March 16, 2016

MEMORANDUM TO: Robert J. Pascarelli, Chief
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Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Siva P. Lingam, Project Manager ***/RA/***
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SUBJECT: LTR-15-0337-1 - DIABLO CANYON POWER PLANT, UNITS 1 AND 2 – CLOSURE OF BULLARD HIGH SCHOOL STUDENTS LETTER THAT WAS ANALYZED UNDER 10 CFR 2.206 PETITION (CAC NOS. MF6515 AND MF6516)

This memorandum documents the closure of the issues raised in the letter postmarked June 3, 2015, and mailed to the U.S. Nuclear Regulatory Commission's (NRC's) Chairman Stephen G. Burns requesting the closure of Diablo Canyon Power Plant (DCPP) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15173A371) from Bullard High School students (BHSS). This letter was ticketed by the Office of the Executive Director for Operations to the Office of Nuclear Reactor Regulation for appropriate action. The BHSS letter requested the closure of DCPP, therefore, the Petition Review Board (PRB) processed it under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 2, "Agency Rules of Practice and Procedures," 2.206, "Requests for Action under This Subpart." The lead author of the letter was Ms. Claire Malley, but it was signed by numerous students. Ms. Malley was a high school senior at the time the letter was drafted, but she is now a college student.

The PRB was unable to contact Ms. Malley as she had graduated from Bullard High School (BHS). However, Ms. Malley's letter provided a return address care of Ms. Erin Adams, a teacher at BHS. Therefore, the petition manager (PM) sent an e-mail to Ms. Adams on August 10, 2015 (ADAMS Accession No. ML15226A226), acknowledging the BHSS letter as a 10 CFR 2.206 petition. This e-mail included NRC Management Directive 8.11, "Review Process for 10 CFR 2.206 Petitions" as an attachment. Furthermore, the PM's e-mail provided Ms. Adams and BHSS the opportunity to address the PRB.

Ms. Adams did not respond to the August e-mail. Thus, in line with the PRB's advice, the PM sent a follow-up e-mail to Ms. Adams on September 15, 2015 (ADAMS Accession No. ML15258A171). The PRB advised the PM to send the second e-mail because the first was sent over the summer when BHS was out of session. Ms. Adams did not respond to the first or second e-mail.

Since contacting Ms. Adams was not a viable path to acquiring Ms. Malley's contact information, the PRB decided to contact the BHS principal, Mr. Carlos Castillo. The PRB sent an e-mail to

the principal and contacted him by telephone on October 22, 2015. The principal replied on October 23, 2015, by providing Ms. Malley's contact information and requesting that the PRB contact Ms. Malley directly. On November 23, 2015, Mr. Tim McGinty, the PRB Chair, and Ms. Maggie Watford, NRC project manager, called Ms. Malley's cell phone number. Ms. Malley did not answer, so they left her a voice mail message requesting that she return the call by December 4, 2015. They also advised Ms. Malley that the petition would be closed if they did not hear from her by the requested date. Ms. Malley never responded to the voice mail. As a result, the PRB Chairman decided to close this petition by providing an evaluation of the BHSS's concerns through an inter-office memorandum to the file from the PM. Furthermore, the PRB concluded that there are no safety concerns raised by BHSS, which would impact the continued operation of DCPP.

BHSS Concern 1

DCPP is a health risk to the surrounding community and a potential catastrophe waiting to happen because of the [seismic] fault lines.

PRB Response

The NRC is the Federal agency that regulates the commercial use of nuclear material in the United States. As part of its mission, the NRC ensures that commercial nuclear reactors are operated in a manner that protects public health and safety. The agency regulates the two DCPP reactors that are located on the shore of the Pacific Ocean in San Luis Obispo County, CA. The effect of earthquakes (actual and potential) on those nuclear reactors has been extensively evaluated during the construction, licensing, and operation of DCPP. The results of these evaluations have concluded that DCPP and its major components are designed to withstand and perform their safety functions during and after a major seismic event, thereby ensuring public health and safety.

