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AMENDMENT NO. 1

DATE: May 14, 2015

RE: VA Medical Center
5000 West National Avenue
Milwaukee, WI 53295

VA Project No. 695-14-112

This Addendum consists of one (1) Narrative pages, four (4) Specification sections, one (1) Drawing sheets, and VA responses to bidding questions:

The following changes regarding the contract specifications and drawings are hereby provided by amendment.

Attachments:

1. Specification Section 01 35 26 Safety Requirements
2. Specification Section 23 73 00 Indoor Central-Station Air-Handling Units
3. Specification Section 23 84 00 Humidity Control Equipment
4. Specification Section 27 52 23 Nurse Call and Code Blue Systems
5. Sheet EP205 – Building 111 – Fifth Floor Plan – Power & Fire Alarm

SPECIFICATIONS:

1. Specification Section 01 35 26 Safety Requirements
 - a. **REPLACE:** replace entire specification with attached.
2. Specification Section 23 73 00 Indoor Central-Station Air-Handling Units
 - a. **REPLACE:** replace entire specification with attached.
3. Specification Section 23 84 00 Humidity Control Equipment
 - a. **ADD:** entire attached specification section.
4. Specification Section 27 52 23 – Nurse Call and Code Blue Systems
 - a. **REPLACE:** replace entire specification with attached.

DRAWINGS:

1. Sheet MH105 – Building 111 – Fifth Floor Plan – New Construction HVAC Plan
 - a. **CHANGE:** detail referenced in note at exterior piping serving ACCU-5547B to read 16/MM500.
2. Sheet EP205 – Building 111 – Fifth Floor Plan – Power & Fire Alarm
 - a. **REVISE:** drawing as shown clouded per attached drawing.

The following questions and answers provide clarification to the contract documents:

1. We will need to shut down the medical gas valves in corridor 209.16 when we make our main tie ins. We need to know how many additional rooms would be effected by this shutdown. This will determine the cost of Medical Gas Recertification. Who is supplying the med gas boom outlets and the med gas pedestal outlets?
 - a. There are (2) additional rooms that are effected by the shutdown. They are:
 - i. Treatment 5535 – 4 Air, 4 Oxygen, 4 Vacuum, & 2 Waste Anesthetic Gas Disposal
 - ii. Prep 5530 – 1 Air, 1 Oxygen, & 1 Vacuum
 - b. Boom outlets and pedestal outlets are to be provided by the contractor
2. Can you provide an as-built drawing of the medical gas piping that would be affected by the outage to make the new connections? Or can you provide a list of rooms and areas that would need to be recertified after the tie ins are made?
 - a. There are (2) additional rooms that are effected by the shutdown. They are:
 - i. Treatment 5535 – 4 Air, 4 Oxygen, 4 Vacuum, & 2 Waste Anesthetic Gas Disposal
 - ii. Prep 5530 – 1 Air, 1 Oxygen, & 1 Vacuum
3. Cannot find fire extinguisher cabinet (FEC) located on drawings.
 - a. No FEC required
4. What size fire extinguisher cabinet is required?
 - a. No FEC required
5. Window Shade Spec Section 12-24-00. Location not shown on drawings. Please clarify.
 - a. No shades required. Omit spec section 12 24 00.
6. Spec Section 13-49-00 Radiation Protection. Page 2, Part 2, Products Article 2.1 Materials, Paragraph A Lead Sheet. “Thickness as shown on drawings.” Cannot find thickness referenced on drawings.
 - a. Thickness of lead is 1/8”.
7. Spec Section 04-45-29, Testing Laboratory Services. Article 3.18 Type of Test: page 11. Clarify what testing is to be included.
 - a. Tests required are listed in article 3.18, items F through M.
8. Drawing IN105 Equipment Schedule. Item “SR” Storage Rack system to hold lead (22) shielding garments. Clarify manufacturer/model #, etc. Drawing reference looks like closet pole.
 - a. Storage rack to be closet pole capable of holding 22 shielding garments. Approximate weight of each garment is 15 pounds.
9. Drawing IN105 Mounting Detail @ Anesthesia Room. Dim. from existing deck to 8’-11” ceiling height is 1’ 9-5/8”. Detail shows min. dim. is 1’-10”. Please clarify.
 - a. Field verify and use actual dimension.
10. Spec Section 074-21-13 Thermal Insulation. Clarify locations required. Not called for on partition types, Drawing A105
 - a. Partition type P1 to have full batt insulation.
11. Are temporary heat detectors required during construction?
 - a. Please refer to Specification Section 01 01 10 – IHR and also Drawing A000

12. Drawing IN105. Multiple items furnished and installed by Siemens. Is the VA or contractor responsible for contracting Siemens for these items?
 - a. **The VA will contact Siemens.**
13. The nurse call specification (27 52 23) page 17 calls for a new Jeron 680 system. We have used this system in the hospital elsewhere. However we have been using the newer offering from Jeron (790 system) as other floors have been upgraded. Bob Steldt from VA Biomed has been our point of contact for these 790 systems. The 680 devices are still available. The north side of the 5C ward has a Jeron 680 system, FYI. Can you clarify your request for this 'older' 680 system?
 - a. **Provide new Jeron 790 nurse call system. Refer to amendment #1 revision to specification 27 52 23.**
14. Drawing EP205, note #14 calls to install (2) new VSMC starters to serve existing exhaust fan EF-1 CATH. What are the specs on this existing exhaust fan? What is the voltage of this exhaust fan? What size starters are required for this existing exhaust fan? What electrical panel is this exhaust fan fed from?
 - a. **The existing exhaust fan EF-1 Cath is 3/4HP, 480V, 3-Phase. It is fed from panel EPH-CR-55-1, as indicated on sheet E400. Refer to sheet EP205 for amendment #1 modifications.**
15. Drawing E400. Is panel UPS-55-1 a new panel to be provided? If so, can more details be provided on this panel such as size, etc?
 - a. **Panel amps, voltage, AIC rating, etc. is indicated on sheet E400 directly below panel name "UPS-55-1". Circuit Breaker definitions and symbols are indicated under "Circuit Breaker Information" on sheet E400. Everything is new on sheet E400, unless indicated by dashed or dash-dot-dashed lines (linetypes are defined under "General Notes" on sheet E400). Physical size is indicated on sheet EP205 in room 5547B.**
16. On page IN105, there is a wall mounting bracket (BR1) for mounting of computer (CPU). Accessory to Work Station Boom. Could you provide a manufacturer and model number?
 - a. **Accessory bracket to ICW – ELP6216 or equal.**
17. Page IN 105, there is a (WS) Retractable boom mounted work station used as a computer station: allows full mobility of the monitor to allow full visualization of the patient while in use. Could you provide a manufacturer and model number?
 - a. **ICW – ELP6216 Elite Double Arm or equal.**
18. Page IN105, there is an (SR) Storage Rack system to hold 22 lead shielding garments. Could you provide a manufacturer and model number or additional detail on what is needed?
 - a. **Storage rack to be closet pole capable of holding 22 shielding garments. Approximate weight of each garment is 15 pounds.**
19. Are the LCN automatic operators sole sourced or can alternate manufacturers be utilized?
 - a. **LCN automatic operators are sole sourced per Specification Section 01 01 10 – SN, 1.6 (B).**
20. Is there a specification for the countertops?
 - a. **06 20 00**
21. Page A105, Note 1 requests "Poly Resin" Countertops. Page IN106, elevation 1 & 4 indicates Poly Resin (CT1) and Poly Resin (CT2). The material schedule on page IN800 indicates SS1

Solid Surface, Avonite. Can you confirm that the Poly Resin is the same as Solid Surface or if there is a different material that should be cited on the finish schedule?

- a. All countertops and wall cap are to be solid surface. Poly Resin is the same as solid surface.
22. Section 3/A107 indicates a poly resin cap at the half wall. Page IN800, finish schedule, note 3 calls for a plam cap. Which is correct?
- a. Wall cap to be solid surface.
23. Is there a specification for the unistrut?
- a. No.
24. MH105 identifies a detail 15/MM500 for detail on a common PVC enclosure. Detail 15/MM500 is for pipe hangers. Could you provide the correct detail?
- a. The detail referenced on drawing MH105 should read 16/MM500 regarding the piping through an exterior wall. PVC enclosure is not detailed and refers to refrigerant line set cover similar to "Line-Hide" by Mitsubishi or "Fortress" by Rectorseal.

**SECTION 01 35 26
SAFETY REQUIREMENTS**

4/2015

1.1 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):
 - A10.1-2011Pre-Project & Pre-Task Safety and Health Planning
 - A10.34-2012Protection of the Public on or Adjacent to Construction Sites
 - A10.38-2013Basic 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):
 - E84-2013Surface Burning Characteristics of Building Materials
- D. The Facilities Guidelines Institute (FGI):
 - FGI Guidelines-2010Guidelines for Design and Construction of Healthcare Facilities
- E. National Fire Protection Association (NFPA):
 - 10-2013Standard for Portable Fire Extinguishers
 - 30-2012Flammable and Combustible Liquids Code
 - 51B-2014Standard for Fire Prevention During Welding, Cutting and Other Hot Work
 - 70-2014National Electrical Code
 - 70B-2013Recommended Practice for Electrical Equipment Maintenance
 - 70E-2012Standard for Electrical Safety in the Workplace
 - 99-2012Health Care Facilities Code
 - 241-2013Standard for Safeguarding Construction, Alteration, and Demolition Operations
- F. The Joint Commission (TJC)
 - TJC ManualComprehensive Accreditation and Certification Manual
- G. U.S. Nuclear Regulatory Commission
 - 10 CFR 20Standards for Protection Against Radiation
- H. U.S. Occupational Safety and Health Administration (OSHA):
 - 29 CFR 1904Reporting and Recording Injuries & Illnesses
 - 29 CFR 1910Safety and Health Regulations for General Industry
 - 29 CFR 1926Safety and Health Regulations for Construction Industry

CPL 2-0.124.....Multi-Employer Citation Policy

I. VHA Directive 2005-007

1.2 DEFINITIONS:

- A. 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)**).
- B. "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.
- C. High Visibility Accident is any mishap which may generate publicity or high visibility.
- D. 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 through provided by a physician or registered personnel.
- E. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
 - 1. Death, regardless of the time between the injury and death, or the length of the illness;
 - 2. Days away from work (any time lost after day of injury/illness onset);
 - 3. Restricted work;
 - 4. Transfer to another job;
 - 5. Medical treatment beyond first aid;
 - 6. Loss of consciousness; or,
 - 7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

1.3 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 Contracting Officer Representative.

1.4 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:

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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/qualification to meet specific OSHA Competent/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;

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- 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 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 INVESTIGATION & REPORTING.** The Contractor shall conduct mishap investigations of all OSHA Recordable Incidents. The APP shall include accident/incident investigation procedure & identify person(s) responsible to provide the following to the Contracting Officer Representative :
 - (1) Exposure data (man-hours worked);
 - (2) Accident investigations, reports, and 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 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;

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- (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.

- C. Submit the APP to the Contracting Officer Representative for review for compliance with contract requirements in accordance with Section [01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES](#) 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
- D. Once accepted by the Contracting Officer Representative, 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, 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 Contracting Officer Representative. 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 (as defined by ASSE/SAFE A10.34) and the environment.

1.5 ACTIVITY HAZARD ANALYSES (AHAS):

- 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).

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- 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 Contracting Officer Representative 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) 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 Contracting Officer Representative for review for compliance with contract requirements in accordance with [Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES](#) for review at least 15 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 Contracting Officer Representative .

1.6 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.
- C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 14 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

1.7 “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. The Prime Contractor 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 safety program.
- B. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons.
- C. 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 the 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.
- D. 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).

1.8 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. 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.
- D. Submit training records associated with the above training requirements to the Contracting Officer Representative /for review for compliance with contract requirements in accordance with [Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES](#) 15 calendar days prior to the date of the preconstruction conference for acceptance.
- E. 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.
- F. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 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

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inspection of the entire construction areas with the subcontractors' present in their work areas. Coordinate with, and report findings and corrective actions weekly to Contracting Officer Representative.

- 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 Contracting Officer Representative 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 Contracting Officer Representative within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS:

- A. Notify the Contracting Officer Representative as soon as practical, but no more than four hours after any accident meeting the definition of OSHA Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$5,000, or any weight handling 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 Contracting Officer Representative determine whether a government investigation will be conducted.
- B. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment 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, and provide the report to the Contracting Officer Representative within 5 calendar days of the accident. The Contracting Officer Representative 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 Contracting Officer Representative monthly.
- D. A summation of all OSHA recordable accidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Contracting Officer Representative monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Contracting Officer Representative as requested.

1.11 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 Contracting Officer Representative 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

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- 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 Contracting Officer Representative, 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 Contracting Officer Representative.
 4. Hearing protection – Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 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. Exterior construction activities causing disturbance of soil or creates dust in some other manner must be controlled. [Refer to Specification Section 01 01 10 IC for more detailed information regarding Infection Control.](#)

1.13 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 Contracting Officer Representative 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. [Refer to Specification Section 01 01 10 FSS for more detailed information regarding Fire Safety.](#)
- 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. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas, the areas that are described in phasing requirements, and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices.
 2. Install one-hour, two-hour fire-rated temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.
 3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with **Section 07 84 00, FIRESTOPPING**.
- E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with **29 CFR 1926, NFPA 241 and NFPA 70**.

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- F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Contracting Officer Representative.
- G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Contracting Officer Representative.
- 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. Standpipes: Install and extend standpipes up with each floor in accordance with **29 CFR 1926** and NFPA 241. Do not charge wet standpipes subject to freezing until weather protected.
- K. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.
- L. 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 Contracting Officer Representative. 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 Contracting Officer Representative.
- M. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with Contracting Officer Representative.
- N. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Contracting Officer Representative at least 10 days in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- O. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Contracting Officer Representative.
- P. 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.
- Q. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- R. If required, submit documentation to the Contracting Officer Representative that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

1.14 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.

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- 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 Contracting Officer Representative with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA specific to energized work activities will be developed, reviewed, and accepted prior to the start of that work.
1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energizing. 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-energizing 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 Contracting Officer Representative.
- 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 has been accepted by the Contracting Officer Representative 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. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites shall have approved ground-fault circuit interrupters for personnel protection. “Assured Equipment Grounding Conductor Program” only is not allowed.

1.15 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.

1.16 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.

1.17 EXCAVATION AND TRENCHES

- A. All excavation and trenching work shall comply with **29 CFR 1926 Subpart P**.
- B. All excavations and trenches 5 feet in depth or greater shall require a written trenching and excavation permit (NOTE – some States and other local jurisdictions require separate state/jurisdiction-issued excavation permits). The permit shall be completed and provided to the Contracting Officer Representative prior to commencing work for the day. At the end of the day, the permit shall be closed out and provided to the Contracting Officer Representative and/or other Government Designated Authority. The permit shall be maintained onsite and include the following:
 - 1. Determination of soil classification.
 - 2. Indication that utilities have been located and identified. If utilities could not be located after all reasonable attempt, then excavating operations will proceed cautiously.
 - 3. Indication of selected excavation protective system.
 - 4. Indication that the spoil pile will be stored at least 2 feet from the edge of the excavation and safe access provided within 25 feet of the workers.
 - 5. Indication of assessment for a potential toxic, explosive, or oxygen deficient atmosphere.
- C. If not using an engineered protective system such as a trench box, shielding, shoring, or other Professional Engineer designed system and using a sloping or benching system, soil classification cannot be Solid Rock or Type A. All soil will be classified as Type B or Type C and sloped or benched in accordance with Appendix B of **29 CFR 1926**.

