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10 CFR 2.202

February 27, 2013

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-001

SUBJECT: Docket Nos. 50-361 and 50-362
License Nos. NPF-10 and NPF-15
Southern California Edison's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
San Onofre Nuclear Generating Station, Units 2 and 3

References:

1. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (ADAMS Accession Number ML 12056A044)
2. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 28, 2012 (ADAMS Accession Number ML 12221A339)
3. NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 24, 2012 (ADAMS Accession Number ML 122400399)
4. Southern California Edison's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-049), dated October 29, 2012

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Southern California Edison (SCE). Reference 1 was immediately effective and directs SCE to provide reliable spent fuel pool indications. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 requires submission of an Overall Integrated Plan by February 28, 2013. The NRC Interim Staff Guidance (ISG) (Reference 2) was issued August 29, 2012 which endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan.

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Reference 4 provided the SCE initial status report regarding reliable spent fuel pool instrumentation, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms SCE has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for providing reliable spent fuel pool level indication.

The information in the enclosure provides the SCE Overall Integrated Plan for reliable spent fuel pool instrumentation pursuant to Reference 3. The enclosed Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the Enclosure, will be provided in the 6-month Integrated Plan updates required by Reference 1.

This letter contains no new regulatory commitments. If there are any questions regarding this plan, please contact Mr. Steven D. Root at 949-368-6480.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 2/27/13

By: _____
Peter T. Dietrich
Senior Vice President and Chief Nuclear Officer

Enclosure: San Onofre Nuclear Generating Station Reliable Spent Fuel Pool Level Instrumentation Overall Integrated Plan Response to NRC Order EA-12-051

cc: Director, Office of Nuclear Reactor Regulation
E. E. Collins, Regional Administrator, NRC Region IV
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3
B. Benney, NRC Project Manager, San Onofre Units 2 and 3

Enclosure 1
San Onofre Nuclear Generating Station
Reliable Spent Fuel Pool Level Instrumentation
Overall Integrated Plan
Response to NRC Order EA-12-051

San Onofre Nuclear Generating Station

Reliable Spent Fuel Pool Instrumentation Overall Integrated Plan Response to NRC Order EA-12-051

SO23-413-5-M3, Rev. 0

Prepared By:	Ashley Serbus, Mechanical Design Engineer	2/25/2013 Date
Technical Review By:	David Vanderwoude, Supervisor, Electrical Design Engineering	2/25/2013 Date
Technical Review By:	Steven Root, Project Manager, Nuclear Regulatory Affairs	2/26/2013 Date
Technical Review By:	David Ford per telecon with Ashley Serbus, David Ford, Supervisor, Operations	2/27/2013 Date
Technical Review By:	Ray Reyes, Instrumentation and Controls Design Engineer	2/25/2013 Date
Approved By:	Gary Johnson, Principle Manager, Plant Engineering	2/26/13 Date
Approved By:	Mehrdad Hojati, Principle Manager, Design Engineering	2/25/2013 Date
Approved By:	John Davis, Principle Manager, Operations	2/25/2013 Date

1.0 OVERALL INTEGRATED PLAN INTRODUCTION

The Nuclear Regulatory Commission (NRC) issued Order EA-12-051 (the "ORDER"), *Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation* (Reference 1) on March 12, 2012. The ORDER requires licensees to have reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. The ORDER also requires that an overall integrated plan be provided that describes how the requirements of the ORDER will be achieved. Nuclear Energy Institute document (NEI) NEI 12-02 [Rev. 1], *Industry Guidance for Compliance with Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,"* (Reference 2) provides an approach for complying with the ORDER. NRC Interim Staff Guidance (ISG), JLD-ISG-2012-03 [Rev. 0], *Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation*, (Reference 3) endorses the guidelines provided in NEI 12-02 [Rev. 1] as an acceptable means of meeting the requirements of the ORDER, subject to the clarifications and exceptions.

In response to the ORDER requirements, Southern California Edison (SCE) will provide two channels of independent, permanently-installed, wide-range spent fuel pool level instrumentation ("SFPLI"), for the spent fuel pool ("SFP") of each Unit 2 and Unit 3. The SFPLI will provide continuous level indication for each SFP on both the Primary and Backup Channels.

This Overall Integrated Plan (the "PLAN") describes the strategy of SONGS Unit 2 and Unit 3 for complying with the requirements of the ORDER using the methods described in NRC JLD-ISG-2012-03 [Rev. 0] in conjunction with Nuclear Energy Institute document NEI 12-02 [Rev. 1]. Six month progress reports will be provided consistent with the requirements of the ORDER.

2.0 APPLICABILITY:

This PLAN applies to San Onofre Nuclear Generation Station Unit 2 and Unit 3.

3.0 SCHEDULE:

Order EA-12-051 requires full implementation of this plan no later than two refueling cycles after submittal of the overall integrated plan, or by December 31, 2016, whichever comes first.

The installation of reliable spent fuel pool level instrumentation for the spent fuel pool associated with Unit 2 is scheduled for completion prior to February 16th, 2016, based on the end of the second refueling outage for Unit 2 following submittal of this PLAN.

The installation of reliable spent fuel pool level instrumentation for the spent fuel pool associated with Unit 3 is scheduled for completion prior to December 31st, 2016, in

accordance with the ORDER as it is in an extended outage and not expected to experience two refueling cycles prior to the end of 2016.

Implementation Schedule	Unit 2	Unit 3
Commence Engineering and Design	3Q2013	4Q2014
Complete Design (Nuclear Engineering Change Package)	4Q2014	4Q2015
Receipt of SFP Level Instrument	2Q2015	2Q2016
SFPLI Procedures and Training Complete	3Q2015	3Q2016
SFPLI Operational	02/16/2016	12/31/2016

Consistent with the requirements of the ORDER, status reports will be generated in six (6) month intervals from the submittal of this PLAN. These submittals will outline progress made, any proposed changes in compliance methods and updates to the proposed schedule. Also, SCE will report to the NRC when full compliance with the requirements of Attachment 2 of Order EA-12-051 has been achieved.

NRC Status Report Schedule	
Submit Overall Integrated PLAN to NRC	02/27/2013
1st Six Month Status Report Submitted to NRC	08/27/2013
2nd Six Month Status Report Submitted to NRC	02/27/2014
3rd Six Month Status Report Submitted to NRC	08/27/2014
4th Six Month Status Report Submitted to NRC	02/27/2015
5th Six Month Status Report Submitted to NRC	08/27/2015
6th Six Month Status Report Submitted to NRC	02/27/2016
7th Six Month Status Report Submitted to NRC	08/27/2016
Final Compliance Notification to NRC	02/27/2017

4.0 ASSOCIATED SPENT FUEL POOL CONFIGURATION:

Unit 2 and Unit 3 discharge irradiated fuel to essentially identical spent fuel storage pool[s]. Units 2 and 3 have separate spent fuel storage facilities. Therefore, there is no safety implication related to sharing. The pools are concrete structures with water-tight stainless steel liners. The SFP for each Unit is interconnected with the fuel transfer pool and the spent fuel cask loading pit by connecting canals (see Attachment 1 and 2). The lowest elevation of these canals is 2'5" above the top of the fuel assemblies in the racks in the SFP. Spent fuel assemblies are stored under water in spent fuel storage racks in the main SFP. Therefore, SFPLI will be provided in each Unit's main SFP to provide Operators with a reliable means of determining the water level above the spent fuel in the spent fuel storage racks.

