UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 12 1981

MEMORANDUM FOR: J. C. Mark, Chairman
Advisory Committee on Reactor Safeguards

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: EMERGENCY PLANNING AT NUCLEAR FACILITIES
DURING AND FOLLOWING NATURAL EVENTS

Your memorandum of March 16, 1981 recommended that the NRC staff give further consideration to the development of emergency plans and the operability of equipment needed to deal with nuclear emergencies which result from natural disturbances such as earthquakes. You also advised that FEMA be requested to review the capabilities of local emergency and disaster organizations to cope with multiple emergencies as might result from a major earthquake followed closely by an accident at a nuclear power plant.

In a memorandum dated November 3, 1980, Brian Grimes, NRC, had requested John McConnell, FEMA, to review the State and local planning efforts for the areas around California nuclear power plant sites with respect to earthquakes and around the Trojan site with respect to volcanic phenomena and how these can best be addressed in the planning process. FEMA has directed the appropriate FEMA regional offices to take such factors into account in their review of offsite preparedness.

In letters from Robert Tedesco, NRC, to licensees and applicants for nuclear power plants in California, the licensees and applicants were requested to revise emergency plans to include description of potential complicating factors which might be caused by earthquakes which either initiate or follow the initiation of accidents, and the provisions and procedures for coping with such events. The California licensees have informed the NRC staff that results of their studies should be completed by June 1981, and will be incorporated into their site emergency plans, and will also be offered to State and local authorities for inclusion into State and local emergency plans. We would expect that California licensees will need to show that communications to offsite authorities are available after moderate earthquakes and that means to augment station staff, assuming roads are disrupted, are available. In such cases an alert condition within the plant because of effects on non-safety equipment might be warranted. An arrangement for feedback of offsite conditions to the plant therefore would be appropriate to assist the licensee in making optimum protective action recommendations.

NRC 11/4/81-10

With respect to plants other than those discussed above, we have considered the impact of natural events such as earthquakes in regard to emergency preparedness associated with nuclear power plants. The current criteria for evaluation of emergency preparedness were developed to cover a wide range of events. Specifically, evacuation time estimates are required to consider adverse conditions which might reasonably be expected to occur during the plant lifetime. We have concluded that additional requirements, such as the design of additional facilities, structures, and systems to specifically withstand earthquakes are not necessary. In particular, no special seismic design of public notification systems, environmental monitoring capability or communications equipment is contemplated. A seismic event coincident with a significant accident at the plant is of very low likelihood. In addition, moderate seismic events would likely create a scenario in which events slowly develop prior to the occurrence of a radioactive release. Sufficient time would be available for existing backup or alternate means of notification and monitoring to be effective. Except in California, these earthquakes are not significant enough in magnitude and frequency to warrant special considerations in the review of emergency preparedness.

We agree with the Committee's comment with regard to exercises and will consider the occasional use of earthquake-induced failures of non-safety equipment as an initiating event for an exercise. Subsequent failures of safety equipment would need to be postulated to provide a significant release scenario.

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

cc: Chairman Hendrie
Commissioner Gilinsky
Commissioner Bradford
Commissioner Ahearne
S. Chilk
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
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WALNUT CREEK, CALIFORNIA 94596

October 7, 1981

Docket Nos. 50-275
50-323

Pacific Gas and Electric Company
P.O. Box 7442
San Francisco, California 94106

Attention: Mr. Philip A. Crane, Jr.
Assistant General Counsel

Gentlemen:

Subject: NRC Inspection - Diablo Canyon Units 1, 2

This refers to the inspection conducted by Mr. D. M. Kunihiro, Team Leader, and other NRC team members on August 19, 1981 of activities authorized by NRC Construction Permit Nos. CPPR-39 and CPPR-69 and to the discussion of our findings held by Mr. Kunihiro with Mr. Jim Shiffer and other members of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and plans and observations by the NRC team members.