1.18 CRANES

- A. All crane work shall comply with **29 CFR 1926 Subpart C**.

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- B. Prior to operating a crane, the operator must be licensed, qualified or certified to operate the crane. Thus, all the provisions contained with Subpart CC are effective and there is no “Phase In” date of November 10, 2014.
- C. A detailed lift permit shall be submitted 14 days prior to the scheduled lift complete with route for truck carrying load, crane load analysis, siting of crane and path of swing. The lift will not be allowed without approval of this document.
- D. Crane operators shall not carry loads
 - 1. Over the general public or VAMC personnel
 - 2. Over any occupied building unless
 - a. The top two floors are vacated
 - b. Or overhead protection with a design live load of 300 psf is provided

1.19 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.

1.20 CONFINED SPACE ENTRY

- A. All confined space entry shall comply with **29 CFR 1910.146** 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 Contracting Officer Representative.

1.21 WELDING AND CUTTING

As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Contracting Officer Representative. Obtain permits from Contracting Officer Representative at least 10 days in advance .

1.22 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.

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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.

1.23 FLOOR & WALL OPENINGS

- A. All floor and wall openings shall comply with **29 CFR 1926 Subpart M**.
- B. Floor and roof holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. See 21.F for covering and labeling requirements. Skylights located in floors or roofs are considered floor or roof hole/openings.
- C. All floor, roof openings or hole into which a person can accidentally walk or fall through shall be guarded either by a railing system with toeboards along all exposed sides or a load-bearing cover. When the cover is not in place, the opening or hole shall be protected by a removable guardrail system or shall be attended when the guarding system has been removed or other fall protection system.
 1. Covers shall be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.
 2. Covers shall be secured when installed, clearly marked with the word "HOLE", "COVER" or "Danger, Roof Opening-Do Not Remove" or color-coded or equivalent methods (e.g., red or orange "X"). Workers must be made aware of the meaning for color coding and equivalent methods.
 3. Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, shall be immediately cut out. No hole or opening shall be left unattended unless covered.
 4. Non-load-bearing skylights shall be guarded by a load-bearing skylight screen, cover, or railing system along all exposed sides.
 5. Workers are prohibited from standing/walking on skylights.

--- E N D ---

SECTION 23 73 00
INDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Air handling units including integral components specified herein.
- B. Definitions: Air Handling Unit (AHU): A factory fabricated and tested assembly of modular sections consisting of a single plenum fan with direct-drive, coils, filters, and other necessary equipment to perform one or more of the following functions of circulating, cleaning, heating, cooling, humidifying, dehumidifying, and mixing of air. Design capacities of units shall be as scheduled on the drawings.

1.2 RELATED WORK

- B. General mechanical requirements and items, which are common to more than one section of Division 23: Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- C. Sound and vibration requirements: Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
- D. Piping and duct insulation: Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION.
- F. Heating and cooling coils and pressure requirements: Section 23 82 16, AIR COILS.
- G. Return and exhaust fans: Section 23 34 00, HVAC FANS.
- H. Requirements for flexible duct connectors, sound attenuators and sound absorbing duct lining, and air leakage: Section 23 31 00, HVAC DUCTS and CASINGS.
- I. Air filters and filters' efficiency: Section 23 40 00, HVAC AIR CLEANING DEVICES.
- J. HVAC controls: Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.
- K. Testing, adjusting and balancing of air and water flows: Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC.
- L. Types of motors: Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT.
- M. Types of motor starters: Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS.
- N. General Commissioning: Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS
- O. HVAC Commissioning: Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS

1.3 QUALITY ASSURANCE

- A. Refer to Article, Quality Assurance, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

B. Air Handling Units Certification

2. Air Handling Units with Plenum Fans:

- a. Air Handling Units with a single Plenum Fan shall be certified in accordance with AHRI 430 and tested/rated in accordance with AHRI 260.

C. Heating, Cooling, and Air Handling Capacity and Performance Standards:

AHRI 430, AHRI 410, ASHRAE 51, and AMCA 210.

D. Performance Criteria:

1. The fan BHP shall include all system effects for all fans.
2. The fan motor shall be selected within the rated nameplate capacity, without relying upon NEMA Standard Service Factor.
3. Select the fan operating point as follows:
 - a. Air Foil, Backward Inclined, or Tubular Fans Including Plenum Fans: At or near the peak static efficiency but at an appropriate distance from the stall line.
4. Operating Limits: AMCA 99 and Manufacturer's Recommendations.

- E. Units shall be factory-fabricated, assembled, and tested by a manufacturer, in business of manufacturing similar air-handling units for at least five (5) years.

1.4. SUBMITTALS:

- A. The contractor shall, in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish a complete submission for all air handling units covered in the project. The submission shall include all information listed below. Partial and incomplete submissions shall be rejected without reviews.

B. Manufacturer's Literature and Data:

1. Submittals for AHUs shall include fans, drives, motors, coils, sound attenuators, filter housings, and all other related accessories. The contractor shall provide custom drawings showing total air handling unit assembly including dimensions, operating weight, access sections, door swings, controls penetrations, electrical disconnect, lights, duplex receptacles, switches, wiring, utility connection points, unit support system, vibration isolators, drain pan, pressure drops through each component (filter, coil etc).
2. Submittal drawings of section or component only will not be acceptable. Contractor shall also submit performance data including performance test results, charts, curves or certified computer selection data; data sheets; fabrication and insulation details. If the unit cannot be shipped in one piece, the contractor shall indicate the number of pieces that each unit will have to be broken

- into to meet shipping and job site rigging requirements. This data shall be submitted in hard copies and in electronic version compatible to AutoCAD version used by the VA at the time of submission.
3. Submit sound power levels in each octave band for the inlet and discharge of the fan and at entrance and discharge of AHUs at scheduled conditions. In absence of sound power ratings refer to Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
 4. Provide fan curves showing Liters/Second (cubic feet per minute), static pressure, efficiency, and horsepower for design point of operation and at maximum design Liters/Second (cubic feet per minute).
 5. Submit total fan static pressure, external static pressure, for AHU including total, inlet and discharge pressures, and itemized specified internal losses and unspecified internal losses. Refer to air handling unit schedule on drawings.
- C. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Include instructions for lubrication, filter replacement, motor and drive replacement, spare part lists, and wiring diagrams.
- D. Submit written test procedures two weeks prior to factory testing. Submit written results of factory tests for approval prior to shipping.
- E. Submit shipping information that clearly indicates how the units will be shipped in compliance with the descriptions below.
1. Units shall be shipped in one (1) piece where possible and in shrink wrapping to protect the unit from dirt, moisture and/or road salt.
 2. If not shipped in one (1) piece, provide manufacturer approved shipping splits where required for installation or to meet shipping and/or job site rigging requirements in modular sections. Indicate clearly that the shipping splits shown in the submittals have been verified to accommodate the construction constraints for rigging as required to complete installation and removal of any section for replacement through available access without adversely affecting other sections.
 3. If shipping splits are provided, each component shall be individually shrink wrapped to protect the unit and all necessary hardware (e.g. bolts, gaskets etc.) will be included to assemble unit on site (see section 2.1.A4).

4. Lifting lugs will be provided to facilitate rigging on shipping splits and joining of segments. If the unit cannot be shipped in one piece, the contractor shall indicate the number of pieces that each unit will have to be broken into to meet shipping and job site rigging requirements.

1.5 APPLICABLE PUBLICATIONS

- A. 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.
- B. Air-Conditioning, Heating, and Refrigeration Institute (AHRI)/(ARI):
410-01.....Standard for Forced-Circulation Air-Heating and Air-Cooling Coils
430-09.....Central Station Air Handling Units
- C. Air Movement and Control Association International, Inc. (AMCA):
210-07.....Laboratory Methods of Testing Fans for Rating
- D. American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. (ASHRAE):
170-2008.....Ventilation of Health Care Facilities
- E. American Society for Testing and Materials (ASTM):
ASTM B117-07a.....Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM D1654-08.....Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D1735-08.....Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
ASTM D3359-08.....Standard Test Methods for Measuring Adhesion by Tape Test
- F. Military Specifications (Mil. Spec.):
MIL-P-21035B-2003.....Paint, High Zinc Dust Content, Galvanizing Repair (Metric)
- G. National Fire Protection Association (NFPA):
NFPA 90A.....Standard for Installation of Air Conditioning and Ventilating Systems, 2009
- H. Energy Policy Act of 2005 (P.L.109-58)

PART 2 - PRODUCTS

2.1 AIR HANDLING UNITS

- A. General:
 1. AHUs shall be fabricated from insulated, solid double-wall galvanized steel without any perforations in draw-through configuration. Casing

- shall be fabricated as specified in section 2.1.C.2. Galvanizing shall be hot dipped conforming to ASTM A525 and shall provide a minimum of 0.275 kg of zinc per square meter (0.90 oz. of zinc per square foot) (G90). Aluminum constructed units, subject to VA approval, may be used in place of galvanized steel. The unit manufacturer shall provide published documentation confirming that the structural rigidity of aluminum air-handling units is equal or greater than the specified galvanized steel.
2. The contractor and the AHU manufacturer shall be responsible for ensuring that the unit will not exceed the allocated space shown on the drawings, including required clearances for service and future overhaul or removal of unit components. All structural, piping, wiring, and ductwork alterations of units, which are dimensionally different than those specified, shall be the responsibility of the contractor at no additional cost to the government.
 3. AHUs shall be fully assembled by the manufacturer in the factory in accordance with the arrangement shown on the drawings. The unit shall be assembled into the largest sections possible subject to shipping and rigging restrictions. The correct fit of all components and casing sections shall be verified in the factory for all units prior to shipment. All units shall be fully assembled, tested, and then split to accommodate shipment and job site rigging. On units not shipped fully assembled, the manufacturer shall tag each section and include air flow direction to facilitate assembly at the job site. Lifting lugs or shipping skids shall be provided for each section to allow for field rigging and final placement of unit.
 4. The AHU manufacturer shall provide the necessary gasketing, caulking, and all screws, nuts, and bolts required for assembly. The manufacturer shall provide a factory-trained and qualified local representative at the job site to supervise the assembly and to assure that the units are assembled to meet manufacturer's recommendations and requirements noted on the drawings. Provide documentation to the Contracting Officer that the local representative has provided services of similar magnitude and complexity on jobs of comparable size. If a local representative cannot be provided, the manufacturer shall provide a factory representative.
 5. Gaskets: All door and casing and panel gaskets and gaskets between air handling unit components, if joined in the field, shall be high quality which seal air tight and retain their structural integrity

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and sealing capability after repeated assembly and disassembly of bolted panels and opening and closing of hinged components. Bolted sections may use a more permanent gasketing method provided they are not disassembled.

6. Structural Rigidity: Provide structural reinforcement when required by span or loading so that the deflection of the assembled structure shall not exceed 1/200 of the span based on a differential static pressure of 1991 PA (8 inch WG) or higher.

B. Base:

1. Provide a heavy duty steel base for supporting all major AHU components. Bases shall be constructed of wide-flange steel I-beams, channels, or minimum 125 mm (5 inch) high 3.5 mm (10 Gauge) steel base rails. Welded or bolted cross members shall be provided as required for lateral stability. Contractor shall provide supplemental steel supports as required to obtain proper operation heights for cooling coil condensate drain trap as required by manufacturer.
2. AHUs shall be completely self supporting for installation.
3. The AHU bases not constructed of galvanized steel shall be cleaned, primed with a rust inhibiting primer, and finished with rust inhibiting exterior enamel.

C. Casing (including wall, floor and roof):

1. General: AHU casing shall be constructed as solid double wall, galvanized steel insulated panels without any perforations, integral of or attached to a structural frame. The thickness of insulation, mode of application and thermal breaks shall be such that there is no visible condensation on the exterior panels of the AHU located in the non-conditioned spaces.
2. Casing Construction:

Table 2.1.C.2

Outer Panel	0.8 mm (22 Gage) Minimum
Inner Panel	0.8 mm (22 Gage) Minimum
Insulation	Foam
Thickness	50 mm (2 inch) Minimum
Density	48 kg/m ³ (3.0 lb/ft ³) Minimum
Total R Value	2.3 m ² .K/W (13.0 ft ² .°F.hr/Btu) Minimum

3. Casing Construction (Contractor's Option):

Table 2.1.C.3

Outer Panel	1.3 mm (18 Gage) Minimum
Inner Panel	1.0 mm (20 Gage) Minimum
Insulation	Fiberglass
Thickness	50 mm (2 inch) Minimum
Density	24 kg/m ³ (1.5 lb/ft ³) Minimum
Total R Value	1.4 m ² .K/W (8.0 ft ² .°F.hr/Btu) Minimum

4. Blank-Off: Provide blank-offs as required to prevent air bypass between the AHU sections, around coils, and filters.
5. Casing panels shall be secured to the support structure with stainless steel or zinc-chromate plated screws and gaskets installed around the panel perimeter. Panels shall be completely removable to allow removal of fan, coils, and other internal components for future maintenance, repair, or modifications. Welded exterior panels are not acceptable.
6. Access Doors: Provide in each access section and where shown on drawings. Show single-sided and double-sided access doors with door swings on the floor plans. Doors shall be a minimum of 50 mm (2 inch) thick with same double wall construction as the unit casing. Doors shall be a minimum of 600 mm (24 inches) wide, unless shown of different size on drawings, and shall be the full casing height up to a maximum of 1850 mm (6 feet). Doors shall be gasketed, hinged, and latched to provide an airtight seal. ~~The access doors for fan section, coil section shall include a minimum 150 mm x 150 mm (6 inch x 6 inch) double thickness, with air space between the glass panes tightly sealed, reinforced glass or Plexiglas window in a gasketed frame.~~
 - a. Hinges: Manufacturers standard, designed for door size, weight and pressure classifications. Hinges shall hold door completely rigid with minimum 45 kg (100 lb) weight hung on latch side of door.
 - b. Latches: Non-corrosive alloy construction, with operating levers for positive cam action, operable from either inside or outside. Doors that do not open against unit operating pressure shall allow the door to ajar and then require approximately 0.785 radian (45 degrees) further movement of the handle for complete opening. Latch shall be capable of restraining explosive opening of door with a force not less than 1991 Pa (8 inch WG).
 - c. Gaskets: Neoprene, continuous around door, positioned for direct compression with no sliding action between the door and gasket.

Secure with high quality mastic to eliminate possibility of gasket slipping or coming loose.

7. Provide sealed sleeves, metal or plastic escutcheons or grommets for penetrations through casing for power and temperature control wiring and pneumatic tubing. Coordinate with electrical and temperature control subcontractors for number and location of penetrations. Coordinate lights, switches, and duplex receptacles and disconnect switch location and mounting. All penetrations and equipment mounting may be provided in the factory or in the field. All field penetrations shall be performed neatly by drilling or saw cutting. No cutting by torches will be allowed. Neatly seal all openings airtight.

E. Floor:

1. Unit floor shall be level without offset space or gap and designed to support a minimum of 488 kg/square meter (100 lbs per square foot) distributed load without permanent deformation or crushing of internal insulation. Provide adequate structural base members beneath floor in service access sections to support typical service foot traffic and to prevent damage to unit floor or internal insulation. Unit floors in casing sections, which may contain water or condensate, shall be watertight with drain pan.
2. Where indicated, furnish and install floor drains, flush with the floor, with nonferrous grate cover and stub through floor for external connection.

