

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

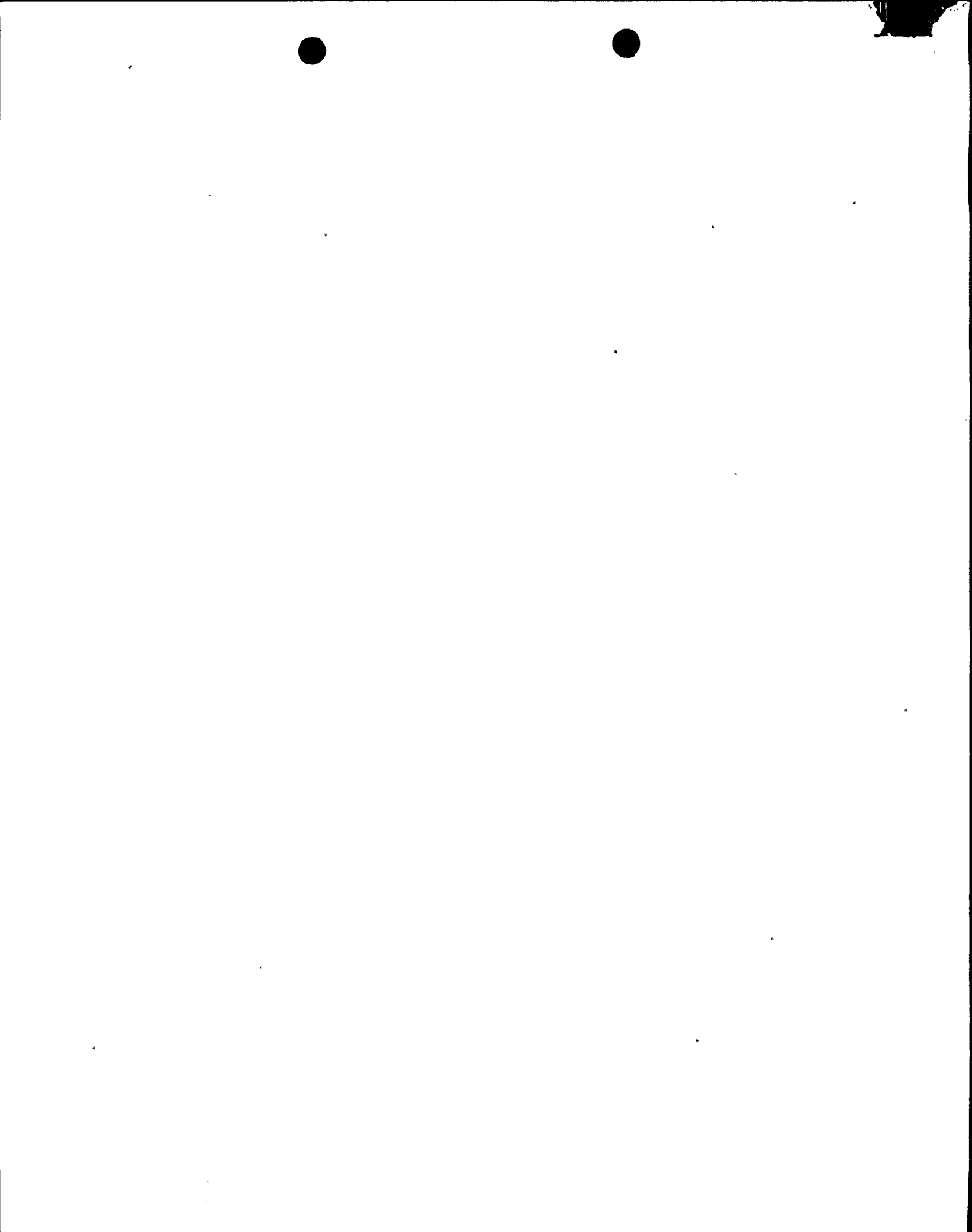
TO: J.F. STOLZ		FROM: PACIFIC GAS & ELEC. CO. SAN FRANCISCO, CALIFORNIA P.A. CRANE, JR.		DATE OF DOCUMENT 6/10/77
				DATE RECEIVED 6/15/77
<input checked="" type="checkbox"/> LETTER <input checked="" type="checkbox"/> ORIGINAL <input type="checkbox"/> COPY	<input type="checkbox"/> NOTORIZED <input checked="" type="checkbox"/> UNCLASSIFIED	PROP	INPUT FORM	NUMBER OF COPIES RECEIVED <b>1 SIGNED</b>

