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November 20, 1992

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362**
Replacement of Exide Batteries
San Onofre Nuclear Generating Station
Units 2 and 3

Southern California Edison has experienced problems with Exide Battery jar covers cracking. Specifically, some jars of three of the Class 1E 125 VDC Safety-Related Station Batteries[1] for Units 2 and 3 (3B008, 3B007 and 2B007) have cracked covers. (SCE has disconnected the affected cells of the jars with cracked covers and the batteries remain operable.) To eliminate the problem with cracking jar covers, SCE will entirely replace these three battery banks with a new Exide battery design that is not subject to this cracking phenomenon. (SCE replaced the other five Station Batteries with the new Exide battery design during previous refueling outages.)

To expedite this replacement process, SCE is planning to install a temporary Class 1E battery bank to allow on-line replacement of these batteries. The use of a temporary battery will affect a previously approved request to deviate from the requirements of 10 CFR 50, Appendix R, Section III.G.2 for fire area 2-AC-50-29 during the time this replacement is being performed. This previously approved deviation was referred to as Deviation Request No. 8.

Consistent with the guidance of NRC Generic Letter 86-10, "Implementation of Fire Protection Requirements," a revision of a previously approved deviation (exemption) requires NRC approval. Specifically, in Enclosure 2 of Generic Letter 86-10, in response to Question 8.4, "Future Changes," the NRC states that approval of a plant modification is required:

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1 A "Battery" refers to a Battery Bank consisting of 29 or 30 individual battery jars with two cells in each jar.

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"If the (licensce's) evaluation (of the change) finds that there is an impact that could result in the (fire) area either not being in conformance with Appendix R or some other aspect of the approved fire protection program, **or being outside the basis for an exemption that was granted for the area involved**, the licensee must either make modifications to achieve conformance or **justify and request** exemption (or, for the post 1979 plants, **approval**) from the NRC."

Therefore, because Units 2 and 3 are post 1979 plants, the purpose of this letter is to request NRC approval of the revision to Deviation Request No. 8 (Enclosure 1). Note that the temporary battery will be used only to facilitate the battery replacement effort and will be removed once this work is completed. Therefore, the plant configuration will be restored to the configuration described in the original approved deviation after the existing battery jars have been replaced with the new Exide battery jars.

Discussion

By letters dated May 31, 1987, and November 20, 1987, SCE submitted a request for NRC approval of 18 deviations from the requirements of 10 CFR 50, Appendix R. One of these deviations (Deviation No. 8) was a request to deviate from the specific requirements of Section III.G.2 of Appendix R to 10 CFR 50 for fire area 2-AC-50-29. An approved deviation for this fire area was required because:

1. The separation between Train A and B switchgear room emergency air conditioning units and other adjacent redundant cables for Units 2 and 3 is less than 20 feet, and

2. Separation between Train A and B cabling for redundant safe shutdown equipment in another location within the fire area is approximately 90 feet with intervening combustibles, and detection is provided over all redundant safe shutdown equipment and major combustibles but is not area-wide.

Specifically, for item 2 above, there is Train A cabling in the east end of fire area 2-AC-50-29 (motor control room) and Train B cabling in the west end of fire area 2-AC-50-29 (lobby). The NRC approved Deviation Request No. 8 by SER dated June 29, 1988. In that SER the NRC stated:

"The deviation in the lobby/motor control room relates to the fact that the separation between Train A and Train B switchgear room emergency air conditioning units and adjacent cables for Units 2 and 3 is less than 20 feet. Also, in another location within the area, redundant systems are separated by 90 feet but the intervening space contains combustible material. In addition, fire detection is not located throughout the area. [...] In all of these areas the observed fire hazards were not considered significant, or, where they were, the hazard was mitigated by the

presence of an automatic fire suppression system. The staff concludes, that if a fire should occur in these locations it will not result in rapid temperature rise or flame propagation. The fire would be detected in its formative stages by the fire detection systems identified in the UFHA or by plant operators. The fire would then be put out by the fire brigade using existing manual fire fighting equipment. Pending arrival of the brigade the spatial separation and physical barriers which exist between redundant shutdown systems is sufficient to assure that safe plant shutdown following the fire could be achieved and maintained. The Staff concludes, therefore, that the above-described conditions are acceptable deviations from C.5.b.(2) of BTP CMEB 9.5-1."

