ETC Engineers & Architects, Inc.

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ADDENDUM NO.1

PROJECT: Emergency Dispatch Center, Paragould, AR
ETC Project No.: 150303CPAG
Date: November 14, 2016

This Addendum becomes a part of the CONTRACT DOCUMENTS, modifies and supplements them as follows:

PROJECT MANUAL:

ITEM 1:
Refer to Section 00003, Advertisement for Bids; The bid opening date and time are changed to Thursday, December 01, 2016 at 2:00 P.M.

ITEM 2:
Replace specification SECTION 01030 - ALLOWANCES with the enclosed SECTION 01030 - ALLOWANCES (ADDENDUM # 1)

ITEM 3:
Add enclosed SECTION 10270 ACCESS FLOORING

ITEM 4:
Add enclosed SECTION M26 3213 Generator Set

End of Addendum 1

SECTION 01030 - ALLOWANCES (ADDENDUM # 1)

PART 1 - GENERAL

1.01 SCOPE: The Contractor shall include in Contract Sum all Allowances stated in the Contract Documents.

The Contractor shall include in the Base Bid all allowances named in the Contract Documents and shall cause the work so covered to be done by such contractors and for such sums as the Architect may direct, the Contract Sum being adjusted in conformity therewith. The Contractor declares that the Contract Sum include such sums for expenses and profit on account of cash allowances as he deems proper. No demand for expenses or profit other than those included in the Contract Sum shall be allowed.

1.02 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Include the sum of Two Thousand Five Hundred Dollars ($2,500.00) for the design, shop drawings, purchase, taxes, freight, delivery, and installation of all interior signage for this project. (Handicapped parking signs, parking stripes and painted directional arrows are included in the Site work bid.) This allowance shall be for a turn-key process from design through installation.

B. Allowance No. 2: Include in the Base Bid the sum of Twenty Dollars ($20.00) per square yard for the material cost only from the supplier for carpet to be used at the raised flooring system. The cost for delivery and freight, taxes, profit, glue, installation labor and miscellaneous accessories for a complete installation is to be in the General Contractor's Contract price. The carpet will be selected by the Architect.

C. Allowance No. 3: Include the sum of Four Thousand Five Hundred Dollars ($4,500) for the design, shop drawings, purchase, taxes, freight, delivery, and installation of exterior cast Aluminum letters for Building sign and interior building plaque for this project. This allowance shall be for a turn-key process from design through installation.

1.03 ADJUSTMENTS OF COSTS: If the costs are more or less than the specified amount of Allowance, the Contract Sum will be adjusted accordingly by change order.

1.04 Allowance shall not be made a part of any subcontract agreement by Contractor until all materials stipulated have been selected by Architect.

END OF SECTION

SECTION 10270

ACCESS FLOORING

PART 1 - GENERAL

1.1 Section Includes

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Work of this section includes, but is not limited to: access floor panels, floor coverings, understructure and various electrical, data and communication accessories.

1.2 Related Sections

A. Concrete sealer shall be compatible with pedestal adhesive, see Division 3.

B. See Division 26 Section “Grounding and Bonding for Electrical Systems” for connection to ground of access flooring understructure. Note: The electrical engineer or contractor shall determine requirements for grounding and the electrical contractor shall provide the necessary labor and materials to electrically connect the access flooring to the building ground if it is required.

1.3 Access Floor Air Plenum Requirements

A. The access floor contractor is aware that the space beneath the access floor will be used as an air delivery plenum and as such will take the necessary precautions when installing their work so as not to impact the integrity of the plenum space specific to air leakage and cleanliness. Any penetrations or holes in the underfloor plenum created for or resulting from the work performed by the Division 9 access flooring contractor are required to be properly sealed to prevent air leakage.

B. Panel construction shall be die-cut welded steel type which creates a consistent panel-to-panel seam width along the entire edge of the panel when installed in accordance with normal installation procedures.