DESCRIPTION	ENCLOSURE
LTR. ADVISING OF A COMPARATIVE ANALYSIS THAT WAS PERFORMED AND RESULTED IN A PEAK CLAD TEMPERATURE HIGHER.....  (1P)	
<b>DO NOT REMOVE</b>	
PLANT NAME: SAB	<b>ACKNOWLEDGED</b>

SAFETY	FOR ACTION/INFORMATION	ENVIRONMENTAL
ASSIGNED AD:	<i>Vassallo</i>	ASSIGNED AD: V. MOORE (LTR)
BRANCH CHIEF:	<i>Stolz</i>	BRANCH CHIEF:
PROJECT MANAGER:	<i>Wilson</i>	PROJECT MANAGER:
LICENSING ASSISTANT:	<i>Horton</i>	LICENSING ASSISTANT:
		B. HARLESS

INTERNAL DISTRIBUTION			
<input checked="" type="checkbox"/> REG FILES	SYSTEMS SAFETY	PLANT SYSTEMS	SITE SAFETY & ENVIRON ANALYSIS
<input checked="" type="checkbox"/> NRC PDR	HEINEMAN	TEDESCO	DENTON & MULLER
<input checked="" type="checkbox"/> T & E (2)	SCHROEDER	BENAROYA	CRUTCHFIELD
<input checked="" type="checkbox"/> OELD	ENGINEERING	LAINAS	
GOSSICK & STAFF	KNIGHT	IPPOLITO	
HANAUER	BOSNAK	F. ROSA	ENVIRO TECH.
MTPC	SIHWELL		ERNST
CASE	PAWLICKI	OPERATING REACTORS	BALLARD
BOYD		STELLO	YOUNGBLOOD
		EISENHUT	
PROJECT MANAGEMENT	REACTOR SAFETY	SHAO	SITE TECH.
SKOVHOLT	ROSS	BAER	
P. COLLINS	NOVAK	BUTLER	GAMMILL (2)
HOUSTON	ROSZNYCZY	GRIMES	
MELTZ	CHECK		SITE ANALYSIS
HELTEMES			VOLLMER
SK	AT&I		BUNCH
	SALTZMAN		J. COLLINS
	RUTBERG		KREGER

EXTERNAL DISTRIBUTION		CONTROL NUMBER
<input checked="" type="checkbox"/> LPDR: San Luis Obispo, Ca		<b>7716700974</b> MAR 4 GD
<input checked="" type="checkbox"/> TIC	NSIC	
<input checked="" type="checkbox"/> NAT LAB		
<input checked="" type="checkbox"/> REG IV (J. HANCHETT)		
<input checked="" type="checkbox"/> 16 CYS ACRS SENT CATEGORY <b>A</b>		



PACIFIC GAS AND ELECTRIC COMPANY

PG&E + 77 BEALE STREET • SAN FRANCISCO, CALIFORNIA 94106 • (415) 781-4211

JOHN C. MORRISSEY  
VICE PRESIDENT AND GENERAL COUNSEL

June 10, 1977

GILBERT L. HARRICK  
GLENN WEST, JR.  
CHARLES W. TOWSELL  
DANIEL E. GIBSON  
JOSEPH J. KELLY  
HOWARD V. GOLUB

EDWARD J. MCGANNEY  
ARTHUR L. HILLMAN, JR.  
ROBERT OHLBACH  
DAN GRAYSON LUSBOCK  
JACK F. FALLIN, JR.

