



Prepared for



SOUTHERN CALIFORNIA  
**EDISON**

An EDISON INTERNATIONAL™ Company

and the  
*State Water Resources Control Board  
Nuclear Review Committee*

Independent Third-Party  
Interim Technical Assessment

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for the  
**Closed-Cycle Cooling Water Technologies  
for San Onofre Nuclear Generating Station**

Prepared by



Bechtel Power Corporation

Report No. 25761-000-30R-G01G-00004 Rev. 0

July 17, 2012

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<b>Revision</b>	<b>Date</b>	<b>Affected Sections</b>
0	July 17, 2012	Initial Issue

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## **List of Abbreviations and Acronyms**

agl	above ground level
APCD	(San Diego) Air Pollution Control District
ASCE	American Society of Civil Engineers
ATC	permit to construct
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
Caltrans	California Department of Transportation
CCC	California Coastal Commission
CCS	closed-cycle system
CDFG	California Department of Fish & Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utility Commission
EIR	Environmental Impact Report
EPCRA	Emergency Planning and Community Right-To-Know Act
ET	Evaptech, Inc.
FAA	Federal Aviation Administration
fps	foot per second
GWA	Government of Western Australia
hybrid	hybrid wet/dry cooling
ICT	International Cooling Tower, Inc.
JUOTC	Joint Utility Once-Through Cooling
MDD	mechanical (forced) draft dry/air cooling
mgd	million gallons per day
NCTD	North Coast Transit District Railway
NDW	wet natural draft cooling
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NYSDEC	New York State Department of Environmental Conservation
OHP	Office of Historic Preservation
OTC	once-through cooling
PDD	passive draft dry air cooling
PTO	permit to operate
RC	Resource Commission
RCRA	Resource Conservation and Recovery Act
SCE	Southern California Edison
SDRWQCB	San Diego Regional Water Quality Control Board
SLC	State Land Commission
SONGS	San Onofre Nuclear Generating Station
SPCC	Spill Prevention Control and Countermeasure Plan
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
USMC	U.S. Marine Corps
WDR	Waste Discharge Requirement

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**Independent Third-Party Interim Technical Assessment  
for the Closed-Cycle Cooling Water Technologies for  
San Onofre Nuclear Generating Station**  
*Report No. 25761-000-30R-G01G-00004*

## 1. Executive Summary

This study summarizes the findings of the first phase of a detailed evaluation to assess viability of the closed-cycle cooling system option relative to once-through cooling for the San Onofre Nuclear Power Station (SONGS), in support of the Nuclear Review Committee's initiative to identify strategies to implement the *California Statewide Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, that is, strategies that comply with Section 316(b), *California Once-Through Cooling Policy*, Phase II rules.

All of the five closed-cycle cooling system technologies have been evaluated considering three water sources seawater, freshwater, and recycled water. They all satisfy the requirements of the Section 316(b) *California Once-Through Cooling Policy*, Phase II rules, therefore, each was evaluated in detail against the Joint Utility Once-Through Cooling (JUOTC)-defined evaluation criteria.

The external approval and permitting assessment for the five closed-cycle cooling water technologies identified a list of potentially applicable federal, state, and local permits and approvals that, not surprisingly, focused on its significant impacts to the marine environment. The efforts to conduct a successful CEQA and secure the U.S. Army Corps of Engineers (USACE) Section 404 permit, California Coastal Commission Coastal Development Permit, State Lands Commission Lease, National Pollutant Discharge Elimination System (NPDES) permit modification will represent the primary regulatory challenges.

These permits are all expected to be contentious and have lengthy processes that will be aligned with the CEQA/Environmental Impact Report review process. The primary issue of concern will be assessing the balance of the land usage, visual impacts, and the impact on the plant power output.

