



Division 01 Construction Specifications

General Requirements

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Authorized

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CHANGE LOG

DATE	CHANGE
January 28, 2020	Added section 01 31 19, Coordination and Meetings

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SECTION 01 25 00 SUBSTITUTIONS

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, (follow section 01 26 00, *Request for Information*) 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 5 business 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. Provide an itemized list with cost comparisons including labor and materials.
 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 a Request for Substitution. Do not assume that LLNS will accept a Request for Substitution 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. Request an interpretation from LLNS if any of the following applies:

1. Subcontractor is unable to determine from the subcontract documents the exact material, process, or system to be installed
2. Elements of construction are required to occupy the same space (interference)
3. An item of work is described differently in more than one place in the subcontract documents

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.

1. Review lower-tier subcontractor and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing, and layout of the work.
2. Subcontractor is responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

D. Before submitting an RFI

1. verify the information is not already included in the subcontract documents. LLNS will coordinate with the subcontractor to close RFIs that request information that is clearly indicated in the subcontract documents.

E. Do not use RFIs for the following purposes.

1. 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.
 - a. If an RFI impacts the sequence of construction, then note the impact on that RFI for consideration by LLNS. Provide complete information required for LLNS to analyze and understand the circumstances causing the impact.

2. To request approval of submittals (use procedures specified in section 01 33 00,*Submittals*)
 3. To request approval of substitutions (use procedures specified in section 01 25 00,*Substitutions*)
 4. To request subcontract changes such as cost, schedule, design, or work performance. (Use change order procedures in the subcontract documents Indicate that there is a cost impact, but do not put costs in an RFI).
- 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

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

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 separately 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 WIRELESS DEVICES IN LIMITED AREAS

- A. Non-government mobile/wireless devices are not allowed in limited areas inside buildings.
 - 1. A mobile device is a portable computing device that:
 - a. can easily be carried by a single individual
 - b. is designed to operate without a physical connection (e.g., wirelessly transmit or receive information)
 - c. possesses local, non-removable data storage
 - d. is powered on for extended periods of time with a self-contained power source
 - 2. Mobile devices also include voice communication capabilities, onboard sensors that allow the device to capture (photograph, video, record or determine location) information and/or built-in features for syncing data. Examples of mobile devices include but are not limited to cell phones, tablets, smart watches, fitness trackers and E-readers.
- B. Tools and equipment with global positioning systems (GPS) and devices with Bluetooth capabilities or wifi are not allowed anywhere in limited areas both inside and outside of buildings.

1.04 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 and Quality Control Manager** – The project manager and the quality control manager can be corporate resources that oversees work on this project on a part-time basis delegates 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 or the construction superintendent can assume this role, unless stated otherwise in the PRD. The safety officer may not perform work. See section 01 35 23 *General Safety Provisions* article "Subcontractor Safety Program" for further requirements.

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 three business days in advance.

1.05 BADGES AND IDENTIFICATION VERIFICATION

- A. Only United States citizens with no outstanding warrants, including unpaid child support and traffic violations may access LLNL.
 - 1. United States Citizen Definition. Persons born or naturalized in the United States. Permanent residency or Green Card holders are not United States citizens.
- B. Badges must be requested 72 hours in advance Provide an email with a completed badge request form to the STR and pmo-cma-team@listserv.llnl.gov with each employee's and lower-tiered employee's, full name, date of birth, social security number, and company name. The form may be obtained from the LLNS STR or representative.
- C. Further details for badging, access, and identification verification are in the *Security and Site Access Provisions* found on the LLNL Supply Chain Management's website, under "Special Conditions."

1.06 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 do not have a security clearance in a work limited area that requires clearance, then they must remain within line of sight of the escort. If opaque barriers, fences, impervious barriers or other divisions are present in a work area, 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 logbook.

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 three business days in advance. Notifications received with less than three business days advance notification could potentially result in no additional resources and may delay work.

- 3. Hours and Overtime.

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

Unless specified otherwise in the Subcontract, coordinate requests for working outside standard hours with the STR. Requests received with less than three business days advance notification may not be approved.

- 4. Subcontractor Vehicles.

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.

Obey signs and postings. Park only in designated parking stalls unless otherwise directed or approved by the STR. 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.

1.07 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 complete 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.

1.08 SURVEY DATA

Where applicable, LLNS has provided horizontal (California State Plane Coordinate System, Zone 3 (US Survey Feet)) and vertical (LLNL vertical datum network) survey control points for the drawings.. Provide construction staking as required for construction and inspection by or under the direction of a Licensed Land Surveyor. .

1.09 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 salvaged materials that are 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.

1.10 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.

1.11 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.

1.12 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

END OF SECTION 01 30 00

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. Cybersecurity requirements and use of subcontractor's management software. Use of Subcontractor's cloud services is not allowed unless approved by LLNS in writing.
 - 3. Security and housekeeping procedures
 - 4. Submission of proposed preliminary project schedule
 - 5. Designation of personnel representing the subcontract parties
 - 6. Use of premises by LLNS and Subcontractor
 - 7. LLNS' requirements and partial occupancy
 - 8. Temporary facilities and controls provided by LLNS
 - 9. 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
 - 10. 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. Including securing information on off hours if necessary.

11. Scheduling, sequence of construction, and scheduling of inspection and testing
 12. Surveying
 13. Procedures for maintaining project record documents (e.g. red-lined drawings)
 14. 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. In coordination with the LLNS STR, arrange and conduct, at least 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, must attend the meetings. Lower tiered subcontractors and engineer-of-record (for design-build projects), as directed by the LLNS STR, must also attend the meetings. Other attendees may include LLNS personnel affected by the work.
- B. Arrange meetings, prepare agenda with copies for participants, and preside at meetings.
1. Distribute meeting agenda 48 hours in advance along with 3-week look-ahead
- C. Include, as a minimum, the following coordination meeting agenda:
1. Project safety and security
 2. Review minutes of previous meetings
 3. Review of work progress via three-week look-ahead
 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 within 48 hours 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

- B. 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, coordinate with the STR and convene a pre-installation meeting at the site prior to commencing work of the specified section. Notify the STR of the meetings at least 1 week in advance.
- B. Require the attendance of parties directly affecting, or affected by, work of the specific section.
- C. Prepare the agenda and preside at meetings to review, as a minimum, the following:
 - 1. Conditions of proposed installation, preparation, and installation procedures
 - 2. Coordination with related work of other Subcontractors on site
- D. Record minutes and distribute copies, for review and comment, to each participant and those affected by the decisions within 3 business days of the meeting. Resolve comments and distribute final minutes within 1 week of the meeting.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION 01 31 19

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SECTION 01 32 01 PROJECT SCHEDULE

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.

Weather.

Unusually severe weather. Greater than 0.25 inches of rainfall within a 24-hour period measured and validated by LLNL provided rainfall data.

Adverse/delayed impact by weather. Demonstrated evidence the actual adverse weather delay days prevented work on critical path activities for 50% or more of the Subcontractor's scheduled workday.

Measured and Validated. Weather data collected by LLNL at a defined collection point and provided to the contractor weekly.

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 experienced scheduler 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.

Use the CSI MasterFormat for the schedule-of-values (refer to subcontract for further schedule-of-values requirements)

Produce schedules compliant with division 1 requirements and incorporate LLNS comments. .If subcontractor believes a LLNS comment to the contract schedule constitutes a change rather than a value added correction or administrative revision, then the subcontractor should notify the contract analyst of the impact prior to proceeding.

3.03 PROJECT SCHEDULE DETAILED REQUIREMENTS

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

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) Long lead material deliveries
- 2) Deliverables as listed in other specification sections
- 3) Escort support as needed
- 4) Submission and acceptance of installed equipment lists
- 5) Submission and acceptance of testing and air balance (TAB)
- 6) Submission of TAB specialist design review report
- 7) Construction activities
- 8) Interfaces with other LLNS operations
- 9) 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.
- 10) Submission and acceptance of testing and balancing of HVAC plus commissioning plans and data
- 11) Air and water balancing report
- 12) Commissioning
- 13) Controls testing plan submission
- 14) Controls testing
- 15) Performance verification testing
- 16) Other systems testing
- 17) Commissioning (including intermediate systems commissioning)
- 18) Inspections as defined in section 01 77 00, "Project Close-Out"
- 19) Correction of punch-list items
- 20) 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 subcontract was executed. Include as the first activity in the project schedule an activity called "Start Project" (or award). Apply the "ES" (early start) constraint date of zero-day duration to the “Start Project” equal to the date that the NTP was executed.

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. Unanticipated delays may be due to unusually severe weather with adverse/delay impact. This delay must be documented in daily reports (see section 01 33 00, *Submittals* for daily report details) and substantiated with measured and validated data.

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* in 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

SECTION 01 33 00 SUBMITTALS

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. Submit a submittal schedule and procedure for LLNS review and approval or rejection 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 on the submittal schedule. 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 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

After project execution and pending notice-to-proceed with the construction work, develop and submit the applicable administrative submittals as follows:

Submittal	Sections for more details
Submittal register	Section 01 33 00, <i>Submittal Procedures</i>
Schedule	Section 01 32 00, <i>Project Schedule</i>
Proof of off-site agencies having jurisdiction over work notifications	Section 01 35 20 <i>Permitting</i> , article 1.04 “Off-Site Agency Notifications”
Quality plan	Section 01 40 00 <i>Quality Requirements</i>
Approved corporate safety plan	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04
Approved job hazard analysis	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04
Radiation work plans	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04 and section 01 35 23.23 <i>Radiological Subcontractor Provisions</i>
Radiation work plans	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04
Training records (fall protection, crane operator, excavation/ trenching)	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04
Signed LLNS Specific Requirements form	Section 01 35 23, <i>General Safety Provisions</i> , appendix C
Abatement plans (asbestos, lead)	Section 01 35 23, <i>General Safety Provisions</i> , article 1.04 and section 01 35 23.13 <i>Asbestos Safety - Class I and II</i> , 01 35 23.19 <i>Asbestos Safety - Class II</i> , 01 35 23.21 <i>Lead Work Exposure Protection</i>
Solid waste management plan and log	Section 01 35 43, <i>Environmental Protection</i> , attachment 01 35 43-2

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.
- D. Submit specifications in Microsoft Word as well as the pdf certified version.

