ACCELERATED DOCUMENT DISTRIBUTION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9304130201 DOC.DATE: 93/04/06 NOTARIZED: NO DOCKET #
FACIL:50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275
50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
AUTH.NAME AUTHOR AFFILIATION
RUEGER,G.M. Pacific Gas & Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards rept of potential for inadequate electrical isolation in certain 120 Vac power circuits for Class IA & IB1 instrumentation,per 920925 meeting w/NRC & util-initiated RG 1.97 review project.

DISTRIBUTION CODE: A003D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 17
TITLE: OR/Licensing Submittal: Suppl 1 to NUREG-0737(Generic Ltr 82-33)

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	1	PD5 PD	1	1
	PETERSON,S	2	2			
INTERNAL:	NRR/DRCH/HHFB11	1	1	OC/LFMB	1	0
	REG FILE 01	1	1	RES/DSIR/EIB	1	1
EXTERNAL:	NRC PDR	1	1	NSIC	1	1

R I D S / A D D S

R I D S / A D D S

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 504-2065) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 10 ENCL 9

Pacific Gas and Electric Company

77 Beale Street, Room 1451
P.O. Box 770000
San Francisco, CA 94177
415/973-4684
Fax 415/973-2313

Gregory M. Rueger
Senior Vice President and
General Manager
Nuclear Power Generation

April 6, 1993

PG&E Letter No. DCL-93-078

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

Re: Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Report of Potential for Inadequate Electrical Isolation in Certain 120 VAC Power Circuits for PG&E Class IA and IB1 Instrumentation

Gentlemen:

On September 25, 1992, PG&E representatives met with NRC personnel in the NRC Region V offices in Walnut Creek, California. PG&E requested the meeting to discuss a potential issue that had been identified by PG&E's self-initiated Regulatory Guide (RG) 1.97 Review Project. The issue regarded the potential for inadequate electrical isolation in certain 120 VAC power circuits for parts of the safety-related instrumentation (PG&E Instrument Classes IA and IB1) at Diablo Canyon Power Plant (DCPP). This condition affects only the power circuits, and not the process or position signals or their associated wiring.

Inadequate isolation could prevent the instrumentation from meeting the single failure criterion. PG&E is committed to the single failure criterion for Class IA and IB1 instrumentation in accordance with IEEE Standards 279-1971 and 308-1971. (PG&E is not committed to the more prescriptive requirements of later standards or RG 1.75.) However, to date, evaluation by PG&E has concluded that the electrical isolation for each of the reviewed affected circuits is acceptable and there is no specific known deviation from the design basis single failure criterion. Therefore, this condition is not a reportable event in accordance with 10 CFR §50.72, §50.73, §50.9, or Part 21. However, agreement was reached at the September 25th meeting that PG&E would provide the NRC with a report containing a detailed description of this issue, including PG&E's plan for performing additional reviews. This report is enclosed.

As stated above, PG&E has found no specific instances where single failure tolerance could not be demonstrated for Class IA or IB1 instrumentation. Based on our experience with the analyses performed to date, PG&E expects that the planned additional reviews will continue to demonstrate adequacy in this area. Consequently, PG&E believes that the health and safety of the public are not affected by this issue.

120112

A003

Please contact me, or Messrs. Warren Fujimoto or Mike Tresler, if you have any questions or comments.

Sincerely,

Gregory M. Rueger

cc: Frank Gee
Ann P. Hodgdon
John B. Martin
Mary H. Miller
Sheri R. Peterson
CPUC
Diablo Distribution

Enclosure

6059S/85K/DDS/119

Enclosure
Report of Potential for Inadequate Electrical Isolation in Certain 120 VAC Power Circuits for PG&E Class IA and IB1 Instrumentation

Executive Summary

PG&E has established a Regulatory Guide (RG) 1.97[1] Review Project for Diablo Canyon Power Plant (DCPP). The purpose of the Project is to systematically review the design for post-accident monitoring instrumentation at DCPP with the various attributes for the instrumentation as specified in RG 1.97.

Project reviews identified the potential for deviation from the single failure criterion for parts of the safety-related instrumentation (PG&E Instrument Classes IA and IB1) due to potentially inadequate electrical isolation in certain 120 VAC power circuits. No actual instances of deviation have been identified to date; engineering analyses, considering credible failure modes and effects, have demonstrated acceptability for the identified affected power circuit pairs. Additional reviews are in progress, as are actions to upgrade the design basis documentation and configuration management functions related to this issue.

PG&E is submitting this report based on discussions with NRC Region V personnel at a meeting on September 25, 1992, and a March 16, 1993, telephone conversation with the NRC Office of Nuclear Reactor Regulation (NRR) Project Manager for DCPP.

Although RG 1.97 Review Project personnel will be performing the additional reviews associated with this issue, we intend to keep this issue separate from our RG 1.97 Review Project. PG&E will submit the final report for the RG 1.97 Review Project by the end of 1993, and a final report for this issue by the end of 1994.

