Prepared for

PG&E

and the
State Water Resources Control Board
Nuclear Review Committee

Independent Third-Party Interim Technical Assessment

for the

Variable Speed Cooling Water Pumping Systems for Diablo Canyon Power Plant

Prepared by BECHTEL Bechtel Power Corporation

Report No. 25762-000-30R-G01G-00001 Rev. 0

July 10, 2012

Independent Third-Party Interim Technical Assessment

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Prepared by:

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Revision	Date	Affected Sections
0	July 10, 2012	Initial Issue

Contents

List of Abbreviations and Acronyms

APCD	Air Pollution Control District
BLM	Bureau of Land Management
Caltrans	California Department of Transportation
CCRWQCB	Central Coast Regional Water Quality Control Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utility Commission
DCPP	Diablo Canyon Power Plant
EPCRA	Emergency Planning and Community Right-To-Know Act
EPRI	Electric Power Research Institute
FAA	Federal Aviation Administration
fps	feet per second
IS	Initial Study
mgd	million gallons per day
MND	Mitigated Negative Declaration
ND	Negative Declaration
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
OHP	Office of Historic Preservation
PGE	Pacific Gas and Electric Company
RC	Resource Commission
RCRA	Resource Conservation Recovery Act
RWQCB	Regional Water Quality Control Board
SCE	Southern California Edison
SONGS	San Onofre Nuclear Generating Station
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WDR	Waste Discharge Requirements

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1. Executive Summary

This study summarizes the findings of the first phase of a detailed evaluation to assess viability of the variable speed pump technology cooling system option to once-through cooling for the Diablo Canyon Nuclear Power Plant (DCPP), which supports the Nuclear Review Committee's initiative to identify strategies to implement the California State Water Resources Control Board (SWRCB) statewide policy on the *Use of Coast and Estuarine Waters for Power Plant Cooling*, that is, strategies that comply with the Section 316b California Once-Through-Cooling Phase II rules.

This initial assessment focuses on two primary factors—the required cooling water withdrawal rates and the cooling water intake temperature. DCPP is a base-loaded power plant, which is designed to operate at full capacity, except during periods of maintenance, repair and refueling. Some marine resource benefits could be realized by reducing load generation (and ocean water withdrawal rates) during off-peak seasons when power demand is lower. However, it is not expected that the off-peak season load reduction and the corresponding reduction in entrainment loss and impingement mortality from variable speed pump operation alone will reach a level commensurate with that of a closed-cycle wet cooling system.

Criterion	Status
External Approval and Permitting	No fatal flaws
Impingement/Entrainment Design	Cannot satisfy 316B California Once-Through Cooling Policy Criteria Phase II Track I requirements.
Environmental Offsets	Weak overall net positive benefit
First-of-Kind-to-Scale	Not conducted
Operability of General Site Conditions	Not conducted
Seismic and Tsunami Issues	Not conducted
Structure and Construction	Not conducted
Maintenance	Not conducted
Conclusion	**Technology is not a candidate for Phase II review**

In addition to these factors, external approval and permit assessment and environmental offset assessment were also conducted for variable speed pump technology. The external approval and permitting assessment identified a rather short list of potentially applicable federal, state, and local permits and approvals that, not unexpectedly, failed to produce a fatal flaw or any lengthy review and approval processes. The environmental offset evaluations offered evidence this technology option is a largely benign technology that may offer a weak net-positive environmental benefit.

The clear conclusions regarding the expected marginal reductions of impingement and entrainment impacts from this technology preclude the need to evaluate other criteria because, to meet the through-screen velocity target of 0.5 fps, the cooling water flow would have to be reduced by 75 percent or more. This severe flow

reduction would render the circulating water pumps inoperable due to the current practical limit of 15 to 30 percent flow reduction achievable with the variable speed pump technology. Finally, an EPRI study (EPRI 2007) concludes that such reduction in load may have significant impacts to the electric generation supply to the grid when most needed.

Thus, the variable speed pump technology, when employed solely as the best technology available, cannot satisfy the requirements of the 316(b) California Once-Through Cooling Policy Phase II rules in a meaningful way. Consequently, this cooling system technology option is not offered as a candidate for further investigation in Phase II of this study.

2. Background and Introduction

2.1 Purpose/Scope of Study

This study is performed in accordance with the requirement established by the SWRCB for Pacific Gas & Electric (PG&E) to conduct a detailed evaluation to assess compliance alternatives to once-through cooling for the DCPP. This requirement is associated with the California statewide policy on the *Use of Coast and Estuarine Waters for Power Plant Cooling*, which established uniform, technology-based standards to implement the Clean Water Act (CWA) Section 316(b) that mandates that location, design, construction, and capacity of the cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts.

This report describes the detailed evaluation of the variable speed pump technology for DCPP based on the list of site-specific criteria approved by the Nuclear Review Committee. The evaluation process includes critical review of published data and literature, consultation with permitting agencies and technical assessment supported by engineering experience and judgment. No new field data was collected as part of this effort. The results of the evaluation are used to characterize the feasibility of this technology and its possible selection as a candidate for further investigation in a follow-on phase of this study.

2.2 Regulatory History

2.2.1 Federal

The U.S. Environmental Protection Agency (USEPA) has proposed standards to meet its obligations under Section 316(b) of the Clean Water Act to issue cooling water intake safeguards. More specifically, this section requires that National Pollutant Discharge Elimination System (NPDES) permits for facilities with cooling water intake structures ensure that the location, design, construction, and capacity of the structures reflect the best technology available to minimize the harmful impacts on the environment. These impacts are associated with the significant withdrawal of cooling water by industrial facilities, which removes from or otherwise impacts significant quantities of aquatic organisms in the waters of the United States. Most of the impacts are to early-life stages of fish and shellfish through impingement and entrainment. Impingement occurs when fish and other aquatic life are trapped against the screens when cooling water is withdrawn, resulting in injury and often death. Entrainment occurs when these organisms are drawn into the facility where they are exposed to high temperatures and pressures—again resulting in injury and death. (USEPA, 2011)

In response to a consent decree with environmental organizations, the USEPA divided the Section 316(b) rules into three phases. Most new facilities (including power plants) are addressed in the Phase I rules, initially promulgated in December 2001. Existing power plants are subsequently addressed, along with other industrial facilities, in the Phase II version of the rules, issued in February 2004. Since then, the rules have

been challenged, remanded, suspended, and reproposed. The current proposed version of the rule (April 20, 2011) dictates that all existing facilities that withdraw more than 2 million gallons per day (mgd) of water from waters of the U.S. and use at least 25 percent of the water they withdraw exclusively for cooling purposes would be subject to:

- Upper limit on the number of fish killed because of impingement and determining the technology necessary to comply with this limit or
- Reducing the intake velocity to 0.5 feet per second (fps) (through-screen) or below, which would allow most fish to avoid impingement

Large power plants (with actual intake flow of 125 mgd or greater) would also be required to conduct studies to help their local permitting authorities (SWRCB) to determine site-specific best technology available for entrainment mortality controls. Note that this version abandoned the original performance standards approach, which mandated the calculation of a baseline against which reduction in entrainment and impingement can be measured.

