

GENERAL

1. Safety Requirements
 - A. Refer to section 01 35 26, SAFETY REQUIREMENTS for safety and infection control requirements.
2. General Intention
 - A. Contractor shall completely prepare equipment for painting operations, including cleaning, removal of dunnage and rust as required by drawings and specifications.
 - B. Visits to the site by Bidders may be made only by appointment with the Medical Center Engineering Officer.
 - C. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.
3. Statement of Bid Item(s)
 - A. General Construction: Work includes construction, alterations, drainage, painting and hot work necessary for removal of existing structures and construction of certain other items.
 - B. Electrical Work: Work includes all labor, material, equipment and supervision to perform the required electrical construction work on this project.
 - C. Mechanical work: Work includes all labor, material, equipment and supervision to perform the required mechanical construction work on this project.
4. Specifications and Drawings for Contractor
 - A. Drawings and contract documents may be obtained from the website where the solicitation is posted. Additional copies will be at Contractor's expense.
5. Construction Security Requirements
 - A. Security Plan
 1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
 2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.
 - B. Security Procedures
 1. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
 2. Before starting work the General Contractor shall give one week's notice to the Contracting Officer so that escorts can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
 3. No photography of VA premises is allowed without written permission of the Contracting Officer.
 4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.
 - C. Guards
 1. Not Applicable.
 - D. Key Control
 1. The General Contractor shall provide duplicate keys and lock combinations to the Contracting officers representative (COR) for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.

2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08 71 00, DOOR HARDWARE and coordinate.

E. Document Control

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Contracting Officer upon request.
4. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
6. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
 - a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.
 - b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

F. Motor Vehicle Restrictions

1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.
2. A limited number of (2 to 5) permits shall be issued for General Contractor and its employees for parking in designated areas only.

6. Operations and Storage Areas

- A. The Contractor shall confine all operations on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings and storage areas are not authorized.
- C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.
- D. Working space and staging of materials shall be determined by the COR.
- E. Workman are subject to the rules of the Medical Center applicable to their conduct.

- F. Execute work so as to interfere as little as possible with normal functioning of the Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by the COR where required by limited working space.
1. Do not stage materials and equipment in other than assigned areas.
 2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
 3. Buildings to Medical Center will not be vacated during duration of construction.
 4. Utilities Services: Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems (except telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the COR. All such actions shall be coordinated with the COR or Utility Company involved.
 - a. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- G. Phasing
1. The Medical Center must maintain its operation 24 hours a day 7 days a week. Therefore, any interruption in service must be scheduled and coordinated with the COR to ensure that no lapses in operation occur. It is the CONTRACTOR'S responsibility to develop a work plan and schedule detailing, at a minimum, the procedures to be employed, the equipment and materials to be used, the interim life safety measure to be used during the work, and a schedule defining the duration of the work with milestone subtasks. The work to be outlined shall include, but not be limited to:
 - a. To insure such executions, Contractor shall furnish the COR with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the COR four weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such dates to insure accomplishment of this work in successive phases mutually agreeable to the COR and Contractor.
- H. Buildings will be occupied during performance of work but immediate areas of alterations will be vacated.
1. Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Medical Centers operations will not be hindered. Contractor shall permit access to Department of Veterans Affairs personnel and patients through other construction areas which serve as routes of access to such affected areas and equipment. These routes whether access or egress shall be isolated from the construction area by temporary partitions and have walking surfaces, lighting etc to facilitate patient and staff access. Coordinate alteration work in areas occupied by Department of

Veterans Affairs so that Medical Center operations will continue during the construction period.

- I. Construction Fence
 - 1. Not Applicable.
- J. When a building and/or construction site is turned over to Contractor, Contractor shall accept entire responsibility including upkeep and maintenance therefore:
 - 1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.
 - 2. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Fire Department or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.
- K. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by COR.
 - 1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of COR. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without a detailed work plan, the Medical Center Director's prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS for additional requirements.
 - 2. Contractor shall submit a request to interrupt any such services to COR in writing, 30 days in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
 - 3. Contractor will be advised of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
 - 4. Major interruptions of any system must be requested, in writing, at least 30 calendar days prior to the desired time and shall be performed as directed by the COR.
 - 5. In case of a contract construction emergency, service will be interrupted on approval of COR. Such approval will be confirmed in writing as soon as practical.
 - 6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- L. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged at the main, branch or panel they originate from. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within

furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

- M. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:

1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles.
2. Cutting, altering and removal of existing roads, walks and entrances are not authorized.

- N. Coordinate the work for this contract with other construction operations as directed by COR. This includes the scheduling of traffic and the use of roadways, as specified in Article 15, USE OF ROADWAYS.

- O. Cemetery Projects

1. Not Applicable.

7. Alterations

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COR and a representative of VA Supply Service, of areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed to the Contracting Officer. This report shall list by rooms and spaces:

1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.
3. Shall note any discrepancies between drawings and existing conditions at site.
4. Shall designate areas for working space, materials staging and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and COR.

- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of COR and/or Supply Representative, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).

- C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and COR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:

1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.

- D. Protection: Provide the following protective measures:

1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.

3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

8. Disposal and Retention

- A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:
 1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by COR.
 2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
 3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

9. Protection of Existing Vegetation, Structures, Equipment, Utilities and Improvements

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

10. Restoration

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the COR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or

replaced with new work, and refinished and left in as good condition as existed before commencing work.

- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

11. Physical Data

- A. Not Applicable.

12. Professional Surveying Services

- A. Not Applicable.

13. Layout of Work

- A. Not Applicable.

14. As Built Drawings

- A. Not Applicable.

15. Use of Roadways

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the COR, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed and restoration performed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.
- B. When new permanent roads are to be a part of this contract, Contractor may construct them immediately for use to facilitate building operations. These roads may be used by all who have business thereon within zone of building operations.
- C. When certain buildings (or parts of certain buildings) are required to be completed in advance of general date of completion, all roads leading thereto must be completed and available for use at time set for completion of such buildings or parts thereof.

16. Resident Engineer's Field Office

- A. Not Applicable

17. Temporary use of Mechanical and Electrical Equipment

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to written approval and compliance with the following provisions:
 - 1. Permission to use each unit or system must be given by COR in writing. If the equipment is not installed and maintained in accordance with the written agreement and following provisions, the COR will withdraw permission for use of the equipment.
 - 2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Installation of temporary electrical equipment or devices shall be in accordance with NFPA 70, *National Electrical Code, Article 590, Temporary Installations*. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again

immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.

3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
 4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
 5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
 6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government. Boilers, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Boiler water must be given complete and continuous chemical treatment.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
 - C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.
18. Temporary use of New Elevators
- A. Not Applicable
19. Temporary use of Existing Elevators
- A. The Contractor and his personnel shall be permitted use of existing elevator(s) subject to the following provisions:
 1. Contractor shall make arrangements with the COR for use of elevator(s).
 2. Personnel for operating elevator(s) shall not be provided by the Department of Veterans Affairs.
 3. Contractor shall cover and provide maximum protection of the entire elevator(s) installation.
 4. All elevator(s) parts worn or damaged during temporary use shall be removed and replaced with new parts at the contractors expense. This shall be determined by an ASME accredited certified elevator safety inspector after temporary use and before acceptance by the Government. Submit report to the COR for approval.
 5. Elevator shall be tested as required by the testing section of the elevator(s) specifications before acceptance by the Department of Veterans Affairs. The Contractor shall be responsible for all cost associated with testing and inspection.
20. Toilets
- A. Contractor may have for use of Contractor's workmen, such toilet accommodations as may be assigned to Contractor by Medical Center. Contractor shall keep such places clean and be responsible for any damage done thereto by Contractor's workmen. Failure to maintain satisfactory condition in toilets will deprive Contractor of the privilege to use such toilets.
21. Availability and use of Utility Services
- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.

- B. The Contractor, at Contractor's expense and in a workmanlike manner, in compliance with code and as satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia and repair restore the infrastructure as required.
- C. Contractor shall install meters at Contractor's expense and furnish the Medical Center a monthly record of the Contractor's usage of electricity as hereinafter specified.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials.
 - 1. Obtain heat by connecting to Medical Center heating distribution system.
- E. Electricity (for Construction and Testing): Furnish all temporary electric services.
 - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.
- F. Water (for Construction and Testing): Furnish temporary water service.
 - 1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection as per code. Water is available at no cost to the Contractor.
 - 2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at COR discretion) of use of water from Medical Center's system.
- G. Fuel: Natural and LP gas and burner fuel oil required for boiler cleaning, normal initial boiler-burner setup and adjusting, and for performing the specified boiler tests will be furnished by the Government. Fuel required for prolonged boiler-burner setup, adjustments, or modifications due to improper design or operation of boiler, burner, or control devices shall be furnished and paid by the Contractor at Contractor's expense.

22. New Telephone Equipment

- A. Not Applicable

23. Tests

- A. As per specification section 22 11 23 the contractor shall provide a written testing and commissioning plan complete with component level, equipment level, sub-system level and system level breakdowns. The plan will provide a schedule and a written sequence of what will be tested, how and what the expected outcome will be. This document will be submitted for approval prior to commencing work. The contractor shall document the results of the approved plan and submit for approval with the as built documentation.
- B. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- C. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.

- D. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire system which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a system which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.
- E. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably period of time during which operating and environmental conditions remain reasonably constant and are typical of the design conditions.
- F. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

24. Instructions

- A. Not Applicable

25. Government Furnished Property

- A. Not Applicable

26. Relocated Equipment and Items

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the COR.
- C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, at the main whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.
- E. Contractor shall employ services of an installation engineer, who is an authorized representative of the manufacturer of this equipment to supervise assembly and installation of existing equipment required to be relocated.
- F. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

27. Storage Space for Department of Veterans Affairs Equipment

- A. Not Applicable

28. Construction Sign

- A. Not Applicable

29. Safety Sign

- A. Provide a Safety Sign where directed by COR. Face of sign shall be 19 mm (3/4 inch) thick exterior grade plywood. Provide two 100 mm by 100 mm (four by four inch) posts extending full height of sign and 900 mm (three feet) into ground. Set bottom of sign level at 1200 mm (four feet) above ground.
- B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.

- C. Maintain sign and remove it when directed by COR.
 - D. Standard Detail Drawing Number SD10000-02(Found on VA TIL) of safety sign showing required legend and other characteristics of sign is shown on the drawings.
 - E. Post the number of accident free days on a daily basis.
30. Photographic Documentation
- A. Not Applicable
31. Final Elevation Digital Images
- A. Not Applicable
32. Historic Preservation
- A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the COR verbally, and then with a written follow up.
33. VA TRIRIGA CPMS

VA contractors, selected by award to perform work, are required to get access to the VA TRIRIGA CPMS. The TRIRIGA CPMS is the management and collaborative environment that the VA uses for all Major, Minor and Non-Recurring Maintenance (NRM) projects within the Office of Construction & Facilities Management (CFM), Veterans Health Administration (VHA), National Cemetery Administration (NCA), and the Veterans Benefits Administration (VBA).

The contractor is solely responsible for acquiring access to the VA TRIRIGA CPMS.

To gain access to the VA TRIRIGA CPMS the contractor is encouraged to follow the licensing process outline as specified below:

- A. Requirement: TRIRIGA is the management and collaborative environment that VA uses for all construction projects. VA requires its contractors to procure TRIRIGA access as part of the cost of performance for a VA construction related contract.
- B. Access Request and Payment can be made through the following URL
<https://valicensing.oncfi.com/>

Inquiries or to request additional services, contact the following:

Craig Alsheimer, Federal Account Manager

Computerized Facility Integrations, LLC

18000 West Nine Mile Road

Suite 700

Southfield, MI 48075

Email: calsheimer@gocfi.com

Phone: 248-557-4234 Extension 6010; 410-292-7006

C. Process:

1. Once the contractor has been notified by VA of the award and a unique contract number, the contractor can enter a request for access to TRIRIGA at URL
<https://valicensing.oncfi.com/>

2. CFI will process the request for access and payment. CFI will create the USER ID and a password. Security provisions required to align the contractor to the Contract Number will be entered and an email will be generated and submitted to the requestor.
3. CFI will also provide standard terms and conditions related to the transaction and use agreement.

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GENERAL

1. Description
 - A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.
2. Contractor Representative
 - A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Contracting Officer's Representative (COTR).
 - B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
 - C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.
3. Contractor's Consultant
 - A. The Contractor shall submit a qualification proposal to the COTR, within 10 days of bid acceptance. The qualification proposal shall include:
 1. The name and address of the proposed consultant.
 2. Information to show that the proposed consultant has the qualifications to meet the requirements specified in the preceding paragraph.
 3. A representative sample of prior construction projects, which the proposed consultant has performed complete project scheduling services. These representative samples shall be of similar size and scope.
 - B. The Contracting Officer has the right to approve or disapprove the proposed consultant, and will notify the Contractor of the VA decision within seven calendar days from receipt of the qualification proposal. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The Contractor shall have their scheduling consultant approved prior to submitting any schedule for approval.
4. Computer Produced Schedules
 - A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of up to five different reports (inclusive of all pages) available within the user defined reports of the scheduling software approved by the Contracting Officer; a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively support the contractor's monthly payment request and the signed look ahead report. The COTR shall identify the five different report formats that the contractor shall provide.
 - B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also responsible for the accurate and timely

submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.

- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project.

5. The Interim and Final Project Schedule Submittal

A. Interim Schedule Submittal: Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved CPM schedule program. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start and start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the Project Schedule. The Contracting Officer's separate approval of the interim schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete working interim Project Schedule shall reflect the Contractor's approach to scheduling the complete project and shall include at a minimum, the following activities:

1. All phasing described in Section 01 00 00, GENERAL REQUIREMENTS-OPERATIONS AND STORAGE AREAS- Paragraph "Phasing"
2. Procurement- Submittals, review and approvals, fabrication and delivery, of all key and long lead time procurement items.
3. Design- All design submissions listed in the RFP solicitation, including the specified meeting and review activities.
4. Detailed design and construction activities for the first 120 work days after Notice to Proceed.
5. Summary activities which are necessary (and are not included above) to properly show:
 - a. The approach to scheduling the remaining work. The work for each major trade must be represented by at least one summary activity, so that the work cumulatively shows the entire project schedule.
 - b. Summary activities shall have the trade code of SUM

B. The interim schedule shall describe the activities to be accomplished and their interdependencies. All work activities (including design), other than procurement activities, shall be cost loaded as specified and will be the basis for progress payments during the period prior to acceptance of the schedule. The interim schedule in its original form shall contain no contract changes or delays which may have been incurred during the interim schedule development period and shall reflect the Contractor's schedule as submitted with his RFP solicitation package, or as negotiated prior to Notice to Proceed. All CPM data

supporting any time extension requests, in accordance with Article ADJUSTMENT OF CONTRACT COMPLETION, will be derived from the approved final schedule.

C. Final Diagram Submittal: Within 45 calendar days prior to the start of construction, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the network diagram. The Contracting Officer's separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling the complete project. The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final schedule development period and shall reflect the Contractors as bid schedule. These changes/delays shall be entered at the first update after the final Project Schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

D. Within 30 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Contracting Officer or his representative, will do one or both of the following.

1. Notify the Contractor concerning his actions, opinions, and objections.
2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.

E. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.

F. The Complete Project Schedule shall contain approximately three work activities/events.

6. Work Activity and Event Cost Data

A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work

activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.

- B. The Contractor shall cost load work activities/events for guarantee period services, test, balance and adjust various systems in accordance with the provisions in Article, FAR 52.232 – 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 – 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS).
- C. In accordance with FAR 52.236 – 1 (PERFORMANCE OF WORK BY THE CONTRACTOR) and VAAR 852.236 – 72 (PERFORMANCE OF WORK BY THE CONTRACTOR), the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this Section, a responsibility code for all activities/events of the project for which the Contractor's forces will perform the work.
- D. The Contractor shall cost load work activities/events for all BID ITEMS including ASBESTOS ABATEMENT. The sum of each BID ITEM work shall equal the value of the bid item in the Contractors' bid.

7. Project Schedule Requirements

A. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:

- 1. Show activities/events as:
 - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
 - b. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
 - c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
 - d. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.
 - e. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
- 2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
- 3. Break up the work into activities/events of a duration no longer than 20 work days each or one reporting period, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the COTR may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 20 work days.

4. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
 5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.
 - B. The Contractor shall submit the following supporting data in addition to the project schedule:
 1. The appropriate project calendar including working days and holidays.
 2. The planned number of shifts per day.
 3. The number of hours per shift.Failure of the Contractor to include this data shall delay the review of the submittal until the Contracting Officer is in receipt of the missing data.
 - C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the COTR. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the COTR's approval of the Project Schedule.
 - D. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce a schedule, reflecting all the activities/events of the complete project schedule being submitted.
8. Payment to the Contractor
 - A. Monthly, the contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 – 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 – 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.
 - B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.
9. Payment and Progress Reporting
 - A. Monthly schedule update meetings will be held on dates mutually agreed to by the COTR and the Contractor. Contractor and their CPM consultant (if applicable) shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the COTR three work days in advance of the schedule update meeting. Job progress will be reviewed to verify:
 1. Actual start and/or finish dates for updated/completed activities/events.
 2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
 3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.

