

Addendum #2 – SHASCOM Remodel
March 5, 2009

1. As I said before, any information I related about the scope or specifications verbally to you at the “walk-through” or in any other way should not be counted as the absolute. As I stated at that meeting, I am a novice at project management when it comes to construction, and I cannot navigate my way around the plans or specifications very well. Please read the specifications, project scope and other items detailed on the plans that are online or available at Ellis Art and Engineering, 2030 Market St., Redding, CA 96001, 244-4417. I have had some potential bidders ask questions that indicate that they may not understand the scope of the HVAC (there is much duct and electrical work outside of the “two rooms”). Also, a protection plan for existing equipment and maintaining constant delivery of electrical services is critical to a bid. Your ability to protect our equipment is the only item not noted on the plans, but is listed in our documents otherwise. Again, it is your responsibility to review the plans from the architect in order to determine scope, specifications and all details for your bid.
2. This morning, the architect was able to provide more info to me regarding the specs for fire suppression, and I have attached them to this document. They will also be posted to our website.
3. I have attached an updated list of attendees to our “walk-thru” meeting with corrected E-Mail info.
4. I am again sending photos of the roof area at this time, in case you missed them.
5. Some bidders have come in and looked at the rooms affected again. Since I have allowed one bidder in, I will allow all. I will allow at least one more inspection of the work areas for those that need one. Please contact me at 530-245-6505, or our Systems Administrator, Kathy Galey at 530-245-6526 to arrange an inspection. One of us will need to escort you, and we will work out times for you.
6. The roof was installed by Harbert Roofing, 8865 Airport Rd., Redding, CA 96002, 530-223-3251, and they hold the existing warranty for the roof.
7. The Fire Suppression system may either activate in both rooms simultaneously, (regardless of location of the sensor activation) or may activate in the room with the active sensor only – your choice.
8. While the document I sent this morning talks of a specific brand, an equivalent system or systems that is another brand or type, and meets all the requirements listed is acceptable.

The following pages titled (CLEAN AGENT FIRE SUPPRESSION) detail the specifications for that system.

START SECTION

SECTION 13966 – CLEAN AGENT FIRE SUPPRESSION

PART 1 – GENERAL

1.1 SCOPE

- A. This specification outlines the requirements for a "Total Flood" Clean Agent Fire Suppression System with automatic detection and control. The work described in this specification includes all engineering, labor, materials, equipment and service necessary, and required, to complete and test the suppression system.

1.2 APPLICABLE STANDARDS AND PUBLICATIONS

- A. The design, equipment, installation, testing and maintenance of the Clean Agent Suppression System shall be in accordance with the applicable requirements set forth in the latest edition of the following codes and standards:
 - 1. NFPA 2001 Clean Agent Fire Extinguishing Systems
 - 2. NFPA 70 National Electric Code
 - 3. NFPA 72 National Fire Alarm Code
 - 4. Factory Mutual Systems (FM) Publications
 - 5. Factory Mutual Approval Guide
 - 6. Underwriters Laboratories, Inc. (UL) Publication Fire Protection Equipment Directory with quarterly supplements
 - 7. National Electrical Manufacturers Association (NEMA) Publication Enclosures for Industrial Controls and Systems
 - 8. U.S. Environmental Protection Agency, Protection of Stratospheric Ozone 59 FR 13044 (SNAP)
 - 9. Requirements of the Authority Having Jurisdiction (AHJ), State and Local codes in force at time of award of contract.
- B. The standards listed, as well as all other applicable codes, standards, and good engineering practices, shall be used as "minimum" design standards.

1.3 REQUIREMENTS

A. QUALITY ASSURANCE

- 1. The manufacturer of the suppression system hardware and detection components shall be ISO 9001 registered.
- 2. The name of the manufacturer shall appear on all major components.
- 3. All devices, components, and equipment shall be the products of the same manufacturer, or supplied by the same manufacturer.

4. All devices, components, and equipment shall be new, standard products of the manufacturer's latest design and suitable to perform the functions intended.
5. All devices and equipment shall be UL listed and/or FM approved.
6. Locks for all cabinets shall be keyed alike.