F. Condensate Drain Pan: Drain pan shall be designed to extend entire length of cooling coils including headers and return bends. Depth of drain pan shall be at least 43 mm (1.7 inches) and shall handle all condensate without overflowing. Drain pan shall be double-wall, double sloping type, and fabricated from stainless (304) with at least 50 mm (2 inch) thick insulation sandwiched between the inner and outer surfaces. Drain pan shall be continuous metal or welded watertight. No mastic sealing of joints exposed to water will be permitted. Drain pan shall be placed on top of casing floor or integrated into casing floor assembly. Drain pan shall be pitched in all directions to drain line.

1. An intermediate, stainless-steel (304) condensate drip pan with copper downspouts shall be provided on stacked cooling coils. Use of intermediate condensate drain channel on upper casing of lower coil is permissible provided it is readily cleanable. Design of intermediate condensate drain shall prevent upper coil condensate from flowing across face of lower coil.

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2. Drain pan shall be piped to the exterior of the unit. Drain pan shall be readily cleanable.
3. Installation, including frame, shall be designed and sealed to prevent blow-by.

I. Plenum Fans - Single Fan:

1. General: Fans shall be Class II (minimum) construction with single inlet, aluminum wheel and stamped air-foil aluminum bladed. The fan wheel shall be mounted on the directly-driven motor shaft in AMCA Arrangement 4. Fans shall be dynamically balanced and internally isolated to minimize the vibrations. Provide a steel inlet cone for each wheel to match with the fan inlet. Locate fan in the air stream to assure proper flow. The fan performance shall be rated in accordance with AMCA 210 or ASHRAE 51.
2. Allowable vibration tolerances for fan shall not exceed a self-excited vibration maximum velocity of 0.005 m/s (0.20 inch per second) RMS, filter in, when measured with a vibration meter on bearing caps of machine in vertical, horizontal and axial directions or measured at equipment mounting feet if bearings are concealed. After field installation, compliance to this requirement shall be demonstrated with field test in accordance with Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT and Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC. Following fan assembly, the complete fan assembly balance shall be tested using an electronic balance analyzer with a tunable filter and stroboscope. Vibration measurements shall be taken on each motor bearing housing in the vertical, horizontal, and axial planes (5 total measurements, 2 each motor bearing and 1 axial).
3. The plenum fans shall be driven by variable speed drives with at least one back-up drive as shown in the design documents. Use of a drive with bypass is not permitted.

J. Fan Motor, Drive, and Mounting Assembly (Plenum Fans):

Fan Motor and Drive: Motors shall be premium energy efficient type, as mandated by the Energy Policy Act of 2005, with efficiencies as shown in the Specifications Section 23 05 12 (General Motor Requirements For HVAC and Steam Equipment), on drawings and suitable for use in variable frequency drive applications. Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION, for additional motor and drive specifications. Refer to Specification Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS

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- N. Filter Section: Refer to Section 23 40 00, HVAC AIR CLEANING DEVICES, for filter requirements.
1. Filters including one complete set for temporary use at site shall be provided independent of the AHU. The AHU manufacturer shall install filter housings and racks in filter section compatible with filters furnished. The AHU manufacturer shall be responsible for furnishing temporary filters (pre-filters and after-filters, as shown on drawings) required for AHU testing.
 2. Factory-fabricated filter section shall be of the same construction and finish as the AHU casing including filter racks and hinged double wall access doors. Filter housings shall be constructed in accordance with side service or holding frame housing requirements in Section 23 40 00, HVAC AIR CLEANING DEVICES.
- P. Coils: Coils shall be mounted on hot dipped galvanized steel supports to assure proper anchoring of coil and future maintenance. Coils shall be face or side removable for future replacement thru the access doors or removable panels. Each coil shall be removable without disturbing adjacent coil. Cooling coils shall be designed and installed to insure no condensate carry over. Provide factory installed extended supply, return, drain, and vent piping connections.
- ~~1. The coating process shall such that uniform coating thickness is maintained at the fin edges. The quality control shall be maintained by ensuring compliance to the applicable ASTM Standards for the following:~~
 - ~~a. Salt Spray Resistance (Minimum 6,000 Hours)~~
 - ~~b. Humidity Resistance (Minimum 1,000 Hours)~~
 - ~~c. Water Immersion (Minimum 260 Hours)~~
 - ~~d. Cross Hatch Adhesion (Minimum 4B-5B Rating)~~
 - ~~e. Impact Resistance (Up to 160 Inch/Pound)~~
- T. Electrical and Lighting: Wiring and equipment specifications shall conform to Division 26, ELECTRICAL.
1. Vapor-proof lights using cast aluminum base style with glass globe and cast aluminum guard **or aluminum die cast base with polycarbonate lens light emitting diode (LED) enclosed and gasketed weather resistant.**
 2. **Lights** shall be installed in access sections for fan, and any section over 300 mm (12 inch) wide. A switch shall control the lights in each compartment with pilot light mounted outside the respective compartment access door. Wiring between switches and lights shall be factory installed. All wiring shall run in neatly installed

electrical conduits and terminate in a junction box for field connection to the building system. Retractable coiled power wiring on movable service lights. Provide single point 115 volt - one phase connection at junction box.

2. Install compatible bulb in each light fixture.
4. Disconnect switch and power wiring: Provide factory or field mounted disconnect switch. Coordinate with Division 26, ELECTRICAL.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install air handling unit in conformance with ARI 435.
- B. Assemble air handling unit components following manufacturer's instructions for handling, testing and operation. Repair damaged galvanized areas with paint in accordance with Military Spec. DOD-P-21035. Repair painted units by touch up of all scratches with finish paint material. Vacuum the interior of air handling units clean prior to operation.
- D. Leakage and test requirements for air handling units shall be the same as specified for ductwork in Specification Section 23 31 00, HVAC DUCTS AND CASINGS except leakage shall not exceed Leakage Class (C_L) 12 listed in SMACNA HVAC Air Duct Leakage Test Manual when tested at 1.5 times the design static pressure. Repair casing air leaks that can be heard or felt during normal operation and to meet test requirements.
- E. Perform field mechanical (vibration) balancing in accordance with Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
- F. Seal and/or fill all openings between the casing and AHU components and utility connections to prevent air leakage or bypass.

3.2 STARTUP SERVICES

- A. The air handling unit shall not be operated for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings are lubricated and fan has been test run under observation.
- B. After the air handling unit is installed and tested, provide startup and operating instructions to VA personnel.
- C. An authorized factory representative should start up, test and certify the final installation and application specific calibration of control components. Items to be verified include fan performance over entire operating range, noise and vibration testing, verification of proper alignment, overall inspection of the installation, Owner/Operator training, etc.

3.3 COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.
- B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

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**SECTION 23 84 00
HUMIDITY CONTROL EQUIPMENT**

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies humidifier units for air conditioning systems and packaged mechanical humidification units.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
- B. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items, which are common to more than one section of Division 23.
- C. Section 23 21 13, HYDRONIC PIPING: Requirements for field hot water piping.
- D. Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Requirements for field steam and condensate piping.
- E. Section 23 31 00, HVAC DUCTS AND CASINGS: Requirements for sheet metal ducts and fittings.
- F. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Requirements for controls and instrumentation.
- G. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC: Requirements for testing, adjusting and balancing of HVAC system.
- H. Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training.
- I. 01 91 00, GENERAL COMMISSIONING REQUIREMENTS

1.3 QUALITY ASSURANCE

- A. Refer to the GENERAL CONDITIONS.
- B. Refer to specification Section 01 00 00, GENERAL REQUIREMENTS for performance tests and instructions to VA personnel.
- C. Refer to paragraph, QUALITY ASSURANCE, in specification Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- D. Unit(s) shall be provided by a manufacturer who has been manufacturing humidifiers and have been in satisfactory service for at least three (3) years.

1.4 SUBMITTALS

- A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data:

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1. Technical data on design operating inlet and outlet conditions, air flows with diagram showing air volumes and conditions throughout the system, humidification capacity and electrical power data.
 2. A general arrangement diagram with overall dimensions showing all major components with overall dimensions, utility and duct work connections, operating weight and required service and equipment removal clearances.
 3. Control diagrams for system for humidifying air, electric circuits interface all control set points.
- C. Shop drawings shall indicate assembly, unit dimensions, weight loading, required clearances, construction details, and field connection details.
- D. Submit unit control system documentation required for interface with BACnet protocol DDC control system. Submit BACnet compliant Protocol Implementation Conformance Statement (PICS) for all controllers.
- E. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.
- F. Provide installation, operating and maintenance instructions, in accordance with Article, INSTRUCTIONS, in specification Section 01 00 00, GENERAL REQUIREMENTS.
- G. Performance test report: In accordance with PART 3.
- H. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.

1.5 APPLICABLE PUBLICATIONS

- A. 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.
- B. Air Movement and Control Association (AMCA):
- 99-10.....Standards Handbook
 - 210-07.....Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (ANSI)
 - 301-06.....Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (ANSI)

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- C. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 - 52.2-07.....METHOD OF TESTING General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size (ANSI)
 - 62.1-10.....Ventilation for Acceptable Indoor Air Quality (ANSI)
- D. American Bearing Manufacturers Association (ABMA)
 - 9-1990 (R2008).....Load Ratings and Fatigue Life for Ball Bearings (ANSI)
- E. National Fire Protection Association (NFPA)
 - 90A-09.....Standard for the Installation of Air-Conditioning and Ventilating Systems
 - 70-0511.....National Electrical Code

1.6 QUALITY ASSURANCE

- A. Performance: Conform to ARI 640
- B. Fabrication: Conform to AMCA 99.
- C. Product of manufacturer regularly engaged in production of pool dehumidification equipment who issues complete catalog data on total product.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.
- B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures and finish.
- C. Comply with manufacturer's rigging and installation instructions.

1.8 PROJECT CONDITIONS

Do not operate units for any purpose, temporary or permanent, until unit has been test run, all piping is connected and energized and all wiring complete and tested.

PART 2 - PRODUCTS

2.1 TUBE DISTRIBUTORS

- A. Dispersion Tubes: factory assembled 304 stainless steel, heli-arc welded, uniform distribution over entire length, tube quantity meeting scheduled absorption distance.
- B. Condensate drain 304 stainless steel construction.

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- C. Escutcheon plates 304 stainless steel to seal each opening around dispersion tube(s) and condensate drain.

2.2 ELECTRIC STEAM HUMIDIFIER UNITS

- A. Construction: Vaporizing chamber, cover and fittings constructed of 304 stainless steel, Heli-arc welded seams.
- B. Cover: Removable, gasketed.
- C. Electrical: Provide a unit disconnect switch and a fuse for each heating element. ETL or UL/CSA listed.
- D. Immersion Heaters: Electric resistance type, INCOLOY alloy sheathing, maximum 90 watts per square inch, constructed threaded and screwed into front face plate of vaporization chamber.
- E. Cleanout access for removal of settled minerals inside vaporization chamber.
- F. Electronic Water Level Control:
 - 1. Function: automatic refill, low water cut-off, skimmer bleed-off, automatic drain/blowdown.
 - 2. Water Level Sensing Unit: constructed with (3) stainless steel probes TEFLON coating.
 - 3. Fill Valve: solenoid operated, factory mounted and wired.
 - 4. Drain Valve: all stainless steel construction factory mounted and wired.
- G. Surface Skimmer: Field adjustable skim duration.
- H. Automatic Drain/Flush: Automatic valve factory mounted and wired.
- I. Controls:
 - 1. Enclosure: ETL or UL/CSA listed JIC, door interlock switch.
 - 2. Magnetic contactors for each heating element.
 - 3. Provide control transformer for all humidifier controls.
 - 4. Provide a terminal strip for connection of the following external devices: Humidistat, Duct high-limit humidistat, Air flow switch, Fan interlock.
 - 5. Provide a vaporizing chamber temperature sensor(s) for the following features: Over-temperature protection, Freeze protection, Pre-heating.
 - 6. Microprocessor: factory mounted and wired in control panel, self-diagnosis at start-up, water make-up valve control and low water safety shutdown, four position functional slide switch on microprocessor board, "AUTO", "STANDBY", "DRAIN", and "TEST".
 - 7. Drain Cycle:

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- a. Auto Drain/Flush Frequency: Microprocessor accumulates actual humidifier "ON" time and activates auto drain and flush sequence.
- b. Auto Drain/Flush Duration: Field adjustable from 2 to 128 seconds.
- c. End of season drain when there has been no demand for humidification over a field adjustable period.

J. Options:

1. Factory unit mounted control cabinet with all wiring between cabinet and humidifier completed at factory.
2. Full Modulation: Microprocessor mounted and wired in control cabinet. Modulating humidistat having an operating range of 20% to 80% R.H., for wall mounting. Modulate humidifier output from 0% to 100% of maximum capacity.
3. Airflow proving switch "Sail Switch," field installed.
4. Humidistat: Room mounted type, 0-10v DC control signal, 20%-80%, field adjustable setpoint range, 24v supply voltage, mounting bracket and cover plate.
5. Duct High Limit Humidistat: Compatible high limit modulating humidistat.
6. Factory Insulation: 1" thick, rigid, foil faced fiberglass insulation, covered with reinforced aluminum foil. All surfaces except front face panel shall be covered.
7. Support Legs: Provide four (4) painted angle-iron support legs, providing 24" clearance between underside of humidifier and floor.
8. Wall Brackets: Provide two (2) welded and painted steel wall brackets to support humidifier on a vertical surface.

2.3 DRAIN COOLER

- A. Construction: 304 stainless steel cylindrical mixing chamber.
- B. Internal baffling system.
- C. Thermostatic bulb: Factory pre-set at 140°F.
- D. Self-contained, adjustable, thermostatic control valve.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Follow equipment manufacturer's written instructions for handling and installation of equipment including clearances.
- B. Mount and wire all control panels.

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- C. Provide all control wiring between humidifier control cabinet and humidifier.
- D. Provide all control wiring between humidifier control cabinet and humidifier external controls.
- D. Verify correct settings and installation of controls.

3.2 CONNECTIONS

- A. Install piping to allow service and maintenance.
- C. Connect condensate drain pans using minimum DN 32 NPS 1-1/4copper tubing. Extend full size to nearest equipment or floor drain. Construct deep trap at connection to drain pan, and install clean out at changes in direction.
- G. Steam and Condensate Piping: Comply with applicable requirements in Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING. Connect with shutoff valve and union or flange.
- I. Ground equipment according to Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- J. Connect wiring according to Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW).
- K. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 STARTUP SERVICE

- A. Perform the following final checks before startup:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connection to piping and electrical systems are complete. Verify that proper thermal-overload protection is installed in starters and disconnect switches.
 - 3. Perform cleaning and adjusting specified in this Section.
- B. Complete installation and startup checks according to manufacturer's written instructions including: leakage testing, operational testing, testing and adjusting controls and safeties.
- C. Startup Report: Report findings during startup. Identify startup steps, corrective measures taken, and final results. State system installation and performance are acceptable in written report.
- D. Manufacturer's field technician's services include items which cannot be verified during an initial trip. Address any outstanding

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items in subsequent trip(s) and submit a report. Expenses: All expenses are to be included in manufacturer's services.

- E. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the Resident Engineer and Commissioning Agent. Provide a minimum of 7 days prior notice.

3.4 ADJUSTING

- B. Adjust initial humidity set points.

3.5 CLEANING

- A. Clean humidification units internally, on completion of installation, according to manufacturer's written instructions. Clean to remove foreign material and construction dirt and dust. Vacuum clean, cabinets and manifolds.

3.6 INSTRUCTIONS

Provide services of manufacturer's technical representative for eight hours to instruct VA personnel in operation and maintenance of installed humidifiers.