Nuclear power plants such as DCPP are massive structures with thick exterior walls and interior barriers of reinforced concrete, and they are among the most hardened commercial structures in the country. The NRC requires that these facilities be designed with a defense-in-depth philosophy to withstand dynamic events such as earthquakes, tornadoes, hurricanes, fires, and floods. These requirements resulted in nuclear power plant designs that inherently afford a strong measure of protection against severe earthquakes.

To date, all the potential earthquake faults in the vicinity of DCPP were evaluated by Pacific Gas and Electric Company (PG&E, the licensee). The NRC staff's independent evaluation concluded that DCPP is safe to operate without causing any harm to the public health and safety.

In response to the NRC's request for information from all U.S. nuclear power plants to reevaluate plant-specific seismic hazards in response to Near-Term Task Force (NTTF) Recommendation 2.1 (seismic evaluation) and NTTF Recommendation 2.3 (seismic walkdown) (ADAMS Accession No. ML12053A340), PG&E submitted its seismic hazard evaluation per NTTF 2.1 on March 11, 2015 (ADAMS Accession No. ML15071A046), and concluded that an expedited seismic evaluation was not required because the reevaluated hazard is bounded by the facility's design basis. The NRC agreed with this conclusion by issuing an interim evaluation

on July 14, 2015 (ADAMS Accession No. ML15173A428). On December 21, 2015 (ADAMS Accession No. ML15362A569), PG&E submitted the updated version of its March 11, 2015, submittal, responding to and incorporating NRC requests for additional information (RAIs). PG&E concluded that the updated ground motion response spectrum (GMRS) remains bounded by the long-term seismic program (LTSP) margin spectrum. PG&E is expected to complete a seismic risk evaluation by the fourth quarter of 2017 for NRC review.

On October 1, 2015, California Governor Jerry Brown signed into law a bill (Assembly Bill No. 361) that will continue operation of two key DCPP safety oversight bodies until the plant's two operating licenses expire in 2025. Assembly Bill No. 361 also authorizes the continued operation of a State panel of seismic hazard specialists, called the Independent Peer Review Panel (IPRP), founded by the State Public Utilities Commission in 2010. The IPRP oversees PG&E's studies of the earthquake hazard facing DCPP. County Supervisor Bruce Gibson is one of the IPRP's members. However, the NRC's continuous, independent Reactor Oversight Process inspection program ensures that DCPP is currently operating safely and will continue to do so.

BHSS Concern 2

The Rancho Seco Power Plant in Sacramento was closed in 1989 due to a public vote, and in a study co-authored by Janette Sherman, a professor at Western Michigan University, in the 20 years after the closure of the plant, a significant drop occurred in all cancers around the Sacramento area. Most of the reductions were in thyroid and breast cancers, the most commonly occurring cancers in survivors of the nuclear bomb attacks in Japan. This is only one of the multitudes of studies that have proven that the surrounding community is exposed to a dangerous health risk, and a report done by the World Business Academy (WBA) establishes similar results in the vicinity of DCPP (15 mile radius).

PRB Response

The NRC regulations in 10 CFR Part 20 direct licensees to maintain exposure to radiation "as low as reasonably achievable," commonly known as ALARA, for every person working in the nuclear industry, and for every member of the general public (though the maximum dose limits for those who work in the industry are higher than the maximum dose limits for members of the general public). The regulatory limits established by the NRC relative to public exposure to radiological effluents are maintained at levels that are a fraction of the background radiation exposure people receive from the normal environmental conditions. Each nuclear power plant annually submits radiological effluent and radiological environmental monitoring reports to the NRC, both of which are publicly available on the NRC's Web site at http://www.nrc.gov/reactors/.

The NRC periodically inspects the licensees' radiological effluent and environmental programs, including these reports, in part, to achieve the following:

- Ensure that the gaseous and liquid effluent processing systems are maintained so that radiological discharges are properly mitigated, monitored, and evaluated with regard to public exposure.