5.0 IDENTIFICATION OF SPENT FUEL POOL WATER LEVELS:

The following SFP elevations apply to SONGS Unit 2 and Unit 3:

- Normal, nominal SFP water level is at Plant El. 61 ft.
- Non-safety related level switch alarm is activated at Plant El. 59 ft. 6 in. on low level.
- The minimum Limiting Condition for Operation (LCO) SFP level is Plant El. 56 ft.
- The top of the SFP racks is approximately at Plant El. 34 ft. 1 in.
- Top of the fuel assemblies is at Plant El. 33 ft.

The three key SFP water levels required to be defined per NRC JLD-ISG-2012-03 and NEI 12-02 for each Unit 2 and Unit 3 are as follows:

5.1 LEVEL 1: Level adequate to support operation of the normal fuel pool cooling system.

Indicated level on either the Primary or Backup instrument channel corresponding to a loss of required NPSH (Net Positive Suction Head) or a loss of reliable SFP cooling pump suction were analyzed to determine LEVEL 1. Analysis described below applies to both Unit 2 and Unit 3.

- Required NPSH: The SFP cooling pumps were analyzed at several flow rates to determine bounding NPSH parameters for both required and available NPSH ($NPSH_R$ and $NPSH_A$). It was determined that in all cases, the $NPSH_A$ was significantly higher than $NPSH_R$. Assuming a SFP water temperature of 175 ℉, the lowest $NPSH_A$ was calculated to be 48.8 ft., and highest $NPSH_R$ of the pump was 19.09 ft. For the purposes of this PLAN, the pool is assumed to be boiling at 212 ℉. The above values can be readily adjusted for the increase in pool temperature (by adjusting for vapor pressure), resulting in the decrease of the $NPSH_A$ to 29.91 ft which is above the $NPSH_R$ of the pump.

Therefore, $NPSH_R$ is not the determining value to be used for LEVEL 1.

- Loss of reliable suction to SFP cooling pumps: It should be noted that the NEI 12-02 [Rev.1] example of uncovering the inlet flange is not conservative for the arrangement of the SFP cooling suction line at SONGS. The conservative assumption is that loss of reliable SFP cooling occurs when the SFP pump experiences cavitation due to the formation of vortices at the suction piping inlet in the SFP. A series of flow rate cases were analyzed to determine the required SFP water elevation over the SFP cooling system suction piping inlet in the SFP needed to prevent the formation of vortices and it was determined that SFP water at Plant El. 59 ft. 6 in. would be adequate to prevent cavitation in the majority of cases. The SFP water at Plant El. 59 ft. 6 in. also aligns with the current normal low level alarm, and is higher than the Technical Specification LCO level.

Therefore, considering the top of the SFP fuel storage rack is at Plant El. 34 ft. 1 in., the indicated level on either the Primary or Backup Instrument Channel of greater than 25 ft. 5 in. above the top of the SFP fuel storage racks considering the design accuracy of the instrument channel (see Section 9.0) is adequate for normal SFP cooling system operation.

LEVEL 1 = Plant El. 59 ft. 6 in. (25 ft. 5 in. above top of SFP fuel storage rack)

5.2 LEVEL 2: Level adequate to provide substantial radiation shielding for a person standing on the SFP operating deck.

Indicated level on either the Primary or Backup Instrument Channel of greater than 10 ft. above the top of SFP stored fuel assemblies based on current guidance in NRC Regulatory Guide 1.13 [Rev.2] (Reference 4) will achieve substantial radiation shielding.

The top of the fuel rack is used as a basis for measurement in this PLAN. Therefore, Level 2 will correspond to an indicated level of greater than 10 ft. above the top of the SFP fuel storage rack, considering the design accuracy of the instrument channel (see Section 9.0).

LEVEL 2 = Plant El. 44 ft. 1 in. (10 ft. above top of SFP fuel storage rack)

5.3 LEVEL 3: Level where the fuel remains covered.

As stated above, SCE used the top of the fuel rack as a basis for measurement. The installation of the SFPLI sensor will be such that it will measure as close as practically possible to the top of the SFP fuel rack. Indicated level on either the Primary or Backup Instrument Channel of greater than ½ ft. above the top of SFP fuel storage racks considering the design accuracy of the instrument channel (see Section 9.0) for both the Primary and Backup Instrument Channels will satisfy the NEI 12-02 requirement of +/-1 ft. from the top of the fuel rack. This monitoring level ensures there is adequate water level above the stored fuel seated in the SFP fuel storage rack.

LEVEL 3 = Plant El. 34 ft. 7 in. (6 in. above top of SFP fuel storage rack)

6.0 INSTRUMENTS:

Both the Primary and Backup Instrument Channels for Unit 2 and Unit 3 will utilize permanently-installed instruments. The design of the Primary and Backup Instruments for Unit 2 and Unit 3 will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02, and no exceptions will be taken.

The instrumentation currently under review utilizes Time Domain Reflectometry ("TDR", also called Guided Wave Radar, "GWR"). This distance measuring instrument utilizes pulse trains that travel along a coaxial cable to an impedance matched probe. The transmitter measures the amount of time delay between the transmitted and received pulse trains that are returned by reflection. The reflection of the pulse train occurs at a point of dielectric change, i.e. interface between air and water. A microprocessor calculates the distance, and thus the level, by this measured delay.

The TDR transmitter has to be remotely mounted in a mild environment (see Attachments 4, 5, 6, & 7), and a coaxial cable installed from the transmitter to the SFP, where a probe will extend down into the SFP. The probe mount will be installed on the pool deck or raised curb in accordance with the plant Seismic Category I criteria.

6.1 Primary (fixed) Instrument Channel:

The Primary Instrument Channel level sensing component[s] will be located in the Spent Fuel Pool as shown in Attachment 1 and Attachment 2. Continuous level indication over a range from LEVEL 3 (Plant El. 34 ft. 7 in.) to the normal operating level (Plant El. 61 ft.) will be provided by the TDR device. Discrete level indications at LEVEL1, LEVEL 2 and LEVEL 3 as described in Section 5.0 will also be available using the TDR transmitter electronics.

6.2 Backup (fixed) Instrument Channel:

The Backup Instrument Channel level sensing component[s] will be located in the Spent Fuel Pool as shown in Attachment 1 and Attachment 2. Continuous level indication over a range from LEVEL 3 (Plant El. 34 ft. 7 in.) to the normal operating level (Plant El. 61 ft.) will be provided by the TDR device. Discrete level indications at LEVEL1, LEVEL 2 and LEVEL 3 as described in Section 5.0 will also be available using the TDR transmitter electronics.

7.0 RELIABILITY:

The reliability of the Primary and Backup Instrument Channels for Unit 2 and Unit 3 will be assured by conformance with the guidance of NRC JLD-ISG-2012-03 and Sections 3.4 and 3.6 of NEI 12-02.

Adequate physical instrument separation within the SFP will minimize the risk of debris impacting the reliability of both instrument channels for a given Unit at the same time (see Section 8.1).

Reliable level indication will be available except during periods of testing and maintenance. The Primary or Backup Instrument Channel can be out of service for testing, maintenance and/or calibration for up to 90 days provided the other channel is functional. Additionally, compensatory actions will be taken if the instrument channel is not expected to be restored or is not restored within 90 days. If both channels become non-functioning then actions will be initiated within 24 hours to restore one of the channels of instrumentation and implement compensatory actions within 72 hours.

8.0 INSTRUMENT CHANNEL DESIGN CRITERIA:

The instrument channel design criteria specified for the Unit 2 and Unit 3 SPFLI will be consistent with the NRC JLD-ISG-2012-03 and NEI 12-02.

8.1 ARRANGEMENT:

The spent fuel pools for both units are essentially identical (Reference 6). The dimensions of the spent fuel pools are 43 ft. 11 $\frac{5}{8}$ in. in the North-South direction by 26 ft. 11 $\frac{5}{8}$ in. in the east-west direction. The Spent Fuel Handling Machine travels on rails in the North-South direction and has a clearance of approximately 6 $\frac{1}{8}$ in. between the bottom of the machine and the SFP deck.