3.7 COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.
- B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

3.8 DEMONSTRATION AND TRAINING

- A. Provide services of manufacturer's technical representative for four hours to demonstrate installed unit and instruct VA personnel in operation and maintenance of units.
- B. Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS.

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SECTION 27 52 23
NURSE CALL AND CODE BLUE SYSTEMS

PART 1 - GENERAL

1.1 SECTION SUMMARY

- A. Work covered by this document includes design, engineering, labor, material and products, equipment warranty and system guarantee, training and services for, and incidental to, the complete installation of new and fully operating National Fire Protection Association (NFPA) - Life Safety Code 101.3-2 (a) Labeled and (b) Listed, Emergency Service Nurse-Call and/or Life Safety listed Code Blue Communication System and associated equipment (here-in-after referred to as the System) provided in approved locations indicated on the contract drawings. These items shall be tested and certified capable of receiving, distributing, interconnecting and supporting Nurse-Call and/or Code Blue communications signals generated local and remotely as detailed herein.
- B. Work shall be complete, Occupational Safety and Health Administration (OSHA), National Recognized Testing Laboratory (NRTL - i.e. Underwriters Laboratory [UL]) Listed and Labeled; and VA Central Office (VACO), Telecommunications Voice Engineering (TVE 0050P3B) tested, certified and ready for operation.
- C. The System shall be delivered free of engineering, manufacturing, installation, and functional defects. It shall be designed, engineered and installed for ease of operation, maintenance, and testing.
- D. The term "provide", as used herein, shall be defined as: designed, engineered, furnished, installed, certified, tested, and guaranteed by the Contractor.

1.2 RELATED SECTIONS

- A. 01 33 23 - Shop Drawings, Product Data and Samples.
- B. 07 84 00 - Firestopping.
- C. 26 05 21 - Low - Voltage Electrical Power Conductors and Cables (600 Volts and Below).
- D. 27 05 11 - Requirements for Communications Installations.
- E. 27 05 26 - Grounding and Bonding for Communications Systems.
- F. 27 05 33 - Raceways and Boxes for Communications Systems.
- G. 27 10 00 - TIP Structured Communications Systems Cabling.

- H. 27 11 00 - TIP Communications Interface and Equipment Rooms Fittings.
- I. 27 15 00 - TIP Communications Horizontal and Vertical Cabling.
- J. 27 41 31 / 41 - Master Antenna Television Equipment and Systems and/or Extension.
- K. 27 51 16 - Public Address & Mass Notification System (PA).
- L. 27 52 31 - Physical Security Management Equipment and System.
- M. 10 25 13 - Patient Bed Service Walls.

1.3 DEFINITION

- A. Provide: Design, engineer, furnish, install, connect complete, test, certify and guarantee.
- B. Work: Materials furnished and completely installed.
- C. Review of contract drawings: A service by the engineer to reduce the possibility of materials being ordered which do not comply with contract documents. The engineer's review shall not relieve the Contractor of responsibility for dimensions or compliance with the contract documents. The reviewer's failure to detect an error does not constitute permission for the Contractor to proceed in error.

1.4 REFERENCES

- A. The installation shall comply fully with all governing authorities, laws and ordinances, regulations, codes and standards, including, but not limited to:
 - 1. United States Federal Law:
 - a. Departments of:
 - 1) Commerce, Consolidated Federal Regulations (CFR), Title 15 - Under the Information Technology Management Reform Act (Public Law 104-106), the Secretary of Commerce approves standards and guidelines that are developed by the:
 - a) Chapter II, National Institute of Standards Technology (NIST - formerly the National Bureau of Standards). Under Section 5131 of the Information Technology Management Reform Act of 1996 and the Federal Information Security Management Act of 2002 (Public Law 107-347), NIST develops - Federal Information Processing Standards Publication (FIPS) 140-2-Security Requirements for Cryptographic Modules.

- b) Chapter XXIII, National Telecommunications and Information Administration (NTIA - aka 'Red Book') Chapter 7.8 / 9; CFR, Title 47 Federal communications Commission (FCC) Part 15, Radio Frequency Restriction of Use and Compliance in "Safety of Life" Functions & Locations.
- 2) Health, (Public Law 96-88), CFR, Title 42, Chapter IV Health & Human Services, CFR, Title 46, Subpart 1395(a)(b) JCAHO "a hospital that meets JCAHO accreditation is deemed to meet the Medicare conditions of Participation by meeting Federal Directives:"
 - a) All guidelines for Life, Personal and Public Safety; and, Essential and Emergency Communications.
- 3) Labor, CFR, Title 29, Part 1910, Chapter XVII - Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Standard:
 - a) Subpart 7 - Definition and requirements (for a NRTL - 15 Laboratory's, for complete list, contact (http://www.osha.gov/dts/otpca/nrtl/faq_nrtl.html):
 - 1) UL:
 - a) 65 - Standard for Wired Cabinets.
 - b) 83-03 - Standard for Thermoplastic-Insulated Wires and Cables.
 - c) 467-01 - Standard for Electrical Grounding and Bonding Equipment
 - d) 468 - Standard for Grounding and Bonding Equipment.
 - e) 486A-01 - Standard for Wire Connectors and Soldering Lugs for Use with Copper Conductors
 - f) 486C-02 - Standard for Splicing Wire Connectors.
 - g) 486E-00 - Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
 - h) 514B-02 - Standard for Fittings for Cable and Conduit.
 - i) 1069 - Hospital Signaling and Nurse Call Equipment.
 - j) 1449 - Standard for Transient Voltage Surge Suppressors.
 - k) 1479-03 - Standard for Fire Tests of Through-

Penetration Fire Stops.

- 1) 1666 - Standard for Wire/Cable Vertical (Riser) Tray Flame Tests.
 - m) 1863 - Standard for Safety, Communications Circuits Accessories.
 - n) 60950-1/2 - Information Technology Equipment - Safety.
- 2) Canadian Standards Association (CSA): same tests as for UL.
 - 3) Communications Certifications Laboratory (CCL): same tests as for UL.
 - 4) Intertek Testing Services NA, Inc. (ITSNA formerly Edison Testing Laboratory [ETL]): same tests as for UL.
- b) Subpart 35 - Compliance with NFPA 101 - Life Safety Code.
 - c) Subpart 36 - Design and construction requirements for exit routes.
 - d) Subpart 268 - Telecommunications.
 - e) Subpart 305 - Wiring methods, components, and equipment for general use.
- 6) Veterans Affairs (Public Law No. 100-527), CFR, Title 38, Volumes I & II:
 - a) Office of Telecommunications:
 - 1) Handbook 6100 - Telecommunications.
 - a) Spectrum Management FCC & NTIA Radio Frequency Compliance and Licensing Program.
 - b) Special Communications Proof of Performance Testing, VACO Compliance and Life Safety Certification(s).
 - b) Office of Cyber and Information Security (OCIS):
 - 1) Handbook 6500 - Information Security Program.
 - 2) Wireless and Handheld Device Security Guideline Version 3.2, August 15, 2005.
 - c) VA's National Center for Patient Safety - Veterans Health Administration Warning System, Failure of Medical Alarm Systems using Paging Technology to Notify Clinical Staff, July 2004.

- d) VA's Center for Engineering Occupational Safety and Health, concurrence with warning identified in VA Directive 7700.
- e) Office of Construction and Facilities Management (CFM):
 - 1) Master Construction Specifications (PG-18-1).
 - 2) Standard Detail and CAD Standards (PG-18-4).
 - 3) Equipment Guide List (PG-18-5).
 - 4) Electrical Design Manual for VA Facilities (PG 18-10), Articles 7 & 8.
 - 5) Minimum Requirements of A/E Submissions (PG 18-15):
 - a) Volume B, Major New Facilities, Major Additions; and Major Renovations, Article VI, Paragraph B.
 - b) Volume C - Minor and NRM Projects, Article III, Paragraph S.
 - c) Volume E - Request for Proposals Design/Build Projects, Article II, Paragraph F.
 - 6) Mission Critical Facilities Design Manual (Final Draft - 2007).
 - 7) Life Safety Protected Design Manual (Final Draft - 2007).
 - 8) Solicitation for Offerors (SFO) for Lease Based Clinics - (05-2009).
- b. Federal Specifications (Fed. Specs.):
 - 1) A-A-59544-00 - Cable and Wire, Electrical (Power, Fixed Installation).
- 2. National Codes:
 - a. American Institute of Architects (AIA): Guidelines for Healthcare Facilities.
 - b. American National Standards Institute/Electronic Industries Association/Telecommunications Industry Association (ANSI/EIA/TIA):
 - 1) 568-B - Commercial Building Telecommunications Wiring Standards:
 - a) B-1 - General Requirements.
 - b) B-2 - Balanced twisted-pair cable systems.
 - c) B-3 - Fiber optic cable systems.

- 2) 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
- 3) 606 - Administration Standard for the Telecommunications Infrastructure of Communications Buildings.
- 4) 607 - Commercial Building Grounding and Bonding Requirements for Telecommunications.
- 5) REC 127-49 - Power Supplies.
- 6) RS 270 - Tools, Crimping, Solderless Wiring Devices, Recommended Procedures for User Certification.
- c. American Society of Mechanical Engineers (ASME):
 - 1) Standard 17.4 - Guide for Emergency Personnel.
 - 2) Standard 17.5 - Elevator & Escalator Equipment (prohibition of installing non-elevator equipment in Elevator Equipment Room / Mechanical Penthouse).
- d. American Society of Testing Material (ASTM):
 - 1) D2301-04 - Standard Specification for Vinyl Chloride Plastic Pressure Sensitive Electrical Insulating Tape.
- e. Building Industries Communications Services Installation (BICSI):
 - 1) All standards for smart building wiring, connections and devices for commercial and medical facilities.
 - 2) Structured Building Cable Topologies.
 - 3) In consort with ANSI/EIA/TIA.
- f. Institute of Electrical and Electronics Engineers (IEEE):
 - 3) C62.41 - Surge Voltages in Low-Voltage AC Power Circuits.
- g. NFPA:
 - 1) 70 - National Electrical Code (current date of issue) - Articles 517, 645 & 800.
 - 2) 75 - Standard for Protection of Electronic Computer Data-Processing Equipment.
 - 3) 77 - Recommended Practice on Static Electricity.
 - 4) 99 - Healthcare Facilities.
 - 5) 101 - Life Safety Code.
3. State Hospital Code(s).
4. Local Town, City and/or County Codes.
5. Accreditation Organization(s):

- a. Joint Commission on Accreditation of Hospitals Organization
(JCAHO) - Section VI, Part 3a - Operating Features.

1.5 QUALIFICATIONS

- A. The OEM shall have had experience with three (3) or more installations of Nurse Call systems of comparable size and interfacing complexity with regards to type and design as specified herein. Each of these installations shall have performed satisfactorily for at least one (1) year after final acceptance by the user. Include the names, locations and point of contact for these installations as a part of the submittal.
- B. The Contractor shall submit certified documentation that they have been an authorized distributor and service organization for the OEM for a minimum of three (3) years. The Contractor shall be authorized by the OEM to pass thru the OEM's warranty of the installed equipment to VA. In addition, the OEM and Contractor shall accept complete responsibility for the design, installation, certification, operation, and physical support for the System. This documentation, along with the System Contractor and OEM certifications must be provided in writing as part of the Contractor's Technical submittal.
- C. The Contractor's Communications Technicians assigned to the System shall be fully trained, qualified, and certified by the OEM on the engineering, installation, operation, and testing of the System. The Contractor shall provide formal written evidence of current OEM certification(s) for the installer(s) as a part of the submittal or to the RE before being allowed to commence work on the System.
- D. The Contractor shall display all applicable national, state and local licenses.
- E. The Contractor shall submit copy (s) of Certificate of successful completion of OEM's installation/training school for installing technicians of the System's Nurse Call and/or Code Blue equipment being proposed.

1.6 CODES AND PERMITS

- A. Provide all necessary permits and schedule all inspections as identified in the contract's milestone chart, so that the system is proof of performance tested, certified and approved by VA and ready for operation on a date directed by the Owner.

- B. The contractor is responsible to adhere to all codes described herein and associated contractual, state and local codes.

1.7 SCHEDULING

- A. After the award of contract, the Contractor shall prepare a detailed schedule (aka milestone chart) using "Microsoft Project" software or equivalent. The Contractor Project Schedule (CPS) shall indicate detailed activities for the projected life of the project. The CPS shall consist of detailed activities and their restraining relationships. It will also detail manpower usage throughout the project.
- B. It is the responsibility of the Contractor to coordinate all work with the other trades for scheduling, rough-in, and finishing all work specified. The owner will not be liable for any additional costs due to missed dates or poor coordination of the supplying contractor with other trades.

1.8 REVIEW OF CONTRACT DRAWINGS AND EQUIPMENT DATA SUBMITTALS (AKA TECHNICAL SUBMITTALS)

(Note: The Contractor is encouraged, but not required, to submit separate technical submittal(s) outlining alternate technical approach(s) to the system requirements stated here-in as long as each alternate technical document(s) is complete, separate, and submitted in precisely the same manner as outlined herein. VA will review and rate each received alternate submittal, which follows this requirement, in exactly the same procedure as outlined herein. Partial, add-on, or addenda type alternates will not be accepted or reviewed.)

- A. Submit at one time within 10 days of contract awarding, drawings and product data on all proposed equipment and system. Check for compliance with contract documents and certify compliance with Contractor's "APPROVED" stamp and signature.
- B. Support all submittals with descriptive materials, i.e., catalog sheets, product data sheets, diagrams, and charts published by the manufacturer. These materials shall show conformance to specification and drawing requirements.
- C. Where multiple products are listed on a single cut-sheet, circle or highlight the one that you propose to use. Provide a complete and through equipment list of equipment expected to be installed in the

system, with spares, as a part of the submittal. Special Communications (TVE-0050P3B) will not review any submittal that does not have this list.

- D. Provide four (4) copies to the PM for technical review. The PM will provide a copy to the offices identified in Paragraph 1.3.C & D, at a minimum for compliance review as described herein where each responsible individual(s) shall respond to the PM within 10 days of receipt of their acceptance or rejection of the submittal(s).
- E. Equipment technical literature detailing the electrical and technical characteristics of each item of equipment to be furnished.
- F. Surveys Required as a Part of The Technical Submittal:
 - 1. The Contractor shall provide the following System surveys that depict various system features and capacities required in addition to the on-site survey requirements described herein. Each survey shall be in writing and contain the following information (the formats are suggestions and may be used for the initial Technical Submittal Survey requirements), as a minimum:
 - a. Nurse Call Cable System Design Plan:
 - 1) An OEM and contractor designed functioning Nurse Call System cable plan to populate the entire empty conduit/pathway distribution systems provided as a part of Specification 27 11 00 shall be provided as a part of the technical proposal. A specific functioning Nurse Call: cable, interfaces, J-boxes and back boxes shall coincide with the total growth items as described herein. It is the Contractor's responsibility to provide the Systems' entire Nurse Call cable and accessory requirements and engineer a functioning Nurse Call distribution system and equipment requirement plan for the devices and stations indicated on the drawings.

1.9 PROJECT RECORD DOCUMENTS (AS BUILTS)

- A. Throughout progress of the Work, maintain an accurate record of changes in Contract Documents. Upon completion of Work, transfer recorded changes to a set of Project Record Documents.
- B. The floorplans shall be marked in pen to include the following:
 - 1. Each device specific locations.
 - 2. Conduit locations.

3. Each interface and equipment specific location.
4. Head-end equipment and specific location.
5. Wiring diagram.
6. Labeling and administration documentation.
7. Warranty certificate.
8. System test results.