Revised Deviation

To facilitate replacement of the existing batteries, SCE is planning to install a temporary battery bank to allow on-line replacement of the batteries. The temporary battery (B00X) would be installed in the east end of fire area 2-AC-50-29, in the motor control room. The impact of this temporary battery on Deviation Request No. 8 varies depending on which train of safety-related equipment is involved:

Train B

When the temporary battery is used to facilitate replacement of 3B008 (Unit 3, Train B), it will be supplying Train B power. The power supply cable from the temporary battery will be routed on the floor of 2-AC-50-29 to the Unit 3, Train B battery room (fire area 3-AC-50-52). Because there is existing Train A cable in the overhead cable trays in the east end of fire area 2-AC-50-29, this configuration will reduce the 90 foot separation between Train A and Train B cables discussed in the original Deviation Request No. 8 to an approximate 6 foot vertical separation (see Enclosure 2 for exact cable routing details).

Train A

When the temporary battery is used to facilitate replacement of Battery 3B007 (Unit 3, Train A) and Battery 2B007 (Unit 2, Train A), the temporary battery would be a Train A source and the Train A/Train B interaction in the east end of fire area 2-AC-50-29 would not exist. However, because Train A cable would be run through the east wall of the battery rooms for batteries 2B007 and 3B007, the 90 foot separation between Trains A and B would be reduced to approximately 85 feet (90 feet minus the 5 foot distance between the existing Train A cable trays and the east wall of Battery rooms 2A and 3A).

Because the Train B battery replacement case is more severe than the Train A battery replacement (6 foot vertical separation between Trains A and B versus an 85 foot horizontal separation), the Train B case bounds the Train A case and is the one described in the revised Deviation Request No. 8 (Enclosure 1).

Battery Replacement

The temporary battery will be identical to the existing Station Batteries in that they:

1. Will be the same cell type as the replacement batteries, but will have 2 cells more than the existing batteries,

2. Will be able to power the ESF loads for the same duration as the existing batteries,

3. Will be seismically qualified, and

4. Will be connected to a full capacity, safety-related battery charger when the temporary battery is connected to one of the ESF distribution buses.

SCE will perform a service test on the temporary battery to demonstrate that it can power either Train A or Train B loads. Because the positive and negative power supply cables will be next to each other, a fuse will be installed to protect the temporary battery against a short in the cable. A chain link fence will also be installed to prevent accidental contact with the battery and to protect against unauthorized entry.

Once approved by the NRC, replacement of these three batteries will be completed in five stages as shown below.

Stage One: TFM C-92-PKA-001

Install temporary battery (B00X) in the east end of fire area 2-AC-50-29, in the motor control room 312. Connect battery B00X to spare battery charger 2B017 with cable routed overhead by tying to the existing support structures. Temporary battery B00X will remain in-place until each jar of batteries 3B008, 3B007 and 2B007 has been replaced. When the temporary battery is not in use, it will be kept on float charge from battery charger 2B017. When the temporary battery is in use, the spare charger is not needed and will be disconnected.

Stage Two: TFM 3-92-PKA-003

Disconnect Battery 3B008 from the Unit 3 Train B ESF distribution switchboard bus 3D2. Connect temporary battery B00X to ESF distribution switchboard bus 3D2 by routing cables on the floor of 2-AC-50-29 and protected with inverted cable trays installed over the cables and bolted to the floor. (See the diagram provided in Enclosure 2 of this letter for exact cable routing details.) Exchange the existing battery jars of 3B008 with the new jars and restore battery 3B008 to operable status. Disconnect temporary battery B00X from the Train B ESF distribution switchboard bus and reconnect 3B008 to the Train B ESF distribution switchboard bus. Remove temporary cabling.

Stage Three: TFM 3-92-PKA-004

Disconnect Battery 3B007 from the Unit 3 Train A ESF distribution switchboard bus 3D1. Connect temporary battery B00X to ESF distribution switchboard bus 3D1 by routing cables on the floor of 2-AC-50-29 and protected with inverted cable trays installed over the cables and bolted to the floor. (See the diagram provided in Enclosure 2 of this letter for exact cable routing details.) Exchange the existing battery jars of 3B007 with the new jars and restore battery 3B007 to operable status. Disconnect temporary battery B00X from the Train A ESF distribution switchboard bus and reconnect 3B007 to the Train A ESF distribution switchboard bus. Remove temporary cabling.