1.4 Environmental Conditions for Storage and Installation

A. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35° to 95° F and relative humidity levels between 20 to 80%. All floor panels shall be stored at ambient temperatures between 50° to 90°F for at least 24 hours before installation begins. All areas of installation shall be enclosed and maintained at ambient temperature between 50° to 90°F and at relative humidity levels between 20% to 80% and shall remain within these environmental limits throughout occupancy.

1.5 References

A. CISCA (Ceilings & Interior Systems Construction Association) - “Recommended Test Procedures for Access Floors” shall be used as a guideline when presenting load performance product information.

1.6 **Performance Certification**

A. Product tests shall be witnessed and certified by independent engineering and testing laboratory based in the U.S. with a minimum of five years experience testing access floor components in accordance CISCA "Recommended Test Procedures for Access Floors".

1.7 **Country-of-Origin and Product Marking**

A. Access floor materials shall comply with the provisions outlined in FAR Subpart 25.2 – Buy American Act – Construction Materials.

B. Floor panels shall be permanently marked with manufacturer's name, product identification, manufacturing date and country-of-origin. Removable Product ID stickers are not acceptable.

1.8 **Performance Requirements**

A. **Design Load:** Panel supported on actual understructure system shall be capable of supporting a point load of 1250 lbs applied on a one square inch area at any location on the panel without experiencing permanent set as defined by CISCA. The loading method used to determine design (allowable) load shall be in conformance with CISCA Concentrated Load test method but with panel tested on actual understructure instead of steel blocks.

B. **Safety Factor**: Panel supported on actual understructure system shall withstand a point load of no less than (2) two times the design load rating on a one square inch area anywhere on the panel without failure when tested in accordance with CISCA A/F, Section 2 "Ultimate Loading". Failure is defined as the point at which the system will no longer accept the load.

C. **Ultimate Load:** Panel supported on actual understructure system shall be capable of supporting a point load of at least 2500 lbs applied through a load indentor on a one square inch area at any location on the panel without failure (i.e. minimum safety factor of 2) when tested in accordance with CISCA A/F, Section 2, "Ultimate Loading".

D. **Rolling Load**: Panel supported on actual understructure system shall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches when tested in accordance with CISCA A/F, Section 3, "Rolling Loads". Note: wheel 1 and wheel 2 tests shall be performed on two separate panels.

CISCA Wheel 1:	Size: 3" dia x 1 13/16" wide	Load: 1125 lbs.	Passes: 10
CISCA Wheel 2:	Size: 6" dia x 2" wide	Load: 875 lbs.	Passes: 10,000

E. **Impact Load**: Panel supported on actual understructure (the system) shall be capable of supporting an impact load of 150 lbs. dropped from a height of 36 inches onto a one square inch area (using a round or square indentor) at any location on the panel when tested in accordance with CISCA A/F Section 8, "Drop Impact Load Test".

F. **Panel Drop Test**: Panel shall be capable of being dropped face up onto to a concrete slab from a height of 36", after which it shall continue to meet all load performance requirements as previously defined.

G. **Panel Cutout**: Panel with an 8" diameter interior cutout supported on actual understructure shall be capable of maintaining its design load strength with a minimum safety factor of 2 anywhere on the panel without the use of additional supports.

H. **Flammability**: System shall meet *Class A* Flame spread requirements for flame spread and smoke development. Tests shall be performed in accordance with ASTM-E84-1998, Standard Test Method for Surface Burning Characteristics for Building Materials.

I. **Combustibility**: All components of the access floor system shall qualify as noncombustible by demonstrating compliance with requirements of ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg C.

J. **Recycled Content:** Panel and understructure system shall be required to have a minimum post-consumer recycled content of 18% and a minimum total recycled content of 49%

K. **Axial Load**: Pedestal support assembly shall provide a minimum 6000 lb. axial load without permanent deformation when tested in accordance with CISCA A/F, Section 5, "Pedestal Axial Load Test.".

L. **Overturning Moment**: Pedestal support assembly shall provide an average overturning moment of 1000 in-lbs. when glued to a clean, sound, uncoated concrete surface when tested in accordance with CISCA A/F, Section 6, "Pedestal Overturning Moment Test".