For Unit 2, the plan is to mount the sensor for one channel in the northeast corner of the SFP and the other channel in the opposite, northwest corner of the SFP (see

Attachment 1). For Unit 3, the plan is to mount the sensor for one channel in the southeast corner of the SFP and the other channel in the opposite, southwest corner of the SFP (see Attachment 2). This configuration will ensure the instruments are separated by a length comparable to the shortest length of a side of the Spent Fuel Pool in accordance with NEI 12-02 Section 3.2. This physical separation will provide reasonable protection from a single missile impacting both channels. Also, although the level probes may protrude slightly above the level of the spent fuel pool deck, mounting them near corner locations will provide sufficient protection from missiles and debris as described by NEI 12-02 [Rev.1], Section 3.2, and as discussed in Section 8.2 Mounting.

Except for minor installation differences, both instrument channels will be essentially the same. In order to distinguish between the two channels, the instrument located in the Northeast corner for Unit 2 and Southeast corner for Unit 3 will be considered the "Primary Channel." The instrument located in the Northwest corner for Unit 2 and the Southwest corner for Unit 3 will be considered the "Backup Channel."

The supporting electronic instruments will be mounted outside of the spent fuel pool area, to provide a more benign radiation and environmental condition, and also provide for reasonable and accessible locations for operators. Reasonable accessibility is shown by the following initial work to determine appropriate operator access. Time, post-accident radiation and postulated post-accident facility damage were considered.

SFP Primary Level Instruments will be located in Corridor 501 adjacent to the East entrance to the Hot Machine Shop (Rm. 510) of the auxiliary building at Plant El. 63 ft. 6 in. (see Attachment 3). One possible access path to the SFP Primary Level Instruments by personnel during postulated accidents was evaluated as follows:

- For a Unit 2 postulated accident, the operator may exit the Main Control Room and enter western stairwell (see Attachment 4), then proceed to Plant El. 70 ft. and exit the stairwell. The operator then proceeds to corridor 508, and continues to corridor 501 towards the Hot Machine Shop (Rm. 510) (see Attachment 5). ALARA principles are followed such that time is minimized and shielding and distance are maximized. The operator will traverse a Zone B radiological area for a minimum duration and otherwise reside in the lowest radiological area, Zone A, for the remaining time.
- For a Unit 3 postulated accident, the operator may exit the Main Control Room and enter western stairwell (see Attachment 6), then proceed to Plant El. 70 ft. and exit the stairwell. The operator then proceeds to corridor 508, and continues to corridor 501 towards the Hot Machine Shop (Rm. 510) (see Attachment 7). ALARA principles are followed such that time is minimized and shielding and distance are maximized. The operator will traverse a Zone B radiological area for a minimum duration and otherwise reside in the lowest radiological area, Zone A, for the remaining time.

SFP Backup Level Instruments are located in each unit's Primary Plant Makeup Storage Tank Room (Rm. 127A and 127B) at Plant El. 37 ft. (see Attachment 8). One possible access path to the SFP Backup Level Instruments by personnel during postulated accidents was evaluated as follows:

- For a Unit 2 postulated accident, operators may exit the Main Control Room and enter western stairwell (see Attachment 4), then proceed to Plant El. 70 ft. and exit the stairwell. The operator then proceeds to corridor 508, and continues to corridor 501 towards the Hot Machine Shop (Rm. 510) (see Attachment 5). The operator then proceeds to the South stairwell and descends to Plant El. 37 Ft. and exits the stairwell. Finally, the operator proceeds to Primary Plant Makeup Storage Tank Room 127A (see Attachment 4). ALARA principles are followed such that time is minimized and shielding and distance are maximized. The operator will traverse a Zone B and Zone C radiological area for a minimum duration and otherwise reside in the lowest radiological area, Zone A, for the remaining time.
- For a Unit 3 postulated accident, operators may exit the Main Control Room and enter western stairwell (see Attachment 6), then proceed to Plant El. 70 ft. and exit the stairwell. The operator then proceeds to corridor 508, and continues to corridor 501 (see Attachment 7). The operator then proceeds to the North stairwell and descends to Plant El. 37 Ft. and exits the stairwell. Finally, the operator proceeds to the Primary Plant Makeup Storage Tank Room 127B (see Attachment 6). ALARA principles are followed such that time is minimized and shielding and distance are maximized. The operator will traverse a Zone B and Zone C radiological area for a minimum duration and otherwise reside in the lowest radiological area, Zone A, for the remaining time.

The operator will not be required to traverse any unprotected areas to reach any of the four SFPLI displays. As the pathways lie entirely within seismically qualified, protected buildings, facility damage is not expected to affect the operator's ability to access the instrument display. To provide additional assurance that SFP level indication will be available following a beyond design basis event in the Spent Fuel Pool, the instrument transmitter, display, and battery backup location(s) do not require operators to enter the Fuel Handling Building for either Unit 2 or Unit 3.

Trained personnel will be able to promptly (within 15 minutes) monitor the SFP water level once dispatched during the implementation of beyond design basis event procedures.

Illumination of access and egress routes is provided by portable hand lights if other emergency or essential lighting is not available.

8.2 MOUNTING:

All mounting will be in accordance with Section 3.3 of NEI 12-02. The instrument probe for each channel of Unit 2 and Unit 3 will be mounted in the respective Spent Fuel Pool to Seismic Category I requirements. The transmitter, display and battery

backup mounting will also be Seismic Category I, but will be located away from the Spent Fuel Pool as described in Section 11.0. Power and signal cable will use seismically qualified conduits, trays, or raceways.

8.3 QUALIFICATION:

The instrument channel reliability and selection for Unit 2 and Unit 3 will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02 as described below.

8.3.1 Seismic Qualification:

The permanently installed instrument channel components will be demonstrated through an appropriate combination of design, analysis, operating experience and/or testing of components to meet the seismic conditions in the area in which they are installed. This will be accomplished by purchasing and installing all SFPLI equipment for Unit 2 and Unit 3 to Seismic Category I requirements.

8.3.2 Shock and Vibration:

The permanently installed instrument channel components will be demonstrated through an appropriate combination of design, analysis, operating experience and/or testing of components to meet the shock and vibration guidelines delineated in NRC JLD-ISG-2013-03 and NEI 12-02, Section 3.4.

8.3.3 Environmental Conditions:

The permanently installed instrumentation components located in the SFP room(s) and areas of the Fuel Handling Building (FHB) for each channel will be qualified to remain functional when subjected to temperatures of 212°F and 100% relative humidity consistent with the guidelines of NEI 12-02 for no fewer than one hundred twenty (120) days post-event consistent with the indefinite coping capability requirements of NEI 12-06 Rev. 0 (Reference 9).

The permanently installed instrumentation components outside of the FHB will be qualified to environmental conditions documented in the Updated Final Safety Analysis Report for no fewer than one hundred twenty (120) days post-event consistent with the indefinite coping capability requirements of NEI 12-06 Rev. 0 (Reference 9).

All SFPLI equipment in the SFP(s) will be qualified for operation in a concentrated borated water environment.

8.3.4 Radiological Conditions:

Permanently installed instrumentation components will be required to withstand both normal and post-accident radiological conditions. Consistent with the guidelines of NEI 12-02, the instrument channels will be capable of

withstanding post-event radiological conditions as described below, considering the impact of FLEX mitigation strategies.

The permanently installed instrumentation components in the SFP room will be qualified to withstand post-event radiological conditions consistent with the water level in the SFP at Level 3 for a minimum of fourteen (14) hours until FLEX mitigation strategies are deployed, and the SFP is refilled to Level 1. The permanently installed instrumentation components in the SFP room will be consistent with SFP water at Level 1 for the remainder of the one hundred twenty (120) day coping period, consistent with the FLEX Overall Integrated Plan.

