

December 29, 2005

Mr. David H. Oatley, Acting Chief Nuclear Officer
Vice President and General Manager
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON POWER PLANT UNIT 1 AND UNIT 2 - RESPONSE TO NRC BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED WATER REACTORS (TAC NOS. MB9573 AND MB9574)

Dear Mr. Oatley:

This letter acknowledges receipt of your response dated August 8, 2003, to the Nuclear Regulatory Commission (NRC) for Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003. The NRC issued Bulletin 2003-01 to all pressurized-water reactor licensees requesting that they provide a response, within 60 days of the date of Bulletin 2003-01, that contains either the information requested in following form of Option 1 or Option 2 as stated in Bulletin 2003-01:

- Option 1: State that the emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in this bulletin, taking into account the recent research findings described in the Discussion section, and are in compliance with all existing applicable regulatory requirements.
- Option 2: Describe any interim compensatory measures that have been implemented or that will be implemented to reduce the risk which may be associated with potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance is complete. If any of the interim compensatory measures listed in the Discussion section will not be implemented, provide a justification. Additionally, for any planned interim measures that will not be in place prior to your response to this bulletin, submit an implementation schedule and provide the basis for concluding that their implementation is not practical until a later date.

You provided an Option 2 response.

Bulletin 2003-01 discussed six categories of interim compensatory measures (ICMs):

- (1) operator training on indications of and responses to sump clogging;
- (2) procedural modifications if appropriate, that would delay the switchover to containment sump

recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool the containment and reactor core, and operating the CSS intermittently); (3) ensuring that alternative water sources are available to refill the reactor water storage tank (RWST) or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere; (4) more aggressive containment cleaning and increased foreign material controls; (5) ensuring containment drainage paths are unblocked; and (6) ensuring sump screens are free of adverse gaps and breaches.

You stated in your bulletin response of August 8, 2003, that you had implemented the following ICMs:

- (1) an operations standing order which identifies the generic concern regarding potential sump debris blocking and its effect on application of emergency operating procedures - ICM category (1);
- (2) classroom and simulator training on indications of and responses to sump clogging in the operator requalification training cycle by fall 2003 - ICM category (1);
- (3) a higher than required RWST level (by 27,500 gallons) - ICM category (3);
- (4) RWST refill from the boric acid blender or spent fuel pool - ICM category (3);
- (5) more aggressive containment cleaning and increased foreign material control including at-power and post-outage debris/equipment removal, General Employee Training on containment cleanliness, detailed per-Mode 4 containment cleaning and inspection work orders, delay of containment closeout cleaning until later in an outage, assignment of containment cleanliness "program owners" responsible for containment cleanliness and the generation of necessary work orders to maintain the containment clean - ICM category (4);
- (6) modification of the existing refueling cavity floor grating drain into a larger area raised drain screen by fall 2004 - ICM category (5);
- (7) modification of the three crane wall doors to replace existing grating material with less restrictive bars, allowing the passage of most floating debris without causing a blockage of the flow path, while maintaining the doors' function as a 4-inch debris curb by fall 2004 - ICM category (5);
- (8) inspection procedures to ensure that containment recirculation sump screens are free of adverse gaps and breaches, specifically, inspecting to verify that fine screening surfaces are free of holes and that there are no gaps greater than the acceptable gap distance (related to minimum downstream flow clearances) - ICM category (6).

You further stated in your response, including justifications, that you would not be implementing the following ICM: procedural modifications, if appropriate, that would delay the switchover to containment pump recirculation - ICM category (2).

In a November 9, 2004, response to a September 10, 2004, NRC request for additional information (RAI) you:

- (1) elaborated on your operator training to be implemented, including a sump clogging specific simulator lesson provided during Operator Continuing Training, which provided indications of sump blockage and covered coping strategies/response actions for loss of ECCS recirculation capability (such as continued attempts to restore emergency coolant recirculation, efforts to increase RWST level and conserve RWST inventory, initiation of cooldown to cold shutdown, depressurization of the reactor coolant system (RCS), attempts to add makeup directly to the RCS from alternate sources, and maintaining RCS heat removal). In addition, an Operations Standing Order associated with NRC Bulletin 2003-01 and a self-study operator training newsletter addressing recognition of sump clogging, steps to minimize ECCS flow, and RWST makeup steps will be implemented; and
- (2) provided a summary of Pacific Gas and Electric Company's review of Westinghouse Owners Group report WCAP-16204 "Evaluation of Potential ERG [Emergency Response Guideline] and EPG [Emergency Plan Guideline] Changes to Address NRC Bulletin 2003-01 Recommendations" and its eleven candidate operator actions (COAs) related ICMs.