4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
 5. Completion percentage for all completed and partially completed activities/events.
 6. Logic and duration revisions required by this section of the specifications.
 7. Activity/event duration and percent complete shall be updated independently.
- B. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified
- C. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule. The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and resident engineer for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the resident engineer. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the resident engineer within fourteen (14) calendar days of completing the regular schedule update. Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.
- D. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.
10. Responsibility for Completion
- A. If it becomes apparent from the current revised monthly progress schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.

2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
 3. Reschedule the work in conformance with the specification requirements.
 - B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the COTR for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.
11. Changes to the Schedule
 - A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes for any of the following reasons:
 1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
 3. The schedule does not represent the actual prosecution and progress of the project.
 4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.
 - B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.
 - C. Contracting Officer's approval for the revised project schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.
 - D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 – 4 (Changes) and VAAR 852.236 – 88 (Changes – Supplemental), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
 - E. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.
12. Adjustment of Contract Completion
 - A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the COTR may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total

number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.

- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under FAR 52.243 – 4 (Changes) and VAAR 852.236 – 88 (Changes – Supplemental). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

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1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
2. For the purposes of this contract, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
 - A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
 - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
 - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals will not serve as a basis for extending contract time for completion.
5. Submittals will be reviewed for compliance with contract requirements by VA PAHCS Engineering, and action thereon will be taken by COR on behalf of the Contracting Officer.
6. Upon receipt of submittals, Facilities Maintenance Supervisor will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.
7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.
8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect-Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
9. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.
 - A. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
 - B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail or FAX and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only
2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
- C. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
- D. Approved samples will be kept on file by the Resident Engineer at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.
- E. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
 1. For each drawing required, submit one legible photographic paper or vellum reproducible.
 2. Reproducible shall be full size.
 3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
 4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
 5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
 6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
 7. When work is directly related and involves more than one trade, shop drawings shall be submitted to COR under one cover.
10. Samples shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to
Thomas Kiner
VAPAHCS Engineering (138)
3801 Miranda Ave.
Palo Alto, CA. 94304
11. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Resident Engineer.

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1. Applicable Publications

- A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.
- B. American Society of Safety Engineers (ASSE):
 - A10.1-2011 Pre-Project & Pre-Task Safety and Health Planning
 - A10.34-2012 Protection of the Public on or Adjacent to Construction Sites
 - A10.38-2013 Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment American National Standard Construction and Demolition Operations
- C. American Society for Testing and Materials (ASTM):
 - E84-2013 Surface Burning Characteristics of Building Materials
- D. The Facilities Guidelines Institute (FGI):
 - FGI Guidelines-2010 Guidelines for Design and Construction of Healthcare Facilities
- E. National Fire Protection Association (NFPA):
 - 10 Standard for Portable Fire Extinguishers
 - 30 Flammable and Combustible Liquids Code
 - 51B Standard for Fire Prevention During Welding, Cutting and Other Hot Work
 - 70 National Electrical Code
 - 70B Recommended Practice for Electrical Equipment Maintenance
 - 70E Standard for Electrical Safety in the Workplace
 - 99 Health Care Facilities Code
 - 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
- F. The Joint Commission (TJC)
 - TJC Manual Comprehensive Accreditation and Certification Manual
- G. U.S. Occupational Safety and Health Administration (OSHA):
 - 29 CFR 1904 Reporting and Recording Injuries & Illnesses
 - 29 CFR 1910 Safety and Health Regulations for General Industry
 - 29 CFR 1926 Safety and Health Regulations for Construction Industry
 - CPL 2-0.124 Multi-Employer Citation Policy
- H. VHA Directive 2005-007

2. Definitions

- A. Critical Lift. A lift with the hoisted load exceeding 75% of the crane's maximum capacity; lifts made out of the view of the operator (blind picks); lifts involving two or more cranes; personnel being hoisted; and special hazards such as lifts over occupied facilities, loads lifted close to power-lines, and lifts in high winds or where other adverse environmental conditions exist; and any lift which the crane operator believes is critical.
- B. OSHA "Competent Person" (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).
- C. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

- D. High Visibility Accident. Any mishap which may generate publicity or high visibility.
 - E. Accident/Incident Criticality Categories:
 - No impact – near miss incidents that should be investigated but are not required to be reported to the VA
 - Minor incident/impact – incidents that require first aid or result in minor equipment damage (less than \$5000). These incidents must be investigated but are not required to be reported to the VA
 - Moderate incident/impact – Any work-related injury or illness that results in:
 - 1. Days away from work (any time lost after day of injury/illness onset);
 - 2. Restricted work;
 - 3. Transfer to another job;
 - 4. Medical treatment beyond first aid;
 - 5. Loss of consciousness;
 - 6. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (5) above or;
 - 7. any incident that leads to major equipment damage (greater than \$5000).
 - These incidents must be investigated and are required to be reported to the VA
 - Major incident/impact – Any mishap that leads to fatalities, hospitalizations, amputations, and losses of an eye as a result of contractors' activities. Or any incident which leads to major property damage (greater than \$20,000) and/or may generate publicity or high visibility. These incidents must be investigated and are required to be reported to the VA as soon as practical, but not later than 2 hours after the incident.
 - F. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered personnel.
3. Regulatory Requirements
- A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable [federal, state, and local] laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Facility Maintenance Manager or Contracting Officer Representative.
4. Accident Prevention Plan (APP)
- A. The APP (aka Construction Safety & Health Plan) shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.
 - B. The APP shall be prepared as follows:
 - 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language

can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.

2. Address both the Prime Contractors and the subcontractors work operations.
3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.
4. Address all the elements/sub-elements and in order as follows:
 - a. SIGNATURE SHEET. Title, signature, and phone number of the following:
 1. Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);
 2. Plan approver (company/corporate officers authorized to obligate the company);
 3. Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).
 - b. BACKGROUND INFORMATION. List the following:
 1. Contractor;
 2. Contract number;
 3. Project name;
 4. Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).
 - c. STATEMENT OF SAFETY AND HEALTH POLICY. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
 - d. RESPONSIBILITIES AND LINES OF AUTHORITIES. Provide the following:
 1. A statement of the employer's ultimate responsibility for the implementation of his SOH program.
 2. Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.
 3. The names of Competent and or Qualified Person(s) and proof of competency and or qualification to meet specific OSHA Competent and or Qualified Person(s) requirements must be attached.
 4. Requirements that no work shall be performed unless a designated competent person is present on the job site.
 5. Requirements for pre-task Activity Hazard Analysis (AHAs);
 6. Lines of authority.
 7. Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified.
 - e. SUBCONTRACTORS AND SUPPLIERS. If applicable, provide procedures for coordinating SOH activities with other employers on the job site:

1. Identification of subcontractors and suppliers (if known);
 2. Safety responsibilities of subcontractors and suppliers.
- f. Training
1. Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.
 2. Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc...) and any requirements for periodic retraining/recertification are required.
 3. Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.
 4. OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)
- g. Safety and Health Inspections
1. Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., "Site Safety and Health CP"), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.
 2. Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)
- h. Accident/Incident Investigation and Reporting. The Contractor shall conduct mishap investigations of all Moderate and Major as well as all High Visibility Incidents. The APP shall include accident/incident investigation procedure and identify person(s) responsible to provide the following to the Facility Maintenance Manager and COR.
1. Exposure data (man-hours worked)
 2. Accident investigation reports
 3. Project site injury and illness logs
- i. Plans (Programs, Procedures) Required. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:
1. Emergency response
 2. Contingency for severe weather
 3. Fire Prevention
 4. Medical Support
 5. Posting of emergency telephone numbers
 6. Prevention of alcohol and drug abuse

7. Site sanitation(housekeeping, drinking water, toilets)
 8. Night operations and lighting
 9. Hazard communication program
 10. Welding/Cutting "Hot" work
 11. Electrical Safe Work Practices (Electrical LOTO/NFPA 70E)
 12. General Electrical Safety
 13. Hazardous energy control (Machine LOTO)
 14. Site-Specific Fall Protection & Prevention
 15. Excavation/trenching
 16. Asbestos abatement
 17. Lead abatement
 18. Crane Critical lift
 19. Respiratory protection
 20. Health hazard control program
 21. Radiation Safety Program
 22. Abrasive blasting
 23. Heat/Cold Stress Monitoring
 24. Crystalline Silica Monitoring (Assessment)
 25. Demolition plan (to include engineering survey)
 26. Formwork and shoring erection and removal
 27. PreCast Concrete
 28. Public (Mandatory compliance with ANSI/ASSE A10.34-2012)
- C. Submit the APP to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES thirty (30) calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
 - D. Once accepted by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer in accordance with FAR Clause 52.236-13, *Accident Prevention*, until the matter has been rectified.
 - E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority, project overall designated OSHA Competent Person, and Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public and the environment.
5. Activity Hazard Analyses (AHES)
 - A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the

Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)

- B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.
 - C. Work shall not begin until the AHA for the work activity has been accepted by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
 - 1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.
 - 2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
 - a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.
 - b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
 - 3. Submit AHAs to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least thirty (30) calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
 - 4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
 - 5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
6. Preconstruction Conference
- A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the

project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.

- B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

7. Site Safety and Health Officer (SSHO) and Competent Person (CP)

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.
- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO.
- D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

8. Training

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations.

Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.

- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES thirty (30) calendar days prior to the date of the preconstruction conference for acceptance.
- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.
- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

9. Inspections

- A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors' "Trade Safety and Health CPs" present in their work areas. Coordinate with, and report findings and corrective actions weekly to Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.
 - 1. Results of the inspection will be documented with tracking of the identified hazards to abatement.
 - 2. The Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority will be notified immediately prior to start of the inspection and invited to accompany the inspection.
 - 3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.
 - 4. A report of the inspection findings with status of abatement will be provided to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority within one week of the onsite inspection.

10. Accidents, OSHA 300 Logs and Man Hours

- A. The prime contractor shall establish and maintain an accident reporting, recordkeeping, and analysis system to track and analyze all injuries and illnesses, high visibility incidents, and accidental property damage (both government and contractor) that occur on site. Notify the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority as soon as practical, but no more than four hours after any accident meeting the definition of a Moderate or Major incidents, High Visibility Incidents, , or any weight handling and hoisting equipment accident.

Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority determine whether a government investigation will be conducted.

- B. Conduct an accident investigation for all Minor, Moderate and Major incidents as defined in paragraph DEFINITIONS, and property damage accidents resulting in at least \$20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162 (or equivalent) , and provide the report to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority within five (5) calendar days of the accident. The Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority will provide copies of any required or special forms.
- C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority monthly.
- D. A summation of all Minor, Moderate, and Major incidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority as requested.

11. Personal Protective Equipment (PPE)

- A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.
- B. Mandatory PPE includes
 - 1. Hard Hats – unless written authorization is given by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA regulations.
 - 2. Safety glasses - unless written authorization is given by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority in circumstances of no eye hazards, appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.
 - 3. Appropriate Safety Shoes – based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority in circumstances of no foot hazards.
 - 4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

12. Infection Control

- A. Infection Control is critical in all medical center facilities. Interior construction activities causing disturbance of existing dust, or creating new dust, must be conducted within ventilation-controlled areas that minimize the flow of airborne particles into patient areas.
- B. An AHA associated with infection control will be performed by VA personnel in accordance with FGI Guidelines (i.e. Infection Control Risk Assessment (ICRA)). The ICRA procedure found on the American Society for Healthcare Engineering (ASHE) website will be utilized. Risk classifications of Class II or lower will require approval by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority before beginning any construction work. Risk classifications of Class III or higher will require a permit before beginning any construction work. Infection Control permits will be issued by the Facilities Maintenance Manager. The Infection Control Permits will be posted outside the appropriate construction area. More than one permit may be issued for a construction project if the work is located in separate areas requiring separate classes. The primary project scope area for this project is: Class 1, however, work outside the primary project scope area may vary. The required infection control precautions with each class are as follows:

- 1. Class 1 Requirements:

- a. During Construction Work:

- 1. Notify the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
 - 2. Execute work by methods to minimize raising dust from construction operations.
 - 3. Ceiling tiles: Immediately replace a ceiling tiles displaced for visual inspection.

- b. Upon Completion:

- 1. Clean work area upon completion of task.
 - 2. Notify the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.

- c. Barriers shall be erected as required based upon classification (Class III & IV requires barriers) and shall be constructed as follows:

- 1. Not Applicable

- d. Products and Materials

- 1. Not Applicable

- e. Before any construction on site begins, all contractor personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.

- f. A dust control program will be establish and maintained as part of the contractor's infection preventive measures in accordance with the FGI Guidelines for Design and Construction of Healthcare Facilities. Prior to start of work, prepare a plan detailing project-specific dust protection measures with associated product data, including periodic status reports, and submit to Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

- g. Medical center Infection Control personnel will monitor for airborne disease (e.g. aspergillosis) during construction. A baseline of conditions will be established by the medical center prior to the start of work and

periodically during the construction stage to determine impact of construction activities on indoor air quality with safe thresholds established.

- h. In general, the following preventive measures shall be adopted during construction to keep down dust and prevent mold.
 - 1. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. HEPA filtration is required where the exhaust dust may reenter the medical center.
 - 2. Exhaust hoses shall be exhausted so that dust is not reintroduced to the medical center.
 - 3. Adhesive Walk-off/Carpet Walk-off Mats shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
 - 4. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as it is created. Transport these outside the construction area in containers with tightly fitting lids.
 - 5. The contractor shall not haul debris through patient-care areas without prior approval of the Resident Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
 - 6. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
 - 7. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.
- i. Final Cleanup
 - 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
 - 2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
 - 3. All new air ducts shall be cleaned prior to final inspection.

j. Exterior Construction

1. Contractor shall verify that dust will not be introduced into the medical center through intake vents, or building openings. HEPA filtration on intake vents is required where dust may be introduced.
2. Dust created from disturbance of soil such as from vehicle movement will be wetted with use of a water truck as necessary.
3. All cutting, drilling, grinding, sanding, or disturbance of materials shall be accomplished with tools equipped with either local exhaust ventilation (i.e. vacuum systems) or wet suppression controls.

13. Tuberculosis Screening

- A. Contractor shall provide written certification that all contract employees assigned to the work site have had a pre-placement tuberculin screening within 90 days prior to assignment to the worksite and been found have negative TB screening reactions. Contractors shall be required to show documentation of negative TB screening reactions for any additional workers who are added after the 90-day requirement before they will be allowed to work on the work site. NOTE: This can be the Center for Disease Control (CDC) and Prevention and two-step skin testing or a Food and Drug Administration (FDA)-approved blood test.
1. Contract employees manifesting positive screening reactions to the tuberculin shall be examined according to current CDC guidelines prior to working on VHA property.
 2. Subsequently, if the employee is found without evidence of active (infectious) pulmonary TB, a statement documenting examination by a physician shall be on file with the employer (construction contractor), noting that the employee with a positive tuberculin screening test is without evidence of active (infectious) pulmonary TB.
 3. If the employee is found with evidence of active (infectious) pulmonary TB, the employee shall require treatment with a subsequent statement to the fact on file with the employer before being allowed to return to work on VHA property.

14. Fire Safety

- A. Fire Safety Plan: Establish and maintain a site-specific fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.
- B. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- C. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- D. Temporary Construction Partitions
1. Not Applicable
- E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

- F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- J. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the Resident Engineer.
- K. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- L. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority at least thirty six (36) hours in advance.
- M. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- N. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- O. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- P. If required, submit documentation to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

15. Electrical

- A. All electrical work shall comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J – General Environmental Controls, 29 CFR Part 1910 Subpart S – Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.
- B. All qualified persons performing electrical work under this contract shall be licensed journeyman or master electricians. All apprentice electricians performing under this contract shall be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.
- C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply with this requirement is

subject to immediate termination in accordance with FAR clause 52.236-5(c). Only in rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards, or is infeasible due to equipment design or operational limitations is energized work permitted. The Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA and permit specific to energized work activities will be developed, reviewed, and accepted by the VA prior to the start of that activity.

1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.
 2. Verification of the absence of voltage after de-energization and lockout/tagout is considered "energized electrical work" (live work) under NFPA 70E, and shall only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rated personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.
 3. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.
- D. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alternative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work shall not begin until the AHA for the work activity and permit for energized work has been reviewed and accepted by the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
- E. Ground-fault circuit interrupters. GFCI protection shall be provided where an employee is operating or using cord- and plug-connected tools related to construction activity supplied by 125-volt, 15-, 20-, or 30- ampere circuits. Where employees operate or use equipment supplied by greater than 125-volt, 15-, 20-, or 30- ampere circuits, GFCI protection or an assured equipment grounding conductor program shall be implemented in accordance with NFPA 70E - 2015, Chapter 1, Article 110.4(C)(2).

