

Non-Concurrence Process Record for NCP-2012-001

The U.S. Nuclear Regulatory Commission (NRC) strives to establish and maintain an environment that encourages all employees to promptly raise concerns and differing views without fear of reprisal and to promote methods for raising concerns that will enhance a strong safety culture and support the agency's mission.

Individuals are expected to discuss their views and concerns with their immediate supervisors on a regular, ongoing basis. If informal discussions do not resolve concerns, individuals have various mechanisms for expressing and having their concerns and differing views heard and considered by management.

Management Directive MD 10.158, "NRC Non-Concurrence Process," describes the Non-Concurrence Process (NCP). <http://pbadupws.nrc.gov/docs/ML0706/ML070660506.pdf>

The NCP allows employees to document their differing views and concerns early in the decision-making process, have them responded to, and attach them to proposed documents moving through the management approval chain.

NRC Form 757, Non-Concurrence Process is used to document the process.

Section A of the form includes the personal opinions, views, and concerns of an NRC employee.

Section B of the form includes the personal opinions and views of the NRC employee's immediate supervisor.

Section C of the form includes the agency's evaluation of the concerns and the agency's final position and outcome.

NOTE: Content in Sections A and B reflects personal opinions and views and does not represent official factual representation of the issues, nor official rationale for the agency decision. Section C includes the agency's official position on the facts, issues, and rationale for the final decision.

The agency's official position (i.e., the document that was the subject of the non-concurrence) is included in ADAMS accession number ML120450843.

NON-CONCURRENCE PROCESS

NCP TRACKING NUMBER
NCP-2012-001

SECTION A - TO BE COMPLETED BY NON-CONCURRING INDIVIDUAL

TITLE OF SUBJECT DOCUMENT DIABLO CANYON POWER PLANT - INSPECTION REPORT 05000275/323-2011005		ADAMS ACCESSION NO. <i>ML 120450843</i>
DOCUMENT SIGNER Neil O'Keefe,		SIGNER PHONE NO. (817) 200-1141
TITLE Chief	ORGANIZATION Project Branch B, Region IV	
NAME OF NON-CONCURRING INDIVIDUAL(S) Michael Peck		PHONE NO. (805) 595-2354
TITLE Senior Resident Inspector	ORGANIZATION Project Branch B, Region IV	

DOCUMENT AUTHOR DOCUMENT CONTRIBUTOR DOCUMENT REVIEWER ON CONCURRENCE

REASONS FOR NON-CONCURRENCE AND PROPOSED ALTERNATIVES

Issue: Pacific Gas and Electric (PG&E) completed a deterministic reevaluation of the local seismology.¹ This reevaluation concluded that three local faults could produce about 70% greater vibratory ground motion than described in the Final Safety Analysis Report Update (FSARU) for the double design/safe shutdown earthquake. The licensee completed a prompt operability determination (POD)² to assess the effect on the capability of plant structures, systems and components (SSCs) to perform the specified safety functions at the higher vibratory motions.

The inspection report documented the results of the NRC inspection of the seismic POD.³ The report stated that the POD provided an initial basis for concluding a reasonable assurance that plant equipment would withstand the potential effect of the new vibratory ground motion. The inspector non-concurs with the report because the POD failed to meet either the licensee's procedural requirements or the NRC standard for operability. As a result, the licensee failed to demonstrate a reasonable assurance that all Diablo Canyon SSCs were capable of performing the specified safety functions as described in the plant design bases.

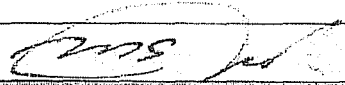
The POD was inadequate because the licensee failed to demonstrate that the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code acceptance limits were met for reactor coolant pressure boundary components at the higher structural stress levels represented by the new seismic information. As defined in 10 CFR 50.55a, "Codes, and Standards," the Code acceptance limits established a minimum standard for operability.