No items of noncompliance with NRC requirements were identified within the scope of this inspection.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you believe to be exempt from disclosure under 10 CFR 9.5(a)(4), it is necessary that you (a) notify this office by telephone within ten (10) days from the date of this letter of your intention to file a request for withholding; and (b) submit within 25 days from the date of this letter a written application to this office to withhold such information. If your receipt of this letter has been delayed such that less than seven (7) days are available for your review, please notify this office promptly so that a new due date may be established. Consistent with section 2.790(b)(1), any such application must be accompanied by an affidavit executed by the owner of the information which identifies the document or part sought to be withheld, and which contains a full statement

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of the basis on which it is claimed that the information should be withheld from public disclosure. This section further requires the statement to address with specificity the considerations listed in 10 CFR 2.790(b)(4). The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified periods noted above, the report will be placed in the Public Document Room.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,

H. E. Book

H. E. Book, Chief
Radiological Safety Branch

Enclosure:
IE Inspection Report
Nos. 50-275/81-21
50-323/81-15

cc w/o encl:
W. A. Raymond, PG&E
R. C. Thornberry, PG&E

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-275/81-21 & 50-323/81-15

Docket No. 59-275, 323 License No. CPPR-39, 69 Safeguards Group

Licensee: Pacific Gas and Electric Company

P. O. Box 7442

San Francisco, California 94106

Facility Name: Diablo Canyon Unit 1, 2

Inspection at: San Luis Obispo County, California

Inspection conducted: August 18-20, 1981

Inspectors: D. Kuniniro, Regional State Liaison Officer, Team Leader — 9/30/81 Date Signed

R. Fish, Radiation Specialist — 10/5/81 Date Signed

for B. Cillis, Radiation Specialist — Date Signed

K. Scown, Emergency Preparedness Coordinator — 10/6/81 Date Signed

for J. Sears, Senior Nuclear Engineer — Date Signed

Approved by: F. Wenslawski, Chief, Reactor Radiation Protection Section — 10/6/81 Date Signed

Approved by: H. Book, Chief, Radiological Safety Branch — 10/7/81 Date Signed

Summary:

Inspection on August 18-20, 1981 (Report Nos. 50-275/81-21 and 50-323/81-15

Areas Inspected: Announced inspection of the emergency plan exercise and associated critiques. The inspection involved 110 hours onsite by eight NRC inspectors and observers.

RV Form 219 (2)

Results: No items of noncompliance or deviations were identified.

1. Persons Contacted

Station Staff

*R. Thornberry, Plant Manager
*W. Kaefer, Technical Assistant to the Plant Manager
*J. Boots, Supervisor, Chemistry and Radiation Protection
*R. Patterson, Plant Superintendent
*W. Keyworth, Senior, Power Production Engineer - Emergency Planning and Licensing

Corporate Office

*J. Shiffer, Manager of Nuclear Operations
*S. Skidmore, Supervisor Nuclear Generation Engineer
*J. Townsend, Supervisor Nuclear Generation Engineer
*W. Fujimoto, Senior Nuclear Generation Engineer
*R. Locke, Senior Counsel

* Attended exit interview

2. Pre-Exercise Activities

a. Emergency Plan Review - Prior to the exercise the inspectors reviewed relevant portions of the licensee's Emergency Plan, Revision 2 and 3, and procedures used to implement the plan. The Emergency Plan provides for the implementation of the planning standards of 10 CFR 50.47, 10 CFR 50, Appendix E, and specific acceptance criteria contained in NUREG 0654/FEMA-REP-1.

b. Exercise Scenario Review - The emergency exercise scenario, developed by EDS Nuclear Inc. for the licensee, met the requirements of 10 CFR 50.47(b)(14), and 10 CFR 50, Appendix E, paragraph IV.F. The inspectors attended briefings by the EDS Nuclear Inc. exercise controllers on July 24 and 31, 1981 and August 17, 1981. Minor changes to the scenario were made pursuant to discussions between the inspectors and representatives of EDS Nuclear Inc. at the July 24, 1981 meeting. The scenario provided for a sequence of simulated events which required the mobilization of the licensee's emergency organization beginning with an Unusual Event and progressing through sequentially escalating classes to a General Emergency. The scenario included events which necessitated and allowed for activation of appropriate offsite agencies as well. Some time compression was written into the scenario to coordinate the overall involvement of licensee, state and local organizations participating in the exercise. The sequence of simulated events was coordinated in advance with State representatives to provide an opportunity for exercising the state and local emergency response organizations. However, the details were known to only three utility personnel who were providing assistance to EDS Nuclear Inc.

3. Emergency Exercise

Simulated emergency conditions began at about 7:00 a.m. on August 19, 1981 and the onsite exercise activities were terminated at about 3:00 p.m. on the same day.