16. Fall Protection

- A. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.
1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.
 2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.
 3. A Warning Line System (WLS) may ONLY be used on floors or flat or low-sloped roofs (between 0 - 18.4 degrees or 4:12 slope) and shall be erected around all sides of the work area (See 29 CFR 1926.502(f) for construction of WLS requirements).

Working within the WLS does not require FP. No worker shall be allowed in the area between the roof or floor edge and the WLS without FP. FP is required when working outside the WLS.

4. Fall protection while using a ladder will be governed by the OSHA requirements.

17. Scaffolds and other Work Platforms

- A. All scaffolds and other work platforms construction activities shall comply with 29 CFR 1926 Subpart L.
- B. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) as stated in Section 1.16.
- C. The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.
 1. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.
 2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.
 3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.
 4. Emergency descent devices shall not be used as working platforms.
- D. Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:
 1. The Competent Person's name and signature
 2. Dates of initial and last inspections
- E. Mast Climbing work platforms: When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection shall be used.

18. Excavation and Trenches

- A. Not Applicable

19. Cranes

- A. Not Applicable

20. Control of Hazardous Energy (Lockout/Tagout)

- A. All installation, maintenance, and servicing of equipment or machinery shall comply with 29 CFR 1910.147 except for specifically referenced operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment shall comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

21. Confined Space Entry

- A. All confined space entry shall comply with 29 CFR 1926, Subpart AA except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].
- B. A site-specific Confined Space Entry Plan (including permitting process) shall be developed and submitted to the Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority.

22. Welding and Cutting

- A. As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Facilities Maintenance Manager or Contracting Officer Representative or Government Designated Authority at least thirty six (36) hours in advance.

23. Ladders

- A. All Ladder use shall comply with 29 CFR 1926 Subpart X.

- B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.
- C. Manufacturer safety labels shall be in place on ladders.
- D. Step Ladders shall not be used in the closed position.
- E. Top steps or cap of step ladders shall not be used as a step.
- F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.
 - 1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.
 - 2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.
- G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

24. Floor and Wall Opening

- A. Not Applicable

--- E N D ---

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
 - 1. Waste Management Plan development and implementation.
 - 2. Techniques to minimize waste generation.
 - 3. Sorting and separating of waste materials.
 - 4. Salvage of existing materials and items for reuse or resale.
 - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
 - 1. Soil.
 - 2. Inerts (eg, concrete, masonry and asphalt).
 - 3. Clean dimensional wood and palette wood.
 - 4. Green waste (biodegradable landscaping materials).
 - 5. Engineered wood products (plywood, particle board and I-joists, etc).
 - 6. Metal products (eg, steel, wire, beverage containers, copper, etc).
 - 7. Cardboard, paper and packaging.
 - 8. Bitumen roofing materials.
 - 9. Plastics (eg, ABS, PVC).
 - 10. Carpet and/or pad.
 - 11. Gypsum board.
 - 12. Insulation.
 - 13. Paint.
 - 14. Fluorescent lamps.

1.2 RELATED WORK

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 00, GENERAL REQUIREMENTS.

C. Lead Paint: Section 02 83 33.13, LEAD BASED PAINT REMOVAL AND DISPOSAL.

1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
1. Excess or unusable construction materials.
 2. Packaging used for construction products.
 3. Poor planning and/or layout.
 4. Construction error.
 5. Over ordering.
 6. Weather damage.
 7. Contamination.
 8. Mishandling.
 9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to recycle construction and demolition waste to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org/tools/cwm.php> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

1.4 TERMINOLOGY

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.

- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
 - 1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
 - 2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:
- B. Prepare and submit to the Resident Engineer a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
 - 1. Procedures to be used for debris management.
 - 2. Techniques to be used to minimize waste generation.
 - 3. Analysis of the estimated job site waste to be generated:

- a. List of each material and quantity to be salvaged, reused, recycled.
 - b. List of each material and quantity proposed to be taken to a landfill.
- 4. Detailed description of the Means/Methods to be used for material handling.
 - a. On site: Material separation, storage, protection where applicable.
 - b. Off site: Transportation means and destination. Include list of materials.
 - 1) Description of materials to be site-separated and self-hauled to designated facilities.
 - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
 - c. The names and locations of mixed debris reuse and recycling facilities or sites.
 - d. The names and locations of trash disposal landfill facilities or sites.
 - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.
- B. U.S. Green Building Council (USGBC):
LEED Green Building Rating System for New Construction

1.7 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

PART 3 - EXECUTION**3.1 COLLECTION**

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

3.2 DISPOSAL

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

3.3 REPORT

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

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- - - E N D - - -

GENERAL

1. Description

- a. This Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS shall form the basis of the construction phase commissioning process and procedures. The Commissioning Agent shall add, modify, and refine the commissioning procedures, as approved by the Department of Veterans Affairs (VA), to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks.
- b. Various sections of the project specifications require equipment startup, testing, and adjusting services. Requirements for startup, testing, and adjusting services specified in the Division 09 and Division 26 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The Contractor shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
- c. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications shall be submitted to the VA and the Commissioning Agent to be indexed for future reference.
- d. Where training or educational services for VA are required and specified in other sections of the specifications, including but not limited to Division 09 and Division 26 series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.
- e. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and the VA's operational needs. The commissioning process shall encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction and post-occupancy phases is intended to achieve the following specific objectives according to the contract documents.
 - i. Verify that the applicable equipment and systems are installed in accordance with the contract documents and according to the manufacturer's recommendations.
 - ii. Verify and document proper integrated performance of equipment and systems.
 - iii. Verify that Operations & Maintenance documentation is complete.
 - iv. Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.
 - v. Verify that the VA's operating personnel are adequately trained to enable them to operate, monitor, adjust, maintain, and repair building systems in an effective and energy-efficient manner.
 - vi. Document the successful achievement of the commissioning objectives listed above.
- f. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

2. Contractual Relationships

- a. For this construction project, the Department of Veterans Affairs contracts with a Contractor to provide construction services. The contracts are administered by the VA Contracting Officer and the Resident Engineer as the designated representative of the Contracting Officer. On this project, the authority to modify the contract in any way is strictly limited to the authority of the Contracting Officer.

- b. In this project, only two contract parties are recognized and communications on contractual issues are strictly limited to VA Resident Engineer and the Contractor. It is the practice of the VA to require that communications between other parties to the contracts (Subcontractors and Vendors) be conducted through the Resident Engineer and Contractor. It is also the practice of the VA that communications between other parties of the project (Commissioning Agent and Architect/Engineer) be conducted through the Resident Engineer.
 - c. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a high level of communication and cooperation between the Commissioning Agent and all other parties (Architects, Engineers, Subcontractors, Vendors, third party testing agencies, etc.) is essential to the success of the Commissioning effort.
 - d. With these fundamental practices in mind, the commissioning process described herein has been developed to recognize that, in the execution of the Commissioning Process, the Commissioning Agent must develop effective methods to communicate with every member of the construction team involved in delivering commissioned systems while simultaneously respecting the exclusive contract authority of the Contracting Officer and Resident Engineer. Thus, the procedures outlined in this specification must be executed within the following limitations:
 - i. No communications (verbal or written) from the Commissioning Agent shall be deemed to constitute direction that modifies the terms of any contract between the Department of Veterans Affairs and the Contractor.
 - ii. Commissioning Issues identified by the Commissioning Agent will be delivered to the Resident Engineer and copied to the designated Commissioning Representatives for the Contractor and subcontractors on the Commissioning Team for information only in order to expedite the communication process. These issues must be understood as the professional opinion of the Commissioning Agent and as suggestions for resolution.
 - iii. In the event that any Commissioning Issues and suggested resolutions are deemed by the Resident Engineer to require either an official interpretation of the construction documents or require a modification of the contract documents, the Contracting Officer or Resident Engineer will issue an official directive to this effect.
 - iv. All parties to the Commissioning Process shall be individually responsible for alerting the Resident Engineer of any issues that they deem to constitute a potential contract change prior to acting on these issues.
 - v. Authority for resolution or modification of design and construction issues rests solely with the Contracting Officer or Resident Engineer, with appropriate technical guidance from the Architect/Engineer and/or Commissioning Agent.
3. Related Work
- a. Section 01 00 00, GENERAL REQUIREMENTS.
 - b. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
 - c. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
 - d. Section 09 91 00, PAINTING.
 - e. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic Restraint.
4. Summary
- a. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

- b. The commissioning activities have been developed to support the VA requirements to meet guidelines for Federal Leadership in Environmental, Energy, and Economic Performance.

5. Acronyms

• ACOR	Alternate Contracting Officer's Representative
• A/E	Architect/Engineer Design Team
• AHJ	Authority Having Jurisdiction
• ASHRAE	Association Society for Heating Air Condition and Refrigeration Engineers
• BOD	Basis of Design
• BSC	Building Systems Commissioning
• CCE	Contracting Center of Excellence
• CD	Construction Documents
• CFE	Contractor Furnished Equipment
• CFR	Code of Federal Regulations
• CONUS	Continental United States (excludes Alaska and Hawaii)
• CO	Contracting Officer
• COR	Contracting Officer Representative
• COTS	Commercial-Off-the-Shelf
• CPC	Construction Phase Commissioning
• Cx	Commissioning
• CxA	Commissioning Agent
• CxM	Commissioning Manager
• CxR	Commissioning Representative
• DPC	Design Phase Commissioning
• FAR	Federal Acquisition Regulation
• FPT	Functional Performance Test
• HIPAA	Health Insurance Portability and Accountability Act of 1996
• IAW	In Accordance With
• LEED	Leadership in Energy and Environmental Design
• LOTO	Lock Out/Tag Out
• MOP	Measure of Performance
• O&M	Operations and Maintenance
• OCI	Organizational Conflict of Interest
• PIPO	Phase In/Phase Out
• POC	Point of Contact
• PRS	Performance Requirements Summary
• SOW	Performance Work Statement
• QA	Quality Assurance
• QAP	Quality Assurance Program
• QASP	Quality Assurance Surveillance Plan
• QC	Quality Control
• QCP	Quality Control Program
• SOW	Statement of Work
• TE	Technical Exhibit
• VA	Department of Veterans Affairs

- VAPAHCS VA Palo Alto Health Care System

6. Definitions

- **Acceptance Phase Commissioning:** Commissioning tasks executed after most construction has been completed, most Site Observations and Static Tests have been completed and Pre-Functional Testing has been completed and accepted. The main commissioning activities performed during this phase are verification that the installed systems are functional by conducting Systems Functional Performance tests and Owner Training.
- **Accuracy:** The capability of an instrument to indicate the true value of a measured quantity.
- **Back Check:** A back check is a verification that an agreed upon solution to a design comment has been adequately addressed in a subsequent design review.
- **Basis of Design:** The Engineer's Basis of Design is comprised of two components: the Design Criteria and the Design Narrative, these documents record the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements (OPR) and to satisfy applicable regulatory requirements, standards, and guidelines.
- **Benchmarks:** Benchmarks are the comparison of a building's energy usage to other similar buildings and to the building itself.. For example, ENERGY STAR Portfolio Manager is a frequently used and nationally recognized building energy benchmarking tool.
- **Building Information Modeling:** Building Information Modeling is a parametric database which allows a building to be designed and constructed virtually in 3D, and provides reports both in 2D views and as schedules. This electronic information can be extracted and reused for pre-populating facility management CMMS systems. Building Systems Commissioning (BSC): NEBB acronym used to designate its commissioning program.
- **Calibrate:** The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.
- **CCTV:** Closed circuit Television. Normally used for security surveillance and alarm detections as part of a special electrical security system.
- **COBie:** Construction Operations Building Information Exchange (COBie) is an electronic industry data format used to transfer information developed during design, construction, and commissioning into the Computer Maintenance Management Systems (CMMS) used to operate facilities. See the Whole Building Design Guide website for further information (<http://www.wbdg.org/resources/cobie.php>).
- **Commissionability:** Defines a design component or construction process that has the necessary elements that will allow a system or component to be effectively measured, tested, operated and commissioned.
- **Commissioning Agent:** The qualified Commissioning Professional who administers the Cx process by managing the Cx team and overseeing the Commissioning Process. Where CxA is used in this specification it means the Commissioning Agent, members of his staff or appointed members of the commissioning team. Note that LEED uses the term Commissioning Authority in lieu of Commissioning Agent.
- **Commissioning Checklist:** Lists of data or inspections to be verified to ensure proper system or component installation, operation, and function. Verification checklists are developed and used during all phases of the commissioning process to verify that the Owner's Project Requirements (OPR) is being achieved.
- **Commissioning Design Review:** The commissioning design review is a collaborative review of the design professionals design documents for items pertaining to the following: owner's project requirements; basis of design; operability and maintainability (O&M) including documentation; functionality; training; energy efficiency, control systems' sequence of operations including building automation system features; commissioning specifications and the ability to functionally test the systems.
- **Commissioning Issue:** A condition identified by the Commissioning Agent or other member of the Commissioning Team that adversely affects the commissionability, operability, maintainability, or functionality of a system, equipment, or component. A condition that is in conflict with the Contract

Documents and/or performance requirements of the installed systems and components. (See also – Commissioning Observation)

- Commissioning Manager: A qualified individual appointed by the Contractor to manage the commissioning process on behalf of the Contractor.
- Commissioning Observation: An issue identified by the Commissioning Agent or other member of the Commissioning Team that does not conform to the project OPR, contract documents or standard industry best practices. (See also Commissioning Issue)
- Commissioning Plan: A document that outlines the commissioning process, commissioning scope and defines responsibilities, processes, schedules, and the documentation requirements of the Commissioning Process.
- Commissioning Process: A quality focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems, components, and assemblies are planned, designed, installed, tested, can be operated, and maintained to meet the Owner's Project Requirements.
- Commissioning Report: The final commissioning document which presents the commissioning process results for the project. Cx reports include an executive summary, the commissioning plan, issue log, correspondence, and all appropriate check sheets and test forms.
- Commissioning Representative: An individual appointed by a sub-contractor to manage the commissioning process on behalf of the sub-contractor.
- Commissioning Specifications: The contract documents that detail the objective, scope and implementation of the commissioning process as developed in the Commissioning Plan.
- Commissioning Team: Individual team members whose coordinated actions are responsible for implementing the Commissioning Process.
- Construction Phase Commissioning: All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.
- Contract Documents: Contract documents include design and construction contracts, price agreements and procedure agreements. Contract Documents also include all final and complete drawings, specifications and all applicable contract modifications or supplements.
- Contractor: A supplier or vendor awarded a contract to provide specific supplies or service to the government. The term used in this contract refers to the prime.
- Coordination Drawings: Drawings showing the work of all trades that are used to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances. On mechanical projects, coordination drawings include structural steel, ductwork, major piping and electrical conduit and show the elevations and locations of the above components.
- Sub-Contractor: One that enters into a contract with a prime contractor. The Government does not have "privity of contract" with the subcontractor.
- Contracting Officer: The person with the authority to enter into, administer, and or terminate contracts, and make related determinations and findings on behalf of the government. Note: The only individual who can legally bind the government.
- Contracting Officer Representative: Upon award of the contract the Contractor will receive a copy of the Contracting Officer Representative Delegation Letter. The letter will state the responsibilities and limitations of the Contracting Officer Representative, especially with regard to changes in cost or price, estimates or changes in delivery dates. The Contracting Officer Representative is not authorized to change any of the terms and conditions of the resulting order. The Contracting Officer Representative will be authorized to perform the following functions:
 - § Maintain written and oral communications with the Contractor concerning technical aspects of the contract.
 - § Issue written interpretations of technical requirements, including Government drawings, designs and specifications.
 - § Communicate with the Contracting Officer and the Contractor of any deficiencies.

- § Coordinate availability of government furnished property.
- § Provide site entry of Contractor personnel.
- § Monitor and inspect Contractor's performance.
- Deliverable: Anything that can be physically delivered, but may include non-manufactured things such as meeting minutes or reports.
- Key Personnel: Those individuals identified to be important to the Contractor's performance.
- Physical Security: Actions that prevent the loss or damage of Government property.
- Quality Assurance: The government procedures to verify that services being performed by the Contractor are performed according to acceptable standards.
- Quality Assurance Surveillance Plan: An organized written document specifying the surveillance methodology to be used for surveillance of contractor performance.
- Quality Control Plan: The Contractor's plan to ensure the necessary measures are taken to meet the terms and conditions of the contract.
- Periodic Surveillance: This method is used to evaluate on a periodic basis such as monthly, quarterly or semi-annually.
- 100 % Inspection: This method will be used for tasks that occur infrequently. The COR or designated representative will inspect and evaluate performance.
- Work Day: The number of hours per day the Contractor provides services in accordance with the contract.
- Work Week: Monday through Friday, unless specified otherwise.