1.10 WARRANTIES

- A. The Contractor shall warrant the installation to be free from defect in material and workmanship for a period of two (2) years from the date of acceptance of the project by the owner. The Contractor shall agree to remedy covered defects within four (4) hours of notification of major failures or within twenty-four (24) hours of notification for individual station related problems.

1.11 USE OF THE SITE

- A. Use of the site shall be at the GC's direction.
- B. Coordinate with the GC for lay-down areas for product storage and administration areas.
- C. Coordinate work with the GC and their sub-contractors.
- D. Access to buildings wherein the work is performed shall be directed by the GC.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft.
- B. Store products in original containers.
- C. Coordinate with the GC for product storage. There may be little or no storage space available on site. Plan to potentially store materials off site.
- D. Do not install damaged products. Remove damaged products from the site and replaced with new product at no cost to the Owner.

1.13 PROJECT CLOSE-OUT

- A. Prior to final inspection and acceptance of the work, remove all debris, rubbish, waste material, tools, construction equipment, machinery and surplus materials from the project site and thoroughly clean your work area.
- B. Before the project closeout date, the Contractor shall submit:
 1. OEM Equipment Warranty Certificates.

2. Evidence of compliance with requirements of governing authorities such as the Low Voltage Certificate of Inspection.
 3. Project record documents.
 4. Instruction manuals and software that is a part of the system.
 5. System Guaranty Certificate.
- C. Contractor shall submit written notice that:
1. Contract Documents have been reviewed.
 2. Project has been inspected for compliance with contract.
 3. Work has been completed in accordance with the contract.

PART 2 - PRODUCTS / FUNCTIONAL REQUIREMENTS

2.1 GENERAL REQUIREMENTS FOR EQUIPMENT AND MATERIALS

- A. Furnish and install a complete and fully functional and operable Nurse Call System for each location shown on the contract drawings.
- B. Coordinate features and select interface components to form an integrated Nurse Call system. Match components and interconnections between the systems for optimum performance of specified functions.
- C. Expansion Capability: The Nurse Call equipment interfaces and cables shall be able to increase number of enunciation points in the future by a minimum of 25 percent (%) above those indicated without adding any internal or external components or main trunk cable conductors.
- D. Equipment: Active electronic type shall use solid-state components, fully rated for continuous duty unless otherwise indicated. Select equipment for normal operation on input power usually supplied between 110 to 130 VAC, 60 Hz supplied from the Facility's Emergency Electrical Power System.
- E. Meet all FCC requirements regarding equipment listing, low radiation and/or interference of RF signal(s). The system shall be designed to prevent direct pickup of signals from within and outside the building structure.
- F. Water Proof Equipment: Listed and labeled by an OSHA certified NRTL (i.e. UL) for duty in wet or in damp locations.

2.2 SYSTEM DESCRIPTION

- A. Furnish and install a complete and fully functional and operable Nurse Call and/or Code Blue System.

- B. The Contractor is responsible for interfacing the MATV and Patient Bed Service Walls with the System.
- C. The Contractor shall continually employ interfacing methods that are approved by the OEM and VA. At a minimum, an acceptable interfacing method requires not only a physical and mechanical connection, but also a matching of signal, voltage, and processing levels with regard to signal quality and impedance. The interface point must adhere to all standards described herein for the full separation of Critical Care and Life Safety systems.
- D. The System Contractor shall connect the System ensuring that all NFPA and UL Critical Care and Life Safety Circuit and System separation guidelines are satisfied. The System Contractor is not allowed to make any connections to the Telephone System. VA shall arrange for the interconnection between the MATV and Patient Bed Service Wall Systems with the appropriate responsible parties.
- E. System hardware shall consist of a standalone nurse call/ Code Blue patient communications network comprised of nurse consoles, control stations, staff and duty stations, room and corridor dome lights, pillow speakers/call cords, pull cord and/or emergency push button stations, wiring. All necessary equipment required to meet the intent of these specifications, whether or not enumerated within these specifications, shall be supplied and installed to provide a complete and operating nurse call/Code Blue patient communications network. It is not acceptable to utilize the telephone cable system for the control and distribution of nurse call (Code Blue) signals and equipment.
- F. System firmware shall be the product of a reputable firmware OEM of record with a proven history of product reliability and sole control over all source code. Manufacturer shall provide, free of charge, product firmware/software upgrades for a period of two (2) years from date of acceptance by VA for any product feature enhancements. System configuration programming changes shall not require any exchange of parts and shall be capable of being executed remotely via a modem connection.
- G. The Nurse Call Head End Equipment shall be located as indicated on the contract documents.

- H. The System shall utilize microprocessor components for all signaling and programming circuits and functions. Self contained or on board system program memory shall be non-volatile and protected from erasure from power outages for a minimum of 12 hours.
- I. Provide a backup battery or a UPS for the System (including each distribution cabinet/point, CRT and Monitor) to allow normal operation and function (as if there was no AC power failure) in the event of an AC power failure or during input power fluctuations for a minimum of 30 minutes.
- J. The System is defined as Critical Service and the Code Blue functions is defined as Life Safety/Support by NFPA (re Part 1.1.A) and so evaluated by JCAHCO.
2. The nurse call system shall annunciate at duty stations and nurse stations as shown on the contract documents.
- K. Each Code Blue System shall be designed to provide continuous electrical supervision of the complete and entire system (i.e. dome light bulbs [each light will be considered supervised if they use any one or a combination of (UL) approved electrical supervision alternates, as identified in UL-1069, 1992 revision], wires, contact switch connections, circuit boards, data, audio, and communication busses, main and UPS power, etc.). All alarm initiating and signaling circuits shall be supervised for open circuits, short circuits, and system grounds. Main and UPS power circuits shall be supervised for a change in state (i.e. primary to backup, low battery, UPS on line, etc.). When an open, short or ground occurs in any system circuit, an audible and visual fault alarm signal shall be initiated at the nurse control station and all remote locations.
- L. When the System is approved to connect to a separate communications system (i.e. LAN, WAN, Telephone, Public Address, radio raging, wireless systems, etc) the connection point shall meet the following minimum requirements for each hard wired connection:
1. UL 60950-1/2.
 2. FIPS 142.
- M. Noise filters and surge protectors shall be provided for each equipment interface cabinet, head end cabinet, control console and local and remote amplifier locations to insure protection from input primary AC

power surges and to insure noise glitches are not induced into low voltage data circuits.

- N. Plug-in connectors shall be provided to connect all equipment. Base band cable systems shall utilize barrier terminal screw type connectors, at a minimum. As an alternate, crimp type connectors installed with a ratchet type installation tool are acceptable provided the cable dress, pairs, shielding, grounding, connections and labeling are the same as the barrier terminal strip connectors. Tape of any type, wire nuts or solder type connections are unacceptable and will not be approved.
- O. Audio Level Processing: The control equipment shall consist of audio mixer(s), volume limiter(s) and/or compressor(s), and power amplifier(s) to process, adjust, equalize, isolate, filter, and amplify each audio channel for each sub-zone in the system and distribute them into the System's RF interfacing distribution trunks and amplification circuits. It is acceptable to use identified Telephone System cable pairs designated for Two-Way Radio interface and control use or identified as spare telephone cable pairs by the Facility's Telephone System Contractor. The use of telephone cable to distribute RF signals, carrying system or sub-system AC or DC voltage is not acceptable and will not be approved. Additionally, each control location shall be provided with the equipment required to insure the system can produce its designed audio channel capacity at each speaker identified on the contract drawings. The Contractor shall provide: a spare set of telephone paging modules as recommended by the OEM (as a minimum provide one spare module for each installed module); one spare audio power amplifier, one spare audio mixer, one spare audio volume limiter and/or compressor, and one spare audio automatic gain adjusting device, and minimum RF equipment recommended by the OEM.
- P. Contractor is responsible for pricing all accessories and miscellaneous equipment required to form a complete and operating system. Unless otherwise noted in this Part, equipment quantities shall be as indicated on the drawings.
- Q. System Performance:
1. At a minimum, each distribution, interconnection, interface, terminating point and TCO shall be capable of supporting the

Facility's Nurse Call and/or Code Blue System voice and data service as follows:

- a. Shall be compliant with and not degrade the operating parameters of the Public Switched Telephone Network (PSTN) and the Federal Telecommunications System (FTS) at each PSTN and FTS interface, interconnection and TCO terminating locations detailed on the contract drawings.
- b. The System shall provide the following minimum operational functions:
 - 1) Code Blue calls shall be cancelable at the calling station only. The nurse call master station (s) that a managing Code Blue functions shall not have the ability to cancel Code Blue calls.
 - 2) Each Code Blue system shall be able to receive audio calls from all bedside stations simultaneously.
 - 3) Calls placed from any Code Blue station shall generate Code Blue emergency type audible and visual signals at each associated nurse control and duty station, respective dome lights and all local and remote annunciator panels. Calls placed from a bedside station shall generate emergency type visual signals at the bedside station and associated dome light(s) in addition to the previous stated stations and panels.
 - 4) Activating the silencing device at any location, while a Code Blue call or system fault is occurring shall mute the audible signals at the alarm location.
 - a) The audible alarm shall regenerate at the end of the selected time-out period until the call or fault is corrected.
 - b) The visual signals shall continue until the call is canceled and/or a fault is corrected. When the fault is corrected, all signals generated by the fault shall automatically cease, returning the System to a standby status.
 - c) Audible signals shall be regenerated in any local or remote annunciator panel that is in the silence mode, in the event

an additional Code Blue call is placed in any Code Blue system.

d) The additional Code Blue call shall also generate visual signals at all annunciators to identify the location of the call.

2. Each System Nurse Call location shall generate a minimum of distinct calls:
 - a. Routine: single flashing dome lights & master station color and audio tone,
 - b. Staff Assist: rapid flashing dome lights & master station color and audio tone,
 - c. Emergency: Red flashing dome lights & master station color and audio tone,
 - d. Code Blue: Blue flashing dome lights and master station color and audio tone,
 - e. Each generated call shall be cancelable at ONLY the originating location,
3. Special Code Blue Interfaces required:
 - a. Provide a contact output for interface to the JCI Pegasys access control system. When code is called for on the nurse call system the output contact shall change state indicating a code call has been placed.
 - b. Refer to the plans for location of the JCI Pegasys panel serving the area of work for this project.

2.3 MANUFACTURERS

- A. The products specified shall be new, UL Listed, labeled and produced by OEM manufacturer of record.
- B. Specifications contained herein as set forth in this document detail the salient operating and performance characteristics of equipment in order for VA to distinguish acceptable items of equipment from unacceptable items of equipment. When an item of equipment is offered or furnished for which there is a specification contained herein, the item of equipment offered or furnished shall meet or exceed the specification for that item of equipment.

C. System shall be Jeron 790.

2.4 PRODUCTS

A. General.

1. Contractor is responsible for pricing all accessories and miscellaneous equipment required to form a complete and operating system. The equipment quantities provided herein shall be as indicated on the drawings with the exception of the indicated spare equipment.

2. Devices listed below shall be manufactured by Jeron and shall be UL listed as part of the Jeron 790 nurse call system.

B. Corridor Dome lights:

1. 4-section LED dome light

2. Jeron 6810+

C. Corridor Zone Light

1. 4-section, LED standard zone light

2. Jeron 8804+

D. Pull-Cord/Emergency Stations

1. 6-foot plastic cord for call activation.
2. Push button for call activation.
3. Call assurance indicator.
4. Cancel button.
5. Causes corridor lamp to flash

6. Jeron 6832+

E. Pull-Cord/Emergency Stations for WET locations

1. Shall include all of the items listed in paragraph "D" above.
 2. Water resistant Design.
 3. Provide and install with gasket between faceplate and wall.
4. Jeron 6858+
5. Any device installed within a shower or tub area shall be required to be a wet location device.

F. Code Blue Station

1. Push button for call activation
2. Call assurance indicator.
3. Causes corridor lamp to flash.
4. Provide device with flip cover over the button such that the cover needs to be opened prior to activating the device.

5. Jeron 6849

G. Patient Station

1. Single tilt-action pillow speaker/call cord receptacle.
2. Allows TV control with pillow speaker.
3. Allows 2-way voice communication.
4. Compatible with specialty bed siderail communications.
5. Call assurance indicator.
- ~~6. Jeron 6823+.~~

H. Pillow Speaker

1. Digital pillow speaker with TV control
2. Provide with patient station described in paragraph "F" above.
- ~~3. Jeron 6898+~~
4. TV interface box and associated cabling between patient station and TV allowing TV control is required only where shown on the construction documents.
 - a. TV interface shall include RJ45 jack in a single gang back box with faceplate.
 - b. Provide 3' patch cord to patch from TV interface box to TV.
 - 1) Coordinate TV cord end required with specific TV provided.

I. Audio/Visual Duty station

1. Push button for staff call-in ability.
2. 2-way communication between station and nurse console(s).
3. Call status LED lamps.
4. Call assurance indicator.
- ~~5. Jeron 6827+~~

J. Master Station

1. Handset ~~touch screen~~ master station with backlit display
- ~~2. Jeron 6875~~

K. Main control Unit

1. Ability to network with other existing control units in the facility.
2. Supports up to 256 beds (when not networked with others control units)
3. Supports up to 12 master stations.
4. LED status indicators.
5. Power supply with battery back-up.

- a. Battery shall support full system operation from the time of loss of normal power to the time generator backup power becomes available.
 - b. power supply output shall be power limited.
- L. Terminal Cabinet
1. Houses main control unit described in paragraph "J" above.
 2. Houses other auxiliary equipment required for a complete and functional nurse call system.
 3. Surface mounted
- M. Nurse Call Cabling
1. Cat 5e, plenum rated cabling between dome lights and terminal cabinet.
 2. 18/2 twisted pair for all in-room devices.
- N. Additional Software Required
1. Nurse Call Reporting Software
 - a. Jeron 6893xl
 - b. Jeron computer/data interface required
- O. Additional Options required
1. Check-in option

PART 3 - EXECUTION

3.1 PROJECT MANAGEMENT

- A. Assign a single project manager to this project who will serve as the point of contact for the Owner, the General Contractor, and the Engineer.
- B. The Contractor shall be proactive in scheduling work at the hospital, specifically the Contractor will initiate and maintain discussion with the general contractor regarding the schedule for ceiling cover up and install cables to meet that schedule.
- C. Contact the Office of Telecommunications, Special Communications Team (0050P2B) at (301) 734-0350 to have a VA Certified Telecommunications COTR assigned to the project for telecommunications review, equipment and system approval and co-ordination with VA's Spectrum Management and OCIS Teams.

3.2 COORDINATION WITH OTHER TRADES

- A. Coordinate with the cabling contractor the location of the TV faceplate and the faceplate opening for the nurse call TV control jack.
- B. Coordinate with the cabling contractor the location of nurse call equipment in the locations shown on the plans.
- C. Before beginning work, verify the location, quantity, size and access for the following:
 1. Isolated ground AC power circuits provided for systems.
 2. Junction boxes, wall boxes, wire troughs, conduit stubs and other related infrastructure for the systems.
 3. System components installed by others.
 4. Overhead supports and rigging hardware installed by others.
- D. Immediately notify the Owner, GC and Consultant(s) in writing of any discrepancies.

3.3 NEEDS ASSESSMENT

Provide a one-on-one meeting with the particular nursing manager of each unit affected by the installation of the new nurse call/code blue system. Review the floor plan drawing, educate the nursing manager with the functions of the equipment that is being provided and gather details specific to the individual units; coverage and priorities of calls; staffing patterns; and other pertinent details that will affect system programming and training.