The permanently installed instrumentation components not in the SFP room will be qualified to withstand post-event radiological conditions documented in the Updated Final Safety Analysis Report for no less than one hundred twenty (120) days.

8.3.5 Other Qualification and Testing:

In addition to the tests above, the instruments will be subjected to a factory acceptance test that is sufficient to demonstrate the operability and accuracy of the components and compliance with guideline.

8.4 INDEPENDENCE:

8.4.1 Electrical Independence

The Primary and Backup Instrument Channels will be electrically independent in accordance with Section 3.5 of NEI 12-02. Alternating Current (AC) power sources utilized for the Primary and Backup Channels as described in Section 8.5 of this PLAN are from different buses such that no one failure will interrupt power to both SFPLI channels (see Attachment 9). Additionally, each SFPLI channel will have battery backup power as well as a reliable alternative source of power defined in the FLEX Overall Integrated Plan. Diverse technologies are not required for independence.

8.4.2 Physical Separation

Physical separation between the Primary and Backup Instrument Channel components will be modeled after Regulatory Guide 1.75, Rev. 1 (Reference 11) requirements for Class 1E systems and the guidance in NEI 12-02 (see Section 8.1).

8.5 POWER SUPPLIES:

For Unit 2 and Unit 3, the power supplies for the Primary and Backup Instrument Channels will be provided from different power buses to assure that the loss of one bus will not result in the loss of both channels (See Attachment 9).

Power for the Primary SFPLI will be taken from the 480 VAC 3 phase panel Q0001. This panel has redundant feeds from both Unit 2 and Unit 3 Plant Auxiliary Electrical

System (See Attachment 9). Each SFPLI will be fed from separate shielded transformers and circuits from this panel.

Power for the Backup SFPLI will be taken from 120VAC lighting switchgear buses L01 for Unit 2 and LO2 for Unit 3. Each bus has redundant feeds from both Unit 2 and Unit 3 switchyard power distribution systems (See Attachment 9).

Each instrument channel will have redundant battery power supply that is maintained charged through the normal power source. The battery capacity will be sufficient to power the instrument channel until provisions can be made to supply power from an alternate source.

As discussed in the FLEX Overall Integrated Plan, should the primary power source become unavailable, provisions will be made to supply power to the respective SFPLI channels from a reliable alternative source. It is the current plan to provide external power connections at the instrument display locations which will allow trained personnel to manually connect FLEX power to the SFPLI devices in a beyond design basis event.

9.0 ACCURACY:

The accuracy for Unit 2 and Unit 3 Primary and Backup Instrument Channels will be within +/- 5 inches, consistent with the guidelines of the NRC JLD-ISG-2012-03 and NEI 12-02. The minimum accuracy requirement for each channel will include all components from the sensor to the remote readout display. Procedures will be modified to ensure the instruments are calibrated in accordance with NEI 12-02 and current plant instrumentation and controls processes.

The minimum accuracy for each channel will be maintained following a loss of power, without calibration and will consider the effect of environmental conditions on the accuracy.

10.0 TESTING:

Testing and calibration of the installed SFPLI channels for Unit 2 and Unit 3 will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02. Specific test procedures will be developed for functional testing of the installed instrument systems, from the sensor through the display, as defined in Section 12.0. Calibration will be specific to each component of the SFPLI system.

11.0 DISPLAY:

The Primary Instrument Channel display(s) for Unit 2 and Unit 3 are integral to the instruments themselves, and will be located in Corridor 501 adjacent to the East entrance to the Hot Machine Shop (Rm. 510 @ Plant El. 63 ft 6 in), which is an accessible location following a Large Scale Natural External Event (LSNEE) (see Section 8.1). The Backup Instrument Channel display(s) for Unit 2 and Unit 3 are also integral with the instruments, and are located in each unit's PPMUT Room (Rm. 127A and Rm. 127B @ Plant El. 37 ft), which are also an accessible location following a LSNEE as described in Section 8.1 of this PLAN. The Nuclear Engineering Change Package design phase will assess the

possibility of providing remote SFP level indication at the FLEX SFP fill station (Open Item 1). The remote read out would allow personnel to monitor water addition into the SFP through a FLEX SFP make up connection.

The two displays for Unit 2 and the two displays for Unit 3 will be sufficiently separated by at least the minimum distance required for independent channels. The location selected for these displays will be such that damage resulting from a LSNEE is unlikely to damage both displays.

Trained personnel will be able to promptly (within 15 minutes) monitor the SFP water level once dispatched during the implementation of beyond design basis event procedures.

12.0 INSTRUMENT CHANNEL PROGRAM CRITERIA:

The program criteria will be consistent with the guidelines in NRC JLD-ISG-2012-03 and NEI 12-02 (with clarifications and exceptions).

A Systematic Approach to Training (SAT) will be taken to train personnel in the operation, maintenance, and testing of the instruments. Training for maintenance, calibration, surveillance and auxiliary power connections will be consistent with equipment vendor guidelines, instructions and recommendations. The training of the required personnel on new and affected procedures will be completed prior to placing the instrumentation in service (see Section 3.0).

Existing procedures for the Spent Fuel Pool will be revised as necessary and/or new procedures developed using vendor provided guidelines and instructions to address the maintenance, operation and abnormal response issues associated with the new SFP level instrumentation. Procedures will address the strategy to ensure SFP water level addition is initiated at an appropriate time consistent with implementation of FLEX coping strategies.

Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the Primary and Backup SFP level instrument channels at their design accuracy. Testing and calibration of the instrumentation will be consistent with vendor recommendations and any other documented basis. Calibration will be specific to each component of the installed instrumentation.

13.0 NEED FOR RELIEF AND BASIS, IF ANY:

San Onofre Nuclear Generating Station is not requesting relief from the requirements of the ORDER or the guidance in NRC JLD-ISG-2012-03. Consistent with the requirements of the ORDER, 60 day status reports will delineate progress made and will request future relief if necessary.

14.0 REFERENCES

1) NRC Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation*, issued March 12, 2012 (Agency wide Documents Access and Management System (ADAMS) Accession No. ML 12056A044)

2) NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, *To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation*, Revision 1, dated August 24, 2012. (ADAMS Accession No. ML 122400399)

3) NRC JLD-ISG-2012-03, *Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation*, Revision 0, dated August 29, 2012 (ADAMS Accession No. ML 12221A339)

4) NRC Regulatory Guide 1.13 Revision 2; Spent Fuel Storage Facility Design Basis

5) ANSI/ANS-57.2-1983; Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants

6) UFSAR; San Onofre 2 & 3 FSAR Updated, Revision 36, Section 9.1.2 Spent Fuel Storage

7) IEEE-344-224; IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations

8) NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, issued March 12, 2012 (ADAMS Accession No. ML 12056A045)

9) NEI 12-06 Rev. 0, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012. (ADAMS Accession No. ML 12242A378)