1.9 **Design Requirements:**

A. Access floor system, where indicated on the design documents, shall consist of modular and removable fully encased cementitious filled welded steel panels fastened onto, and supported by, adjustable height pedestal assemblies. Pedestal head and panel corner design must provide a positive location and lateral engagement of the panel to the understructure support system without the use of fasteners.

B. Panel shall be easily removed by one person with a suction cup lifting device and shall be interchangeable except where cut for special conditions.

C. Quantities, finished floor heights (FFH) and location of accessories shall be as specified on the contract drawings.

1.10 **Submittals for Review**

A. Detail sheets, for each proposed product type, which provide the necessary information to describe the product and its performance.

B. Test reports, certified by an independent testing laboratory with a minimum of five years experience testing access floor components in accordance CISCA Recommended Test Procedures, certifying that component parts perform as specified.

1.11 **Submittals for Information**

A. Manufacturer's installation instructions and guidelines.

B. Manufacturer's Owner Manual outlining recommended care and maintenance procedures.

PART 2 - PRODUCTS

2.1 Manufacturers

A. Access floor system shall be as manufactured by Tate Access Floors, Inc. and shall consist of the ConCore® Positile Carpet access floor panel supported by PosiLock understructure system.

B. Alternative products shall meet or exceed all requirements as indicated herein and must receive prior written approval by the architect or designer.

C. Access floor manufacture shall be ISO9001:2000 certified demonstrating it has a robust and well documented quality management system with continual improvement goals and strategies.

D. Access floor manufacturer's facilities shall be ISO14001:2004 certified demonstrating that they maintain an environmental management system.

E. Access floor manufacturer's facilities shall be OHSAS 18001:2007 certified demonstrating that they maintain an Occupational Health and Safety Management system.

2.2 Support Components

Pedestals:

A. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1" for finished floor heights 6" or greater.

B. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.

C. Pedestal head shall be designed with locating tabs and integral shape to interface with the panel for positive lateral retention and positioning without fasteners. Note: This allows the floor to be installed during the construction process without screws so that access by other related trades can be accomplished quickly and easily. It also enables the user to have a mixed installation of fastened and unfastened panels within the same installation.

D. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.

E. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 6" or greater). Note: This prevents the assembly from inadvertently losing its leveling adjustment when panels are removed from the installation during use.

F. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8" square steel tube and shall be designed to engage the head assembly.

2.3 **Panel Components**

Floor Panels:

A. Panels shall consist of a top steel sheet welded to a formed steel bottom pan filled internally with a lightweight cementitious material. Mechanical or adhesive methods for attachment of the steel top and bottom sheets are unacceptable.

B. Cementitious fill material shall be totally encased within the steel welded shell except where cut for special conditions**.** Note: This greatly reduces the potential for dust in the environment from exposed cement materials.

C. Panel shall have an electrically conductive epoxy paint finish.

D. Corner of panel shall have a locating tab and integral shape design to interface with the pedestal head for positive lateral retention and positioning with or without fasteners.

E. Fastening of panels to pedestal heads shall be accomplished by the use of a machine screw which is specially designed to be self capturing within the body of the panel. Note: This prevents the inadvertent loss of panel fastening screws when accessing the underfloor space and potential damage to objects by screws which extend beyond the depth of the panel.

F. Top surface of the panel shall have an option for four positioning location holes to engage positioning buttons on the PosiTile® carpet tile for precise matching of the carpet tile to the panel.

G. Fit between the pedestal head, panel, and screw shall enable an installation with an average panel to panel gap of 0.015”.

2.4 **Accessories**

A. UL listed Power, Voice & Data Servicenters shall be provided in locations as detailed on the contract drawings. High capacity 11 ¼ inch square PVD Servicenters shall be capable of accommodating four duplex receptacles and three knockouts for standard voice/data faceplates or Tate voice/data interface plates (or grommeted interface plates). Standard capacity 7-5/16 by 6-15/16 inch PVD Servicenters shall be capable of accommodating two duplex receptacles and two Tate voice/data interface plates (or grommeted interface plates). The service outlet box shall be a drop-in design having a hinged Lexan lid with carpet insert and Lexan frame with tapered edge. Service outlet box lid shall be capable of withstanding without failure a load of 800 lb.

