SECTION 28 46 00
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Transmitters for communication with supervising station.

C. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

1.03 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping: Materials and methods for work to be performed by this installer.

B. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Supervisory, alarm, and actuating devices installed in sprinkler system.

1.04 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

D. NFPA 3 - Recommended Practice for Commissioning of Fire Protection and Life Safety Systems; 2015.

E. NFPA 4 - Standard for Integrated Fire Protection and Life Safety System Testing; 2015.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

H. UL 268 - Standard for Smoke Detectors for Fire Alarm Systems; Current Edition, Including All Revisions.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Proposal Documents: Submit the following with cost/time proposal:
   1. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   2. Manufacturer's detailed data sheet for each control unit, initiating device, and notification appliance.
   3. Certification by Contractor that the system design will comply with Contract Documents.
   4. Proposed maintenance contract.

C. Drawings must be prepared using AutoCAD Release 2002 or newer.

D. Evidence of designer qualifications.

E. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction as well as compliance with contract documents, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.

3. Shop Drawings:
   a. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A.14.6.2.4, and complete listing of software required.
   b. System zone boundaries and interfaces to fire safety systems.
   c. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.Plans shall show the addess for addessable devices.
   d. Circuit and conduit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
      1) Calculation method shall be shown including wire size and values used.
      2) Calculation shall be Lump Sum at the end of the circuit or Point to Point. Load Centering shall not be used.
   e. List of all devices on each signaling line circuit, with spare capacity indicated.
4. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
   a. Information to include: Model numbers, listing, ratings, and power requirements.
   b. Product cut sheets, calculations, certificates, etc. shall be submitted in a bound format or a single electronic document (such as PDF), shall be tabbed in a logical manner, and shall contain the information indicated.
   c. Voltage Drop Calculations - Duplicate on drawings
      1) Use methods specified in NFPA 72.
      2) Voltage drop calculations shall start at 85% of nominal voltage, i.e. a 24VDC system shall be calculated as starting at 20.4VDC.
      3) Circuit voltage not to drop below 16 VDC or the UL listed minimum voltage for device powered, whichever is higher.
      4) Device current to be based on UL listed minimum voltage.
      5) Circuit resistance shall include wire length out to last device and back to panel, including elevation changes.
      6) Calculation method shall be shown including wire size and values used.
      7) Calculation shall be Lump Sum at the end of the circuit or Point to Point. Load Centering shall not be used.
   d. Battery calculations - Duplicate on drawings
      1) Use methods specified in NFPA 72.
      2) A minimum 20% safety factor to the calculated Amp-Hours shall be provided.
5. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
6. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
7. Certification by Contractor that the system design complies with Contract Documents.
8. Do not show existing components to be removed.
9. Incomplete submittals or submittals that do not comply with these specifications may be rejected without a review.

F. Evidence of installer qualifications.

G. Evidence of instructor qualifications; training lesson plan outline.

H. Evidence of maintenance contractor qualifications, if different from installer.

I. Inspection and Test Reports:
   1. Submit inspection and test plan prior to closeout demonstration.
   2. Submit documentation of satisfactory inspections and tests.
   3. Submit NFPA 72 "Inspection and Test Form," filled out.

J. Operating and Maintenance Data: See Section 01 78 00 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:

1. Original copy of NFPA 72 with portions that are not relevant to this project neatly crossed out by hand; label with project name and date.
2. Complete set of specified design documents, as approved by authority having jurisdiction.
3. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
4. Contact information for firm that will be providing contract maintenance and trouble call-back service.
5. List of recommended spare parts, tools, and instruments for testing.
6. Replacement parts list with current prices, and source of supply.
7. Detailed troubleshooting guide and large scale input/output matrix.
8. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
9. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

K. Project Record Documents: See Section 01 78 00 for additional requirements; have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
2. "As installed" wiring and schematic diagrams, with final terminal identifications.
3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

L. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.
3. Maintenance contract.

M. Maintenance Materials, Tools, and Software: Furnish the following for Owner's use in maintenance of project.
1. Furnish spare parts of same manufacturer and model as those installed; deliver in original packaging, labeled in same manner as in operating and maintenance data and place in spare parts cabinet.
2. In addition to the items in quantities indicated in PART 2, furnish the following:
a. All tools, software, and documentation necessary to modify the fire alarm system using Owner's personnel; minimum modification capability to include addition and deletion of devices, circuits, and zones, and changes to system description, operation, and evacuation and instructional messages.
b. One copy, on CD-ROM and one copy on USB flash drive, of all software not resident in read-only-memory.

