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50-296 Browns Ferry Nuclear Power Station, Unit 3, Tennessee 05000296
AUTH. NAME AUTHOR AFFILIATION
GRIDLEY, R. Tennessee Valley Authority
RECIP. NAME RECIPIENT AFFILIATION
EBNETER, S. Document Control Branch (Document Control Desk)

SUBJECT: Forwards response to 870113 request for addl info re TVA request for Tech Spec change. Change would delete phrase "in accordance w/manufacturer instruction," from requirement for annual sensitivity checks for smoke detectors.

DISTRIBUTION CODE: A006D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 15
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NMSS/FCAF 1cy. NMSS/FCAF/PM 1cy. OIA 1cy. 05000260
1 cy ea. to: S. Richardson, J. Zwolinski, B. D. Liaw
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MAR 19 1987

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Mr. Stewart Ebneter

In the Matter of the Application of)
Tennessee Valley Authority)

Docket Nos. 50-259
50-260
50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - REQUEST FOR ADDITIONAL INFORMATION - SMOKE DETECTOR SENSITIVITY TESTING

We have prepared the enclosed response to M. Grotenhuis's letter dated January 13, 1987, requesting additional information regarding TVA's request for a technical specification change (BFN TS 215). This change would delete the phrase "in accordance with manufacturer's instruction" from the requirement for annual sensitivity checks for smoke detectors.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley, Director
Nuclear Safety and Licensing

Enclosure

A006
1/1

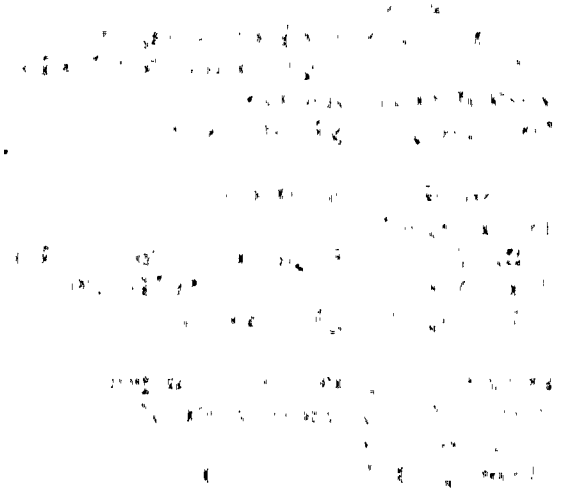
U.S. Nuclear Regulatory Commission

MAR 19 1987

cc (Enclosure):
Mr. G. E. Gears
Browns Ferry Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

Mr. G. G. Zech, Director
TVA Projects
U.S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

Browns Ferry Resident Inspector
Browns Ferry Nuclear Plant
P.O. Box 311
Athens, Alabama 35611



ENCLOSURE
BROWNS FERRY NUCLEAR PLANT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
LETTER FROM M. GROTENHUIS DATED JANUARY 13, 1987

REQUEST NO. 1

Are all smoke detectors currently in service at BFN listed by Underwriters Laboratories or approved by Factory Mutual? If not, please list those detectors by make, model and fire area. Also, list all detectors (make, model and fire area) which can no longer be tested in accordance with the manufacturer's instructions.

RESPONSE

All smoke detectors used at BFN are either U.L. listed or FM approved or both:

Walter Kidde Model CPD-1201	U.L. listed and FM approved
Walter Kidde Model CPD-1212	U.L. listed and FM approved
Walter Kidde Model FT-200	U.L. listed and FM approved
Pyrotronics Duct Type Model CDA-2	U.L. listed

All detectors are tested in accordance with the manufacturer's instructions, except that no manufacturer's instructions are provided to test the sensitivity of the Model FT-200 detectors.

REQUEST NO. 2

Provide justification for keeping detector(s) listed above operable or a time table for replacing these detectors.