The exercise was based on the following major sequence of simulated events at the power plant.

Time	Event
7:02 a.m.	A fire is detected in the Unit 2, 12KV startup switchgear, EL.85' of the north end of the Unit 1 and Unit 2 12KV startup switchgear trip out and a loss of 230KV offsite power results. Diesel generators 1-1, 1-2 and 1-3 automatically start on a 12KV startup bus undervoltage signal.
7:10 a.m.	The Turbine Building fire protection system appears to be inoperable. It is suspected that the fire protection system was not properly restored to service following recent testing activities. Manual fire fighting efforts are ineffective. The fire increases in intensity and threatens vital cable in the cable spreading rooms above on EL.104' of the Turbine Building.
7:40 a.m.	The fire on EL.85' in the north end of the Turbine Building is reported to be under control.
7:50 a.m.	The fire on EL.85' in the north end of the Turbine Building is reported to be totally extinguished.
7:55 a.m.	The Unit 1 12KV startup switchgear has been restored to operability. Apparently, it tripped out due to the fire, but was not damaged. As a result, 230KV offsite power has been restored to availability.
8:00 a.m.	A Bank D rod cluster control assembly (RCCA) is ejected from the reactor core. The reactor trips, followed by the turbine. Auxiliary power transfers to the startup buses. The steam dump system activates and functions normally. The safety injection system initiates as reactor coolant system (RCS) pressure and temperature decrease.

8:01 a.m. The motor-driven auxiliary feedwater pumps start normally and provide the steam generators with feedwater. Containment high radiation and high humidity alarms received.

8:10 a.m. The Shift Foreman is notified that the Radiation Protection Monitoring (RPM) Technician, Auxiliary Operator and Electrician, who were working on containment fan cooler unit 1-2, have been contaminated. Upon hearing a loud crash and the sound of escaping steam, the men hurriedly attempted to exit the containment. The electrician fell and appears to have broken his left leg. All three men were contaminated prior to exiting the containment through the personnel hatch on EL.140'.

8:40 a.m. The reactor is in a stable, hot shutdown condition. The charging pumps have stabilized RCS pressure at 2235 psig and continue to provide makeup for coolant lost through the RCCA ejection break. RCS T_{avg} is 542°F. The plant operations staff is analyzing all available data, and preparing to cool down and depressurize the RCS.

9:00 a.m. As the ambulance carrying the injured and contaminated electrician leaves the Diablo Canyon access road (immediately outside the Avila Beach gate), it collides with a station wagon traveling at a high rate of speed. The people in the ambulance are knocked unconscious in the collision. Personnel arriving at the accident scene are not certain which occupants are contaminated.

9:10 a.m. To remain within Technical Specification RCS pressure-temperature cooldown limits, it is estimated that depressurization of the RCS will take approximately 3 to 5 hours. At that time, residual heat removal system operation will be initiated to bring the reactor to a cold shutdown condition.

9:20 a.m. The Control Room receives continuous indication of high activity inside the containment. Containment integrity has precluded any release of radiation to the environment.

10:15 a.m. Depressurization of the RCS is proceeding in a slow, but orderly and stable manner.

10:30 a.m.	Due to an electric power system grid disturbance, there is a loss of all 230KV and 500 KV offsite power.
10:35 a.m.	Diesel generators 1-1, 1-2 and 1-3 have picked up all vital loads. However, the motor-driven auxiliary feedwater pumps fail to start.
10:45 a.m.	The Electric System Dispatcher Shift Supervisor informs the Shift Foreman that offsite power will be unavailable for four to six hours.
11:00 a.m.	All steam generators boil dry resulting in the loss of the primary system heat sink.
11:05 a.m.	RCS temperature and pressure are rapidly increasing.
11:10 a.m.	All pressurizer power-operated relief valves (PORV) fail closed as actuation pressure is reached (or if early actuation is attempted).
11:12 a.m.	The Control Room receives indication of fuel damage in the reactor core and a rapidly increasing hydrogen concentration in the containment. The hydrogen recombiners appear to be inoperable.
11:45 a.m.	A hydrogen explosion occurs inside the containment as explosive concentration limits are reached. Containment purge exhaust valves RCV-11 and RCV-12 are damaged and appear to be partially open as the unit vent particulate, radiogas and iodine monitors all indicate very high activity levels.
2:15 p.m.	The motor-driven auxiliary feedwater pumps are restored to service and feedwater is now being delivered to the steam generators.
2:45 p.m.	The maintenance team repairs and closes containment purge exhaust fan manual valve 35. The release from the plant is terminated.

