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SUBJECT: Responds to NRC 971113 ltr re violations noted in insp repts 50-275/97-202 & 50-323/97-202 on 970804-0911.Corrective actions:three calculations have been performed to determine max UHS temp which DCPP can be operated.

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January 12, 1998

PG&E Letter DCL-98-007

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Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Reply to NRC Inspection Report Nos. 50-275/97-202 and 50-323/97-202

Dear Commissioners and Staff:

NRC Inspection Report (IR) Nos. 50-275/97-202 and 50-323/97-202, dated November 13, 1997, documented the results of the Design Inspection performed by the NRC from August 4 to September 11, 1997. Appendix A to the IR identified ten open items, five unresolved items (URIs) and five inspection follow-up items (IFIs) as listed in Enclosure 1. In the NRC's IR cover letter, the NRC requested that PG&E provide a schedule within 60 days detailing its plans to complete the corrective actions for each of the open items listed in Appendix A to the report. Actions taken and/or planned to address each of these items and the status/schedule for their completion are provided in Enclosure 2.

Two of the URIs identified in the IR involve issues that the inspection team identified as potential unreviewed safety questions (USQs). One issue involves the capability of the component cooling water and auxiliary saltwater systems to withstand a single passive failure when the trains are crosstied or a single active failure when the trains are split. The second issue involves the availability of the containment spray function during the recirculation mode of operation after an accident. PG&E considers that the actions taken under the 10 CFR 50.59 process to address these issues were correct, and that these issues do not involve USQs. Nonetheless, there were errors associated with the resolution of the spray during recirculation issue in 1991 and 1992, and we have/are continuing to take corrective actions relative to those administrative problems.

The IR also notes the expectation that PG&E will evaluate the applicability of the results and specific findings of the NRC design inspection to other systems and components throughout the plant. The issues identified by the inspection team, including the open items for which a response was requested, were entered into

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the PG&E problem reporting system. This system, governed by Program Directive OM7, "Problem Resolution," ensures that generic issues are addressed as appropriate and corrective actions are taken as necessary to preclude recurrence. Enclosure 2 identifies specific actions taken where appropriate to address potential generic implications of the specific issues identified in Appendix A of the IR. The overall number of issues identified by this extensive examination, and by PG&E's own programs, is relatively small and does not involve loss of safety-related functionality. PG&E believes that, individually or collectively, the issues do not indicate any programmatic failures that would not be corrected by our normal processes. However, the generic implications of the aggregated errors in the Final Safety Analysis Report Update (UFSAR), Design Criteria Memoranda (DCMs), and other design basis related documents will continue to be examined during the completion of PG&E's response to the NRC's 10 CFR 50.54(f) letter regarding adequacy and availability of design bases information. The Licensing and Design Basis Alignment Program will assure that no further actions beyond the normal problem resolution program are required.

In addition, the IR requests PG&E to evaluate the inspection findings, both specific and programmatic, against PG&E's response to the NRC's request for information pursuant to 10 CFR 50.54(f) regarding adequacy and availability of design bases information. Although the inspection team identified inconsistencies between various design basis documents, PG&E remains confident that, as implemented, the design and configuration control processes at Diablo Canyon Power Plant (DCPP) provide reasonable assurance that the plant is being maintained and operated in accordance with its design bases as defined in 10 CFR 50.2. Nonetheless, consistent with commitments made in conjunction with PG&E's 10 CFR 50.54(f) response, PG&E will continue to pursue the actions to maintain and enhance the integrity of the DCPP design and licensing bases as delineated in PG&E letter DCL-97-018, Request for Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Basis Information dated February 6, 1997, including the performance of additional licensing documentation review (UFSAR) and further training in the areas of configuration management, UFSAR, and 10 CFR 50.59 evaluations. These actions also include further reviews of procedures against the DCMs and continuing focused Quality Assurance audits to assess PG&E's performance in ensuring conformance with the DCPP design bases.

Sincerely,

Lawrence F. Womack

cc: Steven D. Bloom
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Enclosures

SCK/2237

NRC Inspection Report (IR) Nos. 50-275/97-202 and 50-323/97-202
Inspection Open Items

Open Item	Type	Subject
50-275/97-202-01	IFI	Review of UHS Calculation for Maximum UHS Temperature at Which the Plant Can be Operated Without Exceeding ASW System Design Limits (Section E1.2.1.2.c)
50-275/97-202-02	IFI	Review of Revision to WCAP-14282 and Incorporation of Revised WCAP-14282 Into Design Bases Documentation (Section E1.2.1.2.c.2)
50-275/97-202-03	URI	Determine if Long-Term Post-LOCA Operation of ASW System With Both Trains Tied Together Represents a USQ (Section E1.2.1.2.d)
50-275/97-202-04	IFI	ASME Section XI Testing of ASW Pumps (Section E1.2.1.2.f)
50-275/97-202-05	URI	Discrepancy in Design Documentation (Sections E1.2.1.2.g, E1.2.3.2.e, E1.3.3.2.a, E1.3.3.2.d)
50-275/97-202-06	URI	Availability of an Alternate Flowpath for the ASW System Section (Section E1.2.1.2.h)
50-275/97-202-07	URI	EDG Transient Analysis Computer Simulation Study (Section E1.2.2.2.a)
50-275/97-202-08	IFI	Control of Calculations (Section E1.2.2.2.c, E1.2.2.2.i)
50-275/97-202-09	IFI	Review of Battery Charger Settings (Section E1.2.2.2.d)
50-275/97-202-10	URI	Potential USQ and TS Adherence Associated With Containment Spray During Containment Recirculation (Section E1.3.1.2.b & c)

IFI = Inspection Follow-up Item
URI = Unresolved Item

REPLY TO INSPECTION REPORT NOS. 50-275/97-202 AND 50-323/97-202

On November 13, 1997, as part of NRC Inspection Report (IR) Nos. 50-275/97-202 and 50-323/97-202, the NRC opened five unresolved items (URIs) and five inspection follow-up items (IFIs). The IR requested that PG&E provide a schedule within 60 days detailing its plans to complete the corrective actions for the open items listed in Appendix A to the report. The required actions and associated schedules are documented below. For each open item, the description of the issue as stated in the IR is provided.