RESPONSE

All smoke detectors in service are operating in an acceptable manner. The detectors are periodically tested to standards which meet and/or exceed criteria specified by the respective manufacturers. In regards to the Walter Kidde Model FT-200, the manufacturer has not specified any acceptance criteria for the sensitivity of the detector, nor have they specified a procedure for testing the sensitivity. TVA has effectively met the recommendations of the manufacturer by developing a procedure which has been approved by the manufacturer.

REQUEST NO. 3

Please provide a description of the procedures and test equipment which will be used, including the manufacturer's manuals and specification data, to periodically test all smoke detectors for which TVA no longer has manufacturer's instructions and/or test equipment.

RESPONSE

The Walter Kidde smoke detector Model FT-200, for which we have no manufacturer's specific sensitivity testing instructions, is tested by Surveillance Instructions SI 4.11.C.1 and SI 4.11.C.5. A copy of a letter from the manufacturer confirming our testing procedure is attached along with the associated vendor manuals and the applicable part of the Surveillance Instruction concerning the FT-200 smoke detector.

REQUEST NO. 4

Please provide the qualifications of the engineer or consultant who designed or approved the procedures and test equipment referred to in "3" above, including provisions for quality control. Also, discuss the bases for TVA's judgment that the testing will be adequately planned and conducted.

RESPONSE

The procedure for testing the sensitivity of the FT-200 was designed by an electrical engineer working for TVA in conjunction with an engineer with Fenwall/Walter Kidde. TVA has received in writing the approval of our testing methods from Fenwall/Walter Kidde. No special test equipment is involved.

As with all Surveillance Instructions, this test procedure is governed by the Quality Assurance Program which provides for quality control. Adequacy of Surveillance Instructions is determined through multidisciplinary review by the Plant Operations Review Committee.

REQUEST NO. 5

It is our position that "checks of smoke detector sensitivity be made in accordance with the manufacturer's instructions". The underlined phrase should not be deleted from the Technical Specifications without a more detailed justification.

RESPONSE

It is our position that BFN has always met the intent of "in accordance with the manufacturer's instructions" and will continue to do so. However, item 5A of Office of Inspection & Enforcement Inspection Report 50-259, 50-260, 50-296/85-28 cites TVA for not meeting the technical specification requirement in that no manufacturer instructions are available to test the sensitivity of the FT-200. TVA believes that the information given above is sufficient justification to approve the amendment request.

REQUEST NO. 6

The Technical Specification should be modified to include reference to any unique or model specific procedure(s) developed for the detector(s) referred to in "3" above.

RESPONSE

The technical specification surveillance requirements for instrumentation do not normally specify unique or model specific detail. Such details are usually under the control of the licensee and are subject to review and audit by TVA organizations and NRC inspectors. The general requirement to perform a sensitivity test reflects the proper level of detail consistent with similar surveillance requirements and provides adequate assurance that the devices will perform their function when required.

FENWAL INCORPORATED
Division of Kidde, Inc.
KIDDE
400 Main Street, Ashland, Massachusetts 01721
Tel: (617) 881-2000 Telex: 94-8421 TWX: 710-380-1072

R39 850621 801

June 19, 1985

Tennessee Valley Authority
Browns Ferry Nuclear Plant
Box 2000
Decatur, AL 35602

Attention: Mr. Darrell Murphy
Electrical Maintenance

Dear Mr. Murphy:

This will confirm that the testing method presently being implemented on your Fenwal Fire Alert FT 200 Smoke Detectors is an acceptable and recommended procedure.