Stage Four: TFM 2-92-PKA-002

Disconnect Battery 2B007 from the Unit 2 Train A ESF distribution switchboard bus 2D1. Connect temporary battery B00X to ESF distribution switchboard bus 2D1 by routing cables on the floor of 2-AC-50-29 and protected with inverted cable trays installed over the cables and bolted to the floor. (See the diagram provided in Enclosure 2 of this letter for exact cable routing details.) Exchange the existing battery jars of 2B007 with the new jars and restore battery 2B007 to operable status. Disconnect temporary battery B00X from the Train A ESF distribution switchboard bus and reconnect 3B007 to the Train A ESF distribution switchboard bus. Remove temporary cabling.

Stage Five: TFM 2-92-PKA-001

Remove temporary battery B00X from fire area 2-AC-50-29 and return to storage. Use of temporary battery concluded.

Based on the previous experience with replacing batteries, SCE forecasts approximately 4 weeks[2] to completely replace the existing jars with the new jars for each battery. Because the "Train B" case described above is required only for the replacement of Battery 3B008, the approximate 6 foot vertical separation between Trains A and B will exist for 4 weeks. The 85 foot horizontal separation between Trains A and B (the less severe "Train A" case described above) will exist for two 4-week periods during the replacement of Batteries 3B007 and 2B007. SCE expects to have the temporary battery installed in 2-AC-50-29 for a total of approximately 20 weeks.

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[2] This includes a 1 week period to perform Battery room/rack maintenance activities.

<u>Compensatory Measures</u>

SCE will implement a **continuous** fire watch for rooms 312 and 303C while temporary battery B00X is connected to the Train B ESF distribution switchboard bus during replacement of battery 3B008. SCE will implement an **hourly** fire watch while Temporary Battery B00X is installed in fire area 2-AC-50-29 and during the implementation of TFM 3-92-PKA-004 and TFM 2-92-PKA-002 (Train A cases). Additional manual fire fighting equipment as described in the revised deviation request will also be provided. While Battery B00X is installed, SCE will implement additional administrative controls for area 2-AC-50-29 to:

1. Limit maintenance activities that are unrelated to the battery replacement effort,

2. Limit the use of combustible liquids (solvents, oils, etc.) to those required for the battery replacement effort,

3. Limit transient combustibles to those required for the battery replacement effort,

4. Provide for periodic temperature and hydrogen gas monitoring near temporary battery B00X, and

5. Modify the normal HVAC ducts and provide portable fans to ensure hydrogen gas concentrations do not exceed 2%.

Edison believes that these compensatory measures and administrative controls, ensure that the conclusion reached by the NRC in their SER regarding a fire in this area remains valid. Namely, if a fire should occur in this area, (1) it would not result in rapid temperature rise or flame propagation, (2) the fire would be detected in its formative stages by the fire watch, the fire detection systems, or plant operators, and (3) the fire would be extinguished by the fire brigade using existing manual fire fighting equipment, or the automatic fire suppression systems.

Because the use of a temporary battery described above is not a permanent modification, SCE considers these compensatory measures to provide protection equivalent to the train separation requirements of Appendix R.

Summary

SCE will be replacing all of the jars of Batteries 3B008, 3B007, and 2B007 and is planning to complete this work on-line through the use of temporary battery B00X. We are requesting NRC approval of the revision to Deviation Request No. 8 provided in Enclosure 1 to this letter. SCE is planning to initiate the battery replacement work as soon as NRC approval is received.

If you have any questions or need additional information, please contact me.

Very truly yours,

Walter C. Marsh

Enclosures

cc: J. B. Martin, Regional Administrator, NRC Region V
C. W. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2 & 3
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3

bcc: (See attached sheet)

Enclosure 1

REVISED DEVIATION REQUEST NO. 3

UNITS 2 AND 3 LOBBY/MOTOR CONTROL ROOM
FIRE AREA 2-AC-50-29

Deviation Requested

A deviation is requested from Southern California Edison's commitment to Section III.G.2 of Appendix R to 10 CFR 50 to the extent it requires: (1) the separation of redundant safe shutdown cables and equipment by 20 feet free of intervening combustibles, and (2) complete area-wide detection. Specifically, separation between Train A and B switchgear room emergency air conditioning units and other adjacent redundant cables for Units 2 and 3 is less than 20 feet. Separation between Train A and B cabling for redundant safe shutdown equipment in another location within the fire area is approximately ninety feet with intervening combustibles, and detection is provided over all redundant equipment and major combustibles but is not area-wide.

Additionally, while TFM 3-92-PKA-003 is being constructed, Train B components and cables will be installed in room 312, the motor control room. This equipment will be installed in close proximity to the existing train A cabling. Train B cabling will be routed from these batteries to battery room 3B (see diagram in Enclosure 2).