The POD was also inadequate because the licensee failed to demonstrate that all seismically qualified plant SSCs would continue to function at the higher vibratory motion associated with new seismic information in accordance with the double design (safe shutdown) earthquake design basis.

Background - Current Seismic Design and Licensing Basis (CLB)

Seismic qualification for Diablo Canyon SSCs were developed from three design bases⁴ events:

- Design Earthquake (DE): This safety analysis implemented the 10 CFR 100 requirements for the Operational Basis Earthquake. The DE (0.2 g)⁵ represented the maximum vibratory ground motion that could reasonably be expected during the operating life of the plant. The DE ensured the seismic qualification for which those plant features necessary for continued operation remain functional without undue risk to the health and safety of the public.
- Double Design Earthquake (DDE): This safety analysis implemented the 10 CFR 100 requirements for the safe shutdown earthquake. The DDE (0.4 g) represented the maximum earthquake potential (producing the maximum vibratory ground motion) for all earthquake epicenters within 200 miles and faults within 75 miles of the plant. The DDE established the seismic qualification requirements for plant SSCs necessary to:

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DATE *Jan 26, 2012*

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- Ensure the integrity of the reactor coolant pressure boundary,
- Prevent or mitigate design basis accidents, and
- Safely shutdown the plant.

- Hosgri Event (HE): This safety analysis implemented a PG&E commitment to the NRC to demonstrate that the plant could be safely shutdown following a postulated 7.5 M earthquake on the Hosgri Fault line (0.75 g).

The HE represented the largest ground motion of the three design basis events. However, SSC seismic qualification was limited by each of the three design basis earthquakes. For example, the safety analysis predicted higher vibratory motion for DE and DDE than the HE at the steam generators, as shown in Figure 1. The bounding vibratory motion (shaking), used to seismically qualify individual plant components, was a function of the component location. As shown in Figure 2, the DDE provided the limiting floor response spectrum for the 88 foot level of the containment building. The seismic qualification of plant structures was also limited by both the DDE and HE, dependant on location. For example, the seismic qualification of the lower levels of the containment structure were limited by the HE design basis while the upper levels were dominated by the larger DDE spectrum. Portions of the reactor coolant pressure boundary were more limited by the DE and DDE than HE. These differences in qualification requirements resulted from different assumptions, methods, design basis values/inputs, and acceptance criteria approved for each seismic safety analysis.

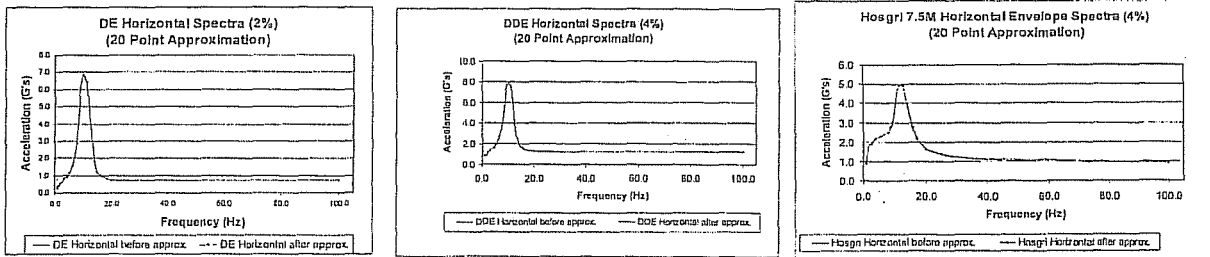


Figure 1
Comparison of DE, DDE, & HE Horizontal Response Spectrum at the Steam Generators

The Diablo Canyon Long Term Seismic Program (LTSP)

Several groups raised seismic safety concerns during the original Diablo Canyon licensing process. A major concern was related to the faulting style assumed in the HE safety analysis. To address these concerns, the NRC included Condition 2.C(7) with the original plant License. This license condition required PG&E to identify, examine, and evaluate all relevant geological and seismic data and information that became available since the 1979 Atomic Safety and Licensing Board hearing. From this information, the licensee was required to complete probabilistic and deterministic studies to assure the adequacy of seismic margins. This re-evaluation became known as the LTSP.