A.2 DESIGN DRAWINGS

- E. Submit design drawings as required by the PRD, for review in accordance with this submittal’s specification.
- F. In the drawing package, include enough drawings to provide a full and complete construction package.
- G. 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 PMO.DT-ST-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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(Sample Submittal Register)

Subcontract No.: B123456 Project Title: Westgate Entry Statement					
Item	Spec Section/ Submittal No.	Submittal Description	Spec. Paragraph Number	Date Required To Submit	Date Actually Submitted
1	Award Letter	Preliminary Schedule		03/27/98	03/26/98
2	01 30 00-2	Overtime/non-standard work hour plan	1.06.C	03/27/98	04/01/98
3	01 33 00-2	Submittal Register	1.10, A,B	04/15/98	05/25/98
4	03 10 00-1	Shop drawings/formwork	1.07, B.1,2	06/15/98	06/15/98
5	23 05 29-1	Product data	1.04	08/15/98	08/20/98
6					
7					
8					

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BSECTION 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

Table 01 35 20-1: On-Site Permitting

Type	Description	Section Reference	Advance Notification
Soil and Excavation	Soil disturbance	01 35 23	14 days
Concrete Penetrations	Saw cutting, coring, drilling, demolition, anchoring	01 35 23	14 days
Hot Work	Thermal heat and spark producing activities	01 35 23	24 hours
Utility Outages	Fire sprinkler system, mechanical systems or equipment, low-voltage systems or equipment		14 days
LLNL Building Department	Permit to execute construction		21 days
NIF & PS, or Superblock Work Permit	Work within the NIF & PS directorate		14 days
NIF & PS, or Superblock Hoisting Permit	Work within the NIF & PS directorate		14 days
Roof Access		01 35 23	14 days
Building/Equipment Drain Outage	Installing, removing, or modifying structure system or component drainage system		14 days
Computation VESDA	Fire systems shutdown for under-floor or above-ceiling access in data centers		14 days

END OF SECTION 01 35 20

SECTION 01 35 23
GENERAL SAFETY PROVISIONS

PART 1 - GENERAL

1.01 PROGRAM POLICY

- A. Work at Lawrence Livermore National Laboratory (LLNL) is subject to the below requirements, as well as those cited in the specific topical areas in Section 3 of this document. If there is a conflict between requirements, apply the most stringent rule unless otherwise directed by Lawrence Livermore National Security, LLC (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”
 2. Title 29 CFR, Part 1910, “Occupational Safety and Health Standards,” excluding 29 CFR 1910.1096, “Ionizing Radiation” Title 29 CFR, Part 1926, “Safety and Health Regulations for Construction”
 3. 10 CFR 851, Worker Safety and Health Program
 4. American Conference of Governmental Industrial Hygienists (ACGIH), “Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices”
- B. 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 environment, safety, and health (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. 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.
 - a. Establish and maintain clear and unambiguous lines of authority and responsibility for ES&H at Subcontractor organizational levels.
 - b. 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.
 - c. Allocate resources effectively to balance ES&H considerations (protection of employees, the public, and the environment) with execution of work.
 - d. 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.

- e. Develop work-specific administrative and engineering controls to prevent and mitigate hazards. Emphasize the work design and controls to reduce or eliminate the hazards.
 - f. 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.
 - g. 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. Ensure that employees and lower-tier subcontractor employees performing under this subcontract comply with the ES&H requirements applicable to this subcontract.
 - b. 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.
 - c. 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 (Occupational Safety and Health Administration [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.
 - d. Allow LLNS access to written injury and illness prevention program (IIPP), which the Subcontractor must maintain according to the law.
 - e. ES&H Performance Feedback: Provide feedback to the LLNS Subcontract Technical Representative (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 Department of Energy (DOE) O 442.1B, *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.
1. Assign worker safety and health responsibilities, evaluate personnel performance, and hold personnel accountable for worker safety and health performance.
 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. Inform workers of their rights, which include the following:
 - a. Access to the health and safety information described in subparagraph 1.03.B.3.
 - 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.
 6. During periods of active construction, the Subcontractor must have a safety officer in accordance with Section 01 30 00, "Administrative Requirements," and the project requirements document (PRD).

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 fatalities, injuries and illnesses involving the Subcontractor and lower-tier subcontractor personnel and property damage to LLNS immediately (within one hour of incident). Also, conduct an incident investigation and submit a complete written report on DOE Form 5484.3 to LLNS within seven calendar days of the incident. LLNS may perform its own investigation (see Injury and Illness Reporting Provisions for details). 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. The term "ES&H submittals" may include the following types of documentation:
1. JHA - lists the work tasks to be performed, the hazards and environmental aspects associated with those tasks, and the specific controls the Subcontractor will implement.
 - a. LLNS provides a JHA template that is to be utilized for work performed at LLNL.
 - b. Submit a task based JHA for the project.
 - c. General safety program information does not need to be in the JHA. The JHA may reference the corporate safety plan for that information.
 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.

- d. Submit a corporate safety plan unless otherwise directed by the STR.
 3. DOE/LLNS Specific Safety Requirements include the following:
 - 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.
 - 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 or in the Pre-Analyzed Tasks (PATs) (e.g., lift plans, , complex lockout/tagout [LOTO] plans, excavation plans).
 4. Records - Documentation of readiness to work, such as training records for crane operators or designated competent persons, medical qualifications, or certification of HEPA filter systems.
- B. LLNS will make the final determination on the acceptability of the Subcontractor's ES&H submittals. A LLNS approval of the Subcontractor's ES&H submittals does not relieve the Subcontractor from responsibility for errors or omissions in such submittals or from responsibility for complying with the requirements of this subcontract, applicable laws, or regulations. The Subcontractor is not entitled to a cost or schedule adjustment due to failure to submit acceptable ES&H submittals.
- C. Keep one copy of LLNS approved JHA and other submittals at the jobsite.
- D. 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. In the addendum identify the mitigations and controls for the hazards.

1.05 SUBCONTRACTOR TRAINING PROGRAM

Safety Training - Subcontractor is responsible for training its employees in accordance with laws and standards, and for providing additional training for site supervision. Submit copies of training certificates for each employee to LLNS for operations that require such training prior to performing the work. As a minimum, provide the following training for pertinent Subcontractor personnel:

- A. Employee Orientation Training - Provide orientation training for every employee (including lower-tier subcontractors) working on the jobsite covering the various safety policies, safety manuals, first aid availability, accident reporting procedures, emergency procedures (notification procedures, evacuation routes, mustering points, and accountability), safety meeting participation, personal protective equipment (PPE), enforcement procedures, and any applicable LLNS specific requirements.
- B. Supervisor/Employee Safety Training - Provide training to supervisors covering record keeping, incident investigation, OSHA inspections, Health & Safety 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. In addition, provide training to employees (and lower-tier 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. Submit the names of the designated competent persons for the particular operations and the verification of their training and/or experience.

1.06 SUBCONTRACTOR SAFETY MEETINGS

- A. Safety Orientation - Prior to the start of work, attend a LLNS-hosted construction safety orientation.
- B. Weekly Safety Meetings - Conduct weekly meetings as required by OSHA with on-site Subcontractor and lower-tier subcontractor personnel. Prepare documentation detailing the subject discussed with signatures of participants for each meeting. Make available to LLNS when requested.
- 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 Construction Manager (CM) of the time and location of daily SPA meetings. LLNS CMs will attend SPA meetings at their discretion.

1.07 EMERGENCIES

In an emergency affecting the safety of persons or property, immediately call 911 from an LLNL system phone or 1-925-447-6880 (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 LLNS CM of the occurrence of such an emergency or off normal event and actions taken by the Subcontractor. This notice may be oral, but must be followed by a 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.

3.02 PERSONAL PROTECTIVE EQUIPMENT

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. Construction site PPE includes the following:

- A. American National Standards Institute (ANSI) Z89.1 approved hard hats
- B. ANSI Z87.1 approved safety glasses with side shields
- C. Shirts with a minimum of 4-inch sleeves and long pants
- D. ANSI approved class II high visibility safety vest
- E. American Society for Testing and Materials (ASTM) approved safety toe work boots
- F. Additional PPE as identified and required by the project JHA
- G. Respirators selected and managed in accordance with ANSI Z88.2

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).
 - 1. Erect, maintain, disassemble, and inspect scaffolding daily under the direction of a Subcontractor-designated scaffolding competent person.
 - 2. Submit in the JHA or corporate safety plan details of scaffolding erection, use, and disassembly.
 - 3. Submit training records for designated competent scaffolding persons
- B. Select and use ladders in accordance with 29 CFR 1926, Subpart X, *Stairways and Ladders*.
 - 1. Ladders must be inspected by the user prior to use

3.04 FALL PROTECTION

- A. Provide fall protection at the work site in accordance with 29 CFR 1910 “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. 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.”
- B. LLNS requires the categorization and planning of lifts. See hoisting and rigging requirements in appendix 01 35 23-1 “Cranes, Hoists, and Rigging.”
- C. Qualified LLNS personnel will verify Subcontractor hoisting and rigging operations/equipment are in compliance with the approved lift plan prior to lifts being performed.
- D. When synthetic slings are used and are in contact with edges, corners, or protrusions, the slings are to be protected from cutting damage with sufficient cut protection. The load rating must be determined by the cut protection product manufacturer or a qualified person.

