime Subcontractors, and other pertinent project concerns. The Subcontractor’s project manager, site superintendent, safety officer, and lower tiered subcontractors as directed by the LLNS STR must attend the meetings. Other attendees may include LLNS personnel affected by the work.

B. The STR will arrange meetings, prepare agenda with copies for participants, and preside at meetings.

C. Coordination meeting agenda includes the following:

1. Project safety

2. Review minutes of previous meetings

3. Review of work progress

4. Field observations, non-conforming work, and decisions

5. Identification of problems that impede planned progress

6. Review of submittal schedule and status of submittals

7. Review Subcontractor’s request-for-information (RFI) log and compare to LLNS log

8. Review of outstanding RFIs and requests for substitutions (RFS). Incomplete RFIs and RFS may be rejected by the STR

9. Review of record drawings and specifications (red-line drawings)

10. Review of off-site fabrication and delivery schedules

11. Maintenance of project schedule

12. Corrective measures to regain projected schedules

13. Planned progress during succeeding work period

14. Coordination of projected progress

15. Maintenance of quality and work standards

16. Effect of proposed changes on project schedule and coordination

17. Other business relating to work
18. Status of change orders

D. The STR will record and prepare minutes of the meetings and will distribute copies as soon as practical after meeting to each participant and those affected by decisions made.

1.04 PERIODIC SCHEDULE UPDATE MEETINGS

A. Conduct monthly (unless directed otherwise in the PRD) schedule update meetings for the purposes of reviewing the Subcontractor's proposed out of sequence corrections, determining causes for delay, correcting logic, and maintaining schedule accuracy. See section 01 32 01 Project Schedule article “Periodic Schedule Update Meetings” for further requirements.

1.05 CLOSE-OUT MEETING

A. At least sixty (60) days from the scheduled Beneficial Occupancy Date (BOD) or at 80% construction completion, schedule and meet with LLNS to identify actions necessary for completing the work (punch list) and have a plan for accomplishing these actions in a timely matter. See section 01 77 00 Close-Out.

1.06 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections or the Project Requirements Document (PRD), or as determined by the STR, the STR will convene a pre-installation meeting at the site prior to commencing work of the specified section.

B. Require the attendance of parties directly affecting, or affected by, work of the specific section.

C. The STR will prepare agenda and preside at meetings to review the following:
   1. Conditions of proposed installation, preparation, and installation procedures
   2. Coordination with related work of other Subcontractors on site

D. The STR will record minutes and distribute copies to each participant and those affected by the decisions as soon as practical after meeting.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION 01 31 19
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PART 1 - GENERAL

1.01 DEFINITIONS

**Free Float.** The amount of time an activity can be delayed without delaying the early start of activities following it (i.e. without taking away the float of later activities).

**Independent Float.** Float that belongs to one activity alone. It is not shared with other activities, earlier or later (i.e. it has no effect on other activities).

**Long Lead Materials.** Items that are not readily available off the shelf.

**Level 3 Schedule.** A level 3 schedule (or level 3 control schedule), as defined by AACE International, is the control level generally prepared to communicate the execution of the deliverables for each of the subcontracting parties. The schedule reflects key interfaces and shows enough detail to map the critical activities.

**Milestones.** A significant point or event in the project.

**Negative Total Float.** The amount of time by which the early date (start or finish) of an activity exceeds its late date.

**Total Float.** The amount of time an activity can be delayed without delaying the project end date or an intermediary milestone.

1.02 CALENDAR DAYS

Use calendar days in the schedules. Include non-working days and LLNS-recognized holidays.

1.03 DESIGN-BUILD

If the subcontract is for construction only, ignore directions pertaining to design.

1.04 SUBMITTALS

Submit schedules in accordance with section 01 33 00, “Submittal Procedures” and the requirements of this section. LLNS will return comments as stated in section 01 33 00.

1.05 QUALITY ASSURANCE

Designate an authorized representative to be responsible for preparing the schedule, updating the schedule (activity status), and preparing reports. LLNS will validate the subcontractor’s project schedule against the criteria in this specification.

PART 2 - PRODUCTS

2.01 SOFTWARE

Develop schedules in Microsoft Project (use version that is fully compatible with 2016 version). Obtain approval from the LLNS subcontract technical representative (STR) prior to using alternative scheduling software. If proposing alternate software, provide supporting documentation to show full compatibility.
with Microsoft Project 2016. LLNS, at the discretion of the STR, may request a demonstration to verify compatibility.

LLNS will provide a recommended MS Project template, however if the Subcontractor chooses not to use the LLNS template use the following settings:

- Options > Schedule > Calculation Options
  - Check the box for ‘Actual costs are always calculated by Project’

- Options > Schedule > Calendar Options
  - Fiscal year starts in October

- Options > Advanced > Earned Value Options
  - Set Default task Earned Value Method to Physical % Complete

- Using ‘Rollup’ column, set all activities to ‘Yes’

- All tasks must be set to Auto Scheduled

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

Develop schedule, as a minimum, to an AACE International level 3 control schedule for status and reporting. Show the sequence in which the Subcontractor proposes to perform the work and dates on which the Subcontractor contemplates starting and completing the schedule activities. Schedule the entire project, including the design (if applicable) and construction (including commissioning) sequences. Scheduling of design and construction is the responsibility of the Subcontractor. Subcontractor management personnel must actively participate in the schedule development. Designers and lower-tier subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate project schedule. Provide a schedule that is forward planning as well as a project monitoring tool.

A. Subcontractor’s Project Schedule

Use the Subcontractor’s project schedule to measure the progress of the work and to aid in evaluating time extensions. Make the schedule cost-loaded and CSI MasterFormat activity-coded (use the latest edition of MasterFormat). Cost-load as a single project resource, at $1/unit and as an activity resource assignment. Make the cost-load level of detail consistent with the Schedule-of-Values, do not make cost-loading more detailed unless directed in the PRD. The subcontractor’s project schedule is the basis for progress payment evaluation. If the Subcontractor fails to submit the schedule within the time prescribed, LLNS may withhold approval of progress payments until the Subcontractor submits the required schedule.

B. Schedule Status

Provide a schedule status on at least a monthly basis. If, in the opinion of LLNS, the progress of the work falls behind the Subcontractor’s project schedule, take steps necessary to improve progress, including steps that may be required by LLNS, without additional impacts. In this circumstance, LLNS may require the Subcontractor to increase the number of shifts, overtime operations, and days
of work. LLNS may also require the Subcontractor to submit a supplementary schedule or schedules, updated weekly, as LLNS deems necessary to demonstrate how the scheduled rate of progress will be regained. (See article 3.05 Submission Requirements.)

3.02 CONSIDERATIONS FOR PAYMENT

Cost-load the schedule commensurate with the subcontract schedule of values. The cost-loaded schedule is a consideration for determining subcontract earnings during each update period and the amount of each progress payment. Lack of an accepted schedule update will result in an inability of LLNS to evaluate subcontract progress for the purposes of payment. Failure of the Subcontractor to provide required information will result in the rejection of the preliminary, initial, and subsequent schedule updates. In the event schedule revisions are directed by the LLNS STR and those revisions have not been included in subsequent revisions or updates, LLNS may withhold payment for each payment period, until such revisions to the project schedule have been made.

3.03 PROJECT SCHEDULE DETAILED REQUIREMENTS

Failure of the Subcontractor to meet the requirements of this specification will result in LLNS rejecting the schedule.

A. Critical Path Method

Use the critical path method (CPM) of network calculations to generate the project schedule. Prepare the project schedule in the precedence diagram method (PDM).

B. Level of Detail

Failure to develop the project schedule detail to at least level 3 will result in LLNS rejection. LLNS will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

1. Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Ensure that there are no non-procurement and non-level-of-effort activities that have original durations (OD) greater than 30 calendar days. Limit activity duration, except procurement and level-of-effort to no more than 45 calendar days.

2. Design (if design-build project) and Permit Activities

Include design and Subcontractor permit and authorization activities with the necessary meetings and follow-up actions and design package submission dates. Include the design schedule in the project schedule; show the sequence of events involved in carrying out the project design tasks within the specific subcontract period. Identify major design tasks, including those that control the flow of work. Include LLNL review and comment incorporation periods associated with each item.

3. Procurement Activities

Include activities associated with the submittal; LLNL review cycle; acceptance; procurement; fabrication and delivery of long lead materials, equipment, fabricated assemblies; and items on the critical path. A typical procurement sequence includes the following string of activities: submit, accept, procure, fabricate, and deliver.
4. Major Tasks

Include, at least, the following list of tasks, if part of the project scope. Allow 2 weeks for LLNS review and comment:

1) Deliverables as listed in other specification sections
2) Submission and acceptance of installed equipment lists
3) Submission and acceptance of testing and air balance (TAB)
4) Submission of TAB specialist design review report
5) Construction activities
6) Interfaces with other LLNS operations
7) Planned utility or building service interruptions. If an outage will interfere with LLNS’ operations in the affected area, then describe the duration of the interference and the nature of the impact for the STR approval. Identify the affected buildings and duration of the planned outage. Note that outages may require considerable lead time to arrange; therefore, schedule them as far in advance as possible to avoid delays.
8) Submission and acceptance of testing and balancing of HVAC plus commissioning plans and data
9) Air and water balancing report
10) Commissioning
11) Controls testing plan submission
12) Controls testing
13) Performance verification testing
14) Other systems testing
15) Commissioning (including intermediate systems commissioning)
16) Inspections as defined in section 01 77 00, “Project Close-Out”
17) Correction of punch-list items
18) Close-out

5. LLNS Activities

Show LLNS and other agency activities that could impact progress. These activities include, but are not limited to, acceptances, design reviews, environmental permit approvals by State regulators, permits supplied by LLNS (see section 01 35 20 Permitting), inspections, utility tie-in, Government-Furnished Equipment (GFE) and notice to proceed (NTP) for phasing requirements.

6. Activity Responsibility Coding (RESP)

Assign responsibility code for activities to the Subcontractor, lower-tier-subcontractors, LLNS, or whoever is responsible for performing the activity. Activities coded with a LLNS code include, but are not limited to, LLNS’ design reviews, LLNS’ acceptances, environmental permit approvals by State regulators, government-furnished equipment (GFE) and notice-to-proceed (NTP) for phasing requirements. Code activities not coded with a LLNS responsibility code to the Subcontractor or lower-tier-subcontractor responsible to perform the work. Activities with more than one responsibility code are not allowed. Examples of acceptable activity code values are DOR (for the designer-of-record, ELEC (for the electrical lower-tier-subcontractor), MECH (for the mechanical lower-tier-subcontractor, and LLNS). Unacceptable code values are abbreviations of the names of lower-tier-subcontractors.
7. Subcontract Changes Coding (MODF)

Assign activity code to activity or sequence of activities added to the schedule because of a subcontract modification or change order, when approved by LLNS, with a subcontract changes code. Key code values to the affected activities. Activity or sequence of activities added to the schedule because of alleged constructive changes made by LLNS may be added to a copy of the current schedule, subject to the acceptance of LLNS. Assign activity codes for these activities with a subcontract changes code. Key the code values to the Subcontractor's numbering system. More than one subcontract changes code per activity is not allowed.

8. Subcontract Work Breakdown Structure Coding (SWBS)

Key code schedule activities to the provided SWBS element as well as to the applicable CSI element [see 3.01.A Subcontractors Project Schedule]. Break down the authorized project scope using progressive elaboration to a greater level of definition; from scope statement and work breakdown structure, to logical or related sub elements groupings down to specific scheduled activities to facilitate sufficient planning and invoicing granularity. The Subcontractor may add additional lower levels of detail than the SWBS to better organize their work.

9. Phase of Work Coding (PHAS)

Assign phase of work code to activities based upon the phase of work in which the activity occurs. Code activities to either a design phase or a construction phase. Code fast track design and construction phases proposed by the Subcontractor to allow filtering and organizing the schedule by fast track design and construction packages. If the subcontract specifies construction phasing with separately defined performance periods, identify a construction phase code to allow filtering and organizing the schedule accordingly. Identify each activity with a single project phase and have only one phase of work code.

10. Category of Work Coding (CATW)

Assign category of work code to activities based upon the category of work to which the activity belongs. Category of work code must include, but is not limited to design, design submittal, design reviews, review conferences, permits, construction submittals, construction submittal acceptances, acceptance, procurement, fabrication, delivery, weather sensitive installation, non-weather sensitive installation, start-up, test and turnover. Assign a category of work code to each activity.

C. Scheduled Project Completion and Activity Calendars

The schedule interval extends from award date to the required subcontract completion date. The subcontract completion activity (“End Project”) is based on the required subcontract duration in the accepted subcontract proposal, as adjusted for approved subcontract time extensions. The first scheduled work period is the day after award is acknowledged by the Subcontractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7-day calendar when the subcontract assigns calendar day durations for the activity such as a LLNS acceptance activity. If the Subcontractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and LLNS holidays. Assign the category of work code “weather sensitive installation” to those activities that are weather sensitive. LLNS will interpret work periods not identified as non-work periods on each calendar as meaning the Subcontractor intends to perform work during those periods.
1. Project Start Date

Start the schedule no earlier than the date on which the award was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" (or award). Apply the "ES" constraint date of zero-day duration to the “Start Project” equal to the date that the NTP was acknowledged.

2. Schedule Constraints and Open-Ended Logic

Constrain completion of the last activity in the schedule by the subcontract completion date. Ensure that when the calculated early finish date of the last activity is later than the subcontract completion date the result of the schedule calculations is negative float. Include as the last activity in the project schedule an activity called "End Project". Ensure that the "End Project" activity has a late finish ("LF") constraint date equal to the subcontract completion date for the project, and with a zero-day duration or by using the "project must finish by" date in the scheduling software. No constrained dates other than those specified in the subcontract are allowed. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited. Only two open-ended activities are allowed: “Start Project” (or award) with no predecessor logic and “End Project” with no successor logic. Activities must have a predecessor and a successor with no dangling activities.

D. Interim Completion Dates

Constrain contractually-specified interim completion dates, using soft constraints, to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

1. Out-of-Sequence Progress

Activities that have progressed before preceding logic has been satisfied (out-of-sequence progress) is not allowed. Propose logic corrections to eliminate out-of-sequence progress. Use retained logic, not progress override, to correct out-of-sequence logic prior to submitting status.

2. Negative Lags and Start to Finish Relationships

Negative value lag durations contained in the project schedule are not allowed. Do not use start-to-finish (SF) relationships.

3. Calculation Mode

Retain the logic between predecessors and successors schedule calculations even when the successor activity starts, and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started, and the predecessor logic is not satisfied ("progress override") is not allowed.

4. Milestones

The schedule must include milestone activities for each significant project event. Examples of design milestones are; schematic design phase completed, design development phase completed, and construction documents phase completed. Examples of construction milestones are: notice-to-proceed, permits acquired, long-lead items acquired, foundation/substructure construction completed, construction completed, commissioning completed, and beneficial occupancy.
5. Total Float

Total float must be less than 2 reporting periods.

6. Weather

Include time for anticipated delays attributable to weather based upon average climatic range provided by the National Weather Service or another approved source. Include as a weather delay buffer at the end of construction, but prior to subcontract construction completion milestone.

3.04 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data, Gantt charts, reports, and network diagrams required for each submission are described in the article Submission Requirements.

A. Initial Project Schedule Submission

Submit the initial project schedule for acceptance within 14 calendar days of award. Demonstrate a sequence of activities that represent work through the entire subcontract performance period. Include in the design-build schedule detailed design and permitting activities, including, but not limited to, identification of individual design packages; design submission, reviews and conferences; subcontractor permit and authorization submissions and required LLNS actions; and long lead item acquisition prior to design completion. Also cover in the preliminary design-build schedule the entire construction effort with as much detail as is known at the time; however, as a minimum, include construction start and completion milestones and detailed construction activities through the dry-in milestone, including activity coding and cost loading. Reconcile cost-loaded activities with the subcontract schedule-of-values. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by LLNS acceptance of associated designs. When the design is complete, update the construction schedule and resubmit.

B. Design Package Schedule Submission

With each design package submitted to LLNS, submit a frag-net schedule extracted from the then current Preliminary, Initial or Updated schedule that covers the activities associated with that Design Package including construction, procurement and permitting activities.

C. Periodic Schedule Updates

Based on the result of the meeting, specified in Periodic Schedule Update Meetings, submit periodic schedule updates, along with invoice and accruals. These submissions will enable LLNS to assess Subcontractor's progress. Update the schedule to include detailed, lower WBS level construction activities as the design progresses, but not later than the submission of the final, un-reviewed design submission for each separate design package. LLNS may require submission of detailed schedule activities for distinct construction that is started prior to submission of a final design submission, if such activity is authorized.
3.05 SUBMISSION REQUIREMENTS

Submit the following items for the Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

A. Data

Provide baseline and current working status file data containing the project schedule in the backup format. Include previous update backup files. Label each submittal indicating the type of schedule (e.g. initial or update), full subcontract number, data date, and file name. Provide each schedule with a unique file name. Submit as required in section 01 33 00, “Submittals.”

B. Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by LLNS. Specifically reference in the narrative report on an activity-by-activity basis, changes made since the previous period and relate each change to documented, approved schedule changes.

3.06 PERIODIC SCHEDULE UPDATE MEETINGS

Conduct monthly (unless directed otherwise in the PRD) schedule update meetings for the purposes of reviewing the Subcontractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy. Meetings must occur by the fifth working day of the calendar month and after the Subcontractor has updated the schedule with LLNS concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intends to status. Bring a laptop computer with the scheduling software loaded for the meeting which allows meeting participants to view the proposed schedule update during the meeting. The meeting and resultant acceptable schedule update must be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange that will allow LLNS and the Subcontractor the opportunity to review the updated schedule on a real time and interactive basis. Organize, sort, filter and schedule the update as requested by LLNS. Submit a rough draft of the proposed activity logic corrections to the LLNS STR 48 hours in advance of the meeting. The Subcontractor's project manager and authorized scheduler must attend the meeting.

A. Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing accepted progress, revisions, and adjustments, pursuant to paragraph Submission Requirements not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

B. Status of Activities

Update information, including actual start dates (AS), actual finish dates (AF), remaining durations (RD), and percent complete are subject to the acceptance of LLNS prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting.
1. Start and Finish Dates
   Accurately show the status of the AS and AF dates for each activity currently in-progress or completed since the last update. Only assign AS dates when actual progress occurs on an activity.

2. Remaining Duration
   Update the estimated RD for incomplete activities independent of percent complete. Remaining durations may exceed the activity OD or may exceed the activity's prior update RD if the LLNS STR considers the current OD or RD to be understated based on current progress, insufficient work crews manning the job, unrealistic OD, or deficiencies that must be corrected that restrain successor activities.

3. Percent Complete
   Use physical percent complete. Update the percent complete for each activity started, based on the realistic objective measurable assessment of earned value. Activities that are complete except for remaining minor punch list work and that do not restrain the initiation of successor activities may be declared 100 percent complete. To allow for proper schedule management, cost-load correcting the punch list from LLNS pre-final inspection activities not less than 1 percent of the total subcontract value, which activities may be declared 100 percent complete upon completion and correction of punch list work identified during LLNS pre-final inspections.

3.07 WEEKLY COORDINATION MEETINGS
   A. LLNS and the Subcontractor must meet weekly between the meetings described in paragraph Periodic Schedule Update Meetings (see section 01 31 19, “Coordination and Meetings”) for jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. The then current and approved schedule update must be used for the purposes of this meeting and for the production and review of reports.

   B. Provide a Gantt chart produced by the scheduling software, organized by total float and sorted by early start date, and a three week "look-ahead" schedule by filtering schedule activities to show only current ongoing activities and activities schedule to start during the upcoming two weeks, organized by work area code and sorted by early start date. Also show the status of the prior week tasks – one-week look-back.

   C. LLNS and the Subcontractor must jointly review the schedules. If it appears that activities on the longest path(s), which are currently driving the calculated completion date (driving activities), are not progressing satisfactorily, and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes, but is not limited to, the following: increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if activities coded as LLNS responsibility require LLNS corrective action.

3.08 DIRECTED CHANGES
   If issued a directed change order (DCO) for work prior to settlement of price and/or time, submit proposed schedule revisions to LLNS within two weeks of the DCO being issued. LLNS will accept proposed revisions to the schedule prior to inclusion of those changes within the project schedule. The Subcontractor must include these revisions in the project schedule until revisions are submitted, and final
changes and impacts have been negotiated. If the Subcontractor has objections to the revisions furnished by LLNS, advise LLNS within two weeks of receipt of the revisions. Regardless of the objections, the Subcontractor must continue to update the schedule with LLNS's revisions until an agreement in the revisions is reached. If the Subcontractor fails to submit alternative revisions within two weeks of receipt of LLNS's proposed revisions, the Subcontractor will be deemed to have concurred with LLNS's proposed revisions. The proposed revisions may be the basis for an equitable adjustment for performance of the work.

3.09 OWNERSHIP OF FLOAT

Float is not for the exclusive use of either LLNS or the Subcontractor; it is jointly owned by both and is a resource available to and shared by both parties as needed to meet subcontract milestones and the subcontract completion date. The use of resource leveling, or other techniques used for artificially adjusting activity durations to consume float and influence critical path is prohibited. Do not sequester shared float through such strategies such as extending activity duration estimates to consume available float, using preferential logic, or using extensive crew/resource sequencing, constraints, unnecessary milestones, leads or lags on logic ties, and hammock type activities.

END OF SECTION
PART 1 - GENERAL

1.01 SUBMITTAL PROCEDURES

A. General Procedures

1. Submittals should be submitted electronically via LLNS construction management software.

2. Submit drawings, product data (including material specifications and data sheets), manufacturer’s instructions, maintenance manuals, and other submittals specified. If LLNS determines the Subcontractor’s submittal is incomplete or unacceptable, the STR will return it to the Subcontractor.

3. Establish a schedule and procedure for the submittal review, and LLNS approval or review return from LLNS, and resubmittal. Identify critical submittals; design drawings and specifications (if required in the PRD or it is a design-build subcontract); and shop drawings on the schedule. Allow 14 calendar days for LLNS submittal review. LLNS will not allow delays in the job progress because of Subcontractor failure to make required submittals per the approved project schedule and submittal register (see subpart “Submittal Register”). Advise the contract analyst and the STR of potential submittal delays and provide a recovery schedule (refer to section 01 32 01 Project Schedules).

4. Do not begin work related to or impacted by a submittal until LLNS has approved said submittal, or the LLNS STR has provided written direction to proceed.

5. Submit drawings and data, whether prepared by the Subcontractor or its suppliers, as the instruments of the Subcontractor. By providing submittals the Subcontractor represents to LLNS that it has (1) reviewed and approved them, (2) determined and verified materials, field measurements and related field construction criteria, or will do so, and (3) checked and coordinated the information within the Submittals with the requirements of the Work and of the design and build documents.

6. In each submittal, include literature and identify for each separable and separate piece of material or equipment the job title, subcontract number, specification section number, the specific applicable paragraph of the specifications, and the applicable section of the submittal. Consecutively number each different submittal (e.g. see attached sample submittal register in appendix 01 33 00-2).

7. Provide space on shop drawings and submittals for Subcontractor and LLNS review stamps.

8. Distribution

a. Complete the LLNS provided form as instructed and include with each submittal.

b. Submit electronic copies of drawings and data with transmittal form to the STR, copy the Supply Chain Management department contract analyst. Include the subcontract number in communications.
9. Apply the Subcontractor’s stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and subcontract documents.

10. Submittal Review

   a. Review and acceptance or approval of items submitted by the Subcontractor does not constitute acceptance of means, methods, materials, process, or components that do not comply with the requirements of the specifications, drawings, or other subcontract documents.

   b. LLNS will review drawings and data for conformance with the design intent. LLNS approval of the drawings or data does not relieve the Subcontractor from any dimensional or quantity errors, or other errors that develop later. Approval of the submittal documents does not relieve the Subcontractor from responsibility for substituting requirements in the subcontract drawings and specifications; unless the Subcontractor provided written notification to LLNS (as required in section 01 25 00 Substitutions) of the proposed substitution and has received written approval from LLNS for the substitution.

   c. LLNS will indicate review comments and the Subcontractor's required action on the submittals directly or on the transmittal letter. LLNS typically categorizes review comments as follows:

      1) Submittals marked as “NO EXCEPTION TAKEN” appear to be satisfactory as-is and do not require correction.

      2) Submittals marked as “FURNISH AS NOTED” appear to be satisfactory with the noted corrections, and do not require further LLNS review prior to construction. Provide revised drawings reflecting the corrections.

      3) Submittals marked as “REVISE AS NOTED & RESUBMIT” require corrected resubmittals for one or more of the following reasons. Provide a revised submittal for LLNS approval prior to commencement of related work.

         i. Drawings and data require corrections, as noted, prior to final review.

         ii. Drawings and data are incomplete, and require additional detailed information prior to final review.

         iii. Drawings and data do not meet the requirement of subcontract documents.

      4) Submittals marked as “REJECTED, RESUBMIT” do not comply with the subcontract documents, or they propose an “or equal” substitution without following the proper procedures or documentation. Provide a superseding submittal for LLNS approval prior to commencement of related work.

11. Return of Submittals

   a. The LLNS STR will return marked submittals to the Subcontractor as stated in the subcontract. Note that timely reviews are dependent upon complete submittals in accordance with these instructions.

   b. LLNS will return one hard copy or an electronic copy of the drawings and data to the Subcontractor with appropriate stamps and notations. When indicated, make the noted changes and corrections. Promptly resubmit the electronic copy.

12. Subcontractor Resubmittal: Identify changes made since previous submission.
B. Shop Drawings (see appendix 01-33-00-1 for design-build drawing requirements)

1. Submit shop drawings as required by the various sections of the specifications for LLNS review.

2. Request drawing numbers from the LLNS STR and apply to the shop drawings.

3. Provide detailed shop drawings in plan view, with cross-sections as necessary to provide clarity, indicating proposed installation plans. On the drawings, depict actual elevations and linear dimensions, routing changes, transitions, and major offsets deemed necessary to accomplish the installation. Submit the shop drawings to the STR for review and comment prior to starting installation.

4. Submit shop drawings for proposed rearrangements of equipment and materials, and for substitutions in equipment and materials, that differ from those detailed on the subcontract drawings in accordance with 01 25 00, “Substitutions.” Submit uniform shop drawings that conform to the subcontract drawings in quality, size, and detail. Promptly bring unavoidable conflicts encountered during the preparation or review of the shop drawings, or during construction, to the attention of the STR, in writing, for resolution.

5. Where the subcontract drawings are diagrammatic and show only the general arrangement of the systems, ensure materials and equipment are installed correctly and adjust as necessary or required to resolve space problems and preserve service clearance. In the event a major rerouting of a system appears necessary, prepare shop drawings of the proposed rearrangement and submit the drawings for approval to the LLNS STR.

6. Subcontract drawings may not show necessary offsets, adjustments, and transitions required for the complete installation because of the diagrammatic nature and small scale.

C. Product Data

1. Submit product data as required by various articles of this section, or as LLNS otherwise requests, for review in accordance with the instructions in the specifications.

2. Annotate product data submittals to clearly indicate make, model, and identification numbers of submitted items.

D. Calculations

Use standard, recognized computation techniques; shortcut methods and rules of thumb are not acceptable. Present computations in well-indexed document form with assumptions stated and references made to supporting documents and text. Include test data, where appropriate, as part of the supporting documentation.

Submit final calculations. Architects and engineers-of-record are required to have a current license in the State of California, and are required to seal, sign, and date final calculations in accordance with the California Business and Professions Code, sections 5535 through 5538, and sections 6730 through 6749.

In addition to the architect or engineer-of-record, an independent engineer or architect of the same discipline (may be of the same firm) is required to check and sign the calculations.
E. Manufacturer’s Written Instructions

Submit an electronic copy of manufacturer’s written instructions for installing materials or equipment in the submittal register. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.02 SAMPLES

A. Samples for Review. Submit samples to the STR to review for the limited purpose of checking conformance with information given and the design concept expressed in the subcontract documents.

B. Samples for Information. Submit samples to the STR for information only.

C. Samples for Selection

1. Submit samples to the STR for aesthetic, color, or finish selection by LLNS.

2. Submit samples of finishes from the full range of manufacturers’ standard colors, textures, and patterns for LLNS selection, and verification of quality and utility.

3. After review, produce duplicates of LLNS’ selections and distribute in accordance with subpart 1.01.

D. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification and full project information on each sample.

F. Submit the number of samples specified in individual specification sections or the Project Requirements Document (PRD) LLNS will retain one sample.

G. Use reviewed samples in the work if allowed by the individual specification sections.

H. Do not use samples for testing purposes unless specifically stated in the specifications.

1.03 DAILY REPORTS

A. Submit one copy of daily construction reports to the STR at the end of each business day.

B. Report the following: current activities, work areas, crew sizes by craft, weather conditions, tests, inspections, major equipment and material deliveries, a summary of quality problems, non-conformances, and non-conformance resolutions when applicable.

C. Submit copies of pre-task safety planning reports daily.

1.04 TEST REPORTS AND DESIGN DATA

Submit test reports and design data for LLNS review, and for assessing conformance of tested items/components with the design concept expressed in the subcontract documents.
1.05 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Subcontractor to STR, in quantities specified for product data for review. Certificates may be recent or previous test results on material or product, but LLNS approval is required.

B. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.06 MANUFACTURER'S FIELD REPORTS

Submit reports to the STR within 14 calendar days after observation or prior to request for final inspection, whichever is sooner, to assess conformance with information given and the design concept expressed in the subcontract documents.

1.07 ERECTION DRAWINGS

A. Submit drawings to the subcontract technical representative (STR) to assess conformance with information given and the design concept expressed in the subcontract documents.

B. LLNS may reject data indicating inappropriate or unacceptable work.

1.08 SUBMITTAL REGISTER

Within 14 calendar days of receiving notice to proceed, submit a comprehensive submittal register (see sample submittal register in appendix 01 33 00-2). Do not construe this register as limiting the type and number of Subcontractor submittals that may be required or advisable in order to facilitate the correct execution of the work. Other specification sections may require additional submittals. Additional submittals include mockups, installer qualifications, calculations, certifications, and other submittals not specifically categorized.

1.09 ADMINISTRATIVE SUBMITTALS

A. Submit a list of lower-tier subcontractors in accordance with subcontract requirements. Include subcontractors’ telephone numbers and addresses.

B. Various sections within the general requirements of the division 01 specifications list submittal requirements of administrative nature. Unless specifically indicated otherwise, submit these using the same process as specified for other submittals in this section.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Upon receipt of written notice to proceed with construction phase work, perform the work of the construction documents and the services in this section. Do not deviate from the PRD or the LLNS-approved construction documents, including the drawings, specifications, and other approved submittals without following the change request process in the subcontract documents.
END OF SECTION

(appendices follow)
APPENDIX 01-33-00-1
ADDITIONAL REQUIREMENTS FOR DESIGN-BUILD PROJECTS

A.1 GENERAL

A. Provide construction documents consisting of drawings and specifications that set forth, in detail, the quality levels of materials and systems and other requirements for the construction of the project. The construction documents must not deviate from the design criteria established in the project requirements document (PRD) without following the change request process in the subcontract documents. Failure of LLNS to discover deviations from the design criteria does not relieve the Subcontractor of the obligation to perform the work in accordance with the design criteria.

B. The construction documents, prepared and submitted in accordance with the requirements are deemed “Subcontract Documents.”

C. Provide design services or certifications including drawings, calculations, specifications, certifications, and other submittals signed and sealed by the State of California licensed design professional.

A.2 DESIGN DRAWINGS

D. Submit design drawings as required by the PRD, for review in accordance with this submittals specification.

E. In the drawing package, include sufficient drawings to provide a full and complete construction package.

F. Drawing Format and Preparation Requirements

1. Conform to and comply with the U.S. National CAD Standard (NCS) available through the National Institute of Building Science (NIBS). For purposes of these specifications, the term "consultant" used in the referenced standards means the Subcontractor or the applicable engineering discipline, as appropriate

2. See drafting and drawing requirements in the LLNL Facilities Drafting Standard STD-DES-0002 attached to the project requirements document (PRD).

A.3 SPECIFICATIONS

A. Conform technical specifications to CSI MasterFormat®, SectionFormat™, and PageFormat™

B. Use LLNL Facilities Master Specifications if required in the PRD.

C. In the construction specifications, refer to the subcontract parties as “Subcontractor” or “lower-tier subcontractor,” and use “LLNS” in place of “Contractor” and “owner.” Do not use the terms “contract,” “contractor,” or “owner.”
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### APPENDIX 01 33 00 -2
### SUBMITTAL REGISTER

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<tr>
<th>Item</th>
<th>Spec Section or Detail Reference/Submittal No.</th>
<th>Submittal Description</th>
<th>Spec. Paragraph Number</th>
<th>Date Required To Submit</th>
<th>Date Actually Submitted</th>
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## Sample Submittal Register

**Subcontract No.:** B123456  
**Project Title:** Westgate Entry Statement

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SECTION 01 35 20
PERMITTING

PART 1 - GENERAL

1.01 REFERENCES

The following documents form a part of these specifications to the extent stated.

A. State of California: California Labor Code, section 7301.1

B. Bay Area Air Quality Management District (BAAQMD): Regulation 11 – Hazardous Pollutants,
Rule 2 – Asbestos Demolition, Renovation, and Manufacturing

C. San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD): Regulation IV (adopts
NESHAP Standards), Rule 4002 – National Emission Standards for Hazardous Air Pollutants

1.02 ON-SITE PERMITTING AND AUTHORIZATIONS

A. General

LLNS requires several permits for work at LLNL and site 300, and special permits for work in
certain facilities or directorates. LLNS will obtain these permits and authorizations on behalf of the
Subcontractor. Schedule the work to allow time for LLNS to obtain these permits and comply with
the permit requirements. Refer to the schedule at the end of this section for a general listing of
permits issued on site. The subcontract technical representative (STR) will coordinate this activity.

B. NIF Directorate Work Permits

The LLNL NIF Principal Directorate requires work permits for work within NIF facilities.
Coordinate these permits through the STR prior to the daily work team meeting and start of work.

C. Specific Hazard Permits

In addition to general work permits, LLNS may require specific hazard permits.

D. Modifications or Connections to Existing Utilities

If modifications or connections to the existing utilities (e.g., electric power, water, gas,
communications, and air) require an interruption of services, give the STR written notice 14 calendar
days prior to the desired modification or connection, or as defined in the specifications. The STR
will obtain a utilities outage permit.

1.03 OFF-SITE SPECIAL PERMITTING

A. Although LLNS is generally not required to secure permits from local jurisdictions for work on site,
certain types of work may entail obtaining permits from off-site agencies. Examples include elevator
construction, soil remediation due to contamination, closing existing underground water tanks, and
other environmentally regulated activities. In such instances, LLNS may be required to obtain the
permit, but the Subcontractor may also be required to prepare documentation for the permit. Other
permits require the Subcontractor to obtain the permit. In both cases, comply with regulations
regarding the work under the issued permit. Refer to the following paragraphs and the Project
Requirements Document (PRD), as applicable, for a listing of such special requirements.
When constructing an elevator, lift, or hoist, obtain necessary permits from the State of California in accordance with *California Labor Code* section 7301.1. The Subcontractor is solely responsible for obtaining these permits, and bears the consequences of delays associated with the issuance of permits.

1.04 OFF-SITE AGENCY NOTIFICATIONS

When the Subcontractor is conducting certain activities on site, notify off-site agencies having jurisdiction over this work. Two examples of such an activity are demolition and asbestos abatement work, which require at least 10 days prior notification to the local air resource board (BAAQMD or SJVUAPCD.) Before beginning work that requires off site agency notification, submit proof to LLNS that the agency has received such notification.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 ON-SITE PERMITTING

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<tr>
<th>Type</th>
<th>Description</th>
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<td>Soil disturbance</td>
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<td>14 days</td>
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<td>Concrete Penetrations</td>
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<tr>
<td>LLNL Building Department</td>
<td>Permit to execute construction</td>
<td></td>
<td>21 days</td>
</tr>
<tr>
<td>NIF &amp; PS Work Permit</td>
<td>Work within the NIF &amp; PS directorate</td>
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<td>14 days</td>
</tr>
<tr>
<td>NIF &amp; PS Hoisting Permit</td>
<td>Work within the NIF &amp; PS directorate</td>
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<td>14 days</td>
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<tr>
<td>Roof Access</td>
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<td>01 35 23</td>
<td>14 days</td>
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<tr>
<td>Building/Equipment Drain Outage</td>
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<td>01 35 23</td>
<td>14 days</td>
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PART 1 - GENERAL

1.01 PROGRAM POLICY

A. For the purposes of these General Safety Provisions, the term “safety” encompasses the environment, safety, and health, including pollution prevention and waste minimization. The term “employees” includes Subcontractor employees and lower-tier subcontractor employees performing work under this subcontract, and LLNS employees.

B. The requirements apply to the Subcontractor and their lower-tier subcontractors (referred to as “Subcontractor” in this document).

C. Regulatory Requirements

Work at LLNL is subject to the Occupational Safety and Health Administration (OSHA) and worker safety and health requirements as identified below. If there is a conflict between requirements, the Subcontractor is to apply the most stringent rule unless otherwise directed by LLNS:

1. Title 29 CFR, Parts 1904.4 through 1904.11, 1904.29 through 1904.33; 1904.44, and 1904.46, “Recording and Reporting Occupational Injuries and Illnesses”
4. 10 CFR 851, Worker Safety and Health Program
5. American Conference of Governmental Industrial Hygienists (ACGIH), “Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices”
8. ANSI Z49.1, “Safety in Welding, Cutting and Allied Processes,” sections 4.3 and E4.3

D. General Requirements

1. Perform work safely and provide a place of employment free from recognized hazards that may cause, or are likely to cause, death or serious physical harm to employees. This includes providing protection for the public and the environment. The subcontractor is responsible for the safe performance of the work in accordance with applicable federal, state, and LLNS-specific ES&H requirements. Exercise a degree of care commensurate with the work and the associated hazards. Ensure that ES&H is an integral and transparent part of the planning and execution of work.
a. Subcontractor line management is responsible for the protection of employees, the public, and the environment. Subcontractor line management includes those Subcontractor and lower-tier subcontractor employees managing or supervising employees performing work.

b. Establish and maintain clear and unambiguous lines of authority and responsibility for ES&H at Subcontractor organizational levels.

c. Ensure that Subcontractor personnel possess the experience, skills, knowledge, and abilities that are necessary to discharge their responsibilities. Remove employees from work under the Subcontract if they are determined to be careless, incompetent, unfit for duty or otherwise objectionable to the Subcontractor or LLNS.

d. Allocate resources effectively to balance ES&H considerations (protection of employees, the public, and the environment) with execution of work.

e. Before performing work, evaluate the associated hazards and implement the ES&H standards and requirements contained or referenced in this subcontract to assure protection of employees, the public, and the environment from potential adverse consequences of the work activity.

f. Develop work-specific administrative and engineering controls to prevent and mitigate hazards. Emphasize the work design and controls to reduce or eliminate the hazards.

g. LLNS and the Subcontractor have agreed upon “conditions and requirements” for initiating and conducting the work. These agreed upon “conditions and requirements” are requirements of this subcontract and binding upon the Subcontractor.

h. Manage and perform the work in accordance with a Subcontractor safety plan that fulfills conditions in this General Safety Provisions and other specification sections. See subpart 1.03 for safety plan requirements.

2. Comply with, and assist LLNS in complying with, ES&H requirements of applicable laws and regulations, and applicable directives identified in this subcontract. Cooperate with LLNS, federal, state, and local agencies having jurisdiction over ES&H matters under this subcontract.

   a. Promptly evaluate and resolve noncompliance with applicable ES&H requirements of this subcontract and the Subcontractor’s safety plan. If the Subcontractor fails to provide resolution or if, at any time, the Subcontractor’s acts or failure to act cause substantial harm or an imminent danger to the environment or the health and safety of employees or the public, LLNS may issue an order stopping work in whole or in part. A stop work order issued by LLNS under this clause is without prejudice to other legal or contractual rights of LLNS or the U.S. Government. In addition, LLNS may, at its discretion, withhold payments and rescind security access badges, until the Subcontractor submits or implements a satisfactory corrective action plan or cure proposal. In the event that LLNS issues a stop work order, at its discretion LLNS may authorize the resumption of the work. The Subcontractor is not entitled to an extension of time or additional compensation for damages due to, or in connection with, a work stoppage ordered in accordance with this specification.

   b. Ensure that employees and lower-tier subcontractor employees performing under this subcontract comply with the ES&H requirements applicable to this subcontract.

   c. Accordingly, apply the ES&H requirements of this subcontract to lower-tier subcontractors to the extent necessary to ensure compliance with the ES&H requirements. Include a clause substantially the same as this paragraph in lower-tier subcontracts involving complex or hazardous work. These subcontracts must provide for the right to stop work.
d. Immediately report occupational injuries, illness, or release of hazardous materials into the environment associated with performance under this subcontract to LLNS. Additionally, cooperate with LLNS and provide a written report of the incident (e.g., a first report of injury). This includes allowing LLNS to review logs and summaries of recordable occupational injuries and illnesses (OSHA No. 300 and 300A forms or State equivalent) maintained by the Subcontractor. Provide comprehensive occupational medicine services for employees (workers) in compliance with applicable laws and regulations. LLNS reserves the right to direct, and to review and approve, the specific occupational medicine services provided by the Subcontractor.

e. Allow LLNS access to written injury and illness prevention program (IIPP), which the Subcontractor must maintain according to the law.

f. ES&H Performance Feedback: Provide feedback to the LLNS STR, when requested, on the effectiveness of LLNS ES&H requirements including, without limitation, those pertaining to on-site ES&H controls, notices, and oversight, LLNS provided ES&H training and information. This feedback may include a self-assessment of the Subcontractor’s performance relative to the ES&H requirements of this subcontract.

1.02 EMPLOYEE CONCERNS PROGRAM, DIFFERING PROFESSIONAL OPINIONS

Comply with DOE O 442.1A, Department of Energy Employee Concerns Program and DOE O 442.2, Differing Professional Opinions for Technical Issues Involving Environmental Safety and Health. The following paragraphs outline the implementation of these programs at LLNL.

A. The Differing Professional Opinions (DPO) process encourages and facilitates dialogue and resolution on DPOs from Subcontractor employees regarding ES&H technical issues. The intent of this process is not to circumvent other avenues for resolving technical disagreements, but rather to supplement existing processes for assessing and addressing technical issues related to ES&H. This process may require LLNS to stop or curtail work operations to place the facility or activity in a safe condition until the DPO issue has been resolved.

B. Subcontractor employees with knowledge of a significant ES&H-related technical issue or activity at LLNL that they believe is not being properly addressed should raise the issue in accordance with the following instructions to ensure it is properly considered in a timely manner. The National Nuclear Security Administration (NNSA), the DOE agency that oversees LLNL operations, uses the term “submitters” to refer to Subcontractor employees who submit DPOs. As a submitter, comply with the following:

1. First, seek resolution through readily available processes, such as discussions with first-line supervisors, or the review and comment processes.

2. If not resolved through a readily available process, submit DPO issues in writing to the attention of the LLNS contract analyst, or directly to the NNSA Laboratory Field Office (LFO). The following information is required:

   a. Summary of position, including proposed or established practice
   b. Recommended action
   c. Assessment of consequences and technical basis for concern
   d. Recommended technical experts
   e. Relevant documentation for review
   f. Explain attempts to resolve issue prior to submitting a DPO
   g. Identify the NNSA facility and activity
3. Submit written DPO issues to the following address:

DPO Manager, NNSA/LFO Chief of Staff,
NNSA – Livermore Field Office, L-293
7000 East Avenue / P.O. Box 808
Livermore, CA  94550 / 94551

4. If requested, meet with ad hoc panels and managers, and provide known information to support a thorough review of the concern.

C. The Subcontractor is required to inform employees of their right and ability to report concerns on technical issues relating to ES&H through the DPO process.

D. The Subcontractor is required to extend the requirements of this subpart to lower-tier subcontractors to the extent necessary to ensure the lower-tier subcontractor’s compliance with the requirements and the safe performance of work.

1.03 SUBCONTRACTOR SAFETY PROGRAM

A. The Subcontractor is solely responsible for initiating, maintaining, and supervising safety provisions, precautions, and programs in the course of the performance of the subcontract.

B. Management Responsibilities and Worker Rights

The Subcontractor and its lower-tier subcontractors are required to provide a workplace at the LLNL site that is free from recognized hazards with the potential to cause death or serious physical harm and perform work in accordance with these General Safety Provisions.


2. Use qualified worker safety and health professionals (e.g., certified industrial hygienist or certified safety professional) as required by these General Safety Provisions.

3. Provide workers with access to information relevant to the worker safety and health, including:
   a. The Subcontractor’s corporate safety plan, job hazard analysis (JHA), and any other relevant health and safety documents.
   b. Applicable injury/illness information from OSHA No. 300 and 300A Forms (or California State equivalents), subject to Freedom of Information Act restrictions.
   c. LLNS provided health and safety information and publications.
   d. LLNS provided 10 CFR 851 worker’s rights poster, to be posted at the jobsite.

4. Provide measures for workers to report, without reprisal, job-related fatalities, injuries, illnesses, incidents, and hazards and make suggestions for mitigating hazards. Promptly respond to such reports and suggestions.

5. Provide regular communication with workers about workplace health and safety matters.

6. Inform workers of their rights, which include:
   a. Access to the health and safety information described in 1.03.C.3, above.
   b. Notification when monitoring indicates overexposure to hazardous materials.
   c. Right to observe monitoring and receive the results of their own exposure monitoring.
d. Express concerns related to worker safety and health.
e. The right to stop work or decline to perform an assigned task based on a reasonable belief
   that the task poses an imminent risk of death, serious physical harm, or other serious
   hazard in circumstances where there is insufficient time to use normal hazard reporting
   procedures.

7. During periods of active construction, the Subcontractor must have a safety officer in
   accordance with section 01 30 00, “Administrative Requirements.”

C. Hazard Assessment and Prevention
   1. Address hazards identified in the Subcontractor Area Hazards Control List (SAHCL), the
      Subcontractor’s corporate safety plan, and the JHA.
   2. The Subcontractor’s workers are required to acknowledge being informed of the hazards and
      protective measures associated with assigned work activities. After the safety orientation submit
      an attendance roster with employee signatures verifying that each employee understands the
      safety plan, and ensure that the attendance roster is always available at the jobsite.
   3. Instruct workers to report to the Subcontractor’s designated representative hazards not
      previously identified or evaluated. If immediate corrective action is not possible or the hazard
      falls outside of project scope, immediately notify affected workers, post appropriate warning
      signs, implement needed interim control measures, and notify LLNS of the action taken. Stop
      work in the affected area until appropriate protective measures are established.
   4. Establish and document procedures for routinely assessing workplace hazards produced from
      chemical, biological, and safety hazards at the jobsite.
   5. Implement a hazard prevention and abatement process to ensure prompt abatement of identified
      and potential hazards at the jobsite.

D. Recordkeeping and Reporting
   Report OSHA recordable injuries and property damage to LLNS immediately (within one hour of
   incident). Also, conduct an incident investigation and submit a complete written report to LLNS
   within 24 hours of the incident. LLNS may perform its own investigation. If an injury is involved,
   provide a daily verbal and written update to LLNS until the claimant is released to full duty and/or
   claim has been resolved. Retain and maintain work activity records in accordance with applicable
   state and federal requirements.

1.04 SUBCONTRACTOR ES&H SUBMITTALS

A. Subcontractors are required to submit documentation of the work tasks, hazards, controls, general
   safety practices, and readiness to work to LLNL. This information is termed “ES&H submittals,”
   and may include the following types of documentation:

1. Job Hazards Analysis (JHA): Lists the work tasks the subcontractor will perform at LLNL, the
   hazards and environmental aspects associated with those tasks, and the specific engineering,
   administrative, personal protective equipment (PPE), and training controls the subcontractor
   will implement.

2. Corporate Safety Plan: Documents the subcontractor’s general approach to ES&H, such as:
a. Implementation of OSHA requirements (e.g., hearing conservation program, respiratory protection program).
b. Outline of training program.
c. Procedures and forms, such as confined space entry permits or aerial lift inspection forms.

3. DOE / LLNS Specific Safety Requirements: Information LLNS requires to meet site-specific requirements, such as:

a. Identification of the person responsible for safety on the project.
b. Injury and illness reporting program.
c. Site-specific emergency response information, including local medical provider.
   1) LLNS requires a comprehensive occupational medicine program for workers stationed at the LLNL jobsite for more than 30 days per year, or who are enrolled for any length of time in a medical monitoring program required by 10 CFR 851 or other federal, state, or local regulation.

d. Supplemental documentation as required by these specifications (e.g. lift plans, asbestos or lead work plans, complex LOTO plans, excavation plans)

4. Records: Documentation of readiness to work, such as training records for crane operators or designated competent persons (e.g., fall protection, rigging, scaffolding, trenching and excavation), medical qualifications or certification of HEPA filter systems.

B. Submit a JHA for the project, to include the work tasks, hazards and environmental aspects, and the specific controls the subcontractor will implement while working at LLNL. General safety program information does not need to be in the JHA. The JHA may reference the corporate safety plan for that information. LLNS will provide a template to collect this information and training on JHA development for work performed at LLNL.

C. Submit a corporate safety plan unless otherwise directed by the STR.

D. Submit the DOE / LLNS Specific Requirements forms (included as appendix C to these provisions). By submitting appendix C, the Subcontractor acknowledges it will adhere to the LLNS-specific requirements. LLNS-specific requirements are in addition to requirements of a corporate safety plan and supersede corporate requirements should they conflict. If this form is submitted, there is no need to modify corporate safety programs for LLNS-specific requirements.

E. Submit records when required by other sections of this specification.

F. LLNS will make the final determination on the acceptability of the Subcontractor’s ES&H submittals. LLNS’ approval of the Subcontractor’s ES&H submittals does not relieve the Subcontractor from responsibility for any errors or omissions in such submittals or from responsibility for complying with the requirements of this subcontract (including, without limitation, these specifications) or applicable laws or regulations. The Subcontractor is not entitled to a cost or schedule adjustment due to failure to submit acceptable ES&H submittals.

G. Keep one copy of LLNS-approved JHA and other submittals at the jobsite.

H. Before performing a work activity that involves hazards that were not addressed in the original submittals, submit an addendum in the form of a modification for acceptance. New hazards may result from changes to the scope of work or unexpected site conditions. Identify in the addendum mitigation or control for the new hazard.
1.05  SUBCONTRACTOR TRAINING PROGRAM

A.  Safety Training

The Subcontractor is responsible to train its employees in accordance with laws and standards, and include additional training for site supervision. Continue training through the term of the subcontract. Submit copies of training certificates for each employee to LLNS for operations that require such training prior to performing the work.

1.  As a minimum, provide the following training for pertinent Subcontractor personnel:
   a.  Employee Orientation Training
       Provide orientation training for every employee (including sub-tier subcontractors) working on the jobsite covering the various safety policies, safety manuals, first aid availability, accident reporting procedures, safety meeting participation, personal protective equipment, enforcement procedures, and special LLNS safety requirements that are required in the specifications, these General Safety Provisions, or the subcontract.
   b.  Supervisor / Employee Safety Training
       Provide training to supervisors covering record keeping, incident investigation, OSHA inspections, H&S documentation requirements (e.g. OSHA 30-hour course for construction). Be prepared to submit each employee’s training course(s) certification(s) to LLNS if requested.

       Provide training to employees (and lower tiered subcontractors) on construction hazards and protective measures (e.g. OSHA 10-hour course). Be prepared to submit each employee’s training course(s) certification(s) to LLNS if requested.
   c.  Competent and Qualified Person Training
       Operations requiring a competent and qualified person in accordance with OSHA requirements include, but are not limited to, trenching, excavation and shoring, fall protection, scaffolds, confined space entry, silica, and rigging. Provide in writing the names of the designated competent persons for the particular operations and the verification of their training and/or experience.
   d.  Emergency Procedures
       Procedures are required to cover notification procedures, evacuation routes, mustering points, and accountability. Include this section as part of the employee orientation training specified in paragraph A.1.a above.
   e.  Lockout/Tagout
       Training is required to cover each individual piece of energy producing machinery or equipment that is to be removed, installed, serviced, or altered during the project. See subpart 3.10 “Lockout/Tagout LOTO” of this section.
   f.  Any other training as directed in the Project Requirements Document or SAHCL.

2.  Provide the following additional training to employees if performing the specific work:
   a.  Confined space entry for personnel working in permit-required confined spaces
   b.  Oxy-fuel gas welding and cutting safety for personnel performing oxy-fuel gas welding or cutting
   c.  Powered industrial truck (forklift) for personnel required to operate a forklift
   d.  Crane and/or rigging safety for personnel operating hoists or cranes or rigging for a lift
   e.  Fall protection for personnel required to work at elevations six feet and above
   f.  Respirator training and fit test for personnel required to don respirators
g. Scissor/aerial lift operator training for personnel required to operate scissor lifts or aerial lifts
h. Silica training for any personnel who may be exposed to respirable crystalline silica in construction work at or above OSHA’s Action Level.
i. Scaffold safety for erectors and personnel required to work from scaffolding

1.06 **SUBCONTRACTOR SAFETY MEETINGS**

A. **Safety Orientation**

Prior to the start of work, attend a LLNS-hosted safety orientation. The orientation will include the viewing of a general safety video, a video describing LLNL’s permit process, an overview of construction safety requirements specified in this section, and a discussion of site-specific safety requirements. Prepare an attendance roster.

B. **Weekly Safety Meetings**

Conduct weekly meetings as required by OSHA with on-site Subcontractor and sub-tier subcontractor personnel. Prepare documentation detailing the subject discussed with signatures of participants for each meeting. Make available to LLNS when requested.

On projects involving soil-disturbing activities at Site 300, communicate the risk of Valley Fever and discuss the mitigation measures to protect those potentially affected.

C. **Daily Safe Plan of Action (SPA) Meetings**

Conduct daily SPA meetings with the work crew and each lower-tier subcontractor at the jobsite at the start of work. See appendix 01 35 23 B for the SPA process, a sample worksheet, and checklist. If performing work within the National Ignition Facility (NIF) complex, the Subcontractor should use NIF’s SPA.

Inform the LLNS STR of the time and location of daily SPA meetings. LLNS STRs will attend SPA meetings at his/her discretion.

1.07 **EMERGENCIES**

In an emergency affecting the safety of persons or property, immediately call 911 from an LLNL system phone or (925) 447-6880 (LLNL Emergency Dispatch Center) from off-site, pay, or cellular phone, and take appropriate action to prevent or minimize damage, injury, or loss, and to preserve the integrity of the scene for future investigation. Promptly notify the STR of the occurrence of such an emergency and actions taken by the Subcontractor. This notice may be oral followed by written confirmation.

1.08 **SPECIAL PROVISIONS FOR SITE 300**

A. The LLNL Site 300 location is an area where LLNS processes, transports, and tests explosives; treat Site 300 as a hazards area. Subcontractor employees seeking access to the jobsite for the first time must complete the S300 Site Access training.

B. Site 300 also has a Valley Fever hazard. Soil disturbance and outdoor dust-generating activities require use of effective dust control, mitigation measures, and respiratory protection for workers to limit the potential inhalation of spores. Subcontractor employees must complete a web-based training course on Valley Fever, or its equivalent, prior to commencement of any on-site work at Site 300.
C. The “Security and Site Access Provisions” detail additional work requirements.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 PROTECTION OF PERSONS AND PROPERTY

A. Erect and maintain, as required by existing conditions and performance of the subcontract, safeguards for safety and protection, including: providing lighting and ventilation; posting adequate access control signage and/or barriers with the appropriate signal words (i.e., Danger, Warning, Caution, or Notice) against hazards; issuing and posting safety regulations; and notifying LLNS of conditions that could affect LLNS or other subcontractor activities at the project site, adjacent sites, or utilities sites.

B. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent inhalation exposure and potential contamination caused by the generation of dust, fumes, vapors, or gases.

C. Notify LLNS when use or storage of hazardous materials, equipment, or unusual methods are necessary.

D. Do not perform or permit the performance of subcontract work on the project site to endanger the safety and/or health of persons or property. Address these safety management processes in the Subcontractor’s corporate safety plan.

3.02 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Submit PPE Program as part of the corporate safety plan.

Provide and inspect PPE, and ensure that Subcontractor employees, lower-tiered subcontractors, and construction vendors utilize required PPE. Minimum construction site PPE includes the following:

1. Safety glasses
2. Hard hats
3. Safety toe work boots (“high tops”)
4. Long pants and shirts with a minimum of 4-inch sleeves
5. High visibility/reflective vests or other acceptable reflective clothing (class II) when work is performed in inclement weather or workers are subject to vehicle and/or heavy equipment traffic
6. Additional PPE as required by other sections of the specifications, General Safety Provisions, SAHCL, and JHA
3.03 SCAFFOLDING AND LADDER SAFETY

A. Erect, use and disassemble scaffolding in accordance with 29 CFR 1926 Subpart L, Scaffolds. Train scaffolding users in accordance with 29 CFR 1926.454(a).

B. Select and use ladders in accordance with 29 CFR 1926, Subpart X, Stairways and Ladders.

C. Ladder use: LLNS has specific requirements for safe ladder use:
   1. Use personal fall protection when working from a ladder and the midsection of the worker’s torso (i.e. belt buckle) is outside of the side rails of the ladder, or if it is necessary to work backwards from a ladder.
   2. Whenever possible, perform work on ladders so the worker is able to face the ladder and maintain three points of contact when climbing or descending.
   3. Raise and lower materials and tools by a rope or other mechanical means.

D. Scaffolding shall be erected, maintained, disassembled, and inspected daily under the direction of a subcontractor-designated scaffolding competent person. Ladders shall be inspected by the user prior to use.

E. Submit in the JHA or corporate safety plan details of scaffolding erection, use, and disassembly. Submit training records for designated competent scaffolding persons.

3.04 FALL PROTECTION

A. Provide fall protection at the work site in accordance with 29 CFR 1920 "Occupational Safety and Health Standards" or 29 CFR 1926 “Safety and Health Regulations for Construction” as applicable to the work being performed. Provide safety equipment, material, labor, and services required for compliance with this requirement. Warning line systems in compliance with OSHA 29 CFR 1910.29, (d) or OSHA 29 CFR 1926.502, (f) must include additional warning lines or demarcation at lower levels when needed to ensure that they are visible at the employee’s working level.