Specifically in regard to the WCAP-16204 COAs, you stated that:

- (1) COA A1a, "Secure One Spray Pump" would not be implemented because the benefit is limited for small break loss-of-coolant accidents (SBLOCAs) (delay of recirculation of just tens of minutes). To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CSS pumps must be taken in the first few minutes of an accident, introducing significant opportunity for operator errors due to operator workload;
- (2) COA A1b, "Secure Both Spray Pumps" would not be implemented because the benefits again were considered minimal, while current procedural guidance exists to prevent unnecessary use of the CSS;
- (3) COA A2, "Establish One Train of Containment Sump Recirculation Prior to Automatic Actuation" would not be implemented because it was considered to complicate operator efforts during diagnosis and response to LOCA events;
- (4) COA A3, "Terminate One Train of Safety Injection After Recirculation Alignment" would not be implemented because it could create the potential for an interruption of safety injection flow, given single failure considerations;
- (5) COA A4, "Early Termination of One RHR Pump Prior to Recirculation Alignment" would not be implemented because it is applicable to Combustion Engineering (CE) plants only, unlike Diablo Canyon Power Plant, Unit 1 and Unit 2 (DCPP), which are of a Westinghouse design;

- (6) COA A5, "Refill of Refueling Water Storage Tank," RWST refill is initiated immediately after the containment recirculation alignment is achieved - ICM category (3);
- (7) COA A6, "Inject More Than One RWST Volume From a Refilled RWST or by Bypassing the RWST," inventory addition instructions are to be included in a new procedure ECA-1.3, "Sump Blockage Guideline" (it is noted that the guidance for injecting alternate water sources (non-RWST) into the reactor core is included in ECA 1.1) - ICM category (3);
- (8) COA A7, "Provide More Aggressive Cooldown and Depressurization Following a SBLOCA," would not be implemented because Westinghouse ERGs already address maximizing the cooldown rate up to the Technical Specification limit - ICM category (2);
- (9) COA 8, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage," has been implemented with the guidance in effect on symptoms such as diverging level indications between inside sump and outside sump monitors, unstable recirculation flow, and oscillating RHR pump motor amperages, with direction to reduce flow and equipment in-service to protect ECCS pumps - ICM category (1);
- (10) COA 9, "Develop Contingency Actions in Response to: Containment Sump Blockage, Loss of Suction, and Cavitation," has been implemented with guidance in effect to sequentially secure ECCS components, as needed, to prevent damage - ICM category (1);
- (11) COA A10, "Early Termination of One Train of High-Head Injection Prior to Recirculation Alignment," is applicable to CE plants only, unlike DCP's Westinghouse design; and
- (12) COA A11, "Prevent or Delay Containment Spray for SBLOCA in Ice Condenser Plants," is applicable to ice condenser plants only, unlike DCP's dry containment design.

In your RAI response, you also discussed another sump blockage-related procedural enhancement to reduce RHR-driven spray flow by throttling as RCS conditions permit after recirculation alignment has been established, thereby ensuring spray flow from RHR is secured if no longer needed - ICM category (1).

The NRC staff has considered your Option 2 response for compensatory measures that have been or will be implemented to reduce the risk associated with potentially degraded or nonconforming ECCS and CSS recirculation functions. Based on your response, the NRC staff considers your actions to be responsive to and meet the intent of Bulletin 2003-01. Please retain any records of your actions in response to Bulletin 2003-01, as the NRC staff may conduct subsequent inspection activities regarding this issue.

Mr. David H. Oatley

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Should you have any questions, please contact me at 301-415-1445.

Sincerely,

/RA/

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275
and 50-323

cc: See next page

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Diablo Canyon Power Plant, Units 1 and 2

cc:

NRC Resident Inspector
Diablo Canyon Power Plant
c/o U.S. Nuclear Regulatory Commission
P.O. Box 369
Avila Beach, CA 93424

Sierra Club San Lucia Chapter
ATTN: Andrew Christie
P.O. Box 15755
San Luis Obispo, CA 93406

Ms. Nancy Culver
San Luis Obispo
Mothers for Peace
P.O. Box 164
Pismo Beach, CA 93448

Chairman
San Luis Obispo County Board of
Supervisors
Room 370
County Government Center
San Luis Obispo, CA 93408

Mr. Truman Burns
Mr. Robert Kinosian
California Public Utilities Commission
505 Van Ness, Room 4102
San Francisco, CA 94102

Diablo Canyon Independent Safety
Committee
ATTN: Robert R. Wellington, Esq.
Legal Counsel
857 Cass Street, Suite D
Monterey, CA 93940

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavillion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Richard F. Locke, Esq.
Pacific Gas & Electric Company
P.O. Box 7442
San Francisco, CA 94120

City Editor
The Tribune
3825 South Higuera Street
P.O. Box 112
San Luis Obispo, CA 93406-0112

Mr. Ed Bailey, Chief
Radiologic Health Branch
State Department of Health Services
P.O. Box 997414 (MS 7610)
Sacramento, CA 95899-7414

Mr. James D. Boyd, Commissioner
California Energy Commission
1516 Ninth Street (MS 31)
Sacramento, CA 95814

Mr. James R. Becker, Vice President
Diablo Canyon Operations
and Station Director
Diablo Canyon Power Plant
P.O. Box 3
Avila Beach, CA 93424

Jennifer Tang
Field Representative
United States Senator Barbara Boxer
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

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