1.0 Background

Conformance with the single failure criterion for PG&E Instrument Class IA (reactor protection and engineered safeguards features) and IB1 (RG 1.97 Category 1) instrumentation is part of the design basis for DCPP, and derives from PG&E's commitment to the Institute of Electrical and Electronic Engineers (IEEE) Standards 279-1971[3] and 308-1971[4].

NRC's Safety Evaluation Report[5] (SER) for DCPP (dated October 1974) concluded that the design of DCPP AC and DC power distribution systems met 10 CFR 50 Appendix A[6], General Design Criteria 17 (Electrical Power Systems) and 18 (Inspection and Testing of Electrical Power Systems), and IEEE 308-1971.

PG&E is not committed in general to RG 1.75[2]. Both Revisions 1 (dated January 1975) and 2 (dated September 1978) of RG 1.75 clarified the NRC's intent that the RG was not applicable to plants whose Construction Permit Safety Evaluation Reports were issued prior to issuance of Revision 0 of the RG in February 1974. That is, RG 1.75 would not be

used as a basis for evaluating the adequacy of the design of these plants. The Construction Permit Safety Evaluation Reports for DCPP Units 1 and 2, dated January 23, 1968, and November 18, 1969, respectively, both significantly pre-dated the initial issue date of RG 1.75 in 1974.

PG&E initiated the RG 1.97 Review Project in 1991 in response to issues identified from design basis reconstitution activities, nonconformance report (NCR) investigations, and a 1988 NRC audit of PG&E's RG 1.97 implementation. PG&E apprised the NRC of those issues, and of the scope and methodology of the RG 1.97 Review Project, at a meeting in Rockville, MD., on December 18, 1991. The status and preliminary findings of the project were presented to NRC personnel at a meeting in Rockville on November 19, 1992. PG&E intends to submit an interim RG 1.97 Project Report by April 30, 1993, and a final RG 1.97 Project Report by the end of 1993.

The potential for inadequate electrical isolation in instrument power circuits discussed in this report was identified by the reviews performed for the RG 1.97 Review Project. This issue was discussed with NRC Region V personnel at a meeting in Walnut Creek, CA, on September 25, 1992 (and was part of the November 19 presentation in Rockville mentioned above).

2.0 Description of Issue

2.1 General Description

PG&E reviews have identified the potential for inadequate electrical isolation in Class IA and IB1 instrumentation power circuits. As illustrated in Figure 1, there is the possibility that unisolated lower classification devices (i.e., PG&E Instrument Classes IB2, IB3, IC or II) could fail as a result of a postulated event. This failure affects only the power circuits, and not the process or position signals or their associated wiring. The majority of the lower classification devices identified to date are located in the control board, control room and cable spreading room. The assumed common failure mode is electrical shorting caused by loss of physical integrity. The loss of physical integrity may be internal to the device or may be external (i.e., resulting from failure of the mounting fasteners/supports for the device). There are a number of credible events that must be considered, including seismic activity, fire, harsh post-accident environments, missiles, pipe whip, jet impingement, flooding, tornado, and tsunami.

The simultaneous electrical shorting of the lower classification devices due to a postulated event would trip their respective circuit breakers. If redundant PG&E Class IA or IB1 devices were also supplied power by these breakers, then these devices would be deenergized as well. Such an occurrence would be a deviation from the single failure criterion in that a single event would have caused the simultaneous loss of redundant Class IA or IB1 instrumentation.

Conformance with the single failure criterion for IA and IB1 instrumentation is part of the design basis for DCPP. Consequently, deviation from the single failure criterion would be contrary to the plant's design basis.

Engineering analyses have been performed for the specific affected circuit pairs identified to date, which are listed in Section 2.2). The analyses considered all credible events that could cause the postulated common failure mode (electrical shorting) in the unisolated lower classification devices. Only seismic events and fire were determined to be credible. There were no instances in which unisolated lower classification devices were located where they would be subject to a harsh accident environment. Also, because seismic qualification is not required for these devices, seismic evaluations had to be performed in most cases.

The analyses concluded that each of the identified circuit pairs retained single failure tolerance. Consequently, there are no actual specific instances of deviation from the single failure criterion.

However, the analyses revealed the intricacy of this issue and its potentially broader scope. That is, other 120 VAC instrument circuits may have similar mixes of load classifications. Although each of the identified circuit pairs has been found to be single failure tolerant, PG&E concluded that directed, comprehensive reviews of the loads on additional Class 1E 120V Instrument AC breakers are warranted.

The planned additional reviews are described in Section 4.0. PG&E expects these reviews, and any associated analyses, to continue to confirm conformance with the single failure criterion. The bases for this expectation are PG&E's experience with the analyses performed to date including the preliminary results of the most recent reviews (see Section 4.1.2), and general knowledge of historical plant design approaches. Plant design practices have always provided for review of seismic adequacy when additional equipment was added to safety-related circuits. While not documented in the detail now prescribed by PG&E procedures, we expect that past practices, along with similarity of both safety-related and nonsafety-related instruments, the similarity of mounting details, and the standardized maintenance practices applied to both classes of equipment, lead PG&E to expect continuing success at documenting the adequacy of all connected loads.