B. If fall protection is applicable to the project, submit the following:
   1. Fall protection program as part of the corporate safety plan.
   2. Assessed fall hazard at the jobsite and the selected fall protection system.
   3. Name of competent person(s) and documentation of training.
   4. If required by LLNS, a detailed description of the methodology for identifying anchor points, calculating clearance requirements, and rescue procedures.

3.05 HOISTING AND RIGGING ACTIVITIES

A. Regulations

B. Applicability

Hoisting and rigging activities include use of the following equipment or devices:

1. Mobile cranes
2. Facility cranes
3. Forklifts with lifting attachments
4. Chain falls
5. Come-a-longs
6. Gantries
7. Industrial grade and/or rated: jacks, rollers, dollies, skates/skids, SPMT’s (self-propelled modular transporters), pushers/pullers
8. Rigging equipment, such as slings, rigging hardware, below-the-hook lifting devices, etc.

C. LLNS Specific Requirements

LLNS has specific requirements for the categorization and planning of lifts. See hoisting and rigging requirements in appendix 01 35 23 A “Cranes, Hoists, and Rigging” following this section.

Qualified LLNS personnel will verify subcontractor hoisting and rigging operations/equipment inspections prior to lifts being performed.

3.06 MATERIAL HANDLING

A. Handle materials in accordance with 29 CFR 1926, subpart H, and 29 CFR 1910, subpart N.

B. LLNL may request a material handling plan when moving large irregularly shaped, configured or sized items (center of gravity or balance concerns) or equipment with tight installation tolerances.

3.07 AERIAL LIFTS


B. In addition, LLNS requires that operators and passengers in any type of aerial lift use fall restraint with a body harness attached to an anchor point on the basket.

C. LLNS requires Subcontractors to obtain prior approval from the LLNS STR if it is necessary to exit lifts or platforms from a height. If traveling 50 feet or more, the platform shall be in the lowered or stowed position. Extensible or articulating booms should be retracted or folded.

D. Submit in the corporate safety plan a description of the subcontractor’s aerial lift safety and inspection program. Submit in the JHA any specific controls at the task level. Operator training records and inspection records should be available for review at the jobsite.
3.08 ROOF ACCESS

The LLNS SAHCL will document hazards associated with roof access, which may include exhausted gases, fumes, or particles from rooftop stacks, chemical hoods, glove boxes, hot water boilers, and building sewer systems. Other potential hazards include exposure to ionizing and non-ionizing radiation, electrical shock, moving machinery, explosive hazards, or contamination from previous operations or experiments. There are also fall hazards related to working at heights, slips, trips, skylights, and ladder use. The STR will obtain prior authorization and any LLNS-specific permits required to access roofs. Follow the STR’s direction and requirements on applicable Roof Access Permits.

3.09 CONFINED SPACES

A. Conduct entries of permit-required confined spaces in accordance with 29 CFR 1910.146, 29 CFR 1926 Subpart AA, and ANSI Z88.2. If the subcontractor is the sole entrant, the entry will be performed under the subcontractor’s confined space program using the subcontractor’s entry permit. If the entry is performed jointly by LLNS and the subcontractor, the entry will be performed under LLNS requirements using a LLNS entry permit. In all cases, conduct a joint pre-activity walkthrough to review confined space hazards and controls.

B. Submit in the corporate safety plan a description of the confined space entry program including the confined space entry permit and employee training program. Submit in the JHA task specific controls such as the location of the confined space, ventilation, monitoring and any site-specific rescue procedures.

3.10 LOCKOUT/TAGOUT (LOTO)

A. If working on or near equipment or systems (as defined in 29 CFR 1910.147 or 29 CFR 1910.333) with energy sources, then the following applies:

1. Implement a lockout/tagout (LOTO) program in accordance with 29 CFR 1910.147, NFPA 70E, and as described in the corporate safety plan. Perform LOTO of electrical circuits in accordance with 29 CFR 1910.333, subpart S, Electrical. LLNL requires both a lock and tag, and individually keyed locks (not combination). Each affected worker must apply their own lock – do not allow a single individual to perform LOTO for other workers. Coordinate LOTO in advance with LLNS – do not perform LOTO before obtaining LLNS’ STR approval.

2. LLNS requires a documented written procedure for “complex” or “equipment specific” LOTO, where any of the following apply:
   a. The equipment has potential for stored or residual energy, or re-accumulation of stored energy after shut down.
   b. The machine or equipment has more than a single source of energy that cannot be readily identified and isolated.
   c. The isolation and locking out of that energy source will not completely de-energize and deactivate the machine or equipment.
   d. A locked-out condition cannot be achieved using a single lockout device.
   e. The LOTO of the equipment creates a hazard for other employees.
   f. The equipment has a record of energizing un-expectedly.

3. If, during the course of work, a device is encountered that cannot be locked, obtain guidance from LLNS before proceeding.
3.11 WELDING, BURNING, OR FIRE PRODUCING ACTIVITIES

A. Perform welding in accordance with ANSI Z49.1: Safety in Welding, Cutting, and Allied Processes, sections 4.3 and E4.3. Do not use thoriated welding rods without the STR’s approval in writing. Submit welding program as part of the corporate safety plan.

B. LLNS requires hot-work permits for welding, soldering, and other operations with fire potential. The STR will obtain permits from the LLNL Fire Department for the following types of activities: cutting and welding, heat treating, grinding, powder-driven fasteners, hot riveting, torching, soldering, using tar pots or tar kettles, using open fires for any purpose, barbecuing, and any other heat-producing, spark-producing tasks that could produce a fire hazard. Follow controls as prescribed on the permit and post permits in the work area until the work is completed.

3.12 LASER SAFETY

Conduct work with lasers in accordance with ANSI Standard Z136.1, Safe Use of Lasers. Submit in the JHA or corporate safety plan the specific controls if using lasers classified as 3b or greater.

3.13 HOT OR COLD ENVIRONMENTS

Comply with the ACGIH TLVs (provide water and cool shade for rest breaks; mandated work/rest cycles starting at 85 degrees based on exertion level). Submit Heat Stress Program as part of the corporate safety plan.

3.14 HEARING CONSERVATION PROGRAM

A. When the work tasks (identified by the subcontractor in the JHA) or work area (identified by LLNS in the SAHCL) exposes workers to noise that equals or exceeds an 8-hour Time-Weighted Average of 85 dBA, the Subcontractor shall submit a hearing conservation program (HCP) in accordance with 29 CFR 1910.95, Occupational Noise Exposure. Enrollment in the HCP is determined without regard to any attenuation provided by the use of hearing protectors.

B. LLNL requires HCP enrollment at 85 dBA as an 8-hour TWA, with a 3 dB exchange rate. The limit and exchange rate must be taken into account when using previously-measured or estimated noise exposures to determine worker enrollment.

C. Submit in the corporate safety program a description of the HCP, including the following elements:

1. Annual training on noise protection [29CFR1910.95(k)(1)].

2. Description of the audiometric testing program, to include baseline and annual audiograms for exposed workers, to be provided within 6 months of the start of exposure [29CFR1910.95(g)].

3. For the following, submit in the JHA controls specific to the work tasks to be performed at LLNL:
   a. The type of hearing protection devices used [29CFR1910.95(i)]
   b. Baseline or periodic noise monitoring for high-noise activities [29CFR1910.95(d)]

4. Submittals shall document that the subcontractor will conform to the ACGIH TLV for work at LLNL.
3.15 EXPOSURE PROTECTION FOR SILICA DUST

A. When performing work generating silica dust (e.g., jackhammering, core-drilling, or saw-cutting concrete, removing or sawing tile or stone, sand-blasting, repaving), protect workers in accordance with the OSHA silica standard (29 CFR 1926.1153) using a combination of administrative controls, engineering controls, and PPE to prevent worker exposure to respirable airborne silica from exceeding the ACGIH TLV exposure limits. After January 17, 2019, construction contractors must obtain either exposure monitoring data or use a combination of exposure monitoring data and objective data to accurately characterize worker exposures to respirable silica instead of relying solely on the controls identified 29 CFR 1926.1153(c)(1) Table 1. In the absence of exposure monitoring data, respiratory protection greater than that specified in Table 1 may be required. All monitoring results conducted by subcontractors on their employees performing work at LLNL must be submitted to the STR.

B. HEPA vacuums used for worker protection or to clean up any silica dust and/or slurry generated during concrete or asphalt disturbance shall be certified in accordance with 3.17, below.

C. Submit in the JHA task-specific controls. If respiratory protection will be used, submit a respiratory protection plan demonstrating compliance with 29 CFR 1926.103.

3.16 EXPOSURE PROTECTION FOR ASBESTOS AND LEAD


3.17 EXPOSURE PROTECTION FOR CHEMICALS OR HAZARDOUS SUBSTANCES OTHER THAN ASBESTOS, LEAD, OR SILICA

A. Ensure worker exposure to chemicals or hazardous substances does not exceed the current TLVs established by ACGIH. Where ACGIH has not established a TLV, use OSHA permissible exposure limits (PELs) defined in 29 CFR 1910, subpart Z, or 29 CFR 1926. Note that ACGIH TLVs are typically more stringent than OSHA PELs. If the PEL is more restrictive than the TLV, the lower exposure level is the applicable requirement.

B. Baseline Exposure Assessment Submittals

1. Submit in the JHA or corporate safety plan a description of the proposed engineering controls (e.g., wet methods, ventilation) and personal protective equipment to mitigate worker exposure to chemicals or hazardous substances. If respiratory protection is proposed, also submit a respiratory protection program.

2. If applicable, conduct air monitoring in accordance with methods set forth by the National Institute for Occupational Safety and Health (NIOSH) or OSHA where available. A LLNS industrial hygienist will review air monitoring data.

3. If using corrosive materials an eye wash that complies with ANSI-Z358.1-1990 is required.
3.18 HEPA FILTER CERTIFICATION

HEPA-filtered equipment (e.g., vacuum cleaners, portable exhaust ventilation units, negative-pressure machines) used for asbestos, lead, silica, or other hazardous materials shall be certified every 12 months. Certification shall be documented via a sticker on the equipment or a copy of documentation from the certifying organization. LLNS retains the right to check the performance of HEPA-filtered equipment once it arrives at the LLNL project location/building.

3.19 ELECTRICAL SAFETY

A. General

Follow the applicable safety procedures when working with electricity. Submit in the JHA or corporate safety plan details on the electrical safety practices, addressing the following:

1. Qualified electricians are required to perform electrical work and in accordance with NFPA 70E and 29 CFR 1926, subparts K and V, and as provided for in the Subcontractor’s safety program.

2. If exposed energized parts are encountered where none were expected, particularly during testing of locked- and tagged-out circuits, stop work immediately and contact the STR for guidance before proceeding.

B. Lockout/Tagout

Lock and tag electrical circuits planned for work in accordance with 3.10 above.

C. LLNS does not anticipate a need for work on energized circuits for this project. Contact the STR immediately if conditions arise that necessitate working on energized circuits.

D. In the course of this project, work may be required near exposed, energized equipment. Address this work in the safety plan, provide qualified personnel to perform such work, and provide necessary safety equipment as specified in NFPA 70E and 29 CFR 1926, subparts K and V. Notify LLNS 14 days in advance of performing the work. LLNS may provide guidance for performing such work.

3.20 LOCATING BURIED AND HIDDEN UTILITIES

A. Before performing soil, concrete, or non-concrete wall penetrations, notify LLNS (LLNS will complete location surveys of soil and concrete if required) and coordinate with LLNS to secure excavation and drilling permits.

B. Soil and Concrete Procedures

1. General

Permits are required for soil penetration regardless of depth. Permits may be required for concrete structure penetration. Notify the LLNS STR at least 14 days in advance of anticipated concrete drilling. LLNS will determine if scanning is required, and if a permit is required.

2. Locator Services

LLNS will perform locating surveys and will furnish available documentation for the area of proposed excavation or drilling, including drawings, survey data, and locating reports. Clearly mark excavation areas with white paint in accordance with California Code 4216.2. Confirm
that these marks remain intact and clearly visible throughout the entire survey and excavation process.

3. Excavation and Drilling Permits

LLNS will not issue a permit without a completed locating survey. Submit a permit request to LLNS; LLNS will issue a permit within 14 working days of receipt of the request and the completed survey. Commence excavation and drilling work within 15 days of permit issuance or the permit will expire. Notify LLNS if the period of excavation work will extend beyond 30 days from permit issuance so that LLNS may extend the permit.

4. Wall Penetration

Check with LLNS for known hazards. Layout and plan the penetration beforehand and identify hazards on both sides of the wall. Mark new conduit routes and planned wall penetrations deeper than ¼ inch. Request the LLNS STR review and approve the routing and penetration locations prior to continuing the work.

5. Excavation

Perform excavation under the supervision of a competent person as defined by 29 CFR 1926, sections 650 and 651. If feasible, secure utilities by lock and tag procedures in accordance with this section. When excavations are planned, exercise the following cautions:

a. When the excavation crosses or is within a 30-inch radius of a known or located utility, excavate by hand or air knife until reaching the required depth or the utility is located.

b. When the excavation parallels the located utility, test the proposed route of excavation by potholing every 25 feet prior to starting the excavation. Excavate potholes by hand until the reaching the required depth or the utility is located. If the surveyed depth of the located utility is not uniform, decrease the pothole interval distance to 10 feet. If the potholing operation locates a utility where none was expected, stop the operation and immediately notify LLNS.

c. Place direct burial warning tape and markers along the entire length of and about 2 feet above uncovered subsurface infrastructures during backfilling. Include information on tape and coding in the survey. On nonmetallic utilities, install tracer wire in accordance with Figure 1. If existing nonmetallic utilities are uncovered during excavation, place programmable electronic marker prior to backfilling trench. LLNS will provide programmable electronic balls.

d. If excavation uncovers an unidentified utility, stop excavation in this area and immediately notify LLNS.
C. LLNS requires extensive planning and careful execution of any penetration of non-concrete walls, floors, or ceilings, both interior and exterior. Penetrations include the use of hand or power tools for saw cutting; hole drilling; insertion of anchors for earthquake protection and seismic tie-downs; attaching support brackets/clips with screws or molly bolts for utility pipes/conduits, boxes, and panels; and hanging of white boards.

1. Required PPE

   Use safety glasses with side shields and electrical-hazard (EH) rated safety shoes while performing wall penetrations. In addition, use Type 0 electrical gloves for penetrations where electrical wiring over 50 V is suspected and can’t be located.

2. Penetrations Greater than ¼ inch into Wall Cavities or Wood and Metal Framing

   Whenever a wall cavity is penetrated by more than ¼ inch, observe the following:

   a. Use Proper Analysis Tools

      Use non-conductive power or manual tools, such as reamers, screwdrivers, awls, wooden-handled punches, or other blunt instrument with insulated handle. Required hand tools include small 1/8 inch by 8 inch long small screwdriver, hand jab-saw, battery drill, double insulated cored tools, hole saws, flashlight, fiber optic scope, and scanner. Use standard scanners for wood with a detector for metal/wire location.
b. Plan the Penetration
Check with the LLNS for known hazards. Layout and plan the penetration beforehand and identify hazards on both sides of the wall. Mark new conduit routes and wall penetrations. As required request the LLNS STR review and approve the routing and penetration locations prior to continuing the work.

c. Identify Exterior Hazards
Surfacing material hazards such as asbestos, beryllium, lead, or other hazardous materials require additional permits, training, and PPE. If suspect hazardous materials are encountered, stop work and notify LLNS.

d. Identify Interior Hazards
Identify wall interior hazards such as electrical, EMT, and other ferrous or non-ferrous utilities by scanning, scoping, or cutting a view hole into the surface.

- Hand scan the area to determine location of studs, metal objects, electrical conduits, mechanical pipes, and other obstructions.
- Hand scan the area with a voltage sensitive detector for electrical circuits not in a metal conduit, such as “romex” type wiring.
- Using non-conductive tools, poke a hole for a bore scope, or cut a view hole, at a depth equal to, but not greater than the thickness of the surface material layers. View inside structure with a flashlight, or bore scope for utilities.

e. Finding and Anchoring to Framing
Verify framing and spacing to determine best placement for drill or anchoring site, particularly for weight-bearing fasteners. Determine if framing is metal or wood and check correct spacing (e.g., 16 or 24 inches). If framing can’t be found by scanner, check behind walls, under floors, in false ceilings, and on other floor levels (if applicable) to determine spacing. Look inside cabinets and bookshelves for fasteners layout.

f. Relocate penetrations to avoid identified hazards.

g. Drilling Procedures
Use drill bit or hole saw flagged with tape installed around it to indicate gypsum board depth. Set pilot bit as shallow as possible. Use light pressure to drill a hole to depth gauge with a battery drill. If any resistance other than the gypsum board is detected, stop work and notify LLNS; use jab-saw to finish hole. If obstruction is present, contact LLNS to relocate hole. After first hole is completed, perform a visual check in wall to ensure that no obstructions are present. Follow the same procedure from the other side of the wall to complete opening.

3.21 EXCAVATION AND TRENCHING

A. Before beginning excavations 5 feet or more in depth, submit in the corporate safety plan the trenching and excavation program, and in the JHA or a separate document submit a detailed plan showing the design of shoring, bracing, sloping, or other provisions to protect workers from the hazard of caving ground during the excavation.

B. Special Trench Barricades

In areas of high population density and high pedestrian traffic, provide special open-trench barricades and protection. For open trenches adjacent to occupied buildings, crossing pedestrians, crosswalks and paths, at street intersections, and crossing or adjacent to sidewalks and driveways, the following forms of open-trench protection are required:
1. Provide type II barricades, as defined in CALTRANS Traffic Manual, positioned on each side of the trench and at a maximum of 10-foot intervals. Alternate spacing on each side of the trench to show that a frontal view depicts barricades at 5-foot intervals.

2. Position each barricade at least 2 feet away, whenever possible, from the open trench or excavation.

3. Provide barricades with a yellow flasher at least 8 inches in diameter (note: temporary barricades used during daylight operations do not require flashers). Direct street-side flashers parallel with the street, and face curb-side flashers and flashers along pedestrian routes in the direction of pedestrian traffic.

4. When not using continuous solid barricades, attach interconnecting ropes or tape to barricades. When rope is used, attach streamers at 2 foot to 3 foot intervals.

5. Provide walkways and bridges with standard guard rails at pedestrian crossing points, except when trench width is 2 feet or less, in which case use a type II barricade straddling the trench on either side of the walkway.

6. Where vehicle traffic crosses trenching operations, provide metal plate coverings to support motor vehicles. Determining the adequacy of the metal plate to support traffic loads is the responsibility of the Subcontractor.

3.22 DEMOLISHING UTILITIES

Paint or label existing utilities structures, subsystems, and components (SSC) planned for demolition. Notify LLNS, and request concurrence. After the LLNS representative concurs with the SSC selection, do the following:

- Ascertaint that the marked utilities are de-energized, or de-energize
- Isolate and air-gap
- Annotate the status as de-energized using black paint in the presence of the LLNS representative

3.23 PRESSURE SAFETY

For work involving installation and or test of new building piping systems, refer to section 22 01 11.13 “Cleaning, Testing, and Disinfecting Building Utility Piping Systems”. This defines procedures for cleaning, testing, disinfecting, and placing into service newly installed building piping systems at Lawrence Livermore National Security LLC.

END OF SECTION

(01 35 23 Appendix A follows)
APPENDIX 01 35 23 A
HOISTING AND RIGGING ACTIVITIES

PART 1 - REGULATIONS

Conduct hoisting and rigging activities in accordance with 29 CFR 1926 Safety and Health Regulations for Construction Subpart CC – Cranes & Derricks in Construction and Subpart R Steel Erection. Plan and execute lifts of personnel, such as using a hoisting device or basket, in accordance with 29 CFR 1926.1431 and ASME B30.23.

PART 2 - APPLICABILITY

This requirement establishes planning considerations that apply to industrial load handling equipment covered by ASME and ANSI standards when moving loads vertically and/or horizontally. Hoisting and rigging activities include use of the following equipment or devices:

- Mobile cranes
- Facility cranes
- Forklifts with lifting attachments
- Chain falls
- Come-a-longs
- Gantries
- Industrial grade and/or rated: Jacks, Rollers, Dollies, Skates/skids, SPMT’s (Self Propelled Modular Transporters), Pushers/pullers
- Rigging equipment, such as slings, rigging hardware, below-the-hook lifting devices, etc.

PART 3 - LLNS-SPECIFIC REQUIREMENTS

In addition, the following LLNS requirements apply to Subcontractors performing hoisting and rigging activities at LLNL.

3.01 PERSONNEL TRAINING AND QUALIFICATION

Provide personnel who rig loads, provide crane signal duties, and/or operate cranes or hoists that have experience and training on selection, inspection, hazards, operation, and use of hoisting and rigging equipment. Personnel must also have the following qualifications:

- Be 18 years of age or older
- Operator certification by the National Commission for Certification of Crane Operators (NCCCO) or other organization recognized by the U.S. Department of Labor
- Rigger/Signalman certification by the National Commission for Certification of Crane Operators (NCCCO) or other organization recognized by the U.S. Department of Labor

3.02 EQUIPMENT INSPECTION AND MAINTENANCE

Tag rigging equipment with capacity. Provide documentation upon request demonstrating that the equipment passed an annual inspection within 1 year from date of intended use, and passed a preoperational inspection prior to use. Store rigging properly (e.g., on racks or in protected areas).
Inspect rigging in compliance with 29 CFR 1926.1400. Maintain inspection records at the project site and make them available upon request for verification of inspections.

### 3.03 LIFT CLASSIFICATION

LLNS will classify lifts during the bid walk into one of the following categories: Ordinary, Special-Ordinary or Critical. Provide input during the bid walk to LLNS as appropriate to determine the lift categories.

#### A. Ordinary lift

Lifts that are not categorized as Special-Ordinary Critical, or Personnel are Ordinary lifts.

#### B. Special-Ordinary lift

Lifts where any of the following conditions are present:

1. The load will be rotated or manipulated on or about its non-vertical axis.
2. The load will be transferred (i.e. in mid-air from one crane to another).
3. Any load where the center of gravity might move during the lift, such as a tank filled with liquid.
4. Use of multiple lifting devices; such as use of more than one lifting equipment (i.e., cranes, hoists, forklifts, jacks) in sharing the load.
5. LLNS management may choose to classify a lift as Special-Ordinary for reasons other than those noted above.

#### C. Critical lift

Lifts where any of the following conditions are met:

1. Loss of control of the load being lifted would likely result in the declaration of an emergency.
2. The load is unique and vital to a system, facility, or project operation, and would be irreplaceable or not repairable if damaged.
3. If the load is damaged, the cost to replace or repair the load, or the delay in operations would have a negative impact on facility, organizational, or DOE budgets that would affect program commitments.
4. If mishandling or dropping of the load would cause any of the above consequences to nearby installations and facilities.
5. For steel erection, the lift exceeds 75 percent of the rated capacity of the crane or derrick, or requires the use of more than one mobile crane or derrick (refer to 29 CFR 1926.751).

### 3.04 LIFT PLAN REQUIREMENTS

Submit lift plans for lifts (except simple lifts that are less than 2000 lbs.). The Subcontractor may include multiple lifts at a construction location in a single lift plan.
A. Lift plans should be specific to the configuration of the intended lift. Address the following in the lift plans:

1. Designate personnel roles, as shown in the table below.

2. Break the lifting activities down to the task level (staging, rigging, pre-lift, lift, and securement), using drawings and/or text.

3. Characterize the load – weight, dimensions, center of gravity, rigidity, stability, and rigging attachment points. Verify undocumented attachment points by calculation to demonstrate adequacy.
   a. If some of these parameters cannot be determined ahead of time, submit plans for field determinations, including trial lifts.

4. Define the work area –
   a. Boundaries and access control.
   b. Travel path of the load.
   c. Start, staging, and finish points.
   d. Equipment, facilities, or structures that pose obstructions or impediments to moving/manipulating the load.
   e. Imposed loads on structures, utilities (above/below grade).
   f. Weather considerations.
   g. Identify the lifting and rigging equipment: type (use the categories in section B), capacities (load charts), physical size (length, width, height, physical compatibility), and rigging equipment (slings, rigging hardware, below-the-hook lifting devices).
   h. Describe securement of the load.
   i. Provide load path calculations (identify the forces that are effecting the rigging equipment).
   j. Provide mathematical calculations to demonstrate the load/object moves only due to forces and moments appropriately applied to start and stop desired motion.
   k. Demonstrate that equipment and components are within design constraints, and peripheral issues (ground bearing issues, crane mat calculations, and prohibited zones for power lines) are properly addressed.

B. The table below lists the requirements and documentation for the different categories of lifts:
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Lift Type</th>
<th>Ordinary &lt; 2000-lbs</th>
<th>Ordinary &gt; 2000-lbs</th>
<th>Special-Ordinary</th>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documented Lift Plan</td>
<td></td>
<td>Not required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Designation of Personnel Roles</td>
<td></td>
<td>Appoint a Designated Leader (DL); LLNS concurrence. Designate in lift plan, present at work site for entire lifting operation, may delegate or transfer. Communicate DL changes verbally.</td>
<td>Appoint a Designated Leader (DL); LLNS concurrence. Designate in lift plan, present at work site for entire lifting operation, may delegate or transfer. Communicate DL changes verbally.</td>
<td>Appoint a Designated Leader (DL); LLNS concurrence. Designate in lift plan, present at work site for entire lifting operation, may delegate or transfer. Communicate DL changes verbally.</td>
<td>Appoint a Person In Charge (PIC); LLNS concurrence. Designate in lift plan, present at work site for entire lifting operation, may not be delegated or transferred.</td>
</tr>
<tr>
<td>Inspections / Verifications</td>
<td></td>
<td>Hoisting and rigging equipment meet ASME B30 requirements. Provide current certifications and inspection records. LLNS qualified personnel verification and approval of equipment upon arrival at LLNL. Request that the LLNS STR arrange verification of set up and equipment prior to each set of lifts following repositioning.</td>
<td>Hoisting and rigging equipment meet ASME B30 requirements. Provide current certifications and inspection records. LLNS qualified personnel verification and approval of equipment upon arrival at LLNL. Request that the LLNS STR arrange verification of set up and equipment prior to each set of lifts following repositioning.</td>
<td>Hoisting and rigging equipment meet ASME B30 requirements. Provide current certifications and inspection records. LLNS qualified personnel verification and approval of equipment upon arrival at LLNL. Request that the LLNS STR arrange verification of set up and equipment prior to each set of lifts following repositioning.</td>
<td>Proof load test rigging equipment (slings, below-the-hook lifting devices, and rigging hardware) in accordance with applicable ASME standard. LLNS qualified personnel verification and approval of equipment upon arrival at LLNL. Request that the LLNS STR arrange verification of set up and equipment prior to each set of lifts following repositioning.</td>
</tr>
<tr>
<td>Drawings</td>
<td></td>
<td>Scaled drawings required</td>
<td>Scaled drawings required</td>
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<tr>
<td>Documented Pre-Lift Meeting</td>
<td></td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required. Document in the lift plan.</td>
</tr>
<tr>
<td>Practice Lift</td>
<td></td>
<td></td>
<td>Required</td>
<td>Required as specified by LLNS</td>
<td></td>
</tr>
<tr>
<td>Documented Post-Lift De-Brief</td>
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<td>Required</td>
<td>Required</td>
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<td>Required</td>
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PART 4 - REQUIRED SUBMITTALS

Submit the following information/documents to LLNS:

A. Completed Lift Plan (may utilize template provided by LLNS).
   1. Submit the lift plan(s) to LLNS for review and approval at least 10 calendar days prior to the commencement of the specific lift.
   2. Include scaled drawings for Special-Ordinary and Critical lifts.

B. Note: Present deviations from an approved lift plan to the LLNS STR for approval prior to proceeding.

C. Certification/Qualification documents for Crane Operators, Riggers and Signal Persons.
   1. Provide personnel qualifications with lift plan prior to the beginning of the work activity or upon arrival of the personnel at LLNL for approval by the STR.
   2. Age verification (i.e., employees are over 18 years of age) for employees involved with cranes, hoisting and rigging.

D. Current crane certifications and inspection information.

E. ASME certifications and inspection records for the equipment used for hoisting and rigging.

F. ASME proof load test documentation for slings, below-the-hook lifting devices and rigging hardware used for critical lifts.

END OF APPENDIX A
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PART 1 - PURPOSE AND SCOPE

This process establishes requirements for preparing a Safe Plan of Action (SPA) for construction projects at Lawrence Livermore National Laboratory. The SPA is a task-driven process designed to ensure that every task receives proper safety planning prior to starting work. The SPA is part of the daily work authorization for all work activities.

The SPA is a task-and-time-specific process that supplements other processes in place to help foster safe, timely, and quality work at the jobsite. LLNS requires that the Subcontractor’s work crew and superintendent develop the SPA as a team effort before beginning a task. The intent is to systematically plan specific tasks in a safe and effective manner. The SPA does not replace procedures set forth in Subcontractor’s site safety program, but reinforces particular aspects of safety pertaining to specific day’s work.

PART 2 - RESPONSIBILITIES

Implementation of the SPA process is the responsibility of Subcontractor’s management, field teams, and LLNS’ project team. The Subcontractor may delegate authority to perform identified tasks to other qualified personnel, but responsibility remains with those named above.