1. ***IFI 50-275/97-202-01:*** *Review of UHS Calculation for Maximum UHS Temperature at Which the Plant can be Operated Without Exceeding ASW System Design Limits (Section E1.2.1.2.c)*

   Item Description *- ASW system temperature is controlled by TS 3/4.7.12 which requires that the second CCW heat exchanger be placed in operation when the ocean temperature exceeds 64°F. Flow requirements are verified through regular surveillance testing (see section E1.2.1.f). Because of the effects of "EL Nino" on ocean temperature, the team questioned the licensee as to maximum ocean temperature limits that would continue to allow safe operation. DCPP could not identify the maximum ocean temperature at which the plant could be operated with both CCW heat exchangers in operation to maintain CCW and ASW systems within their existing design limits. At the time of exit, DCPP was preparing a calculation to determine the maximum UHS temperature at which the plant could be operated, and this has been left as a follow-up item.*

   Response - Three calculations have been performed to determine the maximum ultimate heat sink (UHS) temperature at which Diablo Canyon Power Plant (DCPP) can be operated. Each calculation evaluates a specific range of operating configurations. Taken together, these calculations establish the limit of operation with elevated UHS temperatures.

   - The first calculation, M-1027, assesses the limits on operation in Modes 1 through 3. This calculation concludes that operation of DCPP with two component cooling water (CCW) heat exchangers in service and with UHS temperatures as high as 75°F is acceptable.
   - The second calculation was performed to address a special case not included in Calculation M-1027, operation following a loss-of-coolant accident (LOCA) with two auxiliary saltwater (ASW) pumps and two CCW heat exchangers in service. This calculation is addressed as Case 9 of WCAP-14282, Revision 1, which was issued to update the CCW heatup analysis to address various technical issues identified since its initial issue. Calculation M-1027 determined that operation of DCPP in this configuration is acceptable with an UHS temperature as high as 80°F.

- The third calculation, M-1020, determines the maximum UHS temperature for which a single CCW heat exchanger may support Mode 4 (Hot Shutdown) operation. The DCPP Technical Specifications (TS) require that if a second CCW heat exchanger cannot be placed into service within 8 hours when the UHS exceeds 64°F, then the plant must go to Mode 4. Calculation M-1020 determined that adequate heat removal capability was available with UHS temperatures as high as 70°F.

All three calculations referenced above, including WCAP-14282, Revision 1, have been completed and issued. Based on these three calculations, an UHS upper temperature limit has been established as 70°F. This limit will be incorporated into the design basis by Design Change Package (DCP) M-49386. DCP M-49386 will be implemented by June 1, 1998. Information regarding the maximum UHS temperature will be added to the Improved Technical Specifications (ITS) as part of the response to a request for additional information associated with Section 3.7 of the ITS. This request is expected to be received in approximately May 1998, with the information submitted approximately 30 days following the receipt of the request.

This limit was not part of plant analysis or procedure in the past based on knowledge of system performance and recognition that historical ocean temperatures essentially precluded it from being a limiting factor. While that was still believed to be true, the questions associated with the inspection and the El Nino phenomenon led to formalization of this limit, thus confirming past judgment.

Because of the system specific nature of this issue, lack of similar issues, and the confirmation of past judgment, no further generic considerations are warranted.

2. ***IFI 50-275/97-202-02:*** *Review of Revision to WCAP-14282 and incorporation of revised WCAP-14282 into design bases documentation (Section E1.2.1.2.c.2)*

Item Description *- At the time of the inspection, WCAP-14282 was in revision to finalize the preliminary analysis done in PGE-96-503 and to also capture the history and the effect of the CCW system changes on all interfacing systems. Issue of the revised WCAP-14282 will also supersede/revise a number of calculations and design documentation including DCMs and the UFSAR. The changes necessary to incorporate revised WCAP-14282 into design bases documentation is being tracked by DCPP under AR A0439116.*

Response - WCAP-14282, Revision 1, was issued on December 12, 1997. WCAP-14282, Revision 1, will be incorporated into the DCPP design basis by DCP M-49386 which is currently in preparation. In conjunction with incorporating the results of WCAP-14282 into the design basis, DCP M-49386 will implement changes to the Final Safety Analysis Report Update

(UFSAR), as well as various design criteria memoranda (DCMs), procedures and calculations relating to CCW/ASW system operation. As discussed above, DCP M-49386 will be implemented by June 1, 1998.

The unique nature of the cooling systems and their limitations, and the need to update these analyses and associated documentation were recognized before the inspection, and have been addressed. No further generic considerations are required.

3. ***URI 50-275/97-202-03:*** *Determine if Long-term post-LOCA Operation of ASW System With Both Trains Tied Together Represents a USQ (Section E1.2.1.2.d)*

Item Description *- The team reviewed the ability of the ASW system to be separated into two redundant trains for long term post-LOCA cooling as described in UFSAR section 9.2.7.2, and as was the intent of the original design. The team determined that the ASW system, in combination with CCW system, could withstand a single active failure during all phases of accident mitigation as long as the trains remained mechanically cross-tied. The ASW system is currently configured to operate with both trains tied together. DCPP EOP E-1.4, "Transfer to Hot Leg Recirculation," originally required separation of the ASW and the CCW systems into isolated trains approximately 10 1/2 hours after the LOCA. The EOP was revised as part of LER 97-001-00 corrective action and the trains are now separated during long term cooling based on a decision to be made by the TSC to separate the trains to be able to withstand a single passive failure in the fluid system. The team determined that this ASW system operation did not form the original bases for the ASW system design or licensing, and was a potential unreviewed safety question (USQ) that needed to be further evaluated by the NRC.*

Response - In early 1997, prior to the NRC Design Inspection, PG&E identified that realigning the ASW/CCW system into two separate trains created a vulnerability to a single active failure of an electrical power supply. This concern was addressed in Nonconformance Report (NCR) N0002010 and reported to the NRC in License Event Report (LER) 1-97-001-00. The corrective actions to address this condition have been completed. They included:

- The UFSAR was revised to have the Technical Support Center (TSC) direct the separation of the ASW/CCW trains.
- Emergency Operating Procedure (EOP) E-1.4, "Transfer to Hot Leg Recirculation," was revised to have the operators consult the TSC on the separation of the ASW/CCW trains.
- TSC Procedure PEP EN-1, "Plant Accident Mitigation Diagnostic Aids and Guidelines," was revised to include guidance on train separation.