Very truly yours,

FENWAL INCORPORATED

Robert C. Savery/lh

Robert C. Savery
Marketing Manager
Commercial Fire Detection
Protection Systems Division

RCS/lh

FILE COPY

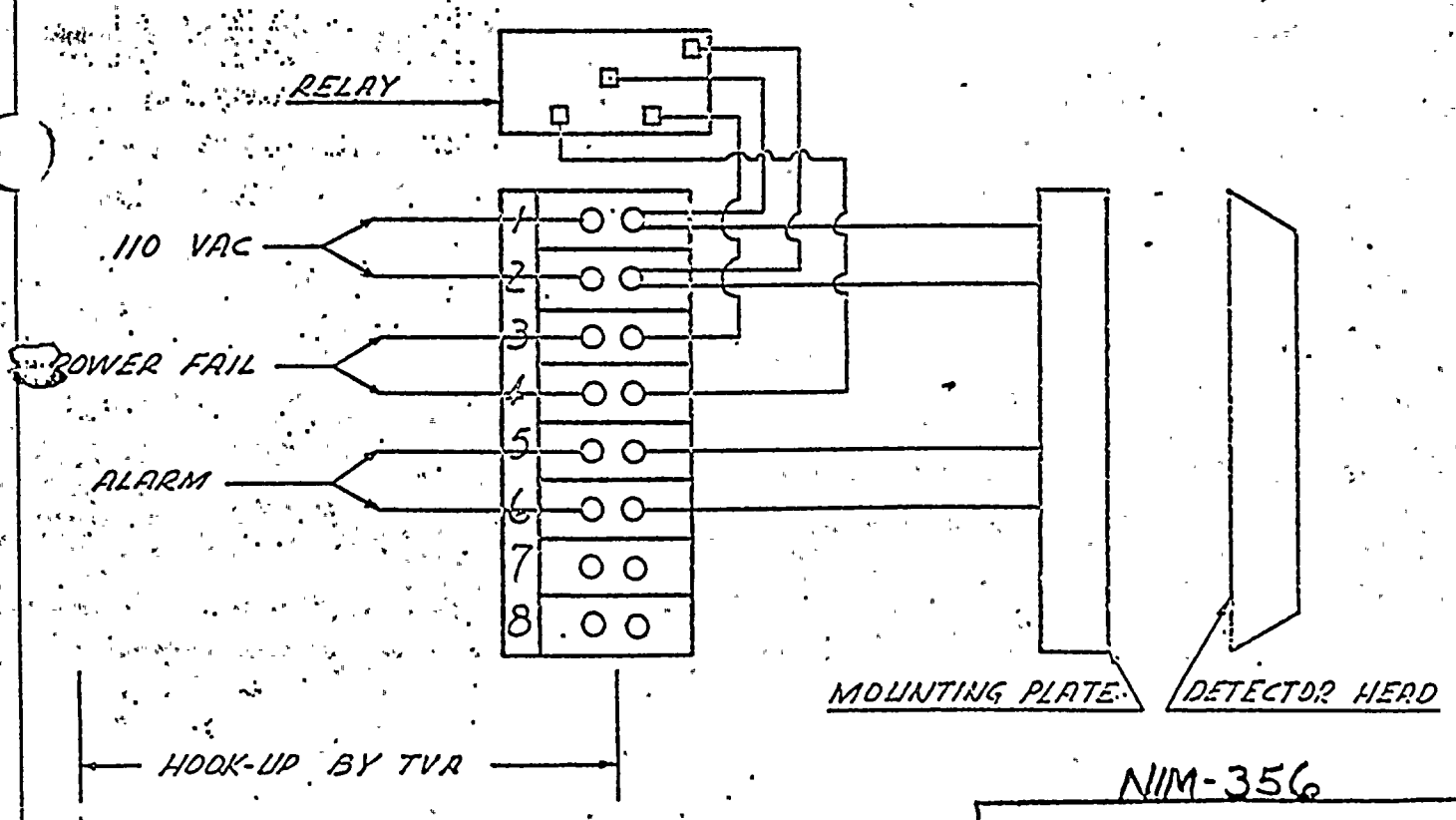
3S SECURITY SYSTEM, INC.
5710 KINGSTON PIKE • P. O. BOX 10807 • KNOXVILLE, TENNESSEE 37919 • PHONE (615) 584-6175

INSTRUCTION, INSTALLATION & OPERATION INFORMATION:
IONIZATION SMOKE DETECTOR FT200/3S
CONTRACT 71C36-54742

GENERAL - Bulletin 912 and 925 have been furnished which give descriptive data, special features, and specifications on the FT200. The information contained herein is for use for the above contract.

The FT200/3S is a smoke detector with a self contained power supply. The unit has three basic parts. 1. 6" x 6" x 4" steel junction box with terminal strip and relay. 2. Mounting base that is attached to top of the junction box. 3. Detector head.

INSTALLATION - The junction box is provided with 3/4" and 1" knock outs. The junction box can be mounted on the conduit without damage to the detector head, since the parts are easily separated. The mounting base and junction box top are screwed in place after wiring is attached to the terminal strip in the junction box.



For futher details see Contract Drawings 1 of 2 and 2 of 2..

-continued on reverse side-

FOR INFORMATION ONLY

DATE

NIM-356

TVA JUN 16 197
BROWNS FERRY
CONTRACT NO: 71C36-54742
TITLE:

CHECKED:

Hook up will be made as follows: 110 VAC will be connected to terminals 1 and 2, wires from annunciator to acknowledge power failure will be connected to terminals 3 and 4. Wires from annunciator to acknowledge alarm condition will be connected to terminals 5 and 6.

OPERATION - The detector will actuate when smoke passes through the chamber. The output in alarm condition is a relay contact closure. The output upon loss of power is a relay contact closure.

SENSITIVITY - Factory calibrated to respond to a nominal value of 0.006 GCF. Alarm response time is approximately 5 seconds. (GCF values are determined by the use of Ambient Particle Detectors - models APD-1, APD-2, APD-3 - manufactured by Fire Alert Co.)

MAINTENANCE - The minimal maintenance required on the FT-200 detector consists of an annual cleaning of dust from the collector plate/radium chamber area. Caution: Cleaning programs should be geared to the individual detector environment. In areas where an oily firm or other coating may develop, the radium source and the inside surface of the collector plate must be periodically cleaned with a cotton swab saturated with chemically pure alcohol. Areas having an abnormally high lint or dust atmosphere will also require more frequent cleaning. When in doubt, clean. Cotton swabs or other material used to clean the radium source and collector plate should be discriminately destroyed after use.

GENERAL The FT-200 is an ionization type, products of combustion detector that is listed by Underwriters Laboratory Inc., Underwriters Laboratory of Canada, and Factory Mutual. The FT-200 utilizes the unique Fire Alert design of "chamber sampling" in order to provide maximum sensitivity and functional capabilities not possible with other detectors. Maximum reliability is provided by the fact that three samples must be missed before an alarm can be initiated. All solid state low voltage circuitry, with self-contained alarm and supervisory relays, provides compatability with most alarm system controls and accessories.

Specifications

REMOTE TEST: Detectors can be installed for remote testing by adding any normally open contact device (switch, relay, etc.) to the terminals provided. Upon momentary closure of the remote contact the detector will electronically duplicate the effect of products of combustion by decreasing the time between chamber samples: less time = less ionization current = alarm condition.

FIELD TESTING: Total "in-system" testing is made available by use of the FTM-200 field test meter. The field test meter plugs in-series with the detector and operates from the existing system power. Provides means for testing detector sensitivity, alarm and supervisory relay operation, analyzes system voltage amplitude and rectification, incorporates remote test and reset switches. For additional FTM-200 information refer to Fire Alert Bulletin No. 923.

CONDITION INDICATOR: Operating conditions are indicated at the detector by a light emitting diode. Intensity is such that no distraction is experienced yet readily facilitates visual checking of detector operation:

Normal Condition = Stable flash rate approximately once per second.
Trouble Condition = No flashing. Indicates loss of supply power or open circuit.
Unstable Condition = Erratic flash rate. Indicates an increase in ambient particles of combustion or unstable detector sensitivity.
Alarm Condition = Constant light.

ONE MODEL: Detectors are equipped with insect screen/velocity shields and are factory pre-set so that any detector can be applied to either normal or high air velocity conditions. Relay contact arrangements are such that any FT-200 can be wired in 12 different configurations. (See sample diagram on page 3).

APPROVED
This approval does not relieve the Contractor from any part of his responsibility for the correctness of design, details and dimensions.
TENNESSEE VALLEY AUTHORITY
Date MAY 19 1971

Special Features

SENSITIVITY: Factory calibrated to respond to a nominal value of 0.006 GCF. Alarm response is approximately 5 seconds.

TEMPERATURE: Thermistor controlled for stability from 0 degrees to 150 degrees fahrenheit.

ELECTRICAL

Operating Voltage = 20.4 to 26.4 VDC: full wave rectified: 3.2 watts.
Current Drain = 42 MA. normal; 90 MA. alarm condition; 132 MA. alarm condition/remote lamp.
Contact Rating = 3.0 amp at 30 VDC; 1.0 amp at 120 VAC; resistive load.
Grounding = Available with either positive or negative potential to the housing.

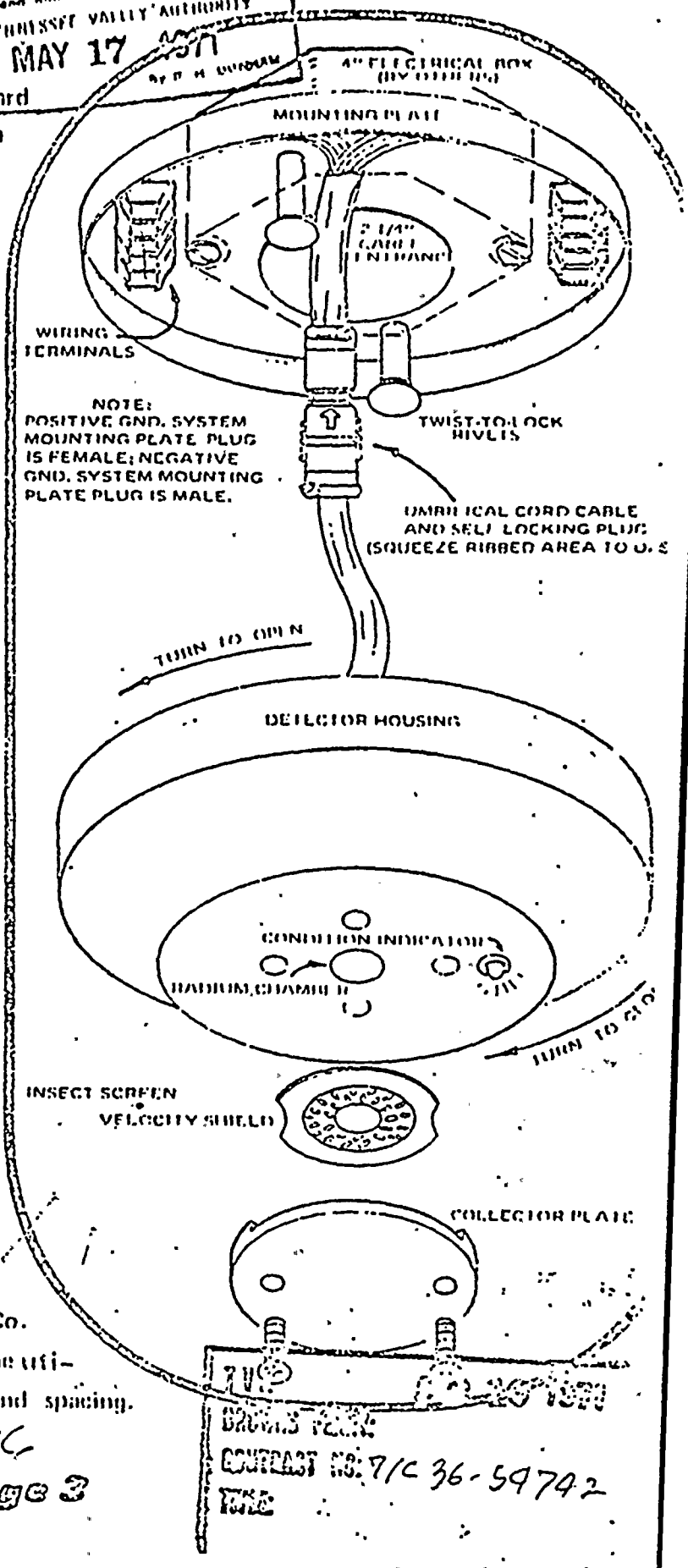
RADIUM 0.50 to 0.75 micro curies of radium 226. A.E.C exempt under gas and aerosol detector category. See Fire Alert Bulletin No. 875 for summary of radioactive material.

NM 356

TVA APR 16 1971
DRAWING FROM:
DRAWING NO. 71C36-5474-2

Installation

The pre-wired detector mounting plate fits standard 4" sq. or octagonal electrical boxes. All installation wiring is terminated at the mounting plate by means of an "umbilical cord" cable and self-lock plug arrangement. The detector is then secured by a twist-to-lock mechanism. This plug connection, twist-to-lock design allows installation of the mounting plates and all system wiring prior to the completion of general construction without risk of detector damage.



Spacing

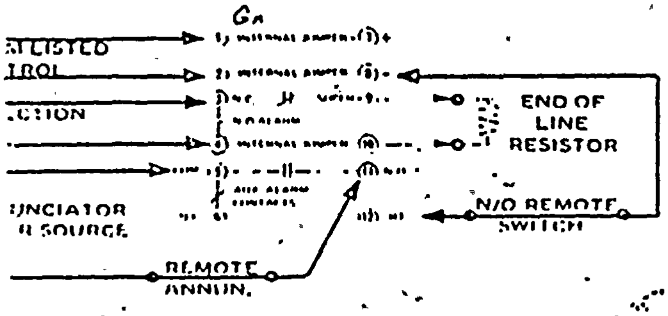
All ionization type, products of combustion detectors are tested for listing by Underwriters Laboratories on 30 ft. centers, smooth ceilings 15 ft. high, and minimum air movement. The resultant 900 sq. ft. spacing, therefore, may be used as a reasonable guide for comparable applications. However, where conditions not anticipated by the U.L. test exist (ceiling obstructions, high air exchange rates, etc.) a reduced square footage coverage must be considered in order to achieve adequate protection. Computer rooms and other such installations may require a spacing of 200 sq. ft. or less, due to their extreme high air exchange rates (and the resultant particle dilution factor); plus the high dollar value of the property being protected. It is advised that particle detection equipment (such as Fire Alert Co. Ambient Particle Detectors) and actual test fires be utilized to determine optimum detector location and spacing.

NIM 35C

All FT-200 detectors can be wired for remote testing regardless of the basic installation wiring con-
uration. By connecting a normally open switch from "RT" terminal (No. 12) to negative battery
o. 2 or 8) detectors can be remote tested from any point by a momentary switch closure.
2. Connections shown as arrows (<——>) indicates wiring external of the detector and must be provided by the installer. All other connections and contacts shown are integral to the detector.

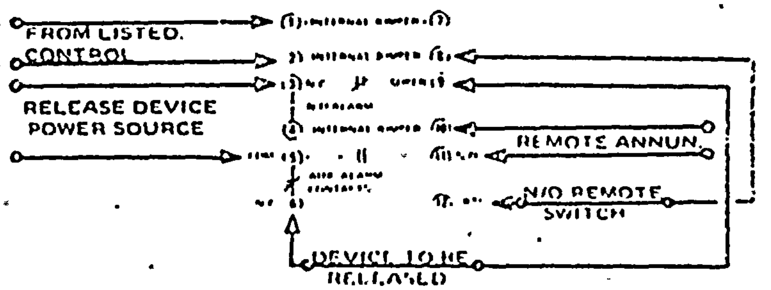
SAMPLE CASE "A"

CONNECTED TO ACTUATE SYSTEM CONTROL AND PROVIDE REMOTE ANNUNCIATION AND REMOTE TESTING:



SAMPLE CASE "B"

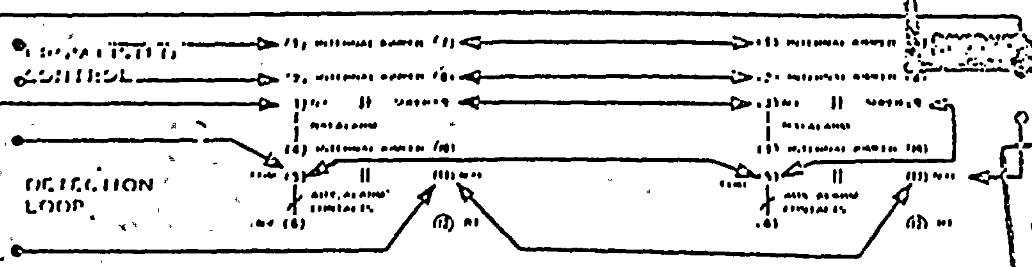
CONNECTED FOR RELEASE DEVICE SERVICE WITH REMOTE ANNUNCIATION AND REMOTE TEST:



NOTE: UNDERWRITERS LABORATORY (AND OTHER REGULATING AGENCIES) REQUIRES THAT DETECTORS OPERATING UNDER "RELEASE DEVICE SERVICE" MUST ACTUATE (RELEASE) FROM EITHER TROUBLE OR ALARM CONDITIONS.

SAMPLE CASE "C"

CONNECTED TO ACTUATE ALARM SYSTEM CONTROL WHEN ALARM AND SUPERVISORY CONTACTS MUST BE ISOLATED:



TVA APR 1971
CONTRACT NO. 71C36-54742

APPROVED
This approval does not relieve Contractor from any part of his responsibility for the correctness of design, details and dimensions.
TENNESSEE VALLEY AUTHORITY

NIM 356

Ordering Information

OSITIVE GROUND MODEL = FT-200P (PLUS BATTERY CONNECTED TO HOUSING)
EGATIVE GROUND MODEL = FT-200N (NEGATIVE BATTERY CONNECTED TO HOUSING)
LOR – SEMI-GLOSS IVORY ENAMEL (CHROME PLATING AVAILABLE, SEE BULLETIN 905)
– 3" X 8" X 8"; WEIGHT – 2 1/2 LBS. (FOR CARTONED DETECTORS)
CTORS INDIVIDUALLY CARTONED WITH COPY OF INSTRUCTION DATA SHEET NO. 911

Printed in USA 8-1-70

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT

REV 0002

Surveillance Instruction 4.11.C.1 and 4.11.C.5
Fire Protection
Testing of Smoke and Heat Detectors

Unit 2

Description

This surveillance instruction is used to comply with the requirements of technical specifications 4.11.C.1 and 4.11.C.5. The following table lists the requirements regarding these functions:

SI	Frequency	Surveillance Requirement
4.11.C.1	Once/6 months	All smoke and heat detectors located in the following areas will be functionally tested for operability and results documented: reactor building, diesel generator buildings, control bay, intake pumping station, cable tunnel to the intake pumping station, and the fixed spray system for cable trays along the south wall of the turbine building, EL 586.
4.11.C.5	Once/year	All smoke detectors located in the areas listed above will be functionally tested for sensitivity and results documented.

The data sheet of this SI cover both SI-4.11.C.1 and 4.11.C.5, since once per year the two SI's are performed simultaneously. Only the last column on the data sheets for smoke detectors applies to SI-4.11.C.5. The rest of the data is for SI-4.11.C.1. When SI.4.11.C.1 only is being performed the last data column on the smoke detector data sheets is not applicable.

1.0 Prerequisites

1.1 Obtain the shift engineer's written approval before performing the tests in this procedure. (Reference data cover sheet)

2.0 Requirements

2.1 Smoke source (Preferably MSA 458480 Smoke Tube)

2.2 DC Voltmeter (20,000 ohms per volt or more)

2.0 Requirements (Continued)

2.3 Heat source (heat gun)

2.4 Stopwatch (needed only for SI-4.11.C.5)

2.5 Pyrotronics model SCU-8 sensitivity test set (needed only SI-4.11.C.5)

2.6 Data sheets SI-4.11.C.1 & .5

2.7 Gamewell "Sens-meter" Model 29972 (needed only for SI-4.11.C.5 to check sensitivity of Sensmoke Model 29969 Smoke Detector).

3.0 Precautions

3.1 Prior to testing any detectors, notify the proper unit operator (unit where detector annunciates) as to which series of detectors will be tested and the area where they are located.

3.2 Coordinate with the shift engineer as to the need for fire watches when testing the CO_2 system heat detectors. Refer to prerequisites 3.2 and 3.3 in SI-4.11.B.1.a for proper fire watch procedure.

3.3 Report all smoke and heat detectors that do not meet this document's operational and/or sensitivity guidelines to the shift engineer.

CAUTION: Testing should cease and the shift engineer should be immediately notified whenever more than one unacceptable detector is found in the same area of testing.

3.4 Carefully observe procedure sequences to avoid spurious initiation of fire protection circuits. Actuate ONLY one detector at a time.

3.5 When testing heat detectors, check the area for oil spills or other types of combustibles. If any are present, have the area cleaned before testing.

3.6 Do not apply excessive heat to any one point on the heat detector sensors. The heat source should not be applied closer to the detector than necessary to actuate it.

3.0 Precautions (Continued)

3.7 Before doing any testing read and be familiar with the entire procedure.

3.8 Any discrepancy between the procedure and the system must be investigated. The discrepancy could involve either defective components in the system, improper installation of the system or procedure errors.

3.9 Make sure the correct zone alarms when a detector is initiated. Zone numbers are listed at the top of the data sheet and the zones are tested in alphabetical order.

3.10 If any smoke detector base mounting nylon screws are found broken or if any plastic insulating plates are missing, these must be replaced. Use only Kidde part #601215, storeroom TIIC #ARG-120P. DO NOT use metal screws.

4.0 Procedure

4.1 Test each detector according to its circuit function as follows. Detector circuit function is listed on the data sheets for each group of detectors. The method of testing each different detector model is described in section 4.2. Location of local panels is in section 4.3. Diagrams of test progression by area are in section 4:4.

4.0 Procedure (Continued

4.2 (Continued)

4.2.1.2 (Continued)

voltage (ΔV) be less than 0.6 volts or greater than 2.0 volts. Record ΔV on the data sheet. Lock the detector back to its mounting plate.

4.2.1.3 Walter Kidde Co. Model FT-200

Momentarily apply the smoke source to the sensor of the smoke detector until the light on the detector is illuminated continuously. Allow a few seconds for the detector to clear. (The detector will clear more readily if it is fanned.) Write N/A in the column for wire lifted on the data sheet. Verify the annunciation will clear in the control room.

Sensitivity Test (SI-4.11.C.5 only check before applying smoke source to detector.) Testing each detector, use a stopwatch to determine the flash rate (seconds/flash) of the condition indicator light on each detector. Time the detector for one minute while counting the flashes. Divide the total time in seconds by the number of flashes that occurred during that time. Calculate the flash rate to nearest 0.01 second. Record this flash rate along with the flash rate stamped on the detector mounting plate in the appropriate column of the data sheet as shown below. The calculated flash rate should not differ from the stamped flash rate by more than 10%.

$$\frac{\text{Seconds}}{\text{Flashes}} = \text{Flash Rate}$$

Stamped Flash Rate