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

- A. Operate aerial lifts (e.g., scissor, boom, JLG) in accordance with 29 CFR 1910.66 – 1910.68, *Powered Platforms, Aerial lifts, and Vehicle-Mounted Work Platforms*, and 1926.450 – 1926.454, *Scaffolds*.
- 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 CM and Industrial Safety Professional if it is necessary to exit lifts or platforms from a height.

- D. In the corporate safety plan, describe the Subcontractor's aerial lift safety and inspection program. Operator training records and inspection records should be available for review at the jobsite.

3.08 ROOF ACCESS

The LLNS SAHCL documents hazards associated with roof access, which may include, but are not limited to, exhausted gases, fumes, or particles from rooftop stacks, chemical hoods, glove boxes, hot water boilers, and building sewer systems. The LLNS CM will obtain prior authorization and any LLNS specific permits required to access roofs. Follow the LLNS CM'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.
- B. If the Subcontractor is the sole entrant, perform the entry under the Subcontractor's confined space program using the Subcontractor's entry permit. If the entry is performed jointly by LLNS and the Subcontractor, perform the entry under LLNS requirements using a LLNS entry permit. In all cases, conduct a joint pre-activity walkthrough to review confined space hazards and controls.
- C. Submit in the corporate safety plan the written confined space program including the confined space entry permit and evidence of worker training meeting 29 CFR 1910.146 or 29 CFR 1926 Subpart AA. 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 LOTO program in accordance with 29 CFR 1910.147, National Fire Protection Association (NFPA) 70E, and as described in the Subcontractor corporate safety plan.
 2. Perform LOTO of electrical circuits in accordance with 29 CFR 1910.333, Subpart S, *Electrical*.
 3. LLNL requires both a lock and tag, and individually keyed locks (not combination). Each LOTO Authorized Worker must apply their own lock.
 4. Coordinate LOTO in advance with LLNS, obtaining approval from the LLNS CM prior to commencing activities.
 5. LLNS recognizes only "simple LOTO" (the Rule of 1's) and "complex LOTO" (LOTO jobs that are not a simple LOTO).
 - a. Simple LOTO is where there is:
 - One energy source
 - One control point
 - One lock per person
 - One craft, one shift, one location, one employer
 - b. For complex LOTO, LLNS requires a documented written procedure before work begins.

6. If, during work, a device is encountered that cannot be locked, obtain guidance from LLNS before proceeding.
7. The use of 'air gap' (or any similar term) is prohibited for LOTO-related work. Physical separation may be used within the scope of demolition or new construction activities after disconnection or prior to connection of utilities (i.e., water, gas, electrical, etc.). Physical separation may be used as an additional safety measure in conjunction with LOTO but must not be used in lieu of LOTO for service and maintenance activities.

3.11 WELDING, BURNING, OR FIRE PRODUCING ACTIVITIES

- A. Perform welding in accordance with OSHA 29 CFR 1926 Subpart J and ANSI Z49.1: *Safety in Welding, Cutting, and Allied Processes*, Sections 4.3 and E4.3.
 1. Do not use thoriated tungsten without LLNS CM's approval in writing.
 2. 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.
 1. The LLNS CM will obtain permits from the LLNL Fire Department for activities including cutting and welding, heat treating, grinding, powder-driven fasteners, hot riveting, torching, soldering, using tar pots or tar kettles, and any other heat-producing, or spark-producing, tasks that could result in a fire hazard.
 2. 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 or work area exposes workers to noise that equals or exceeds an 8-hour time-weighted average (TWA) of 85 dBA, submit a hearing conservation program (HCP) in accordance with 29 CFR 1910.95, *Occupational Noise Exposure*.
- B. ACGIH requires HCP enrollment at 85 dBA as an 8-hour TWA, with a 3 dBA exchange rate. 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)].

- C. Submit in the JHA the controls specific to the work tasks to be performed at LLNL which shall include the following:
 - 1. Baseline or periodic area noise monitoring [29CFR1910.95(d)]
 - 2. The type of hearing protection devices required [29CFR1910.95(i)]

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), 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.
- B. When there is reasonable expectation an activity will exceed ACGIH TLV exposure limits, the Subcontractor must appoint a silica competent person in accordance with OSHA silica standard (29 CFR 1926.1153).
- C. Baseline exposure, or objective industry data, must be used to justify the use of engineering and administrative, and PPE controls to prevent exposures from exceeding the TLV.
- D. HEPA vacuums used for worker protection or to clean up silica dust and/or slurry generated during concrete or asphalt disturbance shall be certified in accordance with subparagraph 3.18, HEPA FILTER CERTIFICATION.
- E. Submit in the JHA task-specific controls.

3.16 EXPOSURE PROTECTION FOR ASBESTOS AND LEAD

See Section 01 35 23.13, "Asbestos Safety – Class I and II," Section 01 35 23.19, "Asbestos Safety – Class III, IV, Unclassified," and Section 01 35 23.21, "Lead Work Exposure Protection."

3.17 EXPOSURE PROTECTION FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS OTHER THAN ASBESTOS, BERYLLIUM, LEAD, OR SILICA

- A. Ensure worker exposure to chemicals or hazardous substances does not exceed the TLVs established by ACGIH, with exception of 10 CFR 850, Chronic Beryllium Disease Prevention Program, for Beryllium. 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. Implement OSHA requirements for substances that OSHA has established substance specific standards for (e.g., Chromium [VI], Cadmium, Inorganic Arsenic, Methylene Chloride).
 - 1. When there is a reasonable expectation an activity will exceed an applicable Occupational Exposure Limit (OEL), utilize respiratory protection unless previous exposure monitoring, objective data, or a current exposure assessment demonstrates level below the OEL.
 - a. Submit information that demonstrates exposures are below the OEL when respiratory protection is not required.
 - 2. If applicable, conduct air monitoring in accordance with methods set forth by NIOSH or OSHA where available.

B. Job Hazard Analysis Submittals

1. Submit in the JHA or corporate safety plan a description of the proposed engineering controls (e.g., wet methods, ventilation) and PPE to mitigate worker exposure to chemicals or hazardous substances.
2. 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, and LLNS retains the right to check the certification and performance of HEPA-filtered equipment once it arrives at the LLNL project location/building.

3.19 ELECTRICAL SAFETY

- A. 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 electrical workers 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 LLNS CM for guidance before proceeding.
- B. Lock and tag electrical circuits planned for work in accordance with 3.10, LOTO/TAGOUT (LOTO).
- C. 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 CM to secure dig and penetration permits.
- B. Procedure
 1. Permits are required for soil penetration regardless of depth. Permits may be required for other types of penetrations. Notify the LLNS CM at least 14 days in advance of anticipated drilling. LLNS will determine if scanning and/or a permit is required.
 2. 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. Mark new conduit routes and planned wall penetrations deeper than $\frac{1}{4}$ inch. Request the LLNS CM review and approval of routing and penetration locations prior to continuing the work.
4. Excavations
 - a. Perform excavation in accordance with paragraph 3.21, EXCAVATIONS AND TRENCHING.
 - b. 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.
 - c. 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 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.
 - d. 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.
 - e. If excavation uncovers an unidentified utility, stop excavation in this area and immediately notify the LLNS CM.

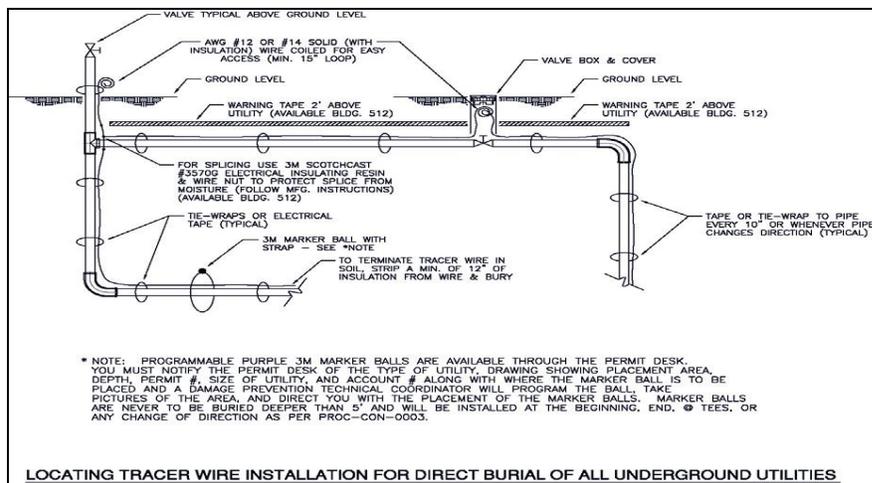


Figure 1. Tracer Wire Installation - Direct Burial of Nonmetallic Piping

- C. LLNS requires extensive planning and careful execution of any penetration of concrete or non-concrete walls, floors, or ceilings, both interior and exterior.
 1. Required PPE - Use safety glasses with side shields and electrical hazard (EH)-rated safety shoes, or dielectric boots. In addition, use class 0 electrical gloves for penetrations where electrical over 50V is known, or suspected and cannot be located.