2.2 Circuits Identified to Date

The following identification of the redundant instrumentation that could be lost is for information only. Analyses described in Section 3.0 demonstrate that both identified circuit pairs are single failure tolerant.

RG 1.97 project reviews initially identified the following affected pair of 120 VAC power circuits for DCPP Unit 1. The circuits and their associated supply breakers are as follows:

- Circuit 120Y00 -- Breaker 52-PY11-20
- Circuit 220Y00 -- Breaker 52-PY12-20

The Attachment provides schematic diagrams of these circuits and listings of the devices powered from these circuits.

Both circuits in the circuit pair have Class IA and IB1 loads in combination with unisolated loads of lower classification. Electrical shorting failure of unisolated lower classification loads in both circuits could trip both breakers for the circuit pair. The redundant higher classification devices that could be lost are the following:

- Emergency Diesel Generators (EDG) speed-switching tachometers YM-3 and YM-2.

- Reactor coolant wide-range (WR) temperature recorders TR-413, TR-423, TR-433 and TR-443.

The EDG speed-switching tachometers are Class IA devices that control various EDG starting and run permissives. Although these devices are DC powered (primary source), there are scenarios that might result in their deenergization if the analyses discussed in Section 3.0 below did not demonstrate the single failure tolerance of this circuit pair.

Loss of the temperature recorders would remove redundant indication and recording for both reactor inlet wide-range (WR) temperature ($T_{COLD(WR)}$) and reactor outlet WR temperature ($T_{HOT(WR)}$). These are identified as Category 1 variables (redundancy required) in RG 1.97, Table 3.

Subsequent RG 1.97 project reviews identified a second affected pair of 120 VAC power circuits for Unit 1:

- Circuit 233Y00 -- Breaker 52-PY12-33
- Circuit 333Y00 -- Breaker 52-PY13-33

As above, both circuits in this circuit pair have Class IA and IB1 loads in combination with unisolated loads of lower classification. The potentially affected redundant instrumentation was as follows:

- Containment Pressure (WR) Recording
- Containment Reactor Cavity Sump Level (WR) Recording
- In-Core Thermocouple Temperature Recording
- Reactor Vessel Level Indication
- Containment Hydrogen Monitors
- Containment High Range Radiation Recording
- New and Spent Fuel Pool Radiation Monitors

The issue associated with this second circuit pair is similar to that described above for circuits 120Y00 and 220Y00. Therefore, no schematic diagrams or device lists are attached for this second pair.

3.0 Analysis

3.1 Engineering Analyses

Engineering analyses were performed for each identified circuit pair. The analyses considered all credible events that could cause the postulated common mode failure (electrical shorting) in the unisolated lower classification devices. The credible events that were considered included seismic activity, fire, harsh post-accident environments, missiles, pipe whip, jet impingement, flooding, tornado, and tsunami. Only seismic events and fire were determined to be credible; the others were ruled out for various reasons. For example, in the case of Environmental Qualification (EQ), there were no unisolated lower classification devices on either circuit pair that was located in a harsh EQ area. The lower classification devices that were located in a harsh area were found to be isolated by fuses controlled in accordance with DCPP's Fuse Control Program. Thus, the harsh environment resulting from an accident is not a potential cause for adverse impact to Class IA or IB1 instrumentation.

The evaluations for seismic events and fire are discussed in the following sections.

3.1.1 Seismic Evaluation

Initial reviews determined that the lower classification devices did not necessarily have seismic files established. Therefore, seismic evaluations were performed that included:

- Walkdowns of installed hardware.
- Discussions with equipment manufacturers.
- Comparisons of lower classification devices with seismically qualified higher classification devices to confirm the applicability of the seismic qualification documentation for the lower classification device.

The equipment reviewed was found to be capable of withstanding a design basis seismic event. Seismic qualification files were developed or updated for devices not previously addressed in the files.

The seismic evaluations confirmed single failure tolerance of the identified circuit pairs from a seismic perspective.

3.1.2 Fire Protection Evaluation

The fire protection aspects (10 CFR 50, Appendix R[7]) were also evaluated. With respect to fire protection, the relevant consideration is whether redundant Appendix R safe shutdown equipment would be deenergized as a result of a fire in a single fire area.

A preliminary review was performed to provide assurance that the absence of 120 VAC electrical isolation would not impact the availability of Appendix R 120 VAC circuits following a postulated fire in the areas which credit the circuits for safe shutdown. This review encompassed all 120 VAC breakers that supply power to Appendix R safe shutdown loads. The review determined that the absence of electrical isolation would not impact the availability of Appendix R 120 VAC circuits, in the event of a postulated fire in the areas which credit these circuits for safe shutdown. The results of this preliminary review will be confirmed through the performance of the RG 1.97 Review Project and the Fire Protection Program Upgrades Project.