- The operators on FCV-495 and FCV-496 were upgraded to allow for remote manual operation from the control room.
- Other systems were reviewed for similar problems dealing with the generic implications of this issue.

The licensing basis impact evaluation (LBIE) performed to address the changes to the UFSAR and EOP was reviewed at the time of the NRC Design Inspection. PG&E continues to believe that the LBIE and attached safety evaluation conform to DCPP procedural requirements, and correctly conclude that these changes do not constitute an unreviewed safety question (USQ). The bases for this conclusion, as described in the completed LBIE, are as follows:

- The changes do not effect the design of any system or the ability of the systems to perform their safety functions.
- The changes do not affect assumptions made in the UFSAR accident analysis, nor the results of these analyses.
- The use of operators and the TSC personnel to assess the most reliable UHS lineup (ASW/CCW trains) for long term operation and to change the lineup as necessary in response to a single failure is acceptable. Indications of a single failure and system conditions are available, response can be made in an acceptable time frame, and procedures are in place to perform the necessary/appropriate operations.

PG&E will be working with Nuclear Reactor Regulation and Region IV to expeditiously resolve the USQ issue.

4. ***IFI 50-275/97-202-04:*** *ASME Section XI testing of ASW pumps (Section E1.2.1.2.f)*

Item Description *- The ASW pumps are tested to a specific point on the pump performance curve to establish the acceptance criteria. The specific point selected for the test requires throttling of the CCW heat exchanger ASW outlet valve of the opposite train (the pump is tested through the cross-tie to demonstrate adequate performance for the most limiting condition) to meet configuration requirements for the test. If the surveillance test is being performed as post maintenance testing (PMT), it could result in both the ASW pump and the opposite heat exchanger being inoperable at the same time (the heat exchanger is declared inoperable when its outlet valve is throttled). The team considered that rendering the CCW heat exchanger inoperable by throttling of the ASW outlet valve every time the surveillance test was performed was an undesirable practice, and that test modifications would correct this problem. DCPP initiated AR A0443221 to either (1) obtain relief from Section XI to allow testing the pump at various flow rates or (2) re-baseline the test reference flow rate to a higher value so that the heat exchanger outlet valve does not need to be throttled from its normal position.*

Response – A relief request was submitted in PG&E letter DCL-97-210, "Inservice Testing Relief Request P-RR5 - Auxiliary Saltwater Pump (ASWP) Performance Using Evaluation of Pump Curves," dated December 12, 1997. Approval of this relief request would allow ASW pump testing using an evaluation of pump performance compared to pump curves in lieu of a reference value as required by Operation and Maintenance Part 6, "Inservice Testing of Pumps in Light-Water Reactor Power Plants," paragraph 5.2.(b). Testing in accordance with this relief request would eliminate the need to adjust the CCW heat exchanger outlet throttle valve resulting in the heat exchanger being declared inoperable.

5. ***URI 50-275/97-202-05:*** *Discrepancy in Design Documentation (Sections E1.2.1.2.g, E1.2.3.2.e, E1.3.3.2.a, E1.3.3.2.d*

Item Description (Example 1) *- The team reviewed the ASW system piping schematic 102017 sheets 3 and 3B, Revision 83, DCM S-17B, DCM M-46, "Piping Pressures, Temperatures, and Operating Modes," Revision 23, and calculation M-784 to verify the piping design pressure and temperature classification for the discharge lines from the pump to the CCW heat exchanger and from the CCW heat exchanger to the ocean. The team determined that the pressure and temperature classification as determined in M-784 were acceptable. However the temperature classification in DCM S-17B did not reflect the classification in M-784. DCPP initiated AR A0438253 to revise DCM S-17B to reflect the classification in M-784.*

Response - DCM S-17B, "Auxiliary Saltwater System," is being revised per Action Request (AR) A0449058. The temperature and pressure classification for the ASW system will be corrected in this revision which will be implemented in conjunction with DCP M-49386 by June 1, 1998. This condition is considered to be an isolated problem with no generic implications since the correct information regarding pressure and temperature classification for the ASW system is provided in DCMs M-46, "Piping Pressures, Temperatures, and Operating Modes - Unit 1" and M-71, "Piping Pressures, Temperatures and Operating Modes."

Item Description (Example 2) *- TS 3/4.5.5, page 3/4 5-11, RWST Surveillance Requirements, describes verifying the RWST temperature to establish operability during low outside ambient temperature conditions. However, TS bases 3/4.5.5, page B3/4 5-7, only mentions RWST volume and boron concentration as a requirement for operability. As indicated in the UFSAR and surveillance procedure STP R-20, temperature is verified along with boron concentration when performing surveillance of the RWST. This issue does not constitute a safety concern and the licensee will track this issue for correction as part of a planned effort to standardize the DCPP TS.*

Response - Refueling water storage tank (RWST) temperature will be added to TS 3/4.5.5 Bases in conjunction with the DCPP Standard Technical

Specification submittal. The discrepancy between TS 3/4.5.5 and its Bases occurred in conjunction with the implementation of License Amendment 101/100. Since LAR 94-06 (DCL-94-177, "Revision of Technical Specifications 3/4.1.2.5, 3/4.1.2.6. and 3/4.5.5 - RWST Allowed Outage Time and Solution Temperature") proposed the elimination of RWST temperature from TS 3/4.5.5, reference to RWST temperature was removed. However, the NRC did not approve the deletion of the RWST temperature. Consequently, the RWST temperature remained in the TS, but the Bases approved by the NRC did not contain information on the temperature since it was proposed for deletion. Based on this unique cause, this finding is not considered to represent a generic concern regarding consistency between the TS and their Bases. Information regarding the RWST temperature will be added to the ITS Bases as part of the response to a request for additional information associated with Section 3.5 of the ITS. This request is expected to be received in approximately March 1998, with the information submitted approximately 30 days following the receipt of the request.