2. Penetrations Greater than ¼ inch into Wall Cavities or Wood and Metal Framing: Observe the following:
 - a. Use Proper Analysis Tools: Use non-conductive power or manual tools. Use standard scanners for wood with a detector for metal/wire location.
 - b. Plan the Penetration: Check with the LLNS CM 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 CM 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 borescope for utilities.
 - e. Relocate penetrations to avoid identified hazards.

3.21 EXCAVATION AND TRENCHING

- A. Perform excavation under the supervision of a competent person as defined by 29 CFR 1926 Subpart P, Sections 650, 651, and 652.
- B. 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.
- C. 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- 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:

- A. Confirm with LLNS CM that the marked utilities are de-energized, or de-energize.
- B. Isolate and physically separate per 3.10, LOCKOUT/TAGOUT (LOTO).
- C. Annotate the status as de-energized using black paint in the presence of the LLNS representative.
- D. Protect adjacent utilities from damage during demolition activities.

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.

3.24 TEMPORARY TRAFFIC CONTROL

Submit a Maintenance of Traffic (MOT) plan when work may affect the safety of motorist, bicycle, or pedestrian traffic. Provide temporary traffic control in compliance with the “California Manual on Uniform Traffic Control Devices” (Caltrans publication).

END OF SECTION

(appendices follow)

APPENDIX 01 35 23-1 HOISTING AND RIGGING ACTIVITIES

A.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.

A.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, and below-the-hook lifting devices

A.3 LLNS-SPECIFIC REQUIREMENTS

The following LLNS requirements apply to Subcontractors performing hoisting and rigging activities at LLNL.

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

- B. **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.
- C. **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.
1. **Ordinary lift:** Lifts that are not categorized as Special-Ordinary, Critical, or Personnel are Ordinary lifts.
 2. **Special-Ordinary lift:** Lifts where any of the following conditions are present:
 - a. The load will be rotated or manipulated on or about its non-vertical axis.
 - b. The load will be transferred (i.e., in mid-air from one crane to another).
 - c. Any load where the center of gravity might move during the lift, such as a tank filled with liquid.
 - d. Use of multiple lifting devices; such as use of more than one lifting equipment (i.e., cranes, hoists, forklifts, jacks) in sharing the load.
 - e. LLNS management may choose to classify a lift as Special-Ordinary for reasons other than those noted above.
 3. **Critical lift:** Lifts where any of the following conditions are met:
 - a. Loss of control of the load being lifted would likely result in the declaration of an emergency.
 - b. The load is unique and vital to a system, facility, or project operation, and would be irreplaceable or not repairable if damaged.
 - c. 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.
 - d. If mishandling or dropping of the load would cause any of the above consequences to nearby installations and facilities.
 - e. For steel erection, the lift exceeds 75 percent of the rated capacity of the crane or derrick, or if the lift requires the use of more than one mobile crane or derrick (refer to 29 CFR 1926.751).
- D. **Lift Plan Requirements:** Submit lift plans for lifts (except ordinary lifts that are less than 2000 lbs.). The Subcontractor may include multiple lifts at a construction location in a single lift plan.
1. Lift plans should be specific to the configuration of the intended lift. Address the following in the lift plans:
 - a. Designate personnel roles, as shown in the table below.
 - b. Break the lifting activities down to the task level (staging, rigging, pre-lift, lift, and securement), using drawings and/or text.
 - c. Characterize the load – weight, dimensions, center of gravity, rigidity, stability, and rigging attachment points. Verify undocumented attachment points by calculation to demonstrate adequacy.
 - If some of these parameters cannot be determined ahead of time, submit plans for field determinations, including trial lifts.

- d. Define the work area –
 - Boundaries and access control.
 - Travel path of the load.
 - Start, staging, and finish points.
 - Equipment, facilities, or structures that pose obstructions or impediments to moving/manipulating the load.
 - Imposed loads on structures, utilities (above/below grade).
 - Weather considerations.
 - 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).
 - Describe securement of the load.
 - Provide load path calculations (identify the forces that are affecting the rigging equipment).
 - Provide mathematical calculations to demonstrate the load/object moves only due to forces and moments appropriately applied to start and stop desired motion.
 - 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.

2. The table below lists the requirements and documentation for the different categories of lifts:

Requirement	Lift Type			
	Ordinary < 2000-lbs	Ordinary > 2000-lbs	Special-Ordinary	Critical
Documented Lift Plan	Not required	Required	Required	Required
Designation of Personnel Roles	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.	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.	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.	Appoint a Person In Charge (PIC); LLNS concurrence. Designate in lift plan, present at work site for entire lifting operation, and cannot be delegated or transferred.

Requirement	Lift Type			
	Ordinary < 2000-lbs	Ordinary > 2000-lbs	Special-Ordinary	Critical
Inspections/ Verifications	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.	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.	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.	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.
Drawings			Scaled drawings required	Scaled drawings required
Documented Pre-Lift Meeting			Required	Required. Document in the lift plan.
Practice Lift				Required as specified by LLNS
Documented Post-Lift De-Brief		Required	Required	Required

E. Required Submittals: Submit the following information/documents to LLNS:

1. Completed Lift Plan (may utilize template provided by LLNS).
 - a. Submit the lift plan(s) to LLNS for review and approval at least 10 calendar days prior to the commencement of the specific lift.
 - b. Include scaled drawings for Special-Ordinary and Critical lifts.
2. **Note:** Present deviations from an approved lift plan to the LLNS STR for approval prior to proceeding.
3. Certification/Qualification documents for Crane Operators, Riggers and Signal Persons.
 - a. 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.
 - b. Age verification (i.e., employees are over 18 years of age) for employees involved with cranes, hoisting and rigging.

4. Current crane certifications and inspection information.
5. ASME certifications and inspection records for the equipment used for hoisting and rigging.
6. ASME proof load test documentation for slings, below-the-hook lifting devices and rigging hardware used for critical lifts.

END OF APPENDIX 01 35 23-1

APPENDIX 01 35 23-2
SAFE PLAN OF ACTION (SPA)

A.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; it reinforces aspects of safety pertaining to specific day's work.

A.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 Team 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. Conduct 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.

A.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. 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 LLNS 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.

Worker Readiness Sample Questions:

<input type="checkbox"/> Is the work ready?	<input type="checkbox"/> Are there any new, unique or significant hazards in today's work?
	<input type="checkbox"/> Are the controls in place and functioning?
	<input type="checkbox"/> Any interfaces with other work groups?
<input type="checkbox"/> Is the work area ready?	<input type="checkbox"/> Is the work released for the day?
	<input type="checkbox"/> Other work in the area?
	<input type="checkbox"/> Are there any new area hazards that have not been previously identified?
<input type="checkbox"/> Are all the workers ready?	<input type="checkbox"/> Do we all understand today's tasks and <i>who</i> is doing <i>what</i> ?
	<input type="checkbox"/> Do you have any medical conditions that impact your ability to work safely?

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.

LLNL Subcontractor Safe Plan of Action (SPA) Worksheet



Project: _____

LLNL Subcontractor: _____

IWS# _____ WCD# _____ Work Permit # _____

Lower-tier Subcontractor: _____ Craft: _____ LLNS Responsible Individual Name/Phone: _____

Date: _____ Location of Task: _____ Shift: _____

MAJOR WORK STEPS OF TASK	POTENTIAL HAZARDS	CONTROLS / SAFETY PLAN	EQUIPMENT/TOOLS REQUIRED
Task Specific Required Inspection Daily Liff Inspection Harness Inspection Fire Extinguisher Inspection Current Cords – Properly Inspected by Each User All Existing Systems Enabled Hoisting and Rigging Inspected	Inspected By/Name: Inspected By/Name: Inspected By/Name: Documented Below by Signature Inspected By/Name: Inspected By/Name:	Work Area Coordination & Safety Questions Coordination needed with adjacent and/or co-occupancy in work area? _____ Y _____ N Any scheduled hold-point and/or safety hold-point inspections? (below) _____ Y _____ N Is the work to be performed and work area ready? _____ Y _____ N Does everyone understand the task to be performed? _____ Y _____ N Safety Hold Point Inspection (If applicable):	
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 <u>LEGIBLY PRINT</u> 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.			

Safe Plan of Action – Preparation Tool**Personal Protective Equipment:**

- Hard Hat
- Eye 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
- Scrapes, 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
- Hearing protection - $\geq 85\text{Db}$
 - Double required
- Co-occupancy

Worker Readiness Questions

- Are all Workers ready?
- Is anyone feeling stressed or distracted
- Does everyone feel they can proceed with the work safety?

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

Approved Safety Documentation:

- Corporate Safety Plan
- JAHA
- Approval from STR/CM to begin work

END OF APPENDIX 01 35 23-2

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SECTION 01 35 23.13
ASBESTOS SAFETY - CLASS I AND II

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. ACMs are indicated in the Subcontractor Area Hazards Control List (SAHCL).

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.
4. **Class IV.** Maintenance and custodial activities that employee contacts but does not disturb ACM and PACM. Activities to clean up dust, waste, and debris resulting from Class I, II, and III activities.
5. **"Unclassified."** Activities involving the removing of ACMs that contain less than 1% asbestos by layer.

