

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
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6. ISSUED BY CODE	7. ADMINISTERED BY (If other than Item 6) CODE
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8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(X)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 11)

CODE	FACILITY CODE
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11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
15B. CONTRACTOR/OFFEROR	16B. UNITED STATES OF AMERICA
(Signature of person authorized to sign)	(Signature of Contracting Officer)
15C. DATE SIGNED	16C. DATE SIGNED

This amendment is issued to provide the following information:

1. On sheet M2 of the drawings included in the RFP, modify New Work Key Note #11 to read “400 CFM, MAX. 0.25 IN. W.G. PRESSURE DROP”. On sheet M4 of the drawings included in the RFP, modify the exhaust fan schedule to read 400 SCFM for both EF-1 and EF-2.

2. Question: When the project is complete and the temporary units are removed, are the units to be turned over to the government or will the contractor maintain possession of the temporary?

Answer: The temporary HVAC units will remain and property of the contractor.

3. Specification Section 28 31 63 is hereby incorporated into the RFP for the fire alarm and detection system.

SECTION 28 31 63

ANALOG/ADDRESSABLE INTERIOR FIRE ALARM SYSTEM

02/12

PART 1 GENERAL

1.1 REFERENCES

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

FM GLOBAL (FM)

FM APP GUIDE (updated on-line) Approval Guide
<http://www.approvalguide.com/>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241 (2009) Standard for Safeguarding
Construction, Alteration, and Demolition
Operations

NFPA 72 (2010; TIA 10-4) National Fire Alarm and
Signaling Code

NFPA 90A (2009; Errata 09-1) Standard for the
Installation of Air Conditioning and
Ventilating Systems

UNDERWRITERS LABORATORIES (UL)

UL 1971 (2002; Reprint Oct 2008) Signaling Devices
for the Hearing Impaired

UL 268 (2009) Smoke Detectors for Fire Alarm
Systems

UL 464 (2009; Reprint Jan 2011) Standard for
Audible Signal Appliances

UL Electrical Constructn (2009) Electrical Construction Equipment
Directory

UL Fire Prot Dir (2011) Fire Protection Equipment Directory

1.2 RELATED REQUIREMENTS

Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS, applies to this section, with the additions and modifications specified herein.

1.3 DESCRIPTION OF WORK

1.3.1 Scope

This work includes designing and providing a new analog/addressable fire alarm system and first floor smoke detection, attic heat detection as described herein. The system shall include wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, alarm, and supervisory signal initiating devices, and other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described. Provide system complete and ready for operation. Equipment, materials, installation, workmanship, inspection, and testing shall be in strict accordance with the required and advisory provisions of [NFPA 72](#). Provide antenna, conduit, and FACP interface for future mass notification system. Provide relays for each air handler; fire alarm to shut down all air handlers on alarm.

1.4 SUBMITTALS

The following shall be submitted in accordance with Section [01 33 00](#) SUBMITTAL PROCEDURES:

Provide six complete sets of submittals. Partial submittals will not be acceptable and will be returned without review. The Camp Lejeune, Fire Protection Engineer, will review and approve submittals.

[SD-02 Shop Drawings](#)

Provide point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems which are supervised or controlled by the system. Diagrams shall show connections from field devices to the FACP and remote fire alarm control units, initiating circuits, switches, relays and terminals.

Provide plan view drawing showing device locations, terminal cabinet locations, junction boxes, other related equipment, conduit routing, wire counts, circuit identification in each conduit, and circuit layouts for all floors.

Provide a complete description of the system operation [in matrix format] on the drawings.

Provide a complete list of device addresses and corresponding messages.

Provide detailed drawings of the graphic annunciator.

Include annotated catalog data, in table format on the drawings, showing manufacturer's name, model, voltage, and catalog numbers for equipment and components.

Provide complete riser diagrams indicating the wiring sequence of devices and their connections to the control equipment. Include a color code schedule for the wiring. Include floor plans showing the locations of devices and equipment.

[Battery power calculations](#)

Submit shop drawings not smaller than 24 by 36 inches. As a minimum, the shop drawing submittal shall include the items listed above.

SD-03 Product Data

Fire alarm control panel (FACP)

Printers, covers, console rack, video display unit (VDU), etc.

Terminal cabinets/assemblies

Manual stations

Transmitters (including housing)

Batteries

Battery chargers

Smoke sensors

Thermal sensors

Wiring and cable

Notification appliances

Addressable interface devices

Amplifiers

Tone generators

Digitalized voice generators

Smoke sensor testing procedures

Digital alarm communicator transmitter (DACT)

Submit data on proposed equipment, including, but not limited to the items listed above. Include UL or FM listing cards for equipment provided.

SD-06 Test Reports

Furnish preliminary test results to the Contracting Officer. Include the control panel and initiating and indicating devices, a unique identifier for each device with an indication of test results, and signature of the factory-trained technician of the control panel manufacturer and equipment installer. With reports on preliminary tests, include printer information.

SD-07 Certificates

Qualifications of installer

SD-10 Operation and Maintenance Data

INTERIOR FIRE ALARM SYSTEM, Data Package 5

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

Record drawing software

SD-11 Closeout Submittals

Prepare and submit to the Contracting Officer six sets of detailed as-built drawings. The drawings shall include complete wiring diagrams showing connections between devices and equipment, both factory and field wired. Include a riser diagram and drawings showing the as-built location of devices and equipment. The drawings shall show the system as installed, including deviations from both the project drawings and the approved shop drawings. The drawings shall be prepared on uniform sized mylar sheets not less than 30 by 42 inches with 8 by 4 inch title block similar to contract drawings. These drawings shall be submitted within 2 weeks after the final acceptance test of the system. At least one set of as-built (marked-up) drawings shall be provided at the time of, or prior to the final acceptance test.