3.4 INSTALLATION

- A. General:
 1. Execute work in accordance with National, State and local codes, regulations and ordinances.
 2. Install work neatly, plumb and square and in a manner consistent with standard industry practice. Carefully protect work from dust, paint and moisture as dictated by site conditions. The Contractor will be fully responsible for protection of his work during the construction phase up until final acceptance by the Owner.
 3. Install equipment according to OEM's recommendations. Provide any hardware, adaptors, brackets, rack mount kits or other accessories recommended by OEM for correct assembly and installation.
 4. Secure equipment firmly in place, including receptacles, speakers, equipment racks, system cables, etc.

- a. All supports, mounts, fasteners, attachments and attachment points shall support their loads with a safety factor of at least 5:1.
 - b. Do not impose the weight of equipment or fixtures on supports provided for other trades or systems.
 - c. Any suspended equipment or associated hardware must be certified by the OEM for overhead suspension.
 - d. The Contractor is responsible for means and methods in the design, fabrication, installation and certification of any supports, mounts, fasteners and attachments.
5. Finishes for any exposed work such as plates, racks, panels, speakers, etc. shall be approved by the Architect, Owner and TVE 0050P3B.
 6. Coordinate cover plates with field conditions. Size and install cover plates as necessary to hide joints between back boxes and surrounding wall. Where cover plates are not fitted with connectors, provide grommeted holes in size and quantity required. Do not allow cable to leave or enter boxes without cover plates installed.
 7. Active electronic component equipment shall consist of solid state components, be rated for continuous duty service, comply with the requirements of FCC standards for telephone and data equipment, systems, and service.
 8. Color code all distribution wiring to conform to the Nurse Call Industry Standard, EIA/TIA, and this document, whichever is the more stringent. At a minimum, all equipment, cable duct and/or conduit, enclosures, wiring, terminals, and cables shall be clearly and permanently labeled according to and using the provided record drawings, to facilitate installation and maintenance.
 9. Connect the System's primary input AC power to the Facility' Critical Branch of the Emergency AC power distribution system as shown on the plans or if not shown on the plans consult with RE regarding a suitable circuit location prior to bidding.
 10. Product Delivery, Storage and Handling:
 - a. Delivery: Deliver materials to the job site in OEM's original unopened containers, clearly labeled with the OEM's name and

equipment catalog numbers, model and serial identification numbers. The RE may inventory the cable, patch panels, and related equipment.

b. Storage and Handling: Store and protect equipment in a manner, which will preclude damage as directed by the RE.

B. Equipment Cabinets:

1. Provide security covers for all devices not requiring routine operator control.
2. Provide vent panels and cooling fans as required for the operation of equipment within the OEM' specified temperature limits. Provide adequate ventilation space between equipment for cooling. Follow manufacturer's recommendations regarding ventilation space between amplifiers.
3. Provide insulated connections of the electrical raceway to equipment racks.
4. Ensure a minimum of 36 inches in front of each cabinet to comply with OSHA Safety Standards.

C. Wiring Practice - in addition to the MANDATORY infrastructure requirements outlined in VA Construction Specifications 27 10 00 - TIP Structured Communications Cabling, 27 11 00 the following additional practices shall be adhered to:

1. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."
2. Execute all wiring in strict adherence to the National Electrical Code, applicable local building codes and standard industry practices.
3. Wiring shall be classified according to the following low voltage signal types:
 - a. Balanced microphone level audio (below -20dBm) or Balanced line level audio (-20dBm to +30dBm)
 - b. 70V audio speaker level audio.
 - c. Low voltage DC control or power (less than 48VDC)
4. Where raceway is to be EMT (conduit), wiring of differing classifications shall be run in separate conduit. Where raceway is to be an enclosure (rack, tray, wire trough, utility box) wiring of differing classifications which share the same enclosure shall be

- mechanically partitioned and separated by at least four (4) inches. Where Wiring of differing classifications must cross, they shall cross perpendicular to one another.
5. Do not splice wiring anywhere along the entire length of the run. Make sure cables are fully insulated and shielded from each other and from the raceway for the entire length of the run.
 6. Do not pull wire through any enclosure where a change of raceway alignment or direction occurs. Do not bend wires to less than radius recommended by manufacturer.
 7. Replace the entire length of the run of any wire or cable that is damaged or abraided during installation. There are no acceptable methods of repairing damaged or abraided wiring.
 8. Use wire pulling lubricants and pulling tensions as recommended by the OEM.
 9. Use grommets around cut-outs and knock-outs where conduit or chase nipples are not installed.
 10. Do not use tape-based or glue-based cable anchors.
 11. Field wiring entering equipment racks shall be terminated as follows:
 - a. Provide OEM directed service loops at harness break-outs and at plates, panels and equipment. Loops should be sufficient to allow plates, panels and equipment to be removed for service and inspection.
 - b. Line level and speaker level wiring may be terminated inside the equipment rack using specified terminal blocks (see "Products.") Provide 15% spare terminals inside each rack. Microphone level wiring may only be terminated at the equipment served.
 - c. If specified terminal blocks are not designed for rack mounting, utilize ¾" plywood or 1/8" thick aluminum plates/blank panels as a mounting surface. Do not mount on the bottom of the rack.
 - d. Employ permanent strain relief for any cable with an outside diameter of 1" or greater.
 12. Use only balanced audio circuits unless noted otherwise directed and indicated on the drawings.
 13. Make all connections as follows:

- a. For crimp-type connections, use only tools that are specified by the manufacturer for the application.
 - b. Use only insulated spade lugs on screw terminals. Spade lugs shall be sized to fit the wire gauge. Do not exceed two lugs per terminal.
 - c. Wire nuts, electrical tape or "Scotch Lock" connections are not acceptable for any application.
14. Noise filters and surge protectors shall be provided for each equipment interface cabinet, switch equipment cabinet, control console, local, and remote active equipment locations to ensure protection from input primary AC power surges and noise glitches are not induced into low Voltage data circuits.
15. Wires or cables to be installed outside of conduit, cable trays, wireways, cable duct, etc:
- a. Only when specifically authorized as described herein, will wires or cables be identified and approved to be installed outside of conduit. The wire or cable runs shall be UL rated plenum and OEM certified for use in air plenums.
 - b. Wires and cables shall be hidden, protected, fastened and tied at 600 mm (24 in.) intervals, maximum, as described herein to building structure.
 - c. Closer wire or cable fastening intervals may be required to prevents sagging, maintain clearance above suspended ceilings, remove unsightly wiring and cabling from view and discourage tampering and vandalism. Wire or cable runs, not provided in conduit, that penetrate outside building walls, supporting walls, and two hour fire barriers shall be sleeved and sealed with an approved fire retardant sealant.
 - d. Wire or cable runs to system components installed in walls (i.e.: volume attenuators, circuit controllers, signal, or data outlets, etc.) may, when specifically authorized by the RE, be fished through hollow spaces in walls and shall be certified for use in air plenum areas.
 - e. Completely test all of the cables after installation and replace any defective cables.

- f. Wires or cables that are installed outside of buildings shall be in conduit, secured to solid building structures. If specifically approved, on a case by case basis, to be run outside of conduit, the wires or cables shall be installed, as described herein. The bundled wires or cables must: Be tied at not less than 460 mm (18 in.) intervals to a solid building structure; have ultra violet protection and be totally waterproof (including all connections). The laying of wires or cables directly on roof tops, ladders, drooping down walls, walkways, floors, etc. is not allowed and will not be approved.
- D. Cable Installation - Cable Installation - In addition to the **MANDATORY** infrastructure requirements outlined in VA Construction Specifications 27 10 00 - Structured Cabling, the following additional practices shall be adhered to:
1. Support cable on maximum 2'-0" centers. Acceptable means of cable support are cable tray, j-hooks, and bridal rings. Velcro wrap cable bundles loosely to the means of support with plenum rated Velcro straps. Plastic tie wraps are not acceptable as a means to bundle cables.
 2. Run cables parallel to walls.
 3. Install maximum of 10 cables in a single row of J-hooks. Provide necessary rows of J-hooks as required by the number of cables.
 4. Do not lay cables on top of light fixtures, ceiling tiles, mechanical equipment, or ductwork. Maintain at least 2'-0" clearance from all shielded electrical apparatus.
 5. All cables shall be tested after the total installation is fully complete. All test results are to be documented. All cables shall pass acceptable test requirements and levels. Contractor shall remedy any cabling problems or defects in order to pass or comply with testing. This includes the re-pull of new cable as required at no additional cost to the Owner.
 6. Ends of cables shall be properly terminated on both ends per industry and OEM's recommendations.
 7. Provide proper temporary protection of cable after pulling is complete before final dressing and terminations are complete. Do not

- leave cable lying on floor. Bundle and tie wrap up off of the floor until you are ready to terminate.
8. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
 9. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
 10. Bundle, lace, and train conductors to terminal points without exceeding OEM's limitations on bending radii. Install lacing bars and distribution spools.
 11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used.
 12. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.
 13. Separation of Wires: (REFER TO RACEWAY INSTALLATION) Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.
 14. Serve all cables as follows:
 - a. Cover the end of the overall jacket with a 1" (minimum) length of transparent heat-shrink tubing. Cut unused insulated conductors 2" (minimum) past the heat-shrink, fold back over jacket and secure with cable-tie. Cut unused shield/drain wires 2" (minimum) past the Heatshrink and serve as indicated below.
 - b. Cover shield/drain wires with heat-shrink tubing extending back to the overall jacket. Extend tubing ¼" past the end of unused wires, fold back over jacket and secure with cable tie.
 - c. For each solder-type connection, cover the bare wire and solder connection with heat-shrink tubing.
- E. Labeling: Provide labeling in accordance with ANSI/EIA/TIA-606-A. All lettering for Nurse Call and/or Code Blue circuits shall be stenciled using laser printers.

1. Cable and Wires (Hereinafter referred to as "Cable"): Cables shall be labeled at both ends in accordance with ANSI/EIA/TIA-606-A. Labels shall be permanent in contrasting colors. Cables shall be identified according to the System "Record Wiring Diagrams."
2. Equipment: System equipment shall be permanently labeled with contrasting plastic laminate or Bakelite material. System equipment shall be labeled on the face of the unit corresponding to its source.
 - a. Clearly, consistently, logically and permanently mark switches, connectors, jacks, relays, receptacles and electronic and other equipment.
 - b. Engrave and paint fill all receptacle panels using 1/8" (minimum) high lettering and contrasting paint.
 - c. For rack-mounted equipment, use engraved Lamacoid labels with white 1/8" (minimum) high lettering on black background. Label the front and back of all rack-mounted equipment.
3. Conduit, Cable Duct, and/or Cable Tray: The Contractor shall label all conduit, duct and tray, including utilized GFE, with permanent marking devices or spray painted stenciling a minimum of 3 meters (10 ft.) identifying it as the System. In addition, each enclosure shall be labeled according to this standard.
4. Where multiple pieces of equipment reside in the same rack group, clearly and logically label each indicating to which room, channel, receptacle location, etc. they correspond.
5. Permanently label cables at each end, including intra-cabinet connections. Labels shall be covered by the same, transparent heat-shrink tubing covering the end of the overall jacket. Alternatively, computer generated labels of the type which include a clear protective wrap may be used.
6. Contractor's name shall appear no more than once on each continuous set of racks. The Contractor's name shall not appear on wall plates or portable equipment.
7. Ensure each OEM supplied item of equipment has appropriate UL Labels Marks for the service the equipment is performed permanently attached or marked to a **non-removal** board in the unit. EQUIPMENT INSTALLED NOT BEARING THESE UL MARKS WILL NOT BE ALLOWED TO BE A

PART OF THE SYSTEM. THE CONTRACTOR SHALL BEAR ALL COSTS REQUIRED TO PROVIDE REPLACEMENT EQUIPMENT WITH APPROVED UL MARKS.

F. Conduit and Signal Ducts: When the Contractor and/or OEM determines additional system conduits and/or signal ducts are required in order to meet the system minimum performance standards outlined herein, the contractor shall provide these items as follows:

1. Conduit:

- a. The Contractor shall employ the latest installation practices and materials. The Contractor shall provide conduit, junction boxes, connectors, sleeves, weather heads, pitch pockets, and associated sealing materials not specifically identified in this document as GFE. Conduit penetrations of walls, ceilings, floors, interstitial space, fire barriers, etc., shall be sleeved and sealed.
- b. All cables shall be installed in separate conduit and/or signal ducts (exception from the separate conduit requirement to allow Nurse Call and/or Code Blue cables to be installed in partitioned cable tray with voice cables may be granted in writing by the RE if requested). Conduits shall be provided in accordance with Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and NEC Articles 517 for Critical Care and 800 for Communications systems, at a minimum.
- c. When metal, plastic covered, etc., flexible cable protective armor or systems are specifically authorized to be provided for use in the System, their installation guidelines and standards shall be as specified herein, Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and the NEC.
- d. When "interduct" flexible cable protective systems is specifically authorized to be provided for use in the System, it's installation guidelines and standards shall be as the specified herein, Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and the NEC.
- e. Conduit fill (including GFE approved to be used in the system) shall not exceed 40%. Each conduit end shall be equipped with a protective insulator or sleeve to cover the conduit end, connection nut or clamp, to protect the wire or cable during

installation and remaining in the conduit. Electrical power conduit shall be installed in accordance with the NEC. AC power conduit shall be run separate from signal conduit.

- f. Ensure that Critical Care Nurse Call and/or Code Blue //, and _____ // Systems (as identified by NEC Section 517) are completely separated and protected from all other systems.
2. Signal Duct, Cable Duct, or Cable Tray:
 - a. The Contractor shall use GFE signal duct, cable duct, and/or cable tray, when identified and approved by the RE.
 - b. Approved signal and/or cable duct shall be a minimum size of 100 mm x 100 mm (4 in. X 4 in.) inside diameter with removable tops or sides, as appropriate. Protective sleeves, guides or barriers are required on all sharp corners, openings, anchors, bolts or screw ends, junction, interface and connection points.
 - c. Approved cable tray shall be fully covered, mechanically and physically partitioned for multiple electronic circuit use, and be UL certified and labeled for use with telecommunication circuits and/or systems. The RE shall approve width and height dimensions.
 - d. All cable junctions and taps shall be accessible. Provide an 8" X 8" X 4" (minimum) junction box attached to the cable duct or raceway for installation of distribution system passive equipment. Ensure all equipment and tap junctions are accessible

3.5 PROTECTION OF NETWORK DEVICES

- A. Contractor shall protect network devices during unpacking and installation by wearing manufacturer approved electrostatic discharge (ESD) wrist straps tied to chassis ground. The wrist strap shall meet OSHA requirements for prevention of electrical shock, should technician come in contact with high voltage.

3.6 CUTTING, CLEANING AND PATCHING

- A. It shall be the responsibility of the contractor to keep their work area clear of debris and clean area daily at completion of work.
- B. It shall be the responsibility of the contractor to patch and paint any wall or surface that has been disturbed by the execution of this work.
- C. The Contractor shall be responsible for providing any additional cutting, drilling, fitting or patching required that is not indicated

as provided by others to complete the Work or to make its parts fit together properly.

- D. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate Contractor the Contractor's consent to cutting or otherwise altering the Work.
- E. Where coring of existing (previously installed) concrete is specified or required, including coring indicated under unit prices, the location of such coring shall be clearly identified in the field and the location shall be approved by the Project Manager prior to commencement of coring work.