The Section 316(b) Phase II final rule is expected to be issued July 27, 2012. When the final rule becomes effective, it is likely to include an implementation timeline that would require the implementation of technologies to the impingement requirements within 8 years (2020).

2.2.2 State

The SWRCB is responsible for ensuring compliance with the finalized Section 316(b) rules in California, and it has been actively pursuing a parallel path regulatory program that is focused on the state's coastal generating stations with once-through cooling systems, including DCPP. The SWRCB's Once-Through Cooling Policy became effective October 2, 2010. This policy established statewide technology-based requirements to significantly reduce the adverse impacts to aquatic life from once-through cooling. Closed-cycle wet cooling has been selected as the best technology available.

Affected facilities, including DCPP, are expected to:

- Reduce intake flow to a level commensurate with that attainable with a closed-cycle wet cooling system and reduce through-screen velocity to 0.5 fps or below—Track 1, or
- Reduce impacts to aquatic life comparably by other means—Track 2

This policy is being implemented through an "adaptive management strategy," which is intended to achieve compliance with the policy standards without disrupting the critical needs of the state's electrical generation and transmission system. A Nuclear Review Committee was later established to oversee the studies, which will investigate the ability, alternatives, and costs for both SONGS and DCPP to meet the policy requirements. This study is a direct outgrowth of the adaptive management strategy to implement this Once-Through Cooling Policy (Bishop, 2011).

2.2.3 Current Cooling Water Intake System and Section 316(b) Compliance History – DCPP

DCPP operates a common cooling water intake system to provide cooling water to the once-through cooling systems of Units 1 and 2. Each unit's water withdrawal rate is approximately 867,000 gpm or 1,248 mgd. Cooling water is withdrawn through a shoreline intake structure in a cove partially protected with man-made

breakwaters. The inlet structure includes a set of inclined bar racks and traveling screens. A concrete curtain wall extends 7.75 feet below mean sea level to keep out floating debris. Incoming cooling water for the normal circulating water system travels to one of four separate screen bays (two per unit). Each screen bay is fitted with three rotating vertical traveling screen assemblies with 3/8-inch stainless steel mesh panels. The through-screen velocity is approximately 1.95 cfs. A high-pressure spray wash removes any debris or fish that have become impinged on the screen face into a sump that leads back to the intake cove (Tetra Tech 2009). In addition, each unit has two auxiliary saltwater trains (one duty and one standby) that perform safety-related functions and each train is served with one auxiliary saltwater pump, rated at 11,000 gpm (DCPP, 2009). The auxiliary saltwater pumps for each unit are housed in separate pump bays located near the center of the intake structure, and are serviced by a common 5-foot wide traveling water screen.

Because of the high flow rate of the once-through cooling water system and intake velocity that exceeds 0.5 fps, the current DCPP cooling water intake structure arrangement is considered to be ineffective at reducing impingement mortality and entrainment losses. Consequently, this matter has been the subject of a number of Coastal Commission Regional Water Quality Control Board initiatives that have increasingly focused on the mitigation of impingement and entrainment impacts via the application of potentially viable alternative cooling system technologies.

2.3 Screening Process (A/B Criteria)

The technology screening process for the Phase I portion of the evaluation will be performed using a two-tier criteria (Criteria Set A/B) approach that achieves a technically comprehensive assessment while minimizing the time and effort required. The screening will be performed initially for Set A criteria. If the technology satisfies all of the Set A criteria, it will be evaluated using the Set B criteria.

Set A includes the following criteria that are critical to the screening process:

- External approval and permitting (nonnuclear licensing)
- Impingement/entrainment design
- Offsetting of environmental impacts

All remaining criteria are grouped into Set B criteria, which are the following:

- First-of-a-kind to scale
- Operability of general site conditions
- Seismic and tsunami issues
- Structure
- Construction
- Maintenance

During the screening process, if any criterion cannot be met, the screening process is suspended and a summary report for that technology is then prepared.

3. Technology Description

A variable frequency drive or variable speed pump allows the pump to adjust its speed such that the intake system can operate over a range of water withdrawal rates. The need to vary withdrawal flow typically occurs in response to reduced demands on generation load or to match the optimal cooling water flow rate that is required for the system to operate efficiently within its thermal limits. Depending on the intake water tem-

perature, condenser efficiency/back pressure, and power output, the required circulating flow rate may vary for different seasons of the year, particularly between winter/spring and summer. The intake system and the rated flow of the cooling water pumps are typically designed for peak load and summer month conditions. During winter/spring and other off-peak months, the intake cooling water temperature tends to be lower than the design condition, and there will be less demand on the generation load. As a result, the cooling water flow demand will be lower. A variable frequency drive or variable speed pump system has the ability to match the seasonal variation in the cooling water flow demand instead of requiring the system to be pumping constantly at or near the design flow year round.

Currently, both DCPP Units 1 and 2 are base-load units and do not vary load on a daily basis. To determine the ability of variable speed pump technology to reduce impingement mortality and entrainment loss, in compliance with the 316(b) California Once-Through Cooling Policy Phase II rules, one needs to recognize that the range of flow reduction most current large-capacity variable speed pumps can achieve is on the order of 15 to 30 percent.

According to published studies on the subject, a proportional relationship between reduction of flow and reduction of entrainment exists for a specific withdrawal location, that is, the percent of flow reduction approximates the percent of entrainment reduction. The potential of intake flow reduction with the use of variable speed cooling water pumps at DCPP, therefore, implies a similar improvement on entrainment loss. The correlation with impingement mortality is not as well defined as impingement reduction, which is related to the decreased number of organisms potentially coming into contact with the components (such as the screens) of intake structure or related to the reduced withdrawal rate and the associated decreased impingement velocity. For this evaluation, a proportional reduction of impingement mortality and flow reduction is assumed.

Implementation of this technology would not involve any change to the auxiliary saltwater pumps and associated intake bays. There would be no impact to the safe operation of auxiliary saltwater pumps.

4. Criterion Evaluation

4.1 External Approval and Permitting

4.1.1 General Discussion

The external approval and permitting assessment focused on identifying the applicable (required) permits and approvals for construction and operation of a variable speed cooling water pumping system.

The initial assessment effort focused on developing a comprehensive list of potentially applicable permits and approvals at the federal, California, county, and municipal level (as applicable). This applicability of each permit/approval to the proposed variable speed pump option was evaluated. Those permits and approvals that were deemed applicable were subsequently scrutinized to characterize the expected duration and complexity of the regulatory review process. Special attention was directed to identifying environmental impact issues or criteria that would preclude the applicable permit or approval from ever being issued or granted. That is, the focus was to screen each applicable permit or approval for fatal flaws in the associated regulatory review process that would preclude the variable speed cooling water pumping system from further consideration.