7. Applicable Publications

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- a. American Conference of Governmental Industrial Hygienists (ACGIH)
 - ACGIH TLV-BKLT-2012, Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
 - ACGIH TLV-DOC-2012, Documentation of Threshold Limit Values and Biological Exposure Indices
- b. ASME International (ASME)
 - A13.1-07(R2013), Scheme for the Identification of Piping Systems
- c. Code of Federal Regulation (CFR)
 - 40 CFR 59, Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- d. Commercial Item Description (CID)
 - A-A-1272A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- e. Federal Specifications (Fed Spec)
 - TT-P-1411A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- f. Master Painters Institute (MPI)
 - MPI 1, Aluminum Paint
 - MPI 4, Interior/ Exterior Latex Block Filler
 - MPI 5, Exterior Alkyd Wood Primer
 - MPI 7, Exterior Oil Wood Primer
 - MPI 8, Exterior Alkyd, Flat MPI Gloss Level 1
 - MPI 9, Exterior Alkyd Enamel MPI Gloss Level 6
 - MPI 10, Exterior Latex, Flat

- MPI 11, Exterior Latex, Semi-Gloss
 - MPI 18, Organic Zinc Rich Primer
 - MPI 22, Aluminum Paint, High Heat (up to 590° - 1100F)
 - MPI 27, Exterior / Interior Alkyd Floor Enamel, Gloss
 - MPI 31, Polyurethane, Moisture Cured, Clear Gloss
 - MPI 36, Knot Sealer
 - MPI 43, Interior Satin Latex, MPI Gloss Level 4
 - MPI 44, Interior Low Sheen Latex, MPI Gloss Level 2
 - MPI 45, Interior Primer Sealer
 - MPI 46, Interior Enamel Undercoat
 - MPI 47, Interior Alkyd, Semi-Gloss, MPI Gloss Level 5
 - MPI 48, Interior Alkyd, Gloss, MPI Gloss Level 6
 - MPI 50, Interior Latex Primer Sealer
 - MPI 51, Interior Alkyd, Eggshell, MPI Gloss Level 3
 - MPI 52, Interior Latex, MPI Gloss Level 3
 - MPI 53, Interior Latex, Flat, MPI Gloss Level 1
 - MPI 54, Interior Latex, Semi-Gloss, MPI Gloss Level 5
 - MPI 59, Interior/Exterior Alkyd Porch & Floor Enamel, Low Gloss
 - MPI 60, Interior/Exterior Latex Porch & Floor Paint, Low Gloss
 - MPI 66, Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved)
 - MPI 67, Interior Latex Fire Retardant, Top-Coat (ULC Approved)
 - MPI 68, Interior/ Exterior Latex Porch & Floor Paint, Gloss
 - MPI 71, Polyurethane, Moisture Cured, Clear, Flat
 - MPI 77, Epoxy Cold Cured, Gloss
 - MPI 79, Marine Alkyd Metal Primer
 - MPI 90, Interior Wood Stain, Semi-Transparent
 - MPI 91, Wood Filler Paste
 - MPI 94, Exterior Alkyd, Semi-Gloss
 - MPI 95, Fast Drying Metal Primer
 - MPI 98, High Build Epoxy Coating
 - MPI 101, Epoxy Anti-Corrosive Metal Primer
 - MPI 108, High Build Epoxy Coating, Low Gloss
 - MPI 114, Interior Latex, Gloss
 - MPI 119, Exterior Latex, High Gloss (acrylic)
 - MPI 134, Galvanized Water Based Primer
 - MPI 135, Non-Cementitious Galvanized Primer
 - MPI 138, Interior High Performance Latex, MPI Gloss Level 2
 - MPI 139, Interior High Performance Latex, MPI Gloss Level 3
 - MPI 140, Interior High Performance Latex, MPI Gloss Level 4
 - MPI 141, Interior High Performance Latex (SG) MPI Gloss Level 5
 - MPI 163, Exterior Water Based Semi-Gloss Light Industrial Coating, MPI Gloss Level 5
- g. National Electrical Manufacturers Association (NEMA)
- ICS 6-1993 (R2001, R2006), Industrial Control and Systems: Enclosures
 - 250-2014, Enclosures for Electrical Equipment (1000 Volts Maximum)

- h. National Fire Protection Association
 - 70, National Electrical Code
 - 70B, Recommended Practice for Electrical Equipment Maintenance
 - 70E, Standard for Electrical Safety in the Workplace
 - i. Society for Protective Coatings (SSPC)
 - SSPC SP 1-82(R2004), Solvent Cleaning
 - SSPC SP 2-82(R2004), Hand Tool Cleaning
 - SSPC SP 3-28(R2004), Power Tool Cleaning
 - SSPC SP 10/NACE No.2, Near-White Blast Cleaning
 - SSPC PA Guide 10, Guide to Safety and Health Requirements
 - j. Underwriters' Laboratories, Inc. (UL)
 - 508-1999 (R2013), Standards for Industrial Control Equipment
 - k. U.S. National Archives and Records Administration (NARA)
 - 29 CFR 1910.1000, Air Contaminants
8. Systems to be Commissioned
- a. Commissioning of a system or systems specified for this project is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel, is required in cooperation with the VA and the Commissioning Agent.
9. Commissioning Team
- a. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project Superintendent and subcontractors, installers, schedulers, suppliers, and specialists deemed appropriate by the Department of Veterans Affairs (VA) and Commissioning Agent.
 - b. Members Appointed by Contractor:
 - i. Contractor' Commissioning Manager: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.
 - ii. Contractor's Commissioning Representative(s): Individual(s), each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions.
 - c. Members Appointed by VA:
 - i. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. The VA will engage the CxA under a separate contract.
 - ii. User: Representatives of the facility user and operation and maintenance personnel.
 - iii. A/E: Representative of the Architect and engineering design professionals.
10. VA's Commissioning Responsibilities
- a. Appoint an individual, company or firm to act as the Commissioning Agent.
 - b. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 - i. Coordination meetings.
 - ii. Training in operation and maintenance of systems, subsystems, and equipment.
 - iii. Testing meetings.
 - iv. Witness and assist in Systems Functional Performance Testing.
 - v. Demonstration of operation of systems, subsystems, and equipment.

- c. Provide the Construction Documents, prepared by Architect and approved by VA, to the Commissioning Agent and for use in managing the commissioning process, developing the commissioning plan, systems manuals, and reviewing the operation and maintenance training plan.

11. Contractor's Commissioning Responsibilities

- a. The Contractor shall assign a Commissioning Manager to manage commissioning activities of the Contractor, and subcontractors.
- b. The Contractor shall ensure that the commissioning responsibilities outlined in these specifications are included in all subcontracts and that subcontractors comply with the requirements of these specifications.
- c. The Contractor shall ensure that each installing subcontractor shall assign representatives with expertise and authority to act on behalf of the subcontractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 - i. Participate in commissioning coordination meetings.
 - ii. Conduct operation and maintenance training sessions in accordance with approved training plans.
 - iii. Verify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 - iv. Evaluate commissioning issues and commissioning observations identified in the Commissioning Issues Log, field reports, test reports or other commissioning documents. In collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - v. Review and comment on commissioning documentation.
 - vi. Participate in meetings to coordinate Systems Functional Performance Testing.
 - vii. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to Commissioning Agent for incorporation into the commissioning plan.
 - viii. Provide information to the Commissioning Agent for developing commissioning plan.
 - ix. Participate in training sessions for VA's operation and maintenance personnel.
 - x. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures to conduct Systems Functional Performance Testing of installed systems.

12. Commissioning Agent's Responsibilities

- a. Organize and lead the commissioning team.
- b. Prepare the commissioning plan.
- c. Review and comment on selected submittals from the Contractor for general conformance with the Construction Documents. Review and comment on the ability to test and operate the system and/or equipment, including providing gages, controls and other components required to operate, maintain, and test the system. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the Construction Documents.
- d. At the beginning of the construction phase, conduct an initial construction phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; Pre-Functional Checklists, Systems Functional Performance Testing; and project completion.
- e. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss status of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The Commissioning

- Agent shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- f. Observe construction and report progress, observations and issues. Observe systems and equipment installation for adequate accessibility for maintenance and component replacement or repair, and for general conformance with the Construction Documents.
 - g. Prepare Project specific Pre-Functional Checklists and Systems Functional Performance Test procedures.
 - h. Coordinate Systems Functional Performance Testing schedule with the Contractor.
 - i. Witness selected systems startups.
 - j. Verify selected Pre-Functional Checklists completed and submitted by the Contractor.
 - k. Witness and document Systems Functional Performance Testing.
 - l. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
 - m. Review and comment on operation and maintenance (O&M) documentation and systems manual outline for compliance with the Contract Documents.
 - n. Review operation and maintenance training program developed by the Contractor. Verify training plans provide qualified instructors to conduct operation and maintenance training.
 - o. Prepare commissioning Field Observation Reports.
 - p. Prepare the Final Commissioning Report.
 - q. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal Systems Functional Performance Testing. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.
 - r. Assemble the final commissioning documentation, including the Final Commissioning Report and Addendum to the Final Commissioning Report.

13. Commissioning Documentation

- a. Commissioning Plan: A document, prepared by Commissioning Agent, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited, to the following:
 - i. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 - ii. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
 - iii. 3. Identification of systems and equipment to be commissioned.
 - iv. 4. Schedule of Commissioning Coordination meetings.
 - v. Identification of items that must be completed before the next operation can proceed.
 - vi. Description of responsibilities of commissioning team members.
 - vii. Description of observations to be made.
 - viii. Description of requirements for operation and maintenance training.

- ix. Schedule for commissioning activities with dates coordinated with overall construction schedule.
 - x. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 - xi. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
 - xii. Preliminary Systems Functional Performance Test procedures.
- b. Systems Functional Performance Test Procedures: The Commissioning Agent will develop Systems Functional Performance Test Procedures for each system to be commissioned, including subsystems, or equipment and interfaces or interlocks with other systems. Systems Functional Performance Test Procedures will include a separate entry, with space for comments, for each item to be tested. Preliminary Systems Functional Performance Test Procedures will be provided to the VA, Architect/Engineer, and Contractor for review and comment. The Systems Performance Test Procedure will include test procedures for each mode of operation and provide space to indicate whether the mode under test responded as required. Each System Functional Performance Test procedure, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
 - i. Name and identification code of tested system.
 - ii. Test number.
 - iii. Time and date of test.
 - iv. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 - v. Dated signatures of the person performing test and of the witness, if applicable.
 - vi. Individuals present for test.
 - vii. Observations and Issues.
 - viii. Issue number, if any, generated as the result of test.
- c. Pre-Functional Checklists: The Commissioning Agent will prepare Pre-Functional Checklists. Pre-Functional Checklists shall be completed and signed by the Contractor, verifying that systems, subsystems, equipment, and associated controls are ready for testing. The Commissioning Agent will spot check Pre-Functional Checklists to verify accuracy and readiness for testing. Inaccurate or incomplete Pre-Functional Checklists shall be returned to the Contractor for correction and resubmission.
- d. Test and Inspection Reports: The Commissioning Agent will record test data, observations, and measurements on Systems Functional Performance Test Procedure. The report will also include recommendation for system acceptance or non-acceptance. Photographs, forms, and other means appropriate for the application shall be included with data. Commissioning Agent Will compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- e. Corrective Action Documents: The Commissioning Agent will document corrective action taken for systems and equipment that fail tests. The documentation will include any required modifications to systems and equipment and/or revisions to test procedures, if any. The Commissioning Agent will witness and document any retesting of systems and/or equipment requiring corrective action and document retest results.
- f. Commissioning Issues Log: The Commissioning Agent will prepare and maintain Commissioning Issues Log that describes Commissioning Issues and Commissioning Observations that are identified during the Commissioning process. These observations and issues include, but are not limited to,

those that are at variance with the Contract Documents. The Commissioning Issues Log will identify and track issues as they are encountered, the party responsible for resolution, progress toward resolution, and document how the issue was resolved. The Master Commissioning Issues Log will also track the status of unresolved issues.

- i. Creating a Commissioning Issues Log Entry:
 1. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
 2. Assign a descriptive title for the issue.
 3. Identify date and time of the issue.
 4. Identify test number of test being performed at the time of the observation, if applicable, for cross reference.
 5. Identify system, subsystem, and equipment to which the issue applies.
 6. Identify location of system, subsystem, and equipment.
 7. Include information that may be helpful in diagnosing or evaluating the issue.
 8. Note recommended corrective action.
 9. Identify commissioning team member responsible for corrective action.
 10. Identify expected date of correction.
 11. Identify person that identified the issue.
- ii. Documenting Issue Resolution:
 1. Log date correction is completed or the issue is resolved.
 2. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 3. Identify changes to the Contract Documents that may require action.
 4. State that correction was completed and system, subsystem, and equipment are ready for retest, if applicable.
 5. Identify person(s) who corrected or resolved the issue.
 6. Identify person(s) verifying the issue resolution.
- g. Final Commissioning Report: The Commissioning Agent will document results of the commissioning process, including unresolved issues, and performance of systems, subsystems, and equipment. The Commissioning Report will indicate whether systems, subsystems, and equipment have been properly installed and are performing according to the Contract Documents. This report will be used by the Department of Veterans Affairs when determining that systems will be accepted. This report will be used to evaluate systems, subsystems, and equipment and will serve as a future reference document during VA occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents and those that do not meet requirements of the Contract Documents. The commissioning report will include, but is not limited to, the following:
 - i. Lists and explanations of substitutions; compromises; variances with the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. Design Narrative documentation maintained by the Commissioning Agent.
 - ii. Commissioning plan.
 - iii. Pre-Functional Checklists completed by the Contractor, with annotation of the Commissioning Agent review and spot check.
 - iv. Systems Functional Performance Test Procedures, with annotation of test results and test completion.
 - v. Commissioning Issues Log.

- vi. Listing of deferred and off season test(s) not performed, including the schedule for their completion.
- h. Addendum to Final Commissioning Report: The Commissioning Agent will prepare an Addendum to the Final Commissioning Report near the end of the Warranty Period. The Addendum will indicate whether systems, subsystems, and equipment are complete and continue to perform according to the Contract Documents. The Addendum to the Final Commissioning Report shall include, but is not limited to, the following:
 - i. Documentation of deferred and off season test(s) results.
 - ii. Completed Systems Functional Performance Test Procedures for off season test(s).
 - iii. Documentation that unresolved system performance issues have been resolved.
 - iv. Updated Commissioning Issues Log, including status of unresolved issues.
 - v. Identification of potential Warranty Claims to be corrected by the Contractor.
- i. Systems Manual: The Commissioning Agent will gather required information and compile the Systems Manual. The Systems Manual will include, but is not limited to, the following:
 - i. Design Narrative, including system narratives, schematics, single-line diagrams, flow diagrams, equipment schedules, and changes made throughout the Project.
 - ii. Reference to Final Commissioning Plan.
 - iii. Reference to Final Commissioning Report.
 - iv. Approved Operation and Maintenance Data as submitted by the Contractor.

14. Submittals

- a. Preliminary Commissioning Plan Submittal: The Commissioning Agent has prepared a Preliminary Commissioning Plan based on the final Construction Documents. The Preliminary Commissioning Plan is included as an Appendix to this specification section. The Preliminary Commissioning Plan is provided for information only. It contains preliminary information about the following commissioning activities:
 - i. The Commissioning Team: A list of commissioning team members by organization.
 - ii. Systems to be commissioned. A detailed list of systems to be commissioned for the project. This list also provides preliminary information on systems/equipment submittals to be reviewed by the Commissioning Agent; preliminary information on Pre-Functional Checklists that are to be completed; preliminary information on Systems Performance Testing, including information on testing sample size (where authorized by the VA).
 - iii. Commissioning Team Roles and Responsibilities: Preliminary roles and responsibilities for each Commissioning Team member.
 - iv. Commissioning Documents: A preliminary list of commissioning-related documents, include identification of the parties responsible for preparation, review, approval, and action on each document.
 - v. Commissioning Activities Schedule: Identification of Commissioning Activities, including Systems Functional Testing, the expected duration and predecessors for the activity.
 - vi. Pre-Functional Checklists: Preliminary Pre-Functional Checklists for equipment, components, subsystems, and systems to be commissioned. These Preliminary Pre-Functional Checklists provide guidance on the level of detailed information the Contractor shall include on the final submission.
 - vii. Systems Functional Performance Test Procedures: Preliminary step-by-step System Functional Performance Test Procedures to be used during Systems Functional Performance Testing. These Preliminary Systems Functional Performance procedures provide information

on the level of testing rigor, and the level of Contractor support required during performance of system's testing.