1.4 INSTALLER

1. Contractor shall be trained by the supplier to design, install, test, and maintain fire suppression systems.
2. The installing contractor shall be an experienced firm regularly engaged in the installation of automatic clean agent, or similar, fire suppression systems, in strict accordance with all applicable codes and standards.
3. The installing contractor must have a minimum of five (5) years experience in the design, installation, and testing, of clean agent, or similar fire suppression systems. A list of systems of a similar nature and scope shall be provided on request.

1.5 SUBMITTALS

1. The installing contractor shall submit the following design information and drawings for approval prior to starting work on this project.
2. Field installation layout drawings detailing the location of all agent storage tanks, nozzles, pipe runs, including pipe sizes and lengths, control panel(s), detectors, manual pull stations, abort stations, audible and visual alarms, etc.
3. Auxiliary details and information such as maintenance panels, door holders, special sealing requirements, and equipment shutdown.
4. Electrical layout drawings shall show the location of all devices and include point-to-point conduit runs and a description of the method(s) used for detector mounting.
5. Provide an internal control panel wiring diagram which shall include power supply requirements and field wiring termination points.
6. Separate drawing providing symbol legend and identifying all symbols used.
7. Annunciator wiring schematics and dimensioned display panel illustration shall be provided.
8. Complete hydraulic flow calculations, from a UL listed computer program, shall be provided for all engineered clean agent systems. Calculation sheet(s) must include the manufacturer's name and UL listing number for verification. The individual sections of pipe and each fitting to be used, as shown on the isometrics, must be identified and included in the calculation. Total agent discharge time must be shown and detailed by zone.
9. A complete sequence of operation shall be submitted detailing all alarm devices, shutdown functions, remote signaling, time delay, and agent discharge for each zone or system.
10. Submit drawings, calculations and system component sheets for approval to the local fire prevention agency, owner's insurance underwriter, and all other authorities having jurisdiction before starting installation.

1.6 SYSTEM REQUIREMENTS

1. The system shall be a Total Flood SAPPHIRE Fire Suppression System supplied by ANSUL INCORPORATED.
2. The system shall provide a 3M Novec 1230 minimum design concentration of 4.2% by volume for Class A hazards and a minimum of 5.85% by volume for Class B hazards in

all areas and/or protected spaces, at the minimum anticipated temperature within the protected area. System design shall not exceed 10% for normally occupied spaces, adjusted for maximum space temperature anticipated, with provisions for room evacuation before agent release.

3. The system shall be complete in all ways. It shall include a mechanical and electrical installation, all detection and control equipment, agent storage containers, Novec 1230 agent, discharge nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, alarm interface, advisory signs, functional checkout and testing, training and any other operations necessary for a functional UL listed SAPPHIRE Clean Agent suppression system.
4. The owner shall be responsible for sealing and securing the protected spaces against agent loss and/or leakage during the 10-minute "hold" period.
5. The system(s) shall be actuated by a combination of ionization and photoelectric detectors installed for maximum area coverage of 250 sq. ft. (23.2 m) per detector, in both the room, under floor and above ceiling protected spaces. If the airflow is one air change per minute, photoelectric detectors only shall be installed for maximum area coverage of 125 sq. ft. (11.6 m) per detector. (Ref. NFPA No. 72.)
6. Detectors shall be Cross-Zoned detection requiring two detectors to be in alarm before release.
7. Automatic operation of each protected area shall be as follows:
 - a. Actuation of one (1) detector, within the system.
 - b. Illuminate the "ALARM" lamp on the control panel face.
 - c. Energize an alarm bell.
 - d. Transfer auxiliary contacts, which can perform auxiliary system functions such as: Operate door holder/closures on access doors; Transmit a signal to a fire alarm system.
 - e. Light an individual lamp on an optional annunciator.
9. Actuation of a 2nd detector, within the system, shall:
 - a. Illuminate the "PRE-DISCHARGE" lamp on the control panel face.
 - b. Energize a pre-discharge horn/strobe device.
 - c. Start time-delay sequence (not to exceed 60 seconds).
 - d. System abort sequence is enabled at this time.
 - e. Light an individual lamp on an optional annunciator.
10. After completion of the time-delay sequence, the SAPPHIRE Clean Agent system shall discharge and the following shall occur:
 - a. Illuminate a "SYSTEM FIRED" lamp on the control panel face.
 - b. Shutdown of all power to high-voltage equipment.
 - c. Energize a visual indicator(s) outside the hazard in which the discharge occurred.
 - d. Energize a "System Fired" audible device.
11. The system shall be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall duplicate the sequence description above except that the time delay and abort functions shall be bypassed. The manual