B. Provide manufacturer’s standard steps, ramps, fascia plate, perimeter support, and grommets where indicated on the contract drawings.

C. Provide 4 spare floor panels and 10 square feet of understructure systems for each type used in the project for maintenance stock. Deliver to project in manufacturer’s standard packaging clearly marked with the contents.

D. Provide 2 panel lifting devices.

E. When applicable provide manufacturer’s standard underfloor air systems components (including grilles and diffusers) where indicated on the contract drawings.

2.5 **Finishes**

A. Finish the surface of floor panels with floor covering material as indicated on the contract drawings. Where floor coverings are by the access floor manufacturer, the type, color and pattern shall be selected from manufacturer's standard. All areas to be furnished with laminated floor panels must be maintained at ambient temperature between 50° to 90° F and at humidity level between 20% to 80% relative and shall remain within these ranges through installation and occupancy.

B. Carpet tile: Access floor system shall be designed to accommodate a modular carpet tile (PosiTile®) that precisely matches one carpet tile to one ConCore® panel. This is accomplished utilizing four precisely located positioning buttons on the carpet tile which engage into four positioning location holes within the top surface of the access floor panel. The carpet tile's durable backing maintains dimensional stability, and holds the carpet tile flat without adhesives. Adhesives are not necessary and shall not be permitted on the Positile installation except where the carpet is cut and more than two positioners are removed.

C. Edge treatments for factory applied finishes shall be as follows:

1. High Pressure Laminate: Integral trim edge, separate trim pieces are unacceptable
2. All Other Finishes: Monolithic or vinyl edge trim pieces applied to the panel's top surface and shall not wrap around the panel's edge.

2.6 **Fabrication Tolerances**

A. Floor panel flatness measured on a diagonal: +/- 0.035"

B. Floor panel flatness measured along edges: +/- 0.025"

C. Floor panel width or length of required size: +/- 0.010"

D. Floor panel squareness tolerance: +/- 0.015"

PART 3 - EXECUTION

3.1 **Preparation**

A. Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean, and dry as completed by others.

B. Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. Verify that adhesive achieves bond to slab before commencing work.

C. Verify dimensions on contract drawings, including level of interfaces including abutting floor, ledges and doorsills.

D. The General Contractor shall provide clear access, dry subfloor area free of construction debris and other trades throughout installation of access floor system.

E. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35° to 95° F and relative humidity levels between 20 to 80%. At least 24 hrs. before installation begins, all floor panels shall be stored at ambient temperatures

between 50° to 90° F and relative humidity levels between 20% to 80% and shall remain within these environmental limits throughout occupancy.

3.2 **Installation**

A. Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.

B. Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. All traffic on access floor shall be controlled by access floor installer. No traffic but that of access floor installers shall be permitted on any floor area for 24 hours to allow the pedestal adhesive to set. Access floor panels shall not be removed by other trades for 72 hours after their installation.

C. Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.

D. No dust or debris producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.

E. Access floor installer shall keep the subfloor broom clean as installation progresses.

F. Partially complete floors shall be braced against shifting to maintain the integrity of the installed system where required.

G. Additional pedestals as needed shall support panels where floor is disrupted by columns, walls, and perimeter cutouts.

H. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.

I. Finished floor shall be level, not varying more than 0.062" in 10 feet or 0.125" overall.

J. Inspect system prior to application of floor covering and replace any floor panels that are cracked, broken and structurally damaged and do not comply with specified requirements.

K. Installed panels shall be straight and square and spaced so that the distance from one end to the other of any line of 12 panels is not less than 24 feet and does not exceed 24' 1/8".

L. Acceptance: General contractor shall accept floor in whole or in part prior to allowing use by other trades.

M. All cable and wire openings shall be sealed with manufacturer's removable cable cutout seal or grommets.

End of Section 10270

PART 1 - GENERAL

1.1 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 23 1126; Facility Liquefied-Petroleum Gas Piping.