1.06 QUALITY ASSURANCE

A. Copies of Design Criteria Documents: Maintain at the project site for the duration of the project, bound together, an original copy of NFPA 72, the relevant portions of applicable codes, and instructions and guidelines of authorities having jurisdiction; deliver to Owner upon completion.

B. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

C. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.

1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
   a. Demonstrated qualifications through written assessment of at least NICET level II, or AE approved equivalent. This includes individuals installing conduit, boxes, or wire for fire alarm devices.
3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
4. Contract maintenance office located within ___ miles (100 km) of project site.
5. Certified in the State in which the Project is located as fire alarm installer.

D. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.

E. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

C. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units and Accessories - Basis of Design: Honeywell.

B. Fire Alarm Control Units and Accessories - Other Acceptable Manufacturers:

C. Initiating Devices and Notification Appliances:
1. System Sensor.
2. Same manufacturer as control units.

D. Substitutions: See Section 01 60 00 - Product Requirements.
1. For other acceptable manufacturers of control units specified, submit product data showing equivalent features and compliance with Contract Documents.
2. For substitution of products by manufacturers not listed, submit product data showing features and certification by Contractor that the design will comply with Contract Documents.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
2. Provide all labor to complete required work.
3. Protected Premises: Entire building shown on drawings.
4. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
   a. ADA Standards.
   b. The requirements of the local authority having jurisdiction, which is State Fire Marshall.
   c. Applicable local codes.

d. Contract Documents (drawings and specifications).
e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.

5. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
6. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
7. Program notification zones and voice messages as directed by Owner.
8. Hearing Impaired Occupants: Provide visible notification devices in all public areas and in dwelling units.
   a. This shall include, but not be limited to, all public restrooms, break rooms, exam rooms, fitting rooms, work rooms, conference rooms, open office areas, and corridors.
9. Fire Command Center: Location indicated on drawings.
10. Fire Alarm Control Unit: Existing,unknown location.

B. Supervising Stations and Fire Department Connections:
   1. Public Fire Department Notification: By on-premises supervising station.
   2. On-Premises Supervising Station: Existing proprietary station operated by Owner, located at remote.
   3. Remote Supervising Station: UL-listed central station under contract to facility.
   4. Means of Transmission to On-Premises Supervising Station: Directly connected noncoded system.
   5. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.

C. Circuits:
   1. Signaling Line Circuits (SLC) Within Single Building: Class B.
   2. Signaling Line Circuits (SLC) Between Buildings: Class A.
   3. Notification Appliance Circuits (NAC): Class B.

D. Spare Capacity:
   1. Fire Alarm Control Units: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.

E. Power Sources:
   1. Primary: Dedicated branch circuits of the facility power distribution system.
   2. Secondary: Storage batteries.
   3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
   4. Unless noted otherwise on the plans, power booster panels (NAC) shall not be fed from a separate notification power booster panel (daisy chained). Each NAC shall be triggered by a SLC circuit.

F. Guards for Protection of Components
   1. Description: Welded wire mesh or polycarbonate of size and shape for the manual station, smoke detector, strobe, or other device requiring protection.
      a. Factory fabricated and furnished by manufacturer of the device.
      b. Finish: Clear, or paint of color to match the protected device.
      c. Listed components of Safety Technology International Incorporated may be used with applicable de-ratings for strobes, horns, etc.

2.03 EXISTING COMPONENTS

A. Existing Fire Alarm System: Remove existing components indicated and incorporate remaining components into new system, under warranty as if they were new; do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.

B. On-Premises Supervising Station: Include as part of this work all modifications necessary to existing supervising station to accommodate new fire alarm work.

C. Clearly label components that are "Not In Service."

D. Remove unused existing components and materials from site and dispose of properly.

2.04 FIRE SAFETY SYSTEMS INTERFACES

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
1. Sprinkler water control valves.
2. Duct smoke detectors.
3. Dry-pipe sprinkler system pressure.
4. Dry-pipe sprinkler valve room low temperature.