discharge station shall be of the electrical actuation type and shall be supervised at the main control panel.

PART 2 - MATERIALS

2.1 GENERAL REQUIREMENTS

- A. The SAPPHIRE Clean Agent system materials and equipment shall be standard products of the supplier's latest design and suitable to perform all functions intended. When one or more pieces of equipment must perform the same function(s), they shall be duplicates produced by one manufacturer.
1. All devices and equipment shall be U.L. Listed and/or FM approved.
 2. Each system shall have its own supply of clean agent.
 3. The system design can be modular, central storage, or a combination of both design criteria.
 4. Systems shall be designed in accordance with the manufacturer's guidelines.
 5. Each supply shall be located within the hazard area, or as near as possible, to reduce the amount of pipe and fittings required to install the system.
 6. The clean agent shall be stored in SAPPHIRE Clean Agent storage tanks. Tanks shall be super-pressurized with dry nitrogen to an operating pressure of 360 psi @ 70 °F (24.8 bar at 21 °C). Tanks shall be of high-strength low alloy steel construction and conforming to NFPA 2001.
 7. Tanks (master) shall be actuated by either a resettable electric actuator or by pneumatic means from a nitrogen cartridge located in the releasing device. Explosive devices shall not be permitted.
 8. Each tank shall have a pressure gauge and low pressure switch (optional) to provide visual and electrical supervision of the container pressure. The low-pressure switch shall be wired to the control panel to provide audible and visual "Trouble" alarms in the event the container pressure drops below 290 psi (20 bar). The pressure gauge shall be color coded to provide an easy, visual indication of container pressure.
 9. Tanks shall have a pressure relief provision that automatically operates before the internal nominal pressure exceeds 730 psi (50 bar).
 10. Engineered discharge nozzles shall be provided within the manufacturer's guidelines to distribute the Novec 1230 agent throughout the protected spaces. The nozzles shall be designed to provide proper agent quantity and distribution. Nozzles shall be available in 1/2 in. through 2 in. pipe sizes. Each size shall be available in 180° and 360° distribution patterns.
 11. Distribution piping and fittings shall be installed in accordance with the manufacturer's requirements, NFPA 2001, and approved piping standards and guidelines. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures. All piping shall be adequately supported and anchored at all directional changes and nozzle locations.
 12. All piping shall be reamed, blown clear and swabbed with suitable solvents to remove burrs, mill varnish and cutting oils before assembly.
 13. All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male thread only.

2.2 AGENT

1. The fire suppression agent shall be 3M™ Novec™ 1230 Fire Protection Fluid manufactured by 3M Company, St. Paul, MN or their approved supplier.
2. Agent shall not contain any Hydrofluorocarbons (HFC).