The assessment also focused on identifying the critical path (longest duration) initial preconstruction permitting processes, that is, those that support site mobilization, physical site access, initial earthwork/foundations

for each closed-cooling system option. The duration of the permitting and the approval process, while not a definitive fatal flaw, could later serve as a screening tool if combined with specific schedule limitations.

Permits and approvals that support later stages of construction and operation that are not critical path to the start of construction were also included in the assessment since these items could pose significant operational constraints to future DCPP operations.

4.1.2 Detailed evaluation

This summary list of permits provided the basis for subsequent discussions with key relevant regulatory authorities regarding the applicable permit application needs and the permit review time frames. These discussions were also critical for the identification of potential regulatory or permit-related barriers to implementation—fatal flaws.

The following regulatory authorities were contacted:

- U.S. Army Corps of Engineers (USACE)
- California Public Utility Commission (CPUC)
- California Coastal Commission
- California State Lands Commission
- State Water Resources Control Board (SWRCB)
- Central Coast Regional Water Quality Control Board
- San Luis Obispo Air Pollution Control District
- San Luis Obispo County

The following sections describe the relevant key permitting/approval processes for the variable speed cooling water pump technology and summarize these findings in Table 1, which lists the applicable permits and approvals, determines the critical path review processes and, most importantly, highlights those processes that may be fatally flawed.

4.1.2.1 Variable Speed Cooling Water Pumping System

The variable speed pumping system will be designed to automatically adjust to seasonal flow demand variations and other influences to meet plant needs. The construction efforts to install the variable speed pumping system will be limited. This effort will not involve additional permanent or temporary land use, since the construction efforts will be confined to areas internal to the existing buildings and in other developed areas of the DCPP facility. There will be no additional temporary or permanent structures associated with this cooling system technology. The associated construction work force will use DCPP existing parking and delivery facilities. The existing offshore saltwater intake system will be used without modification, so there is no marine work envisioned for the variable speed cooling water pumping system.

U.S. Army Corps of Engineers

The USACE is the lead agency for Clean Water Act Section 404 and Section 10 permitting processes, which are focused primary on impacts to waters of the United States and waterborne navigation. The variable speed cooling water pump system is not expected to pose any construction impacts to USACE jurisdictional waters.

Consequently, this option is not expected to demand the Corps general permit program (Nationwide Permit) or the more complex individual Section 404/10 permit. The potentially lengthy permit review process associated with the individual form of the permit is not a concern (Lambert, 2012).

California Public Utility Commission

PG&E's DCPP is regulated by the California Public Utility Commission (CPUC), which is charged with overseeing investor-owned public utilities. San Luis Obispo County may share the role of Lead Agency for the California Environmental Quality Act (CEQA) review process with the CPUC. CEQA is a regulatory statute, which requires state or local regulatory agencies to identify, assess, avoid or otherwise mitigate the significant environmental impacts from the proposed action—the addition of new cooling system technology.

The proposed variable speed cooling system pump will probably not trigger preparation of Environmental Impact Report. Instead, the CEQA review process will follow the abbreviated process, which could include development of an *Initial Study* (IS). This will be followed either by a *Negative Declaration* (ND), which is indicative of no adverse environmental impacts or by a *Mitigated Negative Declaration* (MND) that follows mitigation of relatively minor negative impacts. This decision, along with other financial information, would ultimately support the process to determine if PG&E can recover the costs associated with this cooling system technology.

While the CPUC-sponsored environmental review process will be mostly a perfunctory affair, the follow-on decision process regarding cost recovery will be more involved and potentially contentious. Consequently, there are no clear environmental barriers that preclude completion of the CEQA review.

California Coastal Commission

The California Coastal Commission has a broad mandate to protect the coast resources of California, which includes the entire DCPP facility. Consequently, the Commission's environmental concerns address a broad range of subject matter including visual resources, land and marine-based biological resources, land use and socioeconomic concerns (e.g., recreational use/access). Despite this comprehensive focus, the Commission has little in the way of specific, objective criteria that could be used to effectively screen any of the cooling technology options from further consideration.

The California Coastal Commission representatives (Detmer & Luster, 2012) indicated that the Commission recognized there were no great options to the existing once-through cooling system at DCPP. Indeed, it was indicated that almost all of the cooling system technology replacement options present some sort of negative impacts. Given that basis, the Commission may consider options that may present additional onshore impacts to help mitigate the offshore environmental consequences of the existing once-through cooling. The Commission mandate to protect the coastal resources offers this agency some latitude to balance one set of impacts versus another. This evaluation process is on a case-by-case basis, which can be translated into the conclusion that there are few triggers that would automatically preclude any of the cooling system options from consideration, including the variable speed cooling water pump system.

The California Coastal Commission indicates that they are concerned about visual impacts in the coastal zone. The variable speed pump system would not alter the existing profile of the DCPP facility and therefore would not offer visual resource concerns.

The pumping system would not involve offshore construction efforts, so the California Coastal Commission concerns regarding the deleterious impacts on marine resources (for example, hard marine substrate, commercial fishing) would not prove to be a decisive or contentious part of their review process.

The California Coastal Commission would view the reduced water withdrawals possible with the variable speed pumping system as wholly positive outcomes given the associated reduction of thermal impacts (lower effluent discharge rate) and parallel reduction of entrainment/impingement impacts. The overall weight of these positives in their balancing of environmental impacts is somewhat reduced by the fact that Commission is not primarily charged with evaluating the cooling system's compliance with California Once-Through Cooling Policy Section 316(b) Phase II criteria or NPDES thermal discharge considerations.

The California Coastal Commission review and approval process is somewhat bound by the California Environmental Quality Act (CEQA) review process. That is, any application for a Coastal Development Permit is dependent on information, which comes out of the California Environmental Quality Act-driven environmental impact report process. Given the expected abbreviated CEQA process for this cooling system, the California Coastal Commission review process will not be a contentious or critical path permitting process.

California State Lands Commission

Construction efforts in subaqueous lands associated any cooling system modifications will be evaluated/approved by the California State Lands Commission. This review and associated lease approval process can follow three different track as shown below:

- **Categorical Exemption** — applicable to those situations where there are no significant environmental impacts and there are no substantive changes in the existing land use.

- **Mitigated Negative Declaration** — applicable for work that poses minor environmental impacts, during noncritical seasons, for a limited period of time.

- **Environmental Impact Report/CEQA Process** — applicable for work that could potentially generate significant environmental impacts, uses heavy construction equipment, and/or will continue over a significant time period (months). This review process is not fast-track and could extend for a year.