Item Description (Example 3) *- The team noted a discrepancy in DCM S-12, Section 4.3.1.g, which provided a description of the initiating signal for the CS system. The DCM section described only the "P" signal for automatic actuation of the CS system. According to UFSAR Chapter 7 and Logic Diagram 4014233, a coincident "P" and "S" signal is required to initiate automatic actuation, which is consistent with the design documents. This discrepancy has no safety impact. The issue involves an inconsistency between the design criteria document and the UFSAR. The licensee concurred and noted that AR A0438244 resolution will correct the DCM.*

Response - PG&E agrees with the inspection team that the statement in DCM S-12, "Containment Spray System," does not clearly identify what is really required for the containment spray (CS) system actuation and that the DCM requires enhancement. Both the DCM and the UFSAR have been revised as necessary to clearly identify the requirement of coincidental "S" and "P" signals for the automatic actuation of the CS system.

It is believed that the above discrepancy is the result of an assumption that the "P" signal would not be present without the "S" signal. This was based on the fact that conditions that cause the "S" signal (high containment pressure) would have to be present for the "P" signal parameter to exist (high-high containment pressure). As a result of this assumption, only the "P" signal was discussed in DCM S-12 as being required to actuate the CS system. As the system was always designed and maintained with both signals required, there is no safety impact with respect to this discrepancy. This discrepancy is believed to be an oversight and is considered to have no generic implications.

Item Description (Example 4) *- UFSAR Section 6.2.3 5.3, Spray Additive Tank Instrumentation, states that two alarms are provided to announce that the SAT solution has been exhausted. Based on a verification of control*

room annunciator layout drawing 500808 and the as-installed condition, only one alarm exists which is on window group PK01. Also, contrary to the UFSAR description, this alarm is to announce that the TS level of 60% in the SAT has been reached, instead of being exhausted. This discrepancy also affects Instrument Schematic 102033 Sh. 18 and DCM S-12, par. 4.3.9.1. The licensee concurred with this discrepancy and issued AR A0442941 to revise the UFSAR, Instrument Schematic and DCM S-12. The licensee does not consider that a tank LO-LO alarm is necessary for CS pump protection since emptying of the SAT and injection of gasses into the system will not have an adverse effect. Therefore, the existing design which consists of one alarm, provides sufficient information to evaluate the condition of the SAT in accordance with system design and the TS. The licensee plans to document their technical review of this issue in their safety evaluation that will be performed to revise the UFSAR.

Response - Instrument Schematic 102033, Sheet 18, was reviewed and determined to be correct as shown, with no further action necessary. DCM S-12 and UFSAR Section 6.2.3.5.3, will require revision to clarify the description of the spray additive tank alarms. ARs A0449235 and A0442941 have been initiated to revise the DCM and UFSAR, respectively. These revisions will be completed by February 27, 1998.

While each of these examples may have no specific generic implications, the overall question of their cumulative effect was examined. Because they are unrelated to each other and do not have safety significance, they have no overall cumulative impact on plant safety. Nonetheless, as part of PG&E's Licensing and Design Basis Alignment Program (LDBAP) to examine and improve the consistency of DCPP and its licensing and design basis, PG&E is reviewing the UFSAR and related documentation. In addition to correcting the identified discrepancies, the review effort will continue to examine both the individual findings and the cumulative impact of those findings on our confidence that the plant meets the requirements established in its design and licensing basis. Further actions will be taken should trends indicate that discrepancies might lead to loss of safety function capability. This review will be completed by October 31, 1998. Furthermore, the DCPP Corrective Action Program requires consideration of potential generic aspects of identified problems.

6. ***URI 50-275/97-202-06:*** *Availability of an Alternate Flowpath for the ASW System Section (Section E1.2.1.2.h)*

Item Description *- The ASW pumps for each unit have separate bays from which they take suction. As per UFSAR Section 9.2.7.2.3, "Each unit's pair of ASW pumps share a common traveling screen to remove floating debris from*

the incoming seawater. If the common screen for a unit becomes clogged with debris, seawater may be valved to the ASW pump bays from the unit's circulating water pump bays." The traveling screens at DCPP are designed as Class II, and are, therefore, neither seismically qualified or supported. The team determined that there is a potential for the screen to fail during a seismic event and restrict flow to the ASW pumps. The demusseling line flowpath is not tested or maintained on a routine basis to demonstrate its availability as an alternate flow path. The valves in the flowpath, however, are exercised to demonstrate their operability. The team identified that the inability to demonstrate an acceptable flowpath for ASW pump suction did not conform to the recommendation contained in GL 89-13. DCPP initiated AR A0443544 to reevaluate the need for testing or inspection of the flowpath. The team considered the fact that the UFSAR required flowpath was not being properly maintained (i.e., not in the maintenance rule) or tested to be contrary to the intent of GL 89-13 and a weakness in the licensee's program.

Response – PG&E has reviewed the design basis for the demusseling lines, and has determined that they are not a required redundant ASW flow path. Therefore, the demusseling lines were not considered for maintenance and/or testing in conjunction with the DCPP Generic Letter (GL) 89-13 Program.

The Operations staff can take several actions in the case of a loss of suction to an ASW pump. Abnormal Operating Procedure AP-10, "Loss of Auxiliary Saltwater," directs operators to first start the non-operating ASW pump for the affected unit. If that is not effective, then the operators are directed to utilize the standby pump from the opposite unit through the Unit crosstie valve, FCV-601. FCV-601 is seismically qualified and is Design Class I. It is designed to provide local manual or remote operation. Only if this action is ineffective are the Design Class II demusselling valves utilized to provide a suction flow path for the ASW pumps.

The demusseling piping and valves were specifically designed to support the heat treatment demusseling operation. In addition to this design function, they can provide a flow path to supplement flow in the event of severe screen clogging. Since the flowpath can only be established using Design Class II power and air, and there is no provision for manual opening of the valves, there is no provision in the design to ensure that the demusseling flow path can be placed in service under all plant conditions or after a seismic event: The absence of Design Class I features supports the conclusion that the demusseling flowpath was never intended to be a required redundant ASW flow path.