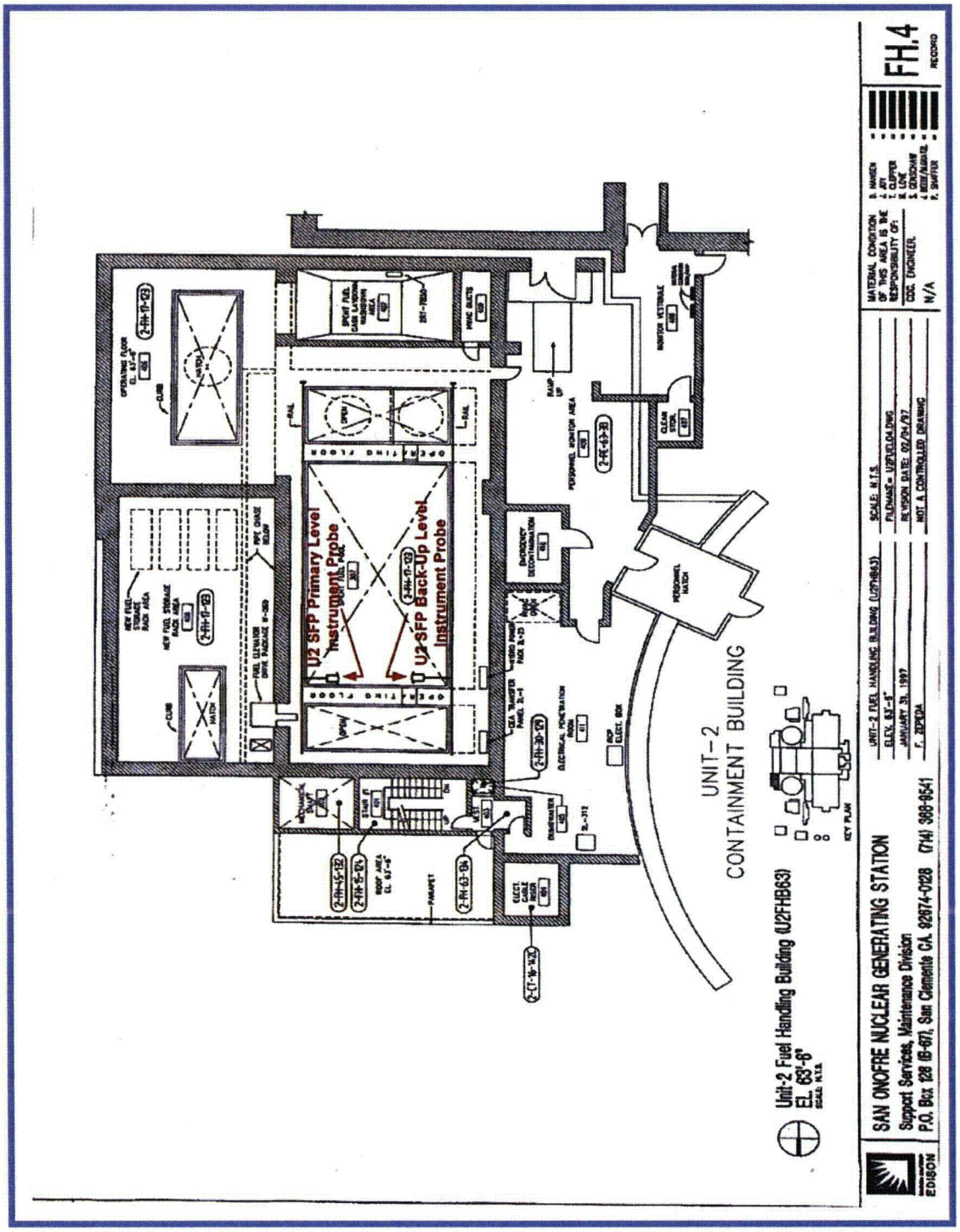
10) Southern California Edison's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-049), dated October 29, 2012

11) NRC Regulatory Guide 1.75 Revision 1; Physical Independence of Electrical Systems

15.0 OPEN ITEMS

No.	Description	Resolution
1	Determine if the Backup Instrument Channel can support a remote display location at the FLEX SFP fill connection.	Forecast Completion 2Q2014

ATTACHMENT 1



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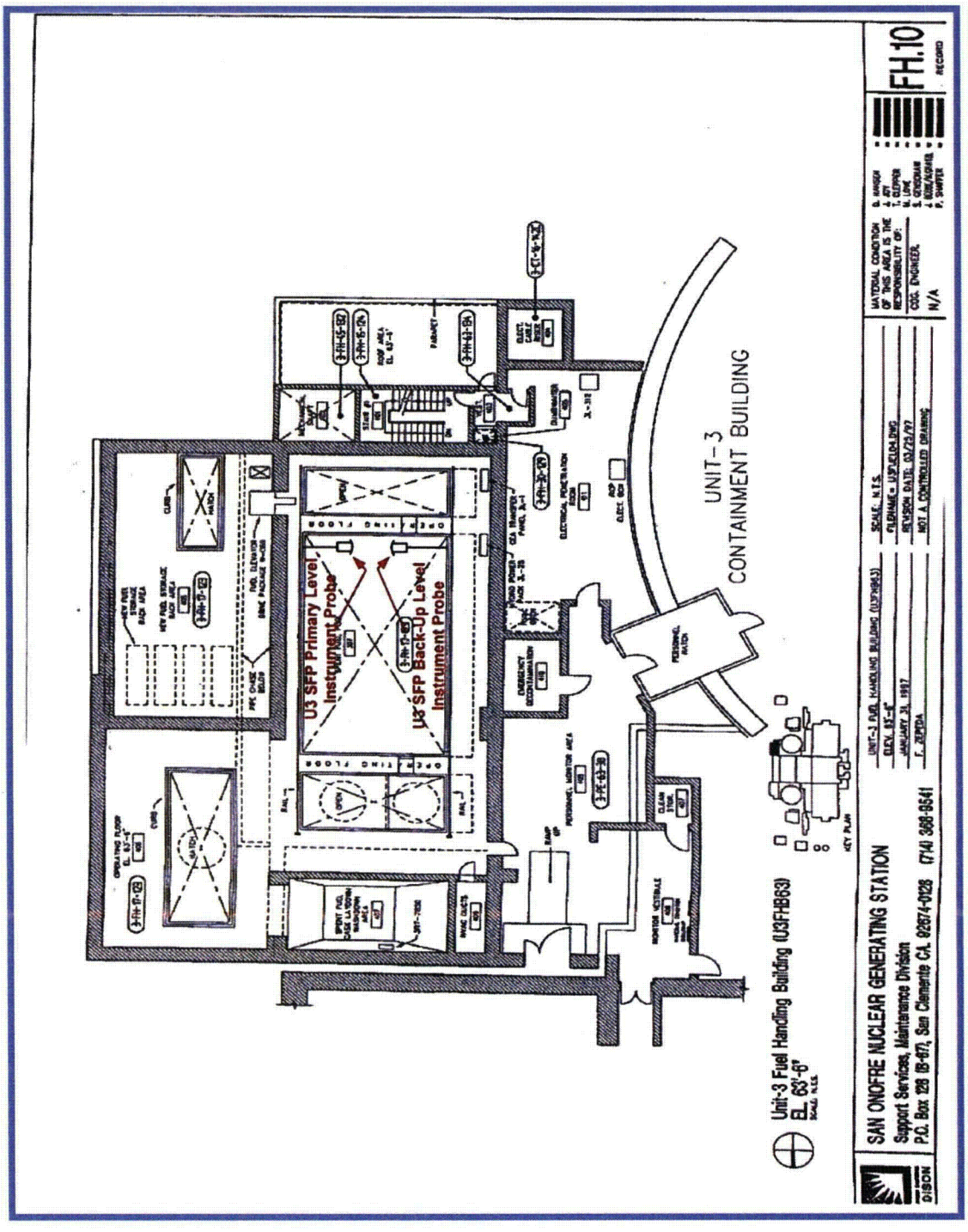