A. The Subcontractor’s management team (project manager and superintendent) is responsible for the following:
   1. Ensuring adequate training in the SPA process for all personnel working at the construction site.
   2. Monitoring content of completed SPA forms for quality and completeness.
   3. Reporting SPA worksheet content to LLNS on a monthly basis.

B. Subcontractor’s Field Team (superintendent and work crew)
   1. Subcontractor’s superintendent is responsible for the following:
      a. Becoming knowledgeable of the SPA process.
      b. Providing on-the-job training for Subcontractor’s work crew.
      c. Conducting meetings at the start of each new task or shift to lead the work crew through the job-planning process and development of the SPA worksheet.
      d. Documenting the SPA using the attached worksheet.
   2. Subcontractor’s Work Crew is responsible for the following:
      a. Becoming knowledgeable of the SPA process.
      b. Completing necessary training in the SPA process.
      c. Participating in preparation of the worksheet at the start of each new task or shift.
      d. Conducting work activities in accordance with the SPA.

C. LLNS Project Team (Project Manager, Construction Manager, and Construction Inspector)
   1. LLNS Project Manager is responsible for the following:
a. Ensuring the project team members receive SPA process training.
b. Making provisions for adequate Subcontractor training and proper implementation of the SPA process.
c. Reviewing a sampling of Subcontractor’s completed SPA forms on a routine basis for appropriate content.

2. LLNS Construction Manager is responsible for the following:
   a. Reviewing Subcontractor’s completed SPA worksheets for consistency and adequate coverage.
   b. Continuously monitoring the overall SPA process for effectiveness and informing the Project Manager and other team members of its findings.
   c. Identifying any additional training needs for Subcontractor’s superintendent or work crew.

3. LLNS Construction Inspector is responsible for the following:
   a. Conducting training of Subcontractor personnel in the SPA process.
   b. Field monitoring the SPA process to assure Subcontractor’s work crews comply with the SPA requirements.

PART 3 - PROCESS

The sequence of action steps in the SPA process and responsible individuals for each step are as described below.

A. Identify Work Area and Task

   Generally, the Subcontractor’s JHA will cover the scope of work. The SPA covers specific tasks performed within a shift in a particular work area using the JHA as a reference. Note: A clear understanding of what the job entails from beginning to end is essential for an accurate and complete SPA.

B. Develop a Safe Plan of Action

   Develop the SPA with input from the work crew assigned to the work during the daily pre-job briefing. The superintendent should provide guidance, leads the work crew as they plan their work for the shift, and solicits their participation in identifying hazards and hazard control measures, such as personnel protective equipment (PPE), required training, permits, procedures, and like items.

C. Document the SPA

   Document SPAs using the attached form, FORM CON 0003, “Subcontractor Safe Plan of Action (SPA) Worksheet.” Each member of Subcontractor’s field team is required to legibly print their name and badge number on the completed worksheet. Signatures indicate the individuals have participated in development of the worksheet, understand the hazards, and agree to follow all the completed worksheet. Any visitors must review and sign the SPA before entering the work area.

D. Conduct SPA Meetings

   Conduct a daily pre-job SPA meeting and discusses tasks for that day. This is a brief (generally not more than 10 minutes) safety meeting. When continuing a task from a previous day, include a review of the current SPA and consider new hazards or conditions that could exist. The SPA meeting may be combined with a “tool-box” meeting or “morning safety” meeting; however, the meeting is
required to include a review all of the SPA(s) currently in effect, or development of a new worksheet and sign-off by each worker and the superintendent as noted in paragraphs C and D above.

E. Post Completed SPA Worksheets

Post the completed worksheet immediately adjacent to the work area such that anyone may review the form throughout the work shift. In case of an incident, immediately evaluate the SPA for work conditions and procedures.

F. Retain Completed SPA Worksheets

Retain hard copies of SPA worksheets and furnish signed and dated copies of the worksheets to the construction manager upon completion of the form, and again at completion of the tasks described in the worksheet. The construction manager will also retain a copy of SPA records.

G. Review the SPA Process

Verify the content and quality of the SPA worksheets completed by personnel and lower-tier subcontractors. The construction manager will utilize appropriate sampling techniques to monitor the quality of completed worksheets.
SAFE PLAN OF ACTION (SPA) WORKSHEET INSTRUCTIONS

Complete the Safe Plan of Action (SPA) worksheet daily for each project. Post the SPA Worksheet instructions at each jobsite for reference.

NOTE: Multi-craft jobs require each discipline to complete a separate form for their task. If necessary, attach additional pages with tasks and page numbers at the bottom (for example, page 1 of 2.)

1. Fill in the IWS number, Work Permit number (if applicable) and PO, PW or Work Order Number.
2. Indicate if there is a Lower-tier Subcontractor on the job, which Craft is performing the work and LLNS Responsible Individual with their phone number.
3. Provide today’s date, location of task, shift being worked and equipment numbers, if applicable.
4. List major work steps of this task, the potential hazards, controls/safety plan and equipment and/or tools required.
5. Use the back side of this form as a guide, walk-through the work area and list potential hazards involved with each work step.
6. Indicate hold-point inspections required in the “work area coordination & safety questions” (under the “Safety Hold Point Inspection” section) for any of the following activities:
   a. Complex lockout/tagout (LOTO)
   b. Rigging/hoisting
   c. Confined space entry
   d. Fall protection
7. Ask the worker readiness questions that are designed to determine if the work crew is ready and able to work safely. If there are specific issues with a worker, it is encouraged that they speak to the foreman or superintendent privately. These questions are not intended to infringe on a worker’s personal health issues, but are a tool for the foreman or superintendent to have a productive dialog with the workers. See below for sample questions. After the foreman or superintendent has asked the questions, document responses by checking the boxes.

<table>
<thead>
<tr>
<th>Worker Readiness Sample Questions:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Is the work ready?</td>
<td>☐ Are there any new, unique or significant hazards in today’s work?</td>
</tr>
<tr>
<td>☐ Are the controls in place and functioning?</td>
<td></td>
</tr>
<tr>
<td>☐ Any interfaces with other work groups?</td>
<td></td>
</tr>
<tr>
<td>☐ Is the work released for the day?</td>
<td></td>
</tr>
<tr>
<td>☐ Other work in the area?</td>
<td></td>
</tr>
<tr>
<td>☐ Are there any new area hazards that have not been previously identified?</td>
<td></td>
</tr>
<tr>
<td>☐ Are all the workers ready?</td>
<td>☐ Do we all understand today’s tasks and who is doing what?</td>
</tr>
<tr>
<td>☐ Do you have any medical conditions that impact your ability to work safely?</td>
<td></td>
</tr>
</tbody>
</table>
8. Have each worker review the work area, assist with completing this form as applicable, and print his/her name and employee/badge number.
9. The LLNS STR may attend SPA meetings.
10. Ensure all copies of SPA(s) are submitted to the LLNS STR for retention in the project file as prescribed by the Laboratory’s retention schedule.
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# LLNL Subcontractor Safe Plan of Action (SPA) Worksheet

## Project: ____________________  LLNL Subcontractor: ____________________

<table>
<thead>
<tr>
<th>IWS#</th>
<th>WCD#</th>
<th>Work Permit #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower-tier Subcontractor:</th>
<th>Craft:</th>
<th>LLNS Responsible Individual Name/Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date:</th>
<th>Location of Task:</th>
<th>Shift:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## MAJOR WORK STEPS OF TASK  POTENTIAL HAZARDS  CONTROLS / SAFETY PLAN  EQUIPMENT / TOOLS REQUIRED

<table>
<thead>
<tr>
<th>Task Specific Required Inspection</th>
<th>Inspected By/Name:</th>
<th>Work Area Coordination &amp; Safety Questions</th>
<th>Any scheduled hold-point and/or safety hold-point inspections? (below)</th>
<th>Is the work to be performed and work area ready?</th>
<th>Does everyone understand the task to be performed?</th>
<th>Safety Hold Point Inspection (If applicable):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Lift Inspection</td>
<td></td>
<td>Coordination needed with adjacent and/or co-occupancy in work area?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harness Inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Extinguisher Inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cords – Properly Inspected by Each User</td>
<td>Documented Below by Signature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Existing Systems Enabled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoisting and Rigging Inspected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-Job briefing has been completed and each employee is taking the responsibility to ensure that all required training for this work activity is current, and that they are competent and qualified on all required tools/equipment – Each employee is required to **LEGIBLY PRINT** his/her Name/Badge Number

Subcontractor Foreman/Superintendent: ____________________

**NOTE:** Work shall pause if conditions change, job scope changes, or a deficiency in the plan is noted. If any injuries or incidents occur, respond as appropriate, then immediately contact the LLNS Responsible Individual. **ALL WORKERS HAVE THE RIGHT TO STOP WORK.**
### Personal Protective Equipment:
- Hard Hat
- Eye protection
- Ear protection
- Face Shield
- Gloves
- Work Boots
- Arm Sleeves
- Welding Hood
- Dust Mask (NIOSH Approved)
- Respirator - trained
- FR clothing
- Other: ______________________

### Ladder:
- Inspection
- Proper use – 3 pts. contact, belt buckle rule
- Tie off point
- Appropriate Storage - laying down

### Lifts and Scaffold:
- Inspection and documentation
- 100% tie off
- Anchorage points
- Tags in place

### Elevated Work:
- Tether tools and material
- Canvas bag
- Fire blanket
- Empty pockets

### Fall Protection:
- Inspection & proper fit
- At least 2 people present
- Fall Rescue plan
- Anchorage Point Available
- Horizontal Lifeline system
- Retractable device

### Barricade:
- Set up/ break down
- Tag

### Material Handling:
- Items secure to cart /truck (tie down)
- Chock if necessary / parking brake
- Stairs or elevator
- Formal plan for high-risk activities approved?

### Hand Hazards:
- Rotating equipment
- Pinch points
- Scraps, cuts, punctures

### Hand & Power Tools:
- Inspect cord(s)
- GFCI
- Review operators manual
- Guarding in place
- UL label or AHJ inspection
- Unplug after use
- Proper clean-up and disposal

### Body Mechanics:
- Stretch
- Proper lifting techniques
- Manual lifting, need help
- Slips / Trips / Falls
- Inspect access / egress
- Awkward body position

### Environment:
- Hydrated
- Shelter available
- Appropriate clothing

### Fire Hazard:
- Cut, weld, burn, grind, solder
- Hot work permit: Fire extinguisher? Fire watch? Area clear of flammables?

### Overhead Hazards:
- Power de-energize required?
- Power lines
- Clearance distance
- Sprinkler lines

### Lifting Equipment (crane):
- Signalman assigned
- Tag line
- Inspection
- Proper rigging, rigging plan

### Vehicular / Pedestrian Traffic:
- Cones, signs
- Flagman
- Communication

### Working with Chemicals:
- Direct Contact
- SDS
- Proper containers and labeling

### Electrical Hazard:
- Contact Energy Owner
- Test before you touch
- Properly rated, calibrated meter
- NFPA70E

### Worker Readiness Questions
- Are all Workers ready?
- Are there any new, unique or significant hazards in today’s work?
- Are the controls in place and functioning?
- Any interfaces with other work groups?
- Is anyone feeling stressed or distracted?
- Is the work released for the day?
- Other work in the areas?
- Are there any new area hazards that have not been previously identified?
- Does everyone feel they can proceed with the work safely?
- Do we all understand today’s tasks and who is doing what?
- Do you have any medical conditions that impact your ability to work safely?

### Approved Safety Documentation:
- Corporate Safety Plan
- JAHA
- Approval from STR/CM to begin work

END OF APPENDIX B
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### DOE / LLNS SPECIFIC SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>Subcontractor:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td></td>
</tr>
</tbody>
</table>

If the information below is available in corporate safety plan, reference where it may be found.

<table>
<thead>
<tr>
<th>Name, title and contact information of person(s) responsible for safety on this project [Section 1.03 B(7)]:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Describe how you will fulfill the management responsibilities per Section 1.03 B (1-5):</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Describe Stop Work Policy [Section 1.03 B (6) e]:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Describe injury / illness recording / reporting program [Section 1.01 F (4)]:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>List all worker safety and health training required for this project [Section 1.05 A (1)]:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Describe your occupational medical program for the workers, if the work requires one [Section 1.04 A (b)]:</th>
<th>(Ex. Respirator medical approvals, beryllium medical surveillance, audiometric testing, etc.)</th>
</tr>
</thead>
</table>
### Emergencies

<table>
<thead>
<tr>
<th>Describe emergency response procedures that workers will follow in the event of an emergency (e.g., chemical spill, fire, earthquake, etc.) while working at LLNL. [Section 1.03 D, Section 1.07]:</th>
<th>(Ex. Notification procedures, evacuation routes, muster points and accountability, emergency phone numbers. Note: Call 911 from lab phone or 925-447-6880 from a cell phone to reach LLNL on-site Fire Department.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Identify local hospital and medical provider).</td>
<td></td>
</tr>
</tbody>
</table>
This document is intended as a supplement to the General Safety Provisions which highlights LLNL-specific requirements contained therein. Lawrence Livermore National Security, LLC (LLNS) requires subcontractors, while working at Lawrence Livermore National Laboratory (LLNL), to certify they shall perform work within the following safety subject areas accordance with the LLNL-specific requirements stated below:

- **Aerial lifts**: LLNS requires operators and passengers in any type of aerial lift (scissor, boom, JLG) to use fall restraint with a body harness attached to an anchor point on the basket.
- **Cranes and Hoisting**: LLNS requires lifts be characterized as simple, complex, or critical, with additional planning and documentation (including job-specific lift plans) required for complex and critical lifts.
- **Exposure to Silica (concrete coring, cutting or jackhammering)**: LLNS requires compliance with the OSHA Final Rule for Silica (29 CFR 1926.1153) using a combination of administrative controls, engineering controls, and PPE to prevent worker exposure to respirable airborne silica from exceeding the ACGIH TLV exposure limits. After January 17, 2019, construction contractors must obtain either exposure monitoring data or use a combination of exposure monitoring data and objective data to accurately characterize worker exposures to respirable silica instead of relying solely on the controls identified 29 CFR 1926.1153(c)(1) Table 1.
- **HEPA certification**: LLNS requires HEPA-filtered vacuums and other equipment used to mitigate asbestos, lead, silica or other hazardous materials to be certified for efficiency annually (with documentation available).
- **Hot or Cold Environments**: LLNS requires compliance with the ACGIH TLVs (provide water and cool shade for rest breaks; mandated work/rest cycles starting at 85 degrees based on exertion level).
- **Ladder use**: LLNS has specific requirements for safe ladder use:
  - Use personal fall protection when working from a ladder and the midsection of the worker’s torso (i.e., belt buckle) is outside of the side rails of the ladder, or if it is necessary to work backwards from a ladder.
  - Whenever possible, perform work on ladders so the worker is able to face the ladder and maintain three points of contact when climbing or descending.
  - Raise and lower materials and tools by a rope or other mechanical means.
  - Tie off portable ladders, or secure to prevent displacement when the worker’s feet are above 6 feet.
- **Lockout / Tagout**: LLNS requires each worker use its own individually-keyed lock (no combination locks, and no group LOTO where each worker does not have its own lock). LLNS also requires both a lock and a tag for each worker (no tags alone).
- **Noise / Hearing Conservation Program**: LLNS requires enrollment in a hearing conservation program for all workers who exceed the ACGIH TLV (8-hour Time Weighted Average of 85 dB, with a 3 dB doubling). LLNS requires all workers exposed over this threshold be enrolled in annual hearing tests, starting within 6 months of exposure.
- **Welding**: LLNS prohibits the use of thoriated welding rods.

The above LLNS specific requirements, including training and the availability of resources to ensure compliance, will be initially and periodically reviewed by the Subcontractor with all Subcontractor supervisors and employees regardless of tier. The Subcontractor shall maintain a record of the employees instructed on the above.

(Name of Subcontractor)____________________________, and its lower tier subcontractor acknowledge receipt of this document, and certify that subcontractors shall abide by these controls while working at LLNL.

Signature of Subcontractor Representative  Date

END OF APPENDIX C
PART 1 - GENERAL

This section includes asbestos controls for class I and class II asbestos containing material (ACM) abatement and removal. For class III work, see section 01 35 23.19, “Asbestos Safety – Class III.” Refer to the definitions in subpart 1.02 for different classes of work.

1.01 SECTION INCLUDES

This section defines requirements for the protection from airborne asbestos for Subcontractors in or near the work area, including disposal. Asbestos containing materials are indicated in the SAHCL (Subcontractor Area Hazards Control List).

A. The Statement of Work specifies the following:

1. ACM to be removed
2. Areas requiring decontamination

1.02 ITEMS REQUIRING ENCAPSULATION REFERENCES

A. Definitions

1. **Class I.** Activities involving the removal of thermal system insulation (TSI) and surfacing ACM and presumed asbestos containing materials (PACM).

2. **Class II.** Activities involving the removal of ACM that is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

3. **Class III.** Repair and maintenance operations, where ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed. All waste must fit inside a 60 inch by 60 inch bag.

B. Reference Standards

The following documents form a part of these specifications to the extent stated.


   29 CFR 1910 *Occupational Safety and Health Standards* (Fed/OSHA)

   29 CFR 1926 *Safety and Health Regulations for the Construction Industry, Department of Labor* (DOL)

   40 CFR 61 *National Emission Standards for Hazardous Air Pollutants* (NESHAPS)

   40 CFR 763 *Asbestos Hazard Emergency Response Act* (AHERA)

2. California Code of Regulations (CCR)

   Title 8 *Industrial Relations* (Cal/OSHA Regulations), Section 1529, *Asbestos*
Title 22  
*Social Security*, Division 4.5, “Environmental Health Standards for the Management of Hazardous Waste”

Title 26  
*Toxics*


4. San Joaquin Valley Air Pollution Control District (SJVAPCD), National Emission Standards for Hazardous Air Pollutants, Regulation IV (Adopts NESHAP Standards), Rule 4002. (Note: this regulation is applicable for Site 300 projects only).

5. National Institute of Occupational Safety and Health (NIOSH)


1.03 SUBMITTALS

A. **Asbestos Abatement Work Plan.** Submit an “Asbestos Abatement Plan” to LLNS for approval prior to starting work on site. In the plan, detail the proposed work methods, procedures, and equipment intended to prevent asbestos exposure of LLNS and Subcontractor employees, ensure LLNS facilities are not contaminated, and protect the environment. Include the engineering, administrative, and personal-protective controls that provide compliance with the applicable provisions of these specifications, and applicable regulations and laws. Also, address the following specific items in the asbestos abatement work plan:

1. *Isolation Controls.* Describe the equipment, supplies, and techniques used to isolate a regulated containment area. Describe the engineering controls employed.

2. *Air-Sampling Plan.* Include the personal air-sampling plan described in these specifications.

3. *Negative-Pressure System.* Describe the selection, testing, staging, use, and monitoring methods for equipment to provide a negative pressure in the asbestos-removal area.

4. Waste Handling
   a. Nonfriable ACM. Describe the containment, storage, transportation, and disposal methods for nonfriable asbestos-containing waste and asbestos items.
   b. Friable ACM. Describe the containment and turn-over methods for friable ACM turned over to LLNS for disposal.

B. **Prestart Submittals.** Provide the following applicable items to LLNS prior to the start of asbestos-handling work:
1. Proof of current licensing with Contractors State Licensing Board for asbestos related work
2. Proof of current registration with the California Department of Industrial Relations
   a. Registration as a handler of carcinogens
   b. Registration to perform asbestos-related work
3. Evidence of employee training meeting the 40 CFR 763 (AHERA), 29 CFR 1910 (Fed/OSHA),
   29 CFR 1926 (DOL), and CCR, title 8 (Cal/OSHA) requirements for employees performing
   asbestos work
4. Evidence of training and fit testing of each employee for the use of each respirator proposed,
   including positive pressure respirators
5. Evidence of supervisor training meeting the AHERA, Fed/OSHA, and Cal/OSHA requirements
6. Evidence of industrial hygienist meeting CCR title 8 requirements for “certified asbestos
   consultant”
7. Evidence of medical surveillance for employees using respirator or otherwise and/or where
   medical surveillance is required by Fed and Cal/OSHA regulations
8. Subcontractor's respiratory protection policy
9. Evidence of air monitoring data if the subcontractor uses a Negative Exposure Assessment
   (NEA)
10. Satisfactory results of onsite testing of HEPA-filtered equipment
11. Asbestos-abatement work procedure and safety plan, as required herein
12. Evidence of a valid BAAQMD Acknowledgement of Demolition / Notification and Payment
    Fees or San Joaquin Valley Air Pollution Control District (SJVAPCD) Demolition/Renovation
    Permit Release for the specific project
    a. For Livermore Site asbestos maintenance projects that are less than 100 linear feet, 100
       square feet, or 35 cubic feet use the Annual LLNL Cumulative Asbestos Permit; if greater
       than these thresholds, submit a separate BAAQMD asbestos notification specific for the
       project. If a structural element is involved submit a Demolition Notification
    b. For Site300 asbestos maintenance projects that are greater than 160 linear feet, 260 square
       feet, or 35 cubic feet of suspected building materials, submit a SJVAPCD asbestos
       notification for the project. If a structural element is involved, submit a Demolition
       Notification
13. Name and address of site where nonfriable asbestos waste will be disposed (see section 3.07)
14. Copy of notification of California Department of Industrial Relations
15. Copy of asbestos-related insurance coverage
16. Descriptive literature on specified equipment and material, as listed below:
   a. Negative-pressure machines
b. Water-filtration system and filters

c. Wetting materials, encapsulants, spray glues, and other chemicals (including safety data sheets)

d. Fire-resistant plastic or other materials used in construction of isolated area

e. Respirators

f. Negative-pressure monitor

g. Air-sampling pump

h. Fire extinguishers brought onsite

i. Ground fault circuit interrupters (GFCI)

j. Floor buffer machines and associated pads

k. Alternative removal devices, such as water jet sprayers and infrared heating machines

l. Temporary water-resistant lighting

C. **Daily Submittals.** Submit the following items to LLNS within one working day following the day on which they are collected.

1. Results of personal air monitoring (8-hour time-weighted average and excursion results, as well as raw laboratory data), signed by Subcontractor's designated industrial hygienist (in accordance with air-sampling plan)

2. Copies of print-out from negative-pressure monitors

D. **Final Submittals.** Following the completion of asbestos-handling work, submit copies of access logs for the regulated area and completed shipping documents.

### 1.04 TRAINING & QUALITY ASSURANCE

A. Employee Training Qualifications

The following is mandatory Subcontractor-provided training for Subcontractor employees performing asbestos-handling work:

1. **All Employees.** Trained and certified in accordance with the federal and State of California OSHA requirements, and meet the training provisions for "workers" of the Asbestos Hazard Emergency Response Act (AHERA) as codified in 40 CFR 763. This latter requirement requires attendance and successful completion of a State of California-approved training class at least four days in duration. Employees must have current certification with documented attendance at applicable certification refresher classes.

2. **Supervisor/Competent Person.** Each individual assigned to work as a supervisor shall meet the requirements for a “competent person” as described in 29 CFR 1926.1101, for a “certified supervisor” as described in CCR title 8, and for a “supervisor” as required by AHERA, as codified in 40 CFR 763. This latter requirement requires attendance at a State-approved training course of four or five days in duration. The supervisor/competent person must have current certification with documented attendance at applicable certification refresher classes.
3. **Industrial Hygienist.** The assigned industrial hygienist must meet the requirements for a “certified asbestos consultant (CAC)” described in CCR, title 8. Industrial hygienists must have current certification with documented attendance at applicable certification refresher classes.

B. Provide ACM removal by an asbestos-abatement contractor licensed to perform asbestos removal in the State of California.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

Provide material, equipment, tools, and devices required to complete the asbestos safety work.

#### 2.02 GLOVE BAGS

Provide minimum 6-mil thick polyethylene, polyvinyl chloride, or equivalent plastic sack, with a seamless bottom, and two sealed inward projecting long-sleeved gloves or mittens, preprinted with same warning notice as a disposal bag, equipped with a pouch for storage of tools, with designated location for wand or HEPA vacuum wand. Do not use glove bags larger than 60 inches by 60 inches.

#### 2.03 SHEET PLASTIC

A. **Polyethylene Sheet.** A single polyethylene film in the largest sheet size possible to minimize seams, 6 mil thick, clear, frosted, or black as indicated.

B. **Polyethylene Film.** Provide flame resistant polyethylene film that conforms to requirements set forth by the NFPA 701. Provide largest size possible to minimize seams, 6.0-mil thick, frosted or black as indicated.

#### 2.04 MISCELLANEOUS MATERIALS

A. **Duct Tape.** Provide duct tape in 2 inch or 3 inch widths with an adhesive formulated to stick aggressively to sheet polyethylene.

B. **Spray Cement.** Provide aerosol spray adhesive specifically formulated to stick tenaciously to sheet polyethylene.

C. **Wetting Materials.** Use either amended water or a removal encapsulant for wetting prior to disturbance of ACM as follows:

1. **Amended Water.** Provide water with an added surfactant. Use a mixture of surfactant and water that results in ACM wetting and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

2. **Removal Encapsulant.** Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in ACM wetting and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.
D. **Garden Sprayer.** Provide a hand pump type pressure-can garden sprayer fabricated out of either metal or plastic, and equipped with a metal wand at the end of a hose that can deliver a stream or spray of liquid under pressure.

PART 3 - EXECUTION

3.01 PROTECTION

A. **Personal-Protective Equipment (PPE).** Use PPE to minimize Subcontractor employee exposure to asbestos as described in 29 CFR 1926.1101, CCR, title 8, section 1529, and below:

1. **Respirators**

   Select, fit, and use respirators in accordance with 29 CFR 1926.1101 and CCR, title 8, section 1529, except: select respirators to ensure employee exposure to asbestos inside the respirator does not exceed 0.01 fibers per cubic centimeter (f/cc) of air, as determined by historic air monitoring on work of a similar type conducted by the Subcontractor, and based upon the results of personal sampling conducted during the course of this work. Make available to LLNS, if requested, the historic air-monitoring data used for initial selection of respirators for employee protection.

2. **Protective Clothing**

   a. Subcontractor's employees must wear disposable-type full-body protective clothing, including foot, hand, and head covering, as required by Cal and Fed/OSHA when working in a regulated, containment area.

   b. Make disposable protective coveralls, shoe covers, and gloves available for use by qualified LLNS inspectors. Stage this gear at the entrance to each isolated area or at the perimeter of each asbestos-work area. Provide at least four sets of disposable gear each day for each work area after starting the asbestos-removal work and until the area successfully passes the final clearance sample.

3. **Other Protective Gear**

   Provide other necessary protective gear, including boots, goggles, and hardhats, and enforce the use of the provided gear.

B. **General Safety Requirements.** Conform work procedures to and comply with applicable safety standards. The following are some specific requirements for this work:

1. **Ladders.** Use only type 1 industrial grade ladders. Use ladders fabricated of non-electrically conductive materials. Maintain in good mechanical condition.

2. **Electrical.** For work conducted in an isolated/regulated area, provide electrical power via a ground-fault interrupter circuit. This includes power for lighting, vacuum cleaners, and negative-pressure machines. Provide temporary, water resistant lighting for asbestos-abatement areas. Do not use existing lighting.
3. **Working/Walking Surfaces.** Keep working and walking surfaces in the asbestos work area and the surrounding area, which is utilized for asbestos-abatement work, free of tripping hazards such as electrical cords, equipment, and supplies. Where these surfaces are slippery, as when floor plastic becomes wet, provide ribbed rubber soled boots or shoes for employees in this area.

4. **Access Log.** Maintain an access log signed by persons entering asbestos work areas. Stage this log at the access point to the asbestos work area.

5. **Fire Sprinkler Heads.** Protect fire sprinkler heads from damage during asbestos work by sealing them in cellophane or paper or using a similar material and method approved by LLNS.

C. **View Ports.** If using opaque plastic sheeting for constructing critical barriers, provide view ports at appropriate locations so that LLNS or local air quality district (BAAQMD) representatives may observe the work within the critical barriers without entering the negative-pressure enclosures (NPE).

### 3.02 ENGINEERING CONTROLS AND GENERAL WORK PROCEDURES

A. Perform asbestos work in accordance with controls outlined in 29 CFR 1926.1101, or alternatively CCR, title 8, section 1529 for class I or II work.

B. Unless specifically exempted by LLNS, only handle ACM wet. Use water with an appropriate wetting agent or removal encapsulant to wet materials prior to and during handling. Submit the wetting agent to LLNS for approval prior to the start of work.

C. Post warning signs, with the following message, at entrances to regulated work areas:

   **DANGER!**
   **ASBESTOS.**
   **MAY CAUSE CANCER.**
   **CAUSES DAMAGE TO LUNGS.**
   **AUTHORIZED PERSONNEL ONLY.**
   **WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA.**

D. Handle asbestos inside negative-pressure containments. Provide containment in an isolated area equipped with a HEPA-filtered negative-pressure machine or a negative pressure glove box/glove bag. Maintain negative pressure at -0.02 inch water gauge (wg) or greater at all times after starting asbestos work until clearance sampling indicates that the area meets the final clearance criterion.