Enclosure 1 of the GL 89-13 states: "Redundant and infrequently used cooling loops should be flushed and flow tested periodically at the maximum design flow to ensure that they are not fouled or clogged. Other components of the service water system should be tested on a regular schedule to ensure that they are not fouled or clogged..." During the preparation of the GL

89-13 response, the demusseling lines and valves were not considered part of the safety-related service water system boundary. The demusseling line is not considered a "cooling loop" and, as such, would not meet the criteria for requiring flushing or testing as described in Enclosure 1 of the GL.

In summary, the demusseling flowpath was not included in the scope of the PG&E response to GL 89-13 because it is not a "required" fully redundant flow path for the ASW system. This is consistent with the design and licensing basis for this flow path, and PG&E believes that this should not be considered a weakness in the PG&E GL 89-13 Program. Nevertheless, PG&E recognizes the value in ensuring the viability of the alternative flow path provided by the demusseling lines. Thus, PG&E currently performs periodic stroke testing of the demusseling valves. In addition, to evaluate the potential for biofouling or siltation of the demusseling flow path, PG&E will inspect one of the Unit 2 demusseling lines in conjunction with planned valve maintenance during the upcoming Unit 2 eight refueling outage (2R8). Based on the results of the inspection, the need for a maintenance or testing program for the demusseling flowpath will be evaluated. This evaluation will be completed within 90 days of the completion of 2R8. The 2R8 is expected to be completed on approximately March 20, 1998.

PG&E's program in response to the NRC's 10 CFR 50.54(f) letter regarding adequacy and availability of design bases information (LDBAP), is examining other systems and will provide additional assurance that required functionality is available and covered by appropriate procedures. Any further actions required will be determined based on the results of that program. This program will be completed by October 31, 1998.

7. ***URI 50-275/97-202-07:*** *EDG transient analysis computer simulation study (Section E1.2.2.2.a)*

Item Description *- Paragraph 4.3.1.j of DCM S-21 stated that, "Each diesel-generator set is designed so that at no time during the loading sequence will the frequency decrease to less than 95 percent of nominal frequency. [R.G.1.9]." Paragraph 4.3.1.n stated that "The diesel-generator sets are designed to ensure that nominal frequency is restored within 2 percent of nominal in less than 40 percent of each load sequence time interval. [R.G.1.9]." Regulatory Guide 1.9 Revision 1 revised the 40 percent criteria to 60 percent but the DCM did not reflect this allowance. UFSAR section 8.3.1.1.13.1 has similar descriptions of capability. When the team questioned the licensee as to their commitment for bus frequency and recovery time the licensee pointed out that EDG loading had been discussed with the NRC in PG&E Letter DCL-85-132, dated March 29, 1985. In that letter, the licensee described how testing demonstrated that their equipment met "the intent of" Safety Guide 9 or Reg Guide 1.9 Revision 0. The licensee also pointed out that it was not clear from docketed correspondence that the NRC responded*

to their 1985 letter about "intent of" since the original SAR indicated that Reg Guide 1.9 was met.

The team reviewed calculation 215-DC, Revision 1 dated December 26, 1996, "EDG Loading Capability Study without KWS Relay." In this study, a computer simulation was used to analyze the machine's transient responses. The results for four of the six diesel generators showed the frequency dropping to 56.8 Hz. or slightly below the 57 Hertz minimum criteria during design basis loading. The frequency dip occurred during the initial load block when none of the ECCS motors were loaded, and the only load on the diesels were the 480 volt transformers. Also, during this initial load block, one machine had a frequency recovery time of 2.54 seconds, which slightly exceeded the 2.4 second (60%) criteria of NRC Regulatory Guide 1.9. The Integrated Test of Engineered Safeguards and Diesel Generators (Surveillance Test Procedure STP M-15) conducted on the diesels to monitor their performance, however, do not show any dip in frequency below 57 Hz. or recovery time greater than 2.4 seconds. This difference between the computer study and actual tests was determined to be due to the slow governor response modeled in the analysis. The study also showed that for the non-design-bases case when three motors were loaded simultaneously the frequency dipped to 55.68 Hz.

The team's review determined that the computer simulation study results and EDG design requirement for transient loading were not well documented and led to confusion during the inspection. DCPP initiated AR A0444243 to evaluate current system capabilities, to resolve the discrepancies in their commitment to EDG response transient loading, and to revise calculation 215-DC as necessary.

Response - During the NRC Design Inspection, PG&E provided the inspection team with specific responses to questions related to Calculation 215-DC and compliance with Safety Guide (SG) 9 and Regulatory Guide (RG) 1.9, Revision 1. These responses are documented in PG&E files as Chron 234219. In order to clarify the basis for DCPP's compliance with SG 9 and RG 1.9, Revision 1, PG&E will revise DCM S-21, "Diesel Engine System," and Calculation 215-DC. The DCM revision will define the acceptance criteria for transient frequency and voltage during the emergency diesel generator (EDG) loading sequence. The revision to Calculation 215-DC will clarify how the combination of testing and simulation results demonstrate compliance with SG 9 and RG 1.9, Revision 1. The calculation revision will also clearly categorize the results as design basis, special studies, or outside design basis. Revisions to DCM S-21 and Calculation 215-DC, will be completed by February 28, 1998.

The LBIE performed in conjunction with the change to UFSAR Subsection 8.3.1.1.13.1, dated April 23, 1997, which documented both field test data and simulation data, provided a technically sound basis for its conclusions. However, a recent review of this safety evaluation conducted as part of

responding to the inspection team's questions, concluded that additional detail should be added to address the 50.59 questions. AR A0446633 was initiated to address this weakness and the LBIE will be revised and reviewed/approved by the Plant Staff Review Committee (PSRC) by April 30, 1998.

In addition, PG&E will submit a letter to the NRC discussing the inaccuracies in DCL-85-132 dated May 29, 1985, "Diesel Generator Capability," and documenting the basis for compliance with SG 9 and RG 1.9, Revision 1. This letter will be submitted to the NRC by May 30, 1998.

The issues addressed in this URI apply to all six EDGs and the corrective actions will encompass the generic implications for the entire set of EDGs. The additional scrutiny applied to the 50.59 evaluation was due to the heightened awareness caused by on-going efforts to strengthen the 50.59 process. No other generic aspects have been identified.

8. ***IFI 50-275/97-202-08:*** *Control of Calculations (Section E1.2.2.2.c, E1.2.2.2.i)*

Item Description

Example 1 *- The team also determined from review of calculation 195A-DC in conjunction with DCNs DC1-EE-47513, 45797 and 47195, that the current as built settings for TOL for ASW system motor operated valves 9001A and 9001B and flow control valves FCV-495 and 496 were included in the DCNs and not updated in calculation 195A-DC. AR A0444411 was initiated by DCPP to incorporate the DCN data in a revision to calculation 195A-DC. The team discussed with the licensee their controls for calculations. Procedure CF3.ID4, "Design Calculations," Revision 2, requires that calculations affected by a design change be identified and revised prior to closure of the design change package. The procedure does not however, require that calculations that are made obsolete by a change be automatically archived or made historical. The licensee's position is, that these superseded calculations served their purpose of forming the basis for the previous design and through other controls engineers are made aware of the current calculations. During the course of this inspection, the team had difficulty determining the most current calculations that supported the system design. The licensee's program depends heavily on people to remember the calculational history.*

Example 2 *-The status of calculations was confusing. Specifically, there are situations where limited scope calculations (i.e., smaller calculations) were performed. Data in these smaller calculations may supersede information in a larger calculation. There is no periodic updating of the major calculations to incorporate the collected small revisions. This same condition was also true for other functional reviews discussed elsewhere in this report.*

Response (Examples 1 & 2) - PG&E failed to fully explain the Calculation Program requirements to the inspection team. Specifically, Procedure

CF3.ID4, "Design Calculations," Section 5.4.5 provides an exception for "master calculations that are updated on a scheduled basis" or periodically updated calculations. It states that these periodically updated calculations do not have to be in "Final" status when the DCP is closed provided that "the calculation for the specific design has been approved final and the structure, system, or component is not placed in service in an unanalyzed condition."

In addition, Calculation 195C-DC *(Note - the correct calculation number is 195C-DC instead of 195A-DC as stated in the IR)* is a master calculation periodically updated per Electrical Engineering Work Instruction EE-9. The master revision tracking AR for Calculation 195C-DC update is AR A0303199. All three design change notices (DCNs) identified by the inspection team are listed in this tracking AR. Additionally, the setpoint change calculations were approved as part of these DCNs. PG&E believes that a more thorough explanation would have led to agreement on the adequacy of calculation controls relative to these specific changes.

Nonetheless, PG&E believes that the program should be enhanced and will take the following actions to address the specific concerns noted in Examples 1 and 2:

1) Revise Calculation 195C-DC to incorporate all design changes by March 2, 1998.

2) Revise Procedure CF3.ID4 to enhance the calculation process as follows:

   - Include the AR numbers of the tracking ARs for master calculation updates in the Design Calculation Index (DCI) "Remarks" field so that the user is alerted to the existence of a recently approved calculation not yet updated in the master calculation.
   - Include a requirement that when a calculation is revised or used for a design change, the user shall review the calculation package (and other calculations affected by the work in progress) for the current status and update the status on the calculation in the DCI when necessary.
   - Include a requirement to update the master calculations within 120 days of completion of a refueling outage if there any changes to the calculation.

   This revision will be completed by May 31, 1998.

3) During knowledge transfer activities associated with the transfer of engineering activities to the site, key calculations will be identified and reviewed by engineering, at which time calculation status changes will be made as appropriate. This activity will be completed by December 31, 1998. This will update several hundred of the most actively used and important calculations. PG&E has plans to update the status of the remainder of the approximately 35,000 calculations related to DCPP design only when they are used as discussed in 2 above.

While the above actions aimed at addressing the weaknesses in the process for controlling calculations identified by Examples 1 and 2 are not likely to resolve other existing unidentified calculational discrepancies, there are no indications that any safety functions have been impacted. Hence these actions are considered to be adequate to deal with the programmatic issues. In conjunction with our normal problem identification and resolution process, which will assure future identified problems are tracked and closed in an appropriate manner, these actions should be sufficient to preclude the emergence of significant calculation related issues.

9. ***IFI 50-275/97-202-09:*** *Review of Battery Charger Settings (Section E1.2.2.2.d)*

Item Description *- The vital battery chargers are sized by calculation 236A-DC, and the current revision of this calculation takes credit for a maximum charger capability of 110% of the full load rating (440 amps). Again as per UFSAR Sections 8.3.2.2.1.4, 8.3.2.2.1.2, 8.3.2.2.2.4 and DCM No. S-67 Section 4.3.3.1 for Battery Chargers, the chargers are set at sufficient capacity to carry loads up to 110 percent of its 400 ampere rating and are set to current limit at 110% of rated output current. However, Maintenance Procedure MP E-67.3A, "Routine Preventive Maintenance of Station Batteries," Section 7.19.6 sets the "current limit to 430 (425-435) Amps by adjusting P5 on the Current Control Module." At this present setting of 107.5%, the battery charger has adequate capability to supply the DC loads for analyzed accident scenarios. The current available to recharge a totally discharged battery is slightly reduced and this will lengthen the time required for recharge but will still be less than the twelve hours required by the UFSAR. The 107.5% battery charger setting is not in agreement with calculational assumptions. DCPP initiated AR A0441745 to reconcile the difference between the design bases and actual setting for the battery chargers.*

The present battery float voltage setting is 135 Volts plus control tolerances that could allow it to be 135.9 Volts. This is 5 Volts above the TS 4.8.3.1.a.2 minimum requirement of "greater than or equal to 130 Volts on float charge." The Vendor manual from C&D, the battery Vendor, specifies a nominal float Voltage per cell of 2.20 to 2.25 Volts, which is 132 to 135 Volts for the 60 cell vital batteries. The team identified that a higher float voltage can tend to "bake" normally energized DC coils which may shorten the usable life of equipment. However, setting the float at 135 Volts can be beneficial since fewer equalizations would be necessary. DCPP issued AR A0444410 to reevaluate the float Voltage setting.