Discussion

The Lobby/Motor Control Room Fire Area 2-29 consists of the corridor and lobbies surrounding the electrical equipment rooms in the Auxiliary Building at elevation 50'.

The in-situ combustible loading consist of cable insulation and is approximately 31,869 BTU/sq.ft.[3], which equates to an equivalent fire severity of 24 minutes. While TFM C-92-PKA-001 and TFM 3-92-PKA-003 are installed, 980 lbs. of plastic (battery jars), 361.2 lbs of cable insulation, 720 lbs of wood, and 400 lbs of packing material will be added in fire area 2-AC-50-29. This combustible loading is considered transient and will be removed when the TFM's associated with the battery replacement are completed. The total combustible loading while TFM C-92-PKA-001 and TFM 3-92-PKA-003 are implemented is approximately 37,715 BTU/sq.ft. with an equivalent fire severity of 28.3 minutes. Any additional loading added during the replacement effort will be controlled be site administrative procedure for the control of transient combustibles.

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3 Current combustible loading defined in Revision 8 of the UFHA.

Existing fire protection capability in the area consists of detection and automatic suppression. Ionization smoke detectors provide early warning fire detection and alarm in the control room as well as in the site fire department office. Detectors are located above the emergency Train A and B air conditioning units for Units 2 and 3, above the trays containing the redundant Train A and B cabling, and in two out of three east-west corridors. Suppression is provided by an automatic wet pipe sprinkler system. Sprinklers are installed throughout the area including where the redundant cable trays and emergency air conditioning units are located. The automatic sprinkler system provides area wide suppression, and will also provide automatic suppression over temporary battery B00X and its associated cables. Manual fire suppression capability in the form of fire hose stations and portable extinguishers exist in the area. Fire department standpipe connections are provided in adjacent areas for use by the San Onofre Fire Department. A fire watch will continuously rove rooms 312 and 303C during implementation of TFM 3-92-FKA-003 while battery B00X is connected to the Train B ESF distribution switchboard bus. Additional portable fire fighting capability (extinguishers and fire hose) will be positioned for rooms 312 and 303C when battery B00X is in use.

[Note: An hourly fire watch will be implemented during the installation of battery B00X and replacement of batteries 3B007 and 2B007.]

Unit 2 switchgear room redundant emergency air conditioning units and associated power cables are located near the north side of the fire area. The minimum horizontal separation of the fans is approximately 12 feet. There are no intervening combustibles between the units however, there is a cable tray on the other side of the corridor that passes both units. Both fans, fan motors, and cooling coils are completely enclosed in sheet metal housings. A roughly one square foot opening with an installed manual damper exists in the fan inlet ducting. The opening is upstream of the fan and associated cooling coils. Power cables to the Train A fan are wrapped in a 1-hour rated fire barrier.

Other redundant cables in the area of the Train A emergency fan consists of Train B emergency power and instrumentation cables. The horizontal separation between these cables and the fan unit is approximately 10 feet at the closest point.

Unit 3 switchgear room redundant emergency air conditioning units and associated power cables are located near the south side of the fire area. The separation of these units and related cables is similar to the corresponding Unit 2 equipment and cables described above. In addition, other Train B cables which are redundant to the Train A HVAC unit are separated by approximately 10 feet. Power cables to the Train B fan are wrapped in a 1-hour rated fire barrier.

In another part of this fire area, cable trays are located in the east side which contain Train A cabling for the following safe shutdown equipment:

Emergency Chilled Water

Emergency Air Conditioning

Reactor Coolant System

4160 V Switchgear

480 V Switchgear

Auxiliary Feedwater

Component Cooling Water

Shutdown Cooling

120 V Vital Bus

125 V DC

Train B cabling for the above safe shutdown systems is routed in trays located at the west side of the area. Prior to implementation of the TFM's, the horizontal separation between the Train A and B cabling for the above safe shutdown equipment is approximately 90 feet with intervening combustibles consisting of cable insulation.

Additionally, TFM 3-92-PKA-003 and TFM C-92-PKA-001 install Train B temporary batteries in room 312 and associated cable from that location to battery room 3B (fire area 3-AC-50-52). These batteries will be installed within 6 feet (vertical) of Train A cables. The Train B battery cables will run from the batteries through the middle corridor (room 303C), where there are no redundant safe shutdown train A cables or components credited for a fire in this fire area, to battery room 3B.