MALCOLM H. FURBUSH  
ASSOCIATE GENERAL COUNSEL

SENIOR COUNSEL

CHARLES T. VAN DEUSEN  
PHILIP A. CRANE, JR.  
HENRY J. LAPLANTE  
RICHARD A. CLARKE  
JOHN S. GIBSON  
ASSISTANT GENERAL COUNSEL

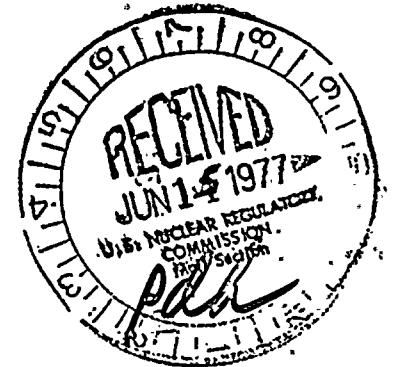
JOSHUA BAR-LEV  
ROBERT L. BORDON  
BERNARD J. DELLA-SANTA  
WILLIAM M. EDWARDS  
DONALD D. ERICKSON  
KATHY GRAMAK  
PETER W. HANSCHEM  
JAMES A. KAYLOR  
F. RONALD LAUFHEIMER  
MEREK E. LIPSON  
RICHARD L. MEISS  
ROBERT R. RICKETT  
SHIRLEY A. SANDERSON  
LOUIS F. SCHOFIELD  
DAVID J. WILLIAMS  
RUCE R. WORTHINGTON

J. PETER BAUMGARTNER  
LEIGH B. CABBODY  
BRIAN S. DENTON  
JOSEPH S. ENGLEBT, JR.  
BARBARA A. GOODE  
ANNETTE GREEN  
ROBERT L. HARRIS  
KERRY R. KUBITZ  
THEODORE L. LINDBERG, JR.  
JAMES C. LOGSDON  
RICHARD M. MOSS  
IVOR E. SANDON  
ROBERT N. SCHIFF  
JACK W. SHUCK  
SHIRLEY WOO

REGULATORY DOCKET FILE COPY

ATTORNEYS

Mr. John F. Stoltz, Chief  
Light Water Reactors Branch No. 1  
Division of Project Management  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555



Re: Dockets 50-275-OL, 50-323-OL  
Diablo Canyon Units 1 and 2

Dear Mr. Stoltz:

This letter is in response to informal staff questions on the ECCS analysis, at upper head temperature  $T_{HOT}$ , submitted in FSAR Amendments 47 and 49.

The analysis was performed using Unit 2 parameters. Unit 2 is rated at a higher power (3411 Mwt) than Unit 1, and in addition a comparative analysis was performed at the same power level for both units, which showed that Unit 2 parameters resulted in a peak clad temperature 14°F higher than Unit 1. Thus, Unit 2 parameters are conservative for Unit 1.