DCPP selected a nominal equalize Voltage of 138 Volts. For equalizing charge, C&D recommends a range of 2.33 to 2.38 Volts per cell which is 139.8 to 142.8 Volts for 60 cells. The DCM S-67 defines the recommended

DC System maximum operating limit of 139.8 Volts. Setting the equalize level at 138 Volts has no serious consequences except to reduce the effectiveness of the equalization. The team identified that DCPP's rationale for operating the battery outside of the battery manufacturer's float and equalization range recommendations was not clear. DCPP initiated AR A0444410 to review the setting for the battery float and equalize voltage.

Response - Charger Output Current Setting - The concern raised by this IFI applies to the Revision 0 of the Calculation 236A-DC where the inverters are normally supplied by the battery through the respective charger resulting in a higher calculated charger load. After the inverter replacement project, the inverters are normally supplied from the 480V system as reflected in Revision 1 of the Calculation 236A-DC. The Revision 1 calculation shows the minimum battery charger load size as 316A. The purpose of the calculation is to establish that the sizing of the battery chargers is adequate to supply the existing DC connected loads and recharge the battery within 12 hours. The conclusions specify the minimum charger size of 316 amps, and therefore, the nominal setting of 430A (425-435A) in Maintenance Procedure E-67.3A, "Routine Preventive Maintenance of Station Battery Chargers," is acceptable. The UFSAR and DCM statements made in context were meant to describe battery charger capacity ratings. Although technically correct, the UFSAR and DCM statements could be inferred to be settings. PG&E will review and clarify the subject UFSAR and DCM statements by April 1, 1998.

Charger Float Voltage Field Setting - PG&E concurs with the inspection team that if the battery float voltage is set too high, it can tend to "bake" normally energized direct current (DC) coils. However, PG&E believes that the advantage of reducing the number of equalization cycles outweighs the negligible effect of the small delta (0.9 Volts) between the maximum set voltage and the maximum value of the manufacturer's recommended range. PG&E has recently revised the weekly Surveillance Test Procedure (STP) M-11A, Revision 12, "Measurement of Station Battery Pilot Cell Voltage and Specific Gravity," tolerance band of 135V +/- 1VDC to a tighter float voltage band of 135 +/- 0.5 volts as being conservative with respect to the field setting basis of 135V +/- 0.9 VDC. The basis for this field setting is found in STP basis document B-STP M-11A (Revision 0), paragraph 7.6. In addition, DCPP operating experience has shown that neither battery life nor capacity is affected by operation with the existing float voltage setting. We have also not noted an excessive number of normally energized DC coils failing due to "baking." Thus, the nominal float voltage field setting of 135 Volts, with the revised tolerance band, will be retained. AR A0444410 has been updated to document the rationale for the acceptability of this setting.

Charger Equalizing Voltage Field Setting - DCPP operating experience has shown that the charger equalizing voltage field setting of 138 VDC is adequate to restore the battery to nominal parameters. The 138 VDC field setting was selected to be below the recommended DC system maximum

operating limit of 139.8VDC (DCM S-67, Section 4.3.1.g). The basis for the field setting is found in STP basis document B-STP M-11B (Revision 0), paragraph 6.13. Thus, the nominal equalizing voltage field setting of 138 VDC will be retained. AR A0444410 has been updated to document the rationale for the acceptability of this setting.

Since the existing battery current and voltage settings were determined to be appropriate and consistent with the applicable design bases, no generic considerations are involved in the issues addressed by this IFI.

10. ***URI 50-275/97-202-10:*** *Potential USQ and TS Adherence Associated with Containment Spray During Containment Recirculation (Section E1.3.1.2.b & c)*

Background *- In December 1991, the licensee discovered (LER 1-91-018) that the heat loads placed on the CCW system by two trains of RHR in the event of an accident with a loss of a single train of ASW would be unacceptable. The CCW system heat loads could be brought to within design limits by operating with only one train of RHR. Since the containment spray function is assumed by the RHR system during recirculation, PG&E believed that one RHR pump could not provide both adequate core cooling flow and containment spray flow simultaneously. No engineering calculation was performed to substantiate this belief, but it was felt to be an obvious conclusion based on pump curves and flow path resistances. Additionally, the licensee did not have a calculational basis for the original assumed ability of the RHR system to provide the containment spray function during the recirculation phase of the accident after a single failure occurred. Based on the new data (LER 1-91-018), PG&E initiated changes to the UFSAR to re-classify the containment spray function during recirculation as non-safety related, revised EOP E-1.3 to prohibit spray during recirculation with only one RHR pump in operation, and eliminate the UFSAR requirement to operate spray for a minimum of 2 hours. Westinghouse was requested to reevaluate the containment analysis to verify that two of the five containment fan coolers could remove the containment heat without the need to spray the containment using the RHR pump aligned to the containment sump. The team's review of the Westinghouse containment reanalysis is discussed in Section E1.2.1.2.c of this report (NRC IR 97-202).*

Item Description (Issue 1) - Original Safety Evaluations

The problems noted by the Inspection Team in the safety evaluations performed to address the changes implemented in conjunction with LER-1-91-018 involved the following: The Operations Department did no safety evaluation for Revision 9 to EOP E-1.3 before it was issued because their screening was in error. Westinghouse did a safety evaluation for the revision after it was issued and concluded that there was no unreviewed safety question but recommended an UFSAR change. In spite of this Westinghouse recommendation, PG&E did not change UFSAR Table 6.3-5. The

Westinghouse safety evaluation and the one associated with OE 91-15 performed by PG&E both failed to recognize that TS 3.6.2.1 required that the RHR system provide the long term containment spray function during the recirculation phase of the accident. Additionally, the newly discovered consequence of the single failure of an RHR pump could also be considered to be an unanalyzed consequence of the malfunction of equipment important to safety. The Inspection Team considered this issue to be a potential unreviewed safety question that should have been brought to the attention of the NRC for review when the LER condition was discovered.

Response - PG&E considers that the actions taken under the 50.59 process to declassify the CS function during the recirculation phase of a LOCA were appropriate, and that this change does not involve a USQ. The CS function during the recirculation phase of a LOCA is not required for CS operability by either the licensing or design bases for DCPP. PG&E has interpreted the requirement to demonstrate the capability to spray containment using the RHR system as demonstrating that the valves connecting the RHR system to the containment spray rings can be opened. PG&E has evaluated the current configuration of DCPP Units 1 and 2 and believes that, based on the design of the system, the CS system is operable, and the TSs are not being violated since the evaluation demonstrates that recirculation spray can be performed given the worst case single failure assumption.

The screen for Revision 9 to EOP E-1.3, "Transfer to Cold Leg Recirculation," was based in part on the knowledge of the outcome of the prompt operability assessment, the preliminary investigation identifying NCR DC0-91-EN-N030, and the assessment of the evaluation used for the development of Operability Evaluation 91-15, "Component Cooling Water (CCW) System Temperature During Post-LOCA Reactor Coolant System Cold Leg Recirculation." However, based on the recent NCR and NRC Enforcement Conference on EOP changes without 50.59 reviews, current guidance would lead reviewers to conclude a 50.59 safety evaluation would be necessary.

Although Westinghouse recommended revision of Table 6.3-5 of the UFSAR, it was not revised because it reflects the sequence of events that takes place if EOP E-1.3 is followed with the occurrence of no single failures. It was the purpose of the table to show that switchover to recirculation mode could be accomplished in the required time, and not to illustrate the switchover timing of all single failure cases. Hence revision of the table to reflect the RHR train failure case was not appropriate, even though CS might not be used if one of the RHR trains were to fail.

As a result of the NRC inspection team's questions regarding the licensing and design basis of the CS function during the recirculation phase of an accident, PG&E prepared an integrated "white paper" (CS in Post-LOCA Recirculation Licensing and Design Basis History at the Diablo Canyon Nuclear Power Plant), and 50.59 safety evaluation. The "white paper" and

50.59 safety evaluation provide a single integrated picture of the bases and history, assembled from many references and the personal knowledge of individuals involved at the time. PG&E believes the plant design and its bases are consistent and valid, and that the changes made were appropriate under PG&E's 50.59 process. At the same time, it is clear that several errors and omissions occurred during the process of reviews and changes to the EOPs, UFSAR, and other documents. The "white paper" and 50.59 safety evaluation were reviewed by the PSRC on September 4, 1997, and the PSRC determined that the previous 1991 decision continued to be valid and that no USQ or TS change was required when the EOP change was made in 1991.

PG&E will be working with Nuclear Reactor Regulation and Region IV to expeditiously resolve the USQ issue. The required actions to address the identified errors and omissions are documented in AR A0442630 and have been completed with the exception of a revision to EOP E-1.3 which will be completed by January 31, 1998.

Item Description (Issue 2) - 1997 Safety Evaluation

Because of the concerns expressed by the Inspection Team with regard to the change in the original design basis as to containment spray during post-LOCA recirculation, PG&E prepared a new consolidated safety evaluation. The new safety evaluation was titled; "10 CFR 50.59 Safety Evaluation for Reclassification of Containment Spray During the Recirculation Mode of Safety Injection As a non-safety-Related Function."

The Team determined that the licensee's response to Question 4 in this new safety evaluation involving the probability of occurrence or consequences of a malfunction of equipment important to safety previously evaluated in the SAR was marked "No." The limitations on the use of containment spray during recirculation with only one RHR pump in operation were never addressed in any revision of the UFSAR and therefore are a new ramification of the previously evaluated consequences of the single failure of an RHR pump. Additionally, as specified in 10 CFR part 50.59, a change to the facility or procedures specified in the UFSAR can not be made without prior Commission approval if it involves a change in the TS or is a USQ. The NRC is currently evaluating whether the licensee's change involved a USQ and whether a change to the TS should have been requested prior to the change. This item is included as part of URI 50-275/97-202-10, Potential USQ and TS Adherence Associated with Containment Spray During Containment Recirculation.

Response - The limitations on the use of CS during recirculation with only one RHR pump in operation were not addressed in the UFSAR because the accident analysis in the UFSAR states that no credit is taken for spray operation in the recirculation mode. UFSAR, Section 6.2C.4.2, containing a discussion of the current accident analysis, states "During the recirculation

phase of post-accident operation, water can conceivably be drawn from the RHR heat exchanger outlet and sprayed into the containment atmosphere via the recirculation spray system. However, recirculation spray is not modeled in the COCO code in the analyses reported herein." With regard to containment analysis, the containment pressure remained below that assumed for the leakage and the temperature remained within the environmental qualification of equipment inside containment. Since there was no credit taken for using recirculation spray in the accident analysis, it was not considered necessary to include a discussion of the consequences of its unavailability, since there were no consequences.

Again, as discussed in the response to Issue 1 above, PG&E considers the actions taken under the 50.59 process to declassify the CS function during the recirculation phase of a LOCA were appropriate, and that this issue does not involve a USQ. Although use of recirculation spray is not required for accident mitigation, the capability does exist to establish recirculation spray even in the event of the failure of an RHR train, meeting the TS requirements. Hence, the probability of occurrence or the consequences of a malfunction of equipment important to safety has not changed, and a no USQ conclusion is appropriate under the circumstances.

While PG&E believes that the correct evaluation conclusions were reached in the 1991/1992 process related to this change, a number of errors were made. The LDBAP review program, as mentioned elsewhere in this response, continues to examine functional requirements specified in the UFSAR and their implementation, and will provide confidence that potential errors in the processing of other problems and/or changes did not compromise the capability of systems or structures to perform their intended safety functions.

In addition, because of the more significant nature of this issue, PG&E will identify and examine other design basis related problems that were identified and reported on LERs in the last 10 years and resolved with a plant or procedure change, but for which no LAR was submitted. Any identified errors with the handling of these problems will be corrected, and their overall significance will be assessed to see if any further work beyond this effort is required to provide assurance that the plant's structures and systems can perform their intended functions. This program will be completed by December 31, 1998.