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
1. Sprinkler water flow.
2. Smoke Detector(s)
3. Manual Pull Stations

2.05 COMPONENTS

A. General:
1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
3. Provide legible, permanent labels for each addressable device, using address used in control panel.

B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.

C. Master Control Unit: As specified for Basis of Design above, or equivalent.

D. Initiating Devices:
1. Addressable Systems:
a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.
2. Manual Pull Stations: Double Action.
3. Beam-Type Smoke Detector: Each detector shall consist of a separate transmitter and receiver, and shall have the following features:
a. UL 268 listed, operating at 24-V dc, nominal.
b. Detector must use separate UV/IR beams for smoke verification.
c. Trouble signal delay, fixed at 20 seconds.
d. Separate Color-Coded LEDs: Indicate normal, alarm, and trouble status.

E. Notification Appliances:
1. Horn/Strobes White Trim Clear Strobe.
a. Selectable candela with candela visible when installed.
2. Strobes: White Trim Clear Strobe.
a. Selectable candela with candela visible when installed.

F. Conduit:
1. Install all wiring in a conduit or raceway. Conduit fill shall not exceed 40 percent of the interior cross sectional area where three or more cables are included within a single conduit.
2. Install conduit in accordance with the National Electrical Code, NFPA 70.
3. Conduit shall be 3/4 inch minimum.

4. Wiring for low voltage control, alarm notification, emergency communication, and similar power-limited auxiliary functions may be installed in the same conduit as initiating and signaling line circuits. Design system to permit simultaneous operation of all circuits without interference or loss of signals.
5. Fire Alarm Conduit: All fire alarm wiring shall be in hot-galvanized electric metalic tubing colored RED from the factory.
    a. Junction covers shall be painted red and labeled "Fire Alarm".
    b. Fire alarm conduit shall have the wording "Fire Alarm" factory stamped onto each 10' section of conduit. If conduit is to be exposed in a finished area, see criteria below.
    c. If conduit is to be ran in an area with finished exposed ceiling spaces, consult with architect engineer for appropriate conduit and junction box color to match other equipment.
6. Conduits shall not enter the control panel or any other component provided except where entry is specified by the manufacturer.

G. Wire:
1. All fire alarm system wiring shall be new.
2. Wiring shall comply with local, state, and national codes and as recommended by the manufacturer. Number and size of conductors shall be as recommended by the manufacturer, but shall be not less than 18 AWG for initiating device and signaling line circuits, and 16 AWG for notification appliance circuits.
3. All wiring and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. FPLP red cable shall be used for all interior fire alarm circuits including that in conduit.
5. Any wire that goes underground, such as to PIV switches or to other buildings, shall be listed and approved for wet locations in accordance with NFPA 70.
6. All field wiring shall be supervised for open circuits, short circuits, and grounded conditions.

H. Control Panel: Connected to a separate dedicated branch circuit with a separate dedicated disconnect switch; circuit labeled FIRE ALARM.

I. Circuit Conductors: Copper or optical fiber; provide 200 feet (60 m) extra; color code and label.

J. Wiring runs shall be tested for continuity, short circuits and grounds before any system devices are installed or energized.

K. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.

L. Locks and Keys: Deliver keys to Owner.

M. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
2. Provide one for each control unit where operations are to be performed.
3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain Owner's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. The contractor is responsible for testing all components in accordance with the manufacturers required and suggested procedures and in accordance with NFPA 72. If this specification incorporates a detailed Acceptance Test Procedure (ATP) prepared by the engineer than it shall also be followed.

B. Every fire alarm system shall be pre-tested by the contractor prior to scheduleing any inspections by the architect engineer, owner, or local jurisdictions. Testing shall comply with this section and NFPA 72.

C. Notify Owner 7 days prior to beginning completion inspections and tests.

D. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
   1. A signed Record of Completion shall be provided to the inspector prior to their inspection.

E. Provide the service of a competent, factory-trained technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.

F. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

G. Provide all tools, software, and supplies required to accomplish inspection and testing.

H. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

I. All smoke detectors shall be tested using canned smoke, or other approved method that will functionally test the smoke chamber. The use of magnets to commission smoke detectors is strictly prohibited.