Evaluation

A deviation from the requirements of Section III.G.2 to provide 20 foot separation free of intervening combustibles between the emergency switchgear room air conditioning units and associated power cables and other redundant safe shutdown equipment cables, and complete area wide detection is requested based on the following evaluation:

The automatic sprinkler system provides complete protection over the entire fire area. The ionization smoke detectors adequately cover redundant safe shutdown equipment and, in all areas where located, detector spacing follows the guidelines of NFPA 72E. The only area without detection is the center east-west corridor. This corridor does not contain any redundant equipment and combustible loading is light, primarily consisting of a few cable trays prior to implementation of TFM 3-92-PKA-003. Plant Administrative Procedures will limit the accumulation of transient combustible materials. This corridor is fully sprinklered and fire spread along its length for 90 feet is not considered possible. Manual suppression systems exist in this area and adjacent fire areas. A fire watch will continuously rove rooms 312 and 303C while temporary

battery BOOX is connected to the Train B ESF distribution switchboard bus. Additional manual fire fighting equipment will be located in close proximity to the temporary battery BOOX.

[While TFM 3-92-PKA-004 and TFM 2-92-PKA-002 are implemented and during installation of battery BOOX, an hourly roving fire watch will be implemented.]

If a fire were to occur at one of the emergency air conditioning fans it is unlikely it would impact the operation of both fans or the Train B emergency power and instrumentation cables. The fan motors are completely enclosed in a sheet metal housing which acts as a radiant energy shield. In addition, the sprinklers, and wrapping of one train of fan power cables in a 1-hour rated barrier will provide reasonable assurance that one train will remain free of fire damage. The fans are separated horizontally by 12 feet with no intervening combustibles. The separation between both Train A fans and the redundant Train B emergency power and instrumentation cables is approximately 10 feet with no intervening combustibles. The Unit 2 Train A fan power cable is wrapped in a 1-hour rated barrier. The Unit 3 Train A fan power cable is not wrapped; however, it leaves the metal fan housing and immediately turns east and is routed along the corridor away from the redundant Train B emergency power and instrumentation cables. Existing ionization detectors are located in the immediate area which provide early fire detection and alarm in the site Fire Department office as well as the control room. In addition, the sprinkler system provides area wide coverage. It is expected that any potential fires would be rapidly extinguished.

For the separation of redundant cables in other parts of the fire area while TFM C-92-PKA-001 is installed but not being utilized, the large horizontal separation distance of 90 feet between the redundant cables and the area-wide automatic suppression system, and detectors in two of three east-west corridors adequately compensate for the existence of intervening combustibles, and provide assurance that fire propagation between redundant trains cannot be reasonably expected.

As stated above, during the construction of TFM 3-92-PKA-003, a Train B battery and associated cables will be located in room 312 which already contains A Train cables. These TFM's provide an acceptable level of protection for the following reasons:

1. A continuous fire watch will be implemented in rooms 312 (location of temporary battery storage) and 303C (center corridor) while battery BOOX is connected to the Train B ESF distribution switchboard bus.

2. Addition of a permanent battery storage room and cables would be dictated by the design requirements of BTP 9.5-1, Appendix A and 10 CFR 50, Appendix R requirements. These documents represent the licensing basis for SONGS 2 and 3 Fire Protection Program. Noting the fire protection features available in the fire area, the addition of a permanent installation of batteries and associated train B cable would require additional fire barriers separating the batteries from Train A cables and 1 hour fire rated protection of

the battery cables as they pass through fire area 2-AC-50-29. Except for the lack of detection in the center corridor as described in the original deviation request, all other fire protection features required by BTP 9.5-1, Appendix A, and 10 CFR 50 Appendix R are installed.

However, because this is not a permanent modification, compensatory measures (continuous fire watch for TFM 3-92-PKA-003, additional manual suppression equipment) in lieu of the installation of temporary fire barriers are considered as equivalent protection. This is beyond the requirements of Technical Specification 3.7.9. for an inoperable fire barrier which would only require an hourly fire watch patrol.

3. Besides the equipment needed to support the change out of the batteries, no transient combustibles will be stored in the vicinity of the temporary battery or cables.

4. Modifications to the existing HVAC system will provide a mechanism to exhaust hydrogen gas and prevent concentrations over 2% in fire area 2-AC-50-29. Additionally, hydrogen gas sampling will be performed every two hours to verify concentrations remain below 2%. Sampling will be performed during the entire period in which the batteries are being charged. Portable fans will be pre-staged in the area to allow for mixing of hydrogen gas in the unlikely event that concentrations approach 2% concentration. These modifications and administrative controls will ensure the potential for fire involving hydrogen is eliminated.