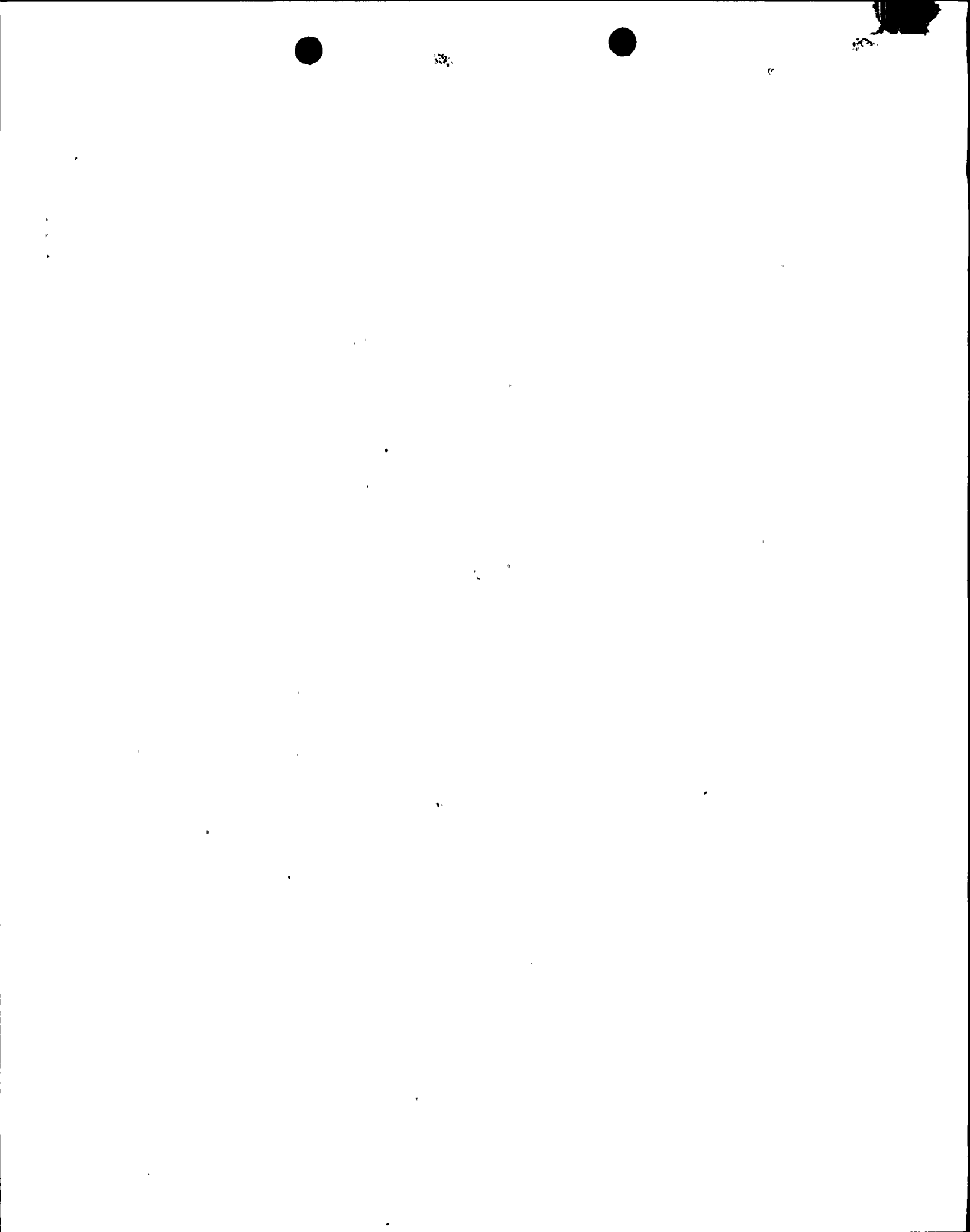
A statement similar to the above paragraph will be incorporated into the FSAR in a future amendment.

Very truly yours,

*Philip A. Crane, Jr.*

CC: ASLB  
Parties

771670097



**DISTRIBUTION**

Docket Files	← RTedesco
NRC PDR	HDenton
Local PDR	VMoore
LWR-#1 File	RVollmer
RBoyd	ELD
RDeYoung	MERNst
DVassallo	WGammill
FWilliams	IE (3)
JStolz	
LEngle	
DAllison	
EHylton	
RHeineman	
DRoss	
JKnight	

JUN 07 1977

Docket Nos. 50-275  
and 50-323 ←

Pacific Gas & Electric Company  
ATTN: Mr. John C. Morrissey  
Vice President & General Counsel  
77 Beale Street  
San Francisco, California 94106

bcc: JRBuchanan, NSIC  
TBAbernathy, TIC  
ACRS (16)

Gentlemen:

**SUBJECT: FACILITY DESIGN FOR THE PROTECTION OF SAFETY RELATED EQUIPMENT  
FROM THE EFFECTS OF POSTULATED PIPING FAILURES OUTSIDE CONTAINMENT  
DIABLO CANYON, UNITS 1 AND 2**

We have informed you in previous discussions that we have reviewed your submittals concerning postulated pipe breaks outside containment and found them to be acceptable. However, we understand that you intend to provide an analysis of some specific items that are different from those which you have documented in your previous submittals, particularly for Unit No. 2.