2.3 CONTROL PANEL

1. The control panel shall be an AUTOPULSE releasing panel supplied by ANSUL INCORPORATED.
2. The detection control system and its components shall be UL listed and FM approved for use as a local fire alarm system with releasing device service.
3. The control system shall perform all functions necessary to operate the system detection, actuation, and auxiliary functions.
4. The control system shall include battery standby power to support 24 hours in standby and 5 minutes in alarm.
5. The control system shall be microprocessor based, utilizing a distributed processing concept. A single microprocessor failure shall not impact operation of additional modules in the system.
6. The control system shall be capable of supporting Cross Zoned Detection.
7. The control system shall supply integrated 2.0 amp (minimum) power supply circuitry.
8. Each control system shall contain four (4) initiating circuits:
 - a. Each circuit shall be capable of Class A (Style D) or Class B (Style A) operation.
 - b. Each circuit shall be capable of operating up to fifteen (15) approved detectors or thirty (30) detectors per system.
 - c. Each circuit shall be capable of monitoring contact devices configured for manual release, manual alarm, system abort, trouble input or auxiliary (non-fire) input.
9. Each control system shall contain release circuits for activation of a fire suppression system(s):
 - a. Each circuit shall be capable of Class B (Style Y) operation.
 - b. Each circuit shall be rated for a minimum of 1.5 amp @ 24 VDC.
10. Each control system shall contain two (2) indicating appliance circuits for annunciation:
 - a. Each circuit shall be capable of Class A (Style B) or Class B (Style Y) operation.
 - b. Each circuit shall be rated for a minimum of 1.5 amp @ 24 VDC.
11. Each control system shall provide an auxiliary power supply rated for 2 amps @ 24 VDC.
12. Each control system shall provide two (2) SPST relays: one for common alarm and one for common trouble. Four (4) additional programmable relays can be added to each control system by adding a relay module.

2.4 DETECTORS

1. The detectors shall be spaced and installed in accordance with the manufacturer's specifications and the guidelines of NFPA 72.
2. The ionization detector shall be an Ansul model.
3. The photoelectric detector shall be an Ansul model.

2.5 MANUAL RELEASE (Electric)

1. The electric manual release shall be a dual action device which provides a means of manually discharging the suppression system when used in conjunction with the detection system.
2. The manual release shall be an Ansul model.
3. The manual release manual pull station shall be a dual action device requiring two distinct operations to initiate a system actuation.

4. Manual actuation shall bypass the time delay and abort functions and shall cause all release and shutdown devices to operate in the same manner as if the system had operated automatically.
5. Manual release shall be located at each exit from the protected hazard.

2.6 ABORT STATION

1. The abort station shall be the "Dead Man" type and shall be located next to each manual release.
2. The abort station shall be an Ansul model.
3. The abort station shall be supervised and shall indicate a trouble condition at the control panel, if depressed, and no alarm condition exists.
4. "Locking" or "Keyed" abort stations shall not be permitted.

2.7 AUDIBLE and VISUAL ALARMS

1. Alarm audible and visual signal devices shall operate from the control panel.
2. The alarm bell, alarm horn, and horn strobe devices shall be an Ansul model.
3. The visual alarm unit shall be an Ansul strobe device.
4. A strobe device shall be placed outside, and above, each exit door from the protected space. Provide an advisory sign at each light location.

2.8 CAUTION and ADVISORY SIGNS

1. Signs shall be provided to comply with NFPA 2001 and the recommendations of the SAPPHIRE equipment provider.
2. Entrance sign: (1) required at each entrance to a protected space.
3. Manual discharge sign: (1) required at each manual release station.
4. Flashing light sign: (1) required at each flashing light over each exit from a protected space.

2.9 SYSTEM and CONTROL WIRING

1. All system wiring including electrical power shall be furnished and installed by the contractor.
2. All wiring shall be installed in electrical metallic tubing (EMT), or conduit, and must be installed and kept separate from all other building wiring.
3. All system components shall be securely supported independent of the wiring. Runs of conduit and wiring shall be straight, neatly arranged, properly supported, and installed parallel and perpendicular to walls and partitions.
4. The sizes of the conductors shall be those specified by the manufacturer. Color-coded wire shall be used. All wires shall be tagged at all junction points and shall be free from shorts, earth connections (unless so noted on the system drawings), and crosses between conductors. Final terminations between the control panel and the system field wiring shall be made under the direct supervision of a factory-trained representative.
5. All wiring shall be installed by qualified individuals, in a neat and workmanlike manner, to conform to the National Electrical Code, Article 725 and Article 760, except as

otherwise permitted for limited energy circuits, as described in NFPA 72. Wiring installation shall meet all local, state, province, and/or country codes.

6. The complete system electrical installation and all auxiliary components shall be connected to earth ground in accordance with the National Electrical Code.