- Verify the adequacy of public dose calculations and projections resulting from radioactive effluent discharges.

- Verify that the radiological environmental monitoring program quantifies the impact of radioactive gaseous and liquid effluent release program. These inspection reports are also publicly available on the NRC's Web site at http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html.

In inspecting these annual reports and supporting calculations, the NRC has continually noted that the maximum dose from radiological effluents from nuclear power plants, including DCPP, are a small fraction (e.g., less than 1/100th of 1 percent) of the regulatory limits set by the NRC and, therefore, the licensees are meeting the ALARA principle.

The NRC has not specifically reviewed the WBA report authored by Joseph Mangano, MPH, MBA, published on March 3, 2014, on the health status of residents in San Luis Obispo and Santa Barbara Counties living near DCPP. However, the San Luis Obispo County Public Health Department (SLOCPHD), with input from State and Santa Barbara County epidemiologists, undertook a detailed review of the study to confirm or refute its conclusions that Federally-permitted emissions of radioactivity from DCPP pose a health risk to the public, especially to people living near DCPP. After thorough review of the WBA report and the methods used in it, SLOCPHD concluded, with a focus of health outcomes from DCPP emissions, that none of the claims in the WBA report could be validated. The SLOCHPD report further concluded that there are substantial and obvious problems in the methodology wherein basic statistical precepts were overlooked, and the WBA report shows selection bias in choosing case and control groups. SLOCPHD concluded that the major findings in the WBA report are erroneous or not substantiated by proper scientific methods.

Based on the above, the NRC concludes that there are no public health and safety issues from the operation of DCPP.

BHSS Concern 3

Diablo Canyon sits in close proximity to the Shoreline, Los Osos, San Luis Bay, and Hosgri faults, and research conducted by PG&E, the owners of the plant, in 2011, discovered that the nearby faults are capable of making more motion than accounted in the design. In addition, in 2008, PG&E replaced the plant's steam generator[s] and reactor vessel heads without assessing that the replacements could withstand a major earthquake, losing power, and a loss of cooling water simultaneously. The two events were evaluated separately instead of together, and this calls for concern because the Fukushima meltdown was caused by a tsunami knocking out power systems, leading to a loss of cooling water.

PRB Response

DCPP safety-related structures, systems, and components were designed against a design earthquake and a double-design earthquake. DCPP was also evaluated for the special case of the Hosgri earthquake during the licensing phase of the plant. In part because of the unique aspects of the Hosgri report during the licensing phase, the NRC required PG&E to establish the LTSP to reevaluate its seismic evaluation every 10 years or as required or demanded. In

2009, when the new Shoreline fault was discovered after NRC issued the operating license, PG&E evaluated the Shoreline fault in accordance with the LTSP. PG&E found that the ground motion from an earthquake on the Hosgri fault bounded those motions anticipated from the Shoreline fault. After performing an extensive independent evaluation of the Shoreline fault, the NRC concurred with PG&E's evaluation.

In response to the NRC's request for information from all U.S. nuclear power plants to reevaluate plant-specific seismic hazards in response to NTTF Recommendations 2.1 (seismic evaluation) and 2.3 (seismic walkdown), PG&E submitted its seismic hazard evaluation per NTTF 2.1 on March 11, 2015, and concluded that expedited seismic evaluation was not required. The NRC agreed with this conclusion by issuing its interim evaluation on July 14, 2015. On December 21, 2015, PG&E submitted an updated version of its March 11, 2015, submittal, responding to and incorporating NRC RAIs. PG&E concluded that the updated GMRS remains bounded by the LTSP margin spectrum. PG&E has committed to complete its seismic risk evaluation by fourth quarter of 2017 for NRC review.

The design-basis tsunami for DCPP considers distantly-operated tsunamis and locally-operated tsunamis. The design-basis tsunami is the greater of these tsunamis and 34.6 feet. Additionally, DCPP sits atop a coastal bluff, 85 feet above sea level, decreasing its vulnerability to a tsunami hazard. DCPP's ability to withstand large waves and the maximum wave height at the intake structure were determined through extensive and detailed scaled model wave testing. The only safety-related components within the projected sea wave zone (auxiliary saltwater system) are protected from tsunami effects.