The variable speed pump system is not expected to require revisions of the current cooling system infrastructure situated on subaqueous lands. Therefore, concerns from Commission representatives (DeLeon & Oggins, 2012) regarding the slow progress regarding recent lease approval processes for nonnuclear facility with once-through cooling systems may not be applicable. However, this assumes that the current leasing arrangement at DCPP remains in force to support the new variable speed cooling water pump system. Most of the nonnuclear facilities have requested extensions to continue to evaluate available mitigation strategies.

The State Lands Commission evaluates each project individually and determines the appropriate review/approval path. The variable speed cooling water system, at best, will follow the categorical exemption mode if evaluated at all by the Commission. Consequently, the State Lands Commission lease will not represent a significant permitting hurdle for this cooling technology system.

State Water Resources Control Board — Central Coast Regional Water Quality Control Board

While the SWRCB has overall permit authority for California's two active the nuclear power stations, while the Central Coast Regional Water Quality Control Board has the follow-on inspection and enforcement role for the issue permits. For DCPP, the SWRCB expects to modify the existing NPDES permit in support of the proposed variable speed cooling water pump system. The lack of significant disruption to local land surfaces is expected to negate any need for new waste discharge requirements permit for construction impacts to jurisdictional streambed areas and possibly avoid the need to seek coverage under the general storm water permit for construction activity.

The reduced water withdrawal rates associated with this option will occur in response to changes in ambient conditions and regional power demands. Reduced cooling water needs will be associated with a parallel improvement in impingement and entrapment. This variable speed cooling water pump system may require the current DCPP NPDES permit to be revised to address the expected changes to the cooling system discharge quantity and provisions of California Once-Through Cooling Policy Section 316(b) Phase II requirements (reduction of impingement and entrainment impacts to marine resources). There will ostensibly be no changes to the current water treatment system since this option can be characterized as a once-through system with more flexible withdrawal rates.

Both the SWRCB and Central Coast Regional Water Quality Control Board representatives (Jauregui, 2012 and Von Langen, 2012) explained that there are no obvious regulatory barriers regarding issuance of a revised NPDES permit for any of the cooling system options currently under consideration, including the variable speed cooling water pump system. The Central Coast Regional Water Quality Control Board and SWRCB will not necessarily preclude cooling system options from consideration, even if these options fall short of full compliance with the performance criteria tied to Section 316(b) Phase II rules (that is, through-screen velocity less than 0.5 fps and entrainment/impingement levels equivalent that associated with a closed cooling cycle system). The variable speed cooling water pump system entrainment and impingement performance will fall well short of closed cycle attributes.

The SWRCB is ultimately a political body (nine members), interested in reviewing as much information/evidence from the applicant and their own technical staff regarding the feasibility and impacts of various cooling system alternatives. Consequently, none of the SWRCB permits represent a fatal flaw or critical path permitting process to the variable speed cooling water pump system.

San Luis Obispo Air Pollution Control District (APCD)

DCPP is located within the San Luis Obispo Air Pollution Control District, a state-designated non-attainment area for PM-10 and PM-2.5, that is, the District has failed to achieve compliance with the state ambient air quality standards for these pollutants (Willey, 2012). In addition to this air quality compliance issue, there are also local concerns regarding visibility impacts on the nearest visibility sensitive areas, so-called Class I areas that are comprised of national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres), and international parks that were in existence as of August 1977. While these situations may have ramifications for those cooling system options that generate significant particulate emissions (closed cooling cycle systems), air quality permits/approvals are not expected to play an appreciable role for the variable speed cooling water pump system—a system that will not generate any operational additional air emissions.

San Luis Obispo County

While most of the potential cooling systems options for DCPP will likely trigger the need for the San Luis Obispo County Planning and Building Department to initiate a conditional use permit process, which in turn will be wholly dependent on a CEQA review process, there is some question as to whether the replacement of the cooling system pumping system (by itself) will represent a sufficient trigger for the condition use permitting or CEQA process.

The county recently completed a CEQA/conditional use permit review process for the DCPP steam generator replacement project (Hostetter, 2012). The county, along with the Nuclear Review Committee, were designated the "Lead Agencies" for the CEQA review. The CEQA/conditional use permit process for the steam generator replacement project, which involved significant rounds of negotiations, was characterized as complex and lengthy (years long).

While the county (Hostetter, 2012) predicted that any cooling system option with significant potential for environmental impacts would likely trigger a similar complex and lengthy CEQA/conditional use permit review process, the limited construction and operability impacts associated with replacement of essentially an internal pumping system may be viewed differently. While a CPUC-led environmental review process would likely be a somewhat perfunctory affair, the county-driven CEQA/conditional use permit process may be pursued more aggressively to support the evaluation of alternative cooling system options—a key focus for any county-sponsored CEQA and conditional use permit review process.

If the variable-speed cooling system pump does not trigger preparation of an Environmental Impact Report, the county-led CEQA review process will follow the abbreviated process, which could include development of an *Initial Study*, followed either by a *Negative Declaration*, which is indicative of no adverse environmental impacts, or a *Mitigated Negative Declaration*, which follow mitigation of relatively minor negative impacts.

The county indicated (Hostetter, 2012) that is unlikely that they will identify any environmental impact criteria from the CEQA review process that would immediately preclude any of the cooling system alternatives under consideration, including the variable speed cooling water pumping system. The county views the CEQA review process as the mechanism that will ultimately identify the best solution for DCPP – all solutions will be considered.

Other Regulatory Agencies

In addition to the key regulatory agencies described above, there are a number of regulatory agencies that could potentially play a role in the permitting of the various cooling system technology options. The U.S. Fish and Wildlife Service, California Department of Fish and Game, and the California Office of Historic Preservation, for example, often play significant regulatory roles in power plant upgrade projects. The variable speed cooling water pump system, however, entails little or no new land disturbance that would impact sensitive biological or cultural resources.

Installation of the pumping system within an existing DCPP building will not alter the overall profile of the DCPP facility and certainly will not require significantly tall or large construction equipment. These considerations will preclude significant interactions with California Department of Transportation - Caltrans (roadway crossings, encroachments, oversized vehicles) and the Federal Aviation Administration (FAA) whose focus would be limited to aviation obstruction impacts posed by tall new permanent or temporary features greater than 200 feet above ground level).

Finally, the California Energy Commission (CEC) will be largely excluded from the permitting processes primarily because variable cooling water pump systems will not boost currently power levels of the DCPP facility, let along reach the 50 MW threshold, which would mandate CEC review.

4.1.2.2 Summary

The external approval and permitting assessment for the variable speed cooling water pump system identified a rather short list of potentially applicable federal, state, and local permits and approvals. This result was expected given the obvious limited nature of the construction work associated with installing the variable speed pumps and the likewise marginal difference in cooling system operations when compared with current practices.