B. Reference Standards

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

1. Code of Federal Regulations (CFR)

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

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
6. American Society of Mechanical Engineers International (ASME), ASME N510, *Testing of Nuclear Air Treatment Systems* (formerly American National Standards Institute [ANSI] N510)
7. National Fire Protection Association (NFPA), NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*

1.03 SUBMITTALS

- A. **Asbestos Abatement Work Plan.** Submit an “Asbestos Abatement Plan” to the Subcontract Technical Representative (STR) 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 Lawrence Livermore National Security, LLC (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.
 - a. Provide diagram of abatement area including negative pressure machine(s) and decontamination chambers.
 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 the STR 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. Record of successful respirator fit testing and training, performed by a qualified individual within the previous 12 months, for each employee using each proposed respirator, including positive pressure respirators, on this project with the employee's name with each record.
 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. Evidence of HEPA-filtered equipment certification (see Section 01 35 23, "General Safety Provisions," Subpart 3.18, "HEPA Filter Certification").
 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 SJVAPCD Demolition/Renovation Permit Release for the specific project:
 - a. For Livermore Site: Friable ACM removal greater than 100 linear feet, 100 square feet, or 35 cubic feet, submit a separate BAAQMD asbestos notification specific for the project. If a structural element is involved submit a Demolition Notification.
 - b. For Site300: Friable ACM removal greater than 160 linear feet, 260 square feet, or 35 cubic feet, 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 on-site
 - 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 the STR within one working day following the day on which the results are available.
- 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) within one working day following the day on which the results are available.
 - 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 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 in accordance with 29 CFR 1926.1101.

- A. Polyethylene sheeting shall be fire retardant with a minimum thickness of 6-mil where the largest size possible is provided to minimize seams.
- B. Asbestos waste bags and glove bags shall be 6-mil thick.

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. Use respiratory protection in accordance with 29 CFR 1926.1101 and CCR, title 8, Section 1529. Class I Asbestos Work requires tight-fitting, powered air-purifying respirator (PAPR) or full facepiece, supplied-air respirator operated in the pressure-demand mode and equipped with either HEPA egress cartridges or an auxiliary positive-pressure, self-contained breathing apparatus (SCBA) whenever a negative exposure assessment is not available.
 - 2. Protective Clothing:
 - a. 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 to 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 GFCI. 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, use wet methods.
- C. Post DANGER Asbestos Work Area signs at entrances to regulated work areas in accordance to 29 CFR 1926.1101.
- D. Establish a regulated area that will keep unprotected personnel out and prevent the spread of asbestos 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.
- E. **HEPA-Filtered Equipment Testing.** Test and certify HEPA filtered equipment in accordance with Section 01 35 23, "General Safety Provision," Subpart 3.18, "HEPA Filter Certification."
 1. Duct the exhaust from negative-pressure machines outside occupied buildings. Notify STR with request for exemption from exterior exhaust. If exemption granted, double-filtration exhaust may be required when exhausting indoors.
 2. When using HEPA-filtered vacuum cleaner to provide negative pressure to a mini-enclosure or glove bag, the vacuum cleaner must pass the certification test and is only used as part of the work of this section.

3.03 GLOVE BAGS

- 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.
 1. Shut off and tagout ventilation units that service the area where the asbestos-containing material is being removed.

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. 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. Shut off and tagout all ventilation units that service the area where the ACM 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.
- 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.
- c. Provide transparent viewing ports at appropriate locations in critical barriers to all LLNS or local air quality district (BAAQMD, SJVAPCD) representatives to observe the work areas from outside the barrier.
- d. 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.
- e. 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

Establish decontamination chambers and connect to the regulated area for employee decontamination to meet the requirements of 29 CFR 1926.1101, CCR tile 8, Section 1529, and as specified below:

- a. Employees shall enter and exit the regulated area through the decontamination area.
- b. If needed, shower facilities shall be provided to comply with 29 CFR 1910.141(d)(3), unless it is proven to not be feasible. The showers shall be adjacent to both the equipment room and clean room unless it is demonstrated that this location is not feasible.
 - 1) If not feasible or where work is performed outdoors, asbestos contamination shall be removed in accordance to 1926.1101 (j)(1).

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.
- b. Maintain a pressure differential inside the isolated area of negative 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.
 - 1) Provide recording, continuous-reading negative-pressure monitor (i.e., manometer).
 - 2) Calibrate this monitor prior to the start of the asbestos-abatement work, and at least once every two weeks thereafter.
 - 3) Affix a calibration sticker to each monitor, with the date of calibration and the name of the person and organization performing the calibration.

- 4) 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.
- c. 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).
- d. 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 ASBESTOS ROOFING REMOVAL

- A. Perform asbestos work in accordance with controls outlines in 29 CFR 1926.1101, or alternatively CCR, title 8, Section 1529 for class II work.
 1. Shut off and tagout all ventilation units that service the area where the ACM is being removed.
 2. Lower ACM that is not intact to the ground as soon as it is practicable, but no later than the end of the work shift. Material remaining on roof shall either be kept wet, placed in an impermeable waste bag or wrapped in plastic sheeting.

3.06 ADMINISTRATIVE CONTROLS

- A. Personal Hygienic Practices and Housekeeping
 1. Do not eat, drink, use tobacco products, or apply cosmetics in the designated regulated area.

3.07 AIR-SAMPLING PLAN

- A. Conduct employee sampling in accordance with Cal and Fed/OSHA requirements pertaining to air sampling.
- B. Submit to the STR, 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 the STR. 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 the STR 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.

3.08 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 3.10 "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 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.
 4. Continue decontamination until 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.

3.09 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 29 CFR 1926.1101, other applicable laws, codes, and regulations. Mark vehicles used to transport asbestos-containing waste material as specified below during loading and unloading of waste.
- C. Seal friable 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 CCR, 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.

3.10 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, training and medical surveillance records 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 erected 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.

3.11 CLEARANCE CRITERIA

LLNS will consider the workspace 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 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 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

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SECTION 01 35 23.19
ASBESTOS SAFETY - CLASS III, CLASS IV AND “UNCLASSIFIED”

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. ACMs are indicated in the Subcontractor Area Hazards Control List (SAHCL) .

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.
4. **Class IV.** Maintenance and custodial activities that employee contacts but does not disturb ACM and PACM. Activities to clean up dust, waste and debris resulting from Class I, II, and III activities.
5. **“Unclassified.”** Activities involving the removing of ACMs that contain less than 1% asbestos by layer.

B. Reference Standards

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

1. Code of Federal Regulations (CFR)

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*
6. American Society of Mechanical Engineers International (ASME), ASME N510, *Testing of Nuclear Air Treatment Systems* (formerly American National Standards Institute [ANSI] N510)
7. National Fire Protection Association (NFPA), NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*

1.03 SUBMITTALS

- A. **Asbestos Abatement Work Plan.** Submit an “Asbestos Abatement Plan” to Lawrence Livermore National Security, LLC (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.
 - a. *Provide diagram of abatement area including negative pressure machine(s) and decontamination chambers.*
 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. Record of successful respirator fit testing and training, performed by a qualified individual within the previous 12 months, for each employee using each proposed respirator, including positive pressure respirators, on this project with the employee's name with each record.
 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. Evidence of HEPA-filtered equipment certification (see Section 01 35 23, "General Safety Provisions," Subpart 3.18, "HEPA Filter Certification").
 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 SJVAPCD Demolition/Renovation Permit Release for the specific project:
 - a. For Livermore Site: Friable ACM removal greater than 100 linear feet, 100 square feet, or 35 cubic feet, submit a separate BAAQMD asbestos notification specific for the project. If a structural element is involved submit a demolition Notification.
 - b. For Site300: Friable ACM removal greater than 160 linear feet, 260 square feet, or 35 cubic feet, 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 on-site
 - 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 Subcontract Technical Representative (STR) within one working day following the day on which the results are available.
 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) within one working day following the day on which the results are available.
 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 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 two 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 in accordance with 29 CFR 1926.1101.

- A. Polyethylene sheeting shall be fire retardant with a minimum thickness of 6-mil where the largest size possible is provided to minimize seams.
- B. Asbestos waste bags and glove bags shall be 6-mil thick.

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. Use respiratory protection in accordance with 29 CFR 1926.1101 and CCR, title 8, Section 1529.
 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 to 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

GFCI. 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 III or IV work.
- B. Unless specifically exempted by LLNS, use wet methods.
- C. Post DANGER Asbestos Work Area signs at entrances to regulated work areas in accordance to 29 CFR 1926.1101.
- D. **HEPA-Filtered Equipment Testing.** Test and certify HEPA filtered equipment in accordance with General Safety Provisions Section 01 35 23, Subpart 3.18.
- E. When using HEPA-filtered vacuum cleaner to provide negative pressure to a mini-enclosure or glove bag, the vacuum cleaner must pass the current certification test within the past 12 months and is only used as part of the work of this section.
- F. For “unclassified” asbestos work, work in accordance with controls outlined in 29 CFR 1926.1101, Subpart G.

3.03 GLOVE BAGS

- A. Perform asbestos work in accordance with controls outlined in 29 CFR 1926.1101, or alternatively CCR, title 8, Section 1529 for class III work.
 1. Shut off and tagout all ventilation units that service the area where the asbestos-containing material is being removed.

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. 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. Shut off and tagout all ventilation units that service the area where the asbestos-containing material from surrounding areas of the building or the general environment by constructing

- a mini-enclosure. Construct this enclosure from materials that meet the fire-resistance requirements.
- 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.
 - c. Provide transparent viewing ports at appropriate locations in critical barriers to allow LLNS or local air quality district (BAAQMD, SJVAPCD) representatives to observe the work areas from outside the barriers.
 - d. Make barriers isolating the work area from the surrounding areas complete and as airtight as possible.
 - e. 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.

3.05 ADMINISTRATIVE CONTROLS

A. Personal Hygienic Practices and Housekeeping

1. Do not eat, drink, use tobacco products, or apply cosmetics in the designated regulated area.

3.06 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.