Submit the installer's training history for the employees involved with this contract.

1.5 ADDITIONAL SUBMITTAL REQUIREMENTS

1.5.1 Battery Power Calculations

Verify that battery capacity exceeds supervisory and alarm power requirements.

- a. Provide complete battery calculations for both the alarm and supervisory power requirements. Ampere hour requirements for each system component shall be submitted with the calculations.
- b. Provide data on each circuit to indicate that there is at least 25 percent spare capacity for notification appliances, [25] [50] percent spare capacity for initiating devices. Annotate data for each circuit on the drawings.
- [c. Provide data to indicate that the amplifiers have sufficient capacity to simultaneously drive fire alarm speakers at their 1/2 watt tap plus 50 percent spare capacity. Annotate data for each circuit on the drawings.]
- [d. Provide a detailed description of the final acceptance testing procedures (including equipment necessary for testing smoke detectors using real smoke).]

1.5.2 Qualifications of Installer

Design shall be by a National Institute for Certification in Engineering Technologies (NICET) Level III or Level IV Technician. Installer shall have an office, which has been in existence for at least 3 years, within a 800 mile radius of the job site. Installation shall be accomplished by an electrical contractor with a minimum of 5 years' experience in the

installation of fire alarm systems. The Contracting Officer may reject any proposed installer who cannot show evidence of such qualifications. The services of a technician provided by the control equipment manufacturer shall be provided to supervise installation, adjustments, and tests of the system. The Contractor shall furnish evidence that the fire alarm equipment supplier has an experienced and effective service organization which carries a stock of repair parts for the system to be furnished. The Contractor shall guarantee labor, materials, and equipment provided under this contract against defects for a period of one year after the date of final acceptance of this work by the Contracting Officer and the receipt of as-built drawings and schematics of all equipment. Prior to installation, submit data for approval by the Camp Lejeune, Fire Protection Engineer, showing that the Contractor has successfully installed addressable, analog intelligent interior fire alarm systems of the same type as specified herein, or that the Contractor has a firm contractual agreement with a subcontractor having such required experience. Include the names and locations of at least three installations where the Contractor, or the subcontractor referred to above, has installed such systems. Indicate the type and design of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 18 months. Submit names and phone numbers of points of contact at each site.

1.5.3 Record Drawing Software

Furnish one set of floppy diskettes containing CAD based drawings in DXF format of as-built drawings and schematics.

1.6 QUALITY ASSURANCE

Equipment and devices shall be compatible, operable and listed for use with existing station fire alarm system and shall not impair reliability or operational functions of existing supervising station fire alarm system. [Existing supervising station fire alarm system is Simplex 4100.]

1.6.1 Regulatory Requirements

Devices and equipment for fire alarm service shall be listed by [UL Fire Prot Dir](#) or approved by [FM APP GUIDE](#).

1.6.1.1 Requirements for Fire Protection Service

Equipment and material shall have been tested by UL and listed in [UL Fire Prot Dir](#) or approved by FM and listed in [FM APP GUIDE](#). Where the terms "listed" or "approved" appear in this specification, they shall mean listed in [UL Fire Prot Dir](#) or [FM APP GUIDE](#). The omission of these terms under the description of any item of equipment described shall not be construed as waiving this requirement.

1.6.1.2 Testing Services or Laboratories

Fire alarm and fire detection equipment shall be constructed in accordance with [UL Fire Prot Dir](#), [UL Electrical Constructn](#), or [FM APP GUIDE](#).

1.6.2 Standard Products

Provide materials, equipment, and devices that have been tested by a nationally recognized testing laboratory, such as UL or FM, and listed or approved for fire protection service when so required by [NFPA 72](#) or this specification. Select material from one manufacturer, where possible, and

not a combination of manufacturers, for any particular classification of materials.

1.6.3 Modification of References

- a. In NFPA publications referred to herein, consider advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears; interpret reference to "authority having jurisdiction" to mean the Camp Lejeune, Fire Protection Engineer.
- [b. The recommended practices stated in the manufacturer's literature or documentation shall be considered as mandatory requirements.]

1.7 DELIVERY, STORAGE, AND HANDLING

Protect equipment delivered and placed in storage from the weather, humidity, and temperature variation, dirt and dust, and other contaminants.

1.8 SPARE PARTS AND TOOLS

1.8.1 Interchangeable Parts

Spare parts furnished shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, tagging, or stamping. Spare parts shall be delivered to the Contracting Officer at the time of the final acceptance testing.

1.8.2 Spare Parts

Furnish the following spare parts and accessories:

- a. 4 audiovisual devices of each type installed
- b. 4 fuses for each fused circuit
- c. 1 manual stations
- d. 2 smoke sensors and base of each type installed
- e. 2 heat sensors and base of each type installed

1.8.3 Parts List

Furnish a list, in duplicate, of all other parts and accessories which the manufacturer of the system recommends to be stocked for maintenance.

1.9 KEYS

Keys and locks for equipment shall be identical. Provide not less than six keys of each type required. Keys shall be CAT 60.

PART 2 PRODUCTS

2.1 [EXISTING FIRE ALARM EQUIPMENT

Existing fire alarm equipment shall be maintained fully operational until the new equipment has been tested and accepted by the Contracting Officer. As new equipment is installed, it shall be labeled "NOT IN SERVICE" until

the new equipment is accepted. Once the new system is completed, tested, and accepted by the Government, it shall be placed in service and connected to the station fire alarm system. New equipment shall have tags removed and the existing equipment shall be tagged "NOT IN SERVICE" until removed from the building.