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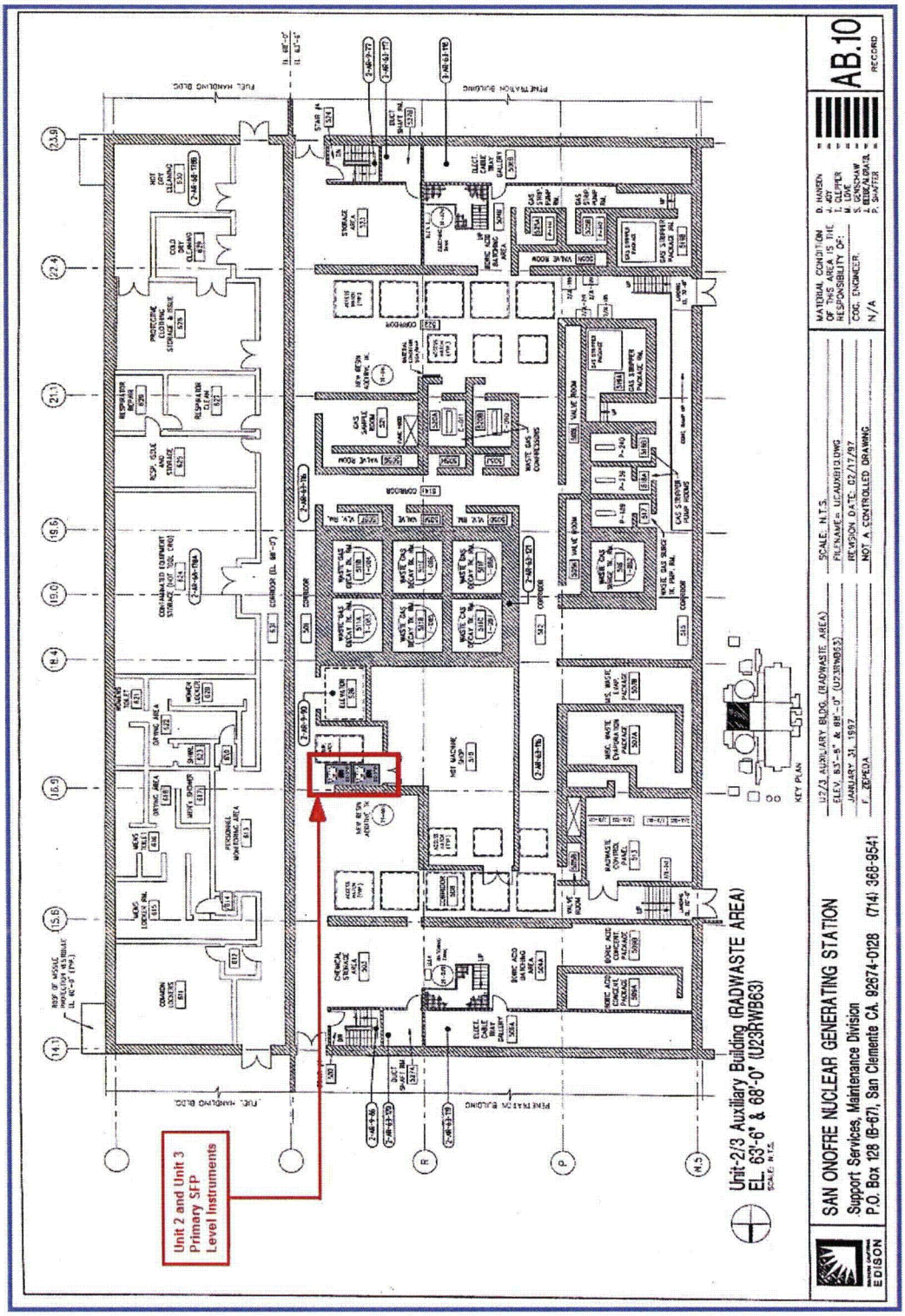

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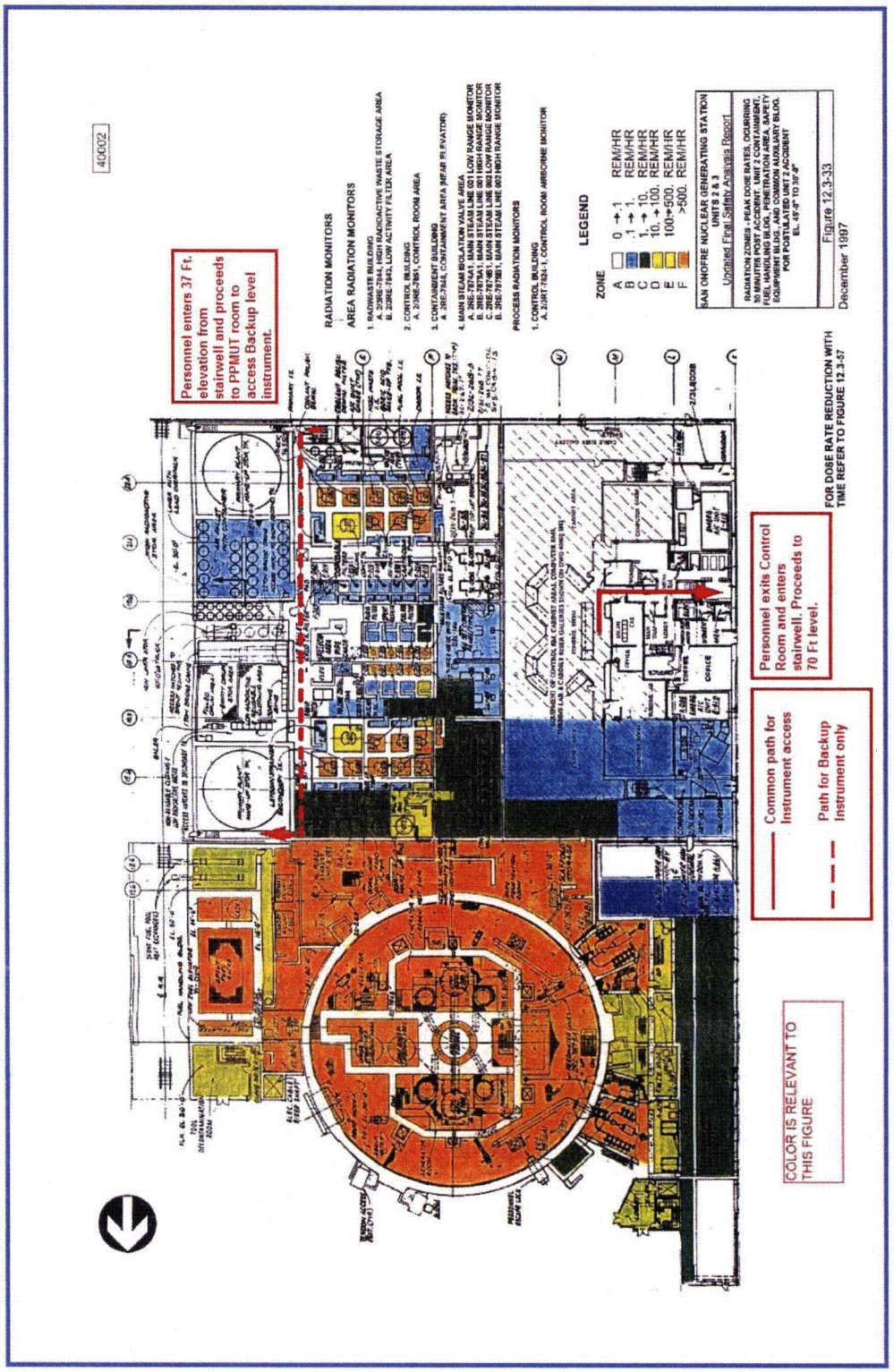