C. Section 26 0526; Grounding.

D. Section 26 0533; Raceways.

E. Section 26 0536; Wires & Cables.

1.2 SUMMARY

A. Provide a generator and automatic transfer switch complete system.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, specifications, installation instructions and dimensioned drawings for each generator. Include prototype test certifications and specification sheets showing all standard and optional accessories to be supplied, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number, each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
   1. Generator spec sheet indicating fuel consumption and dimensions.
   2. Fuel tank spec sheets indicating gallons and dimensions.
   3. Alternator data sheet verifying oversized generator kw, skva, voltage dip and X"D requirements.
   4. Electronic circuit breaker data sheet.
   5. Time-current characteristic curves for generator protective device.
   6. Extended Life Coolant data sheet.
   7. Warranty disclosure statement indicating compliance with term and rental allowance.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Base Details By Installing Contractor: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
3. Wiring Diagrams: Power, signal, and control wiring.
4. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
5. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Wiring Diagrams: Submit shop drawings detailing the manufacturer's electrical requirements for power supply wiring for generator sets and associated equipment. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.

D. Certificates of Shop Inspections and Data Reports: For products required to have ASME label, signed by product manufacturer.

E. Source quality-control reports.
1. Certified summary of prototype-unit test report.
2. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
3. Report of sound generation.

F. Operation and Maintenance Manual Data: Submit maintenance data and parts lists, “trouble shooting” guides for generator system materials and products. Include this data, product data, shop drawings and record drawings in the maintenance manual. Furnish these materials with protective covering for storage and identified with labels describing contents. In addition to items specified in Division 1 Section “Operation and Maintenance Data,” include the following:
1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

G. Record Drawings: At project closeout, submit record drawings of installed generator systems, show exact location of all equipment, wiring connections and installed specialties in accordance with the requirements of Division 01.

1.4 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Firms regularly engaged in the manufacture of generator sets and equipment of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years. Maintain, within 100 miles of Project site, a service center capable of providing

training, parts, and emergency maintenance repairs. Supplier of the electric plant and associated items shall have permanent service facilities in this trade area. Authorized distributor shall provide copies of technician's factory training certificates specific to the proposed product on engine overhaul and electrical systems control repair in order to verify the level of support capabilities. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Major engine and control parts shall be available within 24 hours from the time a component is deemed defective. Authorized distributor shall also have the availability of an alternate mobile unit in the event of a catastrophic failure within 4 hours of notification.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with generator systems work similar to that required for this project. Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
   1. Maintenance Proximity: Not more than three hour travel time from Installer's place of business to Project site.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of the system and are based on the specific system indicated. Refer to Division 01 Section "Substitutions & Product Options."

D. Codes and Standards: The generator set shall conform to the requirements of the following codes and standards:
   1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
   2. EN61000-6-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
   3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
   4. IEC8528 part 4. Control Systems for Generator Sets
   5. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
   6. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
   7. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Articles 100, 700, 701, and 702, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   8. NFPA99 – Essential Electrical Systems for Health Care Facilities
   9. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

10. UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed.
11. Comply with ASME B15.1.
12. Comply with NFPA 37.
13. UL 1008 – Standard for Transfer Switch Equipment
14. IEC 60947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment
15. NEMA Standard ICS10-1993 (formerly ICS2-447) – AC Automatic Transfer Switches
16. UL 508 Industrial Control Equipment

E. Testing: To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.
   1. Design Prototype Tests: Components of the emergency system such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes and preproduction models shall be subject to the following tests.
      a. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

   2. Site Tests: An installation check, start-up, and building load test shall be performed by the manufacturer's local representative. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:
      a. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected.
      b. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery charger, alternator strip heaters, remote annunciator, etc.
      c. Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and frequency, and phase rotation.
      d. Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator set voltage, amperes, and frequency shall be monitored throughout the test. An external load bank shall be connected to the system if sufficient building load is unavailable to load the generator set to the nameplate kW rating.

F. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

G. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
   1. Notify Owner no fewer than ten days in advance of proposed interruption of electrical service.
   2. Do not proceed with interruption of electrical service without Owner's written permission.