3.2 Class IA Device Susceptibility

A preliminary review of the most important instrument loads, Instrument Class IA, was performed to determine whether they would be susceptible to the 120 VAC power isolation issue.

For the most critical subset of Instrument Class IA instrumentation, i.e., Reactor Protection System (RPS) and Engineered Safeguards Features Actuation System (ESFAS) initiation circuits, no power isolation issues were identified. That is, no lower classification devices that share breakers with these circuits were identified.

In addition, this review looked at 120V Instrument AC breakers that supply other IA loads. The preliminary assessment concluded that the necessary safety functions can be fulfilled.

The results of this review will be confirmed through the performance of the breaker review activity discussed in Section 4.1 below.

3.3 Unit 2 Circuit Pairs

The circuit pairs identified for DCPP Unit 1 have corresponding circuit pairs in Unit 2. Investigation confirmed that the Unit 2 circuit pairs were similar to the Unit 1 pairs with respect to loads, classification of loads, and electrical isolation. Therefore, the analyses performed for the Unit 1 circuit pairs were determined to be applicable also to the Unit 2 pairs. This conclusion will be confirmed through the performance of the breaker review activity discussed in Section 4.1 below.

4.0 Corrective Action

4.1 Immediate Corrective Actions

4.1.1 Evaluations of Identified Circuit Pairs

Section 3.1 above discusses the evaluations that were performed as immediate corrective actions for the two identified circuit pairs. These evaluations concluded that there were no instances of deviation from the design basis single failure criterion in either of the identified circuit pairs.

4.1.2 120 VAC Class 1E Breaker Review Activity

At the September 25, 1992, meeting with NRC Region V personnel, PG&E described additional 120 VAC Class 1E breaker reviews that would be performed. Since that meeting, PG&E decided to expand the scope of these additional reviews.

PG&E will perform a 100 percent review, with respect to adequate power isolation, of the circuits fed from Class 1E 120V Instrument AC breakers that feed Instrument Class IA, IB1 or IB2 loads, in both DCPP Units. These reviews will confirm the single failure tolerance of Class IA and IB1 instrumentation, or appropriate actions will be taken. For any potential deviation from the single failure criterion, PG&E will upgrade or dedicate existing devices to assure that the attributes needed to fulfill the single failure criterion are clearly identified and maintained during the plant life. Otherwise, isolation will be provided.

These breaker reviews will also identify affected lower classification devices for purposes of configuration control during future procurement, maintenance and modification activities (see configuration management discussion in Section 4.2 below).

The confirmatory reviews discussed in Sections 3.2 and 3.3 above are encompassed by the scope described in this section.

Note that this breaker review activity has already commenced. Progress to date includes:

- Preparation of special illustrations to depict loads, fuses and locations on a single drawing for each circuit.
- Development/refinement of the methodology to be used to perform the breaker reviews.

- Testing of the methodology on approximately twenty breakers.

The preliminary results of these twenty breaker reviews have been satisfactory and support PG&E's expectations that conformance with the single failure criterion will be demonstrated for the entire scope of the additional reviews.

4.1.3 Fire Protection Program Upgrades Project

The Fire Protection Program Upgrade Project includes the review and upgrade of the documentation associated with common power supply circuits. This effort will provide a documented basis for the adequacy of the circuit fusing provided for each 120 VAC breaker which powers safe shutdown equipment. This documentation is expected to validate the conclusions of the preliminary review performed to assess the impact of the identified circuit isolation issues on the DCPP 10 CFR 50 Appendix R analysis.

4.2 Corrective Actions to Prevent Recurrence

4.2.1 Configuration Management Enhancement

PG&E is making enhancements to the configuration management program for DCPP to assure that components with certain attributes that would not normally be required of the device by virtue of its functional classification (e.g., seismic qualification) will be recognized and maintained throughout future procurement, maintenance and modification activities.

These enhancements will include establishing a new classification for selected equipment affected by this 120 VAC power isolation issue. This classification will clearly identify equipment (and associated required attributes) that are relied on in single failure analyses, but that otherwise have no safety function.

PG&E has established an Enhanced Design Criteria Memorandum (DCM) program for DCPP to reconstitute and capture the design requirements for plant systems (as well as various topical areas). The detailed bases and application of the new equipment classification will be defined in the applicable DCMs for instrumentation and electrical systems and equipment.

5.0 Conclusion

As stated in this report, PG&E has found each circuit examined to date to meet single failure requirements. Based on our experience with the analyses performed to date, PG&E expects that the planned additional reviews will continue to demonstrate adequacy in this area.

Consequently, PG&E believes that the health and safety of the public are not affected by this issue.

6.0 References

1. NRC Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," Revision 3, dated May 1983.

2. NRC Regulatory Guide 1.75, "Physical Independence of Electric Systems," Revision 2, dated September 1978.

3. Institute of Electrical and Electronic Engineers (IEEE) Standard 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations."