4. Post Exercise Critique

The inspectors attended the licensee critique held on August 20, 1981, during which licensee exercise participants discussed the exercise results. During the critique, the inspectors noted that the discussion included the identification of problem areas and suggestions for improvement, and that the participant comments were documented. In response to certain comments and suggestions, personnel were specifically assigned and instructed by utility management to take appropriate corrective actions.

5. Exit Interview

Following the licensee's self-critique, the inspectors met with the licensee representatives denoted in paragraph 1. The team leader summarized the purpose and scope of the inspection and each inspector presented his individual comments on aspects of the exercise personally observed by the inspector (Attachment A). The nature of the exercise observations did not necessitate discussion of, or commitments to specific corrective measures. However, one aspect of the utility emergency response concept of operation was discussed as not being in conformance with the onsite emergency organization staffing criteria specified in NUREG 0654, II B. J. and Table B-1. The licensee was advised to reevaluate his present staffing concept (see attachment A, para. 1.) and to consider alternative approaches, and that this issue would be reexamined during the emergency planning appraisal. (81-21-01)

On the basis of the eight NRC inspector observations made in the Control Room, Technical Support Center, Emergency Operations Facility, and on observations made of other in-plant and on-site emergency response activities the inspection team has concluded that the exercise was well planned and executed, and met the objectives set forth in Attachment B; that the exercise demonstrated the licensee's overall capability to implement their Emergency Plan and procedures; and that no observations were made that would indicate that appropriate measures would not or could not be taken to protect the public health and safety in the event of a radiological accident at the Diablo Canyon nuclear power plant.

Attachment A

Specific Comments

1. Emergency Operations Facility

The utility's concept of operation calls for the corporate Manager of Nuclear Operations to assume the position as the Offsite Recovery Manager (ORM), and to control the utility Emergency Operations Facility (EOF) and all emergency response activities. This concept necessitates traveling from San Francisco to San Luis Obispo. In order to minimize travel time the utility has contracted special air transportation for this purpose. The exercise demonstrated the capability to perform this relocation in a relatively short period of time (approximately two and one half hours after initial notification). However, it is desirable that the EOF be fully activated and operational within a shorter period of time to perform the following functions:

- Management of overall licensee emergency response,
- Coordination of radiological and environmental assessment,
- Determination of recommended public protective actions, and
- Coordination of emergency response activities with federal, state, and local agencies.

Although the EOF was manned within one hour by plant personnel their primary authority and responsibility was limited to liaison duties. Presently, the Plant Superintendent who is located in the TSC retains the authority and responsiblity for all utility emergency response activities until the arrival of the ORM. In order to relieve the plant staff of these responsibilities, the time frame for for full activation of the EOF should be no greater than one hour.

2. Onsite radiation monitoring

(a) The wind direction status should be provided to the field monitoring teams during initial activation and updated accordingly whenever changes occur so that team personnel can take necessary protective actions.

(b) A HP-240 detector probe should be included as part of the field monitoring team's emergency equipment. This piece of equipment is necessary to perform certain radiation monitoring functions outlined in implementing procedure EPR-2, Attachments 8, "Release of Airborne Radioactive Materials"

(c) Chem/Radiation Protection Technicians should be reminded that analyses of particulate air samples, iodine samples, contamination surveys and environmental samples must be performed in areas free of significant background radiation fields.

(d) The need for performing contamination surveys to ascertain loose surface contamination levels onsite and in plant during an accident should be considered for the purpose of determining protective actions for field monitoring teams and occupied inplant and site areas

3. Other in-plant response activities

a. Fire brigade

The exercise demonstrated that a timely dispatch of the fire brigade could be made to a fire scene, and that they could follow procedures for informing the shift foreman, calling the back up fire brigade, requesting Calif. Div. of Forestry (CDF) assistance, and isolating ventilation systems and doors around the fire area.