B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
   1. Ambient Temperature: Minus 15 to plus 122 deg F
   2. Relative Humidity: 0 to 95 percent.
   3. Altitude: Sea level to 1000 feet.

1.6 WARRANTY

A. The standby electric engine-generator from the factory shall be warranted by the manufacturer against defective materials and factory workmanship for a period of 5 years with a 2,500 hour term. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge including travel and labor.

B. Platinum level shall include all as shipped consist from the factory excluding filters, fluids, vee belts, paint and batteries.

C. Additional coverage is allowed if repairs cannot be completed within 48 hours of the "authorized dealer" technician's initial visit for a covered "mechanical breakdown" due solely to the nature of the "mechanical breakdown" or inability to supply the required repair components. Up to $20,000 (US$) is allowed for rental genset expenses that are hereby defined as the reasonable and customary rental charge, mileage per guidelines given in the "repairer" travel & mileage limitations section of this contract and the necessary labor for connection & disconnection to your facility of the Rental GenSet from an "authorized dealer".

D. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to the following:
   1. Faulty operation of controls.
   2. Deterioration of any component beyond the degradation of normal use.
   3. Defective material and workmanship in accordance with the manufacturer's published warranty from date of start-up.
   4. Optional warranties shall be available upon request.

E. Warranty Period(s) from date of Substantial Completion: Two year basic extended warranty for the generator set.

F. The generator set manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment similar to that specified. A service agreement shall be available and shall include system operation under simulated operating conditions, adjustment to the generator set, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and proper functioning of all systems.

1.7 COORDINATION

A. Coordinate the size and location of concrete bases with actual equipment provided and structural and architectural plans. Cast anchor-bolt inserts into the base.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. The generator set shall be a Kohler model 125RZG with a 4S13 alternator. It shall provide 110 kW, 137.5 kVA when operating at 120/208 volts, .8 power factor. The generator set shall be capable of this rating while operating in an ambient condition of 77°F (25°C) and 4921 feet above sea level.

B. The generator set shall be capable of starting motor loads of 446 kVA inrush, with a maximum voltage dip of 35%.

C. Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base

D. The generator set described herein is a Kohler model 125RZG, and it is with the price of this equipment that the contractor of this section shall enter with his proposal. If the contractor wants to propose equivalent equipment, it is to be submitted in a separate document. All additional costs associated with re-engineering and mechanical & electrical modifications to the installation will be

at the contractor's expense. The contractor must also supply the details listed below with his equivalent proposal:

1. The associated credit
2. Any deviations from the specifications
3. The weight & outline dimensions

E. Engine
   1. The 496 cubic-inch-displacement engine shall deliver a minimum of 195 hp at a governed speed of 1800 rpm. The engine shall be equipped with the following:
   2. An electronic isochronous governor capable of +0.5% steady-state frequency regulation.
   3. 12 Volt positive engagement solenoid shift-starting motor.
   4. 70-Ampere minimum automatic battery charging alternator with solid-state voltage regulation.
   5. Positive displacement, full pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.
   6. Dry-type replaceable air cleaner elements for normal applications.

F. The turbocharged engine shall be fueled with HD5 propane vapor and be supplied with a unit-mounted electric solenoid fuel shut-off valve, flexible fuel line, and secondary fuel pressure regulator.

G. The engine shall have a minimum of 8 cylinders, and be liquid-cooled by a unit-mounted radiator, blower fan, water pump, and thermostats. This system shall properly cool the engine with up to 0.5 inches H20 static pressure on the fan in an ambient temperature up to 122F/50C.

H. Alternator
   1. The alternator shall be a Fast Response™ II permanent magnet brushless design.
   2. The alternator shall be salient-pole, brushless, 12-lead reconnectable, self-ventilated of drip-proof construction with amortisseur rotor windings and skewed stator for smooth voltage waveform. The insulation shall meet the NEMA standard (MG1-33.40) for Class H and be insulated with epoxy varnish to be fungus resistant per MIL 1-24092. Temperature rise of the rotor and stator shall be limited to 130°C. The excitation system shall be of brushless construction controlled by a solid- state voltage regulator capable of maintaining voltage within +/- 2% at any constant load from 0% to 100% of rating. The regulator must be isolated to prevent tracking when connected to SCR loads, and provide individual adjustments for voltage range, stability and volts-per-hertz operations; and be protected from the environment by conformal coating.