3.07 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 3.9 "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 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.
 - 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.

3.08 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 29 CFR 1926.1101, other 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.

- C. Seal friable 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 CCR, 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.

3.09 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, training and medical surveillance records 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.

3.10 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 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 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 $\mu\text{g}/\text{m}^3$, 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 Lawrence Livermore National Security, LLC (LLNS) personnel may encounter lead as part of this work. The *Subcontractor Area Hazards Control List (SAHCL)* 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 the Occupational Safety and Health Administration (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: <i>Metal & Metalloid Particulates in Workplace Atmospheres (Atomic Absorption)</i> |
| 29 CFR 1926.59 | <i>Hazard Communication Safety and Health Regulation for the Construction Industry</i> |
| 29 CFR 1926.62 | <i>Lead Safety and Health Regulation for the Construction Industry</i> |

B. Department of Energy (DOE)

DOE-STD-3020, *Specification for HEPA Filters Used by DOE Contractors* (2005)

C. Consumer Product Safety Commission (CPSC)

Established limits for lead in paint

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

- | | |
|------------|---|
| NIOSH 7082 | <i>Lead by Flame AAS</i> (Atomic Absorption Spectrophotometer) |
| NIOSH 7105 | <i>Lead by HGAAS</i> (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 $\mu\text{g}/\text{m}^3$) averaged over an 8-hour period

CFR Code of Federal Regulations

CPSC Consumer Product Safety Commission

ELLAP Environmental Lead Laboratory Accreditation Program

HEPA High-Efficiency Particulate Air

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

PEL Permissible Exposure Limit of 50 micro-grams per cubic meter of air (50 $\mu\text{g}/\text{m}^3$) averaged over an 8-hour period

PPE Personal Protective Equipment

SDS Safety Data Sheet

TCLP Toxicity Characteristic Leaching Procedure

Trigger Tasks

Group 1

Tasks/operations with presumed employee exposures above the PEL but below 500 $\mu\text{g}/\text{m}^3$. 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 $\mu\text{g}/\text{m}^3$. 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 $\mu\text{g}/\text{m}^3$. 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, 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 on-site 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. SDS for encapsulants, spray glues, chemicals, and materials proposed for use on the project.
8. Evidence of HEPA-filtered equipment certification (see Section 01 35 23, "General Safety Provisions," Subpart 3.18, "HEPA Filter Certification").

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.
- D. Use respiratory protection meeting the requirements of 29 CFR 1910.134 and 29 CFR 1926.62. Use the protection factors given in 29 CFR 1910.134(d)(3)(i)(A).

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/ft²).

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 Lawrence Livermore National Security's, LLC (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. 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 (DUTF) 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 (BMPs).
 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 Subcontract Technical Representative (STR) for assistance.
 6. If storm water accumulates in a trench or other excavation outside of a known contamination source area, visually inspect the water for an oily sheen or other material. If no sheen and water is clear, it may be released to closest sanitary waste system or to ground. If a sheen or other material e.g., sludge, solids, color change 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. Pay fees associated with coverage under the “Construction General Permit” directly to the State of California.
 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 BMPs, and perform inspections.
 4. Keep a SWPPP binder on-site and available for review during working hours. Submit stormwater monitoring data to the 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. Prepare the Notice of Intent (NOI), Annual Report, Ad HOC reports, Notice of Termination and other permit registration documents in order for work to be covered by the Construction General Permit and upload to the Storm Water Multiple Application and Report Tracking System (SMARTS).

10. LLNS Responsibilities

- a. LLNS will link the Subcontractor as a data submitter in the “Storm Water Multiple Application Reporting & Tracking System” (SMARTS). LLNS will notify the LRP when permit registration documents are ready for certification.
- b. 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.
- c. LLNS may accept erosivity waivers for projects that fall within the Environmental Protection Agency’s (EPA’s) Small Construction Rainfall Erosivity Waiver. Application and processing of the waiver through SMARTS is the responsibility of the Subcontractor. A waiver does not relieve the Subcontractor of the requirements of article 1.2.B.

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. Provide the STR with the following records:
 - a. Equipment Type e.g., generator, air compressor, lift.
 - b. Equipment make and model.
 - c. Internal combustion engine fuel type e.g., diesel, gasoline, propane.
 - d. Internal combustion make and model.
 - e. Internal combustion engine maximum brake horsepower rating
 - f. Internal combustion engine Environmental Protection Agency (EPA) family identification number.
 - g. Number of hours equipment/engine operate at LLNL.

2. Ensure products, equipment, and work comply with BAAQMD or SJVAPCD regulations and the air permits issued for the Lawrence Livermore National Laboratory (LLNL) facility. Request a list of applicable air permits from the STR. Supply required information.
3. Advise the LLNS STR of HVAC work involving refrigerants. Persons installing, maintaining, servicing, repairing, or disposing of equipment containing refrigerants must be certified in accordance with Section 608 of the Clean Air Act. Some LLNL equipment containing refrigerants may also be subject to the CARB's refrigerant management regulation. Persons repairing leaks to equipment subject to the CARB regulation must also hold a current and active California contractor's license in the C38 – Refrigeration Contractor licensing classification. Equipment used for refrigerant recovery must also be certified 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.

Provide the STR with the following records as applicable:

- a. EPA certification cards of all technicians performing work handling refrigerants.
- b. Make, model, and serial numbers of all recovery equipment used to recover refrigerants.
- c. New refrigeration equipment installation records: make, model, serial number, type, and full charge of refrigerant per refrigerant circuit.
- d. Maintenance, service, repair and disposal records: location and identification of the refrigeration equipment; maintenance, service, repair or disposal date; parts of the refrigeration equipment being maintained, serviced, repaired or disposed; type of maintenance, service, repair or disposal for each part; names of the persons performing the maintenance, service, repair or disposal; and the type and amount of refrigerant added to or removed from the equipment.
- e. Leak inspections records: inspection date, inspection methods, location of each identified leak, and a certification that all visible and accessible parts of the refrigeration equipment were inspected.
- f. Initial and follow-up verification test records: refrigeration equipment location and identification, test dates, locations of all repaired leaks that were tested, types of verification tests used and the results of the tests.
- g. Refrigerant reclamation/destruction records, type and quantity of refrigerants transferred for reclamation/destruction and who it was transferred to and date of transfer.
- h. Refrigerant must be recovered from equipment being disposed of prior to removal if there is a potential for the refrigerant to leak e.g., split systems, fragile equipment, or circuits that require opening prior to removal. Equipment with a fully assembled circuit e.g, packaged units, that will not leak prior to disposal may be sent to a Certified appliance Recycler (CAR) without first recovering the refrigerant. It is the CAR's responsibility to recover any refrigerant prior to recycling or final disposal. Provide the STR with the following records:
 - 1) Make, model, and serial numbers of equipment being disposed.
 - 2) Certified technician's name and company, certification number, and type (I, II, III or Universal).
 - 3) Refrigerant type, amount (lbs), and date recovered.

4. Equipment under Large-Spark Ignition Regulation, Off-Road Diesel-Fueled Regulation and On-Road Diesel-Fueled Regulation must comply with the following:
 - a. Required labeling
 - b. Follow LLNL Idling Policy
5. Subcontractors must be in compliance with the Truck and Bus Regulation (Vehicles GVWR >14,000 lb., diesel fueled) that includes a copy of the compliance certificate by CARB or, a written statement from the vehicle owner that verifies that their fleet is in compliance with the Truck and Bus regulation.

C. Asbestos

1. Ensure that a 10-day BAAQMD or SJVAPCD notification is submitted prior to demolition or renovation activities involving the stripping of friable asbestos equal to or greater than 100 lineal ft., 100 square ft., or 35 cubic ft. (BAAQMD) while the SJVAPCD thresholds are equal to or greater than 260 lineal ft., 100 square ft., or 35 cubic ft.

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 leaks to the STR.

Stop work and 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. Collect unused concrete in drums or lined containers. Remove excess concrete for proper disposal off-site and report the total quantity disposed of or recycled to the STR. (See paragraph 1.10 for disposal.)
2. Discharge wash water from cleaning concrete trucks and concrete handling equipment in drums or lined containers and properly dispose off-site. Discharge wash and rinse water from pressure washing buildings as follows:
 - a. Collect and manage hazardous materials (e.g., lead-based paint chips) as hazardous waste.

- b. Collect wash water containing soap and discharge to the sanitary sewer. Contact STR for guidance.
 - c. Collect, characterize, and dispose of properly, waste water resulting from washing hazardous residue or areas contaminated with hazardous materials. Contact STR for guidance.
 - d. Discharge uncontaminated rinse water from pressure washing roofs through a filter system such as hay rolls or a filter bag. Contact STR for guidance.
 - e. Do not discharge wash and rinse water into a storm drain, drainage channel, or other bodies of water.
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 tanks/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 freeboard to accommodate for 24 hour 25 year storm if exposed to the elements; periodic inspection of all regulated bulk storage containers, portable bulk storage container, electrical equipment and operating equipment 55 gallons and larger (that remains at the facility for 6 months or longer); 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. The aforementioned personnel are also required to take an annual training refresher provided by LLNS.
 - 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 as determined by a service-approved LLNS biologist; 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 U.S. Fish and Wildlife Services. Contact the LLNS STR for a determination.
- B. Restrict work at Site 300 that involves exterior soil disturbance to periods of low rainfall (less than 0.25 inch per 24-hour period), periods with less than a 30 percent chance of rain, or dry weather.¹
- C. Limit Site 300 grading, excavation, and construction activities to the seasonal dry period normally acknowledged as April 15 through October 15.¹
- D. 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 work day. Whenever possible, completely 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 at least 6" wide. Earth ramps should be used whenever possible.
 3. Cap pipe ends in open excavations at the end of each work day to prevent animals entering and being trapped inside.
 4. 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.
- E. If an LLNL endangered species awareness briefing is required prior to initiating work, then LLNS requires that laborers, craftsman, supervisors, and managers directly involved in this project attend the above training.