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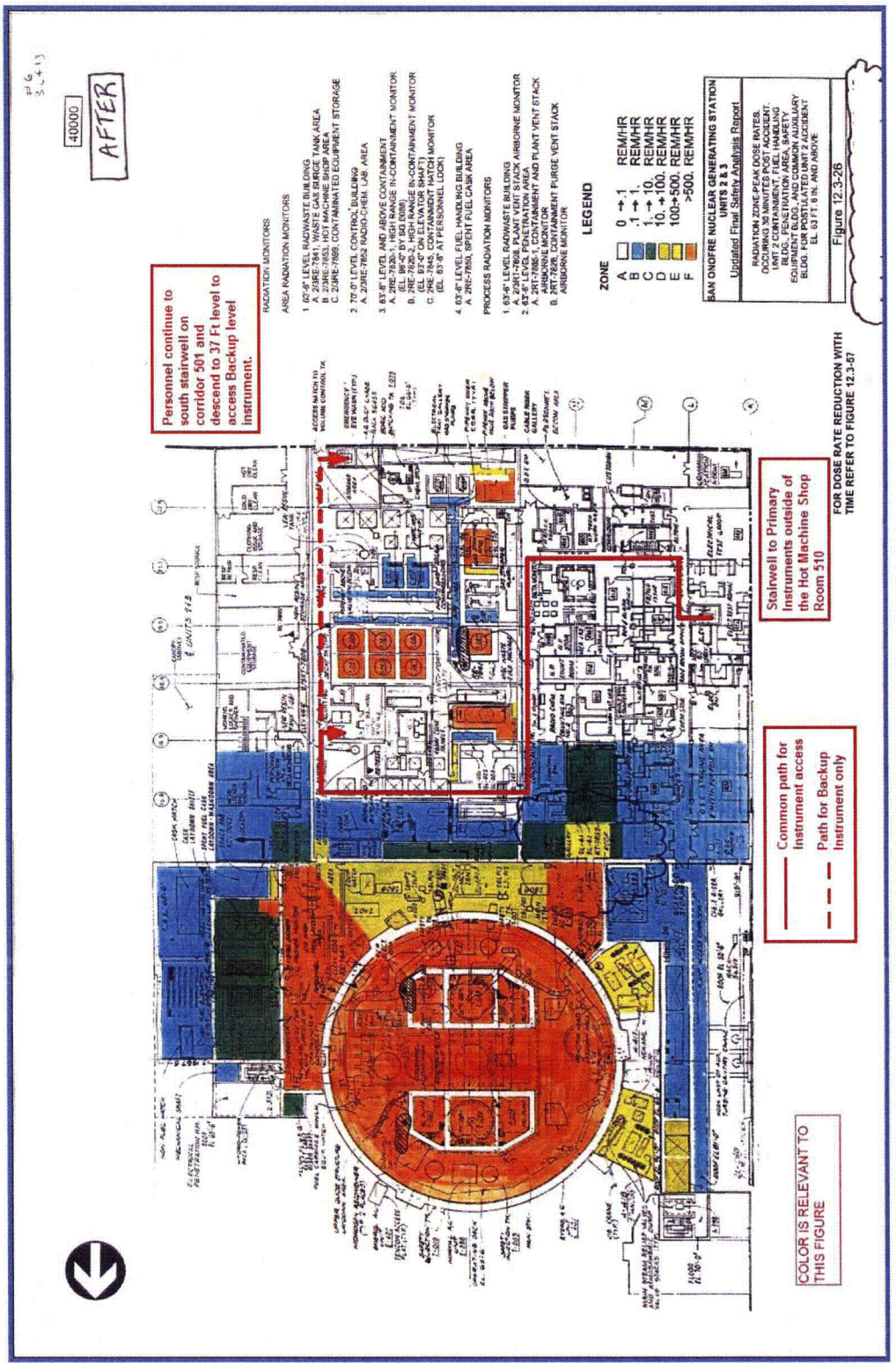

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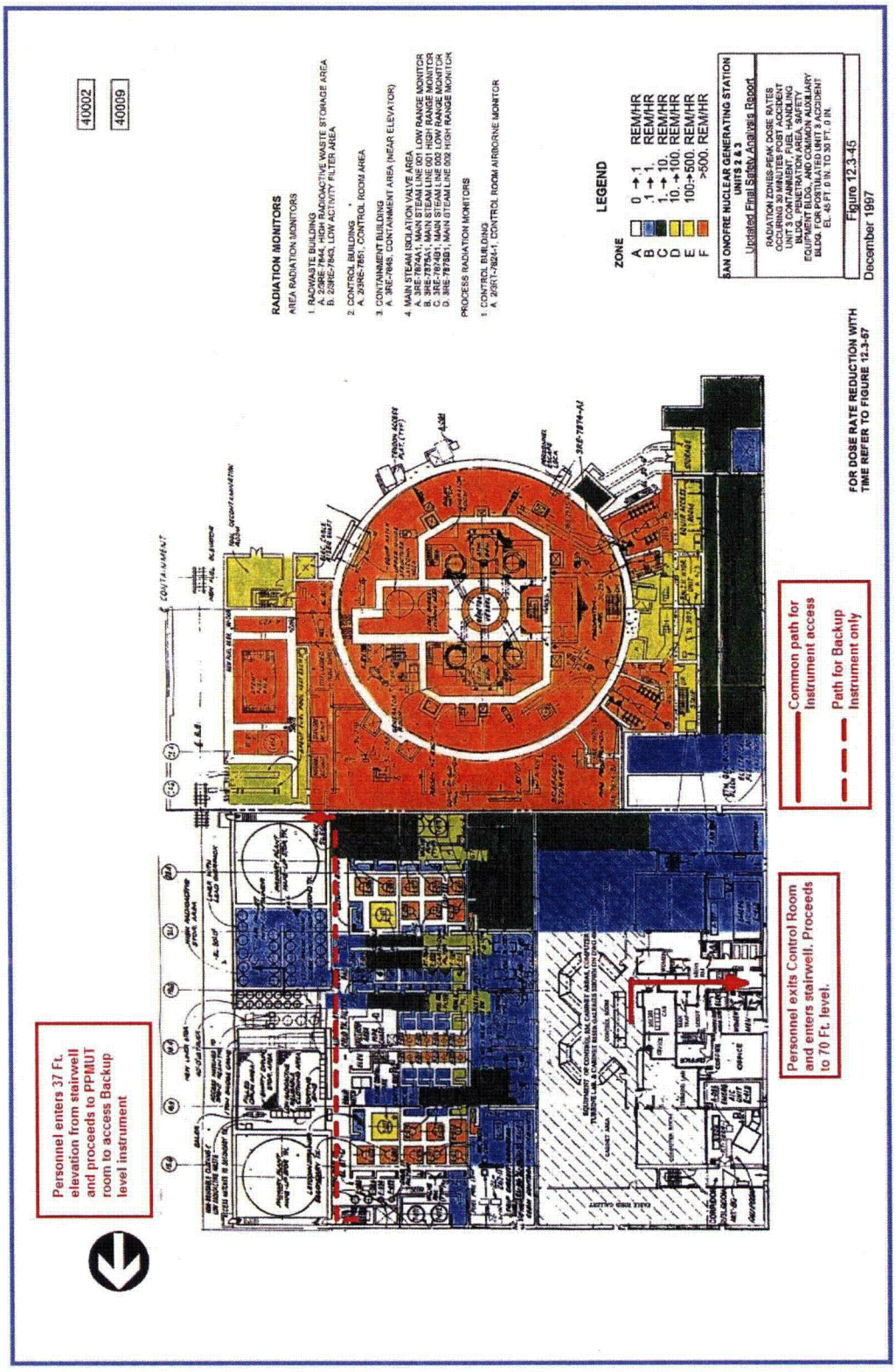