PG&E completed the LTSP and submitted the final report to the NRC in 1988.⁶ The licensee concluded that the original seismic design basis (DE & DDE) plus the HE was adequate and no changes were necessary. In 1991 the NRC accepted the LTSP final report and closed the License Condition.⁷ The NRC concluded that the LTSP did not alter the plant seismic qualification or design basis. In 1991, PG&E made three commitments associated with closure of the LTSP:

- Use the LTSP data to maintain seismic margins for future modifications of certain plant equipment,
- Maintain a strong geosciences and engineering staff, and
- Continue to operate a strong-motion accelerometer array and coastal seismic network.

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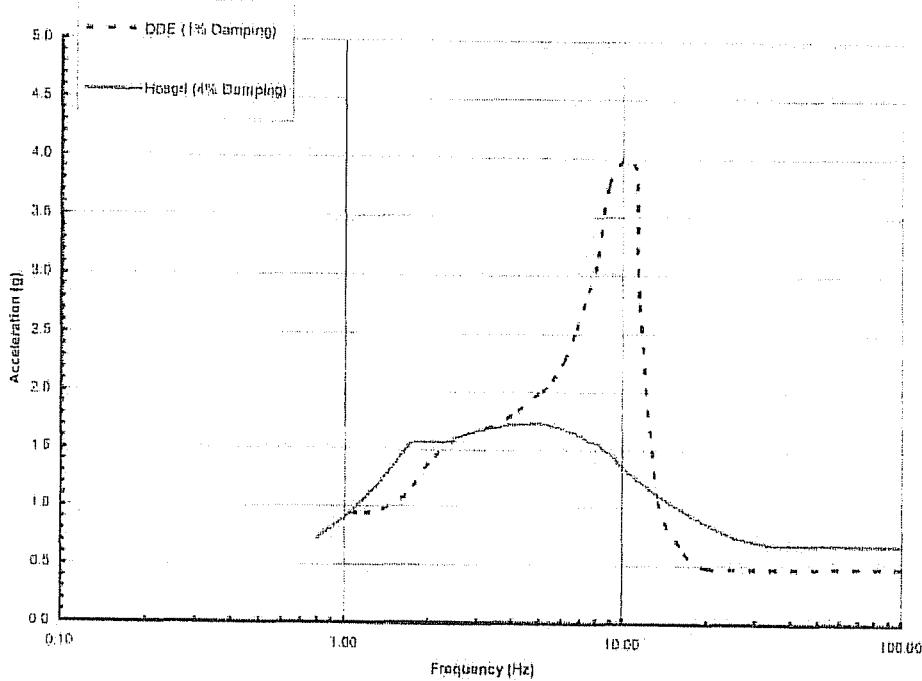


Figure 2
Comparison of DDE and HE Containments Floor Response at 88 Foot

Sequence of Events

- November 2008: The licensee notified the NRC of a new offshore seismic feature located about a mile from the plant. This offshore feature became known as the Shoreline fault. The licensee postulated that an earthquake on the Shoreline fault could produce between 0.69 to 0.74 g peak ground acceleration at the plant. The licensee concluded a POD was not required because the new ground motion was bound by the LTSP deterministic ground motion spectrum.
- September 2010: The NRC identified that an earthquake on the Shoreline Fault could produce about 70 percent greater peak ground motion assumed in the DDE/safe shutdown earthquake design basis.
- October 2010: The NRC requested that PG&E evaluate that capability (operability) of plant SSCs to perform the safety functions at the higher ground motions.
- December 2010: PG&E concluded that a POD was not required because of previous agreements reached with the NRC that new seismic information only needed to be evaluated by the LTSP.⁹
- January 2011: PG&E completed and submitted to the NRC a reevaluation of the local seismology. This report concluded that three local earthquake faults (Shoreline, San Luis Bay, and Los Oslo) could produce about 70% greater ground motion than the DDE.⁹