- b. Final Commissioning Plan Submittal: Based on the Final Construction Documents and the Contractor's project team, the Commissioning Agent will prepare the Final Commissioning Plan as described in this section. The Commissioning Agent will submit three hard copies and three sets of electronic files of Final Commissioning Plan. The Contractor shall review the Commissioning Plan and provide any comments to the VA. The Commissioning Agent will incorporate review comments into the Final Commissioning Plan as directed by the VA.
- c. Systems Functional Performance Test Procedure: The Commissioning Agent will submit preliminary Systems Functional Performance Test Procedures to the Contractor, and the VA for review and comment. The Contractor shall return review comments to the VA and the Commissioning Agent. The VA will also return review comments to the Commissioning Agent. The Commissioning Agent will incorporate review comments into the Final Systems Functional Test Procedures to be used in Systems Functional Performance Testing.
- d. Pre-Functional Checklists: The Commissioning Agent will submit Pre-Functional Checklists to be completed by the Contractor.
- e. Test and Inspection Reports: The Commissioning Agent will submit test and inspection reports to the VA with copies to the Contractor and the Architect/Engineer.
- f. Corrective Action Documents: The Commissioning Agent will submit corrective action documents to the VA Resident Engineer with copies to the Contractor and Architect.
- g. Preliminary Commissioning Report Submittal: The Commissioning Agent will submit three electronic copies of the preliminary commissioning report. One electronic copy, with review comments, will be returned to the Commissioning Agent for preparation of the final submittal.
- h. Final Commissioning Report Submittal: The Commissioning Agent will submit four sets of electronically formatted information of the final commissioning report to the VA. The final submittal will incorporate comments as directed by the VA.
- i. Data for Commissioning:
 - i. The Commissioning Agent will request in writing from the Contractor specific information needed about each piece of commissioned equipment or system to fulfill requirements of the Commissioning Plan.
 - ii. The Commissioning Agent may request further documentation as is necessary for the commissioning process or to support other VA data collection requirements, including Construction Operations Building Information Exchange (COBIE), Building Information Modeling (BIM), etc.

15. Commissioning Process

- a. The Commissioning Agent will be responsible for the overall management of the commissioning process as well as coordinating scheduling of commissioning tasks with the VA and the Contractor. As directed by the VA, the Contractor shall incorporate Commissioning tasks, including, but not limited to, Systems Functional Performance Testing (including predecessors) with the Master Construction Schedule.
- b. Within 10 days of contract award, the Contractor shall designate a specific individual as the Commissioning Manager (CxM) to manage and lead the commissioning effort on behalf of the Contractor. The Commissioning Manager shall be the single point of contact and communications for all commissioning related services by the Contractor.
- c. Within 10 days of contract award, the Contractor shall ensure that each subcontractor designates specific individuals as Commissioning Representatives (CxR) to be responsible for commissioning

related tasks. The Contractor shall ensure the designated Commissioning Representatives participate in the commissioning process as team members providing commissioning testing services, equipment operation, adjustments, and corrections if necessary. The Contractor shall ensure that all Commissioning Representatives shall have sufficient authority to direct their respective staff to provide the services required, and to speak on behalf of their organizations in all commissioning related contractual matters.

16. Quality Assurance

- a. Instructor Qualifications: Factory authorized service representatives shall be experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- b. Test Equipment Calibration: The Contractor shall comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

17. Coordination

- a. Management: The Commissioning Agent will coordinate the commissioning activities with the VA and Contractor. The Commissioning Agent will submit commissioning documents and information to the VA. All commissioning team members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
- b. Scheduling: The Contractor shall work with the Commissioning Agent and the VA to incorporate the commissioning activities into the construction schedule. The Commissioning Agent will provide sufficient information (including, but not limited to, tasks, durations and predecessors) on commissioning activities to allow the Contractor and the VA to schedule commissioning activities. All parties shall address scheduling issues and make necessary notifications in a timely manner in order to expedite the project and the commissioning process. The Contractor shall update the Master Construction as directed by the VA.
- c. Initial Schedule of Commissioning Events: The Commissioning Agent will provide the initial schedule of primary commissioning events in the Commissioning Plan and at the commissioning coordination meetings. The Commissioning Plan will provide a format for this schedule. As construction progresses, more detailed schedules will be developed by the Contractor with information from the Commissioning Agent.
- d. Commissioning Coordinating Meetings: The Commissioning Agent will conduct periodic Commissioning Coordination Meetings of the commissioning team to review status of commissioning activities, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- e. Pretesting Meetings: The Commissioning Agent will conduct pretest meetings of the commissioning team to review startup reports, Pre-Functional Checklist results, Systems Functional Performance Testing procedures, testing personnel and instrumentation requirements.
- f. Systems Functional Performance Testing Coordination: The Contractor shall coordinate testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. The Contractor shall coordinate the schedule times for tests, inspections, obtaining samples, and similar activities.

PRODUCTS

18. Test Equipment

- a. The Contractor shall provide all standard and specialized testing equipment required to perform Systems Functional Performance Testing. Test equipment required for Systems Functional Performance Testing will be identified in the detailed System Functional Performance Test Procedure prepared by the Commissioning Agent.
- b. Data logging equipment and software required to test equipment shall be provided by the Contractor.
- c. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 °C (1.0 °F) and a resolution of + or - 0.1 °C (0.2 °F). Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and following any repairs to the equipment. Calibration tags shall be affixed or certificates readily available.

EXECUTION

19. Commissioning Process Roles and Responsibilities

- a. The following table outlines the roles and responsibilities for the Commissioning Team members during the Construction Phase:

Construction Phase		CxA = Commissioning Agent RE = Resident Engineer A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Commissioning Roles & Responsibilities							
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Meetings	Construction Commissioning Kick Off meeting	L	A	P	P	O	
	Commissioning Meetings	L	A	P	P	O	
	Project Progress Meetings	P	A	P	L	O	
	Controls Meeting	L	A	P	P	O	
Coordination	Coordinate with [OGC's, AHJ, Vendors, etc.] to ensure that Cx interacts properly with other systems as needed to support the OPR and BOD.	L	A	P	P	N/A	

Construction Phase		CxA = Commissioning Agent					L = Lead
Commissioning Roles & Responsibilities		RE = Resident Engineer					P = Participate
		A/E = Design Arch/Engineer					A = Approve
		PC = Prime Contractor					R = Review
		O&M = Gov't Facility O&M					O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Cx Plan & Spec	Final Commissioning Plan	L	A	R	R	O	
Schedules	Duration Schedule for Commissioning Activities	L	A	R	R	N/A	
OPR and BOD	Maintain OPR on behalf of Owner	L	A	R	R	O	
	Maintain BOD/DID on behalf of Owner	L	A	R	R	O	
Document Reviews	TAB Plan Review	L	A	R	R	O	
	Submittal and Shop Drawing Review	R	A	R	L	O	
	Review Contractor Equipment Startup Checklists	L	A	R	R	N/A	
	Review Change Orders, ASI, and RFI	L	A	R	R	N/A	
Site Observations	Witness Factory Testing	P	A	P	L	O	
	Construction Observation Site Visits	L	A	R	R	O	
Functional Test Protocols	Final Pre-Functional Checklists	L	A	R	R	O	
	Final Functional Performance Test Protocols	L	A	R	R	O	
Technical Activities	Issues Resolution Meetings	P	A	P	L	O	

Construction Phase		CxA = Commissioning Agent					L = Lead
Commissioning Roles & Responsibilities		RE = Resident Engineer					P = Participate
		A/E = Design Arch/Engineer					A = Approve
		PC = Prime Contractor					R = Review
		O&M = Gov't Facility O&M					O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Reports and Logs	Status Reports	L	A	R	R	O	
	Maintain Commissioning Issues Log	L	A	R	R	O	

- b. The following table outlines the roles and responsibilities for the Commissioning Team members during the Acceptance Phase:

Acceptance Phase		CxA = Commissioning Agent					L = Lead
Commissioning Roles & Responsibilities		RE = Resident Engineer					P = Participate
		A/E = Design Arch/Engineer					A = Approve
		PC = Prime Contractor					R = Review
		O&M = Gov't Facility O&M					O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Meetings	Commissioning Meetings	L	A	P	P	O	
	Project Progress Meetings	P	A	P	L	O	
	Pre-Test Coordination Meeting	L	A	P	P	O	
	Lessons Learned and Commissioning Report Review Meeting	L	A	P	P	O	
Coordination	Coordinate with [OGC's, AHJ, Vendors, etc.] to ensure that Cx interacts properly with other systems as needed to support OPR and BOD	L	P	P	P	O	
Cx Plan & Spec	Maintain/Update Commissioning Plan	L	A	R	R	O	
Schedules	Prepare Functional Test Schedule	L	A	R	R	O	
OPR and BOD	Maintain OPR on behalf of Owner	L	A	R	R	O	

Acceptance Phase		CxA = Commissioning Agent					L = Lead
Commissioning Roles & Responsibilities		RE = Resident Engineer					P = Participate
		A/E = Design Arch/Engineer					A = Approve
		PC = Prime Contractor					R = Review
		O&M = Gov't Facility O&M					O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Document Reviews	Maintain BOD/DID on behalf of Owner	L	A	R	R	O	
	Review Completed Pre-Functional Checklists	L	A	R	R	O	
	Pre-Functional Checklist Verification	L	A	R	R	O	
	Review Operations & Maintenance Manuals	L	A	R	R	R	
	Training Plan Review	L	A	R	R	R	
	Warranty Review	L	A	R	R	O	
	Review TAB Report	L	A	R	R	O	
Site Observations	Construction Observation Site Visits	L	A	R	R	O	
	Witness Selected Equipment Startup	L	A	R	R	O	
Functional Test Protocols	TAB Verification	L	A	R	R	O	
	Systems Functional Performance Testing	L	A	P	P	P	
	Retesting	L	A	P	P	P	
Technical Activities	Issues Resolution Meetings	P	A	P	L	O	
	Systems Training	L	S	R	P	P	
Reports and Logs	Status Reports	L	A	R	R	O	
	Maintain Commissioning Issues Log	L	A	R	R	O	
	Final Commissioning Report	L	A	R	R	R	
	Prepare Systems Manuals	L	A	R	R	R	

- c. The following table outlines the roles and responsibilities for the Commissioning Team members during the Warranty Phase:

Warranty Phase	CxA = Commissioning Agent	L = Lead
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Commissioning Roles & Responsibilities		RE = Resident Engineer A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					P = Participate A = Approve R = Review O= Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Meetings	Post-Occupancy User Review Meeting	L	A	O	P	P	
Site Observations	Periodic Site Visits	L	A	O	O	P	
Functional Test Protocols	Deferred and/or seasonal Testing	L	A	O	P	P	
Technical Activities	Issues Resolution Meetings	L	S	O	O	P	
	Post-Occupancy Warranty Checkup and review of Significant Outstanding Issues	L	A		R	P	
Reports and Logs	Final Commissioning Report Amendment	L	A		R	R	
	Status Reports	L	A		R	R	

20. Startup, Initial Checkout and Pre Functional Checklists

- a. The following procedures shall apply to all equipment and systems to be commissioned.
 - i. Pre-Functional Checklists are important to ensure that the equipment and systems are hooked up and operational. These ensure that Systems Functional Performance Testing may proceed without unnecessary delays. Each system to be commissioned shall have a full Pre-Functional Checklist completed by the Contractor prior to Systems Functional Performance Testing. No sampling strategies are used.
 1. The Pre-Functional Checklist will identify the trades responsible for completing the checklist. The Contractor shall ensure the appropriate trades complete the checklists.
 2. The Commissioning Agent will review completed Pre-Functional Checklists and field-verify the accuracy of the completed checklist using sampling techniques.
 - ii. Startup and Initial Checkout Plan: The Contractor shall develop detailed startup plans for all equipment. The primary role of the Contractor in this process is to ensure that there is written documentation that each of the manufacturer recommended procedures have been completed. Parties responsible for startup shall be identified in the Startup Plan and in the checklist forms.
 1. The Contractor shall develop the full startup plan by combining (or adding to) the checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual data and the field checkout sheets normally used by the

Contractor. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.

2. The full startup plan shall at a minimum consist of the following items:
 - a. The Pre-Functional Checklists.
 - b. The manufacturer's standard written startup procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - c. The manufacturer's normally used field checkout sheets.
3. The Commissioning Agent will submit the full startup plan to the VA and Contractor for review. Final approval will be by the VA.
4. The Contractor shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.

iii. Sensor and Actuator Calibration

1. All field installed temperature, relative humidity, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described in Division 09 and Division 26 series specifications.
2. All procedures used shall be fully documented on the Pre-Functional Checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

iv. Execution of Equipment Startup:

1. Four (4) weeks prior to equipment startup, the Contractor shall schedule startup and checkout with the VA and Commissioning Agent. The performance of the startup and checkout shall be directed and executed by the Contractor.
2. The Commissioning Agent will observe the startup procedures for selected pieces of primary equipment.
3. The Contractor shall execute startup and provide the VA and Commissioning Agent with a signed and dated copy of the completed startup checklists, and contractor tests.
4. Only individuals that have direct knowledge and witnessed that a line item task on the Startup Checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

21. Deficiencies, Nonconformance and Approval in Checklists and Startup

- a. The Contractor shall clearly list any outstanding items of the initial startup and Pre-Functional Checklist procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies shall be provided to the VA and the Commissioning Agent within two days of completion.
- b. The Commissioning Agent will review the report and submit comments to the VA. The Commissioning Agent will work with the Contractor to correct and verify deficiencies or uncompleted items. The Commissioning Agent will involve the VA and others as necessary. The Contractor shall correct all areas that are noncompliant or incomplete in the checklists in a timely manner, and shall notify the VA and Commissioning Agent as soon as outstanding items have been corrected. The Contractor shall submit an updated startup report and a Statement of Correction on the original noncompliance report. When satisfactorily completed, the Commissioning Agent will recommend approval of the checklists and startup of each system to the VA.
- c. The Contractor shall be responsible for resolution of deficiencies as directed the VA.

22. Systems Functional Performance Testing

- a. This paragraph applies to Systems Functional Performance Testing of systems for all referenced specification Divisions.
- b. Objectives and Scope: The objective of Systems Functional Performance Testing is to demonstrate that each system is operating according to the Contract Documents. Systems Functional Performance Testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of noncompliant performance are identified and corrected, thereby improving the operation and functioning of the systems. In general, each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, fire alarm and emergency power) where there is a specified system response. The Contractor shall verify each sequence in the sequences of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.
- c. Development of Systems Functional Performance Test Procedures: Before Systems Functional Performance Test procedures are written, the Contractor shall submit all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements found in the Contract Documents and approved submittals and shop drawings, the Commissioning Agent will develop specific Systems Functional Test Procedures to verify and document proper operation of each piece of equipment and system to be commissioned. The Contractor shall assist the Commissioning Agent in developing the Systems Functional Performance Test procedures as requested by the Commissioning Agent i.e. by answering questions about equipment, operation, sequences, etc. Prior to execution, the Commissioning Agent will provide a copy of the Systems Functional Performance Test procedures to the VA, the Architect/Engineer, and the Contractor, who shall review the tests for feasibility, safety, equipment and warranty protection.
- d. Purpose of Test Procedures: The purpose of each specific Systems Functional Performance Test is to verify and document compliance with the stated criteria of acceptance given on the test form. Representative test formats and examples are found in the Commissioning Plan for this project. (The Commissioning Plan is issued as a separate document and is available for review.) The test procedure forms developed by the Commissioning Agent will include, but not be limited to, the following information:
 - i. System and equipment or component name(s)
 - ii. Equipment location and ID number
 - iii. Unique test ID number, and reference to unique Pre-Functional Checklists and startup documentation, and ID numbers for the piece of equipment
 - iv. Date
 - v. Project name
 - vi. Participating parties
 - vii. A copy of the specification section describing the test requirements
 - viii. A copy of the specific sequence of operations or other specified parameters being verified
 - ix. Formulas used in any calculations
 - x. Required pretest field measurements
 - xi. Instructions for setting up the test.
 - xii. Special cautions, alarm limits, etc.
 - xiii. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format

- xiv. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
 - xv. A section for comments.
 - xvi. Signatures and date block for the Commissioning Agent. A place for the Contractor to initial to signify attendance at the test.
- e. Test Methods: Systems Functional Performance Testing shall be achieved by manual testing (i.e. persons manipulate the equipment and observe performance) and/or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by standalone data loggers. The Contractor and Commissioning Agent shall determine which method is most appropriate for tests that do not have a method specified.
- i. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, although timing the testing to experience actual conditions is encouraged wherever practical.
 - ii. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.
 - iii. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
 - iv. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the Air Conditioning compressor lockout initiate at an outside air temperature below 12 C (54 F), when the outside air temperature is above 12 C (54 F), temporarily change the lockout setpoint to be 2 C (4 F) above the current outside air temperature.
 - v. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification shall be completed during systems startup and initial checkout.
- f. Setup: Each function and test shall be performed under conditions that simulate actual conditions as closely as is practically possible. The Contractor shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pretest condition.
- g. Sampling: No sampling is allowed in completing Pre-Functional Checklists. Sampling is allowed for Systems Functional Performance Test Procedures execution. The Commissioning Agent will determine the sampling rate. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the Commissioning Agent may stop the testing and require

the Contractor to perform and document a checkout of the remaining units, prior to continuing with Systems Functional Performance Testing of the remaining units.