2.1.1 Equipment Removal

After acceptance of the new system by the Contracting Officer, existing equipment not connected to the new system shall be removed, unused exposed conduit shall be removed, and damaged surfaces shall be restored. The material shall be removed from the site and disposed of by the Contractor.

2.1.2 Repair Service/Replacement Parts

Repair services and replacement parts for the system furnished under this contract shall be available for a period of 10 years after the date of final acceptance of this work by the Contracting Officer. On-site service during the guarantee period shall be provided within 24 hours after notification. All repairs shall be completed within 48 hours after notification.

2.1.3 Manufacturer Qualifications

Components shall be of current design and shall be in regular and recurrent production at the time of installation. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to [NFPA 72](#), except as otherwise or additionally specified herein.

]2.2 INTERIOR FIRE ALARM SYSTEM DESIGN

2.2.1 Definitions

Wherever mentioned in this specification or on the drawings, the equipment, devices, and functions shall be defined as follows:

- a. Analog/Addressable System: A system in which multiple signals are transmitted via the same conduction path to a remote fire alarm control unit and fire alarm control panel, decoded and separated so that each signal will initiate the specified response.
- b. Hard Wired System: A system in which alarm and supervisory initiating devices are directly connected, through individual dedicated conductors, to a central control panel without the use of analog/addressable circuits or devices.
- c. Interface Device: An addressable device which interconnects hard wired systems or devices to an analog/addressable system.
- d. Fire Alarm Control Unit: A control panel, remote from the fire alarm control panel, that receives inputs from automatic and manual fire alarm devices; may supply power to detection devices and interface devices; may provide transfer of power to the notification appliances; may provide transfer of condition to relays or devices connected to the control unit; and reports to and receives signals from the fire alarm control panel.
- e. Fire Alarm Control Panel (FACP): A master control panel having the features of a fire alarm control unit and to which fire alarm control

units are interconnected. The panel has central processing, memory, input and output terminals, [video display units (VDUs),] [and] [printers].

- f. Terminal Cabinet: A steel cabinet with locking, hinge-mounted door in which terminal strips are securely mounted.

2.2.2 System Operation

The system shall be a complete, supervised, noncoded, analog/addressable fire alarm system conforming to NFPA 72. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal. The system shall provide the following functions and operating features:

- a. The FACP shall provide power, annunciation, supervision, and control for the system.
- b. Provide Class A initiating device circuits.
- c. Provide Class A signaling line circuits.
- d. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.
- e. Provide an audible and visual trouble signal to activate upon a single break or open condition, or ground fault. The trouble signal shall also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory panel modules. Provide a trouble alarm silence feature which shall silence the audible trouble signal, without affecting the visual indicator. After the system returns to normal operating conditions, the trouble signal shall again sound until the trouble is acknowledged. A smoke sensor in the process of being verified for the actual presence of smoke shall not initiate a trouble condition.
- f. Provide a notification appliance silencing switch which, when activated, will silence the audible signal appliance, but will not affect the visual alarm indicator, the liquid crystal display, or the automatic notification of the fire department. This switch shall be overridden upon activation of a subsequent alarm.
- g. Provide alarm verification capability for smoke sensors. Alarm verification shall initially be set for 30 seconds.
- h. Provide program capability via switches in a locked portion of the FACP to bypass the automatic notification appliance circuits, fire reporting system, air handler shutdown features. Operation of this programming shall indicate this action on the FACP display and printer output.
- i. Alarm, supervisory, and/or trouble signals shall be automatically transmitted to the fire department.
- j. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.
- k. The system shall be capable of being programmed from the panel's

keyboard. Programmed information shall be stored in non-volatile memory.

- l. The system shall be capable of operating, supervising, and/or monitoring both addressable and non-addressable alarm and supervisory devices.
- m. There shall be no limit, other than maximum system capacity, as to the number of addressable devices which may be in alarm simultaneously.
- n. Where the fire alarm system is responsible for initiating an action in another emergency control device or system, such as an HVAC system, the addressable fire alarm relay shall be within 3 feet of the emergency control device.
- o. An alarm signal shall automatically initiate the following functions:
 - (1) Transmission of an alarm signal to the fire department.
 - (2) Visual indication of the device operated on the fire alarm control panel (FACP). Indication on the graphic annunciator shall be by floor, zone or circuit, and type of device.
 - (3) Continuous actuation of all alarm notification appliances.
 - (4) Shut down the appropriate air handlers in accordance with NFPA 90A in addition to other requirements of this paragraph.
- p. A supervisory signal shall automatically initiate the following functions:
 - (1) Visual indication of the device operated on the FACP and sound the audible alarm at the respective panel.
 - (2) Transmission of a supervisory signal to the fire department.
- q. A trouble condition shall automatically initiate the following functions:
 - (1) Visual indication of the system trouble on the FACP and sound the audible alarm at the respective panel.
 - (2) Transmission of a trouble signal to the fire department.
- r. The maximum permissible elapsed time between the actuation of an initiating device and its indication at the FACP shall be 15 seconds.
- s. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP shall not exceed 200 seconds.

2.2.3 Overvoltage and Surge Protection

- a. Sensor Wiring Surge Protection: Digital and analog inputs and outputs shall be protected against surges induced by sensor wiring installed outdoors and as shown. The inputs and outputs shall be tested with the following waveform[s]:
 - (1) A 10 by 1000 microsecond waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.