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- March 2011: The NRC opened Diablo Canyon Unresolved Item: 05000275; 323/2011002-03, "Requirement to Perform an Operability Evaluation Following Receipt of New Seismic Information." This unresolved item was used to track NRC review of the licensee's conclusion that new seismic information did not have to be evaluated against the plant design basis.
- June 2011: PG&E concluded that the new seismic information was a nonconforming condition as defined by their corrective action program. The licensee completed a POD to assess the effect of the new information on the capability of plant equipment. The licensee concluded that all plant SSCs were operable because the new ground motions were enveloped by the HE ground motions. The licensee stated that NRC operability guidance allowed use of the HE safety analysis to demonstrate that the DDE design basis was met.¹⁰
- August 2011: The NRC concluded that new seismic information developed by the licensee was required to be evaluated against each of the three design basis earthquakes use to establish plant seismic qualification. Comparison only to the HE or LTSP (margin to Hosgri) was not sufficient to ensure all plant SSCs were capable of performing the specified safety functions.¹¹
- October 2011: PG&E revised the POD to reformat the information. The licensee did not make any substantive changes supporting operability.¹²
- October 2011: PG&E requested the NRC approve the HE design basis as the safe shutdown earthquake for Diablo Canyon.¹³
- December 2011: PG&E supplemented the October 2011 request with a detailed list of deviations and exceptions between the HE design basis and NRC Standard Review Plan.¹⁴

Pacific Gas and Electric Seismic Prompt Operability Determination

PG&E concluded that all SSCs were operable because the new seismic deterministic ground motion spectrums were bound by HE design basis. The POD stated that HE safety analysis, including methods, design basis values/inputs, and acceptance criteria, was an acceptable alternative method for concluding that all plant SSC met the specified safety functions for the DDE.

NRC Operability Standard^{15,16}

To be considered operable, plant SSCs must be capable of performing the specified safety functions specified by design and within the required range of design physical conditions, initiation times, and mission times. The specified function(s) are those safety functions described in the CLB for the facility and are based on safety analysis of specific design basis events.

Immediate operability determinations are made without delay, using the best available information. PODs are a follow-up to immediate determinations when additional information, such as supporting analysis, is needed to confirm the immediate determinations. In both cases, the available information should be sufficient to conclude that the SSC is operable. The scope of an operability determination must be sufficient to address the capability of SSCs to perform their specified safety function(s). The licensee should declare the SSC inoperable if at any time the available information is inadequate to support a reasonable assurance that degraded or nonconforming SSCs are capable of performing the specified safety function(s).

The failure to meet a General Design Criteria or a Regulation should be treated as a degraded or nonconforming condition and is an entry condition for an operability determination.

The operability determination should assess credible consequential failures previously considered in the design. For example, equipment described in the safety analysis needed to mitigate a loss of coolant accident must be capable of performing those functions after the shaking associated with the DDE.

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Licenses may use alternative analytic methods (different methods than described in the CLB) when performing PODs. These alternative methods must be technically appropriate to the facility design and produce results consistent with the applicable acceptance criteria in the CLB. The alternative method should not over-predict SSC performance and licensees should perform benchmark comparisons with the CLB methods. Use of alternate methods does not include substitution of design basis, design basis functions or values/inputs. Use of alternative methods is not permitted in cases where a Regulation or license condition specifies the name of an analytic method for a particular application. In such cases, the application of the alternate analysis must be consistent with the licensing condition or Regulation. For example, ASME Boiler and Pressure Vessel Code methods and acceptance limits are specified by 10 CFR 50.55a. Licensees are not permitted use margins above the Code acceptance limits (or Code Cases) for demonstrating operability. These margins are reserved for the NRC.

A SSC is either operable or inoperable. The guidance does not provide for an indeterminate conclusion of operability.

Pacific Gas and Electric's Operability Standard¹⁷

The PG&E operability procedure closely paralleled the NRC Technical Guidance. The licensee's process allowed use of margin between the actual capability of degraded/nonconforming SSCs and the specified safety functions as defined in the design basis. The licensee's POD may credit conservatism within the design or margin gained by using compensatory actions.

The specified safety function(s) are those functions the SSCs were designed to accomplish as described in the UFSAR and other CLB documents. When SSC capability is degraded to point where it cannot perform the specified safety function, with a reasonable expectation of reliability, then the system should be judged inoperable. Alternate methods (engineering judgment) apply to calculational methods and should not be used to change design inputs.

Analysis of the Pacific Gas and Electric Seismic Prompt Operability Determination

The inspector concluded that the seismic POD did not meet either the NRC nor the licensee's standards:

- The POD failed to demonstrate that the integrity of the reactor coolant system pressure boundary would be maintained following a DDE

The reactor coolant system specified safety functions included that pressure boundary integrity would be maintained following the combined structural loading resulting from the DDE (safe shutdown earthquake) and a loss of coolant accident. This safety function is met by demonstrating that the ASME Boiler and Pressure Vessel Code, Section III, acceptance limits would be met. The licensee was required to calculate the resultant component stresses use the Code methodology, as specified in the plant design, including the specified DDE design basis values and design information. The POD was inadequate because the licensee failed to provide a reasonable assurance that the Code acceptance limits would not be exceeded for the DDE design basis case given the 70% increase in seismic vibratory ground motion.

The licensee's substitution of the HE design basis for demonstrating the DDE Code acceptance criteria were met was not an acceptance approach by either the licensee's operability procedure or the NRC operability guidance. This was a concern because in many cases, the reactor coolant pressure boundary stress was more limiting for the DDE than HE (see Figure 1).

- The POD failed to demonstrate that equipment necessary to prevent or mitigate an accident would remain functional following a safe shutdown earthquake

In many cases the DDE safety analysis provided the bounding vibratory motion used to establish the seismic qualification for plant SSC. For example, the FSARU credited the containment fan coolers to mitigate the design basis loss of coolant and steam line break accidents. The design basis required these coolers to be qualified to function following the vibratory motion (shaking) associated with the DDE. These coolers are located on the 88 foot level of the containment building. As shown in Figure 2, the DDE vibratory motion was greater than HE at this location. The POD was inadequate because the licensee failed to

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demonstrate that the coolers would still function at the increased motion associated with the new seismic information for the DDE case.

Safety Consequence

The seismic design bases and FSARU safety analyses provide reasonable assurance that nuclear safety is maintained following postulated earthquakes. PG&E developed new seismic information that concluded the bounding DDE safety analysis was no longer in conformance with NRC Regulations.¹⁰ The licensee implemented corrective actions in the form of a license amendment request. This information is currently under NRC review. The operability process is used to determine if the licensee can continue to safely operate the plant pending completion of these corrective actions. The PG&E POD used to conclude that the operability threshold was met was inconsistent with the licensee's procedures and NRC Technical Guidance. As a result, the inspector was unable to conclude that key plant SSCs, including the reactor coolant pressure boundary, remain operable. An inoperable conclusion does not necessarily equate to an unsafe condition. However, a declaration of inoperable SSC would require additional NRC engagement before the licensee would be permitted operate the plant beyond the Technical Specification out of service times.

Recommendation

The inspector recommends that the NRC issue a violation with this inspection report associated with the failure of PG&E to follow the station operability determination procedure.