¹ Site 300 *Site Wide Incidental Take permit conditions*.

- F. Deposit food scraps, paper and aluminum wrappers, food containers, cans, bottles, and other food-related and trash items from the project area in covered and closed trash containers that are not accessible by wildlife. Food trash bins must be emptied at the end of work day.
- G. Do not feed wildlife at LLNL sites.
- H. Do not bring animals to LLNL sites.
- I. Implement appropriate erosion control measures as identified by LLNS, such as native seeding and burlap straw wattles. Do not use materials containing plastic monofilament, nylon net, plastic net, or photodegradable netting at LLNL sites.
- J. 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 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 at the end of each work day, so that the project site is completely surrounded by exclusion fencing overnight. The exclusion fencing must remain in place during 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 sandbags or trenched into the ground. Exclusionary fencing must follow the specifications of the manufacturer, and requires inspection of the wildlife biologist after installation. Exclusionary fencing must be maintained by the subcontractor throughout the duration of the project.
 - 1. Perform weekly inspections of the exclusionary fencing associated with the project.
 - 2. Repair holes, tears, gaps, or downed fence observed during the inspection as soon as possible.
 - 3. Document the weekly inspections, and repairs that are performed. Maintain records of the inspections onsite and make available to LLNS upon request.
- K. Do not violate the exclusion zones or other areas demarcated by LLNS.
- L. 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.
- M. 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

1. Turn off electric-powered items (e.g., tools, office equipment, lights) when not in use.
2. Use energy efficient products (i.e., Energy Star products or Federal Energy Management Program- [FEMP] designated products) unless the energy-consuming product is not listed in the Energy Star program or FEMP.

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 IMPORTED FILL MATERIAL

If the project involves importing fill material, test the material to ensure it meets the LLNL Soil Reuse Criteria before being brought onto the project site.

Identify a borrow material source, and have the materials sampled and tested. Chemical analysis of collected samples will be in accordance with Section 3.1 of LLNL's *Soils Screening and Management Plan*.

Analyze collected samples with a State of California Environmental Laboratory Accreditation Program (ELAP) certified laboratory. Guidelines for sampling of the proposed borrow material is outlined in the following table (from Department of Toxic Substances Control [2010]).

Coordinate import of fill materials through the STR.

Composite samples for volatile organic compounds (VOCs) are not acceptable. Composite samples for heavy metals, pesticides, herbicides, or polycyclic aromatic hydrocarbons (PAHs) from unanalyzed stockpiled soil are also unacceptable unless the material is stockpiled at the borrow area and originates from the same source area.

Note: The individual or individuals that collect the samples must be trained (e.g., coursework or degree in Civil, Environmental or Geotechnical Engineering, or Geology) to collect soil samples for environmental testing.

Recommended Fill Material Sampling Schedule

Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every 1/2 acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	Samples per Volume
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for the first 1,000 cubic yards, +1 sample for each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for the first 5,000 cubic yards, +1 sample per each additional 1,000 cubic yards

1.11 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 contamination prior to disturbance, disposal, or re-use (disposal and reuse of excavated or demolished materials, e.g., asphalt, soil, concrete, and other materials). Coordinate such sample testing with the STR.

1. Sampling and Evaluation

If LLNS **evaluated** the materials and determines that off-site management is required, the following must occur: 1) Send non-hazardous, municipal and industrial waste to Altamont landfill, Vasco landfill, or Forward 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 or recycle to LLNS for evaluation. Contact the STR for coordination

- 2) Generated hazardous waste will be managed by LLNS.

Note: Immediately stop work and notify the STR if workers encounter unexpected impacted soil and debris or suspect items (e.g., drums, boxes, cans, bottles, or discolored, malodorous, or otherwise suspected contaminated soil and debris) and wait for further direction regarding resumption of work. Coordinate disposal of materials demonstrating visual/detectable contamination through the STR.

- a. 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 the materials from the site.

Stockpile such materials in separate piles or in roll-off bins as designated by LLNS.

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.

Note: Immediately stop work and notify the STR if workers encounter unexpected impacted soil and debris or suspect items (e.g., drums, boxes, cans, bottles, or discolored, malodorous, or otherwise suspected contaminated soil and debris) and wait for further direction regarding resumption of work. Coordinate disposal of materials demonstrating visual/detectable contamination through the STR.

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, non-friable asbestos, 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. 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.
 - a. If recovered by the subcontractor, E-waste must be managed through a Department of Toxic Substances Control (DTSC)-approved E-waste recycler and appliances must be recycled through a certified appliance recycler (CAR). Provide the STR with recycling receipts.

C. Treated Wood Waste (TWW)

If the project involves removal of treated wood, for example old treated wood used in construction for foundational supports, concrete or asphalt installation, do the following:

1. Ensure personnel handling TWW are trained in hazardous waste management, are aware of TWW hazards, and are familiar with safe handling practices.
2. Segregate non-utility from utility TWW and accumulate non-utility TWW in compliance with hazardous waste requirements identified in Title 22 of the California Code of Regulations before waste is turned over to LLNS for disposal.
3. Utility TWW must be labeled as TWW-UTILITY SERVICE, accumulated, and stored in a manner that prevents the TWW from contact with the ground and water. LLNS will manage the disposal, and provide labels and guidance to aid in utility TWW management.

D. Hazardous/Radioactive Waste (and other Regulated waste)

LLNS will manage hazardous and radioactive waste generated at LLNL. This includes universal waste such as electronics, batteries, and fluorescent light tubes.

1. In situations when the contract dictates that certain wastes or materials e.g., spent lead-acid batteries or refrigerants, are managed and recycled by the subcontractor, the subcontractor must provide the following to the STR.
 - a. The destination recycling facility
 - b. Receipts or tickets received from the recycling facility upon deliver.

Do not place these types of waste items 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.

1.12 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 and release of certain toxic and hazardous chemicals and materials through the following:

1. Make maximum use of biobased products (e.g., cleaning supplies, sealants and coatings) that are United States Department of Agriculture (USDA)-designated items (www.biopreferred.gov) unless the product cannot be acquired as follows:
 - a. Competitively within a time frame providing for compliance with the contract performance schedule.
 - b. Meeting contract performance requirements; or
 - c. At a reasonable price.
2. 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).
 - a. 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.
 - b. Purchase materials in container sizes and amounts that minimize the amount of excess material generated by the project.
 - c. 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. Use non-petroleum-based chemicals for removing potential asbestos-containing tile or mastic (e.g., Bean-e-doo or similar).
3. Purchase toxic and/or hazardous materials in container sizes and amounts that minimize the amount of excess material generated by the work.
4. 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.

5. 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.

6. 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.

1.13 CONTROLLED ITEMS AND MATERIALS

Do not use or bring the controlled items and 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)

APPENDIX 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 California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Storm Water NPDES Permit, R2-2011-0083 for the Livermore Site and the California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2008-0148, Waste Discharge Requirements Issued to Lawrence Livermore National Security, LLC, and the U.S. Department of Energy for Lawrence Livermore National Laboratory Experimental Test Site (Site 300) Sewage Evaporation and Percolation Ponds, Septic Systems, Cooling Tower Discharges, Mechanical Equipment Wastewater Discharges, and Other Low-Threat Discharges. The Storm Water Pollution Prevention Plans (SWPPP) for the Livermore Site and Site 300 document storm water requirements for the portions of LLNL (as listed in **article STORM WATER POLLUTION PREVENTION**) 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 on-site 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 sediment control techniques when bare soil is temporarily exposed. See SE factsheet series in *Storm Water Best Management Practice Handbook: Construction (CASQA)*.
- 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 Administration (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.

- Properly store and dispose of waste materials generated from the activity. See Factsheet WM-5 in *Storm Water Best Management Practice Handbook: Construction (CASQA)*.
- 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)*.
- Designate an appropriate concrete wash out area for trucks. See Factsheet WM-8 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 off-site away from disturbed areas on-site.
- 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 on-site, 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 on-site, 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)*.
- Contain and clean up waste generated by grinding, drilling, sanding, sandblasting and scraping. Use a vacuum for fine particle clean-up. Dispose of wastes properly.

APPENDIX 01 35 43-2**SOLID WASTE MANAGEMENT PLAN (SWMP)**

Company Name _____ Date _____

Company Contact _____ Phone _____

Waste Type	Preferred Disposition	Actual Disposition (Preferred or other – if other provide detail)	Final Amount (lbs.)
Concrete	Altamont landfill for reuse		
Lumber (no treated wood)	Recycle through LLNL woodyard		
Wood pallets & large landscape wood	Recycle through LLNL woodyard		
Steel and other metal	Recycle through Donation, Utilization, and Sales (DUS)		
Cardboard	Recycle in LLNL cardboard dumpster		

Mailing Address _____

Task Description _____

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APPENDIX 01 35 43-3

Lawrence Livermore National Security, LLC (LLNS)
 Lawrence Livermore National Laboratory (LLNL)
 Hazardous Material Inventory

Project information:

Project Name:	Subcontract No.:
Est. Project Start Date:	Est. Project End Date:

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 STR and the ChemTrack Hotline on ext. 4-4404 if any materials will be left on site after the project is completed.