2.2.4 Addressable Interface Devices

The addressable interface (AI) device shall provide an addressable input interface to the FACP for monitoring normally open or normally closed contact devices such as waterflow switches, valve supervisory switches, fire pump monitoring, independent smoke detection systems, relays for output function actuation, etc.

2.2.5 Smoke Sensors

2.2.5.1 Photoelectric Smoke Sensors

Provide addressable photoelectric smoke sensors as follows:

- a. Provide analog/addressable photoelectric smoke sensors utilizing the photoelectric light scattering principle for operation in accordance with [UL 268](#). Smoke sensors shall be listed for use with the fire alarm control panel.
- b. Provide self-restoring type sensors which do not require any readjustment after actuation at the FACP to restore them to normal operation. Sensors shall be UL listed as smoke-automatic fire sensors.
- c. Components shall be rust and corrosion resistant. Vibration shall have no effect on the sensor's operation. Protect the detection chamber with a fine mesh metallic screen which prevents the entrance of insects or airborne materials. The screen shall not inhibit the movement of smoke particles into the chamber.
- d. Provide twist lock bases for the sensors. The sensors shall maintain contact with their bases without the use of springs. Provide companion mounting base with screw terminals for each conductor. Terminate field wiring on the screw terminals. The sensor shall have a visual indicator to show actuation.
- e. The sensor address shall identify the particular unit, its location within the system, and its sensitivity setting. Sensors shall be of the low voltage type rated for use on a 24 VDC system.
- f. An operator at the control panel, having a proper access level, shall have the capability to manually access the following information for each initiating device.
 - (1) Primary status
 - (2) Device type
 - (3) Present average value
 - (4) Present sensitivity selected
 - (5) Sensor range (normal, dirty, etc.)

2.2.5.2 Smoke Sensor Testing

Smoke sensors shall be tested in accordance with manufacturer's recommended calibrated test method. Submit [smoke sensor testing procedures](#) for approval.

2.2.6 Thermal Sensors

- a. Thermal sensors shall be combination rate-of-rise/fixed temperature

sensing. The alarm condition shall be determined by comparing sensor valve with the stored values.

- b. A moving average of the sensor's heat sensing value to automatically compensate for conditions that could affect detection operations. System shall automatically maintain a constant heat sensing sensitivity from each sensor by compensating for environmental factors.
- c. Automatic self-test routines shall be performed on each sensor which will functionally check sensor sensitivity electronics and ensure the accuracy of the value being transmitted. Any sensor that fails this test shall indicate a trouble condition with the sensor location at the control panel.
- d. An operator at the control panel, having the proper access level, shall have the capability to manually access the following information for each heat sensor:
 - (1) Primary status
 - (2) Device type
 - (3) Present average value
 - (4) Sensor range
- e. An operator at the control panel, having the proper access level, shall have the capability to manually control the following information for each heat sensor:
 - (1) Alarm detection sensitivity values
 - (2) Enable or disable the point/device
 - (3) Control sensor's relay driver output

2.2.7 Electric Power

2.2.7.1 Primary Power

Provide primary power for the FACP from the normal AC service to the building. Power shall be 120 VAC service, transformed through a two-winding, isolation type transformer and rectified to low voltage DC for operation of circuits and devices. Make the service connection for the FACP at the panel D-30. The circuit breaker shall be painted red, marked "FIRE ALARM SYSTEM," and provided with a lockable handle.

2.2.8 Emergency Power Supply

Provide for system operation in the event of primary power source failure. Transfer from normal to auxiliary (secondary) power or restoration from auxiliary to normal power shall be automatic and shall not cause transmission of a false alarm.

2.2.8.1 Batteries

Provide sealed, maintenance-free, batteries as the source for emergency power to the FACP. Batteries shall contain suspended electrolyte. The battery system shall be maintained in a fully charged condition by means of

a solid state battery charger. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power.

2.2.8.2 Capacity

Provide the batteries with sufficient capacity to operate the system under supervisory and trouble conditions, including audible trouble signal devices for 48 hours and audible and visual signal devices under alarm conditions for an additional 10 minutes.

2.2.8.3 Battery Chargers

Provide a solid state, fully automatic, variable charging rate battery charger. The charger shall be capable of providing 150 percent of the connected system load and shall maintain the batteries at full charge. In the event the batteries are fully discharged, the charger shall recharge the batteries back to 95 percent of full charge within 48 hours. Provide pilot light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high rate switch is provided.

2.2.9 System Field Wiring

2.2.9.1 Wiring Within Cabinets, Enclosures, Boxes, Junction Boxes, and Fittings

Provide wiring installed in a neat and workmanlike manner and installed parallel with or at right angles to the sides and back of any box, enclosure, or cabinet. Conductors which are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting, or junction box shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make connections with approved pressure type terminal blocks, which are securely mounted. The use of wire nuts or similar devices shall be prohibited.

2.2.9.2 Terminal Cabinets

Provide a terminal cabinet at the base of any circuit riser, on each floor at each riser, and where indicated on the drawings. Terminal size shall be appropriate for the size of the wiring to be connected. Conductor terminations shall be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection shall be permanently mounted in the terminal cabinet. Minimum size is 8 inches high by 8 inches.

2.2.9.3 Alarm Wiring

Signaling line circuits and initiating device circuit field wiring shall be copper, No. 16 AWG size conductors at a minimum. Wire size shall be sufficient to prevent voltage drop problems. Circuits operating at 24 VDC shall not operate at less than 21.6 volts. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage. Power wiring, operating at 120 VAC minimum, shall be No. 12 AWG solid copper having similar insulation. Provide all wiring in rigid metal conduit or intermediate metal conduit. Electrical metallic tubing conduit is acceptable in dry locations not enclosed in concrete or where not subject to mechanical damage. Conceal conduit in finished areas of new construction and wherever practicable in existing construction. The use of flexible conduit not exceeding a 6 foot length shall be permitted in initiating device circuits. Run conduit or tubing concealed unless

specifically shown otherwise on the drawings. Shielded wiring shall be utilized where recommended by the manufacturer. For shielded wiring, the shield shall be grounded at only one point, which shall be in or adjacent to the FACP.