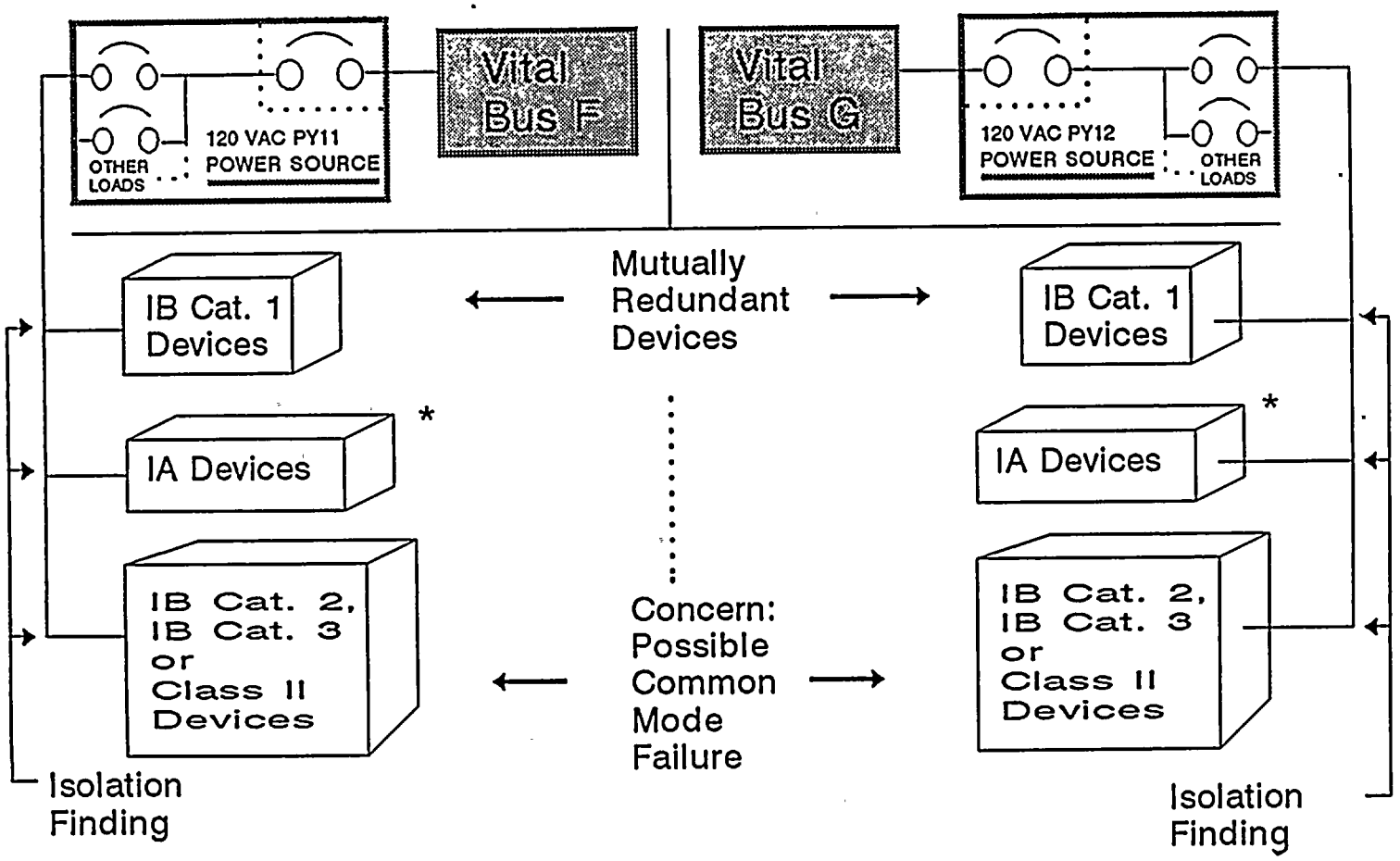
4. IEEE Standard 308-1971, "Criteria for Class 1E Electric Systems for Nuclear Power Generating Stations."