PART 3 – INSTALLATION

3.1 SYSTEM INSPECTION and CHECKOUT

1. After the system installation has been completed, the entire system shall be checked out, inspected, and functionally tested by qualified, trained personnel, in accordance with the manufacturer's recommended procedures and NFPA standards.
2. All containers and distribution piping shall be checked for proper mounting and installation.
3. All electrical wiring shall be tested for proper connection, continuity and resistance to earth.
4. The complete system shall be functionally tested, in the presence of the owner or his representative, and all functions, including system and equipment interlocks, must be operational at least five (5) days prior to the final acceptance tests.
5. Each detector shall be tested in accordance with the manufacturer's recommended procedures and test values recorded.
6. All system and equipment interlocks, such as door release devices, audible and visual devices, equipment shutdowns, local and remote alarms, etc. shall function as required and designed.
7. Each control panel circuit shall be tested for trouble by inducing a trouble condition into the system.

3.2 TRAINING REQUIREMENTS

1. Prior to final acceptance, the installing contractor shall provide operational training to each shift of the owner's personnel. Each training session shall include control panel operation, manual and (optional) abort functions, trouble procedures, supervisory procedures, auxiliary functions and emergency procedures.

3.3 OPERATION and MAINTENANCE

1. Prior to final acceptance, the installing contractor shall provide four (4) complete operation and maintenance instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including piping isometrics, wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s) illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, troubleshooting techniques, maintenance operations and procedures shall be included in the manual.

3.4 AS-BUILT DRAWINGS

1. Upon completion of each system, the installing contractor shall provide four (4) copies of system "AS-Built" drawings to the owner. The drawings shall show actual installation details including all equipment locations (ie., control panel(s), agent container(s), detectors, alarms, manual pull station(s) and abort switch(s), etc.), as well as piping and conduit routing details. Show all room or facilities modifications, including door and/or damper installations completed. One (1) copy of reproducible engineering drawings shall be provided reflecting all actual installation details.

3.5 ACCEPTANCE TEST

1. At the time "AS-Built" drawings and maintenance/operations manuals are submitted, the installing contractor shall submit a "Test Plan" describing procedures to be used to test the control system(s). The Test Plan shall include a step-by-step description of all tests to be performed and shall indicate the type and location of test apparatus to be employed. The tests shall demonstrate that the operational and installation requirements of this specification have been met. All tests shall be conducted in the presence of the owner and shall not be conducted until the Test Plan has been approved.
2. The tests shall demonstrate that the entire control system functions as designed and intended. All circuits shall be tested: automatic actuation and manual actuation, audible and visual alarm devices, and manual override of abort functions. Supervision of all panel circuits, including AC power and battery power supplies, shall be tested and qualified.
3. A room pressurization test shall be conducted in each protected space to determine the presence of openings, which would affect the agent concentration levels. The test(s) shall be conducted using the Retro-Tec Corp. Door Fan system, or equivalent, with integrated computer program. All testing shall be in accordance with NFPA 2001.
4. If room pressurization testing indicates that openings exist which would result in leaks and/or loss of the extinguishing agent, the installing contractor shall be responsible for coordinating the proper sealing of the protected space(s) by the general contractor or his sub-contractor or agent. The general contractor shall be responsible for adequately sealing all protected space(s) against agent loss or leakage. The installing contractor shall inspect all work to ascertain that the protected space(s) have been adequately and properly sealed. THE SUPPRESSION SYSTEM INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUCCESS OF THE ROOM PRESSURIZATION TESTS. If the first room pressurization test is not successful, in accordance with these specifications, the installing contractor shall direct the general contractor to determine, and correct, the cause of the test failure. The installing contractor shall conduct additional room pressurization tests, at no additional cost to the owner, until a successful test is obtained. Copies of successful test results shall be submitted to the owner for his record. Upon acceptance by the owner, the completed system(s) shall be placed into service.

3.6 WARRANTY

1. All Ansul system components furnished and installed under this contract shall be warranted against defects in design, materials and workmanship for the full warranty

period which is standard with the manufacturer, but in no case less than one (1) year from the date of system acceptance.

END OF SECTION