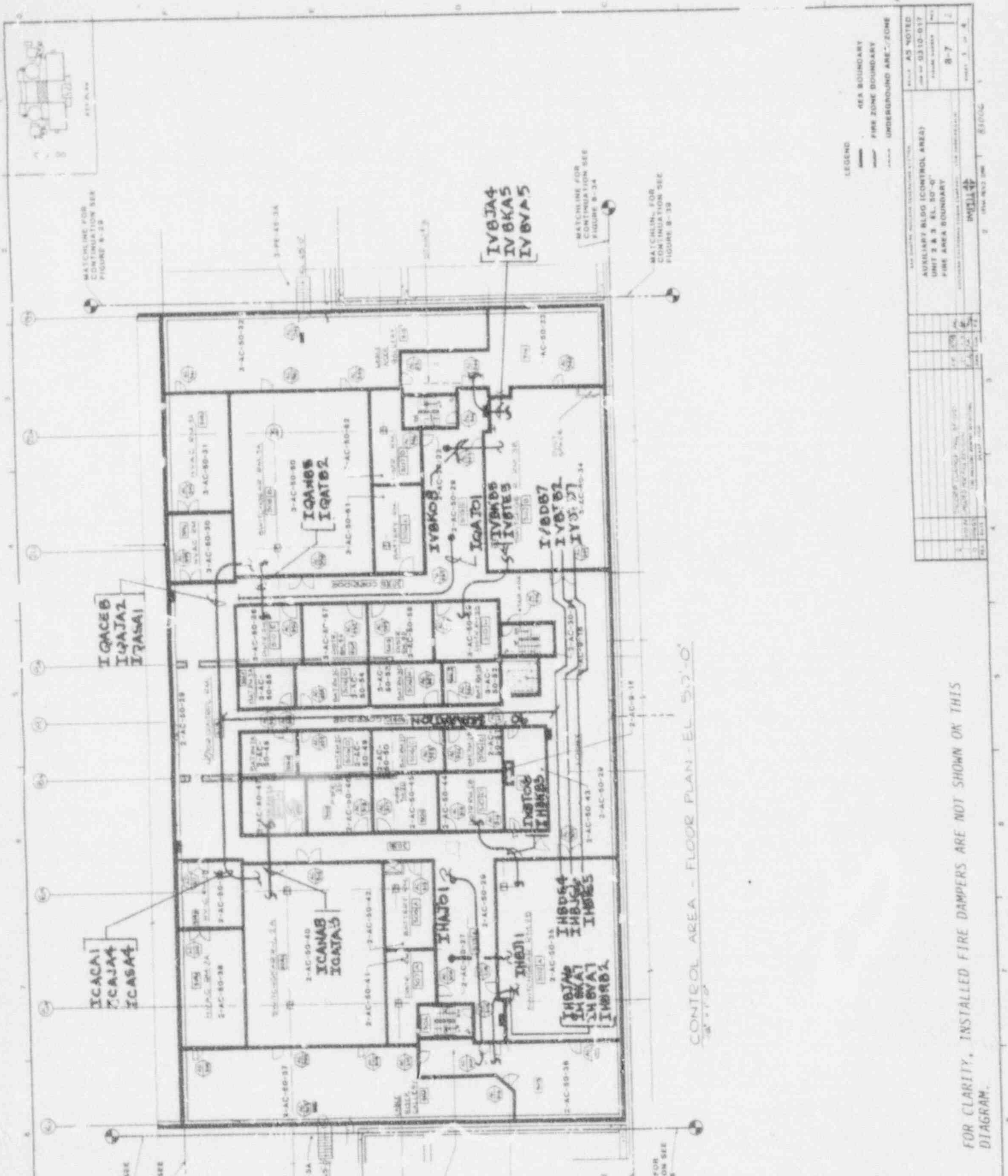
5. This temporary battery will be used for a total of approximately 16 weeks: 4 weeks to replace the battery in room 3B (Fire Area 3-AC-50-52), 4 weeks to replace the battery in room 3A (Fire Area 3-AC-50-55), and 4 weeks to replace the battery in room 2A (Fire Area 2-AC-50-48) and complete a battery performance test. There will also be an approximate one week period between each battery replacement.