The only substantive permits or approvals that will potentially apply to this cooling water option are the county-led CEQA process and an amendment to the existing NPDES permit. Both the CEQA review and

NPDES amendment processes are not expected to be contentious or lengthy. While this cooling system option may provide only limited improvements relative to California Once-Through Cooling Policy Section 316(b) Phase II performance expectations for impingement and entrainment, the consistent message from all of the interested regulatory agencies was that there were no environmental impact issues or criteria that would preclude this option from securing the necessary construction and operating permits and approvals. That is, there were no fatal flaws in the associated regulatory review process that would preclude the variable speed cooling water pumping system from further consideration.

The assessment also indicated that the county-sponsored CEQA review process (6–12 months) is forecast to be somewhat longer than the related impacts would dictate because of the county's interest in having a robust alternative cooling system review process. The duration of this critical path process, however, will not represent barriers to development of this cooling technology system.

4.2 Impingement/Entrainment Design

The primary expectation of using the variable frequency drive or variable speed pump is to reduce the cooling water intake structure cooling water flow withdrawal to an acceptable level that will comply with the impingement mortality and entrainment reduction objectives of the 316(b) California Once-Through Cooling Policy Phase II rules. As stated in Section 3, the two main factors that will influence the required cooling water flow are the plant load generation and the intake water temperature. (Raising the temperature rise across the condensers is not considered a viable alternative to reduce cooling water flow rate because of the potential to increase thermal discharge impacts and reduce steam cycle system performance.)

As a base-load plant, DCPP is designed to operate at full capacity, except during maintenance, repair, and refueling. Some benefits of the variable speed pump system may be attained by reducing load generation during off-peak seasons when power demand is lower. However, it is not expected that the off-peak season load reduction and the corresponding reduction in entrainment loss and impingement mortality, attainable with the use of variable speed pumps alone, will reach a level commensurate with that of a closed-cycle wet cooling system. For instance, assuming conservatively that the off-peak season lasts 6 to 8 months of the year, and generation load and the corresponding cooling water flow could be reduced by 30 percent, and understanding the current practical limit of large capacity variable speed circulating water pumps, the annual withdrawal volume and associated impingement mortality and entrainment loss would be 15 to 20 percent. Further, according to a TENERA field study from late 1996 to mid-1998 (TENERA, 2000), the density of some of the 16 larval fish taxa collected at the DCPP intake was typically higher in late winter and spring months, but there are other species, such as snailfishes, sanddads, speckled sanddads, and pacific sanddads, that peaked in the summer months. The varying seasonality in the density of different larval fish suggests that not all organisms would benefit equally from the use of variable speed pumps to achieve flow reduction during off- peak seasons.

Some level of flow reduction can be a direct result of lower intake water temperature. The daily mean seawater temperature ranges from approximately 10.5°C (50.9°F) in May to approximately 15°C (59°F) in September at DCPP. The maximum seawater temperature is approximately 18°C (64°F) (Tetra Tech, 2002). Seawater temperature measurements at the Coastal Data Information Program observation buoy (Station 076 Diablo Canyon) moored at 0.2 nautical miles offshore of the plant indicate the same order of temperature range with the maximum and minimum values (based on data from 1996 to 2012 recorded at half-hourly interval) at 22°C (71.6°F) and 8.4°C (47.1°F). For a base-load plant like DCPP, the maximum expected flow reduction ranges from 2 to 10 percent for a fully loaded plant, even when ocean water temperatures are below 11.1°C (38.2°F) (TENERA, 2000). Therefore, varying the pump speed to achieve this level of flow reduction would improve entrainment and impingement only marginally. Currently, the normal through-screen velocity

at the traveling water screen is 1.95 fps (Tetra Tech, 2002) at full load operation. A flow reduction of up to 10 percent will reduce the impingement velocity to approximately 1.76 fps, which is still much higher than the target 0.5 fps for the consideration of impingement reduction.

In theory, the through-screen velocity at the traveling water screens could be lowered to 0.5 fps or less, if the cooling water flow would be reduced by 75 percent or more. This severe flow reduction, however, renders the two circulating water pumps per unit inoperable due to the potential practical limit of 15 to 30 percent flow reduction achievable with the variable speed pump technology for pumps in this size range. Even if there was a practical means to deliver this flow to the plant, the reduction in output of the plant would be reduced by over 50 percent. Finally, an EPRI study (EPRI 2007) concludes that such reduction in load may have significant impacts to the electric generation supply to the grid during periods when this power is needed most..

Because of its marginal ability to reduce impingement and entrainment impacts, the variable speed pump technology, when used alone, is deemed inadequate in meeting the requirements of the 316(b) California Once-Through Cooling Policy Phase II rules.

4.3 Environmental Offsets

4.3.1 General Discussion

The environmental offsets are an environmental management tool that has been characterized as the “last line of defense” after attempts to mitigate the environmental impacts of an activity are considered and exhausted (GWA, 2006). In some cases, significant unavoidable adverse environmental impacts may be able to be counterbalanced by some associated positive environmental gains. Environmental offsets, however, are not a project negotiation tool, that is, they do not preclude the need to meet all applicable statutory requirements and they cannot make otherwise “unacceptable” adverse environmental impacts acceptable within the applicable regulatory agency.

In some cases, regulatory agencies may be so constrained by their regulatory foundation that offset opportunities are limited or unavailable. The San Luis Obispo APCD, for example, has the regulatory authority to offset new air emissions in their district from previously banked emission reductions as long as the new emission sources meet appropriate stringent emission performance criteria. The APCD cannot offset new air emissions with reductions in the impingement and entrainment impacts to aquatic life or reductions in land disturbance. In other cases, the regulatory agencies, such as the California Coastal and State Lands Commissions, have a more broadly-based, multidisciplinary review process, which supports a more flexible approach to using environmental offsets to generate the maximum net environmental benefit.

With these considerations in mind, the following assessment of offsetting environmental impacts focuses on identifying both positive and negative construction and operational environmental impacts associated the construction and operation of variable speed cooling water pump system from a broad range of environmental evaluation criteria.

4.3.2 Detailed Discussion

The following sections evaluate the air, water, waste, noise, marine and terrestrial ecological resources, land use, cultural and paleontological resources, visual resources, transportation, and socioeconomic issues associated with construction and operation of the variable speed cooling water pump system. Given the wide range of environmental impact subject areas under consideration, the systematic approach used in the DCPP

License Renewable Application process was used (PG&E, 2009). Consequently, following discussion of the individual environmental subject areas, the related consequences are categorized as having either positive or negative small, moderate, or large impact significance. The specific criteria for this categorization are shown below.

- **Small:** Environmental effects from not detectable or minor such they will not noticeably alter any important attribute of the resource
- **Moderate:** Environmental effects are sufficient to noticeably alter, but not significantly change the attributes of the resource.
- **Large:** Environmental effects are clearly noticeable and are sufficient to change the attributes of the resource.

The results of these evaluations and impact categorization are subsequently summarized in the Table 2.