5. NUREG-0675, "Safety Evaluation of the Diablo Canyon Nuclear Power Station, Units 1 and 2," dated October 16, 1974.

6. Title 10 of the U.S. Code of Federal Regulations (10CFR), Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants."

7. Title 10 of the U.S. Code of Federal Regulations (10CFR), Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

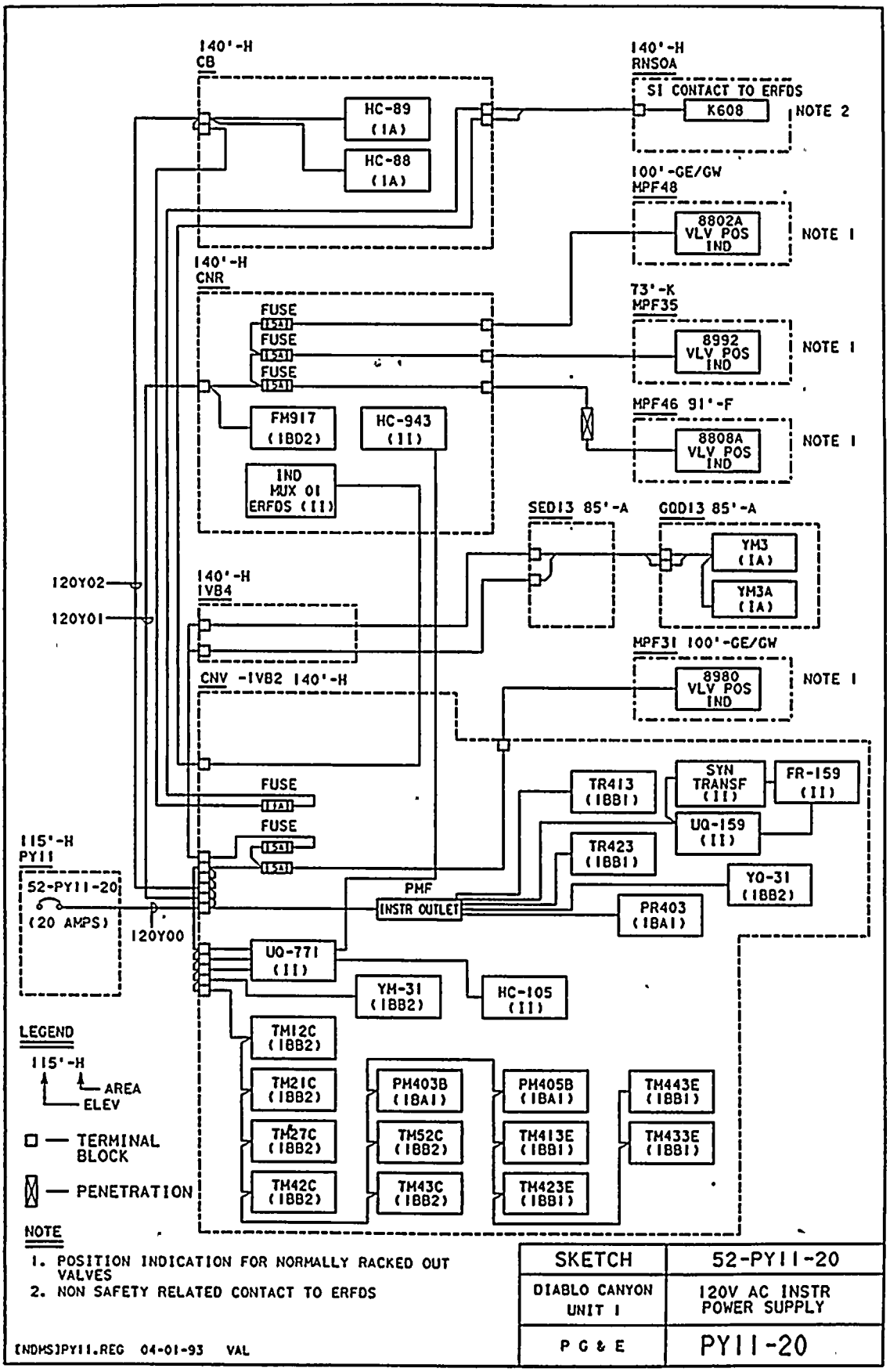
Figure 1
Illustration of Isolation Issue



* Note: Does not affect RPS/ESFAS Initiation Systems.

Attachment

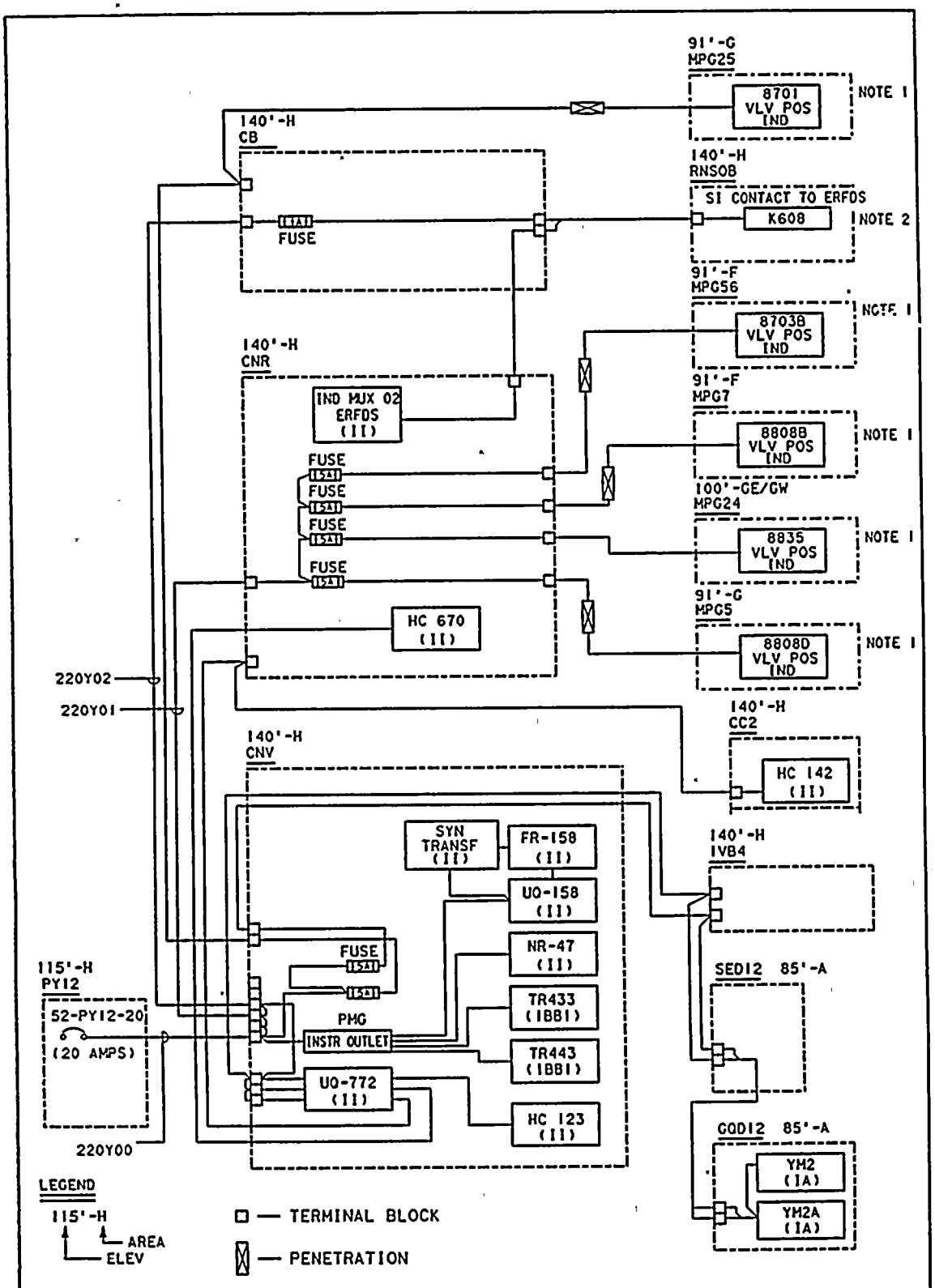
Schematic Diagrams and Fed Devices Lists for 120 VAC Circuits 120Y00 and 220Y00


140'-H
CB
HC-89
(1A)
HC-88
(1A)
140'-H
RNSOA
SI CONTACT TO ERFDS
K608
NOTE 2
100'-GE/GW
MPF48
8802A
VLV POS
IND
NOTE 1
140'-H
CNR
FUSE
FUSE
FUSE
73'-K
MPF35
8992
VLV POS
IND
NOTE 1
FM917
(1BD2)
HC-943
(11)
MPF46 91'-F
8808A
VLV POS
IND
NOTE 1
IND
MUX 01
ERFDS (11)
SED13 85'-A
GDD13 85'-A
YM3
(1A)
YM3A
(1A)
120Y02
120Y01
140'-H
1VB4
MPF31 100'-GE/GW
8980
VLV POS
IND
NOTE 1
CNV -1VB2 140'-H
FUSE
FUSE
TR413
(1BB1)
SYN
TRANSF
(11)
FR-159
(11)
UQ-159
(11)
TR423
(1BB1)
YO-31
(1BB2)
115'-H
PY11
52-PY11-20
(20 AMPS)
120Y00
PMF
INSTR OUTLET
PR403
(1BA1)
UQ-771
(11)
YM-31
(1BB2)
HC-105
(11)
TM12C
(1BB2)
TM21C
(1BB2)
TM27C
(1BB2)
TM42C
(1BB2)
PM403B
(1BA1)
TM52C
(1BB2)
TM43C
(1BB2)
PM405B
(1BA1)
TM413E
(1BB1)
TM423E
(1BB1)
TM443E
(1BB1)
TM433E
(1BB1)
LEGEND
115'-H
AREA
ELEV
TERMINAL BLOCK
PENETRATION
NOTE
1. POSITION INDICATION FOR NORMALLY RACKED OUT VALVES
2. NON SAFETY RELATED CONTACT TO ERFDS
SKETCH
52-PY11-20
DIABLO CANYON UNIT 1
120V AC INSTR POWER SUPPLY
P G & E
PY11-20
[NDMS]PY11.REG 04-01-93 VAL

DEVICES FED FROM PY-11 BREAKER 20 (120Y00)