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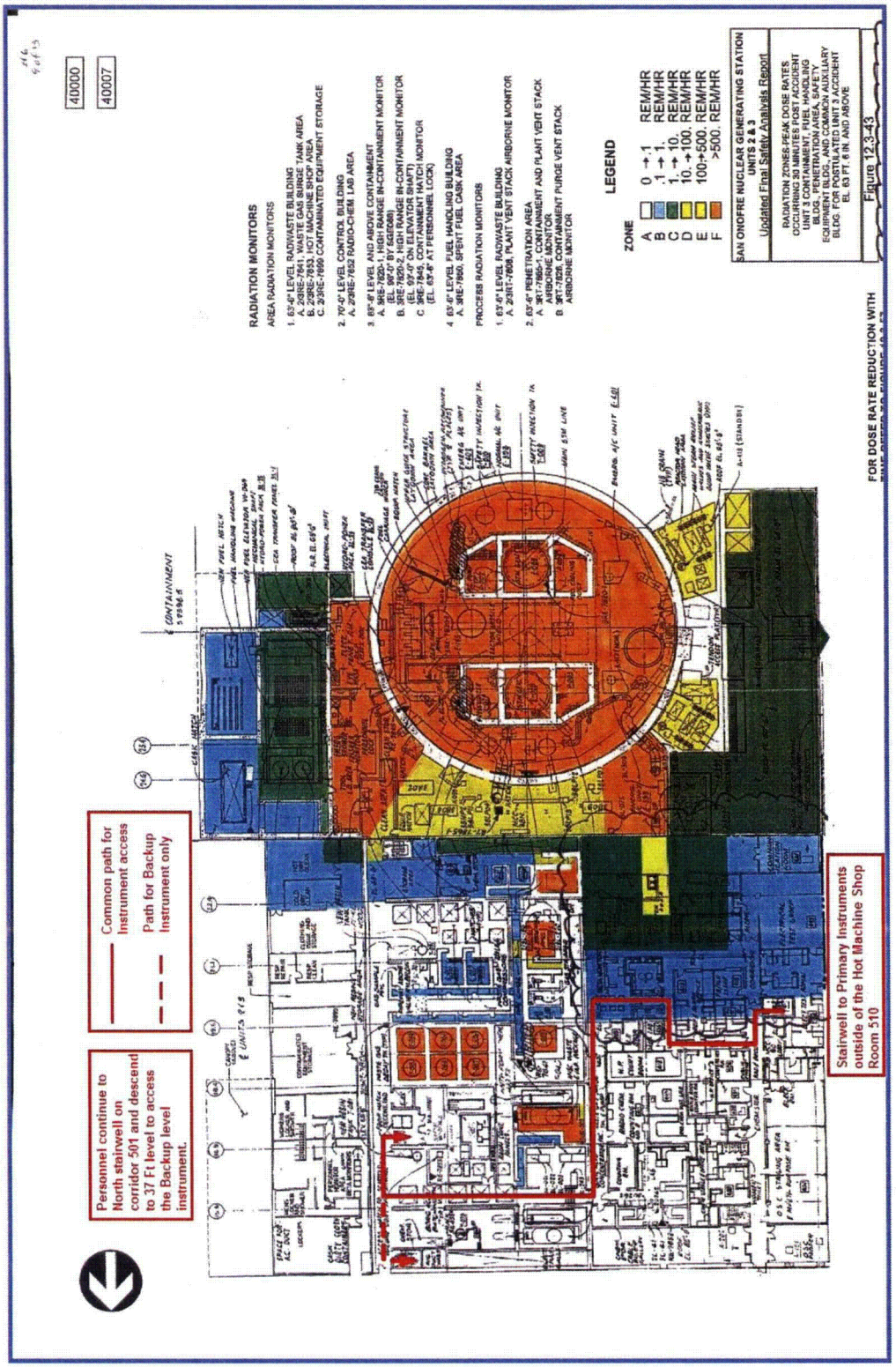

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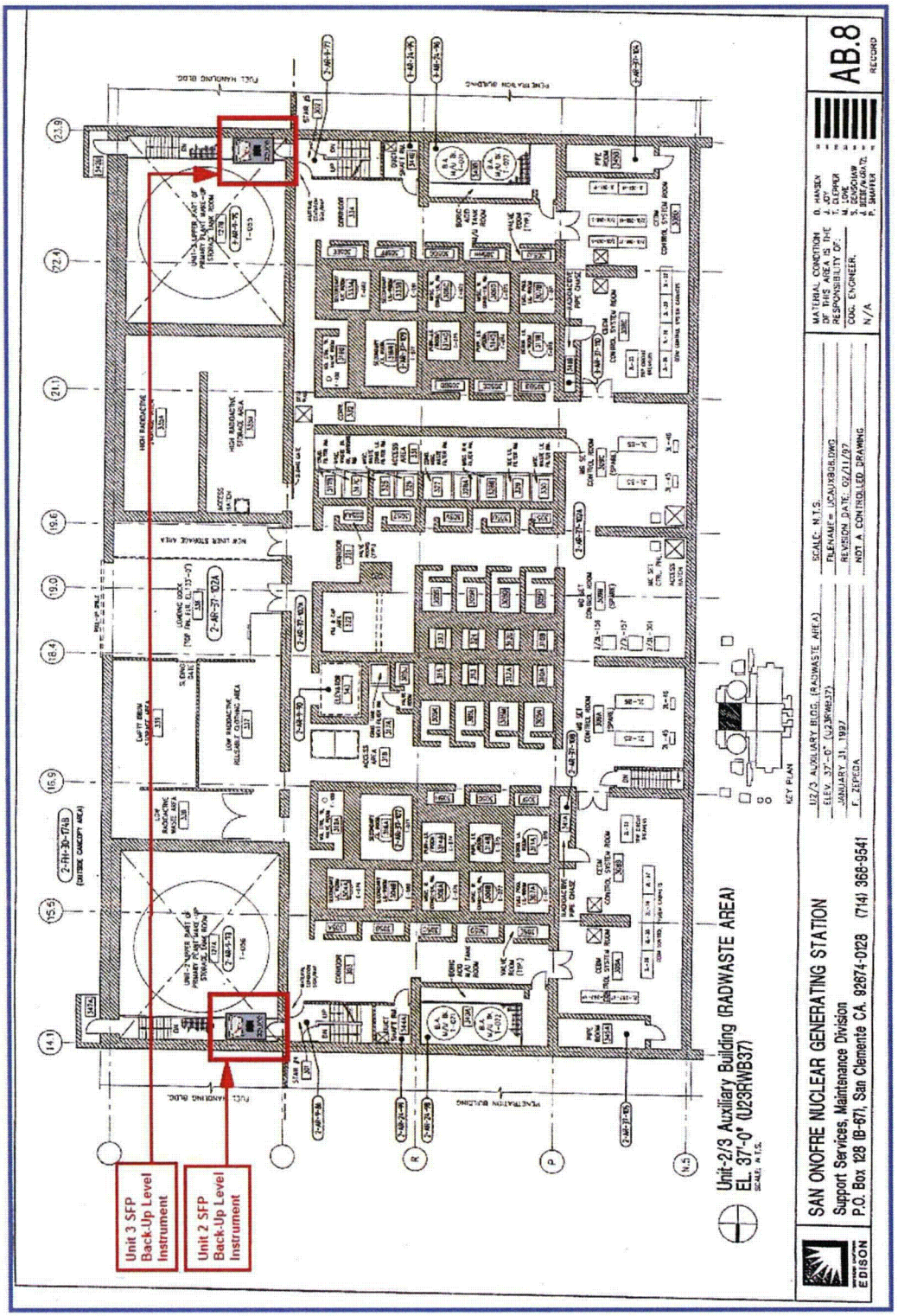

ATTACHMENT 9