3.7 FIREPROOFING

- A. Where Nurse Call and/or Code Blue wires, cables and conduit penetrate fire rated walls, floors and ceilings, fireproof the opening.
- B. Provide conduit sleeves (if not already provided by electrical contractor) for cables that penetrate fire rated walls and Telecommunications Rooms floors and ceilings. After the cabling installation is complete, install fire proofing material in and around all conduit sleeves and openings. Install fire proofing material thoroughly and neatly. Seal all floor and ceiling penetrations.
- C. Use only materials and methods that preserve the integrity of the fire stopping system and its rating.

3.8 GROUNDING

- A. Ground Nurse Call and/or Code Blue cable shields and equipment to eliminate shock hazard and to minimize ground loops, commonmode returns, noise pickup, cross talk, and other impairments as specified in CFM Division 27, Section 27 05 26 - Grounding and Bonding for Communications Systems.
- B. Do not use "3rd or 4th" wire internal electrical system conductors for communications signal ground.

- C. Do not connect the signal ground to the building's external lightning protection system.
- D. Do Not "mix grounds" of different systems.
- E. Insure grounds of different systems are installed as to not violate OSHA Safety and NEC installation requirements for protection of personnel.

PART 4 - TESTING / GUARANTY / TRAINING

4.1 SYSTEM LISTING

The Nurses Call System is NFPA listed as an "Emergency" Communication system. Where Code Blue signals are transmitted, that listing is elevated to "Life Support/Safety." Therefore, the following testing and guaranty provisions are the minimum to be performed and provided by the contractor and Warranted by the OEM.

4.2 PROOF OF PERFORMANCE TESTING

A. Intermediate Testing:

1. After completion of 30 - 40% of the installation of a head end cabinet(s) and interconnection to the corresponding System Patient Head Wall Units and equipment, one master stations, local and remote stations, treatment rooms, and prior to any further work, this portion of the system must be pretested, inspected, and 1certified. Each item of installed equipment shall be checked to ensure appropriate UL Listing and Certification Labels are affixed as required by NFPA -Life Safety Code 101-3.2 (a) & (b), UL Nurse Call Standard 1069 and JCAHCO evaluation guidelines, and proper installation practices are followed. The intermediate test shall include a full operational test.
2. All inspections and tests shall be conducted by an OEM-certified contractor representative and witnessed by TVE-0050P3B if there is no local Government Representative that processes OEM and VA approved Credentials to inspect and certify the system. The results of the inspection will be officially recorded by the Government Representative and maintained on file by the RE, until completion of the entire project. The results will be compared to the Acceptance Test results. An identical inspection may be conducted between the 65 - 75% of the system construction phase, at the direction of the RE.

B. Pretesting:

1. Upon completing installation of the Nurse Call and/or Code Blue System, the Contractor shall align, balance, and completely pretest the entire system under full operating conditions.
2. Pretesting Procedure:
 - a. During the System Pretest the Contractor shall verify (utilizing approved test equipment) that the System is fully operational and meets all the System performance requirements of this standard.
 - b. The Contractor shall pretest and verify that all PSM System functions and specification requirements are met and operational, no unwanted aural effects, such as signal distortion, noise pulses, glitches, audio hum, poling noise, etc. are present. At a minimum, each of the following locations shall be fully pretested:
 - 1) Central Control Cabinets.
 - 2) Nurse Control Stations.
 - a) Master Stations
 - b) Patient Stations
 - c) Duty/Staff Stations
 - d) Emergency Stations
 - e) Code Blue Stations
 - 3) Dome Lights.
 - a) Patient Rooms
 - b) Corridors
 - c) Zone
 - 5) Local and Remote Enunciation Panels (code blue).
 - 6) Electrical Supervision Panels/Functions/locations.
 - 7) All Networked locations.
 - 8) System interface locations (i.e. wireless, PA, telephone, etc.).
 - 9) System trouble reporting.
 - 10) System electrical supervision.
3. The Contractor shall provide four (4) copies of the recorded system pretest measurements and the written certification that the System is ready for the formal acceptance test shall be submitted to the RE.

C. Acceptance Test:

1. After the Nurse Call and/or Code Blue System has been pretested and the Contractor has submitted the pretest results and certification to the RE, then the Contractor shall schedule an acceptance test date and give the RE 15 working days written notice prior to the date the acceptance test is expected to begin. The System shall be tested in the presence of a TVE 0050P3B and OEM certified representatives. The System shall be tested utilizing the approved test equipment to certify proof of performance and Life Safety / Critical Service compliance. The tests shall verify that the total System meets all the requirements of this specification. The notification of the acceptance test shall include the expected length (in time) of the test.
2. The acceptance test shall be performed on a "go-no-go" basis. Only those operator adjustments required to show proof of performance shall be allowed. The test shall demonstrate and verify that the installed System does comply with all requirements of this specification under operating conditions. The System shall be rated as either acceptable or unacceptable at the conclusion of the test. Failure of any part of the System that precludes completion of system testing, and which cannot be repaired in four (4) hours, shall be cause for terminating the acceptance test of the System. Repeated failures that result in a cumulative time of eight (8) hours to affect repairs shall cause the entire System to be declared unacceptable.
3. Retesting of the entire System shall be rescheduled at the convenience of the Government and costs borne by the Contractor at the direction of the SRE.

D. Acceptance Test Procedure:

1. Physical and Mechanical Inspection:
 - a. The TVE 0050P3B Representative will tour all major areas where the Nurse Call and/or Code Blue System and all sub-systems are completely and properly installed to insure they are operationally ready for proof of performance testing. A system inventory including available spare parts will be taken at this time. Each item of installed equipment shall be checked to ensure appropriate UL certification labels are affixed.

- b. The System diagrams, record drawings, equipment manuals, TIP Auto CAD Disks, intermediate, and pretest results shall be formally inventoried and reviewed.
 - c. Failure of the System to meet the installation requirements of this specification shall be grounds for terminating all testing.
2. Operational Test:
- a. After the Physical and Mechanical Inspection, the central terminating and nurse call master control equipment shall be checked to verify that it meets all performance requirements outlined herein. A spectrum analyzer and sound level meter may be utilized to accomplish this requirement.
 - b. Following the central equipment test, a pillow speaker (or on board speaker) shall be connected to the central terminating and nurse call master control equipment's output tap to ensure there are no signal distortions such as intermodulation, data noise, popping sounds, erratic system functions, on any function.
 - c. The distribution system shall be checked at each interface, junction, and distribution point, first, middle, and last intersectional, room, and bed dome light in each leg to verify that the nurse call distribution system meets all system performance standards.
 - d. Each MATV outlet that is controlled by a nurse call pillow speaker shall be functionally tested at the same time utilizing the Contractor's approved hospital grade HDTV receiver and TV remote control cable.
 - e. The RED system and volume stepper switches shall be checked to insure proper operation of the pillow speaker, the volume stepper and the RED system (if installed).
 - f. Additionally, each installed emergency, patient, staff, duty, panic station, intersectional, room, and bed dome light, power supply, code one, and remote annunciator panels shall be checked insuring they meet the requirements of this specification.
 - g. Once these tests have been completed, each installed sub-system function shall be tested as a unified, functioning and fully operating system. The typical functions are: nurse follower, three levels of emergency signaling (i.e. flashing red emergency,

flashing white patient emergency, flashing white or combination lights for staff emergency, separate flashing code blue), minimum of 10 minutes of UPS operation, memory saving, minimum of ten station audio paging, canceling emergency calls at each originating station only, and storage and prioritizing of calls.

- h. Individual Item Test: The TVE 0050P3B Representative will select individual items of equipment for detailed proof of performance testing until 100% of the System has been tested and found to meet the contents of this specification. Each item shall meet or exceed the minimum requirements of this document.
3. Test Conclusion:
- a. At the conclusion of the Acceptance Test, using the generated punch list (or discrepancy list) the VA and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages with the RE. Any retesting to comply with these specifications will be done at the Contractor's expense.
- b. If the System is declared unacceptable without conditions, all rescheduled testing expenses will be borne by the Contractor.
- E. Acceptable Test Equipment: The test equipment shall be furnished by the Contractor and shall have a calibration tag of an acceptable calibration service dated not more than 12 months prior to the test.

4.3 SYSTEM GUARANTEE PERIOD OF SERVICE

- A. Contractor's Responsibility:
1. The Contractor shall guarantee that all provided material and equipment will be free from defects, workmanship and will remain so for a period of one year from date of final acceptance of the System by the VA. The Contractor shall provide OEM's equipment warranty documents, to the RE (or Facility Contracting Officer if the Facility has taken possession of the building), that certifies each item of equipment installed conforms to OEM published specifications.
2. The Contractor's maintenance personnel shall have the ability to contact the Contractor and OEM for emergency maintenance and logistic assistance, remote diagnostic testing, and assistance in resolving technical problems at any time. This contact capability

shall be provided by the Contractor and OEM at no additional cost to the VA.

3. All Contractor maintenance and supervisor personnel shall be fully qualified by the OEM and must provide two (2) copies of current and qualified OEM training certificates and OEM certification upon request.
4. Additionally, the Contractor shall accomplish the following minimum requirements during the two year guaranty period:
 - a. Response Time during the Two Year Guaranty Period:
 - 1) The RE (or Facility Contracting Officer if the system has been turned over to the Facility) is the Contractor's ONLY OFFICIAL reporting and contact official for nurse call system trouble calls, during the guaranty period.
 - 2) A standard work week is considered 8:00 A.M. to 5:00 P.M. or as designated by the RE (or Facility Contracting Officer), Monday through Friday exclusive of Federal Holidays.
 - 3) The Contractor shall respond and correct on-site trouble calls, during the standard work week to:
 - a) A routine trouble call within one (1) working day of its report. A routine trouble is considered a trouble which causes a pillow speaker or cordset, one (1) master nurse control station, patient station, emergency station, or dome light to be inoperable.
 - b) Routine trouble calls in critical emergency health care facilities (i.e., cardiac arrest, intensive care units, etc.) shall also be deemed as an emergency trouble call. The RE (or Facility Contracting Officer) shall notify the Contractor of this type of trouble call.
 - c) An emergency trouble call within four hours of its report. An emergency trouble is considered a trouble which causes a sub-system (ward), distribution point, terminal cabinet, or code one system to be inoperable at anytime.
 - 4) If a Nurse Call and/or Code Blue/ component failure cannot be corrected within four (4) hours (exclusive of the standard work time limits), the Contractor shall be responsible for providing alternate nurse call equipment. The alternate

equipment/system shall be operational within a maximum of 20 hours after the four (4) hour trouble shooting time and restore the effected location operation to meet the System performance standards. If any sub-system or major system trouble cannot be corrected within one working day, the Contractor shall furnish and install compatible substitute equipment returning the System or sub-system to full operational capability, as described herein, until repairs are complete.

- b. Required On-Site Visits during the **Two Year** Guaranty Period
- 1) The Contractor shall visit, on-site, for a minimum of eight (8) hours, once every 12 weeks, during the guaranty period, to perform system preventive maintenance, equipment cleaning, and operational adjustments to maintain the System according the descriptions identified in this document.
 - 2) The Contractor shall arrange all Facility visits with the RE (or Facility Contracting Officer) prior to performing the required maintenance visits.
 - 3) Preventive maintenance shall be performed by the Contractor in accordance with the OEM's recommended practice and service intervals during non-busy time agreed to by the RE (or Facility Contracting Officer) and Contractor.
 - 4) The preventive maintenance schedule, functions and reports shall be provided to and approved by the RE (or Facility Contracting Officer).
 - 5) The Contractor shall provide the RE (or Facility Contracting Officer) a type written report itemizing each deficiency found and the corrective action performed during each required visit or official reported trouble call. The Contractor shall provide the RE with sample copies of these reports for review and approval at the beginning of the Acceptance Test. The following reports are the minimum required:
 - a) The Contractor shall provide a monthly summary all equipment and sub-systems serviced during this guarantee period to RE (or Facility Contracting Officer) by the fifth (5th) working day after the end of each month. The report

shall clearly and concisely describe the services rendered, parts replaced and repairs performed. The report shall prescribe anticipated future needs of the equipment and systems for preventive and predictive maintenance.

b) The Contractor shall maintain a separate log entry for each item of equipment and each sub-system of the System. The log shall list dates and times of all scheduled, routine, and emergency calls. Each emergency call shall be described with details of the nature and causes of emergency steps taken to rectify the situation and specific recommendations to avoid such conditions in the future.

6) The RE (or Facility Contracting Officer) shall convey to the Facility Engineering Officer, two (2) copies of actual reports for evaluation.

a) The RE (or Facility Contracting Officer) shall ensure a copy of these reports is entered into the System's official acquisition documents.

b) The Facility Chief Engineer shall ensure a copy of these reports is entered into the System's official technical record documents.

B. Work Not Included: Maintenance and repair service shall not include the performance of any work due to improper use; accidents; other vendor, contractor, or owner tampering or negligence, for which the Contractor is not directly responsible and does not control. The Contractor shall immediately notify the RE or Facility Contracting Officer in writing upon the discovery of these incidents. The RE or Facility Contracting Officer will investigate all reported incidents and render

4.4 TRAINING

A. Provide thorough training of all nursing staff assigned to those nursing units receiving new networked nurse/patient communications equipment. This training shall be developed and implemented to address two different types of staff. Floor nurses/staff shall receive training from their perspective, and likewise, unit secretaries (or any person whose specific responsibilities include answering patient calls and dispatching staff) shall receive operational training from their perspective. A separate training room will be set up that allows this

CLEMENT J. ZABLOCKI MEDICAL CENTER
MILWAUKEE, WI
BUILDING 111 - SITE PREP CATH LAB
VA PROJECT: 695-14-112

DEPARTMENT OF VETERANS AFFAIRS

02-01-13
Amendment #1

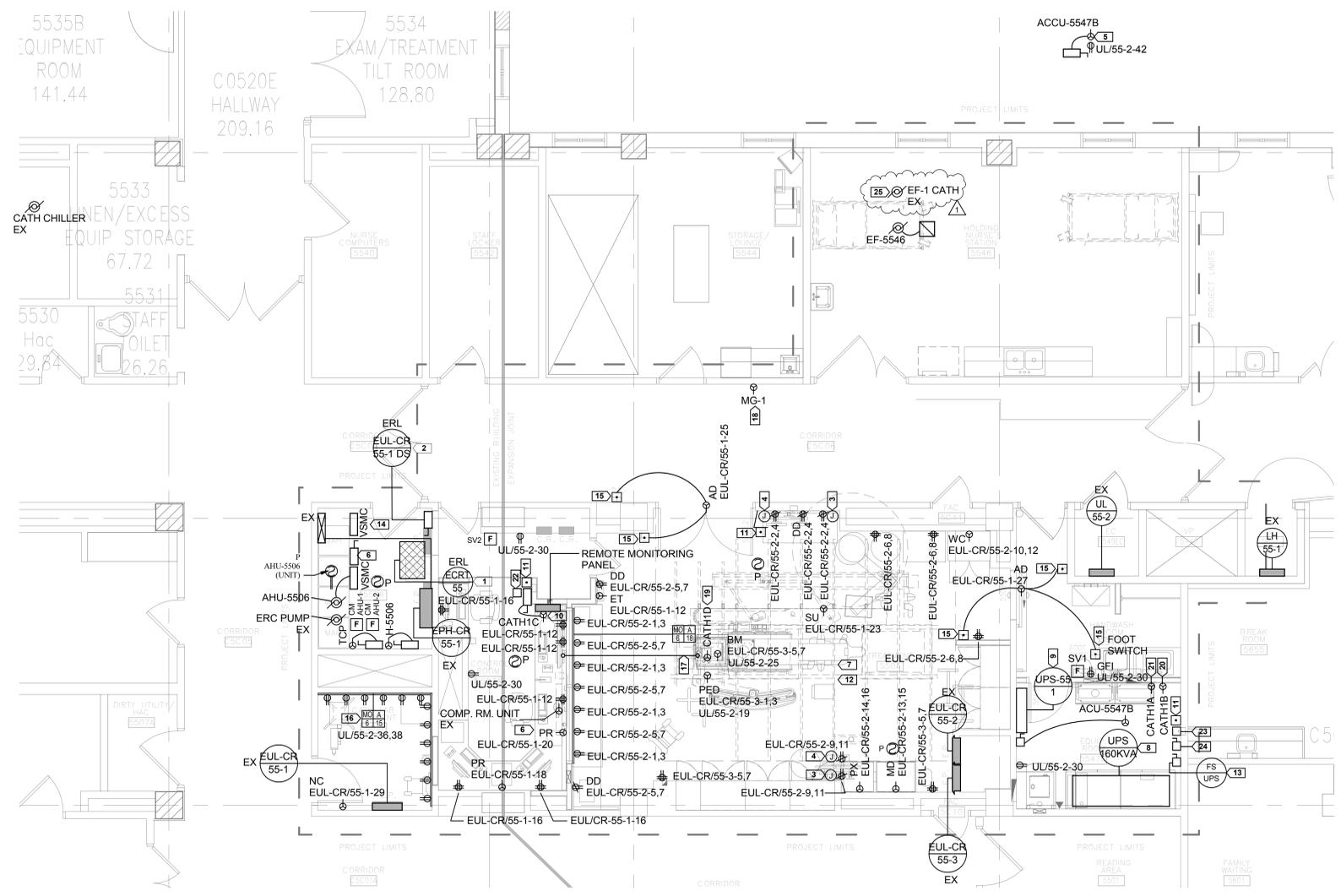
type of individualized training utilizing in-service training unit,
prior to cut over of the new system.