DEVICE TAG #	DEVICE DESCRIPTION
FM-917	CHARGING PUMPS DISCHARGE HEADER-FLOW MODIFIER
FR-159	RCP SEAL LEAKAGE-FLOW RECORDER
HC-88	HAND CONTROLLER FOR SG 1-3 AUX FEEDWATER SUPPLY
HC-89	HAND CONTROLLER FOR SG 1-4 AUX FEEDWATER SUPPLY
HC-105	BAT RECIRC VALVE-HAND CONTROLLER
HC-943	ACCUMULATOR VENT HEADER-HAND CONTROLLER
K608	SAFETY INJECTION SSPS-RELAY CONTACT TO ERFDS
PM-403B	SUB-COOLED MARGIN MONITOR ISOLATOR
PM-405B	SUB-COOLED MARGIN MONITOR ISOLATOR
PR-403	REACTOR COOLANT HOT LEG LOOP 4 PRESSURE RECORDER
TM12C	SUB-COOLED MARGIN MONITOR-SIGNAL MODIFIER
TM21C	SUB-COOLED MARGIN MONITOR-SIGNAL MODIFIER
TM27C	SUB-COOLED MARGIN MINOTOR-SIGNAL MODIFIER
TM42C	SUB-COOLED MARGIN MONITOR-SIGNAL MODIFIER
TM43C	SUB-COOLED MARGIN MONITOR-SIGNAL MODIFIER
TM52C	SUB-COOLED MARGIN MONITOR-SIGNAL MODIFIER
TM413E	SUB-COOLED MARGIN MONITOR-ISOLATOR
TM423E	SUB-COOLED MARGIN MONITOR-ISOLATOR
TM433E	SUB-COOLED MARGIN MONITOR-ISOLATOR
TM443E	SUB-COOLED MARGIN MONITOR-ISOLATOR
TR413	REACTOR COOLANT LOOP 1-TEMPERATURE RECORDER
TR423	REACTOR COOLANT LOOP 2-TEMPERATURE RECORDER
UQ-159	RCP SEAL FLOW LOOP POWER SUPPLY
UQ-771	BAT RECIRCULATION VALVE LOOP POWER SUPPLY
YM3	DIESEL ENGINE SPEED-SWITCHING TACHOMETER
YM3A	DIESEL ENGINE SPEED-SWITCHING TACHOMETER-ISOLATOR
YM-31	SUB-COOLED MARGIN MONITOR-COMPUTER
YQ-31	SUB-COOLED MARGIN MONITOR-POWER SUPPLY
8802A*	SI PUMP 1 HOT LEG LOOPS 1 & 2 DISCH VLV POSITION
8808A*	ACCUMULATOR I INJECTION COLD LEG LOOP 1 VLV POSITION
8980*	RHR PUMP RWST SUCTION HEADER VLV POSITION
8992*	SPRAY ADDITIVE TANK OUTLET VLV POSITION
--	SYNCHRONOUS TRANSFORMER
--	MUX CARD 01 - ERFDS

* POSITION INDICATION FOR NORMALLY RACKED OUT VALVES.



NOTE
1. POSITION INDICATION FOR NORMALLY RACKED OUT VALVES
2. NON SAFETY RELATED CONTACT TO ERFDS

SKETCH	52-PY12-20
DIABLO CANYON UNIT 1	120V AC INSTR POWER SUPPLY
P G & E	PY12-20

[NOMS]PY12.REG 04-01-93 VAL

DEVICES FED FROM PY-12 BREAKER 20 (220Y00)

DEVICE TAG #	DEVICE DESCRIPTION
FR-158	RCP SEAL LEAKAGE FLOW RECORDER
HC-123	HAND CONTROLLER FOR EXCESS LETDOWN HEAT EXCHANGER OUT
HC-142	HAND CONTROLLER FOR CHARGING PUMPS DISCHARGE TO REGEN HX
HC-670	HAND CONTROLLER FOR RESIDUAL HEAT EXCHANGER BYPASS
K608	SAFETY INJECTION SSPS-RELAY CONTACT TO ERFDS
NR-47	POWER RANGE NEUTRON FLUX RECORDER
TR433	REACTOR COOLANT LOOP 3-TEMPERATURE RECORDER
TR443	REACTOR COOLANT LOOP 4-TEMPERATURE RECORDER
UQ-158	RCP SEAL FLOW LOOP POWER SUPPLY
UQ-772	RESIDUAL HEAT EXCHANGER BYPASS POWER SUPPLY
YM2	DIESEL ENGINE SPEED-SWITCHING TACHOMETER
YM2A	DIESEL ENGINE SPEED-SWITCHING TACHOMETER-ISOLATOR
8701*	LOOP 4 HOT LEG RHR SUCTION VLV POSITION
8703B*	LOOPS 1 & 2 RHR INJECTION VLV POSITION
8808B*	ACCUMULATOR 2 INJECTION COLD LEG LOOP 2 VLV POSITION
8808D*	ACCUMULATOR 4 INJECTION COLD LEG LOOP 4 VLV POSITION
8835*	SAFETY INJECTION PUMPS COLD LEG DISCH HEADER VLV POSITION
--	SYNCHRONOUS TRANSFORMER
--	MUX CARD 02 - ERFDS

* POSITION INDICATION FOR NORMALLY RACKED OUT VALVES.