In order to expedite resolution of this matter, we suggest that you submit an analysis for postulated pipe ruptures outside containment which specifically addresses only those facility design features which are different from those which you have documented in your previous submittals. We request that you provide the above information to us as quickly as possible, but not later than July 1, 1977.

Please inform us within seven (7) days after receipt of this letter of your confirmation of our requested schedule date or the date you will be able to meet. If you cannot meet our specified date or if your reply is not fully responsive to our request, it is likely that the overall schedule for completing the licensing review for this project will have to be extended.

Please call us if you have any questions regarding the matters as stated above.

Sincerely,

Original Signed by  
John F. Stolz  
John F. Stolz, Chief  
Light Water Reactors Branch No. 1  
Division of Project Management

MK 4  
GD

OFFICE →	See Page 2	LWR-#1	LWR-#1	LWR-#1	
SURNAME →		LEngle:k1j	DAllison	JStolz	
DATE →		6/ /77	6/ /77	6/ /77	

1957

rd Lantz from 10  
state of indol

Pacific Gas and  
Electric Company

- 2 -

JUN 07 1977

Philip A. Crane, Jr., Esq.  
Pacific Gas & Electric Company  
77 Beale Street  
San Francisco, California 94106

Andrew J. Skaff, Esq.  
California Public Utilities  
Commission  
350 McAllister Street  
San Francisco, California 94102

Mr. Frederick Eissler, President  
Scenic Shoreline Preservation  
Conference, Inc.  
4623 More Mesa Drive  
Santa Barbara, California 93105

Ms. Elizabeth E. Apfelberg  
1415 Cazadero  
San Luis Obispo, California 93401

Ms. Sandra A. Silver  
5055 Radford Avenue  
North Hollywood, California 91607

Mr. Gordon A. Silver  
5055 Radford Avenue  
North Hollywood, California 91607

Paul C. Valentine  
400 Channing Avenue  
Palto Alto, California 94301

Yale I. Jones, Esq.  
100 Van Ness Avenue  
19th Floor  
San Francisco, California 94102

James A. Geocaris  
Center for Law in the Public  
Interest  
10203 Santa Monica Boulevard  
Los Angeles, California 90067

Ms. Raye Fleming  
1746 Charro Street  
San Luis Obispo, California 93401

Mr. John Forster  
985 Palm Street  
San Luis Obispo, California 93401

Mr. William P. Cornwell  
P. O. Box 453  
Morro Bay, California 93442

James O. Schuyler  
Nuclear Project Engineer  
Pacific Gas & Electric Company  
77 Beale Street  
San Francisco, California 94106

Thomas J. Hirons  
Los Alamos, Scientific Lab.  
Group TD-6, MS 226  
P. O. Box 1663  
Los Alamos, New Mexico 87545

Mrs. Thelma Hirdler  
811 Fair Oaks Avenue  
Arroyo Grande, California 93420

Mr. W. C. Gangloff  
Westinghouse Electric Corporation  
P. O. Box 355  
Pittsburgh, Pennsylvania 15230

OFFICE >						
SURNAME >						
DATE >						





Distribution  
Docket Files

R. H. Vollmer  
M. L. Ernst  
W. P. Gammill  
ELD  
ZE (3)  
ACRS (16)  
J. Miller

JUN 6 1976

NRC PDR  
Local PDR  
LWR 1 File  
R. C. DeYoung  
F. J. Williams  
J. Stolz  
E. Hylton  
L. Engle  
R. Heineman  
D. Ross  
J. Knight  
R. Tedesco  
V. A. Moore  
H. Denton  
F. Rosa  
J. Knox

bcc: J. R. Buchanan, NSIC  
T. B. Abernathy, TIC

Docket Nos. 50-275  
and 50-323

Pacific Gas and Electric Company  
ATTNY Mr. John C. Morrissey  
Vice President & General Counsel  
77 Beale Street  
San Francisco, California 94106

Gentlemen:

SUBJECT: EQUIPMENT FAILURES DURING A DEGRADED GRID VOLTAGE CONDITION  
AT MILLSTONE, UNIT 2 (DIABLO CANYON, UNITS 1 AND 2)

Provided herein as Enclosure 1 is a description of events which occurred at Millstone Unit No. 2 during July 1976 relating to plant operation and equipment failures during a degraded grid voltage condition.