J. Smoke detectors shall not be installed until the construction cleanup of all trades is complete per NFPA 72 and this section.
   1. Orange shipping covers, rubber gloves, tape, or other devices shall not be used to try and get around these basic requirements.
   2. Smoke detectors installed before the clean-up of all other dust or particle producing trades and without prior written approval of the engineer and local AHJ shall be replaced at the sole expense of the installing contractor.
   3. AE reserves the right to permanantly and indelibly mark any detector installed this way.
   4. Contractor is urged to use marked, temporary detectors for pre-testing of system and replace with new detectors prior to final testing.

K. All new smoke detectors that show to be "Dirty" through system sensitivity shall be replaced.

L. Audibility testing shall not be conducted until all doors, windows, walls, ceilings, and carpeting are in place. Final audibility testing that does not affect speaker placement should be done after space is fully furnished.

M. At a minimum the following tests shall be conducted, documented and given to AE at closeout:
   1. Open initiating device circuits and verify that the trouble signal actuates.
   2. Open and short signaling line circuits and verify that the trouble signal actuates.
   3. Open and short Notification Appliance Circuits and verify that trouble signal actuates.
   4. Ground all circuits and verify response of trouble signals.
   5. Check presence and audibility of tone throughout building spaces. This includes measuring dBA levels.
      a. A minimum of 15 dBA above ambient shall be obtained in every occupiable space (throughout) per NFPA 72. This includes storage rooms, electrical rooms, telephone rooms, and any other occupiable space.
   6. Each of the alarm, trouble, or supervisory conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

7. Each notification circuit shall be tested under standby power. End-of-line voltage readings shall be taken at the end-of-line resistor for Class “B” circuits, or at the booster panel for Class “A” circuits. Circuit voltage drop shall be recorded and compared to calculated voltage drop. Note: Some systems incorporating synchronizing modules can impair results. If the module cannot be bypassed for voltage readings, the manufacturer should be contacted for guidance.
8. System off-site reporting shall be verified for alarm, supervisory, trouble, correct address, facility name, contact phone number, and contact name.
9. When the system is equipped with optional features or connected to external, non-fire devices, the manufacturer's manual should be consulted to determine the proper testing procedures.

N. The commissioning inspector shall use the system record drawings and other documents specified under this specification during the testing procedure to verify operation as programmed. In conducting the commissioning test, the inspector shall request demonstration of any or all input and output functions.

O. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

P. Diagnostic Period: After successful completion of inspections and tests, Operate system in normal mode for at least 14 days without any system or equipment malfunctions.
1. Record all system operations and malfunctions.
2. If a malfunction occurs, start diagnostic period over after correction of malfunction.
3. At end of successful diagnostic period, fill out and submit NFPA 72 "Inspection and Testing Form."

3.03 OWNER PERSONNEL INSTRUCTION

A. Provide the following instruction to designated Owner personnel:
1. Hands-On Instruction: On-site, using operational system.

B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
1. Initial Training: 1 session pre-closeout.

C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
1. Initial Training: 1 session pre-closeout.

D. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

3.04 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
1. Be prepared to conduct any of the required tests.
2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
3. Have authorized technical representative of control unit manufacturer present during demonstration.
4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
5. Repeat demonstration until successful.

3.05 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. Provide to Owner, a proposal as an alternate to the base bid, for a maintenance contract for entire warranty period, to include the work described below; include the total cost of contract, proposal to be valid at least until 30 days after date of Substantial Completion.

C. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
   1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
   2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
   3. Record keeping required by NFPA 72 and authorities having jurisdiction.

D. Provide trouble call-back service upon notification by Owner:
   1. Provide on-site response within 2 hours of notification.
   2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
   3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

E. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

F. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.

G. Comply with Owner's requirements for access to facility and security.

3.06 SYSTEM TESTING GUARANTEE AND ADDITIONAL FEES

A. Pre-Testing and Commissioning is vital to the performance and compliance of Life-Safety systems. Fire Protection and Life-Safety systems shall be successfully tested and commissioned prior to turning the system(s) over to the Owner.

B. If a commissioning test for an AHJ, Owner, or Architect has been scheduled and is cancelled without sufficient notice to modify a travel schedule without financial penalties, or the system fails to pass all requirements of this specification resulting in a re-inspection, the AHJ, Owner, and/or Architect reserves the right to bill the Contractor for expenses incurred as a result thereof. Such expenses may include travel, transportation, lodging, meals, and daily wages. Daily wages shall not exceed $1200 per day.

END OF SECTION