- h. Cost of Retesting: The cost associated with expanded sample System Functional Performance Tests shall be solely the responsibility of the Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- i. Coordination and Scheduling: The Contractor shall provide a minimum of 7 days' notice to the Commissioning Agent and the VA regarding the completion schedule for the Pre-Functional Checklists and startup of all equipment and systems. The Commissioning Agent will schedule Systems Functional Performance Tests with the Contractor and VA. The Commissioning Agent will witness and document the Systems Functional Performance Testing of systems. The Contractor shall execute the tests in accordance with the Systems Functional Performance Test Procedure.
- j. Testing Prerequisites: In general, Systems Functional Performance Testing will be conducted only after Pre-Functional Checklists have been satisfactorily completed. The control system shall be sufficiently tested and approved by the Commissioning Agent and the VA before it is used to verify performance of other components or systems. The air balancing and water balancing shall be completed before Systems Functional Performance Testing of air-related or water-related equipment or systems are scheduled. Systems Functional Performance Testing will proceed from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems will be checked.
- k. Problem Solving: The Commissioning Agent will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the Contractor.

23. Documentation, Nonconformance and Approval of Tests

- a. Documentation: The Commissioning Agent will witness, and document the results of all Systems Functional Performance Tests using the specific procedural forms developed by the Commissioning Agent for that purpose. Prior to testing, the Commissioning Agent will provide these forms to the VA and the Contractor for review and approval. The Contractor shall include the filled out forms with the O&M manual data.
- b. Nonconformance: The Commissioning Agent will record the results of the Systems Functional Performance Tests on the procedure or test form. All items of nonconformance issues will be noted and reported to the VA on Commissioning Field Reports and/or the Commissioning Master Issues Log.
 - i. Corrections of minor items of noncompliance identified may be made during the tests. In such cases, the item of noncompliance and resolution shall be documented on the Systems Functional Test Procedure.
 - ii. Every effort shall be made to expedite the systems functional Performance Testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the Commissioning Agent shall not be pressured into overlooking noncompliant work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so by direction from the VA.
 - iii. As the Systems Functional Performance Tests progresses and an item of noncompliance is identified, the Commissioning Agent shall discuss the issue with the Contractor and the VA.
 - iv. When there is no dispute on an item of noncompliance, and the Contractor accepts responsibility to correct it:
 - 1. The Commissioning Agent will document the item of noncompliance and the Contractor's response and/or intentions. The Systems Functional Performance Test then continues or proceeds to another test or sequence. After the day's work is complete, the Commissioning Agent will submit a Commissioning Field Report to

- the VA. The Commissioning Agent will also note items of noncompliance and the Contractor's response in the Master Commissioning Issues Log. The Contractor shall correct the item of noncompliance and report completion to the VA and the Commissioning Agent.
2. The need for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test and the test shall be repeated.
- v. If there is a dispute about item of noncompliance, regarding whether it is an item of noncompliance, or who is responsible:
 1. The item of noncompliance shall be documented on the test form with the Contractor's response. The item of noncompliance with the Contractor's response shall also be reported on a Commissioning Field Report and on the Master Commissioning Issues Log.
 2. Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the Department of Veterans Affairs.
 3. The Commissioning Agent will document the resolution process.
 4. Once the interpretation and resolution have been decided, the Contractor shall correct the item of noncompliance, report it to the Commissioning Agent. The requirement for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test. Retesting shall be repeated until satisfactory performance is achieved.
 - c. Cost of Retesting: The cost to retest a System Functional Performance Test shall be solely the responsibility of the Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
 - d. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform in compliance with the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specifications, all identical units may be considered unacceptable by the VA. In such case, the Contractor shall provide the VA with the following:
 - i. Within one week of notification from the VA, the Contractor shall examine all other identical units making a record of the findings. The findings shall be provided to the VA within two weeks of the original notice.
 - ii. Within two weeks of the original notification, the Contractor shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 - iii. The VA shall determine whether a replacement of all identical units or a repair is acceptable.
 - iv. Two examples of the proposed solution shall be installed by the Contractor and the VA shall be allowed to test the installations for up to one week, upon which the VA will decide whether to accept the solution.
 - v. Upon acceptance, the Contractor shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

- e. Approval: The Commissioning Agent will note each satisfactorily demonstrated function on the test form. Formal approval of the Systems Functional Performance Test shall be made later after review by the Commissioning Agent and by the VA. The Commissioning Agent will evaluate each test and report to the VA using a standard form. The VA will give final approval on each test using the same form, and provide signed copies to the Commissioning Agent and the Contractor.

24. Deferred Testing

- a. Unforeseen Deferred Systems Functional Performance Tests: If any Systems Functional Performance Test cannot be completed due to the building structure, required occupancy condition or other conditions, execution of the Systems Functional Performance Testing may be delayed upon approval of the VA. These Systems Functional Performance Tests shall be conducted in the same manner as the seasonal tests as soon as possible. Services of the Contractor to conduct these unforeseen Deferred Systems Functional Performance Tests shall be negotiated between the VA and the Contractor.
- b. Deferred Seasonal Testing: Deferred Seasonal Systems Functional Performance Tests are those that must be deferred until weather conditions are closer to the systems design parameters. The Commissioning Agent will review systems parameters and recommend which Systems Functional Performance Tests should be deferred until weather conditions more closely match systems parameters. The Contractor shall review and comment on the proposed schedule for Deferred Seasonal Testing. The VA will review and approve the schedule for Deferred Seasonal Testing. Deferred Seasonal Systems Functional Performance Tests shall be witnessed and documented by the Commissioning Agent. Deferred Seasonal Systems Functional Performance Tests shall be executed by the Contractor in accordance with these specifications.

25. Operation and Maintenance Training Requirements

- a. Training Preparation Conference: Before operation and maintenance training, the Commissioning Agent will convene a training preparation conference to include VA's Resident Engineer, VA's Operations and Maintenance personnel, and the Contractor. The purpose of this conference will be to discuss and plan for Training and Demonstration of VA Operations and Maintenance personnel.
- b. The Contractor shall provide training and demonstration as required by other Division 09 and Division 26 series sections. The Training and Demonstration shall include, but is not limited to, the following:
 - i. Review the Contract Documents.
 - ii. Review installed systems, subsystems, and equipment.
 - iii. Review instructor qualifications.
 - iv. Review instructional methods and procedures.
 - v. Review training module outlines and contents.
 - vi. Review course materials (including operation and maintenance manuals).
 - vii. Review and discuss locations and other facilities required for instruction.
 - viii. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
 - ix. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
- c. Training Module Submittals: The Contractor shall submit the following information to the VA and the Commissioning Agent.
 - i. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective

and outline for each training module. At completion of training, submit two complete training manuals for VA's use.

- ii. Qualification Data: Submit qualifications for facilitator and/or instructor.
 - iii. Attendance Record: For each training module, submit list of participants and length of instruction time.
 - iv. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
 - v. Demonstration and Training Recording:
 1. General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
 2. Video Format: Provide high quality color DVD color on standard size DVD disks.
 3. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
 4. Narration: Describe scenes on video recording by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 5. Submit two copies within seven days of end of each training module.
 - vi. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.
- d. Quality Assurance
- i. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
 - ii. Instructor Qualifications: A factory authorized service representative, complying with requirements in Division 01 Section, experienced in operation and maintenance procedures and training.
 - iii. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.
- e. Training Coordination
- i. Coordinate instruction schedule with VA's operations. Adjust schedule as required to minimize disrupting VA's operations.
 - ii. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
 - iii. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the VA.
- f. Instruction Program

- i. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Fire protection systems, including fire alarm, fire pumps, and fire suppression systems.
 - 2. Intrusion detection systems.
 - 3. Conveying systems, including elevators, wheelchair lifts, escalators, and automated materials handling systems.
 - 4. Medical equipment, including medical gas equipment and piping.
 - 5. Laboratory equipment, including laboratory air and vacuum equipment and piping.
 - 6. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping, condensate return systems, heating hot water heat exchangers, and heating hot water distribution piping.
 - 7. Refrigeration systems, including chillers, cooling towers, condensers, pumps, and distribution piping.
 - 8. HVAC systems, including air handling equipment, air distribution systems, and terminal equipment and devices.
 - 9. HVAC instrumentation and controls.
 - 10. Electrical service and distribution, including switchgear, transformers, switchboards, panelboards, uninterruptible power supplies, and motor controls.
 - 11. Packaged engine generators, including synchronizing switchgear/switchboards, and transfer switches.
 - 12. Lighting equipment and controls.
 - 13. Communication systems, including intercommunication, surveillance, nurse call systems, public address, mass evacuation, voice and data, and entertainment television equipment.
 - 14. Site utilities including lift stations, condensate pumping and return systems, and storm water pumping systems.
- g. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participants are expected to master. For each module, include instruction for the following:
 - i. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Performance and design criteria if Contractor is delegated design responsibility.
 - 3. Operating standards.
 - 4. Regulatory requirements.
 - 5. Equipment function.
 - 6. Operating characteristics.
 - 7. Limiting conditions.
 - 8. Performance curves.
 - ii. Documentation: Review the following items in detail:
 - 1. Emergency manuals.
 - 2. Operations manuals.
 - 3. Maintenance manuals.
 - 4. Project Record Documents.
 - 5. Identification systems.

6. Warranties and bonds.
7. Maintenance service agreements and similar continuing commitments.
- iii. Emergencies: Include the following, as applicable:
 1. Instructions on meaning of warnings, trouble indications, and error messages.
 2. Instructions on stopping.
 3. Shutdown instructions for each type of emergency.
 4. Operating instructions for conditions outside of normal operating limits.
 5. Sequences for electric or electronic systems.
 6. Special operating instructions and procedures.
- iv. Operations: Include the following, as applicable:
 1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Control sequences.
 6. Safety procedures.
 7. Instructions on stopping.
 8. Normal shutdown instructions.
 9. Operating procedures for emergencies.
 10. Operating procedures for system, subsystem, or equipment failure.
 11. Seasonal and weekend operating instructions.
 12. Required sequences for electric or electronic systems.
 13. Special operating instructions and procedures.
- v. Adjustments: Include the following:
 1. Alignments.
 2. Checking adjustments.
 3. Noise and vibration adjustments.
 4. Economy and efficiency adjustments.
- vi. Troubleshooting: Include the following:
 1. Diagnostic instructions.
 2. Test and inspection procedures.
- vii. Maintenance: Include the following:
 1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Procedures for routine cleaning
 5. Procedures for preventive maintenance.
 6. Procedures for routine maintenance.
 7. Instruction on use of special tools.
- viii. Repairs: Include the following:
 1. Diagnosis instructions.
 2. Repair instructions.
 3. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 4. Instructions for identifying parts and components.
 5. Review of spare parts needed for operation and maintenance.

h. Training Execution

- i. Preparation: Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.
- ii. Instruction
 1. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Department of Veterans Affairs for number of participants, instruction times, and location.
 2. Instructor: Engage qualified instructors to instruct VA's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - a. The Commissioning Agent will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - b. The VA will furnish an instructor to describe VA's operational philosophy.
 - c. The VA will furnish the Contractor with names and positions of participants.
- iii. Scheduling: Provide instruction at mutually agreed times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with the VA and the Commissioning Agent with at least seven days' advance notice.
- iv. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, or a written, performance-based test.
- v. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

i. Demonstration and Training Recording

- i. General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
- ii. Video Format: Provide high quality color DVD color on standard size DVD disks.
- iii. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
- iv. Narration: Describe scenes on videotape by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

-----END-----

GENERAL

1. Description

- A. This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown General Intention.

2. Related Work

- A. Safety Requirements: Section 01 35 26 Safety Requirements Article, ACCIDENT PREVENTION PLAN (APP).
- B. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Construction Waste Management: Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT.

3. Protection

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.
- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.
- E. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- F. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
 - 1. No wall or part of wall shall be permitted to fall outwardly from structures.
 - 2. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
 - 3. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
- G. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new

supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer's approval.

- H. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
 - I. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7 INFECTION PREVENTION MEASURES.
- 4. Utility Services
 - A. Not Applicable
 - 5. Demolition
 - A. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Medical Center to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the COR. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.
 - B. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the COR. When Utility lines are encountered that are not indicated on the drawings, the COR shall be notified prior to further work in that area.
 - 6. Clean Up
 - A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to COR. Clean-up shall include off the Medical Center disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

--- E N D ---

GENERAL

1. DESCRIPTION

- A. This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations..

2. MANUFACTURERS

- A. Manufacturer's trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer's equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements

3. SUBMITTALS

- A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES provide quadruplicate samples for color approval of materials and finishes specified in this section.

4. APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- A. American Conference of Governmental Industrial Hygienists (ACGIH)
 - 1. ACGIH TLV-BKLT-2012, Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
 - 2. ACGIH TLV-DOC-2012, Documentation of Threshold Limit Values and Biological Exposure Indices
- B. ASME International (ASME)
 - 1. A13.1-07(R2013), Scheme for the Identification of Piping Systems
- C. Code of Federal Regulation (CFR)
 - 1. 40 CFR 59, Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- D. Commercial Item Description (CID)
 - 1. A-A-1272A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- E. Federal Specifications (Fed Spec)
 - 1. TT-P-1411A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- F. Master Painters Institute (MPI)
 - 1. MPI 1, Aluminum Paint
 - 2. MPI 4, Interior/ Exterior Latex Block Filler
 - 3. MPI 5, Exterior Alkyd Wood Primer
 - 4. MPI 7, Exterior Oil Wood Primer
 - 5. MPI 8, Exterior Alkyd, Flat MPI Gloss Level 1
 - 6. MPI 9, Exterior Alkyd Enamel MPI Gloss Level 6
 - 7. MPI 10, Exterior Latex, Flat
 - 8. MPI 11, Exterior Latex, Semi-Gloss
 - 9. MPI 18, Organic Zinc Rich Primer
 - 10. MPI 22, Aluminum Paint, High Heat (up to 590° - 1100°F)
 - 11. MPI 27, Exterior / Interior Alkyd Floor Enamel, Gloss
 - 12. MPI 31, Polyurethane, Moisture Cured, Clear Gloss

13. MPI 36, Knot Sealer
14. MPI 43, Interior Satin Latex, MPI Gloss Level 4
15. MPI 44, Interior Low Sheen Latex, MPI Gloss Level 2
16. MPI 45, Interior Primer Sealer
17. MPI 46, Interior Enamel Undercoat
18. MPI 47, Interior Alkyd, Semi-Gloss, MPI Gloss Level 5
19. MPI 48, Interior Alkyd, Gloss, MPI Gloss Level 6
20. MPI 50, Interior Latex Primer Sealer
21. MPI 51, Interior Alkyd, Eggshell, MPI Gloss Level 3
22. MPI 52, Interior Latex, MPI Gloss Level 3
23. MPI 53, Interior Latex, Flat, MPI Gloss Level 1
24. MPI 54, Interior Latex, Semi-Gloss, MPI Gloss Level 5
25. MPI 59, Interior/Exterior Alkyd Porch & Floor Enamel, Low Gloss
26. MPI 60, Interior/Exterior Latex Porch & Floor Paint, Low Gloss
27. MPI 66, Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved)
28. MPI 67, Interior Latex Fire Retardant, Top-Coat (ULC Approved)
29. MPI 68, Interior/ Exterior Latex Porch & Floor Paint, Gloss
30. MPI 71, Polyurethane, Moisture Cured, Clear, Flat
31. MPI 77, Epoxy Cold Cured, Gloss
32. MPI 79, Marine Alkyd Metal Primer
33. MPI 90, Interior Wood Stain, Semi-Transparent
34. MPI 91, Wood Filler Paste
35. MPI 94, Exterior Alkyd, Semi-Gloss
36. MPI 95, Fast Drying Metal Primer
37. MPI 98, High Build Epoxy Coating
38. MPI 101, Epoxy Anti-Corrosive Metal Primer
39. MPI 108, High Build Epoxy Coating, Low Gloss
40. MPI 114, Interior Latex, Gloss
41. MPI 119, Exterior Latex, High Gloss (acrylic)
42. MPI 134, Galvanized Water Based Primer
43. MPI 135, Non-Cementitious Galvanized Primer
44. MPI 138, Interior High Performance Latex, MPI Gloss Level 2
45. MPI 139, Interior High Performance Latex, MPI Gloss Level 3
46. MPI 140, Interior High Performance Latex, MPI Gloss Level 4
47. MPI 141, Interior High Performance Latex (SG) MPI Gloss Level 5
48. MPI 163, Exterior Water Based Semi-Gloss Light Industrial Coating, MPI Gloss Level 5
49. MPI 2000, Architectural Painting Specification Manual
- G. National Electrical Manufacturers Association (NEMA)
 1. ICS 6-1993 (R2001, R2006), Industrial Control and Systems: Enclosures
 2. 250-2014, Enclosures for Electrical Equipment (1000 Volts Maximum)
- H. National Fire Protection Association
 1. 70, National Electrical Code
 2. 70B, Recommended Practice for Electrical Equipment Maintenance
 3. 70E, Standard for Electrical Safety in the Workplace
- I. Society for Protective Coatings (SSPC)
 1. SSPC SP 1-82(R2004), Solvent Cleaning