Endnotes

- ¹ "Report on the Analysis of the Shoreline Fault Zone, Central Coast California to the NRC," January 7, 2011, ADAMS ML110140400
- ² PG&E Notification 50086062
- ³ Diablo Canyon Integrated Inspection Report 05000275/2011005 and 05000323/2011005, Section 1R15
- ⁴ FSARU Sections 2.5.2.9, "Maximum Earthquake," and 3.7.1.1, "Design Response Spectra,"
- ⁵ Peak ground acceleration- gravity
- ⁶ PG&E Long Term Seismic Program Final Report, DCL-88-192, July 1988
- ⁷ SSER 34
- ⁸ Notification 50086062, Task 30
- ⁹ "Report on the Analysis of the Shoreline Fault Zone, Central Coast California to the NRC," January 7, 2011, ADAMS ML110140400
- ¹⁰ Notification 50410266
- ¹¹ "Task Interface Agreement - Concurrence on Diablo Canyon Seismic Qualification Current Licensing and Design Basis," August 1, 2011, ADAMS ML112130665
- ¹² Notification 50410266
- ¹³ Pacific Gas and Electric, License Amendment Request 11-05, "Evaluation of Process for New Seismic Information and Clarifying the Diablo Canyon Power Plant Safe Shutdown Earthquake," ADAMS ML113112A166
- ¹⁴ Pacific Gas and Electric, "Standard Review Plan Comparison Tables for License Amendment Request 11-05," ADAMS ML11312A166
- ¹⁵ NRC Inspection Procedure 71111.05, "Operability Determinations and Functionally Assessments"
- ¹⁶ NRC Inspection Manual, Part 9900: Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," ADAMS ML073440103
- ¹⁷ PG&E Procedure OM7.ID.12, Operability Determinations, Revision 22
- ¹⁸ 10 CFR 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants."

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SECTION B - TO BE COMPLETED BY NON-CONCURRING INDIVIDUAL'S SUPERVISOR

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Region IV, Division of Reactor Projects

COMMENTS FOR THE NCP REVIEWER TO CONSIDER

See attached.

Additional information and explanation
of the issues discussed in this non-concurrence
can be found in ADAMS ML12284A066

CONTINUED IN SECTION D

SIGNATURE
CFO'Keefe

DATE
2/8/12

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Comments:

Dr. Peck has thoroughly researched these issues. The actual facts are not in dispute. Some of the information he has presented involve some personal conclusions made as a result of connecting diverse documents and various sources of requirements and guidance. Dr. Peck has attempted to address concerns solely using the operability assessment process, but additional process(es) will be needed to be address the whole issue. This issue is an unusual case that required regional management discussions with NRR to determine the correct application of the Part 9900 guidance to inspectors. The first section of the Part 9900 specifically states that this is the way to deal with cases where the guidance may not be directly applicable. It is important to note that the Part 9900 document is guidance to the NRC staff, not a regulation.

While this concern has overtones of safety, the actual questions are procedural. In order to categorically show that there are no safety problems, a full and complete operability evaluation is ultimately needed. However, the generic process for performing an operability evaluation requires a clear current licensing basis that directly relates to the non-conforming condition that is being analyzed. The actual seismic current licensing basis did not provide a way to evaluate new information that becomes available. Therefore, the licensee has proposed a methodology to perform the full operability evaluation to the NRC as a license amendment request, and the staff is evaluating the best way to proceed.

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SECTION C - TO BE COMPLETED BY DOCUMENT SPONSOR

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SUMMARY OF ISSUES

See attached.

ACTIONS TAKEN TO ADDRESS NON-CONCURRENCE

See attached

SIGNATURE--DOCUMENT SPONSOR *[Signature]*

TITLE Chief, Branch B

ORGANIZATION Region IV, DRP

DATE 2/8/12

SIGNATURE--NCP REVIEWER *[Signature]* T. PRUETT

TITLE Deputy Director DRP

ORGANIZATION REGION IV

DATE 2/13/2012

NCP OUTCOME

Non-Concurring Individual: CONCURS NON-CONCURS WITHDRAWS NON-CONCURRENCE (i.e., discontinues process)

AVAILABILITY OF NCP FORM

Non-Concurring Individual: WANTS NCP FORM PUBLIC WANTS NCP FORM NON-PUBLIC

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Summary of Issues:

Dr. Peck concluded that a Pacific Gas and Electric prompt operability determination, addressing new seismic information, failed to meet either the licensee's operability or the NRC inspection procedure requirements. As a result, the licensee has not provided an adequate basis to conclude that all seismically qualified structures, systems, and components, are capable of performing as described in the current licensing bases. Dr. Peck recommended that the NRC include a violation in Inspection report 05000275/2011005; 05000323/2011005 associated with the failure of the licensee to follow their operability determination procedure.

Dr. Peck believes that the Pacific Gas and Electric operability procedure and the NRC inspection guidance establish that licensees are expected to demonstrate that a reasonable assurance of equipment capability exist, at any point in time, to conclude that equipment is operable and that these evaluations are performed using the current licensing bases.

Actions Taken to Address Non-concurrence:

Regional management has reviewed and discussed these issues and the associated documents over a period of months. The Director and Deputy Director of DRP, as well as the new and previous branch chiefs for Diablo Canyon, have had numerous discussions with Dr. Peck on these specific concerns. The facts are well-understood. However, the regulatory path forward must be determined through discussions between regional management and NRR. Several discussions have already occurred. The complete operability evaluation that Dr. Peck wants cannot be made by the licensee without the NRC agreeing on the correct way to perform the evaluation, what calculation method and design values are appropriate for the new data, and what plant capability must be demonstrated by this evaluation.

Region IV held a meeting on January 30, 2012, to address how the Part 9900 operability evaluation guidance applies to this situation with representatives from NRR and RES. This meeting resulted in full agreement on the following statements:

- The ground motion data and the calculation method, including damping values, are correlated parameters. They must be based on the same assumptions for the calculation to have validity.
- It is appropriate for the licensee to use the available new ground motion data in the Hosgri Earthquake analysis because the new ground motion data is consistent with that evaluation.
- The NRC will not ask the licensee to use the new ground motion input data in the Design Earthquake or the Double Design Earthquake evaluations because the new ground

motion data does not match the assumptions in those analyses. Attempting to do so would create a numerical result that is not technically justified.

- The licensee's use of the Hosgri Earthquake as an immediate operability assessment method was consistent with the Part 9900 guidance for use of alternative evaluation methods. This immediate operability assessment was appropriate per the Part 9900 guidance, and is an adequate basis to conclude that there is reasonable assurance of operability. The NRC approved the Hosgri Earthquake analysis with the knowledge that the new (at the time) Hosgri seismic information was not able to be used in the Design and Double Design Earthquake analyses.
- It is also appropriate for the licensee to seek NRC approval of the method to perform the more detailed assessment of operability compared to the Design Earthquake and Double Design Earthquake consistent with the prompt operability assessment specified in the Part 9900 guidance.
- The plant continues to be operated safely, including consideration for the new seismic data.

The action proposed by Dr. Peck to take enforcement action at this time is not appropriate based on the discussion above. Procedure OM7 ID12, "Operability Determination," Revision 22 was reviewed in the places indicated by Dr. Peck as potentially involving a violation. No violation of the station procedure was noted during this review, since his conclusion that a violation existed was predicated on first agreeing with his conclusion that the licensee had not sufficiently demonstrated an initial basis for operability, which is contrary to the staff position.

The inspection report wording has been changed to modify the following sentence to which Dr. Peck objected:

"The inspectors concluded that the revised operability determination provided an initial basis for concluding a reasonable assurance that plant equipment would withstand the potential effect of the new vibratory ground motion."

will be revised to state:

"The staff concluded that the revised operability determination provided an initial basis for concluding a reasonable assurance that plant equipment would withstand the potential effect of the new vibratory ground motion."

With this modification, the report will issue a violation for failure to perform an operability evaluation between June and October, 2011, and will state that the licensee has submitted a license amendment to address this issue.