2.2.9.4 Conductor Terminations

Labeling of conductors at terminal blocks in terminal cabinets, FACP, and remote fire alarm control units shall be provided at each conductor connection. Each conductor or cable shall have a shrink-wrap label to provide a unique and specific designation. Each terminal cabinet, FACP, and fire alarm control unit shall contain a laminated drawing which indicates each conductor, its label, circuit, and terminal. The laminated drawing shall be neat, using 12 point lettering minimum size, and mounted within each cabinet, panel, or unit so that it does not interfere with the wiring or terminals. Maintain existing color code scheme where connecting to existing equipment.

2.2.10 Fire Alarm Control Panel (FACP)

Provide a complete control panel fully enclosed in a lockable steel enclosure as specified herein. Operations required for testing or for normal care and maintenance of the systems shall be performed from the front of the enclosure. If more than a single unit is required at a location to form a complete control panel, the unit enclosures shall match exactly. Each control unit shall provide power, supervision, control, and logic for the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. Each control unit shall be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide each panel with supervisory functions for power failure, internal component placement, and operation. Visual indication of alarm, supervisory, or trouble initiation on the fire alarm control panel shall be by liquid crystal display or similar means with a minimum of 80 characters of which at least 32 are field changeable.

2.2.10.1 Cabinet

Install control panel components in cabinets large enough to accommodate all components and also to allow ample gutter space for interconnection of panels as well as field wiring. The enclosure shall be identified by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall say "Fire Alarm Control Panel" and shall not be less than one inch high. Provide prominent rigid plastic or metal identification plates for lamps, circuits, meters, fuses, and switches. The cabinet shall be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions.

2.2.10.2 Control Modules

Provide power and control modules to perform all functions of the FACP. Provide audible signals to indicate any alarm, supervisory, or trouble condition. The alarm signals shall be different from the trouble signal. Connect circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and relays, if any, on screw terminals in the FACP. Circuits operating at 24 VDC shall not operate at less than 21.6 volts. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage.

2.2.10.3 Silencing Switches

- a. Alarm Silencing Switch: Provide an alarm silencing switch at the FACP which shall silence the audible signal but not affect the visual alarm indicator. This switch shall be overridden upon activation of a subsequent alarm.
- b. Supervisory/Trouble Silencing Switch: Provide supervisory and trouble silencing switch which shall silence the audible trouble and supervisory signal, but not extinguish the visual indicator. This switch shall be overridden upon activation of a subsequent alarm, supervision, or trouble condition.

2.2.10.4 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Circuits shall be manually resettable by switch from the FACP after the initiating device or devices have been restored to normal.

2.2.10.5 Fire Alarm Voice Message

A fire alarm shall activate notification appliance circuits. Textual audible appliances shall produce a slow whoop tone for three cycles followed by a voice message which is repeated until the control panel is reset or silenced. Automatic messages shall be broadcast through speakers on appropriate floors, but not in stairs or elevator cabs. The visual strobes and audible message shall automatically be broadcast on the floor of fire alarm origin, [the floor] [two floors] immediately above the floor of fire alarm origin, and the floor immediately below the floor of fire alarm origin. A live voice message shall override the automatic audible output through use of a microphone input at the control panel. When using the microphone, live messages shall be broadcast through speakers in stairs, in elevator cabs, and throughout a selected floor or floors. The system shall be capable of operating all speakers at the same time. The digitalized voice message shall consist of a non-volatile (EPROM) microprocessor based input to the amplifiers. The microprocessor shall actively interrogate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of the stored voice data into the appropriate amplifier input. Loss of operating power, supervisory power, or any other malfunction which could render the digitalized voice module inoperative shall automatically cause the slow whoop tone to take over all functions assigned to the failed unit. Messages shall utilize a female voice and shall be as follows:

"May I have your attention, please. May I have your attention, please. A fire has been reported which may affect your floor. Please walk to the nearest exit and evacuate the building." (Provide a 2 second pause.) "May I have your attention, please...(repeat the message)."

2.2.10.6 Fire Alarm Signal

A fire alarm shall activate notification appliances throughout the building. Audible devices shall be fire alarm horns which produce a three-pulse temporal pattern. Visual devices shall be strobes operating in accordance with [NFPA 72](#).

2.2.10.7 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS, or EPROMS.

2.2.10.8 Field Programmability

Provide control units and control panels that are fully field programmable for control, initiation, notification, supervisory, and trouble functions of both input and output. The system program configuration shall be menu driven. System changes shall be password protected and shall be accomplished using personal computer based equipment.

2.2.10.9 Input/Output Modifications

The FACP shall contain features which allow the bypassing of input devices from the system or the modification of system outputs. These control features shall consist of a panel mounted keypad [and a keyboard]. Any bypass or modification to the system shall indicate a trouble condition on the FACP[, VDU] [and a printed output of the trouble condition].

2.2.10.10 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.

2.2.10.11 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the instructions on the interior of the FACP. The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions shall be approved by the Contracting Officer before being posted.

2.2.10.12 Walk Test

The FACP shall have a walk test feature. When using this feature, operation of initiating devices shall result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated on the system printer, but no other outputs occur.