Air

The air quality impacts associated with installation of the variable speed cooling water pumping system are small given that the limited nature of the associated construction activities. There will be little or no opportunity to generate fugitive dust from land disturbance activities, as the primary activity will involve replacement of a pump system within an existing building. Some additional vehicles-related air emissions can be expected from the small number of outage workforce personal vehicles and over-the-road project construction vehicles. Self-propelled earthmoving equipment will be unnecessary. Construction supplies and pumping equipment deliveries will be minimal. Most of the remaining construction equipment inventory will use existing onsite electrical power avoiding the need for diesel powered equipment.

Because the variable pumping system may actually serve to reduce internal plant power demands, this system will not derate DCPP overall plant efficiency and therefore will not encourage the generation of additional greenhouse gas emissions from replacement fossil power sources.

Surface Water

Given the limited nature of the construction needed to install the variable speed cooling water pumping system, no significant additional surface water resources will be needed and there be little or no new land disturbance that could potentially generate storm water impacts.

During periods of reduced power output, the variable cooling water pump system will withdraw less saltwater resulting in a parallel reduction of impingement- and entrainment-related losses of marine life and a reduction of local thermal impacts from the reduced cooling water discharge. This represents a small positive impact relative to the current condition.

Groundwater

Given the limited nature of the construction needed to install the variable speed cooling water pumping system, no significant additional groundwater resources will be needed.

The variable speed cooling water pump systems are not expected to require any additional groundwater resources.

Waste

Constructions-related waste, including recyclable metals from the previous cooling water pumping system, will be generated during the outage. Consequently, most of the construction wastes will have salvage value and, therefore, will not represent a burden to offsite disposal facilities.

Operation of the variable speed cooling water pump system is not expected to generate any additional wastes.

Noise

Previous studies have concluded from consultations with the County of San Luis Obispo that noise levels are expected not to exceed 70 dBA at the property boundary of the affected area (Tetra Tech, 2008). Noise levels from construction activities for the variable speed pumping system will be largely unchanged, since the primary work areas will be wholly inside existing buildings.

Operational noise levels are expected to be largely unchanged as a result of the new pumping system.

Land Use

Construction activities associated with variable speed cooling water pump system are largely confined to previously disturbed lands and existing structures. Consequently, there are no changes in land use during construction.

The new pumping system will resides wholly within existing structures, so there are no permanent changes in land use.

Marine Ecological Resources

Construction activities associated with the variable speed cooling water are confined to the previously developed land areas. There will be no construction impacts to marine areas.

During periods of reduced power output, the variable cooling water pump system will, in response to lower loads, withdraw less ocean water resulting in a parallel/equivalent reduction of impingement- and entrainment-related marine life losses and a coincident reduction of local thermal impacts from the reduced cooling water discharge. This positive benefit is characterized as small because it is only realized during those limited periods when the facility is operating at a fraction of its full based-load condition.

Terrestrial Ecological Resources

Construction activities associated with the variable speed cooling water are confined to the previously developed land areas. There will be no construction impacts to natural habitat areas or areas with significant ecological value or sensitivity. Operation of the variable speed pumping system will similarly present no threat to these resource areas.

Cultural and Paleontological Resources

Because installation of the variable pumping system will be confined to previously disturbed land, there is little or no potential to discover new cultural or paleontological resources in these developed areas. Operation of this system will similarly pose no threat to cultural or paleontological resources.

Visual Resources

All construction equipment will be low profile, that is, the construction support features and equipment will not extend above the height of local facility structures.

The variable cooling water pump system will be contained within an existing building and will present no permanent change in external profile of the facility.

Transportation

Increased commuting traffic from the construction work forces and construction deliveries could worsen the existing level of service on local roads during the plant outage. This negative traffic impact will be mitigated by the short duration of the variable speed pump construction period. If this construction activity is aligned with a large-scope plant outage activity, its incremental impact relative to other plant upgrade activities will likely make its contribution to local traffic levels negligible.

Socioeconomic Issues

While there will be some additional construction-related employment opportunities, these opportunities are not expected to significantly strain local community resources (for example, housing, school, fire/police services, water/sewer).

Maintenance staff levels are expected to remain largely unchanged following in response to the new pumping system.

4.3.3 Summary

Table 2 summarizes the air, water, waste, noise, marine and terrestrial ecological resources, land use, cultural and paleontological resources, visual resources, transportation, and socioeconomic environmental offsets for the variable speed cooling water pump system. The construction impacts could be characterized as having small negative impact significance because of the minor increase in construction phase air emissions and wastes. Theses impacts are not offset by the limited employment opportunities that may be gained during this same period. Operationally, there is a clear but small positive impact significance related to the variable speed cooling water pumps marginal reduction of cooling water withdrawals and the coincident reductions in entrainment and impingement and thermal discharge impacts. Viewed collectively, the pattern of environmental impact significance ratings suggest that the variable speed cooling water pump system is a largely benign technology, which may offer an overall weak net-positive environmental benefit.

4.4 First-of-a-Kind to Scale

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

4.5 Operability of General Site Conditions

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

4.6 Seismic and Tsunami Issues

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

4.7 Structure

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

4.8 Construction

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

4.9 Maintenance

There is no need to evaluate since this technology has been deemed unacceptable in Section 4.2 for a critical Set A criterion.

5. Conclusion

As described in Section 4.2, a variable frequency drive or variable speed pump technology alone would not reduce entrainment or impingement mortality at the DCPP intake to a level sufficient to satisfy the 316(b) California Once-Through Cooling Policy Phase II rules. Marginal improvement, up to 20 percent based on optimistic estimates with very conservative assumptions, may be attainable during winter and spring months because of the colder seawater temperature in conjunction with lower power demands. Further impingement improvement, such as lowering the through screen velocity to 0.5 fps, can be achieved only by plant reducing flow by over 75 percent, which is outside the capability of the variable speed technology as described above and not sustainable for a base-load plant.

The external approval and permitting and environment offset are described in details in Sections 4.1 and 4.3.

Because it has been determined that the variable frequency drive or variable speed pump technology, when used as a stand-alone best available technology for impingement and entrainment mitigation, will reduce impingement mortality and entrainment loss to levels commensurate with closed-cycle wet cooling system (a Set A criterion) operation, no additional assessment is made beyond Section 4.3. This technology will not be evaluated further in Phase II of this program.

6. Appendices

6.1 Input Data

Input data is based on references cited.

6.2 References

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6.3 Sketches

No sketches are applicable for this technology report.