Material	Quantity	Material	Quantity

(Additional space for inventory information is provided on the next page.)

For more information regarding this inventory:

Subcontractor Name:	Date:
Contact Name:	Telephone No.:

Questions? Please call the ChemTrack Hotline, ext.4-4404

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Basis for acceptance
- B. Quality assurance
- C. Quality control
- D. Material inspection
- E. Mockups
- F. Manufacturer's field services
- G. Repair and protection
- H. Testing and Inspection Activities

1.02 RELATED REQUIREMENTS

01 45 23 "Testing and Laboratory Services"

1.03 DEFINITIONS

- A. Installer/Applicator/Erector: Subcontractor or another entity engaged by Subcontractor as an employee or lower-tier subcontractor to perform a specific construction operation, including installation, erection, application, assembly, and similar operations.
- B. 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.

- C. **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 National Institute of Standards and Technology's (NIST) 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.
- D. **Source Quality-Control Tests:** Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- E. **Quality Assurance:** 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.
- F. **Quality Control:** Tests, inspections, procedures, and related actions 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 NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL)

- A. Submit materials and equipment documentation that are 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 or equipment of the type specified is NRTL listed, submit relevant technical data regarding the proposed material and equipment, in writing, to LLNS for resolution in accordance with section 01 33 00, "Submittals."
- B. 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.

1.05 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.

1.06 TESTING AND INSPECTION

- A. Testing and inspection activities 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 (QA) and quality -control (QC) 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 activities 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.

1.07 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.

B. Subcontractor's Quality Plan

1. See the PRD and Administrative section for quality manager requirements.
2. Prior to start of construction, prepare and submit a project-specific quality plan for LLNS review and acceptance. Describe Subcontractor's quality assurance and quality control activities and include the following:
 - a. Identify key QA/QC personnel in an organization chart.
 - b. Identify personnel responsible for quality.
 - c. Include a chart showing lines of authority, qualifications (in resume form), duties, and responsibilities of each person assigned to the QA/QC function.
 - d. Identify material sources that require source inspection per Subcontract documents.
 - e. Describe materials management and control at the source and in the field.
 - f. Describe materials and equipment receipt inspections.
 - g. Describe the coordination procedures for inspection and testing.
 - h. Describe the submittal process for product submittals and material certifications as per Subcontract documents and complying with the submittal section 01 33 00.
 - i. Describe quality control of installation activities and process control.
 - j. Describe control of testing and measuring equipment.

- k. Provide the method for preventing and identifying suspect/counterfeit items.
- l. Provide the method for identifying, tracking, and resolving non-conforming items.

1.08 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.
- E. For design-build projects, the engineer-of-record for each discipline and the architect-of-record must routinely visit the construction site to observe the progress and construction of the project to assure quality and adherence to the subcontract documents. See the PRD for the frequency of visits

1.09 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.

1.10 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.

1.11 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

**SECTION 01 42 00
CODES AND STANDARDS**

PART 1 - GENERAL

1.01 GENERAL

- A. Perform work in accordance with the version of the codes and standards in effect at time of subcontract execution 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.

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. Prepare design in accordance with the following codes and standards.
- C. 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*
 - 41 CFR 101 *Public Contracts and Property Management; Management of Buildings and Grounds: 20.17: Energy Conservation*
- D. 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*

E. 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*

F. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)

Standard 90.1 *Energy Efficient Design of New Buildings Except Low Rise Residential Buildings*

G. 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*

H. American Society of Civil Engineers (ASCE)

ASCE 7-16 *Minimum Design Loads for Buildings and Other Structures*

I. 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

SECTION 01 45 23
TESTING AND LABORATORY SERVICES

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	<i>Laboratory Compaction Characteristics of Soil Using Standard Effort</i>
ASTM D 1556	<i>Density and Unit Weight of Soil in Place by the Sand Cone Method</i>
ASTM D 1557	<i>Laboratory Compaction Characteristics Using Modified Effort</i>
ASTM D 2829	<i>Sampling and Analysis of Built Up Roofs</i>
ASTM D 3740	<i>Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction</i>
ASTM E 329	<i>Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction</i>

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.

END OF SECTION 01 45 23

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. Always place barricading and signage to encompass the entire potentially affected area of the hazard or entirety of the project. Accompany barricades with appropriate signs and place on access points.
- B. Use hard/rigid type barriers capable of standing up to inclement weather conditions for exterior barriers. Hard barrier control options include but are not limited to high visibility crowd control barricades or high visibility jersey type barricades for pedestrian detours.
- C. Protect 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.
- D. 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 load-bearing structural elements, including roofs. Verify adequacy of structural elements to support temporary loads including personnel or equipment used to place loads. Provide written verification from a California licensed civil or structural engineer (not a LLNS engineer) to the LLNS STR, that structural elements are adequate to support any and all temporary loads that Subcontractor places on roofs, structures, or load-bearing elements.
- 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. Provide and maintain trash receptacles with covers.

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

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**SECTION 01 52 00
STORAGE AND PROTECTION**

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. LLNS is not responsible for storage.
- 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

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**SECTION 01 77 00
PROJECT CLOSE-OUT**

PART 1 - GENERAL

1.01 DEFINITIONS

- A. Substantial completion: Work and related Subcontract obligations are complete in accordance with the Subcontract Documents such that LLNS may access, occupy, take possession, and use the work without impairment due to incomplete or deficient work, and without interference from the Subcontractor's completing remaining work or correcting deficiencies in completed work.

Under no circumstances is the work "substantially complete" if fire and life safety systems are not tested and accepted by the authority having jurisdiction.

See Subcontract documents for required date.

- B. Beneficial occupancy: Taking occupancy when substantially complete. See Subcontract documents for required date.

1.02 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 prior to 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.

1.03 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 that needed 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.

1.04 ADJUSTING

Adjust operating products and equipment to manufacturer's specifications and recommendations to ensure smooth and unhindered operation.

1.05 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*.

1.06 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.

1.07 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.
5. Submit an electronic copy of the manual.

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 - EXECUTION

3.01 FINAL CLEANING

- A. Execute final cleaning prior to final LLNS' project assessment.
- B. Comply with manufacturer recommended cleaning instructions.
- C. Clean debris from drainage systems.
- D. Employ professional building cleaners to thoroughly clean building.
- E. 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. Wash down and scrub, areas affected by the scope of work, material laydown areas and temporary restroom facility areas, and paving soiled as a result of construction activities
 - 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. Ensure areas including parking lots, lay down areas, grassy areas, and construction defined areas are free from nails, screws and other materials capable of puncturing or damaging items such as tires, shoes, and lawnmowers.
 - 5. Remove tools, construction equipment, machinery, and surplus material from project site.
 - 6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains,
 - 7. films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition. Clean exterior side of windows, storefronts and curtainwalls, including window framing.
 - 8. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - 9. Sweep concrete floors broom clean in unoccupied spaces.
 - 10. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - 11. 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.
 - 12. Remove labels that are not permanent.
 - 13. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

14. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 15. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- F. Remove waste and surplus materials, rubbish, and construction facilities from the site.
1. Do not burn waste materials.
 2. Do not bury debris or excess materials on the LLNL property.
 3. Do not discharge volatile, harmful or hazardous materials into drainage systems.
- G. Cleaning Inspection
1. Prior to acceptance by LLNS as substantially complete jointly with LLNS STR, conduct an inspection of interior and exterior surfaces to verify that entire Work is cleaned to LLNS' satisfaction.
 2. Should final cleaning be inadequate, as determined by the LLNS' STR, and the Subcontractor fails to correct conditions, LLNS may engage cleaning service under separate contract and deduct cost from subcontract sum.

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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SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record drawings (drawings showing the changes, also known as red-line)
 - 2. Record specifications (specifications showing the changes)
 - 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 DEFINITIONS

- A. *Released for construction*. Design documents that are stamped and sealed by the designer-of-record, stamped as released for construction, and signed by LLNS for release.
- B. *Final drawings*. Drawings that represent existing conditions either before construction activities or after construction is complete and drawings are updated to the new existing conditions.
- C. *Record drawings*. Drawings that are red-lined and show field changes made during construction.

1.03 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 the 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. The submittal or the RFI log may be used for this reporting.

1.04 RECORD DRAWINGS

- A. Record Drawings: Maintain throughout construction, at the site, one set of marked-up copies (paper or electronic) of the Subcontract drawings and shop drawings. Incorporate new and revised drawings as modifications are issued. Each change should reference the associated RFI, or the engineering change notice if applicable.
 - 1. Preparation: Mark record drawings to show the actual installation where installation varies from engineer-of-record issued drawings. 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.

1.05 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

1.06 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.

1.07 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.

1.08 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

APPENDIX 01 78 39-1
ADDITIONAL REQUIREMENTS FOR DESIGN-BUILD

A.1 FINAL DOCUMENTS

- A. Final digital data files: Immediately before inspection for certificate of substantial completion, submit marked-up record drawings to the STR for approval per article *Record Drawings* in this section. When authorized, prepare a full set of corrected digital data files of the Subcontract drawings, as follows:
1. Comply with the *LLNL Facilities Drafting Standard*, PMO.DT-ST-05.
 2. Format: Same digital data software program, version, and operating system as the original Subcontract drawings.
 3. Incorporate changes and additional information previously marked on record drawings. Delete, redraw, and add details and notations where applicable.
 4. Refer instances of uncertainty to the STR for resolution.
 5. Final digital data files: Organize digital data (CAD and Revit) 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 in conformance with *LLNL Facilities Drafting Standard*.

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