2.2.10.13 History Logging

The control panel shall have the ability to store a minimum of 400 events in a log. These events shall be stored in a battery-protected memory and shall remain in the memory until the memory is downloaded or cleared manually. Resetting of the control panel shall not clear the memory.

2.2.10.14 RS-232-C Output

Each local control panel shall be capable of operating remote service type cathode ray tubes (CRTs), printers, and/or modems. The output shall be paralleled ASCII from an EIA RS-232-C connection with a baud rate of 1200 or 2400 to allow use of any commonly available CRT, printer, or modem.

2.2.11 Remote Fire Alarm Control Units

Provide complete remote control units fully enclosed in a lockable steel enclosure as specified herein. Operations required for testing or for normal care and maintenance of the control units shall be performed from the front of the enclosure. If more than a single unit is required at a location to form a complete control panel, the unit enclosures shall match exactly. Each control unit shall provide power, supervision, control, and logic for its portion of the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. Each control unit shall be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide each unit with supervisory functions for power failure, internal component placement, and operation.

2.2.11.1 Cabinet

Install remote control unit components in cabinets large enough to accommodate components and also to allow ample gutter space for interconnection of units as well as field wiring. The enclosure shall be identified by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall be labeled "Remote Fire Alarm Control Unit" and shall not be less than one inch high. Provide prominent rigid plastic or metal identification plates for lamps, circuits, meters, fuses, and switches. The cabinet shall be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions.

2.2.11.2 Control Modules

Provide power and control modules to perform all functions of the remote control unit. Provide audible signals to indicate any alarm or trouble condition. The alarm signals shall be different from the trouble signal. Connect circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and relays, if any, on screw terminals in the remote control unit. Circuits operating at 24 VDC shall not operate at less than 21.6 volts. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage. Circuits shall be arranged so that there is 25 percent spare capacity for any circuit.

2.2.11.3 Silencing Switches

Provide an alarm silencing switch at the remote control unit which will silence the audible signal but not affect the visual alarm indicator. This switch shall be overridden upon activation of a subsequent alarm. Provide trouble and supervisory silencing switch which will silence the audible trouble and supervisory signal, but not extinguish the visual indicator. This switch shall be overridden upon activation of a subsequent trouble or supervisory signal.

2.2.11.4 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Circuits shall be manually resettable by switch from the remote control unit after the initiating device or devices have been restored to normal.

2.2.11.5 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS, or EPROMS.

2.2.11.6 Field Programmability

Provide control units that are fully field programmable for control, initiating, supervisory, and trouble functions of both input and output. The system program configuration shall be menu driven. System changes shall be password protected and shall be accomplished using personal computer based equipment.

2.2.11.7 Input/Output Modifications

Each remote control unit shall contain features which allow the elimination of input devices from the system or the modification of system outputs. Any such modifications shall indicate a trouble condition on the remote control unit, the FACP, and a printed output of the trouble condition.

2.2.11.8 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory, or trouble condition on the system still exists.

2.2.11.9 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the remote fire alarm control unit. [Install the frame in a conspicuous location observable from the remote fire alarm control unit.] The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions shall be approved by the Contracting Officer before being posted.

2.2.11.10 Walk Test

Each remote control unit shall have a walk test feature. When using this feature, operation of initiating devices shall result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated on the system printer, but no other outputs occur.

2.2.11.11 History Logging

The control panel shall have the ability to store a minimum of 400 events in a log. These events shall be stored in a battery-protected memory and shall remain in the memory until the memory is downloaded or cleared manually. Resetting of the control panel shall not clear the memory.

2.2.12 Amplifiers, Preamplifiers, Tone Generators

Any amplifiers, preamplifiers, tone generators, digitalized voice generators, and other hardware necessary for a complete, operational, textual audible

circuit conforming to NFPA 72 shall be housed in a fire alarm control unit, terminal cabinet, or in the fire alarm control panel. The system shall automatically operate and control all building fire alarm speakers except those installed in the stairs and within elevator cabs. The speakers in the stairs and elevator cabs shall operate only when the microphone is used to deliver live messages. Each amplifier shall have two channels; one to broadcast a message and the other for paging.

2.2.12.1 Construction

Amplifiers shall utilize computer grade solid state components and shall be provided with output protection devices sufficient to protect the amplifier against any transient up to 10 times the highest rated voltage in the system.

2.2.12.2 Inputs

Each system shall be equipped with separate inputs from the tone generator, digitalized voice driver and panel mounted microphone. Microphone inputs shall be of the low impedance, balanced line type. Both microphone and tone generator input shall be operational on any amplifier.

2.2.12.3 Tone Generator

The tone generator shall be of the modular, plug-in type with securely attached labels to identify the component as a tone generator and to identify the specific tone it produces. The tone generator shall produce a slow whoop tone, which shall slowly ascend from low (500 hertz) to high (1200 hertz), and shall be constantly repeated until interrupted by either the digitalized voice message, the microphone input, or the alarm silence mode as specified. Each slow whoop cycle shall last approximately 4 seconds. The tone generator shall be single channel with an automatic backup generator per channel such that failure of the primary tone generator causes the backup generator to automatically take over the functions of the failed unit and also causes transfer of the common trouble relay.

2.2.12.4 Protection Circuits

Each amplifier shall be constantly supervised for any condition which could render the amplifier inoperable at its maximum output. Failure of any component shall cause automatic transfer to a designated backup amplifier, illumination of a visual "amplifier trouble" indicator on the control panel, appropriate logging of the condition on the system printer, and other actions for trouble conditions as specified.

2.2.13 Manual Stations

Provide metal or plastic, semi-flush mounted, double action, addressable manual stations, which are not subject to operation by jarring or vibration. Stations shall be equipped with screw terminals for each conductor. Stations which require the replacement of any portion of the device after activation are not permitted. Stations shall be finished in fire-engine red with molded raised lettering operating instructions of contrasting color. The use of a key or wrench shall be required to reset the station.

2.2.14 Notification Appliances

2.2.14.1 Fire Alarm Speakers

- a. Provide fire alarm speakers conforming to **UL 464** having a minimum of three tap settings and separate terminations for each in and out connection. Tap settings shall include taps of 1/4, 1/2 and 1 watt. Speakers shall utilize the 1/2 watt tap in the system. Speakers shall have an output rating of 84 dBA at **10 feet** as determined by the reverberant room test; data on peak output as determined in an anechoic chamber is not suitable. Speakers shall be capable of installation on standard **4 inch** square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single wall mounted unit.
- b. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gage and equipped with mounting holes and other openings as needed for a complete installation. Fabrication marks and holes shall be ground and finished to provide a smooth and neat appearance for each plate. Each plate shall be primed and painted.

2.2.14.2 Visual Alarm Signals

Provide strobe light visual alarm signals which operate on a supervised 24 volt DC circuit. The strobe lens shall comply with **UL 1971** and conform to the Americans With Disabilities Act. The light pattern shall be disbursed so that it is visible above and below the strobe and from a 90 degree angle on both sides of the strobe. The strobe flash output shall be a minimum of 15 candela based on the **UL 1971** test. The strobe shall have a xenon flash tube. Visible appliances may be part of an audio-visual assembly. Where more than two appliances are located in the same room or corridor, provide synchronized operation.

2.2.14.3 Connections

Provide screw terminals for each notification appliance. Terminals shall be designed to accept the size conductors used in this project without modification.

2.2.15 Automatic Transmitters

2.2.15.1 Digital Alarm Communicator Transmitter (DACT)

Provide DACT that is compatible with the existing supervising station fire alarm system. Transmitter shall have a means to transmit alarm, supervisory, and trouble conditions via a single transmitter. Transmitter shall have a source of power for operation which conforms to **NFPA 72**. Transmitter shall be capable of initiating a test signal daily at any selected time. Transmitter shall be arranged to seize telephone circuits in accordance with **NFPA 72**.

2.2.15.2 Signals To Be Transmitted to the Base Receiving Station

The following signals shall be sent to the base receiving station:

- a. Heat detectors
- b. Manual pull stations

- c. Smoke detectors

2.3 NAMEPLATES

Major components of equipment shall have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new plate permanently affixed to the item or equipment. Major components include, but are not limited to, the following:

- a. FACPs
- b. Automatic transmitter

Furnish to obtain approval by the Contracting Officer before installation. Obtain approval by the Contracting Officer for installation locations. Nameplates shall be etched metal or plastic, permanently attached by screws to panels or adjacent walls.

2.4 WIRING

Provide wiring materials under this section as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM with the additions and modifications specified herein.

PART 3 EXECUTION

3.1 INSTALLATION OF FIRE ALARM INITIATING AND INDICATING DEVICES

- a. FACP: Locate the FACP in lobby. Surface mount the enclosure with the top of the cabinet 6 feet above the finished floor or center the cabinet at 5 feet, whichever is lower. Conductor terminations shall be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection shall be permanently mounted in the FACP.
- b. Manual Stations: Label AHU Master Shut Off. Locate manual stations where shown on the drawings. Mount stations so that their operating handles are 4 feet above the finished floor.
- c. Notification Appliance Devices: Locate notification appliance devices as required by NFPA 72. Mount assemblies on walls 80 inches above the finished floor or 6 inches below the ceiling whichever is lower. Ceiling mounted speakers shall conform to NFPA 72.
- d. Smoke and Heat Sensors: Locate sensors as required by NFPA 72 and their listings on a 4 inch mounting box. Sensors located on the ceiling shall be installed not less than 4 inches from a side wall to the near edge. Those located on the wall shall have the top of the sensor at least 4 inches below the ceiling, but not more than 12 inches below the ceiling. In raised floor spaces, the smoke sensors shall be installed to protect 225 square feet per sensor. Install smoke sensors no closer than 5 feet from air handling supply outlets.
- e. The modification of any fire alarm system and the procedures shall comply with the requirements of NFPA 241.

3.2 DISCONNECTION AND REMOVAL OF EXISTING SYSTEM

Fire alarm control panels and fire alarm devices disconnected and removed shall be turned over to the Contracting Officer.

- a. The existing fire alarm and smoke detection system shall remain in operation at all times during the installation and commissioning of the new system. Once this new system is on-line and accepted by the Government, remove the old system. As new equipment is installed, label it "NOT IN SERVICE." Upon acceptance, remove labels.
- b. Disconnect and remove the existing fire alarm and smoke detection systems where indicated and elsewhere in the specification.
- c. Properly dispose of fire alarm outlet and junction boxes, wiring, conduit, supports, and other such items.

3.3 CONNECTION OF NEW SYSTEM

The following new system connections shall be made during the last phase of construction, at the beginning of the preliminary tests. New system connections shall include:

- a. Connection of new system transmitter to existing base fire reporting system.

Once these connections are made, system shall be left energized and new audio/visual devices deactivated. Report immediately to the Contracting Officer, coordination and field problems resulting from the connection of the above components.

3.4 FIRESTOPPING

Provide firestopping for holes at conduit penetrations through floor slabs, walls, partitions, corridor walls, and vertical service shafts.