I. The generator set shall meet the transient performance requirements of ISO 8528-5, level G-2.

J. The alternator excitation shall be of a permanent magnet exciter design.

K. The generator shall be inherently capable of sustaining at least 250% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current support devices.

L. The alternator having a single maintenance-free bearing, shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.

M. Controller
1. Set-mounted controller capable of facing right, left, or rear, shall be vibration isolated on the alternator enclosure. The controller shall be capable of being remote-mounted. The microprocessor control board shall be moisture proof and capable of operation from -40^{o}C to 85^{o}C. Relays will only be acceptable in high-current circuits.
2. Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine. The controller shall include the following features:
3. Fused DC circuit.
4. Complete 2-wire start/stop control, which shall operate on closure of a remote contact.
5. Speed sensing and a second independent starter motor disengagement systems shall protect against starter engagement with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose.
6. The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then re-engage the starter.
7. Cranking cycler with 15-second ON and OFF cranking periods.
8. Overcrank protection designed to open the cranking circuit after 75 seconds if the engine fails to start.
9. Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure, or overspeed are received.
10. Engine cooldown timer factory set at 5 minutes to permit unloaded running of the standby set after transfer of the load to normal.
11. 3-position (Automatic-OFF-TEST) selector switch. In the TEST position, the engine shall start and run regardless of the position of the remote starting contacts. In the Automatic position, the engine shall start when contacts in the remote control circuit close and stop 5 minutes after those contacts open. In the OFF position, the engine shall not start even though the remote start contacts close. This position shall also provide for immediate shutdown in case of an emergency. Reset of any fault shall also be accomplished by putting the switch to the OFF position.
12. Alarm horn with silencer switch per NFPA 110.
13. Standard indicating lights to signal the following shall be included:
    a. Not-in-Auto (flashing red)

b. Overcrank (red)
c. Emergency Stop (red)
d. High Engine Temperature (red)
e. Overspeed (red)
f. Low Oil Pressure (red)
g. Battery Charger Malfunction (red)
h. Low Battery Voltage (red)
i. Low Fuel (red)
j. Auxiliary Prealarm (yellow)
k. Auxiliary Fault (red)
l. System Ready (green)

14. Test button for indicating lights.
15. Terminals shall be provided for each indicating light above, plus additional terminals for common fault and common prealarm.
16. Instrument Panel shall include the following:
    a. Dual range voltmeter 3 1/2-inch, +/- 2% accuracy
    b. Dual range ammeter 3 1/2-inch, +/- 2% accuracy.
    c. Voltmeter-ammeter phase selector switch.
    d. Lights to indicate high or low meter scale.
    e. Direct reading pointer-type frequency meter 3 1/2-inch, 0.5% accuracy, 45 to 65 Hz scale.
    f. Panel-illuminating lights.
    g. Battery charging voltmeter.
    h. Coolant temperature gauge.
    i. Oil pressure gauge.
    j. Running-time meter.
    k. Voltage-adjust rheostat

N. Accessories
1. A 80% rated line circuit breaker of 400 amperes, 400 amps sensor, 600 volt rated, molded case type, generator mounted.
2. Engine block heater. Thermostatically controlled and sized to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA-99 and NFPA-110, Level 1.
3. A resettable line current sensing circuit breaker with inverse time versus current response shall be furnished which protects the generator from damage due to its own high current capability. This breaker shall not trip within the 10 seconds specified above to allow selective tripping of down-stream fuses or circuit breakers under a fault condition. This breaker shall not automatically reset, preventing restoration of voltage if maintenance is being performed. a field current-sensing breaker will not be acceptable.
4. A sound attenuated weather housing shall be provided. The housing shall be constructed of 18 gauge pre-painted galvanized steel to resist corrosion. The maximum sound level shall not exceed 76 dba at 7 meters (23 feet).
5. Battery rack, and battery cables, capable of holding the manufacturer's recommended batteries, shall be supplied.