B. Provide the following minimum training times and durations:

1. Prior to opening for nursing staff, provide twelve (12) (in 2-hour increments) - split evenly over 3 weeks and day and night shifts. Coordinate schedule with VA project manager.

- - - E N D - - -

three inches = one foot
 one and one half inches = one foot
 one inch = one foot
 three quarters inch = one foot
 one half inch = one foot
 three eighths inch = one foot
 one quarter inch = one foot
 one eighth inch = one foot



- SYMBOLS:**
 (ALL SYMBOLS SHOWN MAY NOT APPEAR ON DRAWINGS)
- ⊖ RECEPTACLE, DUPLEX (IG) ISOLATED GROUND (TD) TRIPLE DUPLEX (TR) TAMPER RESISTANCE (WP) WEATHERPROOF W/GFI RECEPTACLE
 - ⊖ RECEPTACLE, DUPLEX WITH SWITCH
 - ⊖ RECEPTACLE, DUPLEX ON EMERGENCY POWER
 - ⊖ RECEPTACLE, DUPLEX WITH GROUND FAULT CIRCUIT INTERRUPTER
 - ⊖ RECEPTACLE, QUADRUPLEX
 - ⊖ RECEPTACLE, SINGLE
 - ⊖ RECEPTACLE, SINGLE WITH SWITCH
 - ⊖ DUPLEX RECEPTACLE - MOUNTED 6" ABOVE COUNTER BACKSPLASH
 - 46" ⊖ DUPLEX RECEPTACLE - MOUNTED AT SPECIAL MOUNTING HEIGHT INDICATED ON DRAWING OR AS INDICATED IN THE ASSOCIATED ARCHITECTURAL ELEVATION.
 - ↑ INDICATES MOUNTING HEIGHT WHEN SHOWN.
 - DD ⊖ QUADRUPLEX RECEPTACLE - MOUNTED 6" ABOVE COUNTER BACKSPLASH
 - 46" DD ⊖ QUADRUPLEX RECEPTACLE - MOUNTED AT SPECIAL MOUNTING HEIGHT INDICATED ON DRAWING OR AS INDICATED IN THE ASSOCIATED ARCHITECTURAL ELEVATION.
 - ↑ INDICATES MOUNTING HEIGHT WHEN SHOWN.
 - ⊖ RECEPTACLE, SPECIAL PURPOSE OR EQUIPMENT CONNECTION - SEE EQUIPMENT SCHEDULE
 - ⊖ DISCONNECT SWITCH
 - ⊖ MOTOR STARTER - SEE EQUIPMENT SCHEDULE
 - ⊖ VARIABLE FREQUENCY DRIVE
 - ⊖ ELECTRIC SWITCH - SEE EQUIPMENT SCHEDULE
 - ⊖ MOTOR, SINGLE-PHASE
 - ⊖ MOTOR, THREE-PHASE
 - ⊖ TRANSFORMER
 - ⊖ JUNCTION BOX
 - ⊖ METER SOCKET
 - ⊖ PANELBOARD CABINET, SURFACE MOUNTED
 - ⊖ INDICATES DESIGNATION
 - ⊖ PANELBOARD CABINET, FLUSH MOUNTED
 - ⊖ INDICATES DESIGNATION
 - ⊖ MULTI-OUTLET ASSEMBLY (SEE DETAIL)
 - ⊖ NUMBER OF CONDUCTORS IN A RACEWAY
 - ⊖ INDICATES CONDUCTOR SIZE (WHEN SHOWN) FOR PHASE AND NEUTRAL CONDUCTORS
 - ⊖ INDICATES NUMBER OF PHASE CONDUCTORS
 - ⊖ INDICATES NEUTRAL CONDUCTOR
 - ⊖ INDICATES GREEN GROUND CONDUCTOR (NUMBER INDICATES CONDUCTOR SIZE)
 - ⊖ PUSH BUTTON SWITCH
 - ⊖ INDICATES DETAIL DESIGNATION
 - ⊖ SEE DETAIL SYMBOL
 - ⊖ INDICATES SHEET NUMBER
 - ⊖ KEYED NOTE SYMBOL

2 FIFTH FLOOR PLAN - POWER & FIRE ALARM
 EP205 1/4" = 1'-0"

SHEET NOTES -

1. THE CIRCUITS IN THIS AREA SHALL BE FED FROM THE FOLLOWING PANEL BOARDS:
 - NORMAL POWER BRANCH CIRCUIT "NL" IS 208/120V AND SHALL BE FED FROM PANEL UL-55-2, UNLESS NOTED OTHERWISE.
 - CRITICAL POWER BRANCH CIRCUIT "CL" IS 208/120V AND SHALL BE FED FROM PANEL EUL-CR-55-1, UNLESS NOTED OTHERWISE.
2. EC SHALL REFER TO ARCHITECTURAL FLOOR PLANS, REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS.
3. CIRCUIT NUMBERS INDICATED DO NOT REFLECT THE ACTUAL POSITION OF THE CIRCUIT BREAKER IN THE PANEL. RATHER, THE NUMBER INDICATES WHICH DEVICES ARE CONNECTED TO A COMMON CIRCUIT. EC SHALL UTILIZED SPARES, SPACES AND CIRCUITS RELIEVED FROM DUTY TO PROVIDE THE INDICATED NUMBER OF CIRCUITS.
4. EXISTING TO REMAIN, "ETR", ON THIS PLAN REFERS TO THE STATUS OF BASIC ELECTRICAL DEVICES. THERE MAY BE SOME WORK REQUIRED IN THESE SPACES INVOLVING BACK-FEEDING EXISTING CIRCUITS OR OTHER MODIFICATIONS. SEE ALL DOCUMENTS THAT MAKE UP THIS CONTRACT FOR THE TOTAL EXTENT OF WORK REQUIRED IN ALL SPACES.
5. FIELD COORDINATE EXACT HEIGHT AND LOCATION OF LIGHT FIXTURES IN MECHANICAL, TELE/DATA, AND ELECTRICAL ROOMS TO AVOID CONFLICT WITH MECHANICAL EQUIPMENT, DUCT WORK, PIPES, AND STRUCTURAL MEMBERS. FIXTURES SHALL BE CHAIN HUNG AND SUPPORTED FROM THE EXPOSED CEILING. DUCT WORK AND UTILITY PIPING SHALL NOT BE USED FOR SUPPORT. ANY CONFLICT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/OWNER.

SHEET NOTES -

6. EXTEND EXISTING FIRE ALARM CIRCUITS SERVING THE AREA TO NEW FIRE ALARM DEVICES SHOWN ON THIS PLAN. CIRCUITS ARE SERVED FROM EXISTING PANEL WITHIN EXISTING CLOSET 5B07. REFER TO E105 FOR EXISTING PANEL LOCATION.
7. PRIOR TO CORING OR CUTTING CONCRETE SLAB, X-RAY SLAB TO DETERMINE EXISTING CONDUIT PLACEMENT WITHIN THE SLAB.
8. SEE SHEET A001 FOR PROJECT PHASING DRAWINGS AND NOTES.
9. SYMBOLS LIST MAY NOT INCLUDE ALL SYMBOLS INDICATED ON THIS SHEET. FOR A COMPLETE LIST OF SYMBOLS, PLEASE REFERENCE SHEET E000.
10. CORE AND X-RAY BY EC.
11. FOR ANY WORK TO BE COMPLETED ON THE 4TH FLOOR, THE FOLLOWING SHALL APPLY: ACCESS TO 4TH FLOOR WOULD BE 7PM TO 7AM AND ONLY ONE TEAM ROOM PER NIGHT.

KEYED NOTES -

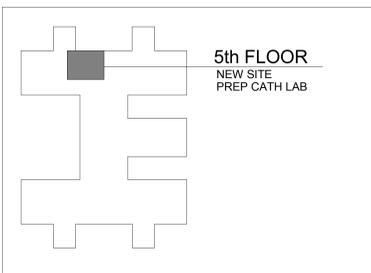
1. CLEAN, RECONNECT AND REINSTALL TRANSFORMER. PROVIDE NEW WIRING AND CONDUIT TO MATCH EXISTING AS REQUIRED FOR TRANSFORMER INSTALLATION AND TO RESTORE TO FULL WORKING CONDITION. TRANSFORMER SHALL BE INSTALLED SO THERE IS A MINIMUM CLEARANCE BEHIND THE TRANSFORMER OF 6".
2. CLEAN, RECONNECT AND REINSTALL DISCONNECT SWITCH. PROVIDE NEW WIRING AND CONDUIT TO MATCH EXISTING AS REQUIRED FOR DISCONNECT SWITCH INSTALLATION AND TO RESTORE TO FULL WORKING CONDITION.
3. RECEPTACLE AND CUSTOM J-BOX WITH BLANK FACEPLATE FOR MONITOR LOCATION. VERIFY MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND OWNER PRIOR TO ROUGH-IN. EC SHALL RUN A 2" CONDUIT WITH PULLSTRING FROM JUNCTION BOX AND TERMINATE AT CEILING DUCT CD-1/CD-2. REFER TO DETAIL 2/E510 FOR CEILING DUCT LOCATION.
4. RECEPTACLE AND CUSTOM J-BOX WITH BLANK FACEPLATE FOR MONITOR LOCATION. VERIFY MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND OWNER PRIOR TO ROUGH-IN. EC SHALL RUN A 2" CONDUIT WITH PULLSTRING FROM JUNCTION BOX AND TERMINATE AT CEILING DUCT CD-1/CD-2. REFER TO DETAIL 2/E510 FOR CEILING DUCT LOCATION.
5. EQUIPMENT CONNECTION LOCATED ON THE SECOND FLOOR ROOF.
6. DISCONNECT FOR AHU-5506.
7. REFER TO SHEETS E510, E511, AND E512 FOR ANY ADDITIONAL WORK ASSOCIATED WITH THE CATH LAB EQUIPMENT BEING INSTALLED, INCLUDING BUT NOT LIMITED TO DUCTS, JUNCTION BOXES, CONDUITS, CIRCUIT BREAKERS, CONDUCTORS, LIGHTS, AND SWITCHES. ELECTRICAL WORK REQUIRED BY THESE DRAWINGS SHALL BE INCLUDED AS PART OF THE ELECTRICAL CONTRACTOR'S WORKS.
8. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "UPS".
9. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "MP".

KEYED NOTES -

10. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "RMP".
11. EMERGENCY POWER OFF BUTTON FOR IMAGING EQUIPMENT.
12. REFER TO DETAIL 4/E500 FOR ANY PENETRATIONS INTO EXISTING LEAD-LINED WALL.
13. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "MD1".
14. PROVIDE (2) NEW VSMC STARTERS TO SERVE EXISTING EXHAUST FAN EF-1 CATH. (1) WILL BE USED AS A STANDBY MOTOR CONTROLLER. WIRE IN PARALLEL. LOCATE IN SAME LOCATION AS REPLACED STARTER. MATCH EXISTING WIRE AND CONDUIT SIZES AS REQUIRED.
15. PUSH BUTTON ACTUATORS FURNISHED BY GENERAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE BOX, ROUGH-IN AND 2 #12, 1/2 CONDUIT BETWEEN PUSH BUTTON ACTUATOR, FOOT SWITCH AND CONTROLLER. E.C. TO VERIFY FOOT SWITCH REQUIREMENTS WITH MANUFACTURER PRIOR TO ROUGH-IN.
16. TWO CIRCUITS PROVIDED FOR MULTI-OUTLET ASSEMBLY. ALTERNATE CIRCUIT FEEDING EVERY OTHER OUTLET ALONG ASSEMBLY.
17. PROVIDE (1) ADDITIONAL 3" CONDUIT FROM PEDESTAL "T1" TO CONTROL ROOM "CRB". REFER TO SHEETS E510, E511, AND E512 FOR THESE REFERENCE POINTS.
18. E.C. SHALL FEED MED GAS PANEL FROM A 20/1P CIRCUIT WITH 3 #12 & 1 #12 GRD 3/4 CONDUIT FROM PANEL EUL-LS/55-1. SEE SEE E105 FOR CLOSET LOCATION.
19. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "T1".
20. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "SC1".

KEYED NOTES -

21. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "PUI".
22. CONTROL TRANSFORMER FOR REMOTE MONITORING PANEL. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
23. ISOLATION TRANSFORMER FOR TABLE POWER OUTLET. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION. EC SHALL WIRE PER DRAWINGS ON SHEETS E510, E511, AND E512. REFER TO CONNECTION "TF".
24. DISCONNECT FOR CATH1D. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
25. EXISTING EXHAUST FAN IS 3/4HP, 480V, 3-PHASE.



PROJECT KEY PLAN: →

100% CONSTRUCTION DOCUMENTS

AMENDMENT #1	05/13/2015
Revisions:	Date

Dept. of Veterans Affairs
 Medical Center
 5000 W. National Avenue
 Milwaukee, WI

CONSULTANTS:
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RING & DUCHATEAU
 17400 W. Capitol Drive Brookfield, WI 53045
 Phone: 414.778.1700 Fax: 414.778.2260 f@drgdu.com
 THIS BAR IS 1" LONG
 IF IT MEASURES ANYTHING OTHER THAN 1"
 ADJUST SCALE ACCORDINGLY.
 R&D Project No. 214148

PROJECT LEADER/ARCHITECT:

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Drawing Title BUILDING 111 - FIFTH FLOOR PLAN - POWER & FIRE ALARM
Approved: Project Director

Project Title Building 111 - Site Prep Cath Lab
Location VA Medical Center, Milwaukee, WI
Date 30 March 2015
Checked By: MIKE MCGANN PE
Drawn By: RD

Project Number 695-14-112
Building Number 111
Drawing Number EP205

Office of Facilities Management

Department of Veterans Affairs