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
National Environmental Policy Act – Bureau of Land Management or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable — the addition of the variable speed cooling water pump system does not constitute major federal action (federal land, funding).	Not applicable	NA	NA
Section 404/10 Permit – U.S. Army Corps of Engineers (USACE)	Not applicable — the addition of a variable speed cooling water pump system will not generate any impacts to waters of U.S. (wetland impacts and discharges of dredge or fill material into waters), nor involve work in navigable waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – U.S. Army Corp of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable — the addition of a variable speed cooling water pump system will not generate any impacts to waters of U.S. (wetland impacts and discharges of dredge or fill material into waters), nor involve work in navigable waters.	Not applicable	NA	NA
Nationwide Permit – U.S. Army Corps of Engineers	Not applicable — the addition of a variable speed cooling water pump system will not generate any impacts to waters of U.S. (wetland impacts and discharges of dredge or fill material into waters), nor involve work in navigable waters.	Not applicable	NA	NA
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable — the addition of the variable speed cooling water pump water system will not impact marine or terrestrial habitat areas.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA)	Not applicable — the addition of the variable speed cooling water pump system will not result in any exterior changes to existing structures.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – FAA	Not applicable — the addition of the variable speed cooling water pump water system will demand the services of a crane or other construction equipment in excess of 200 feet above ground level.	Not applicable	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Not applicable — the addition of the variable speed cooling water pump system will not require any additional land, nor involve any exterior changes to existing structures.	Not applicable	NA	NA

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant *(cont.)*

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the California Environmental Policy Act (CEQA) with the county. The CEQA review process could include preparation of an Initial Study (IS), followed either by a Negative Declaration (ND) or a Mitigated Negative Declaration (MND). Alternatively, the county could influence the CEQA process to follow the Environmental Impact Report route to encourage the alternative review of various cooling system options. This decision from this process will, regardless, be involved with PG&E efforts to recover the costs associated with the variable speed cooling water pump system.	6 - 12 months nominally	Potential	No
California Energy Commission (CEC) – Final Decision	Not applicable — the addition of the variable speed pump will not result in a net power capacity (increase) > 50MW, the threshold for CEC.	Not applicable	NA	NA
Coastal Development Permit – California Coastal Commission/Local Coastal Programs	Not applicable — the variable speed cooling water pump system will not demand any additional land, nor involve any exterior changes to existing structures in the Coastal Zone.	Not applicable	NA	NA
Coastal Development Lease – California State Lands Commission	Not applicable — the variable speed cooling water pump system will not involve any work in the marine environment.	Not applicable	NA	NA
Regional Pollution Control District Permit to Construct (ATC, Authority to Construct) – San Luis Obispo Regional Air Pollution Control District	Not applicable — the variable speed cooling water pump system will not generate any additional air emissions.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTC, Permit to Operate) – San Luis Obispo Air Pollution Control District	Not applicable — the variable speed cooling water pump system will not generate any additional air emissions.	Not applicable	NA	NA
Title V Federal Operating Permit – San Luis Obispo Air Pollution Control District and USEPA	Not applicable — the variable speed cooling water pump system will not generate any additional air emissions.	Not applicable	NA	NA
Title IV Acid Rain Permit – USEPA	Not applicable — the variable speed cooling water pump system will not generate any additional air emissions.	Not applicable	NA	NA

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant *(cont.)*

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
Dust Control Plan – San Luis Obispo Air Pollution Control District	Not applicable — construction of the variable speed cooling water pump system is not expected to disturb ground surfaces and so is not expected to generate any significant supplemental dust emissions. The pumping system will not generate any additional air emissions.	Not applicable	NA	NA
NPDES Industrial Discharge Permit – Central Coast Regional Water Quality Control Board (CCRWQCB) and State Resources Board	While the variable speed cooing water pumping system will likely provide more operational flexibility regarding water withdrawal rates, it will not change the peak water withdrawal rates, nor change the water treatment system. Any subsequent required alteration of the current NPDES permit will be minor.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, Central Coast Regional Water Quality Control Board (CCRWQCB)	Not applicable — construction of the variable speed cooling water pump system is not expected to disturb ground surfaces or alter storm water management features onsite.	Not applicable	NA	NA
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – Central Coast Regional Quality Control Board (CCRWQCB)	Not applicable — construction of the variable speed cooling water pump system is not expected to disturb ground surfaces or alter storm water management features onsite.	Not applicable	NA	NA
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Central Coastal Regional Water Quality Control Board (CCRWQCB)	Not applicable — DCPP NPDES permit addresses operational storm water. No changes to existing storm water management system are expected from addition of the variable speed cooling water pump system.	Not applicable	NA	NA
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Central Coast Regional Quality Control Board (CCRWQCB)	Not applicable — DCPP NPDES permit addresses operational storm water. There is no separate operational phase SWPPP.	Not applicable	NA	NA

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant *(cont.)*

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
2081 Permit for California Endangered Species Act of 1984 (Fish and Game Code, §2050 through 2098) – California Department of Fish & Game (CDFG)	Not applicable — the addition of the variable speed cooling water pump water system will not impact marine or terrestrial habitat areas.	Not applicable	NA	NA
Lake and Streambed Alteration Agreement – California Department of Fish & Game (CDFG)	Not applicable — the addition of the variable speed cooling water pump will not results in impacts to jurisdictional streambed areas (waters of the state).	Not applicable	NA	NA
Waste Discharge Requirements (WDR) – Central Coast Regional Water Quality Control Board	Not applicable — the addition of the variable speed cooling water pump will not results in impacts to jurisdictional streambed areas (waters of the state).	Not applicable	NA	NA
Section 106 Review – Office of Historic Preservation (OHP)	Not applicable — the variable speed cooling water pump system will not demand any additional land nor generate any new surface disturbances.	Not applicable	NA	NA
Notification of Waste Activity – Resource Conservation Recovery Act (RCRA) Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase – Department of Toxic Substance Control, USEPA, San Luis Obispo County Department of Environmental Health Services – California Unified Program Agency	Installation of the pumping system could potentially require an identification number to support management or construction wastes, unless current DCPP identification will be used.	1–2 weeks	No	No
Notification of Waste Activity - Resource Conservation Recovery Act (RCRA) Hazardous Waste Identification Number (Small Quantity Generator) – Operation – Department of Toxic Substance Control, USEPA, San Luis Obispo County Department of Environmental Health Services – California Unified Program Agency	Not applicable — the addition of the pumping system will allow for the continuing use of the existing hazardous waste identification number. There will be not impacts to the onsite hazardous treatment facility (oil separation unit).	Not applicable	NA	NA