Conclusion

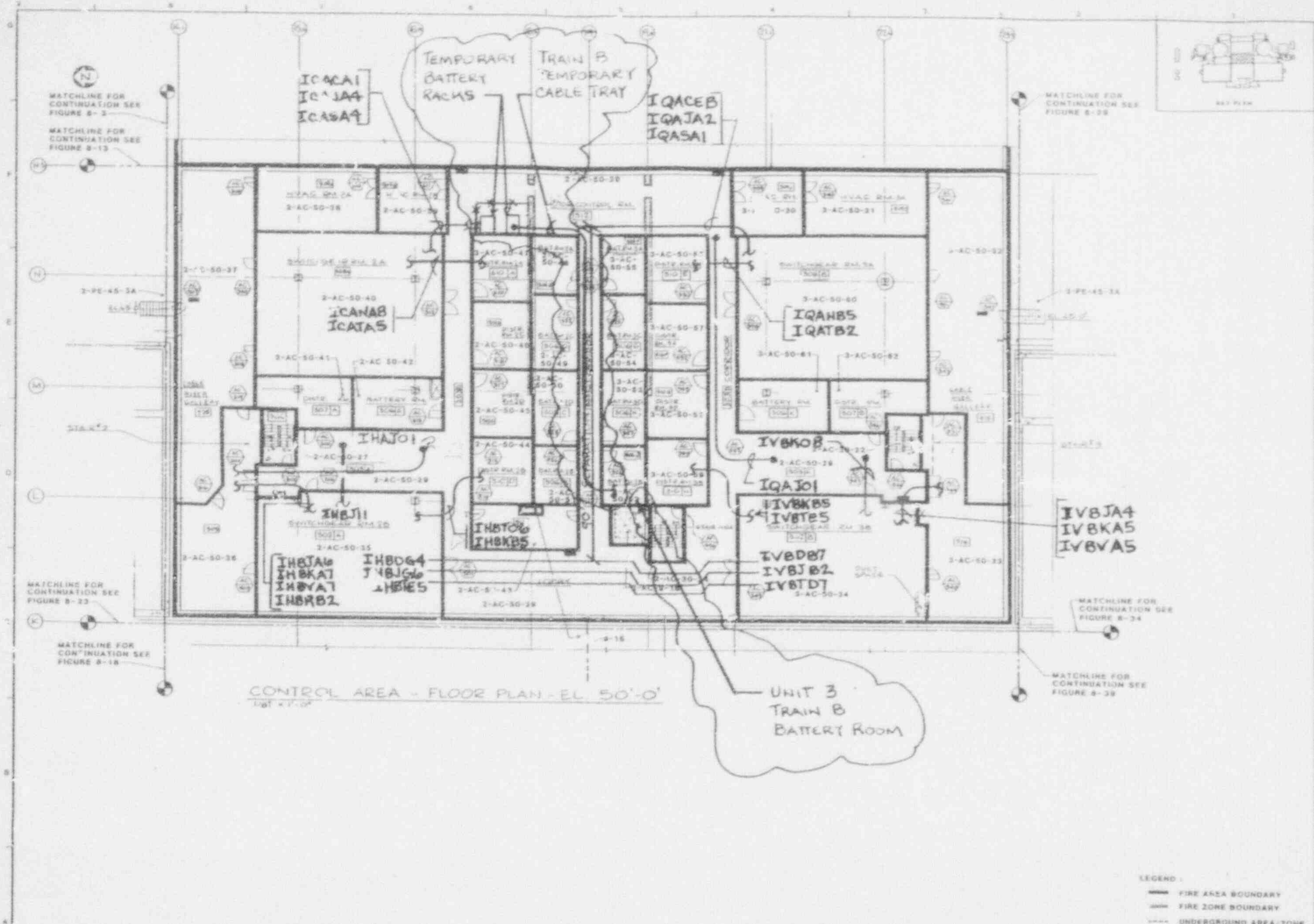
It is, therefore, Southern California Edison's position that a level of protection equivalent to Section III.G.2 of Appendix R to 10 CFR 50 is provided for fire area 2-29. The protection of redundant equipment and cable trays with a one hour rated barrier and addition of area wide smoke detectors would not significantly enhance the level of fire protection provided for safe shutdown equipment, given the limited utilization of the temporary battery modification and the addition of equivalent compensatory measures.