E. Provide NPE, including negative-pressure glove bags, with a recording, continuous-reading negative-pressure monitor (i.e., manometer). Calibrate this monitor prior to the start of the asbestos-abatement work, and at least once every two weeks thereafter. Affix a calibration sticker to each monitor, with the date of calibration and the name of the person and organization performing the calibration. Set the monitor to alarm, with an audible signal that is clearly audible within the asbestos work area, when the pressure differential drops below -0.02 inch wg.

F. **HEPA-Filtered Equipment Testing.** Test and certify HEPA filtered equipment in accordance with section 01 35 23, subpart 3.17.
G. Duct the exhaust from negative-pressure machines outside occupied buildings. LLNS may grant an exemption from exterior exhaust and double-filtration requirements when using HEPA-filtered vacuum cleaner to provide negative pressure to a mini-enclosure or glove bag if the vacuum cleaner passes the DOP test and is only used as part of the work of this section.

H. When air from an NPE duct passes through an occupied area, configure the system such that the flex ducting in the occupied area is under negative pressure.

I. When using plastic sheeting for constructing NPEs, including mini enclosures, use only manufacturer-certified fire-resistant materials.

3.03 GLOVE BAGS

A. Prepare the glove bag for use as follows:

1. Use each glove bag only once.

2. Do not move glove bag once that is already mounted in place.

3. Do not use glove bag on surfaces exceeding 150°F.

4. Check materials adjacent to planned glove bag installation locations. Wrap damaged (broken lagging, hanging, and like items), loose or friable material in 2 layers of 6-mil plastic and "candy-stripe" with duct tape, or render material intact by some other method. Place one layer of duct tape around undamaged pipe at each glove bag attachment location.

5. Shut off and tagout all ventilation units that service the area where the asbestos-containing material is located.

6. Slit top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter) and allow additional so that the top of the glove bag is clear of the pipe after installation.

7. Place necessary tools into pouch located inside glove bag. This will usually include the following: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips, and pre-wetted cloth.

8. Place a strip of duct tape along both edges of the open top slit of glove bag for reinforcement.

9. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Staple down sides approximately 6 inches so that top of the glove bag is clear of pipe. Seal top and sides with duct tape. Duct tape the ends of glove bag to pipe itself, where previously covered with plastic or duct tape.

10. Install glove bag so that it completely covers the circumference of pipe or other structures where the work is to be done.

11. Use smoke tube and aspirator bulb to test seal. Place tube into water sleeve (2-inch opening to glove bag) squeezing bulb and filling bag with visible smoke. Remove smoke tube and twist water sleeve closed. While holding the water sleeve tightly, gently squeeze glove bag and look for smoke leaking out, (especially at the top and ends of the glove bag). If the glove bag leaks, tape closed using duct tape and re-test.
12. Insert wand from garden sprayer through water sleeve. Duct tape water sleeve tightly around the wand to prevent leakage.

13. Thoroughly wet material to be worked on with amended water or removal encapsulant and allow it to soak in. Wet adequately to penetrate and soak material through to substrate.

B. Remove ACM inside a glove bag as follows:

1. One person places their hands into the long-sleeved gloves while the second person directs garden sprayer at the work site.

2. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy-gauge wire with ring-type handles at each end. Throughout this process, spray amended water or removal encapsulant on the cutting area to keep dust to a minimum.

3. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping.

4. Rinse tools with water inside the bag and place back into pouch.

5. Using scrub brush, rags, and water, scrub and wipe down the exposed pipe.

6. Thoroughly wash and wipe down interior of glove bag to a point below the location where the bag will be twisted and taped to seal waste in bottom of bag.

7. Remove water wand from water sleeve and attach the small nozzle from HEPA filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

8. Remove the vacuum nozzle, twist water sleeve closed and seal with duct tape.

9. From outside the bag, pull the tool pouch away from the bag. Place duct tape over twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. Place contaminated tools directly into next glove bag without cleaning. Discard rags and scrub brush with asbestos waste.

10. With removed insulation in the bottom of the bag, twist the bag several times and tape it to seal material in the bottom during removal of the glove bag from the pipe.

11. Slip a 6-mil disposal bag over the glove bag (still attached to the pipe). Remove tape, or cut the bag, open the top of the glove bag, and fold it down into disposal bag.

12. Clean surfaces in the work area using disposable cloths wetted with water with surfactant or removal encapsulant added. When these surfaces are dry, clean with a HEPA-filtered vacuum. Material adhered to a surface with removal encapsulant may require the application of additional removal encapsulant to facilitate cleaning.

13. Seal exposed ends of remaining pipe insulation.

14. Remove disposable suits and place these into bag with waste.

15. Collapse the bag with a HEPA vacuum, twist top bag, seal with at least 3 wraps of duct tape, bend over, and seal again with at least 3 more wraps of duct tape.
3.04 ASBESTOS REMOVAL USING NEGATIVE-PRESSURE ENCLOSURES (NPE)

A. Except in circumstances where LLNS permits other procedures, handle asbestos within an NPE area, as defined in 29 CFR 1926.1101, and as detailed herein. Characteristics of an NPE include isolation of the work area from surrounding areas (typically using disposable plastic sheeting), establishment of negative pressure within the isolated area, and construction and use of a three or more chambered decontamination chamber assembly. Where the NPE area approach is used, the minimum characteristics of that work must include the following items, in addition to other applicable requirements presented in this section and in applicable regulations and laws.

1. Isolation

   a. Completely isolate the ACM handling area from surrounding areas of the building or the general environment by constructing an NPE. Construct this enclosure from materials that meet the fire-resistance requirements specified in this section. If using plastic sheeting or similar materials for part or all of this containment, it must meet the following minimum requirements:

      1) Floor Plastic: Two layers, 6-mil thick; polyethylene or equivalent
      2) Wall Plastic: Two layers, 4-mil thick; polyethylene or equivalent
      3) Critical Barriers and Decontamination Chambers: 6-mil thick; polyethylene or equivalent

   b. “Critical barriers” are initial covers installed over ventilation duct openings, windows, doors, and other transitions from the work area to adjacent non-isolated areas, including doorways on the decontamination chambers. Where the critical barrier forms a new "wall" subdividing a space (and essentially taking the place of "wall plastic" described above), apply at least two layers. Where the work will subsequently cover critical barriers by layers of floor or wall plastic, only a single layer of plastic is necessary for the critical barrier. Provide transparent viewing ports in critical barriers to allow observation of the work areas from outside the barrier.

   c. Make barriers isolating the work area from the surrounding areas complete and as airtight as possible, with the exception of the intended makeup air routes of the personal decontamination chambers, and, if applicable, the waste pass-out chambers. Seal other gaps and openings.

   d. Design the above listed isolation controls such that they remain intact and airtight throughout the expected duration of the work in the isolated area.

2. Decontamination Chambers

   Where employees enter and exit the isolated area, provide a series of three decontamination chambers, separated by airlocks. These decontamination chambers must meet the requirements of 29 CFR 1926.1101, CCR tile 8, section 1529, and as specified below:

   a. Provide chambers that are at least 3 feet by 3 feet, and 7 feet high, unless space restrictions make this infeasible. Secure prior LLNS approval for use of smaller decontamination chambers.
b. Provide an airlock between each decontamination chamber, fitted with flapped, overlapping doors or equivalent approved by LLNS, on each end. The airlock width must be equal to the width of the narrowest decontamination chamber to which it is connecting, and must be at least 2 feet long unless this is not feasible due to lack of space. Secure prior LLNS approval for other arrangements.

c. Designate the decontamination chamber contiguous with the work area as the “equipment room.”

d. In the middle chamber, include a shower for use by employees exiting the work area. Provide one shower for each 10 employees of each gender, or numerical fraction thereof, who are required to shower during the same shift. Provide hot and cold shower water feeding through a common discharge line at a flow rate of not less than 1 gallon per minute. Design the shower to capture the used water. Place the used water either in a drum for disposal as described in subpart 3.07, “Waste Handling,” or filter through a water filter rated at 99.9% filtration efficiency against 1μm particles, and discharge to the sanitary sewer.

e. Designate the exterior chamber as the “clean room.”

f. Use the decontamination chambers in accordance with 29 CFR 1926.1101 and CCR title 8, section 1529.

g. Airflow at the face of the junction of the shower room and the clean room must be at least 50 fpm inward with the curtained doorway pulled open to its limit of travel.

3. Negative-Pressure Requirements

In addition to the general requirements for establishment of a negative pressure within the isolated area, as described above, the following minimum requirements apply:

a. Maintain a minimum of four theoretical air changes per hour in the isolated area. This is in addition to the previously-stated requirement to maintain a pressure differential inside the isolated area of negative 0.02 inch wg. Provide a port on the negative-pressure intake or exhaust ducting, to allow airflow measurement. Check the approximate volumetric flow in each negative-pressure machine, prior to starting asbestos-removal work, by conducting a midpoint measurement of the airflow in the exhaust ducting, using a velometer or equivalent procedure approved by LLNS. Recheck the airflow once a day during the work. Document this check of the airflow in writing daily and submit to LLNS.

b. Locate the negative-pressure exhaust system, to the extent feasible, at the opposite side of the containment to the personal decontamination chambers and waste pass-out (where applicable).

c. For asbestos-handling work where only one negative-pressure machine exhausts the isolated area, stage a second negative-pressure machine at the work site for use in the event of failure of the primary unit. This second unit must meet the same testing requirements as the primary unit prior to use. This unit must have a flow capacity equal to or greater than the flow capacity of the primary unit.
3.05 **AIR-SAMPLING PLAN**

A. Conduct employee sampling in accordance with Cal and Fed/OSHA requirements pertaining to air sampling.

B. Submit to LLNS, prior to the start of asbestos-handling work, a personal air-sampling plan for implementation during the asbestos-handling work, designed to conform to and comply with Cal and Fed/OSHA requirements. An industrial hygienist certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene (ABIH) must design and approve this air-sampling program. Conduct sampling by, or under the direct supervision of the industrial hygienist. The industrial hygienist must review, approve, and sign air sampling reports before submittal to LLNS. Include the following minimum elements in the plan:

1. Where using respirators other than type "C" air-supplying, provide representative employee monitoring in a manner adequate to calculate an 8-hour time-weighted average and an excursion exposure on each shift during which workers handled asbestos materials. Where using type "C" respirators, provide initial representative samples and subsequent weekly samples.

2. A laboratory certified by the American Industrial Hygiene Association (AIHA) in the analysis of air samples by NIOSH 7400 or the Cal or Fed/OSHA reference method must perform the sample analysis in accordance with these methods. In addition, the analyzing laboratory must meet the other requirements for analyst training and quality control as described in 29 CFR 1926.1101 and CCR title 8, section 1529.

3. If the Subcontractor uses products containing toxic materials within permissible exposure limits established in 29 CFR 1910.1000 through 1910.1048, or that pose the potential for inhalation during the asbestos-abatement work, such as spray glues and encapsulants, conduct representative personal air monitoring of employees using these products. Determine the 8-hour time-weighted average exposure, ceiling exposure, or other Cal or Fed/OSHA specified exposure type. Alternatively, submit results of a properly conducted exposure evaluation to LLNS prior to the use of the material in question, signed by an ABIH-certified industrial hygienist indicating that airborne exposure to the toxic materials in this product does not exceed exposure limits or action levels established in 29 CFR 1910 subpart Z.

3.06 **RESPONSE TO FAILURE OF CONTROL PROCEDURES**

**Elevated Perimeter Samples**

A. If a perimeter sample initially obtained by LLNS and analyzed by phase contrast microscopy (PCM) (see subpart 3.08 “Inspections and Air Sampling Conducted by LLNS”) is found to exceed 0.01 fibers per cubic centimeter (f/cc) or the pre-established baseline level, immediately stop asbestos-removal work. If the Subcontractor obtained the sample, immediately inform LLNS of the elevated sample result.

B. LLNS may convene a meeting within 24 hours to determine the cause of the elevated fiber levels. If LLNS determines that the elevated fiber level most likely resulted from failure in the Subcontractor's control procedures, LLNS may have the subject perimeter samples re-analyzed by transmission electron microscopy (TEM) to verify that the fibers detected are asbestos.

C. If analysis indicates the presence of asbestos in concentrations greater than 0.01 f/cc (or 70 s/mm²), do the following:
1. Make corrections or improvements to work procedures to reduce leakage of fibers from work area.

2. Erect critical barriers surrounding area where elevated asbestos level was detected.

3. Decontaminate surrounding areas, as stipulated by LLNS, including vacuuming room surfaces with a HEPA-filtered vacuum cleaner, and wet-wiping of room surfaces.

4. Continue decontamination until LLNS sampling by LLNS, taken using appropriate procedures and analyzed by TEM or PCM, indicate an airborne asbestos level of less than 70s/mm² or 0.01 f/cc.

D. Observed Deficiency in Engineering Controls

Immediately correct observed deficiencies in the engineering controls, such as failure of plastic barriers or covering, loss of required negative pressure, clogging of shower drain, and loss of exhaust airflow. If you cannot correct the problem immediately, stop asbestos work pending correction of the deficiency.

E. Observed Deficiency in Work Practices

Promptly correct identified deficiencies in work practices, use of equipment, and personal-protective controls.

3.07 WASTE HANDLING

A. Dispose of ACM and items contaminated with asbestos, other than those items decontaminated or sealed and removed from LLNS property in a sealed condition, as asbestos-containing waste.

B. Handle, contain, label, store, transport, and dispose of asbestos-containing waste in accordance with applicable laws, codes, and regulations. Mark vehicles used to transport asbestos-containing waste material as specified below during loading and unloading of waste.

DANGER!
CONTAINS ASBESTOS FIBERS.
MAY CAUSE CANCER.
CAUSES DAMAGE TO LUNGS.
DO NOT BREATHE DUST.
AVOID CREATING DUST.

C. Seal waste in airtight containers. Seal the waste in one 6 millimeter gauge or thicker plastic bag and subsequently seal in a second similar bag or metal or plastic drum. Place liquids contaminated with asbestos (e.g., unfiltered shower water) in metal or plastic drums. Ensure proper labeling of secondary bags or drums. Each container of 110 gallons or less shall be displayed with the following words and information in accordance with the requirements of California Code of Regulations, title 22, section 66262.32:

HAZARDOUS WASTE-State and Federal Law Prohibit Improper Disposal.

If found, contact the nearest police or public safety authority, the U.S. Environmental Protection Agency or the California Department of Toxic Substances Control.

Generator's Name and Address __________.
Generator's EPA Identification Number __________.
 Manifest Tracking Number __________.

D. Turn over friable ACM to LLNS. LLNS will manage and dispose of hazardous (friable asbestos-contaminated) waste.

E. Transport nonfriable, nonhazardous ACM to the Waste Management Altamont Landfill or Republic Services Vasco Road Landfill and dispose of in accordance with applicable laws and regulations. For alternate disposal sites, submit the proposed site information and description and quantity of materials to be disposed to LLNS for evaluation on a case-by-case basis.

3.08 INSPECTIONS AND AIR SAMPLING CONDUCTED BY LLNS

LLNS will conduct a variety of inspections of the work site to ensure compliance with the provisions of this section and applicable laws and regulations. These inspections may include, but are not limited to, the following:

A. Inspection of the engineering controls used by the Subcontractor, including isolation controls, negative-pressure machines, decontamination facilities, water-filtration systems, and vacuum cleaners. This may include an initial inspection of the isolated area controls after installation, but before the asbestos-removal work begins. Schedule this set-up inspection with the LLNS construction manager (STR) at least 24 hours in advance of starting asbestos-handling work.

B. Inspection of the PPE used by the Subcontractor, including the use of respirators and protective clothing.

C. Inspection of the work practices used by the Subcontractor, including asbestos wetting and removal procedures, and decontamination procedures.

D. LLNS will conduct a preclearance visual inspection in the work area after asbestos removal, but prior to application of encapsulant or lock-down agent. If the removing asbestos using the isolated/regulated area procedure, conduct the final visual inspection after the removal of the inner layer of plastic sheeting on the floor, walls and other internal surfaces, where applicable. To successfully pass the visual inspection, no visible residue of the material can remain. Schedule this inspection with the STR at least 24 hours in advance.

E. LLNS may conduct perimeter sampling to verify the adequacy of Subcontractor's work procedures. LLNS will take these samples outside regulated areas or restricted perimeters established by the work, and at the exhaust of the negative-pressure machine(s) or in the clean room, where applicable. LLNS will analyze perimeter in accordance with the NIOSH 7400 procedure. The allowable maximum limit for air samples is 0.01 f/cc (fibers per cubic centimeter) of air, or a baseline fiber level established by LLNS, whichever is higher. This is the "perimeter limit." LLNS will establish a baseline in the work area if LLNS deems necessary, or at the request of the Subcontractor. For work in a regulated area, LLNS can usually establish a baseline level only after the Subcontractor has erects isolation controls.
F. LLNS will conduct clearance sampling for asbestos-removal work conducted within a regulated area. LLNS will conduct this clearance sampling after successful completion of the visual inspection, as described above, and after the application of the encapsulant or lock-down agent, as applicable. LLNS will not conduct the final sampling until the encapsulant or lock-down agent is dry, or 24 hours after application of same, as determined by LLNS, whichever is less. LLNS will take the clearance aggressive-type sample only after the Subcontractor removes temporary floor covering (plastic) and wall covering, with the exception of critical barriers and decontamination facilities. The STR will determine the number of clearance samples, and their analysis, after discussion with the Subcontractor.

3.09 CLEARANCE CRITERIA

LLNS will consider the work space cleared of asbestos when the following criteria are met:

A. The subcontractor removes asbestos, other materials, and items as intended, including dust, debris, or residue. LLNS determines by visual inspection that the work is complete.

B. Subcontractor has encapsulated (locked down) surfaces from which the subcontractor removed ACM.

C. The results of the final clearance samples do not exceed the values specified below:

1. Phase Contrast Microscopy (PCM): Where the sample analysis is by PCM, the acceptable clearance level is 0.01 f/cc or less. Each sample from each area must be less than this value to achieve the clearance level. PCM results will be available 24 hours (one working day) after the completion of sampling.

2. Transmission Electron Microscopy (TEM): Where the sample analysis is by TEM, the acceptable clearance level is 70 s/mm² or less for each sample in each asbestos-removal area. TEM sample results will be available 24 hours (one working day) after they are taken.

D. Subcontractor removes equipment and supplies used during the asbestos-removal work (e.g., plastic removed and negative-pressure machine).

E. Subcontractor provides LLNS with the submittals required before, during, and after completing the work.

END OF SECTION
PART 1 - GENERAL

This section includes class III asbestos controls for maintenance and repair operations that may disturb and remove existing asbestos on an incidental basis. For work that involves asbestos abatement, see section 01 35 23.13 “Asbestos Safety – Class I and II.”

1.01 SECTION INCLUDES

This section defines requirements for Class III asbestos work for Subcontractors in or near the work area, including disposal. Asbestos containing materials are indicated in the SAHCL (Subcontractor Area Hazards Control List).

A. The Statement of Work specifies the following:
   1. ACM to be removed
   2. Areas requiring decontamination
   3. Items requiring encapsulation

1.02 REFERENCES

A. Definitions
   1. **Class I.** Activities involving the removal of thermal system insulation (TSI) and surfacing ACM and presumed asbestos containing materials (PACM).

   2. **Class II.** Activities involving the removal of ACM that is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

   3. **Class III.** Repair and maintenance operations, where ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed. All waste must fit inside a 60 inch by 60 inch bag.

B. Reference Standards

The following documents form a part of these specifications to the extent stated.

   29 CFR 1910  *Occupational Safety and Health Standards* (Fed/OSHA)
   29 CFR 1926  *Safety and Health Regulations for the Construction Industry, Department of Labor* (DOL)
   40 CFR 61    *National Emission Standards for Hazardous Air Pollutants* (NESHAPS)
   40 CFR 763    *Asbestos Hazard Emergency Response Act* (AHERA)

2. California Code of Regulations (CCR)
Title 8  Industrial Relations (Cal/OSHA Regulations), Section 1529, Asbestos

Title 22  Social Security, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste

Title 26  Toxics

3. Bay Area Air Quality Management District (BAAQMD), Regulation 11, Hazardous Pollutants, Rule 2, Asbestos Demolition, Renovation and Manufacturing. (Note: this regulation is applicable for Livermore Site projects only).

4. San Joaquin Valley Air Pollution Control District (SJVAPCD), National Emission Standards for Hazardous Air Pollutants, Regulation IV (Adopts NESHAP Standards), Rule 4002. (Note: this regulation is applicable for Site 300 projects only).

5. National Institute of Occupational Safety and Health (NIOSH)
   a. Manual of Sampling Data Sheets, Method 7400
   b. Transmission Electron Microscopy (TEM) OSHA Equivalency Method, Method 7402


1.03 SUBMITTALS

A. Asbestos Abatement Work Plan. Submit an “Asbestos Abatement Plan” to LLNS for approval prior to starting work on site. In the plan, detail the proposed work methods, procedures, and equipment intended to prevent asbestos exposure of LLNS and Subcontractor employees, ensure LLNS facilities are not contaminated, and protect the environment. Include the engineering, administrative, and personal-protective controls that provide compliance with the applicable provisions of these specifications, and applicable regulations and laws. Also, address the following specific items in the asbestos abatement work plan:

1. Isolation Controls. Describe the equipment, supplies, and techniques used to isolate a regulated containment area. Describe the engineering controls employed.

2. Air-Sampling Plan. Include the personal air-sampling plan described in these specifications.

3. Negative-Pressure System. Describe the selection, testing, staging, use, and monitoring methods for equipment to provide a negative pressure in the asbestos-removal area.

4. Waste Handling
   a. Nonfriable ACM. Describe the containment, storage, transportation, and disposal methods for nonfriable asbestos-containing waste and asbestos items.
   b. Friable ACM. Describe the containment and turn-over methods for friable ACM turned over to LLNS for disposal.
B. **Prestart Submittals.** Provide the following applicable items to LLNS prior to the start of asbestos-handling work:

1. Proof of current licensing with Contractors State Licensing Board for asbestos related work
2. Proof of current registration with the California Department of Industrial Relations
   a. Registration as a handler of carcinogens
   b. Registration to perform asbestos-related work
3. Evidence of employee training meeting the 40 CFR 763 (AHERA), 29 CFR 1910 (Fed/OSHA), 29 CFR 1926 (DOL), and CCR, title 8 (Cal/OSHA) requirements for employees performing asbestos work
4. Evidence of training and fit testing of each employee for the use of each respirator proposed, including positive pressure respirators
5. Evidence of supervisor training meeting the AHERA, Fed/OSHA, and Cal/OSHA requirements
6. Evidence of industrial hygienist meeting CCR title 8 requirements for “certified asbestos consultant”
7. Evidence of medical surveillance for employees using respirator and/or where medical surveillance is required by Fed and Cal/OSHA regulations
8. Evidence of air monitoring data if the subcontractor uses a Negative Exposure Assessment (NEA)
9. Subcontractor's respiratory protection policy
10. Satisfactory results of onsite testing of HEPA-filtered equipment
11. Asbestos-abatement work procedure and safety plan, as required herein
12. Evidence of a valid BAAQMD Acknowledgement of Demolition / Notification and Payment Fees or San Joaquin Valley Air Pollution Control District (SJVAPCD) Demolition/Renovation Permit Release for the specific project
   a. For Livermore Site asbestos maintenance projects that are less than 100 linear feet, 100 square feet, or 35 cubic feet use the Annual LLNL Cumulative Asbestos Permit; if greater than these thresholds, submit a separate BAAQMD asbestos notification specific for the project. If a structural element is involved submit a Demolition Notification
   b. For Site300 asbestos maintenance projects that are greater than 160 linear feet, 260 square feet, or 35 cubic feet of suspected building materials, submit a SJVAPCD asbestos notification for the project. If a structural element is involved, submit a Demolition Notification
13. Name and address of site where nonfriable asbestos waste will be disposed (see section 3.07)
14. Copy of notification of California Department of Industrial Relations
15. Copy of asbestos-related insurance coverage
16. Descriptive literature on specified equipment and material, as listed below:
   a. Negative-pressure machines
   b. Water-filtration system and filters
   c. Wetting materials, encapsulants, spray glues, and other chemicals (including safety data sheets)
   d. Fire-resistant plastic or other materials used in construction of isolated area
   e. Respirators
   f. Negative-pressure monitor
   g. Air-sampling pump
   h. Fire extinguishers brought onsite
   i. Ground fault circuit interrupters (GFCI)
   j. Floor buffer machines and associated pads
   k. Alternative removal devices, such as water jet sprayers and infrared heating machines
   l. Temporary water-resistant lighting

C. Daily Submittals. Submit the following items to LLNS STR within one working day following the day on which they are collected.
   1. Results of personal air monitoring (8-hour time-weighted average and excursion results, as well as raw laboratory data), signed by Subcontractor's designated industrial hygienist (in accordance with air-sampling plan)
   2. Copies of print-out from negative-pressure monitors

D. Final Submittals. Following the completion of asbestos-handling work, submit copies of access logs for the regulated area and completed shipping documents.

1.04 TRAINING & QUALITY ASSURANCE

A. Employee Training Qualifications

   The following is mandatory Subcontractor-provided training for Subcontractor employees performing asbestos-handling work:

   1. All Employees. Trained and certified in accordance with the federal and State of California OSHA requirements, and meet the training provisions for "workers" of the Asbestos Hazard Emergency Response Act (AHERA) as codified in 40 CFR 763. This latter requirement requires attendance and successful completion of a State of California-approved training class at least four days in duration. Employees must have current certification with documented attendance at applicable certification refresher classes.
2. **Supervisor/Competent Person.** Each individual assigned to work as a supervisor shall meet the requirements for a “competent person” as described in 29 CFR 1926.1101, for a “certified supervisor” as described in CCR title 8, and for a “supervisor” as required by AHERA, as codified in 40 CFR 763. This latter requirement requires attendance at a State-approved training course of four or five days in duration. The supervisor/competent person must have current certification with documented attendance at applicable certification refresher classes.

3. **Industrial Hygienist.** The assigned industrial hygienist must meet the requirements for a “certified asbestos consultant (CAC)” described in CCR, title 8. Industrial hygienists must have current certification with documented attendance at applicable certification refresher classes.

   B. Provide ACM removal by an asbestos-abatement contractor licensed to perform asbestos removal in the State of California.

**PART 2 - PRODUCTS**

**2.01 GENERAL**

Provide material, equipment, tools, and devices required to complete the asbestos safety work.

**2.02 GLOVE BAGS**

Provide minimum 6-mil thick polyethylene, polyvinyl chloride, or equivalent plastic sack, with a seamless bottom, and two sealed inward projecting long-sleeved gloves or mittens, preprinted with same warning notice as a disposal bag, equipped with a pouch for storage of tools, with designated location for wand or HEPA vacuum wand. Do not use glove bags larger than 60 inches by 60 inches.

**2.03 SHEET PLASTIC**

A. **Polyethylene Sheet.** A single polyethylene film in the largest sheet size possible to minimize seams, 6 mil thick, clear, frosted, or black as indicated.

B. **Polyethylene Film.** Provide flame resistant polyethylene film that conforms to requirements set forth by the NFPA 701. Provide largest size possible to minimize seams, 6.0-mil thick, frosted or black as indicated.

**2.04 MISCELLANEOUS MATERIALS**

A. **Duct Tape.** Provide duct tape in 2 inch or 3 inch widths with an adhesive formulated to stick aggressively to sheet polyethylene.

B. **Spray Cement.** Provide aerosol spray adhesive specifically formulated to stick tenaciously to sheet polyethylene.

C. **Wetting Materials.** Use either amended water or a removal encapsulant for wetting prior to disturbance of ACM as follows:

   1. **Amended Water.** Provide water with an added surfactant. Use a mixture of surfactant and water that results in ACM wetting and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.
2. **Removal Encapsulant.** Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in ACM wetting and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

D. **Garden Sprayer.** Provide a hand pump type pressure-can garden sprayer fabricated out of either metal or plastic, and equipped with a metal wand at the end of a hose that can deliver a stream or spray of liquid under pressure.

**PART 3 - EXECUTION**

**3.01 PROTECTION**

A. **Personal-Protective Equipment (PPE).** Use PPE to minimize Subcontractor employee exposure to asbestos as described in 29 CFR 1926.1101, CCR, title 8, section 1529, and below:

1. **Respirators**
   
   Select, fit, and use respirators in accordance with 29 CFR 1926.1101 and CCR, title 8, section 1529, except: select respirators to ensure employee exposure to asbestos inside the respirator does not exceed 0.01 fibers per cubic centimeter (f/cc) of air, as determined by historic air monitoring on work of a similar type conducted by the Subcontractor, and based upon the results of personal sampling conducted during the course of this work. Make available to LLNS, if requested, the historic air-monitoring data used for initial selection of respirators for employee protection.

2. **Protective Clothing**
   
   a. Subcontractor's employees must wear disposable-type full-body protective clothing, including foot, hand, and head covering, as required by Cal and Fed/OSHA when working in a regulated, containment area.
   
   b. Make disposable protective coveralls, shoe covers, and gloves available for use by qualified LLNS inspectors. Stage this gear at the entrance to each isolated area or at the perimeter of each asbestos-work area. Provide at least four sets of disposable gear each day for each work area after starting the asbestos-removal work and until the area successfully passes the final clearance sampling.

3. **Other Protective Gear**
   
   Provide other necessary protective gear, including boots, goggles, and hardhats, and enforce the use of the provided gear.