2. SSPC SP 2-82(R2004), Hand Tool Cleaning
3. SSPC SP 3-28(R2004), Power Tool Cleaning
4. SSPC SP 10/NACE No.2, Near-White Blast Cleaning
5. SSPC PA Guide 10, Guide to Safety and Health Requirements
- J. Underwriters' Laboratories, Inc. (UL)
 1. 508-1999 (R2013), Standards for Industrial Control Equipment
- K. U.S. National Archives and Records Administration (NARA)
 1. 29 CFR 1910.1000, Air Contaminants

PRODUCTS

5. DIGITAL COLOR PHOTOS
 - A. Size 24 x 35 mm
 - B. Labeled for:
 1. Building name and Number
 2. Electrical Name and Number
6. DIVISION 26 – ELECTRICAL
 - A. 26 11 16 Secondary Unit Substations

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame				
Face Panel				
Doors				

- B. 26 12 19 Pad Mounted, Liquid Filled, Medium Voltage Transformers

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame				
Face Panel				
Doors				

- C. 26 13 13 Medium Voltage Circuit Breaker Switchgear

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame				
Face Panel				
Doors				

D. 26 22 00 Low Voltage Transformers

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame				
Face Panel				
Doors				

E. 26 23 00 Low Voltage Switchgear

Component	Material	Finish	Manufacturer	Mfg. Color/Name
Cabinet Frame				
Face Panel				
Doors				

7. EXECUTION

A. Finish Schedules and Miscellaneous Abbreviations

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Access Flooring	AF
Accordion Folding Partition	AFP
Acoustical Ceiling	AT
Acoustical Ceiling, Special Faced	AT (SP)
Acoustical Metal Pan Ceiling	AMP
Acoustical Wall Panel	AWP
Acoustical Wall Treatment	AWT
Acoustical Wallcovering	AWF
Anodized Aluminum Colored	AAC

Anodized Aluminum Natural Finish	AA
Baked On Enamel	BE
Brick Face	BR
Brick Flooring	BF
Brick Paving	BP
Carpet	CP
Carpet Athletic Flooring	CAF
Carpet Module Tile	CPT
Ceramic Glazed Facing Brick	CGFB
Ceramic Mosaic Tile	FTCT
Concrete	C
Concrete Masonry Unit	CMU
Divider Strips Marble	DS MB
Epoxy Coating	EC
Epoxy Resin Flooring	ERF
Existing	E
Exposed Divider Strips	EXP
Exterior	EXT
Exterior Finish System	EFS
Exterior Paint	EXT-P
Exterior Stain	EXT-ST
Fabric Wallcovering	WF
Facing Tile	SCT
Feature Strips	FS
Floor Mats & Frames	FM
Floor Tile, Mosaic	FT

Fluorocarbon	FC
Folding Panel Partition	FP
Foot Grille	FG
Glass Masonry Unit	GUMU
Glazed Face CMU	GCMU
Glazed Structural Facing Tile	SFTU
Granite	GT
Gypsum Wallboard	GWB
High Glazed Coating	SC
Latex Mastic Flooring	LM
Linear Metal Ceiling	LMC
Linear Wood Ceiling	LWC
Marble	MB
Material	MAT
Mortar	M
Multi-Color Coating	MC
Natural Finish	NF
Paint	P
Paver Tile	PVT
Perforated Metal Facing (Tile or Panels)	PMF
Plaster	PL
Plaster High Strength	HSPL
Plaster Keene Cement	KC
Plastic Laminate	HPDL
Polypropylene Fabric Wallcovering	PFW

Porcelain Paver Tile	PPT
Quarry Tile	QT
Radiant Ceiling Panel System	RCP
Resilient Stair Tread	RST
Rubber Base	RB
Rubber Tile Flooring	RT
Spandrel Glass	SLG
Stain	ST
Stone Flooring	SF
Structural Clay	SC
Suspension Decorative Grids Grids	SDG
Terrazzo Portland Cement	PCT
Terrazzo Tile	TT
Terrazzo, Thin Set	
Textured Gypsum Ceiling Panel	TGC
Textured Metal Ceiling Panel	TMC
Thin set Terrazzo	TST
Veneer Plaster	VP
Vinyl Base	VB
Vinyl Coated Fabric Wallcovering	W
Vinyl Composition Tile	VCT
Vinyl Sheet Flooring	VSF
Vinyl Sheet Flooring (Welded Seams)	WSF

Wall Border	WB
Wood	WD

B. Finish Schedule Symbols

1. ** Same finish as adjoining walls
2. - No color required
3. E Existing
4. XX To match existing
5. EFTR Existing finish to remain
6. RM Remove

--- E N D ---

GENERAL

1. DESCRIPTION

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the construction documents and/or specified herein, including, but not limited to, the following:
 - 1. Prime coats which may be applied in shop under other sections.
 - 2. Prime painting unprimed surfaces to be painted under this Section.
 - 3. Painting items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.
 - 4. Painting ferrous metal (except stainless steel) exposed to view.
 - 5. Painting galvanized ferrous metals exposed to view.
 - 6. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
 - 7. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
 - 8. Painting of any surface not specifically mentioned to be painted herein or on construction documents, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, is to be included as though specified.

2. RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
- C. Section 01 35 26, SAFETY REQUIREMENTS
- D. Division 05, Metals
- E. Division 26, Electrical

3. SUBMITTALS

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 09 91 00, PAINTING", with applicable paragraph identification.
- C. Painter qualifications.
- D. Manufacturer's Literature and Data including:
 - 1. Before work is started, or sample panels are prepared, submit manufacturer's literature and technical data, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one (1) list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.
- E. Sample Panels:
 - 1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
 - 2. Panels to Show Color: Composition board, 100 x 250 mm (4 x 10 inch).
 - 3. Attach labels to panel stating the following:

- a. Federal Specification Number or manufacturers name and product number of paints used.
 - b. Specification code number specified in Section 09 06 00, SCHEDULE FOR FINISHES.
 - c. Product type and color.
 - d. Name of project.
 4. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.
- F. Sample of identity markers if used.
- G. Manufacturers' Certificates indicating compliance with specified requirements.
 1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
 2. High temperature aluminum paint.
 3. Fire retardant paint
4. DELIVERY AND STORAGE
 - A. Deliver materials to site in manufacturer's sealed container marked to show following:
 1. Name of manufacturer.
 2. Product type.
 3. Batch number.
 4. Instructions for use.
 5. Safety precautions.
 - B. In addition to manufacturer's label, provide a label legibly printed as following:
 1. Federal Specification Number, where applicable, and name of material.
 2. Surface upon which material is to be applied.
 3. Specify Coat Types: Prime; body; finish; etc.
 - C. Maintain space for storage, and handling of painting materials and equipment in a ventilated, neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
 - D. Store materials at site at least 24 hours before using, at a temperature between 7 and 30 degrees C (45 and 85 degrees F).
5. QUALITY ASSURANCE
 - A. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces. Submit evidence that key personnel have successfully performed surface preparation and application of coating on a minimum of three (3) similar projects within the past three (3) years.
 - B. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Contracting Officer Representative (COR) in writing of any anticipated problems using the coating systems as specified with substrates primed by others.
6. MOCK UP PANEL
 - A. Finish and texture approved by COR will be used as a standard of quality and workmanship for remainder of work
 - B. Repaint individual areas which are not approved, as determined by the COR, until approval is received.
7. REGULATORY REQUIREMENTS

- A. Paint materials are to conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
 - 1. Volatile Organic Compounds (VOC) Emissions Requirements: Field-applied paints and coatings that are inside the waterproofing system to not exceed limits of authorities having jurisdiction.
 - 2. Lead-Base Paint:
 - a. Comply with Section 410 of the Lead-Based Paint Poisoning Prevention Act, as amended, and with implementing regulations promulgated by Secretary of Housing and Urban Development.
 - b. Regulations concerning prohibition against use of lead-based paint in federal and federally assisted construction, or rehabilitation of residential structures are set forth in Subpart F, Title 24, Code of Federal Regulations, Department of Housing and Urban Development.
 - c. Do not use coatings having a lead content over 0.06 percent by weight of non-volatile content.
 - d. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
 - 3. Asbestos: Provide materials that do not contain asbestos.
 - 4. Chromate, Cadmium, Mercury, and Silica: Provide materials that do not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
 - 5. Human Carcinogens: Provide materials that do not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
 - 6. Use high performance acrylic paints in place of alkyd paints.
- 8. SAFETY AND HEALTH
 - A. Apply paint materials using safety methods and equipment in accordance with the following:
 - 1. Comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis (AHA) as specified in Section 01 35 26, SAFETY REQUIREMENTS. The AHA is to include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.
 - B. Safety Methods Used During Paint Application: Comply with the requirements of SSPC PA Guide 10.
 - C. Toxic Materials: To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:
 - 1. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.
 - 2. 29 CFR 1910.1000.
 - 3. ACGIH-BKLT and ACGHI-DOC, threshold limit values.
- 9. APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

 - A. American Conference of Governmental Industrial Hygienists (ACGIH)
 - 1. ACGIH TLV-BKLT-2012, Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
 - 2. ACGIH TLV-DOC-2012, Documentation of Threshold Limit Values and Biological Exposure Indices
 - B. ASME International (ASME)

1. A13.1-07(R2013), Scheme for the Identification of Piping Systems
- C. Code of Federal Regulation (CFR)
 1. 40 CFR 59, Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- D. Commercial Item Description (CID)
 1. A-A-1272A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- E. Federal Specifications (Fed Spec)
 1. TT-P-1411A, Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- F. Master Painters Institute (MPI)
 1. MPI 1, Aluminum Paint
 2. MPI 4, Interior/ Exterior Latex Block Filler
 3. MPI 5, Exterior Alkyd Wood Primer
 4. MPI 7, Exterior Oil Wood Primer
 5. MPI 8, Exterior Alkyd, Flat MPI Gloss Level 1
 6. MPI 9, Exterior Alkyd Enamel MPI Gloss Level 6
 7. MPI 10, Exterior Latex, Flat
 8. MPI 11, Exterior Latex, Semi-Gloss
 9. MPI 18, Organic Zinc Rich Primer
 10. MPI 22, Aluminum Paint, High Heat (up to 590° - 1100°F)
 11. MPI 27, Exterior / Interior Alkyd Floor Enamel, Gloss
 12. MPI 31, Polyurethane, Moisture Cured, Clear Gloss
 13. MPI 36, Knot Sealer
 14. MPI 43, Interior Satin Latex, MPI Gloss Level 4
 15. MPI 44, Interior Low Sheen Latex, MPI Gloss Level 2
 16. MPI 45, Interior Primer Sealer
 17. MPI 46, Interior Enamel Undercoat
 18. MPI 47, Interior Alkyd, Semi-Gloss, MPI Gloss Level 5
 19. MPI 48, Interior Alkyd, Gloss, MPI Gloss Level 6
 20. MPI 50, Interior Latex Primer Sealer
 21. MPI 51, Interior Alkyd, Eggshell, MPI Gloss Level 3
 22. MPI 52, Interior Latex, MPI Gloss Level 3
 23. MPI 53, Interior Latex, Flat, MPI Gloss Level 1
 24. MPI 54, Interior Latex, Semi-Gloss, MPI Gloss Level 5
 25. MPI 59, Interior/Exterior Alkyd Porch & Floor Enamel, Low Gloss
 26. MPI 60, Interior/Exterior Latex Porch & Floor Paint, Low Gloss
 27. MPI 66, Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved)
 28. MPI 67, Interior Latex Fire Retardant, Top-Coat (ULC Approved)
 29. MPI 68, Interior/ Exterior Latex Porch & Floor Paint, Gloss
 30. MPI 71, Polyurethane, Moisture Cured, Clear, Flat
 31. MPI 77, Epoxy Cold Cured, Gloss
 32. MPI 79, Marine Alkyd Metal Primer
 33. MPI 90, Interior Wood Stain, Semi-Transparent
 34. MPI 91, Wood Filler Paste
 35. MPI 94, Exterior Alkyd, Semi-Gloss

36. MPI 95, Fast Drying Metal Primer
37. MPI 98, High Build Epoxy Coating
38. MPI 101, Epoxy Anti-Corrosive Metal Primer
39. MPI 108, High Build Epoxy Coating, Low Gloss
40. MPI 114, Interior Latex, Gloss
41. MPI 119, Exterior Latex, High Gloss (acrylic)
42. MPI 134, Galvanized Water Based Primer
43. MPI 135, Non-Cementitious Galvanized Primer
44. MPI 138, Interior High Performance Latex, MPI Gloss Level 2
45. MPI 139, Interior High Performance Latex, MPI Gloss Level 3
46. MPI 140, Interior High Performance Latex, MPI Gloss Level 4
47. MPI 141, Interior High Performance Latex (SG) MPI Gloss Level 5
48. MPI 163, Exterior Water Based Semi-Gloss Light Industrial Coating, MPI Gloss Level 5
- G. National Electrical Manufacturers Association (NEMA)
 1. ICS 6-1993 (R2001, R2006), Industrial Control and Systems: Enclosures
 2. 250-2014, Enclosures for Electrical Equipment (1000 Volts Maximum)
- H. National Fire Protection Association
 1. 70, National Electrical Code
 2. 70B, Recommended Practice for Electrical Equipment Maintenance
 3. 70E, Standard for Electrical Safety in the Workplace
- I. Society for Protective Coatings (SSPC)
 1. SSPC SP 1-82(R2004), Solvent Cleaning
 2. SSPC SP 2-82(R2004), Hand Tool Cleaning
 3. SSPC SP 3-28(R2004), Power Tool Cleaning
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 5. SSPC PA Guide 10, Guide to Safety and Health Requirements
- J. Underwriters' Laboratories, Inc. (UL)
 1. 508-1999 (R2013), Standards for Industrial Control Equipment
- K. U.S. National Archives and Records Administration (NARA)
 1. 29 CFR 1910.1000, Air Contaminants

PRODUCTS

10. MATERIALS

- A. Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents.

11. PAINT PROPERTIES

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.
- C. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- D. VOC Content: For field applications that are inside the weatherproofing system, paints and coating to comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L
 2. Non-flat Paints and Coatings: 150 g/L
 3. Dry-Fog Coatings: 400 g/L
 4. Primers, Sealers, and Undercoaters: 200 g/L
 5. Anticorrosive and Antirust Paints applied to Ferrous Metals: 250 g/L
 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L
 7. Pretreatment Wash Primers: 420 g/L
 8. Shellacs, Clear: 730 g/L
 9. Shellacs, Pigmented: 550 g/L
- E. VOC test method for paints and coatings is to be in accordance with 40 CFR 59 (EPA Method 24). Part 60, Appendix A with the exempt compounds' content determined by Method 303 (Determination of Exempt Compounds) in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples" manual.
12. PLASTIC TAPE
- A. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.
 - B. Pressure sensitive adhesive back.
 - C. Widths as shown on construction documents.
13. BIOBASED CONTENT
- A. Paint products shall comply with following bio-based standards for biobased materials.

Material Type	Percent by Weight
Interior Paint	20 percent biobased material
Interior Paint- Oil Based and Solvent Alkyd	67 percent biobased material
Exterior Paint	20 percent biobased material
Wood & Concrete Stain	39 percent biobased content
Polyurethane Coatings	25 percent biobased content
Water Tank Coatings	59 percent biobased content

- B. The minimum-content standards are based on the weight (not the volume) of the material.

EXECUTION

14. JOB CONDITIONS

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
 1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
 2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each day's work.
- B. Atmospheric and Surface Conditions
 1. Do not apply coating when air or substrate conditions are:
 - a. Less than 3 degrees C (5 degrees F) above dew point.

- b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the COR and the product manufacturer. Under no circumstances are application conditions to exceed manufacturer recommendations.
 - c. When the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- 2. Maintain interior temperatures until paint dries hard.
- 3. Do no exterior painting when it is windy and dusty.
- 4. Do not paint in direct sunlight or on surfaces that the sun will warm.
- 5. Apply only on clean, dry and frost free surfaces except as follows:
 - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces only when allowed by manufacturer's printed instructions.
 - b. Concrete and masonry when permitted by manufacturer's recommendations, dampen surfaces to which water thinned acrylic and cementitious paints are applied with a fine mist of water on hot dry days to prevent excessive suction and to cool surface.

15. SURFACE PREPARATION AND PAINTING

- A. The painting procedure shall be in line with the IEEE requirement.
- B. All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:
 - 1. Proper storage to avoid exposure as well as extremes of temperature and shelf life for storage
 - 2. Surface preparation prior to painting
 - 3. Mixing and thinning
 - 4. Application of paints and the recommended limit on time intervals between coats
- C. All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness or other defects.
- D. All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to the manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray be used with prior approval of COR.
- E. The supplier shall, prior to painting, protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

16. CLEANING AND SURFACE PREPARATION

- A. All machining, forming, welding and other manufacturing activities shall be completed before surface preparation. All steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination by sand/shot blast cleaning or chemical cleaning by seven tank process including Phosphating to the appropriate quality.
- B. The Pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination.
- C. All rough surfaces shall be filled with approved two pack filler and then rubbed down to a smooth finish.