Enclosure 2

TRAIN SEPARATION CONFIGURATION - ORIGINAL DEVIATION REQUEST



TRAIN SEPARATION CONFIGURATION - TFM 3-92-PKA-003



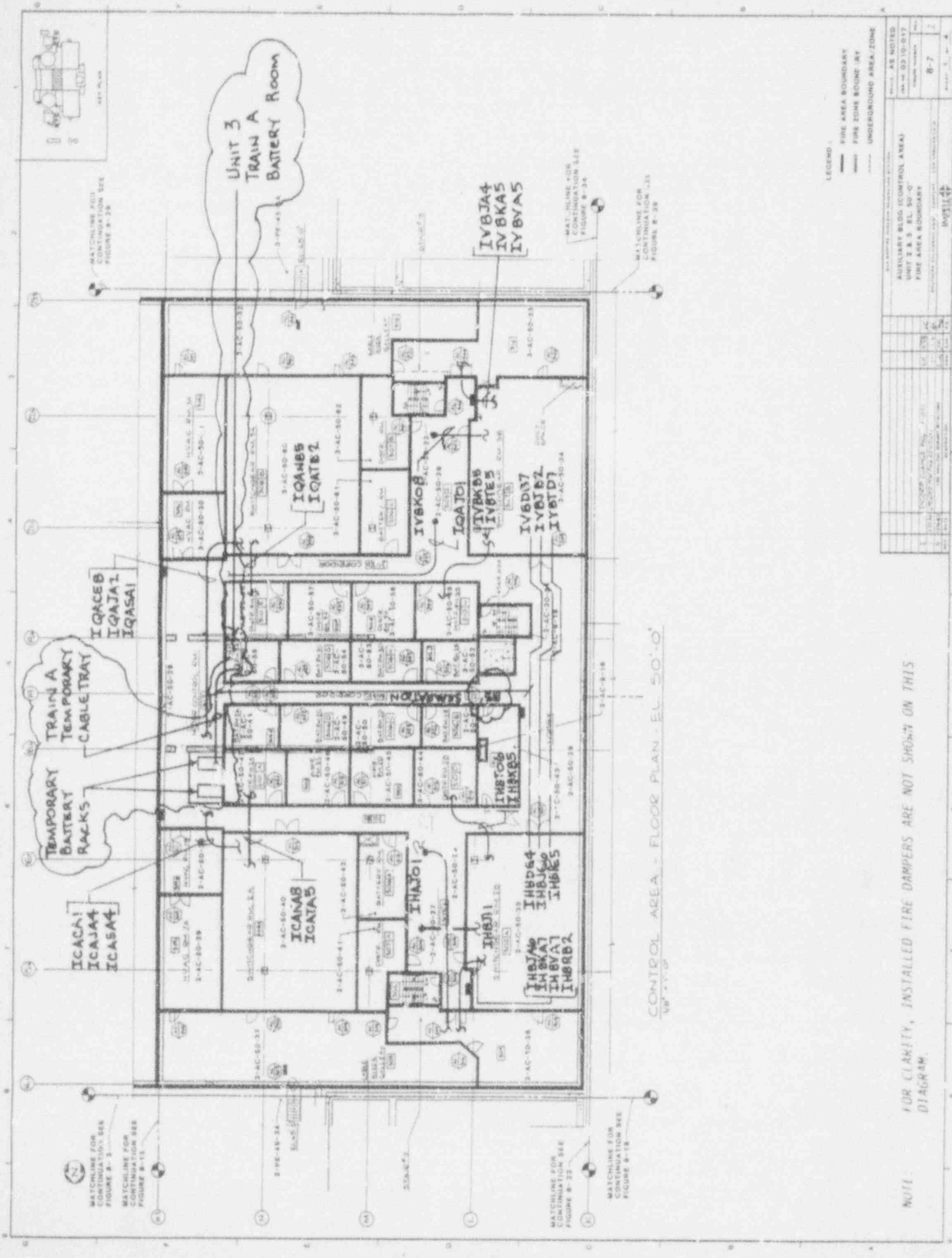
NOTE: FOR CLARITY, INSTALLED FIRE DAMPERS ARE NOT SHOWN ON THIS DIAGRAM.

AUXILIARY BLDG (CONTROL AREA)
UNIT 2 & 3 EL. 50'-0"
FIRE AREA BOUNDARY

SCALE: AS NOTED

FIGURE NUMBER 8-7

TRAIN SEPARATION CONFIGURATION - TFM 3-92-PKA-004



NOTE: FOR CLARITY, INSTALLED FIRE DAMPERS ARE NOT SHOWN ON THIS DIAGRAM.

TRAIN SEPARATION CONFIGURATION - TFM 2-92-PKA-002