In response to the NRC's request for information from all U.S. nuclear power plants to reevaluate plant-specific flooding hazards including tsunami threat in response to NTTF Recommendation 2.1 (flooding evaluation), PG&E submitted its flooding hazard evaluation reports per NTTF 2.1 on March 11, 2015, and February 8, 2016 (ADAMS Accession Nos. ML15071A045 and ML16040A009, respectively). The NRC staff is currently reviewing the DCPP flooding evaluation reports, and will take appropriate measures if required.

Before installation, the licensee evaluated the steam generators and reactor vessel heads for double-design earthquake loads with simultaneous loss-of-coolant accident (LOCA) loads rather than the higher Hosgri seismic loads combined with LOCA loads. Subsequent to the replacement activities, the licensee self-identified their error and conducted an operability assessment and bounding calculations with the correct Hosgri plus LOCA loading combinations. Through this assessment, the licensee determined that the steam generators and reactor vessel heads met the applicable seismic criteria. The NRC staff subsequently inspected the licensee's operability assessment. As a result of this inspection, the NRC issued a design control violation because the licensee initially failed to apply the correct seismic loads associated with replacement activities. But the licensee did take appropriate corrective actions through its operability assessment.

DCPP is taking all actions required by the NRC as a result of the Fukushima accident. Some of the actions include adopting mitigating strategies (ADAMS Accession No. ML16005A638) and keeping accessible portable diesel generators at the site.

Based on the above, DCPP has been designed for safe operation under the conditions postulated in the concern.

BHSS Concern 4

This subject is very personal to me because my parents and family lived near the nuclear accident of Chernobyl. My parents lived in the town of Vinnitsa, located 200 miles from the site of Chernobyl. Thankfully no one in my family was directly affected, but friends and neighbors were affected, because my mother had a summer home up in that region. I understand that the catastrophe at Chernobyl cannot be replicated at DCPP, but preventing similar disasters to Fukushima can save American lives and huge expenses for the future disaster.

PRB Response

The Chernobyl accident happened because of a violation of the test procedures by the plant operators along with many fundamental problems in the design of the plant. The test focused on the switching sequences of the electrical supplies for the reactor. The test procedure was to begin with an automatic emergency shutdown. No detrimental effect on the safety of the reactor was anticipated, so the test program was not formally coordinated with either the chief designer of the reactor or the scientific manager. Instead, it was approved only by the director of the plant (and even this approval was not consistent with established procedures). According to the test, the thermal output of the reactor should have been *no lower* than 700 megawatts at the start of the experiment. If test conditions had been as planned, the procedure would almost certainly have been carried out safely; the eventual disaster resulted from attempts to boost the reactor output once the experiment had been started, which was inconsistent with approved procedure.

The NRC has no jurisdiction to regulate nuclear power plants located outside the United States that are designed, constructed, and operated by other countries. However, the NRC continues to play a key role in applying lessons learned from incidents and accidents worldwide in formulating uniform regulations that ensure public health and safety through the International Atomic Energy Agency for all nuclear plants outside the United States.

The NRC made sure that all the lessons-learned from the Three Mile Island accident, Chernobyl, and September 11, 2001, were considered for safe operation of U.S. nuclear power plants. The required modifications resulting from these lessons-learned were implemented at all the U.S. nuclear power plants including DCPP. In addition, Fukushima concerns have been or will be considered, and the associated modifications have been or will be implemented at DCPP as well as throughout the nuclear industry.

Summary

Based on the responses above, the PRB concluded that DCPP is safe to operate. All actions on this petition are closed.

Docket Nos. 50-275 and 50-323

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Docket Nos. 50-275 and 50-323

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ADAMS Accession Nos.: Pkg: ML15173A372; Response: ML16029A232 *by e-mail

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