B. **General Safety Requirements.** Conform work procedures to and comply with applicable safety standards. The following are some specific requirements for this work:

1. **Ladders.** Use only type 1 industrial grade ladders. Use ladders fabricated of non-electrically conductive materials. Maintain in good mechanical condition.
2. **Electrical.** For work conducted in an isolated/regulated area, provide electrical power via a ground-fault interrupter circuit. This includes power for lighting, vacuum cleaners, and negative-pressure machines. Provide temporary, water resistant lighting for asbestos-abatement areas. Do not use existing lighting.

3. **Working/Walking Surfaces.** Keep working and walking surfaces in the asbestos work area and the surrounding area, which is utilized for asbestos-abatement work, free of tripping hazards such as electrical cords, equipment, and supplies. Where these surfaces are slippery, as when floor plastic becomes wet, provide ribbed rubber soled boots or shoes for employees in this area.

4. **Access Log.** Maintain an access log signed by persons entering asbestos work areas. Stage this log at the access point to the asbestos work area.

5. **Fire Sprinkler Heads.** Protect fire sprinkler heads from damage during asbestos work by sealing them in cellophane or paper or using a similar material and method approved by LLNS.

### 3.02 ENGINEERING CONTROLS AND GENERAL WORK PROCEDURES

A. Perform asbestos work in accordance with controls outlined in 29 CFR 1926.1101, or alternatively CCR, title 8, section 1529 for class I or II work.

B. Unless specifically exempted by LLNS, only handle ACM wet. Use water with an appropriate wetting agent or removal encapsulant to wet materials prior to and during handling. Submit the wetting agent to LLNS for approval prior to the start of work.

C. Post warning signs, with the following message, at entrances to regulated work areas:

```
DANGER!
ASBESTOS.
MAY CAUSE CANCER.
CAUSES DAMAGE TO LUNGS.
AUTHORIZED PERSONNEL ONLY.
WEAR RESPIRATORY PROTECTION AND
PROTECTIVE CLOTHING IN THIS AREA.
```

D. **HEPA-Filtered Equipment Testing.** Test and certify HEPA filtered equipment in accordance with section 01 35 23, subpart 3.17.

E. When using HEPA-filtered vacuum cleaner to provide negative pressure to a mini-enclosure or glove bag, the vacuum cleaner must pass the DOP test and is only used as part of the work of this section.

F. When using plastic sheeting for constructing mini enclosures, use only manufacturer-certified fire-resistant materials.

### 3.03 GLOVE BAGS

A. Prepare the glove bag for use as follows:

1. Use each glove bag only once.
2. Do not move glove bag once that is already mounted in place.
3. Do not use glove bag on surfaces exceeding 150°F.
4. Check materials adjacent to planned glove bag installation locations. Wrap damaged (broken lagging, hanging, and like items), loose or friable material in 2 layers of 6-mil plastic and "candy-stripe" with duct tape, or render material intact by some other method. Place one layer of duct tape around undamaged pipe at each glove bag attachment location.

5. Shut off and tagout all ventilation units that service the area where the asbestos-containing material is located.

6. Slit top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter) and allow additional so that the top of the glove bag is clear of the pipe after installation.

7. Place necessary tools into pouch located inside glove bag. This will usually include the following: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips, and pre-wetted cloth.

8. Place a strip of duct tape along both edges of the open top slit of glove bag for reinforcement.

9. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Staple down sides approximately 6 inches so that top of the glove bag is clear of pipe. Seal top and sides with duct tape. Duct tape the ends of glove bag to pipe itself, where previously covered with plastic or duct tape.

10. Install glove bag so that it completely covers the circumference of pipe or other structures where the work is to be done.

11. Use smoke tube and aspirator bulb to test seal. Place tube into water sleeve (2-inch opening to glove bag) squeezing bulb and filling bag with visible smoke. Remove smoke tube and twist water sleeve closed. While holding the water sleeve tightly, gently squeeze glove bag and look for smoke leaking out, (especially at the top and ends of the glove bag). If the glove bag leaks, tape closed using duct tape and re-test.

12. Insert wand from garden sprayer through water sleeve. Duct tape water sleeve tightly around the wand to prevent leakage.

13. Thoroughly wet material to be worked on with amended water or removal encapsulant and allow it to soak in. Wet adequately to penetrate and soak material through to substrate.

B. Remove ACM inside a glove bag as follows:

1. One person places their hands into the long-sleeved gloves while the second person directs garden sprayer at the work site.

2. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy-gauge wire with ring-type handles at each end. Throughout this process, spray amended water or removal encapsulant on the cutting area to keep dust to a minimum.

3. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping.

4. Rinse tools with water inside the bag and place back into pouch.

5. Using scrub brush, rags, and water, scrub and wipe down the exposed pipe.
6. Thoroughly wash and wipe down interior of glove bag to a point below the location where the bag will be twisted and taped to seal waste in bottom of bag.

7. Remove water wand from water sleeve and attach the small nozzle from HEPA filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

8. Remove the vacuum nozzle, twist water sleeve closed and seal with duct tape.

9. From outside the bag, pull the tool pouch away from the bag. Place duct tape over twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. Place contaminated tools directly into next glove bag without cleaning. Discard rags and scrub brush with asbestos waste.

10. With removed insulation in the bottom of the bag, twist the bag several times and tape it to seal material in the bottom during removal of the glove bag from the pipe.

11. Slip a 6-mil disposal bag over the glove bag (still attached to the pipe). Remove tape, or cut the bag, open the top of the glove bag, and fold it down into disposal bag.

12. Clean surfaces in the work area using disposable cloths wetted with water with surfactant or removal encapsulant added. When these surfaces are dry, clean with a HEPA-filtered vacuum. Material adhered to a surface with removal encapsulant may require the application of additional removal encapsulant to facilitate cleaning.

13. Seal exposed ends of remaining pipe insulation.

14. Remove disposable suits and place these into bag with waste.

15. Collapse the bag with a HEPA vacuum, twist top bag, seal with at least 3 wraps of duct tape, fold over, and seal again with at least 3 more wraps of duct tape.

3.04 ASBESTOS REMOVAL USING MINI-ENCLOSURES

A. Except in circumstances where LLNS permits other procedures, handle asbestos within a mini-enclosure, as defined in 29 CFR 1926.1101, and as detailed herein. A mini-enclosure is a small walk-in enclosure that cannot accommodate more than two people. Characteristics of a mini-enclosure include isolation of the work area from surrounding areas (typically using disposable plastic sheeting) and establishment of negative pressure within the isolated area. Where the mini-enclosure area approach is used, the minimum characteristics of that work must include the following items, in addition to other applicable requirements presented in this section and in applicable regulations and laws.

1. Isolation

   a. Completely isolate the ACM handling area from surrounding areas of the building or the general environment by constructing the mini-enclosure. Construct this enclosure from materials that meet the fire-resistance requirements specified in this section. If using plastic sheeting or similar materials for part or all of this containment, it must meet the following minimum requirements:

   1) Floor Plastic: Two layers, 6-mil thick; polyethylene or equivalent

   2) Wall Plastic: Two layers, 4-mil thick; polyethylene or equivalent
3) Critical Barriers and Decontamination Chambers: 6-mil thick; polyethylene or equivalent

b. “Critical barriers” are initial covers installed over ventilation duct openings, windows, doors, and other transitions from the work area to adjacent non-isolated areas, including doorways on the decontamination chambers. Where the critical barrier forms a new "wall" subdividing a space (and essentially taking the place of "wall plastic" described above), apply at least two layers. Where the work will subsequently cover critical barriers by layers of floor or wall plastic, only a single layer of plastic is necessary for the critical barrier.

c. Make barriers isolating the work area from the surrounding areas complete and as airtight as possible.

d. Design the above listed isolation controls such that they remain intact and airtight throughout the expected duration of the work in the isolated area.

2. Inspect the mini-enclosure for leaks and smoke-tested to detect breaches

a. Seal all breaches prior to start.

3. Air movement within the mini-enclosure will need to be directed away from the employee’s breathing zone.

4. Clean surfaces in the work area using disposable cloths wetted with water with surfactant or removal encapsulant added. When these surfaces are dry, clean with a HEPA-filtered vacuum. Material adhered to a surface with removal encapsulant may require the application of additional removal encapsulant to facilitate cleaning.

5. Remove disposable suits and place these into bag with waste.

3.05 AIR-SAMPLING PLAN

A. Conduct employee sampling in accordance with Cal and Fed/OSHA requirements pertaining to air sampling.

B. Submit to LLNS, prior to the start of asbestos-handling work, a personal air-sampling plan for implementation during the asbestos-handling work, designed to conform to and comply with Cal and Fed/OSHA requirements. An industrial hygienist certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene (ABIH) must design and approve this air-sampling program. Conduct sampling by, or under the direct supervision of the industrial hygienist. The industrial hygienist must review, approve, and sign air sampling reports before submittal to LLNS. Include the following minimum elements in the plan:

1. Where using respirators other than type "C" air-supplying, provide representative employee monitoring in a manner adequate to calculate an 8-hour time-weighted average and an excursion exposure on each shift during which workers handled asbestos materials. Where using type "C" respirators, provide initial representative samples and subsequent weekly samples.

2. A laboratory certified by the American Industrial Hygiene Association (AIHA) in the analysis of air samples by NIOSH 7400 or the Cal or Fed/OSHA reference method must perform the sample analysis in accordance with these methods. In addition, the analyzing laboratory must meet the other requirements for analyst training and quality control as described in 29 CFR 1926.1101 and CCR title 8, section 1529.
3. If the Subcontractor uses products containing toxic materials within permissible exposure limits established in 29 CFR 1910.1000 through 1910.1048, or that pose the potential for inhalation during the asbestos-abatement work, such as spray glues and encapsulants, conduct representative personal air monitoring of employees using these products. Determine the 8-hour time-weighted average exposure, ceiling exposure, or other Cal or Fed/OSHA specified exposure type. Alternatively, submit results of a properly conducted exposure evaluation to LLNS prior to the use of the material in question, signed by an ABIH-certified industrial hygienist indicating that airborne exposure to the toxic materials in this product does not exceed exposure limits or action levels established in 29 CFR 1910 subpart Z.

3.06 RESPONSE TO FAILURE OF CONTROL PROCEDURES

Elevated Perimeter Samples

A. If a perimeter sample initially obtained by LLNS and analyzed by phase contrast microscopy (PCM) (see subpart 3.08 “Inspections and Air Sampling Conducted by LLNS”) is found to exceed 0.01 fibers per cubic centimeter (f/cc) or the pre-established baseline level, immediately stop asbestos-removal work. If the Subcontractor obtained the sample, immediately inform LLNS of the elevated sample result.

B. LLNS may convene a meeting within 24 hours to determine the cause of the elevated fiber levels. If LLNS determines that the elevated fiber level most likely resulted from failure in the Subcontractor's control procedures, LLNS may have the subject perimeter samples re-analyzed by transmission electron microscopy (TEM) to verify that the fibers detected are asbestos.

C. If analysis indicates the presence of asbestos in concentrations greater than 0.01 f/cc (or 70 s/mm²), do the following:

1. Make corrections or improvements to work procedures to reduce leakage of fibers from work area.
2. Erect critical barriers surrounding area where elevated asbestos level was detected.
3. Decontaminate surrounding areas, as stipulated by LLNS, including vacuuming room surfaces with a HEPA-filtered vacuum cleaner, and wet-wiping of room surfaces.
4. Continue decontamination until samples by LLNS, taken using appropriate procedures and analyzed by TEM or PCM, indicate an airborne asbestos level of less than 70s/mm² or 0.01 f/cc.

D. Observed Deficiency in Engineering Controls

Immediately correct observed deficiencies in the engineering controls, such as failure of plastic barriers or covering, loss of required negative pressure, clogging of shower drain, and loss of exhaust airflow. If you cannot correct the problem immediately, stop asbestos work pending correction of the deficiency.

E. Observed Deficiency in Work Practices

Promptly correct identified deficiencies in work practices, use of equipment, and personal-protective controls.
3.07 WASTE HANDLING

A. Dispose of asbestos-containing waste and items contaminated with asbestos, other than those items to be decontaminated or managed by LLNS.

B. Handle, contain, label, store, transport, and dispose of asbestos-containing waste in accordance with applicable laws, codes, and regulations. Mark containers and vehicles used to transport asbestos-containing waste material as specified below during loading and unloading of waste.

   DANGER!
   CONTAINS ASBESTOS FIBERS.
   MAY CAUSE CANCER.
   CAUSES DAMAGE TO LUNGS.
   DO NOT BREATHE DUST.
   AVOID CREATING DUST.

C. Seal waste in airtight containers. Seal the waste in one 6 mil gauge or thicker plastic bag and subsequently seal in a second similar bag or metal or plastic drum. Place liquids contaminated with asbestos (e.g., unfiltered shower water) in metal or plastic drums. Ensure proper labeling of secondary bags or drums. Each container of 110 gallons or less shall be displayed with the following words and information in accordance with the requirements of California Code of Regulations, title 22, section 66262.32:

   HAZARDOUS WASTE-State and Federal Law Prohibit Improper Disposal.

   If found, contact the nearest police or public safety authority, the U.S. Environmental Protection Agency or the California Department of Toxic Substances Control.

   Generator's Name and Address __________.

   Generator's EPA Identification Number __________.

   Manifest Tracking Number __________.

D. Turn over friable ACM to LLNS. LLNS will manage and dispose of hazardous (friable asbestos-contaminated) waste.

E. Transport nonfriable, nonhazardous ACM to the Waste Management Altamont Landfill or Republic Services Vasco Road Landfill and dispose of in accordance with applicable laws and regulations. For alternate disposal sites, submit the proposed site information and description and quantity of materials to be disposed to LLNS for evaluation on a case-by-case basis.

3.08 INSPECTIONS AND AIR SAMPLING CONDUCTED BY LLNS

LLNS will conduct a variety of inspections of the work site to ensure compliance with the provisions of this section and applicable laws and regulations. These inspections may include, but are not limited to, the following:

A. Inspection of the engineering controls used by the Subcontractor. Schedule this set-up inspection with the LLNS construction manager (STR) at least 24 hours in advance of starting asbestos-handling work.

B. Inspection of the PPE used by the Subcontractor, including the use of respirators and protective clothing.
C. Inspection of the work practices used by the Subcontractor, including asbestos-wetting and removal procedures, and decontamination procedures.

D. LLNS may conduct perimeter sampling to verify the adequacy of Subcontractor's work procedures. LLNS will take these samples outside regulated areas or restricted perimeters established by the work, and at the exhaust of the negative-pressure machine(s) or in the clean room, where applicable. LLNS will analyze perimeter in accordance with the NIOSH 7400 procedure. The allowable maximum limit for air samples is 0.01 f/cc (fibers per cubic centimeter) of air, or a baseline fiber level established by LLNS, whichever is higher. This is the "perimeter limit." LLNS will establish a baseline in the work area if LLNS deems necessary, or at the request of the Subcontractor. For work in a regulated area, LLNS can usually establish a baseline level only after the Subcontractor has erected isolation controls.

E. LLNS will conduct a pre-clearance visual inspection in the work area after asbestos abatement and after the application of the encapsulant or lock-down agent, as applicable. LLNS will not conduct the final sampling until the encapsulant or lock-down agent is dry, or 24 hours after application of same, as determined by LLNS, whichever is less. To successfully pass this inspection, there must be no visible residue of the removed material. Schedule this inspection with the LLNS construction manager at least 24 hours in advance.

F. LLNS may conduct clearance sampling for asbestos-removal work conducted within a regulated area.

3.09 CLEARANCE CRITERIA

If clearance sampling is conducted, LLNS will consider the work space cleared of asbestos when the following criteria are met:

A. The subcontractor removes asbestos, other materials, and items as intended, including dust, debris, or residue. LLNS determines by visual inspection that the work is complete.

B. Subcontractor has encapsulated (locked down) surfaces from which the subcontractor removed ACM.

C. The results of the final clearance samples do not exceed the values specified below:

1. Phase Contrast Microscopy (PCM): Where the sample analysis is by PCM, the acceptable clearance level is 0.01 f/cc or less. Each sample from each area must be less than this value to achieve the clearance level. PCM results will be available 24 hours (one working day) after the completion of sampling.

2. Transmission Electron Microscopy (TEM): Where the sample analysis is by TEM, the acceptable clearance level is 70 s/mm² or less for each sample in each asbestos-removal area. TEM sample results will be available 24 hours (one working day) after they are taken.

D. Subcontractor removes equipment and supplies used during the asbestos-removal work (e.g., plastic removed and negative-pressure machine).

E. Subcontractor provides LLNS with the submittals required before, during, and after completing the work.

END OF SECTION
SECTION 01 35 23.21
LEAD WORK EXPOSURE PROTECTION

PART 1 - GENERAL

This section is for use in subcontracted construction work where an employee may be occupationally exposed to lead above the action level of 30 µg/m³, over an 8-hour time weighted average without taking respiratory protection into consideration. This includes construction activity involving lead-containing materials (detectable level of lead) that is a trigger task as defined in this document (see subpart 1.03 “Definitions” below), or has been determined by initial air monitoring or objective data to expose workers to lead above the action level. Painted materials that have not been tested and analyzed for lead shall be assumed to contain lead. If the activity is not a trigger task and does not have the potential to expose workers above the action level, consult the lead section in the environmental protection specification.

1.01 SUMMARY

Subcontractor and LLNS personnel may encounter lead as part of this work. The Statement of Work will specify where lead may be encountered in the specific project area. This section defines lead exposure protection requirements for both the Subcontractor and LLNS personnel in or near the lead work area, and for prevention of cross-contamination of lead dust to LLNS facilities and equipment. Conduct lead work in accordance with 29 CFR 1926.62. Ensure that employee lead exposure does not exceed concentrations greater than the permissible exposure limit (PEL) defined by OSHA.

1.02 REFERENCES

The following documents form a part of these specifications to the extent stated herein.

A. Code of Federal Regulations (CFR)

- 29 CFR 1910 Occupational Safety and Health Standards (Fed/OSHA), OSHA Method ID121: Metal & Metalloid Particulates in Workplace Atmospheres (Atomic Absorption)
- 29 CFR 1926.59 Hazard Communication Safety and Health Regulation for the Construction Industry
- 29 CFR 1926.62 Lead Safety and Health Regulation for the Construction Industry

B. Department of Energy (DOE)


C. Consumer Product Safety Commission (CPSC)

Established limits for lead in paint

D. National Institute of Occupational Safety and Health (NIOSH)

- NIOSH 7082 Lead by Flame AAS (Atomic Absorption Spectrophotometer)
- NIOSH 7105 Lead by HGAAS (Atomic Absorption Spectrophotometer, Graphic Furnace)

1.03 DEFINITIONS/ACRONYMS

AIHA American Industrial Hygiene Association
AL Action Level of thirty micrograms per cubic meter of air (30 µg/m³) averaged over an 8-hour period

CDC Center for Disease Control

CFR Code of Federal Regulations

CPSC Consumer Product Safety Commission

ELLAP Environmental Lead Laboratory Accreditation Program

EPA Environmental Protection Agency

HEPA High-Efficiency Particulate Air

SDS Safety Data Sheet

NID Negative Initial Determination. An exposure assessment also considers other information, including levels of worker training, supervision and previous monitoring results. A conclusion that the planned work (including trigger tasks) will not exceed the PEL and will be conducted under situations closely resembling other similar jobs is called an NID.

NIOSH National Institute of Occupational Safety and Health

OSHA Occupational Safety and Health Administration

PAO Polyalphaoolefin

PEL Permissible Exposure Limit of 50 micro-grams per cubic meter of air (50 µg/m³) averaged over an 8-hour period

PPE Personal Protective Equipment

TCLP Toxicity Characteristics Leeching Procedure

Trigger Tasks

Group 1

Tasks/operations with presumed employee exposures above the PEL but below 500 µg/m³. Provide a respirator with an assigned protection factor of at least 10. Examples are as follows:

- Manual dry scraping and sanding
- Manual demolition of structures
- Heat gun applications
- Power tool cleaning with dust collection systems
- Spray painting with lead based paint

Group 2

Tasks/operations with presumed employee exposure above 500 µg/m³. Provide the employee with a respirator with an assigned protection factor of at least 25. Examples are as follows:

- Lead burning
• Using lead-containing mortar
• Power tool cleaning without dust collection systems
• Rivet busting
• Cleaning activities where dry expendable abrasives are used
• Movement and removal of abrasive blasting enclosures

**Group 3**

Tasks/operations with presumed employee exposure above 2,500 µg/m³. Provide the employee with the appropriate respirator permitted by the respirator standard for use during that exposure condition. Examples are as follows:

• Abrasive blasting
• Welding, cutting, and torch burning on lead containing coatings or painted structures

### 1.04 EXPOSURE ASSESSMENT

A. Initially determine, by a review of previous exposure monitoring data, objective data, calculation, or air sampling plan, if work may expose personnel to lead at or above the OSHA action level, or at or above the level indicated for the appropriate trigger task in compliance with 29 CFR 1926.62 (d). Conduct air sampling in accordance with 29 CFR 1926.62 to initially determine if work may expose personnel to lead at or above the OSHA action level, or at or above the exposure controlled by the minimum respirator protection factor specified in 29 CFR 1926.62 for the specific trigger task performed. Air sampling may be conducted as part of an initial exposure assessment of operations where lead or lead-containing materials are being used, disturbed, or removed. Air sampling must be conducted for trigger task operations. Increase engineering, administrative, and PPE controls, as necessary, based on this initial exposure assessment.

B. A laboratory certified by the AIHA Environmental Lead Laboratory Accreditation Program (ELLAP) must perform analysis of the air samples in accordance with OSHA ID121, NIOSH 7082, or NIOSH 7105.

C. If sample results or the initial exposure assessment, performed in accordance with 29 CFR 1926.62, indicate exposures below the action level, further exposure determination does not need to be repeated except as otherwise provided in 29 CFR 1926.62(d)(7).

### 1.05 TRAINING REQUIREMENTS

A. Ensure that employees performing work with lead-containing material, or work that disturbs lead-containing material that applies to this section, have had a communication of hazards in accordance with 29 CFR 1926.62(l).

B. Provide lead worker training to personnel anticipated to be exposed to lead levels exceeding the action level and to those subject to exposure to lead compounds that cause skin irritation. Employees are required to have received lead worker training within one year of the start of work of this subcontract. Provide training in accordance with 29 CFR 1926.62 (l)(1)(ii-iv), (l)(2), and (l)(3).
1.06 SUBMITTALS

A. Initial Exposure Assessment/Air Sampling Plan

1. Prior to the start of operations where lead or lead-containing materials are used, disturbed, or removed, submit an exposure assessment to LLNS in accordance with subpart 1.04 of this section and 29 CFR 1926.62.

2. Lead Safety Plan

Submit a corporate lead program and job specific lead safety plan to LLNS in accordance with section 01 33 00, “Submittals” to serve as a written compliance plan. In the plan, detail the means and methods for conducting the specified work, and detail procedures and equipment to keep lead exposure of LLNS and Subcontractor personnel below the PEL (permissible exposure limit), and protect LLNS facilities and the environment from contamination. Address the following specific items in the lead safety plan:

a. Describe the equipment and materials, controls, crew size, job responsibilities, and operations and maintenance procedures for each activity that may result in the use or release of lead-containing material. Include a brief project-specific statement of the onsite activities proposed.

b. Describe the specific control methods (e.g., wet methods, use of negative-pressure enclosures, use of critical barriers and drop cloths).

c. Include an administrative control schedule, if used to reduce employee time-weighted average exposure to lead.

d. Describe proposed technology to reduce exposure to below the OSHA established AL and PEL.

e. Include pre-established NIDs based on air monitoring or objective data documenting employee exposure on similar work conducted by the Subcontractor in the prior 12 months.

f. Describe the lead work practice, PPE, and respiratory protection to control worker exposure. Include the use of protective work clothing and equipment, hygiene facilities and practices, and housekeeping practices.

g. Describe arrangements made among subcontractors on multi-subcontractor work sites to inform affected employees (including bystanders) of potential lead exposure and to clarify responsibilities with regard to control of those exposures.

3. Negative Initial Determination (NID)

a. Describe the basis for establishing a NID. Demonstrate that the work of this subcontract involving lead cannot result in personnel exposure to lead at or above the action level during processing, use, or handling.

   1) Demonstrate by conducting initial monitoring of a representative sample of personnel with the greatest exposure to airborne lead in the workplace, or by objective data.

   2) In lieu of the lead safety plan required by this section, submit a NID in conformance with 29 CFR 1926.62 (d)(3) that is satisfactory to LLNS.
3) Perform lead work in accordance with the OSHA lead in construction standard, and the guidance given in this section.

B. Prestart Submittals

Provide the following items to LLNS prior to the start of lead trigger tasks or other activity that can release airborne lead in excess of the PEL:

1. Copies of a notarized statement by the examining medical doctor certifying the date of OSHA-required medical examination and blood testing (29 CFR 1926.62) for each employee on the project who is or may be exposed to lead above the action level for any day of the year in accordance with 29 CFR 1926.62.

2. Record of successful respirator fit testing and training, performed by a qualified individual within the previous 12 months, for each employee using a respirator on this project with the employee’s name with each record.

3. Air-sampling plan, as required by subpart 1.04, “Exposure Assessment”.

4. Lead safety plan, as required by paragraph 1.06.A.1.

5. List of supervisors and workers assigned, or potentially assigned, to the project.

6. Evidence of employee training meeting the requirements of subpart 1.05, above, for employees who will work on the project.

7. Safety data sheets (SDS) for encapsulants, spray glues, chemicals, and materials proposed for use on the project.


9. The name and address of abatement subcontractor’s blood-lead testing laboratory, OSHA-CDC listing, and California certification, if necessary.

10. The name and address of the Subcontractor’s air-monitoring and waste disposal lead-testing laboratories, including certifications of accreditation for lead in the EPA ELLAP and AIHA proficiency program for lead.

C. Daily Submittals

Submit NID records in accordance with 29 CFR 1926.62(d)(5) or results of personal air monitoring, TCLP testing, and other relevant environmental testing performed on the project site, to LLNS within one working day following the day on which the results are available.

D. Closeout Submittals

Submit the following to LLNS at project closeout:

1. Copies of manifests and receipts acknowledging disposal of nonhazardous waste material from the project showing delivery date, quantity, and appropriate signature of the landfill authorized representative.
2. Results of personal air monitoring, TCLP testing, and any other relevant testing performed on the project site.

1.07 PRE-START MEETING

Prior to commencement of work, hold a pre-start meeting with LLNS to discuss lead work issues outlined in subpart 1.06 of this section.

PART 2 - PRODUCTS

2.01 GENERAL

Provide material, equipment, tools, and devices required to complete the lead work safely.

PART 3 - EXECUTION

3.01 PROTECTION

A. Use engineered controls in accordance with subpart 3.02, below, to minimize Subcontractor and LLNS personnel potential for exposure to airborne lead dust.

B. If reasonable engineered and administrative controls cannot achieve compliance with the exposure standards specified in these specifications, use PPE to minimize Subcontractor employee exposure to lead.

1. PPE may include disposable coveralls, gloves, head covers, work shoes with disposable covers, respirators, eye protection, and other necessary equipment.

2. Select PPE to mitigate all exposure hazards, including lead, paint stripper, paint, and lockdown agent.

3. Re-usable work coveralls that comply with the requirements of 29 CFR 1926.62 (g)(2) are an acceptable alternative to disposable coveralls. Do not allow personnel to wear re-usable coveralls home. The Subcontractor is responsible for laundering re-usable clothing.

C. Instruct workers in personal protection, work procedures, emergency evacuation procedures, and use of equipment (including procedures unique to this project) prior to commencing work. Make necessary equipment readily available for the employee, and enforce the use of provided gear.


3.02 ENGINEERING CONTROLS AND GENERAL WORK PRACTICES

A. Engineering and Administrative Controls

Use engineering and administrative controls regardless of the need to use respiratory protection. Submit a description of the specific control methods (e.g., work process description, wet methods) as part of the lead safety plan.

1. Exhaust systems at the source of dust, particulate, or fume generation or within the general work area must be HEPA filtered. If power tools are necessary for lead work, use power tools with HEPA-filter exhausts (if available).
2. Establish a regulated area that will keep unprotected personnel out and prevent the spread of lead dust beyond the boundaries of the area. For work inside buildings, erect critical barriers over ventilation system vents, doors, open areas, and other penetrations. If necessary, configure the ventilation system to place the work area under negative pressure relative to the surrounding areas.

3. Maintain surfaces as free as practicable of accumulations of lead by HEPA-vacuuming and wet-wiping.

4. Use wet methods.

B. HEPA-Filtered Equipment Testing

Use HEPA filtered equipment tested and certified in accordance with section 01 35 23, “General Safety Provisions,” subpart 3.18, “HEPA Filter Certification.”

3.03 ADMINISTRATIVE CONTROLS

A. Personal Hygienic Practices and Housekeeping

The precautions below apply to areas where work with lead-containing materials generates a potential for airborne lead, unless otherwise noted:

1. Do not eat or drink in the designated work area.

2. Designate separate lunch rooms, food storage and preparation areas, and eating areas to avoid the possibility of ingesting lead. Do not perform lead work in these designated areas.

3. Wash hands and face before eating, drinking, using tobacco products, or applying cosmetics.

4. Designate change rooms where employees can segregate street clothes from clothes used for lead work operations that generate airborne lead levels exceeding the PEL.