However, based on the observed performance of the fire brigade at the simulated location of the fire it appeared that the fire brigade members had not performed any pre-fire planning and did not fully understand fire behavior and fire fighting techniques. Specifically, the door through which the team entered was not the best. Location of house(hose) lines and CO^2 reels was better at another entry point. Pre-planning might have resulted in entry through the more suitable access point. In addition, the manner in which the members entered the fire area, standing up with no hose line in place, may indicate a lack of training in fire behavior and proper fire fighting techniques. The failure to attempt use of the CO^2 (Cardox) system and to determine and rectify fire suppression systems may also indicate the need for additional training. No one attempted to find a back up water supply or to check supply valves or pumps. Members seemed content to secure ventilation to the room, shut doors, and await the arrival of CDF. After considerable time had elapsed one member of the fire brigade finally wheeled the 150# extinguisher, that was about 50 feet away, over to be used. This should have been done as soon as the controller at the fire scene issued the message which indicated that certain fire fighting systems were not effective.

The observed shortcomings in the responses of the involved players (fire brigade) may have been a result of the lack of realism in the fire situation, or a lack in understanding on the part of the players as to their expected extent of play in the exercise, and not necessarily due lack of training or knowledge of correct procedures.

b. Injured and Contaminated Worker

This portion of the exercise indicated that notifications to the proper plant personnel, i.e., control room and access control personnel could be made. It also demonstrated the RPMs capability to quickly respond to the area in anticontamination clothing with some first aid supplies (gurney, splints) and radiation instruments.

However, consideration should have been given to taking and wearing protective masks until it was determined that no airborne hazard existed. Also clean clothing (full suits of anti"C"s) and throw away blankets should have been taken to a clean area where contaminated personnel could be removed from the area without spreading contamination.

At the first aid station the prime concern appeared to be over the contamination, (a few thousand counts) on the victims pants, hands, and ankle. The victims leg was not splinted and when he was transported to the ambulance's gurney, personnel lifted him by his pants with no support for the injury. Personnel need to be reminded that the well being of the victim should be first priority, and contamination second.

c. Containment Purge Valve

Response personnel should verify the exact location and piece of equipment or valve to be worked on. Use of a one line diagram and assumed knowledge regarding the location of the valve lead personnel to the wrong valve. Where necessary, engineering diagrams and/or a more thorough description of the piece of equipment in question(eg. Butterfly, 4' diameter #VAC 35 or globe, 4", CCS 41) should be given to avoid confussion by responding personnel.

Response personnel should coordinate and pre-plan response routes in order to minimize radiation exposure. During, the two trips this team made to the incorrect valve they passed by the post accident sampling station which would have been at high radiation levels.

Attachment B

Licensee identified objectives August 19, 1981 emergency preparedness exercise.

a. Demonstrate proficiency in classifying the emergency condition.
b. Demonstrate efficient and effective notification and alerting procedures and methods.
c. Demonstrate the ability of the PG&E Emergency Response Organization to maintain command control.
d. Demonstrate precise and clear transfer of responsibilities from the Onsite Emergency Organization to the Corporate Emergency Response Organization.
e. Demonstrate the ability of the PG&E Emergency Response Organization to maintain continuity of command control throughout the exercise.
f. Demonstrate protective measures considered, determined and used to protect station personnel and the general public.
g. Demonstrate reliability and effective use of emergency communications equipment, and communications procedures and methods.
h. Demonstrate capability to evaluate and produce public information releases in the best interests of all concerned.
i. Demonstrate the ability to provide adequate medical care for personnel affected by the emergency conditions.
j. Demonstrate the ability to perform radiological monitoring and assessments, and offsite dose assessment projections necessary to provide advance warning to local, state and federal agencies, and to the general public.
k. Demonstrate the ability to conduct a post-exercise critique to determine areas requiring additional capability improvements.
l. Demonstrate the physical adequacy of the various PG&E emergency response facilities for individual member working space and communications usage.
m. Demonstrate the primary functional responsibilities and/or problem solving capabilities of the PG&E Emergency Response Organization.
n. Demonstrate recovery techniques in the ability of the PG&E Emergency Response Organization to de-escalate (deactivate) corporate and site emergency response activities and the general public.
o. Demonstrate the ability of the PG&E Emergency Response Organization to intergrate its activities with those of the other participating emergency response organizations (county, state and federal).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket Nos. 50-275 O.L.
	)	50-323 O.L.
(Diablo Canyon Nuclear Power Plant, Unit Nos. 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO GOVERNOR EDMUND G. BROWN JR.'S SECOND SET OF INTERROGATORIES" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 3nd day of November, 1981:

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