3.5 PAINTING

Paint exposed electrical, fire alarm conduit, and surface metal raceway to match adjacent finishes in exposed areas. Paint junction boxes, conduit, and surface metal raceways red in unfinished areas.

3.6 FIELD QUALITY CONTROL

3.6.1 Tests

- a. Megger Tests: After wiring has been installed, and prior to making any connections to panels or devices, wiring shall be megger tested for insulation resistance, grounds, and/or shorts. Conductors with 300 volt rated insulation shall be tested at a minimum of 250 VDC. Conductors with 600 volt rated insulation shall be tested at a minimum of 500 VDC. The tests shall be witnessed by the Contracting Officer and test results recorded for use at the final acceptance test.
- b. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by the Contracting Officer and test results recorded for use at the final acceptance test.

- c. Preliminary Testing: Conduct preliminary tests to ensure that devices and circuits are functioning properly. Tests shall meet the requirements of paragraph entitled "Minimum System Tests." After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that panel functions were tested and operated properly. The letter shall include the names and titles of the witnesses to the preliminary tests. The Contractor and an authorized representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.
- d. Request for Formal Inspection and Tests: When tests have been completed and corrections made, submit a signed, dated certificate with a request for formal inspection and tests to the Contracting Officer.
- e. Final Testing: Notify the Contracting Officer in writing when the system is ready for final acceptance testing. Submit request for test at least 15 calendar days prior to the test date. A final acceptance test will not be scheduled until the operation and maintenance (O&M) manuals are furnished to the Contracting Officer and the following are provided at the job site:
 - (1) The systems manufacturer's technical representative
 - (2) Marked-up red line drawings of the system as actually installed
 - (3) Megger test results
 - (4) Loop resistance test results
 - (5) Complete program printout including input/output addresses

The final tests shall be witnessed by the Camp Lejeune Fire Protection Engineer. At this time, any and all required tests shall be repeated at their discretion. Following acceptance of the system, as-built drawings and O&M manuals shall be delivered to the Contracting Officer for review and acceptance. In existing buildings, the transfer of devices from the existing system to the new system and the permission to begin demolition of the old fire alarm system will not be permitted until the as-built drawings and O&M manuals are received.

3.6.2 Minimum System Tests

Test the system in accordance with the procedures outlined in [NFPA 72](#). The required tests are as follows:

- a. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final system test.
- b. Verify that the control unit is in the normal condition as detailed in the manufacturer's O&M manual.
- c. Test each initiating and indicating device and circuit for proper operation and response at the control unit. Smoke sensors shall be tested in accordance with manufacturer's recommended calibrated test

method. Testing of duct smoke detectors shall comply with the requirements of NFPA 72.

- d. Test the system for specified functions in accordance with the contract drawings and specifications and the manufacturer's O&M manual.
- e. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.
- f. Determine that the system is operable under trouble conditions as specified.
- g. Visually inspect wiring.
- h. Test the battery charger and batteries.
- i. Verify that software control and data files have been entered or programmed into the FACP. Hard copy records of the software shall be provided to the Contracting Officer.
- j. Verify that red-line drawings are accurate.
- k. Measure the current in circuits to ensure there is the calculated spare capacity for the circuits.
- l. Measure voltage readings for circuits to ensure that voltage drop is not excessive.
- m. Disconnect the verification feature for smoke sensors during tests to minimize the amount of smoke needed to activate the sensor. Testing of smoke sensors shall be conducted using real smoke. The use of canned smoke is prohibited.
- n. Measure the voltage drop at the most remote appliance on each notification appliance circuit.

3.7 INSTRUCTION OF GOVERNMENT EMPLOYEES

3.7.1 Instructor

Include in the project the services of an instructor, who shall have received specific training from the manufacturer for the training of other persons regarding the inspection, testing, and maintenance of the system provided. The instructor shall train the Government employees designated by the Contracting Officer, in the care, adjustment, maintenance, and operation of the fire alarm and fire detection system.

3.7.2 Qualifications

Each instructor shall be thoroughly familiar with all parts of this installation. The instructor shall be trained in operating theory as well as in practical O&M work.

3.7.3 Required Instruction Time

Provide 16 hours of instruction after final acceptance of the system. The instruction shall be given during regular working hours on such dates and

times as are selected by the Contracting Officer. The instruction may be divided into two or more periods at the discretion of the Contracting Officer. The training shall allow for rescheduling for unforeseen maintenance and/or fire department responses.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Amendment						CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY						
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
		28 31 63	SD-02 Shop Drawings														
			Battery power calculations	1.5.1													
			SD-03 Product Data														
			Fire alarm control panel (FACP)	2.2.10													
			Printers														
			video display unit (VDU)														
			Terminal cabinets	2.2.9.2													
			Manual stations	2.2.13													
			Transmitters														
			Batteries	2.2.8.1													
			Battery chargers	2.2.8.3													
			Smoke sensors	2.2.5													
			Thermal sensors	2.2.6													
			Wiring	2.2.9.3													
			Wiring	2.4													
			Notification appliances	2.2.14													
			Addressable interface devices	2.2.4													
			Amplifiers	2.2.12													
			Tone generators	2.2.12													
			Digitalized voice generators	2.2.12													
			Smoke sensor testing procedures	2.2.5.2													
			Digital alarm communicator transmitter (DACT)	2.2.15.1													
			SD-07 Certificates														
			Qualifications of installer	1.5.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION							CONTRACTOR											
Amendment							CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY						REMARKS
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																	(a)	
		28 31 63	SD-10 Operation and Maintenance Data															
			INTERIOR FIRE ALARM SYSTEM	2.2														
			Record drawing software	1.5.3														