5. Use showers if the airborne levels are greater than the PEL, and for operations that do not have a negative exposure assessment. Use showers as specified in section 01 10 00, “Statement of Work.” Ensure that other people do not use showers provided by LLNS while the showers have potential lead dust contamination. Decontaminate showers before use by other LLNS employees.

6. Ensure that surfaces are as free as practical of lead dust generated by the activity. Use HEPA-filtered vacuum cleaners and wet methods to remove dust and debris. Do not dry-shovel, blow, or sweep. Clean contaminated surfaces so that they are visibly dust-free.

7. Promptly place lead-containing demolition or renovation debris (e.g., gypsum wallboard) in plastic bags or other sealable containers. Do not allow debris to accumulate in the workspace.

B. Signs

Post DANGER Lead Work Area signs, in accordance with 29 CFR 1926.62(m)(1)(i), at likely entrances to areas where conducting lead trigger tasks and other activity that can release airborne lead in excess of the PEL and for which there is no NID. Illuminate these signs so that they are easily visible to employees and visitors.

3.04 SURFACE CONTAMINATION SAMPLING
Residual surface contamination may pose a hazard to people who subsequently occupy areas where disturbance of lead-containing materials generated an aerosol. Clean contaminated surfaces sufficiently so that they are visibly dust free. LLNS will collect surface wipe samples to confirm clean-up resulted in levels below the limit for release for public use (200 ug/ft$^2$).

### 3.05 WASTE HANDLING

Until analytical results are available, segregate waste materials (including water) and treat as potentially hazardous. Contact LLNS for the proper management of hazardous waste. LLNS will dispose of hazardous waste generated from work performed at LLNS facilities. Package, label and turn over hazardous waste to LLNS at the end of each work day.

### 3.06 INSPECTIONS CONDUCTED BY LLNS

LLNS will conduct a variety of inspections of the work site to ensure compliance with the provisions of this document and applicable laws and regulations.

**END OF SECTION**
SECTION 01 35 43
ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 ENVIRONMENTAL MANAGEMENT SYSTEM

A. Perform the work in a manner that supports LLNS’ commitment to be a responsible steward of the environmental resources under its control and the implementation of the LLNS’ Environmental Management System (EMS) by incorporating the following actions into planning and conducting the work:

1. Protect the air, water, land, and other natural and cultural resources
2. Comply with applicable environmental requirements
3. Prevent pollution, minimize waste, and conserve resources

1.02 STORM WATER POLLUTION PREVENTION

NOTE. Article 1.02 is not applicable if there is no outdoor work, including equipment, materials, and chemical staging, or land disturbance (such as trenching or grading).

A. The subcontractor shall comply with California State Water Resources Control Board “Industrial General Storm Water Permit” (IGP) (2014-0057-DWQ) when performing work in the following areas: the decontamination and waste treatment facility (DWTF) and the B612/625 complex at the Livermore Site; and B883, B845B, and the explosive waste storage facility at Site 300. Copies of LLNS’ “Industrial Activities SWPPP” for the Livermore Site and Site 300, and the current IGP are available for Subcontractor review upon request.

B. If the project involves land disturbance of less than one acre (including staging areas), or the project has potential for storm water impact, then the subcontractor is responsible for the following:

1. Maintain continual storm water pollution prevention and perform work to avoid discharge of pollutants into the storm drainage system. Failure to comply may result in LLNS halting work until the Subcontractor performs remedial action. Refer to attachment 01 35 43-1 of this section for applicable best management practices.

2. The Subcontractor may substitute alternate pollution prevention measures for those identified in the contract erosion control documents and attachment 01 35 43-1. Submit alternate pollution prevention measures for LLNS review. LLNS acceptance of alternate pollution prevention measures will not relieve the Subcontractor of responsibility for the quality and adequacy of the measures or Subcontractor implementation of them. Such acceptance does not warrant, acknowledge, or admit the quality and adequacy of the alternate pollution prevention measures.

3. Provide materials and labor required to implement and maintain pollution prevention measures.

4. If pollution is leaving the project site, implement necessary corrective measures. Failure to comply with the requirements of the SWPPP may result in criminal and civil liability of the Subcontractor under the Clean Water Act.
5. If storm water accumulates in a trench or other excavation within a known contamination source area, the water will be characterized by LLNS (in-situ or in a container) for known contaminants of concern prior to dewatering the excavation. Contact the LLNS STR for assistance.

6. If storm water accumulates in a trench or other excavation, visually inspect the water for an oily sheen or other material. If no sheen, water may be released to closest sanitary waste system or to ground. If a sheen or other material is present, the water will be characterized by LLNS (in-situ or in a container) prior to dewatering the excavation. Contact the LLNS STR for assistance.

C. If the project involves land disturbance equal to or greater than one acre (including staging areas), then the following paragraphs apply [Storm Water Pollution Prevention Plan (SWPPP)].

1. Develop a SWPPP covering the construction site for construction phases, including laydown areas and borrow sites in accordance with requirements of the State of California “Construction General Permit” (order 2009-0009-DWQ amended by 2010-0014-DWQ and 2012-0006-DWQ). SWPPPs must be prepared by qualified SWPPP developers as defined in the above permit. Provide the SWPPP to LLNS for review.

2. LLNS will link the Subcontractor as a data submitter in the “Storm Water Multiple Application Reporting & Tracking System” (SMARTS). The SWPPP, Notice of Intent (NOI), Annual Report, Ad HOC reports, Notice of Termination and other permit registration documents for coverage under the Construction General Permit must be prepared by and uploaded by the subcontractor to SMARTS.

3. Provide documentation of the Construction General Permit required training and certifications for “Qualified SWPPP Developers and Qualified SWPP Practitioners”, and qualifications for Subcontractor personnel that write the SWPPP, implement the best management practices (BMPs), and perform inspections.

4. Keep a SWPPP binder on site and available for review during working hours. Submit stormwater monitoring data to the subcontract technical representative (STR) within two days following a storm event.

5. Submit the SWPPP in accordance with section 01 33 00, “Submittals” for LLNS review and acceptance. Conform to the plan’s provisions once it is accepted by LLNS. Failure to comply may result in LLNS halting work until the Subcontractor takes remedial action.

6. LLNS acceptance of the Subcontractor’s SWPPP does not relieve the Subcontractor of responsibility for the quality and adequacy of the SWPPP or Rain Event Action Plan (REAP). LLNS acceptance does not warrant, acknowledge, or admit the quality and adequacy of the SWPPP.

7. Do not start construction activity until LLNS accepts the Subcontractor’s SWPPP, a Notice of Intent has been submitted to the State, and the State assigns a discharge identification number.

8. Provide materials and labor (including the qualified SWPPP practitioners and storm water sampling personnel) as required to implement and maintain pollution prevention measures. Do not use erosion control rolls, mats, or other similar materials containing monofilament, thin plastic thread, or plastic netting.

9. LLNS reserves the right to inspect the site at any time. Failure to comply may result in LLNS halting work until the Subcontractor performs remedial action, which may include
modifications to BMP implementation and methods used. In addition, failure to comply with the requirements of the SWPPP may result in criminal and civil liability of the Subcontractor under the Clean Water Act.

1.03 AIR EMISSIONS

A. Dust Control

Perform dust control to alleviate and prevent dust nuisance at, or near, the construction site as it pertains to the Subcontract work. “Dust nuisance” is airborne particulate matter in sufficient quantity to obscure an observer’s view by more than 20% for more than 3 minutes in any 1 hour. Use the following methods of dust control when disturbing soil:

1. Spray water on loose soil that may become airborne
2. Cover stockpiled excavated material containing soil to prevent wind and water erosion and dispersal during storage
3. Prevent dust suppression water from entering storm drains.

B. Equipment Emissions

1. Comply with applicable Bay Area Air Quality Management District (BAAQMD), San Joaquin Valley Air Pollution Control District (SJVAPCD), or California Air Resources Board (CARB) requirements for stationary or portable equipment (e.g., generator, air compressors, lifts) with internal combustion engines rated greater than 50 horsepower.

2. Ensure products and work comply with BAAQMD or SJVAPCD regulations and the air permits issued for the LLNL facility. Request a list of applicable air permits from the subcontract technical representative (STR). Supply required information.

3. Subcontractors shall advise the LLNL STR of all HVAC work involving refrigerants. Persons removing, installing or otherwise working with equipment containing refrigerants require certification in accordance with section 608 of the Clean Air Act. The equipment used for refrigerant recovery also requires certification in accordance with section 608 of the Clean Air Act. Comply with the venting prohibition, service practice requirements, leak repair, safe disposal, and record keeping requirements of section 608. Retain maintenance and equipment records pertaining to refrigeration units including, but not limited to, date and type of service, quantity of refrigerant added, personnel training and certifications, equipment calibration, calibration procedures, and certifications. Retain records of disposed appliances including location and date of disposal, types and amounts of refrigerant recovered, and amounts sent for reclamation.

1.04 MATERIAL AND WASTE DISCHARGES

A. Do not discharge hazardous materials or wastes into the environment (i.e., air, soil, surface water, and groundwater). Protect routes of entry to the environment, including direct discharges into air, soil, surface water, storm sewer, sanitary sewer, wells, and drainage channels from construction activities. Achieve this through the safe and proper use and storage of tools, equipment, and materials. Inspect construction equipment and vehicles daily for leaks of fuel, engine coolant, and hydraulic fluid. Contain, repair, and immediately report any leaks to the STR. Immediately report accidental discharges into the environment to the STR. Clean up discharges into the environment according to the guidance provided by LLNS STR.
B. Discharges to Sanitary Sewer

Do not discharge hazardous chemicals into the retention or sanitary system. Obtain approval from the STR prior to discharges into the sanitary sewer system.

C. Discharges to Ground

1. Dump excess concrete only in lined excavation pits identified and approved by the STR. Remove dried, excess concrete for proper disposal off site and report the total quantity disposed of or recycled to the STR. (See section 1.10 for disposal)

2. Discharge wash water from cleaning concrete trucks and concrete handling equipment in properly established evaporation pits identified and approved by the STR.

3. Comply with Spill Prevention, Control, and Countermeasure (SPCC) requirements in 40 CFR 112 including, but not limited to the following: storage of oil and petroleum containers (e.g., diesel, gasoline, dielectric oil, mineral oil, motor oil, oil-based coolants, used oil, and oily wastewater) 55 gallons and larger in secondary containment sized to the largest container plus an additional 10% of freeboard if exposed to the elements; periodic inspection of oil containers 55 gallons and larger; daily inspection of fueling tanks 55 gallons and larger; maintenance of appropriate spill response materials; and the prevention and containment (e.g., drip pans) of leaking equipment.

   a. Comply with and implement LLNS’s site-wide SPCC plan. Personnel responsible for operating, maintaining or inspecting aboveground oil-filled containers or equipment that contain or are capable of containing 55 gallons or more of oil are required to receive SPCC training from LLNS, or provide LLNS with documentation of equivalent training. The aforementioned personnel are also required to take an annual training refresher provided by either LLNS or the Subcontractor.

   b. Provide reports of required SPCC inspections to the STR at a regular frequency or immediately if a spill or leak has occurred.

1.05 PROTECTION OF CULTURAL OR PALEONTOLOGICAL RESOURCES

A. LLNS will clearly mark known cultural or paleontological resource areas within construction zones by staking, fencing, and pink/black diagonally-striped flagging. Avoid these areas during construction. If cultural or paleontological resources are unearthed during construction activities, immediately stop work within 50 feet of the find until LLNS has assessed it and issued notice to proceed.

1. Examples of cultural resources include the following:

   a. Prehistoric cultural deposits such as obsidian or chert flakes or tools; ground-stone mortars, slabs, or pestles; cultural deposits of shell or bone; beads, clothing or woven articles; locally darkened midden (trash) soils; and human interments.

   b. Historic-period cultural materials such as foundations or other structural remains; bottles, nails, barbed wire, ceramic pieces, buttons, weathered boards, and tin cans; refuse deposits; backfilled wells or privies; glass and pottery.

2. Examples of paleontological resources include fossils; bones not of human origin.
B. The Archaeological Resources Protection Act (ARPA) and the Antiquities Act regulate the protection and excavation of cultural and paleontological resources. Do not, under any circumstances, remove or disturb such resources. If discovered, leave in place, note their location, and immediately notify the STR.

1.06 PROTECTION OF BIOLOGICAL RESOURCES

Species listed as endangered, threatened, proposed threatened, or candidates for listing under the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA) are at Site 300, the Livermore Site, and the Arroyo Mocho Site. Several other species occur at these LLNL sites that may receive protection under other federal and state regulations including the Migratory Bird Treaty Act (MBTA). Numerous federal and state laws outline the protection, management requirements, and penalties for noncompliance.

A. If work scope includes working outside, including on roofs, natural resources training (EP0026, EP0027, or EP0028) is required for personnel; and site-specific and project-specific requirements may apply that include, but are not limited to, pre-activity surveys, exclusion zones, and exclusion fencing. See the Project Requirements Document (PRD) for project specific avoidance and minimization measures required by Biological Opinions with the US Fish and Wildlife Services.

B. Open Excavations

Protect wildlife from entrapment in steep-walled excavations greater than 1 foot deep as follows:

1. Cover excavations completely at the end of each working day. Whenever possible, bury the edges of the cover (steel plate or plywood) to prevent wildlife access under the cover, or

2. Provide excavations with animal escape ramps constructed of earth fill or wooden planks. Earth ramps should be used whenever possible.

Before filling excavations, thoroughly inspect them for trapped animals. Contact the LLNS STR to obtain the assistance of a LLNS wildlife biologist to free trapped animals.

C. If an LLNL endangered species awareness briefing is required prior to initiating work, then LLNS requires that laborers, craftsmen, supervisors, and managers directly involved in this project attend the above training.

D. Deposit food scraps, paper wrappers, food containers, cans, bottles, and other trash from the project area in covered and closed trash containers that are not accessible by wildlife.

E. Do not feed wildlife at LLNL sites.

F. Do not bring animals to LLNL sites.

G. Implement appropriate erosion control measures as identified by LLNS, such as native seeding and burlap straw waddles. Do not use materials containing plastic monofilament, nylon net, plastic net, or photodegradable netting at LLNL sites.

H. Install exclusionary fencing, if required by LLNS, to surround the project site prior to the start of work to preclude movement of wildlife into the project site. When required, exclusion fencing must be installed prior to any grading, excavation, construction, soil disturbance, or materials staging associated with this project. Exclusion fencing must completely surround all work areas. The exclusion fencing will include a gate that can be closed, so that the project site is completely surrounded by exclusion fencing overnight. The exclusion fencing must remain in place during all
outside work. Ertec E-Fence that is a minimum of 18 inches in height will be used as exclusion fencing. Exclusion fencing will be held in place at the base by sand bags or trenched into the ground.

I. Do not violate the exclusion zones or other areas demarcated by LLNS.

J. Do not attempt to capture or handle any wildlife. If workers or other personnel discover a frog, salamander, or Alameda whipsnake in the construction area, immediately cease work in that area, and contact the STR.

K. Avoid impacts to nesting birds.
   1. A LLNS wildlife biologist must survey the project site prior to the start of work for the following activities. Contact the STR for assistance.
      a. Construction of new facilities and demolition of existing facilities.
      b. Tree trimming or removal.
      c. Power washing building exteriors or window washing.
      d. HVAC work, roof replacement, or other exterior retrofit projects.

2. If nesting birds are found at the project site, exclusion zones and site-specific avoidance measures may be required.

3. Impacts to nesting birds, and project delays due to nesting birds, can typically be avoided by scheduling the activities listed above after August 30 and before February 15 of any given year. Contact the STR for assistance.

1.07 CONSERVATION OF ENERGY AND WATER

To the maximum extent practicable, implement conservation practices that reduce the consumption of water and electricity. Reduction practices may include the following:

A. Water Use/Consumption
   1. Reduce LLNS-provided potable water use through signage and shutting-off water sources at night to minimize leakage.

2. Turn off water source when not in use.

3. Use water efficient products in work activities, where feasible.

B. Electrical Energy Use

   Turn off electrical powered items (e.g., tools, office equipment, lights) when not in use.

1.08 LEAD

A. Workers may encounter lead-contaminated materials when performing work on this project. Refer to section 01 35 23.21, “Lead Work Exposure Protection” and the PRD for further information.

B. LLNS tracks the amount of lead processed and disposed as required by Federal Emergency Planning and Community Right-to-Know Act (EPCRA) section 313 reporting regulations. The Subcontractor is responsible for documenting the amount of lead (weight) handled and submitting to LLNS.
1.09 **ASBESTOS**

Workers may encounter asbestos-containing materials when performing work on this project. Refer to section 01 35 23.13 “Asbestos Safety – Class I and II”, 01 35 23.19 “Asbestos Safety – Class III”, and the PRD for further information.

1.10 **DISPOSAL OF EXCESS SOIL, ASPHALT, CONCRETE, AND OTHER MATERIALS**

A. If the project involves demolition, soil disturbance, or both, then LLNS may need to test materials for contaminants prior to disturbance, disposal, or re-use [Disposal and re-use of excavated and demolished materials (asphalt, soil, concrete, and other materials)]. Coordinate such sample testing with the STR.

1. Sampling and Evaluation

   a. If LLNS has evaluated the materials and determined they must be managed as industrial waste and disposed offsite, do the following:

      1) Send municipal and industrial waste to Altamont landfill or Vasco landfill (including asphalt and concrete for recycling). For alternate disposal or recycling sites, submit the proposed site information, and description and quantity of materials to be disposed/recycled to LLNS for evaluation on a case-by-case basis.

      If workers encounter either visible or detectable contamination, immediately stop work, notify the STR, and wait for further direction regarding resumption of work. Coordinate disposal of materials demonstrating visual/detectable contamination through the STR.

   b. If LLNS has not evaluated the materials to determine the proper disposition, LLNS will sample and evaluate materials resulting from excavating on the project site prior to the Subcontractor removing it from the site.

      To facilitate sampling and evaluation, arrange for and maintain temporary staging of the materials at the jobsite or as directed by LLNS in accordance with current LLNS procedures, until disposal characterization can be completed (usually within 45 days from placement). Stockpile such materials in separate piles. Stake and identify each pile and separate piles by location. Place the materials on and cover with plastic sheeting at LLNS-designated location and secure against displacement until such materials are tested and approved for disposal.

2. Clean Soil - Site 300 Projects

   Re-use clean fill from this project, in the immediate project area, where appropriate and approved by the STR, Facility Manager and Environmental Analyst. The STR will show the Subcontractor a clean fill storage area during the site visit if required.

3. Clean Soil – Livermore Site Projects

   Re-use excavated clean soil materials on the Livermore Site as directed by LLNS.

4. Contact the STR for review and approval prior to bringing any soil onto either site to be used as “clean fill.” Such fill must meet LLNL Soil Reuse Criteria.

B. Solid Waste Management
1. Prepare a solid waste management plan (SWMP) utilizing the attached form (attachment 01 35 43-2) and submit it to the STR. In the SWMP, include the nonhazardous construction and demolition solid waste components (e.g., wood and metals by type) and their proposed disposition (i.e., solid waste disposal or recycling).

2. LLNS encourages and tracks recycling and solid waste diversion for construction waste and municipal waste generated during the project, such as scrap metal and plastics. Manage recyclable materials through LLNS unless LLNS makes a prior agreement for the Subcontractor to recover the recycled materials. Use LLNS paper and cardboard recycling bins, where available, to reduce the amount of municipal waste generated.

C. Hazardous/Radioactive Waste

LLNS will manage hazardous and radioactive waste generated at LLNL. This includes universal waste such as electronics, batteries, and fluorescent light tubes. These types of waste items shall not be placed into waste containers without the knowledge of LLNS personnel responsible for managing these wastes and certifying the contents of the containers. Contact the LLNS STR to obtain assistance from LLNS personnel responsible for managing these wastes.

1.11 SUBCONTRACTOR USE AND MANAGEMENT OF NONHAZARDOUS AND HAZARDOUS MATERIALS

A. Nonhazardous Materials Use

LLNS has implemented a program to reduce or eliminate the use and release of certain toxic and hazardous chemicals and materials, and requires subcontractors to support this program. To the maximum extent possible without conflicting with the technical requirements of the subcontract, reduce or eliminate the use of hazardous substances and the generation of hazardous waste. Also, purchase toxic and hazardous materials in container sizes and amounts that minimize the amount of excess material generated by the project.

1. Use more environmentally benign solvents and solvent-free alternative systems that reduce or eliminate the use of hazardous substances and the generation of hazardous waste. Also, purchase toxic and hazardous materials in container sizes and amounts that minimize the amount of excess material generated by the project.

2. Re-use or recycle surplus commodities and by products.

3. Implement appropriate management practices for nonhazardous and hazardous materials brought on-site to comply with federal, state, and local regulations including, but not limited to, the following:
   a. Do not store materials or waste near storm drainage systems
   b. Use secondary containment berms for containers of liquid materials
   c. Inspect storage areas
   d. Appropriately label containers

B. Hazardous Materials Use

1. Track and report the use of hazardous materials to LLNS. Discuss with the STR the hazardous material types and quantities proposed for work activities to determine if materials require
tracking. Maintain tracking documents identified by LLNS and provide the documents to LLNS when the work activity is completed.

2. Purchase hazardous materials in container sizes and amounts that minimize the amount of excess material generated by the work.

3. Safety Data Sheets (SDS)

Submit safety data sheets to the STR for all hazardous materials to be used on site. Maintain copies of these SDS in a readily accessible location on-site. Store materials in containers in accordance with the requirements of the SDS within the construction boundary, or as directed by the STR in accordance with the SWPPP. Remove and dispose of such materials not incorporated in the work in accordance with the applicable federal, state, and local regulations.

4. Hazardous Materials Inventory

Complete and submit to the STR the LLNL “Hazardous Material Inventory” form attachment 01 35 43-3. Retain copies of the completed forms with the SDS for the work. If hazardous materials required by the specifications are to remain on site at the end of the project, advise the STR.

5. Transportation of Hazardous Materials

Comply with applicable federal and state regulations when transporting hazardous materials to the LLNL site. Comply with posted traffic signs and speed limits at LLNL sites.

1.12 CONTROLLED ITEMS AND MATERIALS

Do not use or bring any of the controlled items or materials listed below to LLNL Livermore Site or Site 300 without prior written approval from LLNS.

A. Asbestos products

B. Lead or lead-based paint materials (defined as having greater than 600 ppm lead)

C. Hazardous materials with SDS (See paragraph 1.11.B.3)

D. Corrosive or toxic chemicals

E. Flammable or combustible liquids

F. Radioactive materials

G. Radiation generating devices

H. Non-ionizing radiation generating devices

I. Explosives

J. Thoriated welding rods – prohibited for welding purposes

K. Water pipe and fittings, lead solder and flux, and plumbing fitting and fixtures having lead content exceeding the maximum allowable level defined in the California Health and Safety Code, section 116875.
PART 2 - PRODUCTS
Not used

PART 3 - EXECUTION
Not used

END OF SECTION
(Attachments 01 35 43-1, -2 and -3 follow)
ATTACHMENT 01 35 43-1

LLNL Best Management Practices (BMPs) for Land Disturbance Less than 1 acre.

PURPOSE
The requirements in this document are to ensure that LLNL non-industrial facilities and activities do not negatively affect storm water and receiving water quality as required by the San Francisco Bay Region Municipal Regional Storm Water Permit Order No. R2-2009-0074 for the Livermore Site and the Phase II Small MS4 General Permit for Site 300. The portion of the MS4 permit that best describes the activities at Site 300 is “Non-Traditional Small MS4 Permittees” under 40 CFR 122.26 (b) (16). The Storm Water Pollution Prevention Plans (SWPPP) for the Livermore Site and Site 300 document storm water requirements for the portions of LLNL are regulated by the Industrial General Permit.

SCOPE
These BMPs outline coverage for the non-industrial portions of LLNL sites; more specifically construction related activities where ground disturbance is less than one acre.

The effort is to prevent or reduce the discharge of pollutants to storm water from building repair, remodeling, construction, demolition, and land-disturbing activities. LLNS achieves this by using sediment and erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using nonhazardous or less hazardous alternative products, and training employees. It is the responsibility of the Subcontractor to follow this approach for construction areas and activity, including laydown and storage areas.

Most of the BMPs discussed in this chapter are temporary measures specific to construction and ground-disturbing activities. Subcontractors performing work onsite are responsible for implementing BMPs. Where applicable, use BMPs identified in the most recent Storm Water Best Management Practice Handbook: Construction (CASQA).

REQUIREMENTS
These BMPs include, but are not limited to the following:

- Use soil erosion control techniques, when practical, where bare ground is temporarily exposed. See EC factsheet series in Storm Water Best Management Practice Handbook: Construction (CASQA). LLNS prohibits the use of erosion control rolls, mats, or other similar materials containing monofilament, thin plastic thread or plastic netting at the project site.
- Use permanent soil erosion control techniques in areas where buildings are removed and not replaced (e.g., landscaping, hydro-seeding, mulching, or graveling).
- Enclose painting operations, as appropriate, to be consistent with local air quality regulations and the Occupational Safety and Health Act (OSHA).
- Cover and properly store materials of particular concern (e.g., soil piles, chemical storage, paints) exposed to weather, especially during the rainy season. Limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are necessary, consider the use of plastic materials resistant to solar degradation.

Provide spill response training for personnel who handle hazardous materials.

Maintain good housekeeping practices while work is underway, and remove debris in a timely manner.

Prevent discharges of non-permitted wastewater to the storm water drainage system.

Protect nearby storm drains to minimize the chance of inadvertent discharge of construction materials or sediment. See Factsheet SE-10 in *Storm Water Best Management Practice Handbook: Construction* (CASQA).


Clean any sediment or debris from the storm water drainage system in the immediate vicinity of the construction activities after those activities are completed.

Filter or settle sediment-laden runoff prior to discharge (avoid use of straw bales).

Provide effective stabilization for disturbed soils and other erodible areas prior to a forecasted storm.

Maintain effective perimeter controls and stabilize site entrances and exits to sufficiently control discharging or tracking of erodible materials off the site. In the event that track out occurs, street sweep as necessary. See Factsheet TC-2 in *Storm Water Best Management Practice Handbook: Construction* (CASQA).

Divert run-on and storm water generated offsite away from disturbed areas onsite.

Implement effective wind erosion controls.

Wash and clean vehicles and equipment in designated area and prevent pollutants from discharging into storm water. See Factsheet NS-08 in *Storm Water Best Management Practice Handbook: Construction* (CASQA).

If re-fueling is necessary onsite, fuel vehicles in designated location. Design procedures and practices to prevent fuel spills and leaks, and reduce and eliminate contamination of storm water. See Factsheet NS-09 in *Storm Water Best Management Practice Handbook: Construction* (CASQA).

If vehicle maintenance is necessary onsite, perform vehicle and equipment maintenance in a designated area and prevent pollutants from discharging into storm water. See Factsheet NS-10 in *Storm Water Best Management Practice Handbook: Construction* (CASQA).
SOLID WASTE MANAGEMENT PLAN (SWMP)

Company Name ___________________________________________ Date ____________
Company Contact _________________________________________ Phone ____________
Mailing Address ___________________________________________________________________
Task Description ___________________________________________________________________

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Instructions:

1. Please list hazardous materials below for which the manufacturer or producer has prepared a Safety Data Sheet (SDS).

2. Indicate the quantity of each hazardous material (pounds, gallons, and the like) to be handled at the jobsite.

3. Provide a completed copy of this inventory form to LLNS STR, L-514.

4. Notify the ChemTrack Hotline on ext.4-4404 if any materials will be left on site after the project is completed.

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(Additional space for inventory information is provided on the next page.)

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PART 1 - GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Subcontractor of responsibility for compliance with the subcontract document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective specification sections. Requirements in individual sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Subcontractor's other quality-assurance and quality-control procedures that facilitate compliance with the subcontract document requirements.

3. Requirements for subcontractor to provide quality-assurance and quality-control services required by LLNS, the Government, or authorities having jurisdiction are not limited by provisions of this section.

4. Specific test and inspection requirements are not specified in this section.

C. For design-build projects, the engineer-of-record for each discipline and the architect-of-record must visit the construction site to observe the progress and construction of the project to assure quality and structural integrity.

1.02 RELATED SECTIONS

01 45 23 “Testing and Laboratory Services”

1.03 DEFINITIONS

A. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the work and for completed work.

B. Installer/Applicator/Erector: Subcontractor or another entity engaged by subcontractor as an employee or sub-subcontractor to perform a specific construction operation, including installation, erection, application, assembly, and similar operations.

Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
C. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not samples. Unless otherwise indicated, approved mockups establish the standard by which the work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.

2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.

3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for project before products and materials are incorporated into the work, to verify performance or compliance with specified criteria.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory means the same as testing agency.

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements. Subcontractor's quality-control services do not include contract administration activities performed by LLNS.

1.04 BASIS FOR ACCEPTANCE

The basis for inspection/acceptance is compliance with the requirements set forth in the subcontract and terms and conditions of the subcontract. LLNS will reject non-conforming products or services. Correct deficiencies within 14 calendar days of the rejection notice in accordance with the applicable clauses. If the Subcontractor cannot correct deficiencies within 14 calendar days, immediately notify the STR of the reason for the delay and provide a proposed corrective action plan within the 14 calendar days.
1.05 QUALITY ASSURANCE

A. Subcontractor Responsibilities

1. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

2. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

3. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

4. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.

5. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of California and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this project.

1.06 QUALITY CONTROL

A. LLNS Responsibilities: Where quality-control services are indicated as LLNS responsibility, LLNS will engage a qualified testing agency to perform these services.

1. LLNS will furnish subcontractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.

B. Subcontractor Responsibilities: Tests and inspections not explicitly assigned to LLNS are subcontractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of subcontractor by authorities having jurisdiction, whether specified or not.

2. Engage a qualified testing agency to perform quality-control services as indicated in the PRD and other specification sections. Do not employ same entity engaged by LLNS, unless agreed to in writing by LLNS.

3. Notify testing agencies and STR at least 72 hours in advance of time when work that requires testing or inspection will be performed.

4. Where quality-control services are indicated as subcontractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by subcontractor and not required by the subcontract documents are subcontractor's responsibility.

C. Retesting/Re-inspecting: Regardless of whether original tests or inspections were subcontractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced work that failed to comply with the subcontract documents.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1.07 MATERIAL INSPECTION

A. LLNS prohibits suspect and counterfeit materials under the general provisions clause entitled “Quality of Materials and Supplies.” LLNS may conduct periodic inspections of Subcontractor materials for compliance.

B. Subcontractor Examination
   1. Promptly examine shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
   2. Receive LLNS-furnished equipment/materials shipped to the jobsite and examine them in accordance with the above requirements.

1.08 MOCKUPS

A. When required by individual technical specifications section, erect a complete, full scale mockup of assembly at the project site.

B. LLNS or the designated testing laboratory will perform tests specified in the Project Requirements Document (PRD) and in accordance with this section. The accepted mockup becomes the comparison standard for the remaining work.

C. Remove mockup and clear area at completion, when approved by LLNS.

1.09 MANUFACTURERS’ FIELD SERVICES

A. When specified in the PRD and other specification sections, require that the supplier/manufacturer provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, test, adjust, and balance of equipment as applicable, and to make appropriate recommendations.

B. Submit the representative’s written report, which lists observations and recommendations, to LLNS.

PART 2 - PRODUCTS

Not used
PART 3 - EXECUTION

3.01 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at project site. Post changes and revisions as they occur. Provide access to test and inspection log for LLNS’s reference during normal working hours.

C. Submit log at project close-out as part of project record documents

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

   Provide materials and comply with installation requirements specified in other specification sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the subcontract document requirements for cutting and patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are subcontractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00
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PART 1 - GENERAL

1.01 GENERAL

A. Perform work in accordance with the current version of the codes and standards in effect at time of award unless otherwise noted. The codes and standards listed in the individual specification sections, or as shown on the subcontract drawings, are the minimum requirements.

B. Meet or exceed codes and standards when required by these subcontract documents.

1.02 QUALITY ASSURANCE

A. Compliance with Applicable Codes and Standards

In procuring items used in this work, verify the detailed requirements of the specifically named codes and standards and verify that the items procured for use in this work meet or exceed the specified requirements.

B. Nationally Recognized Testing Laboratory (NRTL)

1. Submit materials tested and listed or labeled by a nationally recognized testing laboratory (NRTL) recognized by the Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.7 such as, but not limited to, Underwriters Laboratories (UL) or FM Global (FM). In cases where no material of the type specified is NRTL listed, submit relevant technical data regarding the proposed material, in writing, to LLNS for resolution in accordance with section 01 33 00, “Submittals.”

2. LLNS, solely at its discretion, may require the Subcontractor to submit additional manufacturer's information, such as specific testing procedures used, testing conditions, and other details of the tests.

1.03 CODES AND STANDARDS

A. When required by these specifications, comply with the codes and standards promulgated by the following agencies and organizations and those identified in divisions 02 through 40, or the Project Requirements Document (PRD). Bring conflicts between codes, standards, specifications, drawings, and the referenced documents to the attention of LLNS, in writing, for resolution before taking related action.

B. Code of Federal Regulations (CFR)

10 CFR 435  
*Energy Conservation Voluntary Performance Standards for New Buildings* (mandatory for federal buildings)

29 CFR 1904  
Parts 1904.4-11, 29-33, 44, and 46; *Recording and Reporting Occupational Injuries and Illnesses*

29 CFR 1910  
*Occupational Safety and Health Standards*, Department of Labor

29 CFR 1910.7  
*Definition and Requirements for a Nationally Recognized Testing Laboratory*
29 CFR 1926  *Safety and Health Regulations for Construction*, Department of Labor


C. California Code of Regulations (CCR)

Title 24  Part 2: *California Building Code* (CBC)

Part 3: *California Electrical Code*

Part 4: *California Mechanical Code* (CMC)

Part 5: *California Plumbing Code* (CPC)

Part 6: *California Energy Code*

Part 9: *California Fire Code*

D. American National Standards Institute (ANSI)

ANSI A10 Series  *Safety Requirements for Construction*

ANSI B30 Series  *Safety Standards for Cranes and Hoists*

ANSI Z49.1  *Safety in Welding, Cutting, and Allied Processes*

ANSI Z88.2  *American National Standard for Respiratory Protection*

E. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)


F. National Fire Protection Association (NFPA)

NFPA 70  *National Electrical Code*

NFPA 70E  *Standard for Electrical Safety in the Workplace*

NFPA 101  *Life Safety Code*

NFPA 241  *Standard for Safeguarding Construction, Alteration, and Demolition Operations*

Fire Codes  As applicable

G. American Society of Civil Engineers (ASCE)

ASCE 7-10  *Minimum Design Loads for Buildings and Other Structures*

H. Refer to individual sections of this specification and the subcontract drawings for other names and abbreviations of trade associations and standards applicable to specific portions of the work. Other codes or standards may be cited elsewhere in the construction specifications and drawings and apply as if repeated here.
PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION 01 42 00
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Subcontractor-provided independent testing laboratory services
B. LLNS-provided independent testing laboratory services

1.02 REFERENCES

The following documents form a part of these specifications to the extent stated:

National Institute of Standards and Testing (NIST)
Applicable Standards

ASTM International (ASTM)
ASTM D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D 1556 Density and Unit Weight of Soil in Place by the Sand Cone Method
ASTM D 1557 Laboratory Compaction Characteristics Using Modified Effort
ASTM D 2829 Sampling and Analysis of Built Up Roofs
ASTM D 3740 Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329 Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.03 SUBCONTRACTOR PERFORMANCE REQUIREMENTS

A. Employ and pay for independent testing laboratory services to perform specified inspection and testing. Required tests include those indicated as the Subcontractor’s responsibility in subpart 3.01 of this section and the Project Requirements Document (PRD).

B. Employing testing laboratories does not relieve the Subcontractor of obligation to perform work in accordance with requirements of subcontract documents.

C. Submittals

1. Prior to start of work requiring Subcontractor provided testing services, submit testing laboratory name, address, and telephone number, and names of full-time registered engineer and responsible officer.

2. Submit one copy of the most recent NIST materials reference laboratory report for the inspection of the testing facility. Assure that the facility does not have outstanding NIST deficiencies.
D. Quality Assurance

1. Assure that the testing laboratory subcontract provides for a full-time registered engineer on staff. The sole purpose of the registered engineer is to review the services provided under the subcontract for compliance with the various provisions of subcontract and applicable statutory requirements.

2. Only testing laboratories authorized to operate in the State of California are acceptable to LLNS.

3. Assure that testing equipment is calibrated at reasonable intervals using devices with accuracy traceable to either NIST standards or accepted values of natural physical constants.

E. Testing Laboratory Responsibilities

1. Assure that the testing laboratory is responsible for the following:
   a. Test samples of mixes submitted by the Subcontractor, and testing samples in accordance with the specified standards
   b. Provide qualified personnel at LLNL after due notice from the Subcontractor
   c. Perform specified inspection, sampling, and testing of products in accordance with specified standards
   d. Ascertain material and mix compliance with requirements of subcontract documents
   e. Promptly notify LLNS and the Subcontractor of observed irregularities or nonconformance of work or products
   f. Perform additional inspections and tests required by LLNS
   g. Attend preconstruction and progress meetings

F. Testing Laboratory Reports

After each inspection and test, promptly submit electronic copies of laboratory test reports to LLNS. At a minimum, include the following in the report: issue date, project title, project file number (PFN, obtained from LLNS) and subcontract number, inspector name, sampling or inspection date and time, product identification, specification section, location in the project, inspection or test type, test date, test results, and conformance statement. When requested by LLNS provide interpretation of test results.

G. Limits on Testing Laboratory Authority

The testing laboratory is not empowered to do any of the following:

1. Release, revoke, alter, or increase requirements of subcontract documents
2. Approve or accept a portion of the work
3. Stop a portion of the work

H. Subcontractor Responsibilities

Notify LLNS and testing laboratory 72 hours prior to performing work that requires inspection and testing services.
1.04 LLNS-PROVIDED LABORATORY SERVICES

A. LLNS will employ and pay for an independent testing laboratory to perform inspections, tests, and other services as indicated in the Project Requirements Document (PRD) and division 02 through division 49 specification sections.

B. Testing Laboratory Responsibilities

1. Perform services in accordance with requirements of governing authorities, with the requirements of ASTM D 2829, or ASTM D 3740, or ASTM E 329, and applicable standards of NIST (depending upon project requirements).

2. Perform tests and analysis of fill material in accordance with either ASTM D 698 or ASTM D 1557, depending upon project requirements.

3. Perform compaction testing in accordance with ASTM D 1556 or ASTM D 1557, depending upon fill material used and project requirements.

4. After each inspection and test, submit the electronic test report to LLNS and to the Subcontractor. At a minimum, test reports are required to include the following: issue date, project title, project file number (PFN), subcontract number, inspector’s name, sampling or inspection date and time, product identification, specifications section, location in the project, inspection or test type, test date, test results, and conformance statement. When requested by LLNS, provide interpretation of test results.

C. Subcontractor Responsibilities

1. Cooperate with testing laboratory personnel, provide access to work, furnish tools, material samples, design mix, equipment, storage, and assistance as requested by LLNS or testing laboratory personnel.

2. Deliver adequate samples of proposed materials that require testing and proposed mix designs, to the testing laboratory at the designated location.

3. Notify LLNS 48 hours prior to performing work that requires testing services.

4. If tests indicate that the work does not meet specified requirements, remove and replace the work at no additional cost to LLNS. Or submit the proposed repair extent, products and procedures for LLNS acceptance. A delay in schedule caused by repairs or replacement work is at the Subcontractor’s expense. The Subcontractor is responsible for hiring an engineer when structural repairs need to be validated.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 SCHEDULE OF SUBCONTRACTOR’S INSPECTIONS AND TESTS

A. Provide a complete schedule of inspections and tests for review and acceptance by LLNS.

B. Obtain written approval from LLNS prior to proceeding with inspections and tests.
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS; AND SITE CLEAN-UP

PART 1 - GENERAL

1.01 REFERENCES

Not Used

1.02 TEMPORARY ELECTRICITY

A. Service

See the Project Requirements Document (PRD)

B. Conditions

1. LLNS does not guarantee power capacity available nor is LLNS responsible for service interruptions.

2. Provide and maintain the electrical power distribution system downstream of LLNS-furnished electrical service.

1.03 TEMPORARY TELEPHONE SERVICE

A restricted-use LLNL telephone at building 889 (site 300) is available for AT&T operator-assisted and calling card calls.

1.04 TEMPORARY WATER SERVICE

A. Temporary water is available on a limited basis to the Subcontractor. Potable water is the responsibility of the Subcontractor.

1.05 GENERAL SANITATION

Ensure the construction work area conforms to the requirements of 29 CFR 1926.51

1.06 BARRIERS

A. Provide and maintain temporary barricades, fences, and other structures as required for the protection of public traffic and employees; provide walks around obstructions; and maintain on or near the construction, sufficient light to protect personnel from injury. Provide electrically operated warning lights on barricades during hours of darkness. Do not use open flame lights.

B. Provide protective closure facilities, such as roofing, canopies, and seals at existing buildings where making connections or modifications to prevent the entry of rain and other weather elements so that equipment, facilities and structure are protected and retained in operating condition.

1.07 PROJECT SITE ACCESS CONTROLS

Establish clear limits of construction area and entry control. Provide entry-control sign-in boards, properly delineated boundaries, list of facility points of contact (FPOCs), access requirements, and the like.
1.08 TRAFFIC CONTROL

A. Notify the STR at least 72 hours prior to expected delivery of large shipments at the jobsite.

B. Provide full-time flagman whenever heavy equipment or trucks are crossing or entering onto LLNL or site 300 roads, parking lots, or pathways.

C. Develop and submit pedestrian, bicycle, and vehicular traffic control plans for approval where work affects laboratory roadway and pathway network. Clearly show location of signs, barricades, flagman and other temporary devices. Account for all phases of construction. Plans must conform with the latest edition of the California Manual on Uniform Traffic Control Devices.

1.09 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual specification sections or in the PRD

B. Provide temporary and removable protection for installed products.

1.10 PROTECTION OF EXISTING STRUCTURES AND TREES

A. Protect existing structures, trees, and shrubbery to remain against damage. Provide for temporary watering of existing trees and ground cover where existing irrigation is disrupted by construction. Replace damaged or removed irrigation.

B. Provide tree protection when working adjacent to trees that are not approved for removal.

C. Do not overload structures, including roofs. Verify adequacy of structural elements to support temporary loads including equipment used to place loads. Provide verification from a California licensed civil or structural engineer (not a LLNS engineer), in writing, that temporary loads may be placed on roofs or unfinished structures.

D. Ensure that lifting operations will not cause collateral damage to structures, the environment, and the item being lifted.

E. See the General Provisions, clause 5, Permits, Responsibilities, and Assumption Of Risk in the Subcontract documents for requirements if trees, structures, shrubs or other elements are damaged.

1.11 PROGRESS CLEANING AND WASTE REMOVAL

Keep the construction area clean and remove accumulated debris, waste materials, and rubbish each day in accordance with the solid waste management plan (section 01 35 43, “Environmental Protection”). Assign required labor to perform clean-up and provide dumpsters for rubbish, debris, and nonhazardous waste materials. If, in the opinion of LLNS, the jobsite is not adequately clean and orderly, and presents a potential safety or fire hazard, LLNS will direct the Subcontractor to immediately stop work in the affected area, correct the defects, and perform necessary clean-up. Refer to section 01 77 00, “Project Close-Out” for final cleaning.

1.12 FIELD OFFICES, SHEDS, AND BREAK AREAS

Provide temporary storage, office space, and break areas at the site for the safe and proper storage of tools, materials, and Subcontractor employee use. Locate these temporary facilities where directed by the STR. Remove them when work is complete.
1.13 REPAIR AND REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials; restore utilities to their initial condition prior to final inspection and as directed by the STR.

B. Remove temporary underground installations to the minimum depth required or as indicated on the subcontract documents. Grade site as indicated or restore to original condition.

C. Clean and repair or replace damage caused by work or use of temporary work at no additional cost to LLNS.

D. Replace each tree removed or damaged with a boxed specimen, 6-inch minimum trunk diameter, of like kind at locations directed by LLNS, unless otherwise instructed by LLNS, at no additional cost to LLNS.

E. Restore existing and permanent facilities used during construction to original condition.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION 01 50 00
PART 1 - GENERAL

1.01 TRANSPORTATION AND HANDLING
   A. Transport and handle products in accordance with manufacturer’s written instructions.

1.02 STORAGE AND PROTECTION
   A. Except as directed by the STR, store and protect products in accordance with manufacturers’ written instructions.
   B. Exterior Storage
      1. If exterior storage of materials is available and acceptable to LLNS, then comply with the following:
         a. Arrange storage of products in accordance with section 01 35 43, “Environmental Protection” to permit access for inspection.
         b. Ensure products are undamaged and are maintained in acceptable condition.
         c. Store material to prevent contamination of storm water runoff.
      2. When the Project Requirements Document (PRD) indicates exterior storage of materials is unavailable, or unfavorable to the materials, provide bonded off-site storage and protection for materials.
   C. Maintain finished surfaces clean, unmarred, and protected until accepted by the construction manager.

1.03 REPAIRS AND REPLACEMENTS
   In event of damage to materials, equipment, facilities, or property, replace or repair as directed by the STR. Remove damaged materials from LLNL.

PART 2 - PRODUCTS
Not used

PART 3 - EXECUTION
Not used

END OF SECTION 01 52 00
PART 1 - GENERAL

1.01 SUBSTANTIAL COMPLETION PROCEDURES

A. Provide written notice to the STR that work is substantially complete in accordance with subcontract documents.

B. Subcontractor's Closeout Meeting: At least sixty (60) days from the scheduled Beneficial Occupancy Date (BOD) or at 80% construction completion, schedule and meet with LLNS to identify actions necessary for completing the work (punch list) and have a plan for accomplishing these actions in a timely matter.

   1. The agenda should include, but not be limited to the following:
      a. Status of progress vs. schedule of project
      b. Submittals as detailed in this section, section 01 78 39, and the PRD
      c. Warranty information
      d. Commissioning
      e. Correction of deficiencies
      f. Beneficial occupancy requirements

C. Submittals Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of substantial completion. List items below that are incomplete at time of request.

   1. Submit closeout submittals specified in other division 01 sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

   2. Submit closeout submittals specified in individual sections, including specific warranties, workmanship bonds, final certifications, and similar documents.

   3. Submit maintenance material submittals specified in individual sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the STR. Label with manufacturer's name and model number. Obtain receipt prior to final payment.

   4. Submit testing, adjusting, and balancing records.

   5. Submit changeover information related to LLNS's occupancy, use, operation, and maintenance.

D. Procedures Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of substantial completion. List items below that are incomplete at time of request.

   1. Make final changeover of permanent locks and deliver keys to LLNS.

   2. Complete startup and testing of systems and equipment.

   3. Perform preventive maintenance on equipment used prior to substantial completion.
4. Instruct LLNS personnel in operation, adjustment, and maintenance of products, equipment, and systems.

5. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.

6. Complete final cleaning requirements.

7. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

1.02 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit final application for payment identifying total adjusted subcontract sum, previous payments, and sum remaining due.

2. Submit certified copy of substantial completion inspection list of items to be completed or corrected (punch list), endorsed and dated by LLNS. Certified copy of the list must state that each item has been completed or otherwise resolved for acceptance.

3. Submit record drawings prior to the request for final inspection and payment.

B. Provide written notice to the STR that work is complete in accordance with subcontract documents and is ready for final inspection and acceptance. LLNS will verify the Subcontractor has resolved punch list items and provided compliant and complete technical submittals to support final acceptance.

1.03 ADJUSTING

Adjust operating products and equipment to manufacturer’s specifications and recommendations to ensure smooth and unhindered operation.

1.04 PROJECT RECORD DOCUMENTS

A. Final Submittal of Project Documents

Prior to final acceptance inspection, submit project record documents, as defined in section 01 78 39 Project Record Documents, to LLNS. Include electronic set of drawings, and specifications.

Submit drawings in an Autodesk supported version of AutoCAD as described in section 01 33 00 Submittals.

1.05 GENERAL REQUIREMENTS FOR MANUALS

A. Have personnel experience in maintenance and operation of described products compile operating and maintenance data in the form of manuals appropriate for care and maintenance of products provided under the subcontract and specific information requested in various technical sections of these specifications.

B. Submittal of Manuals

1. Submit content outlines before start of work. LLNS will review and return one with comments.
2. Submit an electronic copy, via LLNS construction management hardware of revised final volumes in final form within 10 days after final inspection.

C. Operation and Maintenance Data Manual Content

1. Part 1
   
   Directory, listing names, addresses, and telephone numbers of the Subcontractor, lower-tier subcontractors, and major equipment suppliers.

2. Part 2
   
   Operation and maintenance instructions arranged by equipment and or system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
   
   a. Significant design criteria
   b. Equipment list and description
   c. Parts list for each component, including recommended spare parts
   d. Operating instructions
   e. Maintenance instructions for equipment and systems
   f. For multiple-energy-source equipment, written lockout/tagout procedures prepared in accordance with 29 CFR 1910.147 (c) (4)

3. Part 3
   
   Project documents and certificates including the following:
   
   a. Shop drawings, product data, and calculations
   b. Certificates
   c. Warranties
   d. Inspection reports

D. Materials and Finishes Manual Content

1. Building Products, Applied Materials, and Finishes
   
   Include manufacturer and (name, address, phone number) product data, with catalog number, size, composition, and color and texture designations. Provide information for reordering custom manufactured products.

2. Instructions for Care and Maintenance
   
   Include manufacturer’s recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

3. Moisture Protection and Weather Exposed Products
   
   Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

4. Additional Requirements
   
   As specified in individual specification sections.
5. Provide a table of contents line item for design data and tabbed fly-sheet.

1.06 WARRANTIES

A. Submit a warranty/master equipment list as shown in attachment 01 77 00-1 to this section. LLNS will provide an electronic form upon request.

B. Form of Submittals

1. Bind submittals in 8 1/2 inch by 11-inch, three side-ring type “D” binders with durable plastic covers.

2. Cover: Identify each binder with typed or printed title WARRANTIES. Include the following: title of project; name, address, and telephone number of the Subcontractor and equipment supplier; and name of responsible company principal.

3. Table of Contents: Develop the table of contents, neatly typed, in the sequence of the project manual table of contents. Identify each item with the number and title of the applicable specification section and the name of product or work item.

4. Separate each warranty with index tab sheets keyed to the table of contents listing. Provide full information using separate typed sheets as necessary. List the Subcontractor, supplier, and manufacturer with name, address, and telephone number of responsible company principal.


C. Preparation of Submittals

1. Obtain warranties, guarantees, executed by responsible Subcontractors, suppliers, and manufacturers, within 14 calendar days after acceptance of the applicable item of work. Except for items put into use with LLNS’ permission, leave date of beginning of time of warranty until the date of substantial completion is determined. Submit the executed original and 3 copies.

2. Provide a copy of each warranty/guarantee and service contract issued. Include an information sheet for LLNS personnel giving:

   a. proper procedures in the event of failure;
   b. required maintenance to maintain contracts; and
   c. instances which might affect the validity of contracts.

3. Verify that documents are in proper form, comply with subcontract documents, contain full information, and are notarized.

4. Co-execute submittals when required.

5. Submit one original, signed copies, of each, and an electronic version.

D. Timing for Submittals

1. For equipment or equipment component parts put into service during construction with LLNS’ permission, submit documents within 14 calendar days after LLNS acceptance of equipment.

2. Make other submittals within 14 calendar days after date of substantial completion, and prior to final application for payment.
3. For items of work for which acceptance is delayed beyond date of substantial completion, submit documents within 14 calendar days after acceptance. List the date of acceptance as the beginning of the warranty period.

E. Construction and Installation Workmanship Warranty

Provide warranty in accordance with the clause entitled, “Warranty of Construction” in the General Provisions. Unless otherwise stated, provide this warranty in addition to equipment, subsystem and component warranties or specific warranties stated elsewhere in the subcontract.

PART 2 - PRODUCTS

2.01 CLEANING AGENTS

A. Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned.

B. Make maximum use of biobased products (e.g., cleaning supplies, sealings and coatings) that are United States Department of Agriculture (USDA)-designated items (www.biopreferred.gov) unless the product cannot be acquired:

1. competitively within a time frame providing for compliance with the contract performance schedule;

2. and meet contract performance requirements; or

3. at a reasonable price.

C. Use cleaning products that comply with either EPA’s Safer Choice or Green Seal GS-37 standards. If Safer Choice or GS-37 products are not available, use products that comply with the California Air Resources Board Consumer Products Regulation (California Code of Regulations Title 17, Article 2, Sections 94507-94517).

PART 3 - B. EXECUTION

3.01 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean debris from drainage systems.

C. Clean site: Complete the following cleaning operations, as applicable to the project, before requesting inspection for certification of substantial completion for entire project or for a designated portion of project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

3. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
4. Remove tools, construction equipment, machinery, and surplus material from project site.
5. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
6. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
7. Sweep concrete floors broom clean in unoccupied spaces.
8. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
9. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
10. Remove labels that are not permanent.
11. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
12. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
13. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

3.02 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of substantial completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction to specified conditions and damaged permanent facilities used during construction to original condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.03 DEMONSTRATION

A. Before final inspection, instruct LLNS’ designated personnel in operation, adjustment, and maintenance of products, equipment, and systems at agreed upon times. Base instruction duration as indicated in the individual specification sections, or in the Project Requirements Document (PRD).

B. Use operation and maintenance manuals as the basis for instruction. Review contents of manual with personnel in detail to explain aspects of operation and maintenance.

C. Prepare and insert additional data in operation and maintenance manual when the need for such data becomes apparent during instruction.

END OF SECTION 01 77 00

(Attachment 01 77 00-1 follows)
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**ATTACHMENT 01 77 00-1**
PART 1 - GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record drawings
   2. Record specifications
   3. Record product data
   4. Miscellaneous record submittals

B. Related Requirements: section 01 77 00 "Project Close-Out" for general closeout procedures; and section 01 33 00 Submittals.

1.02 CLOSE-OUT SUBMITTALS

A. Record Drawings (including shop drawings): Comply with the following:
   1. Ensure shop drawing numbers are those supplied by the LLNS STR.
   2. Number of Copies: Submit one set of marked-up record drawings as follows.
      a. Initial Submittal:
         1) Submit PDF electronic files of marked up drawings, PDF of scanned marked-up drawings, or hardcopy of marked-up drawings.
         2) LLNS will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal:
         1) Submit set of marked-up record drawings, either PDF electronic files of scanned marked-up record drawings, or annotated digital files of drawings.
         2) Submit each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit electronic copies of annotated project's specifications, including addenda and contract modifications, showing changes.

C. Record Product Data: Submit annotated electronic files of each submittal with changes made. Where record product data are required as part of operation and maintenance manuals, submit duplicate marked-up product data as a component of manual.

D. Miscellaneous Record Submittals: See other specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated electronic files and directories of each submittal.
E. Reports: Submit electronic report weekly indicating items incorporated into project record documents concurrent with progress of the work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.03 RECORD DRAWINGS

A. Record Drawings: Maintain, at the site, one set of marked-up copies (paper or electronic) of the Subcontract drawings and shop drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, lower-tier subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record drawings.

   a. Give attention to information on concealed elements that would be difficult to identify or measure and record later.
   b. Accurately record information in an acceptable drawing technique.
   c. Record data as soon as possible after obtaining it.
   d. Record and check the markup before enclosing concealed installations.
   e. Cross-reference record drawings to corresponding photographic (taken by LLNS) documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

   a. Dimensional changes to drawings.
   b. Revisions to details shown on drawings.
   c. Depths of foundations.
   d. Locations and depths of underground utilities.
   e. Revisions to routing of piping and conduits.
   f. Revisions to electrical circuitry.
   g. Actual equipment locations.
   h. Duct size and routing.
   i. Locations of concealed internal utilities.
   j. Changes made by change order or change directive.
   k. Changes made following LLNS written orders.
   l. Details not on the original drawings.
   m. Field records for variable and concealed conditions.
   n. Record information on the work that is shown only schematically.

3. Mark the drawings and shop drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record drawings.

4. Mark record sets with red-color. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original drawings.

6. Note construction change directive numbers, alternate numbers, change order numbers, and similar identification, where applicable.

7. Submit marked up record drawings electronically via LLNL construction management software.
B. Final Digital Data Files: Immediately before inspection for certificate of substantial completion, review marked-up record drawings with the STR. When authorized, prepare a full set of corrected digital data files of the Subcontract drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Subcontract drawings or annotated PDF electronic file with comment function enabled.

2. Incorporate changes and additional information previously marked on record drawings. Delete, redraw, and add details and notations where applicable.

3. Refer instances of uncertainty to the STR for resolution.

4. The STR will furnish Subcontractor with one set of digital data files of the Subcontract drawings for use in recording information. See the *LLNL Facilities Drafting Standards* for data file layer information. Record markups in separate layers.

C. Format: Identify and date each final drawing; include the designation "PROJECT FINAL DRAWING" in a prominent location.

1. Format: Annotated PDF electronic file (record drawings) with comment function enabled.

2. Final Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Subcontract drawings. Name each file with the sheet identification. Include identification in each digital data file.

3. Identification: As follows:
   a. Project name.
   b. Date.
   c. Designation "PROJECT FINAL DRAWINGS."
   d. Name of Subcontractor.

1.04 RECORD SPECIFICATIONS

A. Preparation: Mark specifications to indicate the actual product installation where installation varies from that indicated in specifications, addenda, and Subcontract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. Note related change order, record product data, and record drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file, or scanned PDF electronic file(s) of marked-up paper copy of Specifications.
1.05 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark product data to indicate the actual product installation where installation varies substantially from that indicated in product data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to project site and changes in manufacturer's written instructions for installation.

3. Note related change orders, record specifications, and record drawings where applicable.

C. Format: Submit record product data as annotated PDF electronic file, or scanned PDF electronic file(s) of marked-up paper copy of product data. Include record product data directory organized by specification section number and title, electronically linked to each item of record product data.

1.06 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other specification sections for miscellaneous record keeping and submittal in connection with actual performance of the work. File miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

1.07 MAINTENANCE OF RECORD DOCUMENTS

Store record documents in the field office apart from the Subcontract documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss or maintain electronically. Provide access to project record documents for the STR’s reference during normal working hours.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION