LILCO LONG ISLAND LIGHTING

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

January 29, 1985 SNRC-1141

Dr. Thomas E. Murley
Regional Administrator
Office of Inspection and Enforcement
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Fire Protection
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Reference 1: Letter NRC (Thomas T. Martin) to LILCO (J. D. Leonard) dated 12/21/84 forwarding Inspection Report 84-46

Dear Dr. Murley:

The purpose of this letter is to respond to the Reference (1) letter which forwarded the report of your Fire Protection Inspection held during the week of December 3, 1984. As you are aware, LILCO had verbally requested and was granted an extension to the requested fifteen day response period. This extension was requested to provide LILCO with an opportunity to present its position on various items contained in the report. As a result of our meeting with the Staff on January 15, 1985, it was agreed that LILCO would, within two weeks after the meeting, respond to the deviations as requested in Appendix A to Reference 1, and would also provide its position or status, as appropriate, regarding the other unresolved items contained in the report. This information is contained in Attachment 1 (Response to Deviations) and Attachment 2 (Remaining Unresolved Items). In addition, Attachment 3 provides LILCO's position regarding the issue of automatic suppression for areas of cable tray concentration.

1/1 IE 01

Should you have any questions, please contact this office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

RWG:ck

Attachments:
1. Response to Deviations
2. Unresolved Items
3. Cable Tray Concentrations
4. Response to GL 81-12 Spurious Signals High/Low Pressure Interfaces
5. Diesel Generator Breakers

cc: R. Caruso
P. Eselgroth

AFFIDAVIT

STATE OF NEW YORK)
: ss:
COUNTY OF SUFFOLK)

JOHN D. LEONARD, Jr., being duly sworn, deposes and says I am the Vice President, Nuclear Operations for the Long Island Lighting Company. Attachment 1 to letter SNRC-1141 provides our response to Appendix A, Notice of Deviation, contained in NRC letter dated December 21, 1984. I have read this response which was prepared under my direction and dated January 29, 1985. The facts set forth in this response are based upon reports and information provided to me by the employees, agents and representatives of Long Island Lighting Company responsible for the activities described in this response. I believe the facts set forth in this response are true.

John D. Leonard, Jr.

John D. Leonard, Jr.

Sworn to before me this
30th day of January 1985

Linda A. Cratty

LINDA A. CRATTY
NOTARY PUBLIC, State of New York
No. 4816267
Qualified in Suffolk County
Commission Expires March 30, 1986

Response to Deviations

The identification letters used correspond to those used in Appendix A of Inspection Report 84-46.

Deviation/Departure

A. The Fire Hazard Analysis Report (FHAR), Revision 1, dated June 1982 (an enclosure to your letter to NRC dated August 6, 1982), Section 1, Paragraph E.1.a., describes the licensee commitment to design the fire detector systems in the Reactor Building in accordance with NFPA 72D/E.

Contrary to the above, your design does not conform to NFPA 72D/E, in that the number of detectors per square foot of floor space has not been met; the maximum distance between individual detectors is exceeded (120 feet instead of 30 feet); and the location of detectors relative to ceilings does not conform to NFPA 72D/E. (Unresolved Item 84-46-05)

Corrective Steps Which Have Been Taken

As noted during the 1/15/85 meeting, placement of fire detectors at Shoreham had been approved by American Nuclear Insurers (ANI) in 1981. LILCO had, however, initiated an engineering review of fire detectors by a qualified fire protection consultant to assess compliance with the literal requirements of NFPA 72D/E regarding placement and spacing of fire detectors. A draft report has been issued and a final report is scheduled to be issued documenting this review. In addition, LILCO has taken interim compensatory measures in the Reactor Building consisting of hourly fire watch patrols.

Corrective Steps Which Will Be Taken

A physical walkdown of potential locations for additional detectors to achieve literal NFPA 72E compliance has been initiated and a preliminary schedule for their installation has been developed. Departures from NFPA 72E requirements will be justified. In adding or relocating detectors, LILCO intends to schedule work such that modifications are accomplished first in those radiation areas which provide the highest potential for personnel exposure, in keeping with ALARA principles.

The addition of detectors is a complex and time consuming task which includes determination of suitable locations, for effective operation and access for required maintenance and surveillance activities. In addition, other aspects such as the routing and installation of cable and the design and installation of seismic supports must be addressed. Scaffolding and other installation details (welding, grinding) demand a prudent approach to ensure there is no potential for adversely affecting redundant trains of plant equipment, thus constraining the number of areas which can be worked at any one time.

Date When Full Compliance Will Be Achieved

Initial design and installation planning has taken place for the additional detectors. As stated previously, emphasis is being placed on areas with high radiation zones and areas where currently no detectors exist (Control Building corridor). This overall effort requires the addition or relocation of about 300 detectors. LILCO expects to commence installation and relocation activities approximately the first week of February, 1985.

An ANI approved fire detection system exists throughout the Reactor Building. This has been supplemented by compensatory measures prescribed in the Technical Specifications for inoperable fire detectors as described in letter SNRC-1122. LILCO believes that this system and the existing compensatory measures provide an equivalent degree of protection such that compliance with GDC 3 is achieved.

A tabulation is attached dividing this effort into 3 phases and showing the approximate number of detectors involved in each phase.

Phase I detectors will be installed by approximately June 1, 1985. Installation of detectors for Phases II and III is targeted to be completed by December, 1985.

Fire Detector Installation

Area	New Detectors	Relocated Detector	Existing Detectors
Phase I			
Reactor Building (Elevation 8', Elevation 175', RWCU Area, Main Steam Line Tunnel Area) Control Building Corridors 8 and 9, Computer Room	62	2	17
Phase II			
Remainder of Control Building and Screenwell	48	12	116
Phase III			
Remainder of Reactor Building	178	0	33

Deviation/Departure

B. The FHAR, Revision 1, Section 1, Paragraph D.1.j., describes the licensee commitment to provide fire doors having a fire resistance rating at least equal to the required rating of the barriers in which the doors are located.

Contrary to the above, the resistance rating of a significant number of fire doors in the plant is less than the rating of fire barriers in which they are located in that the fire doors have been degraded due to their modifications for security reasons. (Unresolved item 84-46-07)

Corrective Steps Which Have Been Taken

Prior to the NRC Inspection in December, LILCO had initiated an Underwriter's Laboratory (U/L) fire door inspection which identified 59 FHAR fire doors requiring repair. This work is presently underway, and 13 doors are now repaired. In the interim, compensatory measures have been taken in accordance with the provisions of the Technical Specifications, Section 3.7.8.

Corrective Steps Which Will Be Taken

LILCO will continue its effort to repair the subject fire doors. It is anticipated that U/L reinspection and approval will be sought upon completion of the entire effort. It should be recognized that in order to meet NRC regulatory requirements, certain modifications were required to be made to the doors. An example of this is the addition of magnetic switches which provide an indication of door closure. U/L is not expected to approve this application. For these doors, LILCO will justify their acceptability for fire protection utilizing the following guidelines:

1) It is LILCO's position that a simply mounted magnetic switch of the type and size used at Shoreham will not compromise the fire rating of the fire door.

2) Where welded angle brackets have been utilized for mounting of the switches, suitable resistance of the door is achieved if an automatic spray suppression system exists in close proximity to the door or an automatic gas suppression system exists in an adjoining room.

Date When Full Compliance Will Be Achieved

The remainder of the FHAR fire doors are scheduled to be repaired in April, 1985.

Deviation/Departure

C. The FHAR, Revision 1, Section 1, Paragraph E.2.c., describes the licensee commitment to separate the diesel and electric fire pumps and their associated components by a 3 hour fire barrier.

Contrary to the above, the cables from the diesel fire pump controller and day tank pumps are routed through the same fire areas as the electric fire pump, thereby not meeting the required 3 hour fire barrier separation. (Unresolved item 84-46-08)

Corrective Steps Which Have Been Taken

LILCO has implemented an hourly fire watch patrol for the electric fire pump room. In addition, engineering has been initiated to relocate the subject cables to ensure compliance with the FHAR.

Corrective Steps Which Will Be Taken

As noted above, the subject cables will be relocated to ensure compliance with the FHAR.

Date When Full Compliance Will Be Achieved

This modification will be complete in April, 1985.

Deviation/Departure

D. The FHAR, Revision 1, Section 1, Paragraph D.1.j., describes the licensee's commitment to provide an adequately rated fire damper where a ventilation duct penetrates a fire wall.

Contrary to the above, no fire damper is provided in the ventilation duct penetrating the 2 hour fire wall between the HVAC and chiller rooms at elevation 44 feet. (Unresolved item 84-46-09)

Corrective Steps Which Have Been Taken

LILCO has implemented the provisions of the Shoreham Technical Specifications, Section 3.7.8 as an interim compensatory measure. In addition, engineering has been completed to install a 1½ hour rated fire door in the opening between the HVAC Equipment Room and the plenum located west of the Chiller Equipment Room. Delivery of the door, which is the controlling factor for completion of this fix, is being expedited.

Corrective Steps Which Will Be Taken

As noted above, LILCO will install a 1½ hour rated fire door. This represents a suitable barrier between the HVAC Equipment Room and the plenum to the west of the Chiller Room, thus suitably inhibiting the propagation of fire from one of these areas to the other. In addition, the FHAR will be revised to depict this change.

Date When Full Compliance Will Be Achieved

This modification will be completed prior to exceeding 5% power. An FHAR Revision will be submitted to the NRC by April 5, 1985.

Deviation/Departure

E. The FHAR, Revision 1, Section 1, Paragraph E.5., describes the licensee commitment to design the Carbon Dioxide Suppression Systems in accordance with NFPA 12.

Contrary to the above, the Acceptance Test results for such systems in the Battery Rooms and Cable Tunnel indicate that the design objective was not achieved in that the carbon dioxide design density was not achieved at the highest test point. (Unresolved item 84-46-10)

Corrective Steps Which Have Been Taken

As an interim compensatory measure, LILCO has implemented the provisions of the Shoreham Technical Specifications, Section 3.7.7.3 for the Battery Rooms A and B.

The inability to meet the CO_2 design objective in these rooms at the high elevation was suitably documented as a test exception, and resolved satisfactorily by engineering with the approval of ANI. The concentration of CO_2 achieved during the test was determined to be acceptable for the following reasons:

1) The locations where the combustibles are located experienced a CO_2 concentration meeting NFPA 12 requirements (greater than 50% density).

2) The fire loading at the high elevation test points in the room is minimal as combustibles are concentrated at the lower room heights (batteries and cable trays). Thus, the actual CO_2 level at these points, though below the level required by NFPA 12, will provide adequate fire protection.

For the Cable Tunnel, this has been judged to be acceptable on the basis that no safety related equipment is located in this area.

Corrective Steps Which Will Be Taken

The FHAR will be revised to reflect this exception.

Date When Full Compliance Will Be Achieved

An FHAR revision will be submitted by April 5, 1985.

Deviation/Departure

F. The FHAR, Revision 1, Section 1, Paragraph E.5., describes the licensee commitment to design the Carbon Dioxide Suppression systems in accordance with NFPA 12.

Contrary to the above, the design criteria for such system in the Computer Room is not met in that the fire detectors which actuate the system are located above the suspended ceiling and such location would prevent timely successful actuation of the system if a fire occurred. (Unresolved item 84-46-11)

Corrective Steps Which Have Been Taken

Engineering has been initiated to install two additional fire detectors in the Computer Room below the false ceiling, in order to achieve compliance with NFPA 12.

Corrective Steps Which Will Be Taken

As noted above, two additional detectors will be installed in the Computer Room.

Date When Full Compliance Will Be Achieved

The addition of these detectors will involve the installation of supports and other operations which will create an environment unsuitable for computer use. Experience has shown that shutdown of the computer and protective covering is necessary to prevent impact on this equipment. In view of the need for availability of the computer during low power testing and the fact that the computer room does not have a safe shutdown function, it would be most beneficial to schedule this modification during a "window" so as to impart a minimum constraint on the low power test schedule. In any event, this modification will be completed by June 1, 1985.

Deviation/Departure

G. The FHAR, Revision 1, Section 1, Paragraph D.1.j., describes the licensee commitment to provide a minimum of 3 hour fire rating for ceiling/floor assemblies.

Contrary to the above, such protection was not maintained for the structural steel which forms a part of the ceiling/ floor assemblies in the charcoal filter room and chiller room in that their fireproofing protection ("pyrocrete" coating) was found damaged at elevation 63 feet. (Unresolved item 84-46-12)

Corrective Steps Which Have Been Taken

LILCO had implemented an hourly fire watch patrol in the above areas of the Control Building. As stated at the January 15, 1985 meeting, LILCO has replaced or repaired damaged fire proofing material. A reinspection of damaged areas was performed by LILCO and subsequent inspection was performed by the Resident Inspector on January 9, 1985.

Corrective Steps Which Will Be Taken

No further action is required on this specific item and the hourly fire watch that had been initiated as a compensatory measure has been terminated.

Performance of technical specification surveillance requirement 4.7.8.1 provides adequate assurance that fire proofed sections of fire rated walls are suitably maintained or appropriate measures taken.

Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Deviation/Departure

H. Supplement 1 to the Shoreham Safety Evaluation Report, Section 9.5.4, documents the licensee commitment to install self-contained 8 hour battery pack emergency lighting in all areas of the plant which could be manned to bring the plant to a safe cold shutdown.

Contrary to the above, such lighting in several such areas in the Reactor Building was not installed. (see Inspection Report 50-322/84-46, Paragraph 8.b. for exact locations). (Unresolved item 84-46-19)

Corrective Actions Which Have Been Taken

In letter SNRC-572, dated May 21, 1981, LILCO committed to install 8 hour battery powered emergency lights in areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

The equipment needed for safe shutdown in the event of loss of habitability of the Control Room is described in the Shoreham FSAR Section 7.5.1.4. This equipment is operable from the Remote Shutdown Panel (RSP). Eight hour battery power lights have been installed within the RSP room and in access and egress routes to this room. Thus, LILCO meets the commitment made in letter SNRC-572.

In the course of following plant procedures for remote shutdown, certain procedural steps are taken which, while good practice in terms of minimizing potential plant perturbation or enhancing future plant availability, are not needed and could be removed from the procedure without affecting safe shutdown. For example, procedure SP 29.022.01, "Shutdown from Outside the Control Room Emergency Procedure", includes a step calling for verification of auto start of the Reactor Feed Pump Turbine (RFPT) turning gear. This step requires an operator to physically go to the RFPT; this verification, however, is not required for safe shutdown. Similarly, the specific locations in the Reactor Building that were noted as requiring operator action (unresolved item 84-46-19) are for performance of actions such as verification of equipment operation, system venting, or redundant instrument readout. These actions are not required for safe shutdown.

LILCO recognizes the importance of being able to deal with an event such as loss of the Control Room and the desirability of flexible operator capability and response. LILCO's design philosophy relative to this issue has been defense in depth. The following additional Shoreham plant features are pertinent.

1) Eight hour battery packs are installed in the diesel generator rooms, emergency switchgear rooms, Control Building and the Screenwell Building. (The 8 hour battery powered emergency lights located in Diesel Generator Room 101 are being relocated to improve illumination at the diesel control panel.)

2) A 125 volt AC/DC emergency lighting system is located throughout the Reactor Building (this is not in lieu of the 8 hour battery packs, but supplemental).

3) In addition to the lighting noted above, LILCO has installed two (2) rechargeable handlights in the Control Room and two (2) rechargeable handlights in the remote shutdown panel area.

Actions Which Will Be Taken

As stated above, LILCO will relocate the battery powered emergency lights in Diesel Generator Room 101.

Date When Compliance Will Be Achieved

Full compliance will be achieved prior to exceeding 5% power.

Unresolved Items

The following provides the LILCO position or status on other unresolved items in Inspection Report 84-46 that were not discussed in Attachment 1 to this letter.

Unresolved Item 84-46-01 - Cable Separation Analysis Report

Per the agreement at the January 15, 1985 meeting, NRC Region I will be in communication with LILCO regarding the selection of one or two zones of the Cable Separation Analysis Report and subsequent (approximately 3 weeks later) inspection of implementation of this analysis at the offices of Stone & Webster Engineering Corporation, Boston.

Unresolved Item 84-46-02 - Specific Locations of Components

Procedures required for shutdown outside the control room have been revised to reflect the specific locations of various valves and components where local operation may be performed in the course of implementing this procedure.

Unresolved Items 84-46-17, 84-46-03 and 84-46-04 - Generic Letter 81-12, Spurious Signals, High/Low Pressure Interface

Although not strictly applicable to Shoreham a response to Generic Letter 81-12 was presented to the NRC at the January 15, 1985 meeting, and LILCO's position was provided via handout for staff review. This included information on high/low pressure interfaces and spurious signals. A copy of this handout is included as Attachment 4.

Unresolved Item 84-46-04 - Diesel Generator Breakers

In addition to spurious signals, unresolved item 84-46-04 involved the cooling requirements for the TDI diesel generators. Information on this item was also presented at the January 15, 1985 meeting and a handout was provided for staff review. A copy of this handout is included as Attachment 5.

Unresolved Item 84-46-06 - Controls for RCIC/HPCI Fire Suppression

As noted during the meeting held on January 15, 1985, control panels and associated control cables for deluge valves associated with the RCIC/HPCI Pump areas are offset from the deluge protected areas. Power cables have been located such that while not necessarily offset, they are not within the deluge protected area. The system, however, is designed such that the deluge valve, once open, will remain open until manually closed. The Shoreham design and installation, therefore, meets the requirements of NFPA 15.

Unresolved Item 84-46-13 - Fire Hazards Analysis for Corridors and Manhole

A fire hazard analysis for Control Building corridors and Electric Manhole #1 had not been included in the FHAR. A revised FHAR will be submitted by April 5, 1985.

As stated at the January 15, 1985 meeting, an analysis has been conducted for these areas. The Control Building corridors contain no redundant safety-related cables required for safe shutdown and no loss of redundant systems is possible upon a fire in these areas. Similarly, a fire in Manhole #1 could not affect redundant trains for which credit is taken in the shutdown scenario associated with such a fire.

Although the results of the fire hazards analysis were favorable, LILCO will nonetheless install fire detectors in Control Building corridors 8 and 9. This will be accomplished by June 1, 1985. Manhole #1 has existing fire detectors and a CO_2 suppression system.

Unresolved Item 84-46-14 - Single Header in the Reactor Building

Branch Technical Position 9.5-1 Appendix A requires that a single failure not impair the fire suppression system. LILCO complies with the BTP. With respect to the single header in the Reactor Building, LILCO has utilized the guidance of MEB-1 in determining that the postulated pipe failure for this moderate energy system would result in a crack producing a leakage of 165 gpm. Such a failure would not impair the fire suppression system in the Reactor Building since each fire pump has a rated capacity of 2500 gpm.

The single header configuration utilized at Shoreham was inspected and reviewed by the NRC during the FSAR review process (1979-1980). As a result of a staff question (FHAR Question 1), a redundant feed to the Reactor Building was installed. With this modification, the Staff accepted the design of Shoreham's fire header for the Reactor Building.

A copy of drawing M-10661, Rev. 12, "Water Fire Protection System" is enclosed, showing the water suppression system in the Reactor Building. Shoreham Technical Specifications require that if the fire suppression water system becomes inoperable, a backup fire suppression water system must be established within 24 hours. From the enclosed figure it can be seen that certain non-postulated circumferential breaks in the Reactor Building could be isolated and backup suppression established via hose reels or extinguishers. Depending on the location, certain other non-postulated breaks could render the fire suppression system temporarily inoperable. If backup suppression could not be established, LILCO would bring the plant to the shutdown condition.

The FSAR has always contained the single header configuration. The NRC accepted this configuration and LILCO believes that a backfit is not justified.

<u>Unresolved item 84-46-15</u> - Structural Integrity of Cable Tray Penetrations Seals

This item involves the concern that a cable tray penetration seal may be damaged by imposition of dynamic loads imposed on the seal by failure of "unprotected" cable tray support in the case of a fire.

There are a total of 35 cable tray supports adjacent to penetrations in 3 hour areas. These supports are identified on Table 1. As indicated on Table 1, automatic fire suppression is provided in the affected areas except for the screenwell and the turbine building where a total of 8 supports are located. For those areas where automatic fire suppression is provided, the potential effect of fire loading on the supports is not considered for this analysis because the suppression system will minimize the severity of any fire that occurs, making damage to supports unlikely.

Where automatic fire suppression is not provided, the combustible materials which could contribute to a fire are primarily cables and the fire loading is low, except for El. 37-6 in the turbine building which has moderate fire loading. The actual fire loading for these areas is quantified on Table 1. Considering that cables are the only significant combustibles in the area, it is extremely unlikely that a fire could develop which would affect the cable tray supports. The cable jackets are made of flame retardant and self-extinguishing material and even the worst-case cable fault can not establish a deep-seated fire in the cable tray. Even an exposure fire in the area resulting from one gallon (see FHAR question 1) of gasoline will not establish a fire in the cable trays. If the fire takes place with the gasoline container intact, the fire will last approximately 40 minutes and the temperature in the region of the cable trays will be only about 250°F. If the container spills, the fire will last less than one minute and the temperature at the cable trays will be less than 750°F. Conceivably, the gasoline could be poured into the cable tray in the vicinity of the support and ignited. The resulting fire could establish a deep-seated fire in the cables themselves when the fire retardant materials are driven out after an extended burning period. Should this unlikely event occur, it has been determined that the temperature at which the installed cables would burn is approximately 1150°F.

This temperature is based on testing performed by Factory Mutual Research Corporation for EPRI[1] and the United States Department of Transportation. Cables installed at SNPS are of similar materials as the majority of cable samples tested by Factory Mutual. The temperatures recorded by Factory Mutual were the surface temperatures at the cable during propagation of fire. Actual temperature at the cable tray supports would likely be less than the approximate 1150°F measured during testing.

Without regard for thermal lag and assuming the cable tray support is exposed to that temperature for the duration of the fire, the support will not fail. At 1150°F, the strength of structural steel is approximately 50 percent of the yield strength at room temperature[2].

Analysis of the cable tray supports show that the stresses due to deadweight of the tray are within allowable limits at 1150°F. Therefore, no additional protection of the cable tray supports in the subject areas is required.

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1. EPRI NP-1200, Categorization of Cable Flammability Table 5.1, Page 5-2

2. Steel Design Manual, U.S. Steel, January 1981.

TABLE 1

PENETRATION NUMBER	SUPPORT LOCATION	AUTOMATIC FIRE SUPPRESSION	FIRE LOAD
1	Screenwell SW 104	No	30,538 BTU/ft^2 (< 0.5 hrs)
	Screenwell SW 105	No	Same
2	Emergency Switchgear Room 101	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
3	Emergency Switchgear Room 101	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
4	Emergency Switchgear Room 101	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
5	Emergency Switchgear Room 101	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
6	Emergency Switchgear Room 102	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
7	Emergency Switchgear Room 102	Yes	Not Applicable
	Emergency Switchgear Room 103	Yes	Not Applicable
8	Turbine Building El 15	No	83,786 BTU/ft^2 (< 1.5 hrs)
	Normal Switchgear Room	Yes	Not Applicable

TABLE 1

PENETRATION NUMBER	SUPPORT LOCATION	AUTOMATIC FIRE SUPPRESSION	FIRE LOAD
9	Normal Switchgear Room	Yes	Not Applicable
	Turbine Building EL 15	No	83,786 BTU/ft^2 (< 1.5 hrs)
10	Turbine Building El 15	No	83,786 BTU/ft^2 (< 1.5 hrs)
	Normal Switchgear Room	Yes	Not Applicable
11	Normal Switchgear Room	Yes	Not Applicable
12	Turbine Building El 37-6	No	142,650 BTU/ft^2 (< 2 hrs)
	Normal Switchgear Room	Yes	Not Applicable
13	Turbine Building El-37-6	No	142,650 BTU/ft (< 2 hrs)
	Normal Switchgear Room	Yes	Not Applicable
14	Motor Generator Room	Yes	Not Applicable
	Auxiliary Boiler Room	Yes	Not Applicable
15	Motor Generator Room	Yes	Not Applicable
	Auxiliary Boiler Room	Yes	Not Applicable
16	Motor Generator Room	Yes	Not Applicable
	Auxiliary Boiler Room	Yes	Not Applicable
17	Motor Generator Room	Yes	Not Applicable
	Auxiliary Boiler Room	Yes	Not Applicable
18	Turbine Building El 37-6	No	142,650 BTU/ft^2 (< 2 hrs)
	Normal Switchgear Room	Yes	Not Applicable

* The other side of this penetration is an outside wall.

Unresolved Item 84-46-16 - Sizing of Water Storage Capacity

As noted in the January 15, 1985 meeting, the fire water storage capacity is adequately sized in accordance with BTP 9.5 on the basis of the largest sprinkler demand for safety related areas plus an allowance of 1000 gpm.

Unresolved Item 84-46-18 - 4 Bulb Battery Pack for Emergency Lighting

Specifications for the 4 bulb battery pack require 8 hour capability. Testing has been performed verifying this capability on the 4 bulb battery packs in the plant. Test results will be provided to NRC Region I.

This attachment provides LILCO's position with regard to cable tray concentrations in excess of 6 cable trays.

After review of the plant physical cable configuration, the Fire Hazards Analysis Report and the Cable Separation Analysis Report, LILCO concludes that the fire protection program provides assurance that a fire will not prevent the performance of necessary safe plant shutdown functions and will not significantly increase the risk of radioactive releases to the environment. This is based on consideration of the following points:

1. The SNPS Cable Separation Analysis Report (CSAR) demonstrates that, in the secondary containment, sufficient separation exists between safety related components of redundant systems required for safe shutdown, and that a postulated event causing the disabling of all cables and raceways in the designated area will not prevent safe plant shutdown. This considers the extreme case where an event is assumed to disable shutdown equipment whose cable terminate in or is routed through each affected area. The report concludes that for the postulated event, with the concurrent loss of offsite power, hot and cold shutdown can be accomplished in each case using only safety-related systems and equipment.

2. As a result of the NRC's review of the FHAR, LILCO was requested to describe the fire fighting techniques that would be used to extinguish a cable tray fire. The response, as contained in Rev. 1 of the SNPS FHAR, page 6-1, explains that water hose stations and portable extinguishers are provided for fire suppression. In the case of fire in the cable tray, water shall be sprayed on the cable tray to keep it cool and thus prevent the reignition of fire.

3. Cable tray automatic water suppression systems do exist at two locations in the Reactor Building, in close proximity to the HPCI turbine. Note: Category I MCC's in the vicinity would not be detrimentally affected by these existing suppression systems.

4. Manual hose standpipe systems are located strategically throughout the Reactor Building to fight postulated cable tray fires.

5. Cable tray fire breaks exist in vertical trays at 15' intervals and in horizontal trays at 20' intervals.

6. The Reactor Building has two main safety-related vertical tray risers located in separate quadrants. The plant requires only one of these vertical risers to be operational for safe shutdown (see CSAR). The tray risers have fire stops at each floor level, fire breaks at 15' intervals, solid bottoms and carefully fitted covers.

7. The design configuration of the Reactor Building makes water deluge systems in the many areas where six or more cable trays exist inappropriate due to the close proximity of motor control centers and other electrical equipment. Water damage to this equipment could propagate accident circumstances.

8. Many cable tray covers have been added to meet Regulatory Guide 1.75 requirements for electrical separation. The effectiveness of a water suppression system would be compromised by the existence of these covers. Removal of the covers, however, is not compatible with existing electrical separation requirements.

LILCO feels that, in view of the above points, the present Shoreham design provides sufficient protection to fulfill the requirements of the GDC. In light of this and the fact that there was previous NRC concurrence on the acceptability of the Shoreham design, LILCO trusts that this issue remains resolved.

SHOREHAM NUCLEAR POWER STATION

FIRE PROTECTION EVALUATION

RESPONSE TO GENERIC LETTER 81-12 SPURIOUS SIGNALS

HIGH/LOW PRESSURE INTERFACES

NRC 84-46-03, 84-46-04, 84-46-17

(K-1, F-1, T-2)

RESPONSE TO NRC GENERIC LETTER 81-12

A requirement for the electrical design of the Remote Shutdown Panel (RSP) is that the system must be isolated from all associated circuits as defined in NRC Generic Letter 81-12 (including all circuits routed through the control room and relay room) such that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment or result in spurious operations which could adversely affect the shutdown capability of the RSP. The NRC Generic Letter 81-12 defines three types of associated circuits: common power source, spurious operation, and common enclosure. The electrical design methods for Shoreham Nuclear Power Station (SNPS) are employed to protect the RSP from associated circuits and their potential effects. An evaluation of the RSP performance due to each type of associated circuit defined in Generic Letter 81-12 is performed.

I. COMMON POWER SOURCE

Analysis for SNPS has shown that only safety-related equipment and circuits are required to bring about a safe shutdown.

SNPS does not have associated circuits of the type having a common power source with the shutdown equipment and the power source not electrically separated from the circuit of concern by coordinated breaker, fuses, or similar devices. The RSP circuitry was specifically designed to avoid introducing circuits of this type. Control circuits from the remote shutdown panel are either routed independently from the control room and relay room or transfer switches are employed to isolate wiring run through these areas and to transfer the control circuit to a new power source. Thus short or open circuits or a blown fuse in the control circuit due to events in the control room or relay room will not disable the control capability at the remote shutdown panel. Therefore, it is not necessary to perform an evaluation for this type of associated circuit.

II. SPURIOUS OPERATION

The following sections describe the analysis performed to demonstrate that spurious operation will not prevent the RSP from achieving cold shutdown during a fire in the control room or relay room. The analysis was presented for four categories of equipment located in the control room or relay room:

(1) Remote Shutdown Panel (RSP)

(2) S/RVs

(3) Non-RSP Equipment

(4) High-Low Pressure Interface

Spurious operation was evaluated for its potential consequence in accordance with the assumptions described below:

(1) Spurious operation occurs simultaneously with other fire effects.

(2) Spurious operation for any equipment in the control room or relay room is considered unless the equipment is protected.

(3) A motor-operated valve or any other electrical equipment that has its power supply disabled during normal operation will not spuriously operate.

RSP Equipment

The RSP was designed to handle spurious operations for equipment within its own system. Manual control of the RSP components is available at the remote shutdown panel (RSP). Therefore, it is possible to correct any undesirable spurious operations once the manual control transfer from the control room to the RSP is accomplished. For example, spurious operation of an RHR system valve may divert the makeup water away from the reactor vessel. However, once the control is transferred to the RSP, the valve can be closed to provide sufficient makeup flow for the reactor vessel. Following transfer of control, all RSP equipment will be isolated from both the control room and the relay room.

Safety/Relief Valves

Spurious S/RV operation, where the valve fails open, can reduce reactor coolant inventory and increase suppression pool temperature. The RSP design considers the spurious operation of one S/RV as outlined in FSAR Chapter 15.

Other Non-RSP components

Other non-RSP components include all the equipment in the control room and relay room which is not a component of the RSP, a high-low pressure interface, or an S/RV. Examples of these components are the Division I and Division II of core spray, high pressure coolant injection (HPCI), and Division I of the RHR. These components will not prevent the RSP from achieving cold shutdown for the following reasons:

(1) No credit is taken for operation of these components. Spurious stop of a component is equivalent to the loss of the component.

Spurious start of any of these components will not degrade the RSP performance.

(2) Effects of spurious operation are bounded by other events. For example, spurious operation of the HPCI system could lead to inventory loss because of the steam-driven turbines. However, the amount of inventory loss due to these spurious operations is bounded by the spurious opening of a single S/RV. Therefore, consideration of spurious operation of these non-RSP components is not required.

Any spurious operation of the non-RSP components in the control room or relay room will not prevent the RSP from achieving cold shutdown.

High-Low Pressure Interface

A high-low pressure interface is a special case of spurious operation which may result in a breach of the barrier between a low pressure system and the reactor coolant pressure boundary. A list of all high-low pressure interfaces is provided in Table 1. These components were identified by tracing through all the paths on the nuclear boiler system which may lead to a low pressure system. The significance of the high-low pressure interface was then evaluated to identify the necessary corrective actions. The following types of high-low pressure interfaces do not require corrective action:

(1) One-inch or smaller line because the amount of inventory loss is minimal.

(2) Lines which have check valves to prevent potential inventory loss.

(3) Lines that contain an isolation valve which has its power disabled during normal operation.

(4) Lines bounded by events previously analyzed and bounded by Shoreham design basis. (single stuck open SRV)

Based on this method, the fire protection analysis concluded that only five sets of valves would require corrective actions. These valves are:

(1) 1E11*MOV051 and 052 on the RHR line to the radwaste system.

(2) 1B21*MOV083 and 084 reactor vessel head drain valves.

(3) 1G33*MOV037, 038, 039, on the reactor water cleanup (RWCU) line to the main condenser and waste collector tanks.

(4) 1E11*MOV081A,B - RHR testable check bypass valves

(5) 1E21*MOV081A,B - CS testable check bypass valves

The corrective actions for (1) and (2) above is to remove the overload heater for one of the valves (1E11*MOV052, 1B21*MOV083) when the plant is at power operation. The overload heater will be returned to these valves under controlled conditions when their services are required during plant shutdown. For (3) above, the identified corrective action is to remove the overload heater for valve 1G33*MOV037. This valve is in parallel with a 3/8 inch restricting orifice (1G33*RO050) which is upstream of valves 1G33*MOV038 and 039. The 3/8-inch orifice will limit the amount of potential inventory loss through the downstream high-low pressure interfaces. This corrective action allows the plant to retain the required services of the valves 1G33*MOV038 and 039 during normal plant startup operations without sacrificing plant protection.

For (4) and (5) above, the corrective action is to recalibrate the limit switches such that the valves will be limited to open equivalent to a 1-inch line size. This allows these valves to open as required during plant operation.

The RSP will not affect any of these components or their corrective actions; therefore, the high-low pressure interface has no impact on the RSP.

III. COMMON ENCLOSURE

The electrical separation design basis at SNPS allows associated circuits of the common enclosure type in the control and relay rooms.

To ensure that these associated circuits will not affect the RSP operation, it is necessary to:

(1) provide appropriate measures to prevent propagation of the fire, and

(2) provide electrical protection (e.g., breakers, fuses, or similar devices).

Fire in the control and relay rooms will not propagate to the RSP area or to the MCC area with which the RSP interfaces. This is because the control and relay rooms are in a different building than the RSP and MCC areas. The RSP circuitry is also protected from any damage from the fire in the control and relay rooms by cable routing. Therefore, adequate protection has been provided for the RSP, and associated circuits of the common enclosure type will not affect the RSP.

TABLE 1

High/Low Pressure Interface Components

System	Reference	Equipment	Corrective Action
RHR	FM-20A,B	1E11*MOV051,52 (F040,F049)	Remove overload heater for MOV052 during normal plant operation.
RWCU	FM-24A	1G33-MOV037,038, 039 HCV004 (F031,33,34,35)	Remove overload on MOV037 heater during normal plant operation. 1G33*RO050 (3/8 in. orifice) in parallel with this valve, upstream of valves MOV038,39.
NSSS	FM-29A	1B21*MOV083,084 (F001, F002)	Remove overload heater for MOV083 during normal plant operation
RHR	FM-20A,B	1E11*MOV047,048 (F008, F009)	No action required Note 4
NSSS	FM-29A	1B21*AOV081A-D 082A-D (F022A-D, F028A-D)	No action required Note 5
RHR	FM-20A,B	1E11*MOV036A,B 037A,B (F015A,B, F017A,B)	No action required Note 1
RHR	FM-20A,B	1E11*MOV053,054 (F022, F023)	No action required Note 1
RHR	FM-20A,B	1E11*MOV081A,B (F050A,B)	Limit valves to opening equivalent to 1 in. line size
CS	FM-23A	1E21*MOV033A,B (F005A,B)	No action required Note 1
CS	FM-23A	1E21*MOV081A,B (F047A,B)	Limit valves to opening equivalent to 1 in. line size
HPCI	FM-25A,B	1E41*MOV035 (F006)	No action required Note 1
RCIC	FM-22A	1E51*MOV035 (F012)	No action required Note 1

System	Reference	Equipment	Corrective Action
HPCI	FM-25A,B	1E41AOV081,082 (F028,29)	No action required Note 2
RCIC	FM-22A	1E51AOV081,082 (F025,026)	No action required Note 2
RHR	FM-20A,B	1E11*MOV049 (F052)	No action required Note 3
CRD	FM-27B	1C11*AOV081,082 051,050 (F010,011,0180,181)	No action required Note 5
HPCI	FM-25A,B	1E41*MOV043 (F001)	No action required Note 6

NOTES:

1. Check valve in series to provide protection.

2. One-inch line size limited, no unacceptable release.

3. Release would be comparable to SRV release which is bounding.

4. Reactor pressure interlock (outside control room) provides protection.

5. Numerous interlocks in the Reactor Protection System (outside control room) provides protection.

6. Rupture disc rupture results in isolation of HPCI turbine. Pressure switch between the two rupture discs in series will close both the steam inlet valve and the HPCI turbine stop valve, either of which will isolate the HPCI steam line from atmosphere.

SHOREHAM NUCLEAR POWER STATION

FIRE PROTECTION EVALUATION

DIESEL GENERATOR BREAKERS

NRC 84-46-04

(T-1)

MULTIPLE FAILURE OF EMERGENCY DIESEL GENERATORS DUE TO A FIRE IN THE MAIN CONTROL ROOM

The following conditions would have to be assumed for a fire in the main control room to disable all three emergency diesel generator breakers by shorting out the "closed" indicator light. For the purpose of this evaluation three different scenarios were developed.

I. INTERNAL PANEL FIRE ASSUMPTIONS

1. The limited amount of combustible material in a diesel generator section of the main control board is ignited.

2. The ionization fire detector within that section fails to respond to the fire.

3. The smoke and heat generated by the fire are not noticed by (sight or smell) any of the personnel in the control room which is continuously manned.

4. The fire continues to burn, generating sufficient heat to ignite the combustibles in the adjacent diesel generator sections.

5. The adjacent sections burn undetected by the individual smoke detectors, and the fire is not detected by any of the personnel in the main control room.

This is not considered to be a credible event since there are only limited amounts of combustibles in these sections, each section has an individual ionization fire detector, and the sections are completely barriered off from each other by 1/8 in. steel plate and 1/8 in. of fiberglass reinforced plastic as a thermal and fire barrier. Finally, it is extremely unlikely that the fire would go undetected by operating personnel.

II. EXPOSURE FIRE ASSUMPTIONS

1. A combustible material of sufficient quantity to cause considerable damage to wiring and components inside the main control board is placed directly in front of the diesel generator section.

2. The combustible material is ignited, and the fire is large enough and intense enough to penetrate through the louvers of all three diesel generator sections.

3. The control room personnel are unable to extinguish the fire with hand-held fire extinguishers or CO_2 hose reels. (It is not credible to assume that the fire is undetected by operating personnel.)

4. Control room personnel are forced to evacuate the main control room because of the smoke and heat generated by the fire.

5. The flames penetrating the louvers in each of the three diesel generator sections go beyond the air space behind the panel steel and ignite the combustibles in these sections.

This is not considered to be a credible event since the amount of combustible material (either solid or liquid) allowed in the main control room is strictly controlled by plant procedure. The amount of flammable liquid is restricted to one pint unless specifica 'y approved by upper plant management in accordance with the Shoreham fire ı.otection program. This control also extends to ignition sources such as open flame, welding equipment, and other equipment which could ignite combustible material. Additionally, the opening on the individual louvers is small (1/2 in. by 5 in., approximately) and is angled such that the louvered openings are not completely horizontal thus reducing the effective open area.

Fire extinguishers are available in the main control room, and CO_2 hose reels are provided just outside the control room door. Breathing equipment is provided in the form of self-contained air packs and breathing air lines from a breathing air system of nominal six hours capacity. It is not credible to assume that the fire could start and reach such an intensity that it could not be rapidly extinguished by control room personnel.

III. EXPLOSION AND FIRE ASSUMPTIONS

1. A large quantity of combustible liquid is brought into the main control room and placed near the diesel generator sections of the main control board in violation of written plant procedures.

2. The liquid is ignited and explodes, rapidly spreading the fire throughout the control room.

3. Control room personnel are driven out of the room without being able to take corrective action.

4. The fire affects all three emergency diesel generator sections of the main control board.

This is not considered to be a credible event since the amount of combustible liquid allowed in the main control room is strictly limited as are potential ignition sources. Also, flame retardancy of material was considered in the design of the main control room.

IV. LOSS OF OFFSITE POWER

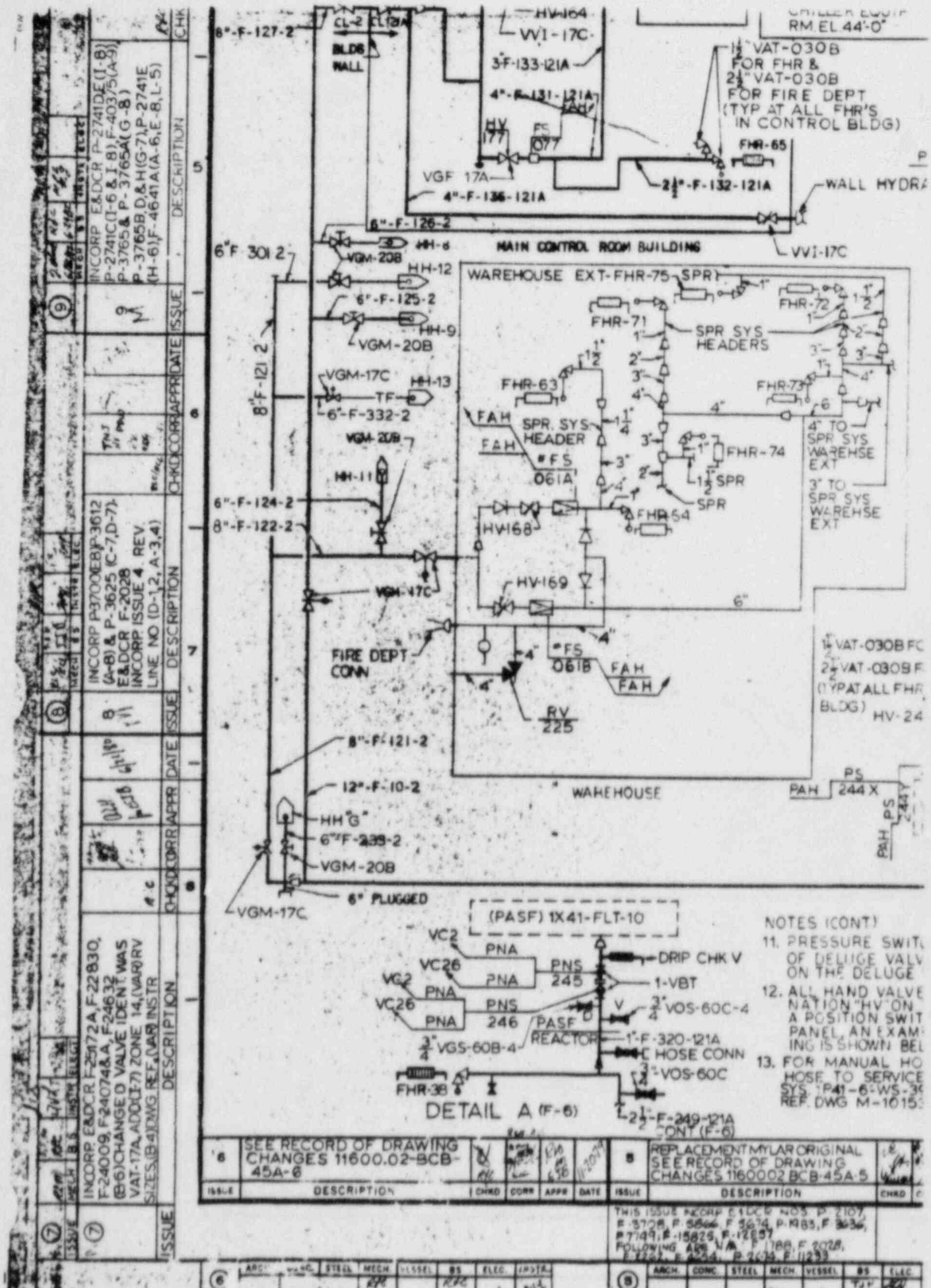
Each of the above three postulated events also assumes a simultaneous loss of offsite power such that the diesel generator breaker control circuits are disabled prior to closing onto their respective emergency buses. Once the breakers have closed, disabling the control circuit will have no effect.

V. HIGH JACKET WATER TEMPERATURE TRIP

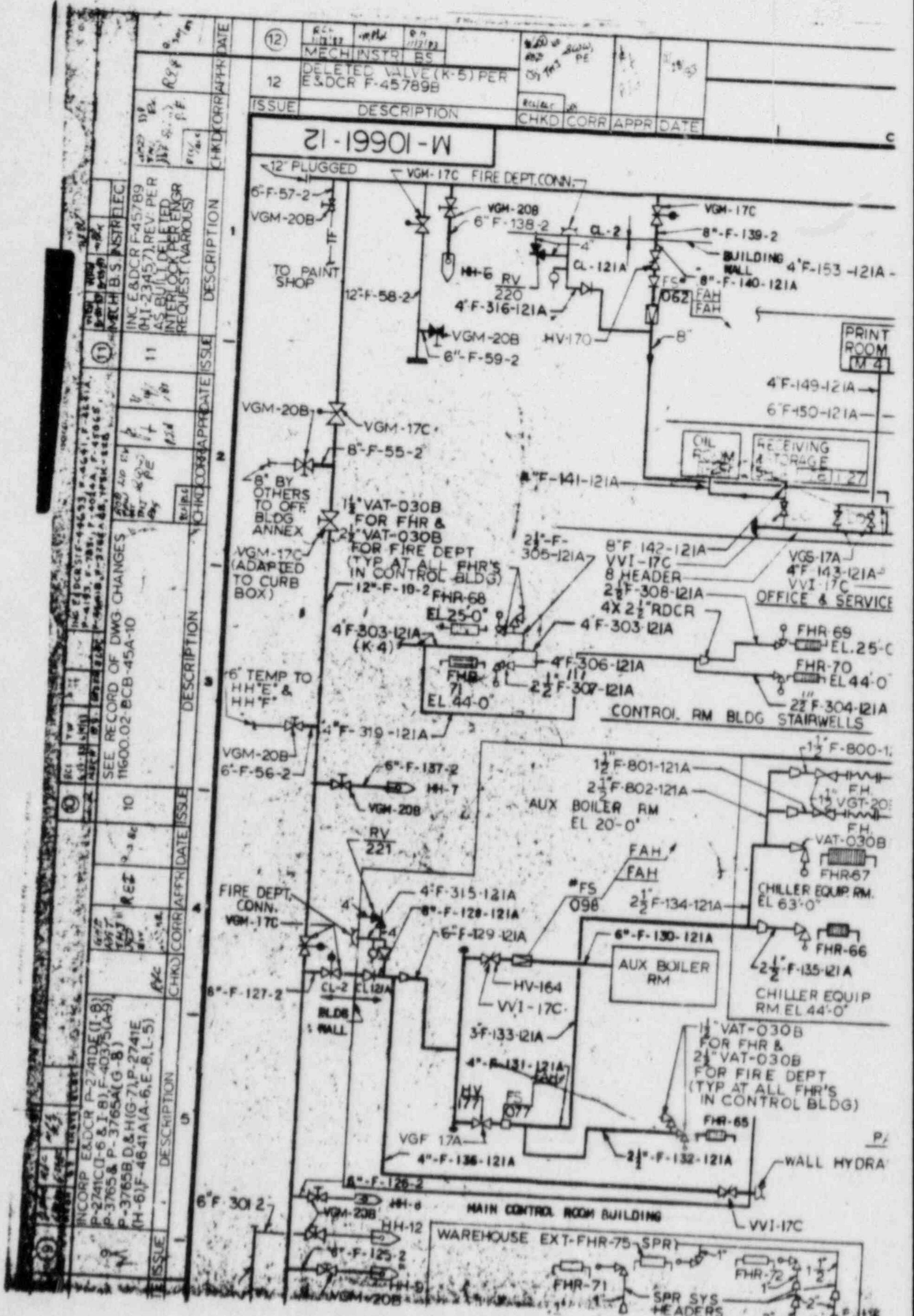
Even if the loss of all three emergency diesel generator output breakers is assumed with the consequent loss of service water to the diesels, the diesels will not be damaged, since during a loop event without a LOCA the diesel generator protective trips are not disabled. The diesels would trip on high jacket water temperature. This would result in a station blackout event (no credit taken for mobile diesels or gas turbine generators). Approximately three hours are available in which to manually start the diesel generators from the diesel generator rooms and manually close the diesel output breakers from the emergency switchgear rooms.

VI. CONCLUSION

For the reasons stated in Sections I, II, and III above, the events postulated are not credible, and the current design of the Shoreham control room is sufficient to prevent unacceptable levels of damage from any credible fire affecting control of the emergency diesel generators.

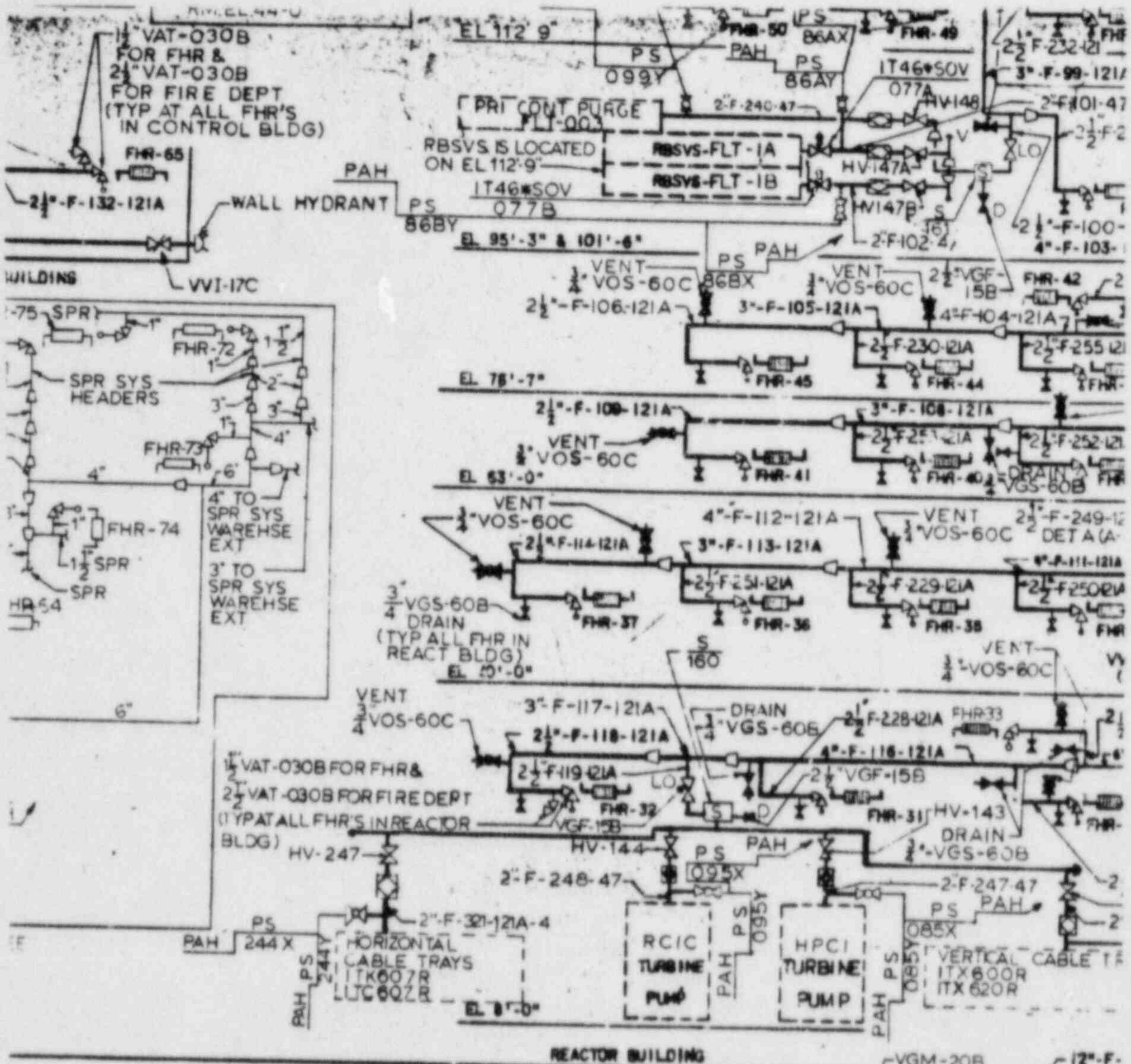


RM.EL 44'-0"
8"-F-127-2
CL-2
BLDG WALL
HV-164
VVI-17C
3"F-133-121A
4"-F-131-121A
HV 177
FS 077
VGF 17A
4"-F-136-121A
1½" VAT-030B FOR FHR & 2½" VAT-030B FOR FIRE DEPT (TYP AT ALL FHR'S IN CONTROL BLDG)
FHR-65
2½"-F-132-121A
WALL HYDRA
6"-F-126-2
MAIN CONTROL ROOM BUILDING
VVI-17C
6"F 301 2
HH-8
VGM-20B
HH-12
6"-F-125-2
HH-9
VGM-20B
8"-F-121 2
VGM-17C
HH-13
TF
6"-F-332-2
VGM-20B
HH-11
6"-F-124-2
8"-F-122-2
VGM-17C
FIRE DEPT CONN
WAREHOUSE EXT-FHR-75
SPR
FHR-71
FHR-72
SPR SYS HEADERS
FHR-63
FHR-73
FAH
SPR. SYS HEADER
FS 061A
FHR-74
4" TO SPR SYS WAREHSE EXT
3" TO SPR SYS WAREHSE EXT
FHR-54
SPR
HV168
HV-169
FS 061B
FAH
RV 225
WAREHOUSE
8"-F-121-2
12"-F-10-2
HH "G"
6"-F-239-2
VGM-20B
6" PLUGGED
VGM-17C
1¼ VAT-030B FC
2½ VAT-030B F
(TYP AT ALL FHR BLDG)
HV-24
PAH
PS 244 X
PS 244Y
PAH
(PASF) 1X41-FLT-10
VC2
PNA
VC26
PNS 245
PNS 246
DRIP CHK V
1-VBT
¾" VOS-60C-4
PASF REACTOR
1"-F-320-121A
HOSE CONN
¾" VOS-60C
¾" VGS-60B-4
FHR-38
DETAIL A (F-6)
2½"-F-249-121A CONT (F-6)
NOTES (CONT)
11. PRESSURE SWIT OF DELUGE VALV ON THE DELUGE
12. ALL HAND VALVE NATION "HV" ON A POSITION SWIT PANEL. AN EXAM ING IS SHOWN BEL
13. FOR MANUAL HO HOSE TO SERVICE SYS. 1P41-6-WS-3 REF. DWG M-10153
6 SEE RECORD OF DRAWING CHANGES 11600.02-BCB-45A-6
5 REPLACEMENT MYLAR ORIGINAL SEE RECORD OF DRAWING CHANGES 1160002 BCB-45A-5
ISSUE DESCRIPTION CHKD CORR APPR DATE



M-10661-12
12
DELETED VALVE (K-5) PER E&DCR F-45789B
ISSUE
DESCRIPTION
CHKD
CORR
APPR
DATE
MECH
INSTR
BS
INC E&DCR F-45789 (H1-23457), REV. PER AS BUILT DELETED INTERLOCK PER ENGR REQUEST (VARIOUS)
SEE RECORD OF DWG CHANGES 11600.02-8CB-45A-10
INCORP E&DCR P-2741DE (I-8) P-2741C(I-6 & I-8), F-40375 (A-9) P-37658 & P-37654 (G-8) P-3765B, D, & H (G-7), P-2741E (H-6), F-4641A (A-6, E-8, L-5)
12" PLUGGED
VGM-17C
FIRE DEPT. CONN.
6"-F-57-2
VGM-20B
TO PAINT SHOP
VGM-20B
6"-F-138-2
CL-2
CL-121A
HH-6
RV 220
4"-F-316-121A
12"-F-58-2
VGM-20B
6"-F-59-2
HV-170
VGM-17C
8"-F-139-2
BUILDING WALL
4"-F-153-121A
FS 062
8"-F-140-121A
FAH
FAH
8"
PRINT ROOM
4"F-149-121A
6"F-150-121A
RECEIVING & STORAGE
VGM-20B
VGM-17C
8"-F-55-2
8" BY OTHERS TO OFF BLDG ANNEX
8"F-141-121A
1 1/2" VAT-030B FOR FHR & 2 1/2" VAT-030B FOR FIRE DEPT (TYP AT ALL FHR'S IN CONTROL BLDG)
VGM-17C (ADAPTED TO CURB BOX)
12"-F-10-2
FHR-68 EL.25-0"
2 1/2"-F-305-121A
8"F-142-121A
VVI-17C
8 HEADER
2 1/2"F-308-121A
4X2 1/2" RDCR
VGS-17A
4"F-143-121A
VVI-17C
OFFICE & SERVICE
4"F-303-121A (K-4)
4"F-303-121A
FHR 69 EL.25-0
FHR 71 EL.44-0"
4"F-306-121A
2 1/2"F-307-121A
FHR-70 EL.44-0
2 1/2"F-304-121A
6" TEMP TO HH "E" & HH "F"
4"F-319-121A
CONTROL RM BLDG STAIRWELLS
VGM-20B
6"-F-56-2
6"-F-137-2
HH-7
VGM-20B
1 1/2"F-800-1
1 1/2"F-801-121A
2 1/2"F-802-121A
AUX BOILER RM EL 20-0"
FH
1 1/2" VGT-20
FH
VAT-030B
FHR-67
RV 221
FAH
FAH
FS 096
2 1/2"F-134-121A
CHILLER EQUIP. RM. EL 63'-0"
FIRE DEPT. CONN. VGM-17C
4"F-315-121A
8"-F-128-121A
6"-F-129-121A
6"-F-130-121A
AUX BOILER RM
FHR-66
2 1/2"-F-135-121A
6"-F-127-2
CL-2
CL121A
BLDG WALL
HV-164
VVI-17C
3"F-133-121A
CHILLER EQUIP RM EL 44'-0"
4"-F-131-121A
1 1/2"VAT-030B FOR FHR & 2 1/2"VAT-030B FOR FIRE DEPT (TYP AT ALL FHR'S IN CONTROL BLDG)
HV 177
FS 077
FHR-65
VGF 17A
4"-F-136-121A
2 1/2"-F-132-121A
WALL HYDRA
6"-F-126-2
6"F-301-2
HH-8
VGM-20B
MAIN CONTROL ROOM BUILDING
VVI-17C
HH-12
WAREHOUSE EXT-FHR-75-SPR
6"-F-125-2
FHR-71
FHR-72
SPR SYS HEADERS
HH-9
VGM-20B

2



-DRIP CHK V
1-VBT
¾"VOS-60C-4
-320-121A
HOSE CONN
-VOS-60C
-F-249-121A
CONT (F-6)

NOTES (CONT)

11. PRESSURE SWITCHES SHOWN DOWNSTREAM OF DELUGE VALVES ARE PHYSICALLY LOCATED ON THE DELUGE VALVE TRIM.
12. ALL HAND VALVES INDICATED BY THE DESIGNATION "HV" ON THIS DWG ARE FURNISHED WITH A POSITION SWITCH AND ALARMS AT THE F.P. PANEL. AN EXAMPLE OF INSTRUMENT NUMBERING IS SHOWN BELOW:

HV-143 PNS 143 PNA
(TYPICAL)

13. FOR MANUAL HOOK-UP BY HOSE TO SERVICE WATER SYS. 1P41-6"-WS-396-156-3 REF. DWG M-10153

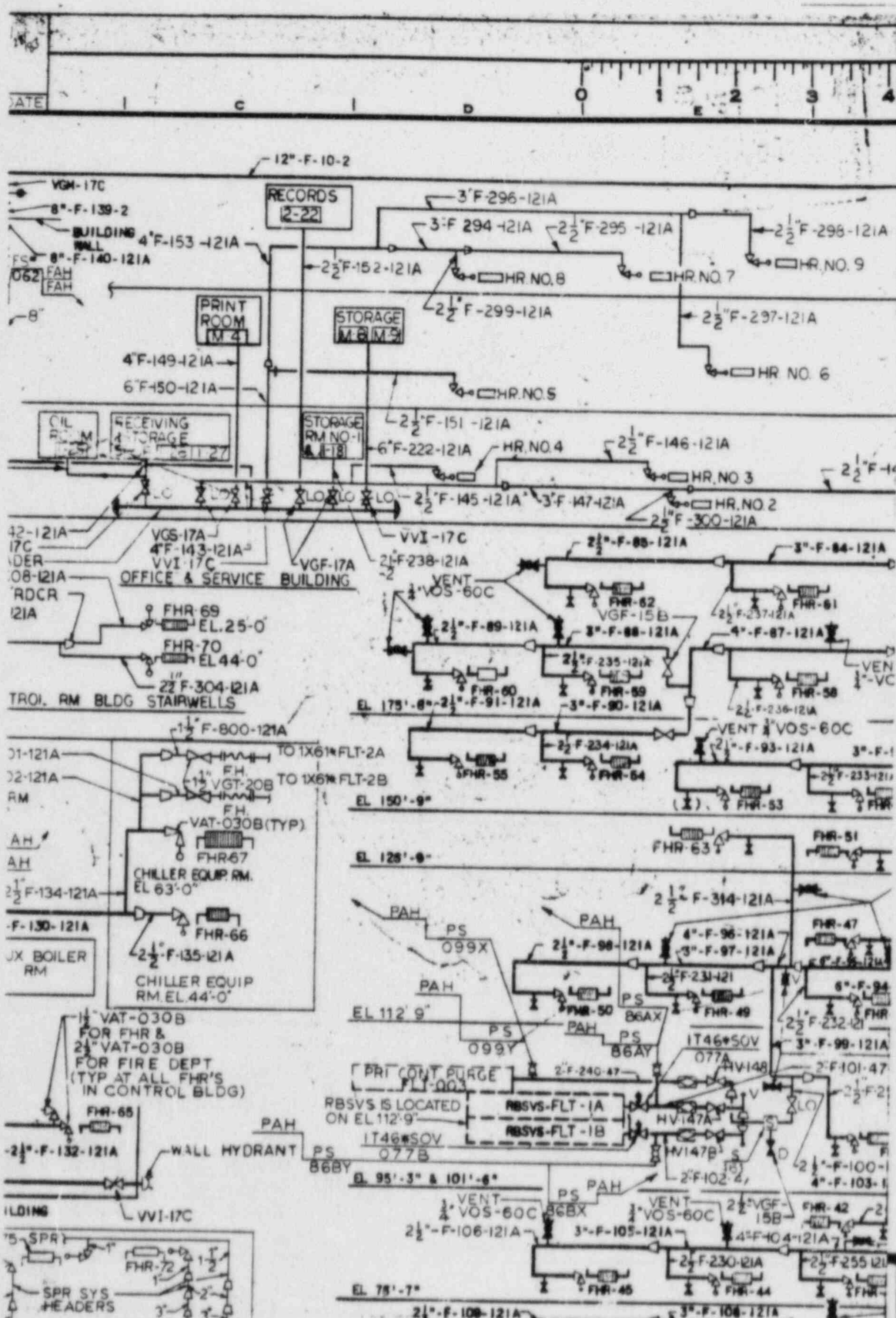
NOTES (CONT)

AS FOLLOWS: 1M43-3"F-211-121A

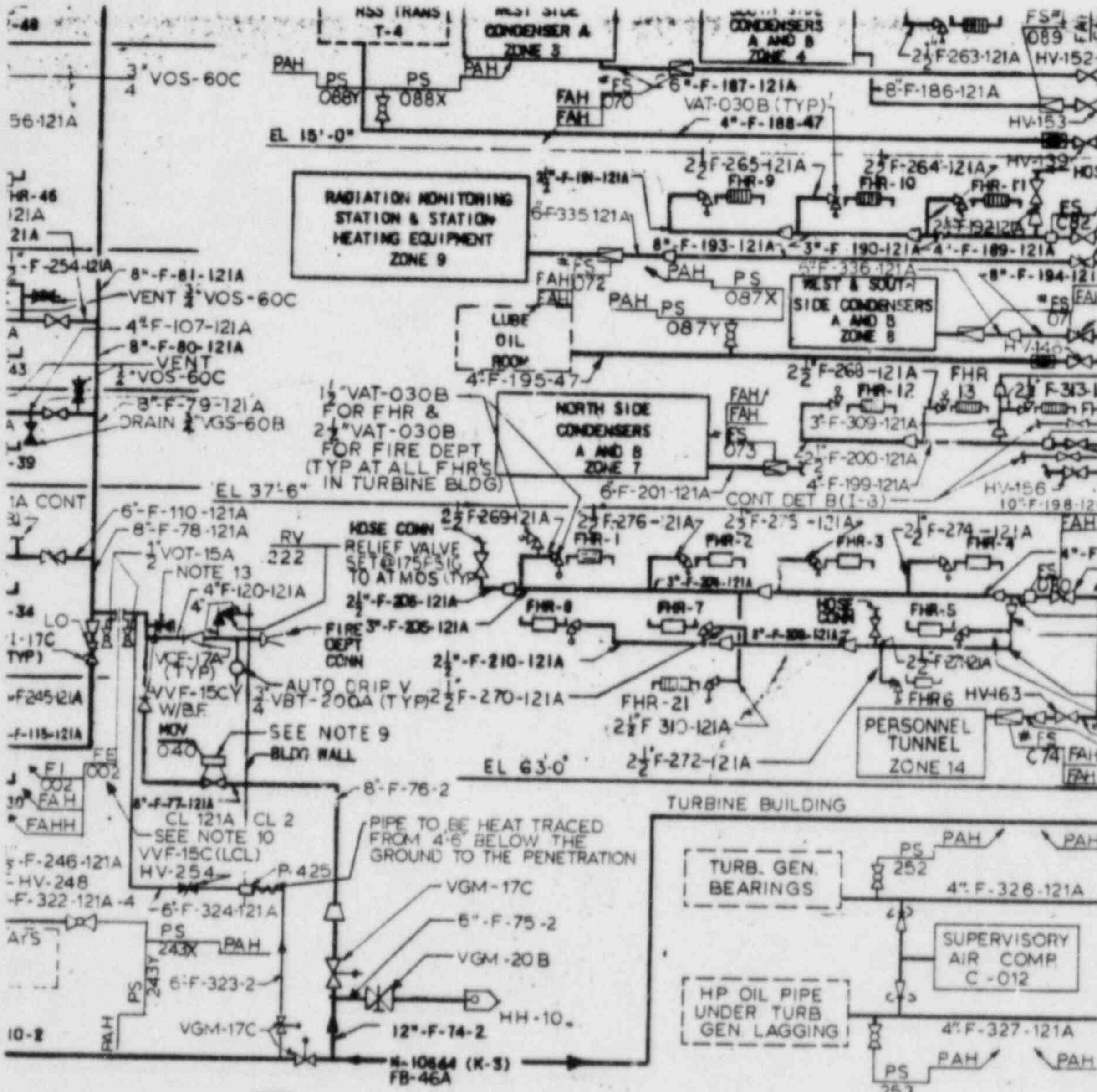
6. ALL LINE & VALVE NOS ARE SUF CODE CLASSIFICATION 4, UNLES NOTED
7. REMOTE INSTRUMENTS ARE ON THE FIRE PANEL, UNLESS OTHERWISE NOTED. A COM ON THE MCB WILL BE PROVIDED FOR AL FIRE PROTECTION PANEL.
8. (*) INDICATES INSTRUMENTS FURNISHE
9. FURNISHED UNDER SHI-209
10. LOOP FURNISHED UNDER SHI-311, 282, 26

DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DE
REPLACEMENT MYLAR ORIGINAL SEE RECORD OF DRAWING CHANGES 11600.02 BCB-45A-5					4	SEE RECORD OF DRAWING CHANGES 11600.02-BCB-45A-4					3	

ARCH.	CONC.	STEEL	MECH.	VESSEL	BS	ELEC.	INSTR.		ARCH.	CONC.	STEEL	MECH.	VESSEL	BS	ELEC.	INSTR.		ARCH.	CONC.
			RCL					4				RCL					3		



12"-F-10-2
RECORDS 2-22
PRINT ROOM M-4
STORAGE M-8 M-9
STORAGE RM NO-1
OFFICE & SERVICE BUILDING
HR. NO. 9
HR. NO. 8
HR. NO. 7
HR. NO. 6
HR. NO. 5
HR. NO. 4
HR. NO. 3
HR. NO. 2
TROL RM BLDG STAIRWELLS
CHILLER EQUIP. RM. EL 63'-0"
CHILLER EQUIP RM. EL. 44'-0"
AUX BOILER RM
WALL HYDRANT
RBSVS IS LOCATED ON EL 112'-9"
PRI CONT PURGE FLT-003
RBSVS-FLT-1A
RBSVS-FLT-1B
EL 175'-8"
EL 150'-9"
EL 128'-9"
EL 112'-9"
EL 95'-3" & 101'-6"
EL 78'-7"
1 1/2" VAT-030B FOR FHR & 2 1/2" VAT-030B FOR FIRE DEPT (TYP AT ALL FHR'S IN CONTROL BLDG)
SPR SYS HEADERS



DETAIL B (I-6)

FIXED WITH
S OTHERWISE

PROTECTION
MON ANNUNCIATOR
RM POINTS ON THE

D BY SHI-330

I&125

NOTES:

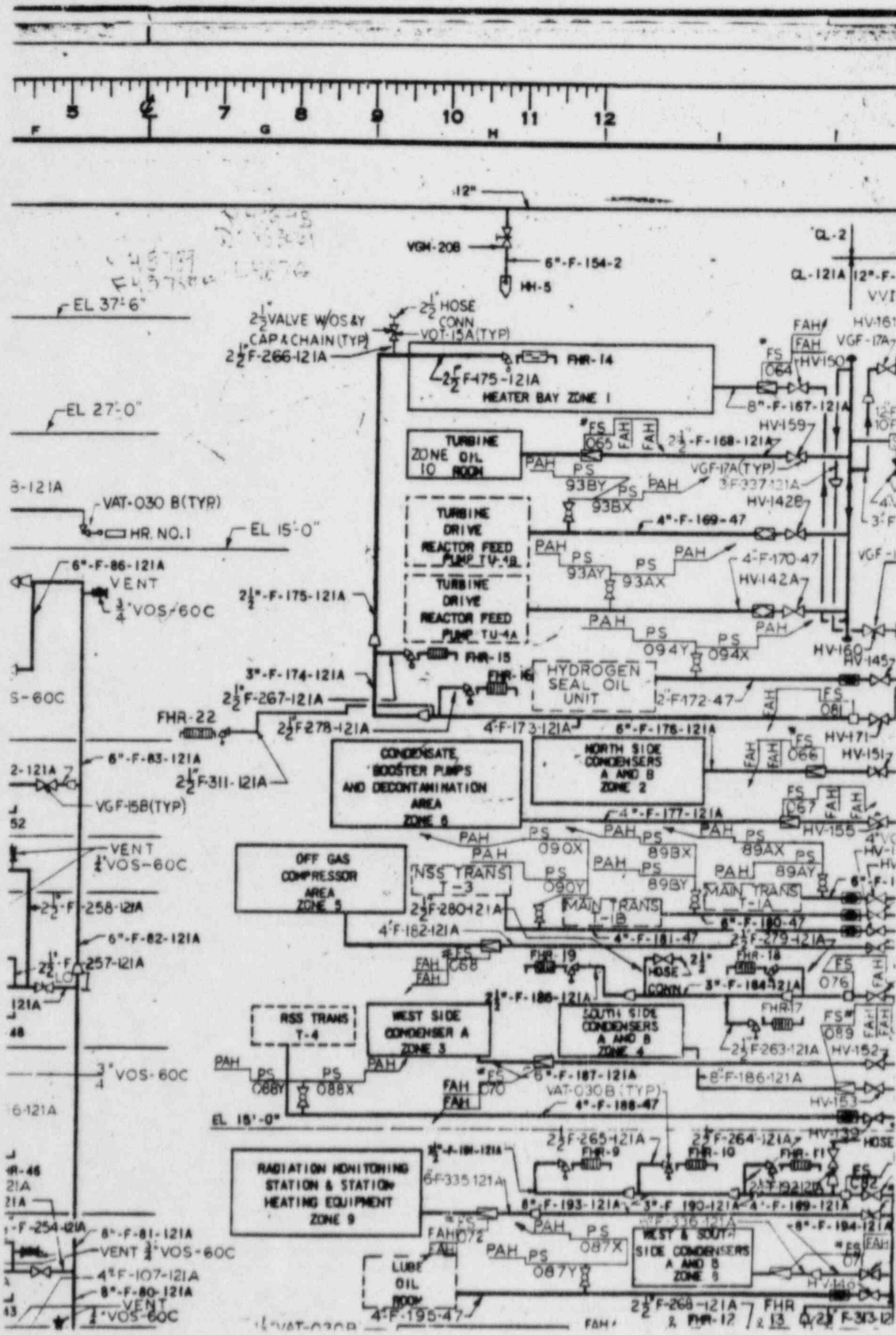
1. SOLID BOXED-IN AREAS DENOTE WET PIPE SPRINKLER SYSTEM.
2. DOTTED BOXED-IN AREAS DENOTE FIXED DELUGE WATER SPRAY SYSTEM.
3. SPRINKLER SYSTEM FOR DIESEL DRIVEN FIRE PUMP AREA M-10664(FB-46A)
4. ALL CONNECTIONS FOR PRESSURE INSTS TO BE 3/4 VOT-15A EXCEPT AS NOTED
5. ALL INSTR, EQPT & LINE DES. NOS. ARE PREFIXED WITH UNIT & SYS. NO IM43, UNLESS OTHERWISE NOTED

REFERENCE DRAWINGS:
CONTROL RM BLDG & MISC AREAS, PLUMBING, FIRE PRO & ROOF DRAIN
FLOW DIAGRAM SYMBOLS
FD SYSTEM 1M-43 FIRE PROT & WELL WATER LINES
SERVICE WATER SYS.

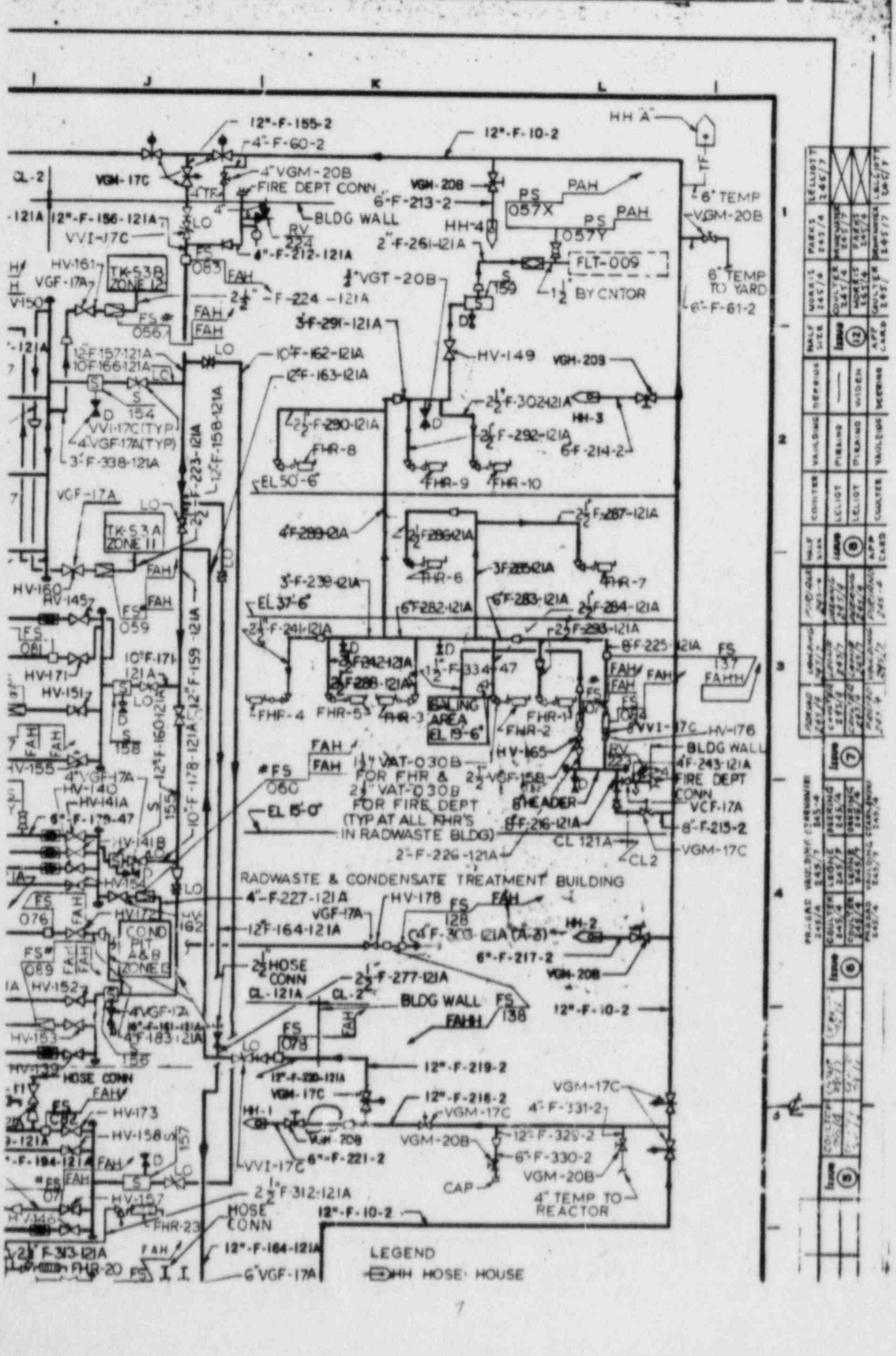
THE INFORMATION ON THIS DRAWING USED FOR OTHER THAN THE CONSTRU REPAIR OF THE PLANT FACILITY DESCRIB

TYPICAL SERV BLDGS ... GLOBE ... VALVES					2	SEE RECORD OF DRAWING CHANGES - ISSUE 2. DIAGRAM REARRANGED - ADDED LINE NO'S, HOSE RACKS, FIRE DEPT & HOSE CONN					1	ORIGINAL ISSUE
CRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION

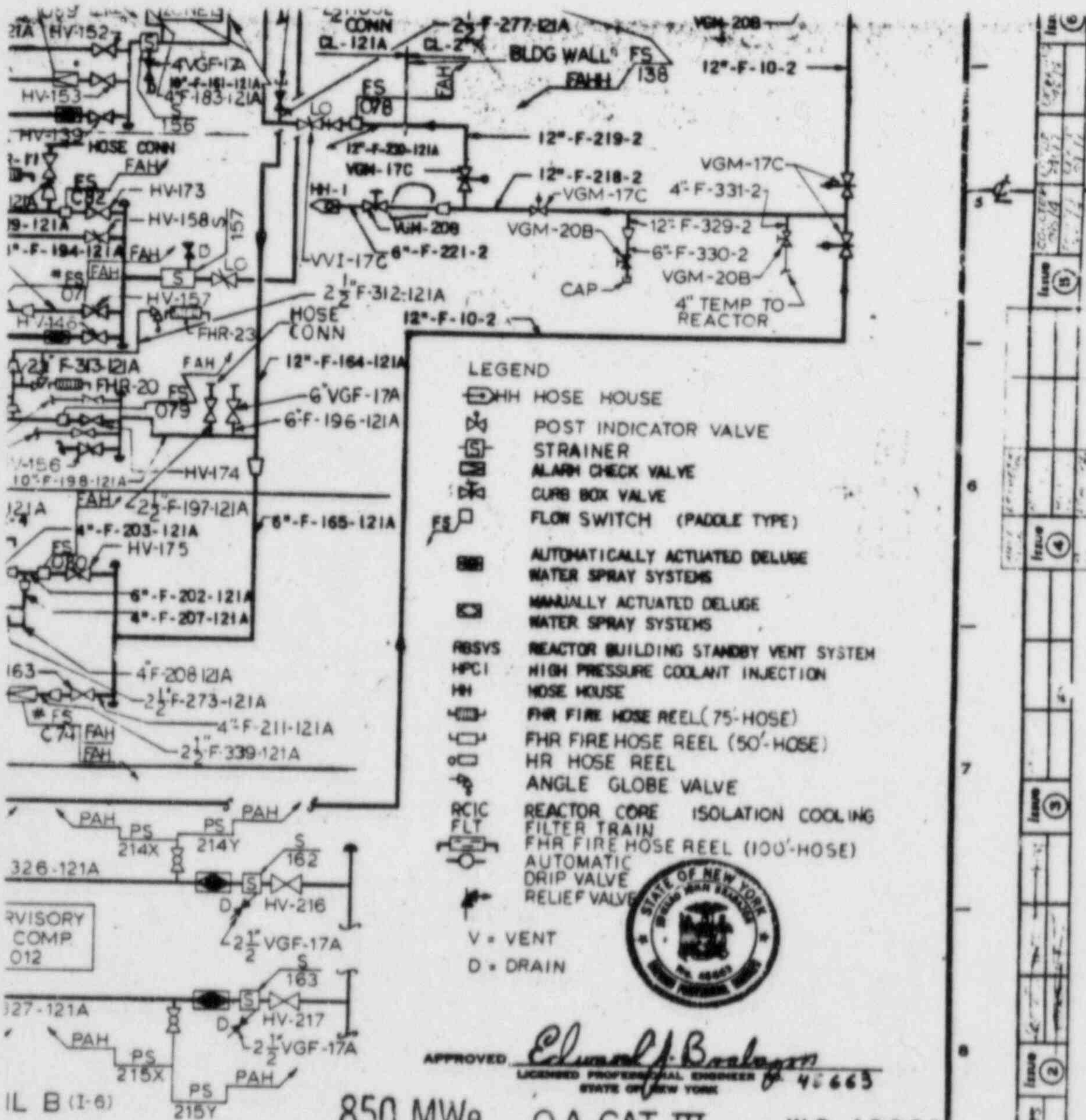
CEL	MECH.	VESSEL	BS	ELEC.	INSTR	②		CONC.	STEEL	MECH.	VESL	BS	ELEC.	①	ARCH	CONC.	...	...	VESSEL



5
6
7
8
9
10
11
12
F
G
H
12"
VGH-208
6"-F-154-2
HH-5
CL-2
CL-121A
12"-F-
EL 37'-6"
EL 27'-0"
EL 15'-0"
$2\frac{1}{2}$" VALVE W/OS&Y CAP&CHAIN (TYP)
$2\frac{1}{2}$" HOSE CONN
VOT-15A (TYP)
$2\frac{1}{2}$"F-266-121A
FHR-14
$2\frac{1}{2}$"F-175-121A
HEATER BAY ZONE 1
FS 064
FAH
HV-150
HV-161
VGF-17A
8"-F-167-121A
TURBINE OIL ROOM
ZONE 10
FS 065
$2\frac{1}{2}$"-F-168-121A
HV-159
PAH
PS 93BY
PS 93BX
VGF-17A (TYP)
3"F-337-121A
HV-142B
TURBINE DRIVE REACTOR FEED PUMP TU-4B
4"-F-169-47
PS 93AY
PS 93AX
4"-F-170-47
HV-142A
TURBINE DRIVE REACTOR FEED PUMP TU-4A
PS 094Y
PS 094X
HV-160
HV-145
VAT-030 B (TYP)
HR. NO. 1
6"-F-86-121A
VENT
$\frac{3}{4}$" VOS-60C
$2\frac{1}{2}$"-F-175-121A
FHR-15
3"-F-174-121A
$2\frac{1}{2}$"F-267-121A
FHR-16
HYDROGEN SEAL OIL UNIT
2"F-172-47
FS 081
HV-171
FHR-22
$2\frac{1}{2}$"F-278-121A
4"F-173-121A
6"-F-176-121A
6"-F-83-121A
$2\frac{1}{2}$"F-311-121A
CONDENSATE BOOSTER PUMPS AND DECONTAMINATION AREA ZONE 6
NORTH SIDE CONDENSERS A AND B ZONE 2
FS 066
HV-151
VGF-15B (TYP)
4"-F-177-121A
FS 067
HV-155
PAH
PS 090X
PS 89BX
PS 89AX
PS 89AY
PS 089Y
PS 090Y
PS 89BY
OFF GAS COMPRESSOR AREA ZONE 5
NSS TRANS T-3
MAIN TRANS T-1B
MAIN TRANS T-1A
$2\frac{1}{2}$"F-280-121A
6"-F-180-47
$2\frac{1}{2}$"-F-258-121A
6"-F-82-121A
4"F-182-121A
4"-F-181-47
$2\frac{1}{2}$"F-279-121A
$2\frac{1}{2}$"-F-257-121A
FS C68
FHR-19
$2\frac{1}{2}$" HOSE CONN
FHR-18
3"-F-184-121A
FS 076
$2\frac{1}{2}$"-F-186-121A
FHR-17
RSS TRANS T-4
WEST SIDE CONDENSER A ZONE 3
SOUTH SIDE CONDENSERS A AND B ZONE 4
$2\frac{1}{2}$"F-263-121A
FS 089
HV-152
$\frac{3}{4}$" VOS-60C
PS 088Y
PS 088X
FS 070
6"-F-187-121A
8"-F-186-121A
VAT-030B (TYP)
4"-F-188-47
HV-153
EL 15'-0"
$2\frac{1}{2}$"F-265-121A
$2\frac{1}{2}$"F-264-121A
HV-139
HOSE
FHR-9
FHR-10
FHR-11
RADIATION MONITORING STATION & STATION HEATING EQUIPMENT ZONE 9
6"F-335-121A
8"-F-193-121A
3"-F-190-121A
4"-F-189-121A
FAH 072
PS 087X
PS 087Y
3"F-336-121A
8"-F-194-121A
WEST & SOUTH SIDE CONDENSERS A AND B ZONE 8
HV-146
8"-F-81-121A
VENT $\frac{3}{4}$" VOS-60C
4"F-107-121A
8"-F-80-121A
LUBE OIL ROOM
4"F-195-47
$2\frac{1}{2}$"F-268-121A
FHR-12
FHR 13



12"-F-155-2
4"-F-60-2
12"-F-10-2
HH "A"
VGM-17C
4" VGM-20B
FIRE DEPT CONN
BLDG WALL
VGM-20B
6"-F-213-2
PS
057X
PAH
PS
057Y
6" TEMP
CL-2
12"-F-156-121A
VVI-17C
RV
224
4"-F-212-121A
HH-4
2"-F-261-121A
FLT-009
1 1/2 BY CNTOR
6" TEMP TO YARD
6"-F-61-2
HV-161
VGF-17A
TK-53B ZONE 12
FS
083
FAH
2 1/2"-F-224-121A
FS
056
FAH
1/2" VGT-20B
3"F-291-121A
HV-149
VGM-20B
HV-150
12"F-157-121A
10"F-166-121A
LO
10"F-162-121A
12"F-163-121A
2 1/2"F-302-121A
HH-3
VVI-17C (TYP)
4" VGF-17A (TYP)
3"-F-338-121A
12"-F-158-121A
2 1/2"-F-290-121A
FHR-8
2 1/2"F-292-121A
6"F-214-2
EL 50'-6"
FHR-9
FHR-10
VGF-17A
TK-53A ZONE 11
4"F-289-121A
2 1/2"F-286-121A
2 1/2"F-287-121A
FHR-6
3"F-285-121A
FHR-7
HV-160
HV-145
FS
059
3"-F-239-121A
EL 37'-6"
6"F-282-121A
6"F-283-121A
2 1/2"F-284-121A
2 1/2"-F-241-121A
2 1/2"F-293-121A
8"-F-225-121A
FS
137
FAHH
FS
081
HV-171
10"F-171
121A
HV-151
12"F-159-121A
2"F-242-121A
2"F-288-121A
1 1/2"-F-334-47
FAH
FAH
FHF-4
FHR-5
FHR-3
BALING AREA EL 19'-6"
FHR-1
FHR-2
FS
084
VVI-17C
HV-176
HV-165
BLDG WALL
4"F-243-121A
FIRE DEPT CONN
HV-155
4" VGF-17A
HV-140
HV-141A
12"F-160-121A
12"-F-178-121A
FS
060
1 1/2" VAT-030B FOR FHR &
2 1/2" VAT-030B FOR FIRE DEPT
(TYP AT ALL FHR'S IN RADWASTE BLDG)
2 1/2" VGF-15B
8" HEADER
VCF-17A
8"F-216-121A
8"-F-215-2
EL 15'-0"
6"-F-179-47
HV-141B
2"-F-226-121A
CL 121A
CL2
VGM-17C
HV-154
RADWASTE & CONDENSATE TREATMENT BUILDING
FS
076
HV-172
4"-F-227-121A
VGF-17A
HV-178
FS
128
FAH
COND PIT A&B ZONE 13
12"F-164-121A
6"F-303-121A
HH-2
6"-F-217-2
VGM-20B
FS
089
HV-152
2 1/2" HOSE CONN
CL-121A
CL-2"
2 1/2"-F-277-121A
BLDG WALL
FS
138
FAHH
12"-F-10-2
4" VGF-17A
4"F-183-121A
HV-153
FS
078
12"-F-219-2
HV-139
HOSE CONN
12"-F-220-121A
VGM-17C
12"-F-218-2
VGM-17C
VGM-17C
4"-F-331-2
HV-173
HH-1
VGM-20B
12"-F-329-2
HV-158
6"-F-330-2
6"-F-221-2
VVI-17C
VGM-20B
CAP
4" TEMP TO REACTOR
HV-157
2 1/2"F-312-121A
FHR-23
HOSE CONN
12"-F-10-2
2 1/2" F-313-121A
FHR-20
12"-F-164-121A
6" VGF-17A
LEGEND
HH HOSE HOUSE



850 MWe QA CAT III W.O. 48923

WINGS:
DG & MISC S, FIRE PRCT M-10662(FB-36B)
SYMBOLS 3 FIRE PROT NES M-10101(FM-14A) M-10664(FB-46A)
SYS. M-10153(FM-47A)

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FLOW DIAGRAM
WATER FIRE PROTECTION SYSTEM
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-10661-12

S & W DWG. No. 1160002-FB-45A-12

Designed by R. BOULES Drawn by R. BOULES
Des. Chk'd by Ch'd by A D YOUNG