On July 27, 1976, all utilities with operating reactor facilities received telephone notification from the NRC of the events at the Millstone Unit No. 2 facility.

As a result of our initial investigation and evaluation of the potential generic implications of the events at Millstone and our preliminary discussions with several licensees, we consider it necessary to require all plants presently in review for an operating license to conduct a thorough evaluation of the problem and to submit formal reports. Therefore, we request that you conduct an investigation of the issue as it affects your facility using the Request for Information detailed in Enclosure 2 as a guide, and provide the analysis and results within 30 days of receipt of this letter or explain why you cannot meet this schedule and provide the schedule you will meet.

MA 4  
GD

OFFICE >						
SURNAME >						
DATE >						

UNIT 8

UNIT 8

UNIT 8

JUN 6 1977

Please call us if you have any questions regarding the matters discussed above.

Sincerely,  
Original Signed by  
John F. Stolz

John F. Stolz, Chief  
Light Water Reactors Branch No. 1  
Division of Project Management

Enclosures:

- 1. Description of Events at Millstone, Unit No. 2
- 2. Request for Information

cc: See page 3

OFFICE	LWR 1	LWR 1	LWR 1			
SURNAME	LEngle/red	DAllison	JStolz			
DATE	6/ /77	6/ /77	6/ /77			

1971 8 JUL

John F. Stoltz  
Original 21 and 22

ccs w/enclosures:

Philip A. Crane, Jr., Esq.  
Pacific Gas and Electric Company  
77 Beale Street  
San Francisco, California 94106

Andrew J. Skaff, Esq.  
California Public Utilities Commission  
350 McAllister Street  
San Francisco, California 94102

Mr. Frederick Eissler, President  
Scenic Shoreline Preservation  
Conference, Inc.  
4623 More Mesa Drive  
Santa Barbara, California 93105

Ms. Elizabeth E. Apfelberg  
1415 Cazadero  
San Luis Obispo, California 93401

Ms. Sandra A. Silver  
5055 Radford Avenue  
North Hollywood, California 91607

Mr. Gordon A. Silver  
5055 Radford Avenue  
North Hollywood, California 91607

Paul C. Valentine, Esq.  
400 Channing Avenue  
Palo Alto, California 94301

Yale I. Jones, Esq.  
100 Van Ness Avenue  
19th Floor  
San Francisco, California 94102

James A. Geocaris, Esq.  
Center for Law in the Public  
Interest  
10203 Santa Monica Boulevard  
Los Angeles, California 90067

Ms. Raye Fleming  
1746 Charro Street  
San Luis Obispo, California 93401

Mr. John Forster  
985 Palm Street  
San Luis Obispo, California 93401

Mr. William P. Cornwell  
P. O. Box 453  
Morro Bay, California 93442

Mr. James O. Schuyler, Nuclear Project  
Engineer  
Pacific Gas and Electric Company  
77 Beale Street  
San Francisco, California 94106

Mrs. Thelma Hirdler  
811 Fair Oaks Avenue  
Arroyo Grande, California 93420

Mr. W. C. Gangloff  
Westinghouse Electric Corporation  
P. O. Box 355  
Pittsburgh, Pennsylvania 15230

OFFICE >						
SURNAME >						
DATE >						



ENCLOSURE NO. 1

DESCRIPTION OF EVENTS

MILLSTONE UNIT NO. 2

On July 20, 1976, Northeast Nuclear Energy Company (NNECO) reported that, following a trip of Millstone Unit No. 2 on July 5, 1976, several motors powered from 480 volt (v) motor control centers failed to start as required. The failure of the 480 v motors to start was traced to blown control power fuses on the individual motor controllers. These controllers receive control power through 480 v/120 v transformers within the controller.

NNECO's investigation disclosed that, as a result of the plant trip, the grid voltage dropped from 352 kv to 333 kv. This voltage drop, in conjunction with additional voltage drops associated with the transformers involved, reduced the control power and voltage within individual 480 v controllers to a voltage which was insufficient to actuate the main line controller contactors. As a result, when the motors were signalled to start, the control power fuses were blown. Subsequent testing by NNECO showed that the contactors required at least 410 v to function properly.

NNECO concluded that under similar low voltage conditions, the operability of 480 v Engineered Safety Feature equipment could not be assured.

NNECO's immediate corrective action was to raise the setpoint of the Engineered Safeguards Actuation System (ESAS) "loss of power" undervoltage relays to assure that the plant would be separated from the grid and emergency power system (dual) operation would be initiated before the control voltage fell below that required for contactor operation. A trip of the undervoltage relays causes the emergency buses to be de-energized and a load shed signal to strip the emergency buses, the diesel generators to start and power the emergency buses, and required safety related loads to sequence start on the buses.

On July 21, 1976, NNECO reported that the earlier corrective action taken was no longer considered appropriate because during starting of a circulating water pump, the voltage dropped below the new ESAS undervoltage relay setting. This de-energized the emergency buses, caused load shedding to occur, started the diesel generators and began sequencing loads onto the emergency buses in accordance with the design. However, during sequencing of the loads onto the buses, the voltage again dropped below the undervoltage relay setting which caused the load shed signal to strip the buses. The result was energized emergency buses with no loads supplied.



. 1



REQUEST FOR INFORMATION

3. Evaluate the design of your facility's Class IE electrical distribution system to determine if the operability of safety related equipment, including associated control circuitry or instrumentation, can be adversely affected by short term or long term degradation in the grid system voltage within the range where the offsite power is counted on to supply important equipment. Your response should address all but not be limited to the following:
  - a. Describe the plant conditions under which the plant auxiliary systems (safety related and non-safety related) will be supplied by offsite power. Include an estimate of the fraction of normal plant operating time in which this is the case.
  - b. The voltage used to describe the grid distribution system is usually a "nominal" value. Define the normal operating range of your grid system voltage and the corresponding voltage values at the safety related buses.
  - c. The transformers utilized in power systems for providing the required voltage at the various system distribution levels are normally provided with taps to allow voltage adjustment. Provide the results of an analysis of your design to determine if the voltage profiles at the safety related buses are satisfactory for the full load and no load conditions on the system and the range of grid voltage.
  - d. Assuming the facility auxiliary loads are being carried by the station generator, provide the voltage profiles at the safety buses for grid voltage at the normal maximum value, the normal minimum value, and at the degraded conditions (high or low voltage, current, etc.) which would require generator trip.
  - e. Identify the sensor location and provide the trip setpoint for your facility's Loss of Offsite Power (undervoltage trip) instrumentation. Include the basis for your trip setpoint selection.
  - f. Assuming operation on offsite power and degradation of the grid system voltage, provide the voltage values at the safety related buses corresponding to the maximum value of grid voltage and the degraded grid voltage corresponding to the undervoltage trip setpoint.
  - g. Utilizing the safety related bus voltage values identified in (f), evaluate the capability of all safety related loads, including related control circuitry and instrumentation, to perform their safety functions. Include a definition of the voltage range over which the safety related components, and non-safety components, can operate continuously in the performance of their design function.



1. Describe the bus voltage monitoring and abnormal voltage alarms available in the control room.
2. The functional safety requirement of the undervoltage trip is to detect the loss of offsite (preferred) power system voltage and initiate the necessary actions required to transfer safety related buses to the onsite power system. Describe the load shedding feature of your design (required prior to transferring to the onsite [diesel generator] systems) and the capability of the onsite systems to perform their function if the load shedding feature is maintained after the diesel generators are connected to their respective safety buses. Describe the bases (if any) for retention or reinstatement of the load shedding function after the diesel generators are connected to their respective buses.
3. Define the facility operating limits (real and reactive power, voltage, frequency and other) established by the grid stability analyses cited in the FSAR. Describe the operating procedures or other provisions presently in effect for assuring that your facility is being operated within these limits.
4. Provide a description of any proposed actions or modifications to your facility based on the results of the analyses performed in response to items 1-3 above.