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant *(cont.)*

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
Spill Prevention and Countermeasure Control Program – 40 CFR 112 and Aboveground Petroleum Storage Act – San Luis Obispo County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	Not applicable — the addition of the pumping system is not expected to require additional water treatment chemicals.	Not applicable	NA	NA
Underground Storage Tank Permit – San Luis Obispo County Department of Environmental Health – California Unified Program Agency and State Water Resources Board	Not applicable — the addition of the pumping system is not expected to require force the relocation of underground tanks.	Not applicable	NA	NA
Risk Management Plan (Clean Air Act 112r) – San Luis Obispo County Department of Environmental Health Services – California Unified Program Agency and USEPA	Not applicable — the addition of the pumping system will not require the addition of any new volatile chemicals.	Not applicable	NA	NA
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Luis Obispo County Department of Environmental Health Services – California Unified Program Agency and USEPA	Not applicable — the addition of the pumping system is not expected to require any new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals).	Not applicable	NA	NA
Land Use Zones/Districts Approval – San Luis Obispo County Department of Planning and Buildings	Not applicable — the addition of the pumping system will be an internal improvement conducted wholly within existing structures.	Not applicable	NA	NA
Condition Use Plan Amendment – San Luis Obispo County Department of Planning and Building	While the scope of work associated with installation of an internal pumping system in an existing building may not be an obvious trigger, it is possible that need to evaluate alternative cooling systems could trigger the need for an amendment to the existing Conditional Use Permit.	Not applicable	NA	NA
Grading Plan Approval or Permit – San Luis Obispo County Department of Public Works & Planning and Building	Not applicable — there will be no grading during the installation of the wedge wire screen system.	Not applicable	NA	NA

Table 1.
Environmental Permit/Approval Assessment: Variable Speed Cooling Water Pump Systems for the Diablo Canyon Power Plant *(cont.)*

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path (Yes/No/NA)	Fatal Flaw (Yes/No/NA)
Erosion and Sediment Control Plan (Rain Event Action Plan) – San Luis Obispo County Department of Public Works	Not applicable — similar to the construction-phase SWPPP. No separate submittal is expected to be directed to the county.	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Luis Obispo County Department of Planning and Building	Not applicable — the addition of the variable speed cooing water pump system may demand an individual or set of county building permits.	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) – San Luis County Environmental Health Services	Not applicable — no new potable water systems are planned.	Not applicable	NA	NA
San Luis Obispo County Well Water Permit – San Luis Obispo County Environmental Health Services	Not applicable — no new wells to be developed.	Not applicable	NA	NA
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Not applicable — the wedge wire screen and associated piping will probably not prove to be oversized.	Not applicable	NA	NA
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Not applicable — the wedge wire elements will probably not prove to be oversized.	Not applicable	NA	NA
Resource Conservation (RC) Land Use Management Approval	Not applicable — while local municipality rules may supersede this regional land use/watershed protection-related project approval process, this is not the case for DCPP.	Not applicable	NA	NA
Temporary Power Pole – Local municipality or San Luis Obispo County Public Works Department	Not applicable — the installation of the variable speed pumping system is not expected to require local power poles.	Not applicable	NA	NA
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Luis Obispo County Fire Department	The addition of variable speed pump may require minor revisions to the existing Fire Safety Plan.	1 month for approval of Fire Safety Plan	No	No
Sewer and Sewer Connections – San Luis Obispo County Environmental Health Services	Not applicable — No new sanitary connections are envisioned.	Not applicable	NA	NA
Road Crossing or Encroachment Permit (Caltrans)	Not applicable — the addition of variable speed pumps will not pose any road crossing or encroachment issues.	Not applicable	NA	NA

Table 2.
Offsetting Impacts for the Variable Speed Cooling Water Pump for the Diablo Canyon Power Plant

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	Minor increase in greenhouse gases, NOx, volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, commuting workforce. Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short-term loss of DCPP generation during the plant outage to install pumping system.	While the variable speed pump system could result in some plant efficiency gains during lower load operating scenario, no significant changes in overall air quality impacts are expected during operation.	Insignificant temporary increase in CO_2 greenhouse gas emissions from commuting traffic during associated plant outages	Small Negative	None
Surface Water	No surface water impacts during construction either supplemental consumptive uses or storm water-related impacts.	During periods of reduced power output, the variable cooling water pump system will withdraw less saltwater that ultimately contributes to local thermal impacts from the reduced cooling water discharge.	Not applicable	None	Small Positive
Groundwater	No additional groundwater resources will be needed to support construction.	No additional groundwater resources will be needed to support operations.	Not applicable	None	None
Waste	Constructions-related waste will be generated during the outage. Most of these wastes will be recyclable metal that will not impact offsite disposal facilities.	No significant increase in waste generation during operation.	Insignificant temporary increase in construction wastes and some metal recyclables	Small Negative	None

Table 2.
Offsetting Impacts for the Variable Speed Cooling Water Pump
for the Diablo Canyon Power Plant *(cont.)*

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Noise	Noise levels from construction will be largely unchanged, since the primary work areas are inside existing buildings.	Operational noise levels are expected to be largely unchanged as a result of the new pumping system.	Not applicable	None	None
Land Use	Construction activities are largely confined to previously disturbance lands and existing structures.	Pumping system resides in existing structures, so there are no permanent changes in land use.	Not applicable	None	None
Marine Ecological Resources	No new marine-based construction will be needed to install the variable speed pumping system.	During periods of reduced power output, the variable cooling water pump system will withdraw less saltwater resulting in a parallel and equivalent reduction of impingement and entrainment impacts and a coincident reduction of local thermal impacts from the reduced cooling water discharge.	Not applicable	None	Small Positive
Terrestrial Ecological Resources	Since construction will be confined to previously disturbed land, there is no potential to disturb natural habitats or other areas with significant ecological value or sensitivity.	No permanent loss of natural habitat areas or other areas with significant ecological value or sensitivity.	Not applicable	None	None
Cultural & Paleontological Resources	Since construction will be confined to previously disturbed land, there is little or no potential to discover new cultural or paleontological resources in these developed areas.	No permanent loss of cultural or paleontological resources.	Not applicable	None	None
Visual Resources	All construction equipment will be low profile, i.e., not extend above the height of local facility structures.	The variable cooling water pump system will be contained within an existing building and will present no permanent change in external profile of the facility.	Not applicable	None	None

Table 2.
Offsetting Impacts for the Variable Speed Cooling Water Pump
for the Diablo Canyon Power Plant *(cont.)*

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Transportation	Increased traffic from the construction work force and construction deliveries could temporarily worsen the existing level of service on local roads during the plant outage.	The new pumping system will not significantly alter the current number of plant deliveries or operating personnel.	Level of Service Impacts (pending later phase)	Small Negative	None
Socioeconomic Issues	While there will be some additional construction-related employment opportunities, these opportunities are not expected to significantly strain local community resources (e.g., housing, school, fire/police services, water/sewer).	Maintenance staff levels are expected to be largely unchanged in response to the new pumping system.	Employment Levels (pending later phase)	Small Positive	None

Notes: Levels of Impact of Significance

Small: Environmental effects from not detectable or minor such they will not noticeably alter any important attribute of the resource
Moderate: Environmental effects are sufficient to noticeably alter, but not significantly change the attributes of the resource.
Large: Environmental effects are clearly noticeable and are sufficient to change the attributes of the resource.