17. PROTECTIVE COATING

- A. As soon as all items have been cleaned and phosphated within four hours of the subsequent drying, they shall be given suitable anticorrosion protection of Zinc chromate primer.

18. PAINT MATERIAL

- A. Followings are the type of paints that may be suitably used for the transformer to be painted at shop and supply of matching paint to site:
1. Heat resistant paint (Hot oil proof) for inside surface.
 2. For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of polyurethane paint. The color of the finishing coats shall be light admiral gray.

19. PAINTING PROCEDURE

- A. All paints in anyone particular system, whether shop or site applied, shall originate from one paint manufacturer.
- B. The paint shall only be applied in the manner detailed by the manufacturer e.g. conventional or airless spray and shall be applied under the manufacturer's recommended conditions.
- C. Where the quality of film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25 %. In all instances, where two or more coats of the same paints are applied, such coatings should be of slightly contrasting colors.
- D. Paint applied to items that are not being painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.
- E. Damaged Paint Work
1. Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.
 2. Any damaged paint work shall be made good as follows:
 - a. The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal.
 - i. A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the originally damaged.
 - ii. The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.
- F. Dry Film Thickness
1. To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray, skips, runs, sags and drips should be avoided.
 2. Each coat of paint shall be allowed to hardened before the next is applied as per manufacturer's recommendations.
 3. Particular attention must be paid to full film thickness at edges.
 4. The requirement for the dry film thickness (DFT) of paint and the material is to be used shall be as given below:

Paint Type	Area to be Painted	No. of Coats	Total Dry Film Thickness (Min)
Powder Paint	Inside	01	20 Micron
a. Thermo setting powder.	Outside	01	60 Micron
Liquid Paint			
a. Zinc Chromate (Primer)	Outside	02	45 Micron
b. Polyurethane paint (Finish Coat)	Outside	01	35 Micron

c. Hot Oil paint	Inside		3.5 Micron
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20. INSPECTION

- A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

21. GENERAL WORKMANSHIP REQUIREMENTS

- A. Application may be by brush or roller. Spray application only upon acceptance from the COR in writing.
- B. Furnish to the COR a painting schedule indicating when the respective coats of paint for the various areas and surfaces will be completed. This schedule is to be kept current as the job progresses.
- C. Protect work at all times. Protect all adjacent work and materials by suitable covering or other method during progress of work. Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and leave work in a clean condition.
- D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- E. When indicated to be painted, remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- F. Materials are to be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- G. Apply materials with a coverage to hide substrate completely. When color, stain, dirt or undercoats show through final coat of paint, the surface is to be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Government.
- H. All coats are to be dry to manufacturer's recommendations before applying succeeding coats.
- I. All suction spots or "hot spots" in plaster after the application of the first coat are to be touched up before applying the second coat.
- J. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

22. SURFACE PREPARATION

- A. General
 - 1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished are to be completely dry, clean and smooth.
 - 2. See other sections of specifications for specified surface conditions and prime coat.
 - 3. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 4. Clean surfaces before applying paint or surface treatments with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

5. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent
 - B. Wood
 1. Not applicable
 - C. Ferrous Metals
 1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
 2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning). Where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
 3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
 - a. Fill flat head countersunk screws used for permanent anchors.
 - b. Do not fill screws of item intended for removal such as glazing beads.
 4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
 5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.
 - D. Zinc-Coated (Galvanized) Metal Aluminum, Copper and Copper Alloys Surfaces Specified Painted
 1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
 2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with MPI 18 (Organic Zinc Rich Coating). Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) or MPI 135 (Non-Cementitious Galvanized Primer) depending on finish coat compatibility.
 - E. Masonry, Concrete, Cement Board, Cement Plaster and Stucco
 1. Clean and remove dust, dirt, oil, grease efflorescence, form release agents, laitance, and other deterrents to paint adhesion.
 2. Use emulsion type cleaning agents to remove oil, grease, paint and similar products. Use of solvents, acid, or steam is not permitted.
 3. Remove loose mortar in masonry work.
 4. Neutralize Concrete floors to be painted by washing with a solution of 1.4 Kg (3 pounds) of zinc sulfate crystals to 3.8 L (1 gallon) of water, allow to dry three (3) days and brush thoroughly free of crystals.
 5. Repair broken and spalled concrete edges with concrete patching compound to match adjacent surfaces as specified in Division 03, CONCRETE Sections. Remove projections to level of adjacent surface by grinding or similar methods.
23. PAINT PREPARATION
- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.

- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two (2) component and two (2) part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

24. APPLICATION

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three (3) coats; prime, body, and finish. When two (2) coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COR.
- E. Apply by brush or roller. Spray application for new or existing occupied spaces only upon approval by acceptance from COR in writing.
 - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
 - 2. In new construction and in existing occupied spaces, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in "Building and Structural Work Field Painting"; "Work not Painted"; motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- F. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

25. PRIME PAINTING

- A. After surface preparation, prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel apply an additional prime coat.
- D. Prime rabbets for stop and face glazing of wood, and for face glazing of steel.
- E. Metals except boilers, incinerator stacks, and engine exhaust pipes:
 - 1. Steel and iron:
 - a. MPI 79 (Marine Alkyd Metal Primer)
 - b. MPI 95 (Fast Drying Metal Primer)
 - c. MPI 101 (Cold Curing Epoxy Primer)
 - i. MPI 77 (Epoxy Cold Cured, Gloss)
 - ii. MPI 98 (High Build Epoxy Coating)
 - iii. MPI 108 (High Build Epoxy Marine Coating)
 - 2. Zinc-coated steel and iron:
 - a. MPI 134 (Waterborne Galvanized Primer)
 - b. MPI 135 (Non-Cementitious Galvanized Primer)

3. Aluminum scheduled to be painted:
 - a. MPI 95 (Fast Drying Metal Primer)
4. Terne Metal:
 - a. MPI 79 (Marine Alkyd Metal Primer)
 - b. MPI 95 (Fast Drying Metal Primer)
5. Copper and copper alloys scheduled to be painted:
 - a. MPI 95 (Fast Drying Metal Primer)
6. Machinery not factory finished:
 - a. MPI 9 (Exterior Alkyd Enamel)
7. Asphalt coated metal:
 - a. MPI 1 (Aluminum Paint)
- F. Metal over 94 degrees C (201 degrees F), Boilers, Incinerator Stacks, and Engine Exhaust Pipes:
 1. MPI 22 (High Heat Resistant Coating)
- G. Concrete Masonry Units except glazed or integrally colored and decorative units:
 1. Prime exterior surface as specified for exterior finishes
- H. Concrete Floors
 1. MPI 68 (Interior/ Exterior Latex Porch & Floor Paint, Gloss)
 2. MPI 60 (Interior/ Exterior Latex Porch & Floor Paint, Low Gloss)
 3. MPI 99 (Water-based Acrylic Curing and Sealing Compound)

26. EXTERIOR FINISHES

Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES

- A. Steel and Ferrous Metal
 1. Two (2) coats on exposed surfaces, except on surfaces over 94 degrees C (201 degrees F)
 - a. MPI 8 (Exterior Alkyd, Flat)
 - b. MPI 9 (Exterior Alkyd Enamel)
 - c. MPI 94 (Exterior Alkyd, Semi-Gloss)
- B. Machinery without factory finish except for primer, one (1) coat
 1. MPI 8 (Exterior Alkyd, Flat)
 2. MPI 9 (Exterior Alkyd Enamel)
 3. MPI 94 (Exterior Alkyd, Semi-Gloss)

27. REFINISHING EXISTING PAINTED SURFACES

- A. Clean, patch and repair existing surfaces as specified under "Surface Preparation". No "telegraphing" of lines, ridges, flakes, etc., through new surfacing is permitted. Where this occurs, sand smooth and re-finish until surface meets with COR's approval.
- B. Remove and reinstall items as specified under "General Workmanship Requirements".
- C. Remove existing finishes or apply separation coats to prevent non compatible coatings from having contact.
- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. In existing rooms and areas where alterations occur, clean existing stained and natural finished wood retouch abraded surfaces and then give entire surface one (1) coat of
 1. MPI 31 (Polyurethane, Moisture Cured, Clear Gloss)
 2. MPI 71 (Polyurethane, Moisture Cured, Clear Flat)

- G. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- H. Coat knots and pitch streaks showing through old finish with MPI 36 (Knot Sealer) before refinishing.
- I. Sand or dull glossy surfaces prior to painting.
- J. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

28. PAINT COLOR

- A. Color and gloss of finish coats is specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. For additional requirements regarding color see Articles, "REFINISHING EXISTING PAINTED SURFACE" and "MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE".
- C. Coat Color:
 - 1. Color of priming coat: Lighter than body coat.
 - 2. Color of body coat: Lighter than finish coat.
 - 3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.
- D. Painting, Caulking, Closures, and Fillers Adjacent to Casework:
 - 1. Paint to match color of casework where casework has a paint finish.
 - 2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

29. MECHANICAL AND ELECTRICAL WORK FIELD PAINTING SCHEDULE

- A. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.
- B. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.
- C. Paint various systems specified in Division 02 – EXISTING CONDITIONS, Division 21 – FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 – HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 – ELECTRONIC SAFETY AND SECURITY.
- D. Paint after tests have been completed.
- E. Omit prime coat from factory prime-coated items.
- F. Finish painting of mechanical and electrical equipment is not required when located in interstitial spaces, above suspended ceilings, in concealed areas such as pipe and electric closets, pipe basements, pipe tunnels, trenches, attics, roof spaces, shafts and furred spaces except on electrical conduit containing feeders 600 volts or more.
- G. Omit field painting of items specified in "BUILDING AND STRUCTURAL WORK FIELD PAINTING"; "Building and Structural Work not Painted".
- H. Color:
 - 1. Paint items having no color specified in Section 09 06 00, SCHEDULE FOR FINISHES to match surrounding surfaces.
 - 2. Paint colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES except for following:
 - a. White: Exterior unfinished surfaces of enameled plumbing fixtures. Insulation coverings on breeching and uptake inside boiler house, drums and drum-heads, oil heaters, condensate tanks and condensate piping.

- b. Gray: Heating, ventilating, air conditioning and refrigeration equipment (except as required to match surrounding surfaces), and water and sewage treatment equipment and sewage ejection equipment.
 - c. Aluminum Color: Ferrous metal on outside of boilers and in connection with boiler settings including supporting doors and door frames and fuel oil burning equipment, and steam generation system (bare piping, fittings, hangers, supports, valves, traps and miscellaneous iron work in contact with pipe).
 - d. Federal Safety Red: Exposed fire protection piping hydrants, post indicators, electrical conduits containing fire alarm control wiring, and fire alarm equipment.
 - e. Federal Safety Orange: Entire lengths of electrical conduits containing feeders 600 volts or more.
 - f. Color to match brickwork sheet metal covering on breeching outside of exterior wall of boiler house.
- I. Apply paint systems on properly prepared and primed surface as follows:
- 1. Exterior Locations:
 - a. Apply two (2) coats to the following ferrous metal items: Vent and exhaust pipes with temperatures under 94 degrees C (201 degrees F), roof drains, fire hydrants, post indicators, yard hydrants, exposed piping and similar items.
 - i. MPI 8 (Exterior Alkyd, Flat)
 - ii. MPI 94 (Exterior Alkyd, Semi-gloss)
 - iii. MPI 9 (Exterior Alkyd Enamel)
 - b. Apply two (2) coats to galvanized and zinc-copper alloy metal.
 - i. MPI 10 (Exterior Latex, Flat)
 - ii. MPI 11 (Exterior Latex, Semi-Gloss)
 - iii. MPI 119 (Exterior Latex, High Gloss (acrylic))
 - c. Apply one (1) coat of MPI 22 (High Heat Resistant Coating), 650 degrees C (1200 degrees F) to incinerator stacks, boiler stacks, and engine generator exhaust.
 - 2. Interior Locations:
 - a. Apply two (2) coats of MPI 47 (Interior Alkyd, Semi-Gloss) to following items:
 - i. Metal under 94 degrees C (201 degrees F) of items such as bare piping, fittings, hangers and supports.
 - ii. Equipment and systems such as hinged covers and frames for control cabinets and boxes, cast-iron radiators, electric conduits and panel boards.
 - iii. Heating, ventilating, air conditioning, plumbing equipment, and machinery having shop prime coat and not factory finished.
 - b. Ferrous metal exposed in hydrotherapy equipment room and chlorinator room of water and sewerage treatment plants: One (1) coat of MPI 101 (Cold Curing Epoxy Primer) and one (1) coat of
 - i. MPI 77 (Epoxy Cold Cured, Gloss)
 - ii. MPI 98 (High Build Epoxy Coating)
 - iii. MPI 108 (High Build Epoxy Marine coating)
 - c. Apply one (1) coat of MPI 50 (Interior Latex Primer Sealer) and one (1) coat on finish of insulation on boiler breeching and uptakes inside boiler house, drums, drumheads, oil heaters, feed water heaters, tanks and piping.
 - i. MPI 53 (Interior Latex, Flat, MPI Gloss Level 1)
 - ii. MPI 44 (Interior Low Sheen Latex)

- iii. MPI 52 (Interior Latex, MPI Gloss Level 3)
- iv. MPI 43 (Interior Satin Latex)
- v. MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5)
- vi. MPI 114 (Interior Latex, Gloss)
- d. Apply two (2) coats of MPI 22 (High Heat Resistant Coating) to ferrous metal surface over 94 degrees K (290 degrees F) of following items:
 - i. Garbage and trash incinerator.
 - ii. Medical waste incinerator.
 - iii. Exterior of boilers and ferrous metal in connection with boiler settings including supporting members, doors and door frames and fuel oil burning equipment.
 - iv. Steam line flanges, bare pipe, fittings, valves, hangers and supports over 94 degrees K (290 degrees F).
 - v. Engine generator exhaust piping and muffler.
- e. Paint electrical conduits containing cables rated 600 volts or more using two (2) coats in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.
 - i. MPI 9 (Exterior Alkyd Enamel)
 - ii. MPI 8 (Exterior Alkyd, Flat)
 - iii. MPI 94 (Exterior Alkyd, Semi-gloss)
- 3. Other Exposed Locations
 - a. Metal surfaces, except aluminum, of cooling towers exposed to view, including connected pipes, rails, and ladders: Two (2) coats of MPI 1 (Aluminum Paint).

30. INDENTITY PAINTING SCHEDULE

- A. Identify designated service in new buildings or projects with extensive remodeling in accordance with ASME A13.1, unless specified otherwise, on exposed piping, piping above removable ceilings, piping in accessible pipe spaces, interstitial spaces, and piping behind access panels. For existing spaces where work is minor match existing.
 - 1. Legend may be identified using snap-on coil plastic markers or by paint stencil applications.
 - 2. Apply legends adjacent to changes in direction, on branches, where pipes pass through walls or floors, adjacent to operating accessories such as valves, regulators, strainers and cleanouts a minimum of 12.2 M (40 feet) apart on straight runs of piping. Identification next to plumbing fixtures is not required.
 - 3. Locate Legends clearly visible from operating position.
 - 4. Use arrow to indicate direction of flow using black stencil paint.
 - 5. Identify pipe contents with sufficient additional details such as temperature, pressure, and contents to identify possible hazard. Insert working pressure shown on construction documents where asterisk appears for High, Medium, and Low Pressure designations as follows:
 - a. High Pressure - 414 kPa (60 psig) and above.
 - b. Medium Pressure - 104 to 413 kPa (15 to 59 psig).
 - c. Low Pressure - 103 kPa (14 psig) and below.
 - d. Add Fuel oil grade numbers.
 - 6. Legend name in full or in abbreviated form as follows:
 - a. Fuel Oil – Grade Brown/White
 - b. Storm Drainage Green/White

- c. Pump Drainage Green/White
 - d. Atmospheric Vent Green/White
 - e. Fuel Gas Yellow/Black
7. Electrical Conduits containing feeders over 600 volts, paint legends using 50 mm (2 inch) high black numbers and letters, showing the voltage class rating. Provide legends where conduits pass through walls and floors and at maximum 6096 mm (20 foot) intervals in between. Use labels with yellow background with black border and words Danger High Voltage Class, 5000, 15000, and or 25000.
8. See Sections for methods of identification, legends, and abbreviations of the following:
- a. Conduits containing high voltage feeders over 600 volts:
 - i. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
 - ii. Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS
 - iii. Section 28 05 33, RACEWAYS AND BOXES FOR ELECTRONIC SAFETY AND SECURITY
31. PROTECTION CLEAN UP AND TOUCH UP
- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
 - B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
 - C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

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