6. 12-volt lead-antimony battery(ies) capable of delivering the manufacturer's recommended minimum cold-cranking Amps required at 0^{o}F, per SAE Standard J-537, shall be supplied.
7. 6-Ampere automatic float and equalize battery charger with +/- 1% constant voltage regulation from no load to full load over +/-10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated for ambient temperatures from -40^{o}C to +60^{o}C, 5% accurate voltmeter and ammeter, fused, reverse polarity and transient protected.
8. The engine exhaust silencer shall be coated to be temperature and rust resistance, rated for critical application. The silencer will reduce total engine exhaust noise by 25-35 dB(A).
9. Gas-proof, seamless, stainless steel, flexible exhaust bellows with threaded NPT connection.
10. Two flexible fuel lines rated at a minimum of 257^{o}F and 100 psi ending in pipe thread.
11. Air cleaner restriction indicator to indicate the need for maintenance of the air cleaners.

O. Remote Serial Annunciator: Annunciator must meet the following specifications:
1. Operating temperature range: -20° to 70°C (-4° to 158°F)
2. Storage temperature range: -40° to 85°C (-40° to 185°F)
3. Humidity range: 5-95% noncondensing
4. Enclosure: NEMA 2
5. Power supply: 12- or 24-VDC
6. Power draw: 200 Ma

P. Standards:
1. NFPA 110, Level 1
2. NFPA 99
3. UL 508 Recognized
4. CE Directive (Voltage and EMC)
5. EN610000-4-4 Fast Transient Immunity

Q. Hardware Requirements
1. Front panel—
2. Up to (24) Light-emitting diode (LED) indicators for shutdowns, warnings (pre-alarms), and status
3. Up to (19) Light-emitting diode (LED) indicators, an audible horn, an alarm silence button, and a lamp test button required by NFPA 110, Level 1.
4. LEDs must be activated to indicate: shutdowns, warnings (pre-alarms), or status
5. Must have a minimum of (3) LED colors to define function
6. Must have LEDs with blinking functions to indicate status
7. LEDs required to activate for the following shutdown and/or warning conditions:
   a. OvercranK.

b. Low Coolant Temperature
c. High Engine Temperature
d. Low Oil Pressure
e. Overspeed
f. Emergency Stop
g. Low Fuel
h. Low Coolant Level
i. Not-In-Auto
j. High Battery Voltage
k. Low Battery Voltage
l. Battery Charger Failure
m. Common Fault

8. LEDs required to activate upon the following status conditions:
   a. Lamp test
   b. Alarm silence
   c. System ready
   d. Generator running
   e. Communications
   f. EPS Supplying Load

9. Up to (3) user-defined inputs shall each activate an LED and an audible horn for shutdowns, warnings, or status conditions.

R. Annunciator shall have removable text inserts for assigning user-defined inputs, assigning generator identification, and replacement.

S. Front panel of annunciator shall be a sealed membrane and shall be capable of both surface-mounting and flush-mounting.

T. Network Communication
   1. Provide an RS-485 connection at the annunciator from the generator controller. Maximum distance shall be 1220 m (4000 ft.) from the generator controller to the furthest annunciator.
   2. No other external wiring required, except power, to activate the LEDs and horn.
   3. Provide up to (4) annunciators per generator. Multiple annunciators shall communicate via RS-485 serial bus.

U. Run Relay to provide a three-pole, double-throw relay with 10 amps at 250 VAC contacts for indicating that the generator is running.

V. Common Failure relay to remotely signal auxiliary faults, emergency stop, high engine temperature, low oil pressure, overcrank, and overspeed via one single-pole, double-throw relay with 10 amps at 120 VAC contacts.

W. Generator prealarm senders to provide signals for local and/or remote annunciation for engine conditions approaching critical/shutdown parameters.

X. Generator rodent guards.

PART 3 - EXECUTION – Not Applicable

END SECTION
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