The five closed cooling water technologies have been reviewed against each of the Phase 1 criterion and the results are summarized below. It should be noted that for the wet closed cooling water technologies, that is, wet natural draft cooling, wet mechanical draft cooling, and the hybrid wet/dry cooling systems, the use of saltwater has been characterized as a fatal flaw due to their significant PM-10 emissions and the associated lack of sufficient related emission offsets. The use of fresh and reclaimed water in these systems, however, did prove to be acceptable. The overall finding is that although the five closed cooling technologies are feasible (assuming specific water supplies), there are several significant technical and operational challenges. These key challenges include the expected contentious permitting process, locating the dry technology towers will require the acquisition of additional land, the significant tower construction challenges, the routing and construction of the plant infrastructure to circulate the cooling water to the towers, the significant de-rating of the units due to the increased condenser back pressure, and the parasitic loads associated with the mechanical draft tower technologies.

All of the technologies, with the exception of saltwater-supplied wet cooling towers, were determined to be acceptable. The evaluation findings is described in detail in Section 4 and summarized in Table CC-1, below:



**Table CC-1.  
Closed-Cycle Cooling System —Overall Conclusions**

CRITERIA	STATUS				
	Passive Draft Dry/Air Cooling (PDD)	Mechanical (Forced) Draft Dry/Air Cooling (MDD)	Wet Natural Draft Cooling (NDW)	Wet Mechanical (Forced) Draft Cooling (MDW)	Hybrid Wet/Dry Cooling (Hybrid)
External Approval and Permitting	No fatal flaws.	No fatal flaws.	Fatal flaw for saltwater towers associated with lack of sufficient PM-2.5 offsets. No fatal flaws for reclaimed/freshwater towers.	Fatal flaw for saltwater towers associated with lack of sufficient PM-2.5 offsets. No fatal flaws for reclaimed/freshwater towers.	Fatal flaw for saltwater towers associated with lack of sufficient PM-2.5 offsets. No fatal flaws for reclaimed/freshwater towers.
Impingement/Entrainment Design	Satisfies Section 316(b) California OTC Policy Criteria requirements.	Satisfies Section 316(b) California OTC Policy Criteria requirements.	Satisfies Section 316(b) California OTC Policy Criteria requirements.	Satisfies Section 316(b) California OTC Policy Criteria requirements.	Satisfies Section 316(b) California OTC Policy Criteria requirements.
Environmental Offsets	Some negative impacts, no fatal flaws	Some negative impacts, no fatal flaws	Some negative impacts, no fatal flaws	Some negative impacts, no fatal flaws	Some negative impacts, no fatal flaws
First-of-Kind-to-Scale	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.
Operability of General Site Conditions	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.
Seismic and Tsunami Issues	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.
Structure and Construction	Possible fatal flaw – the technology can not fit within the plant land boundaries.	Possible fatal flaw – the technology can not fit within the plant land boundaries.	No fatal flaws.	No fatal flaws.	No fatal flaws.
Maintenance	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.	No fatal flaws.
<b>Conclusion</b>	<b>Technology is a candidate for Phase II review.</b>	<b>Technology is a candidate for Phase II review.</b>	<b>Technology is a candidate for Phase II review (only with fresh or reclaimed water).</b>	<b>Technology is a candidate for Phase II review (only with fresh or reclaimed water).</b>	<b>Technology is a candidate for Phase II review (only with fresh or reclaimed water).</b>





## 2. Background and Introduction

### 2.1 Purpose/Scope of Study

This study is performed in accordance with the requirement established by the State Water Resources Control Board (SWRCB) for Southern California Edison (SCE) to conduct a detailed evaluation to assess compliance alternatives to once-through cooling for SONGS. This requirement is associated with the California *State-wide Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, which established uniform, technology-based standards to implement the Clean Water Act, Section 316(b), which 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 five closed-cycle cooling system technologies for DCCP based on the list of site-specific criteria approved by the Nuclear Review Committee. The technologies evaluated were passive draft dry/air cooling, mechanical (forced) draft dry/air cooling system, hybrid wet/dry cooling system, wet natural draft cooling, and wet mechanical (forced) draft cooling. These technologies are described in detail in Section 3. The evaluation process includes critical review of published data and literature, consultation with permitting agencies and technical assessment supported by engineering experience and judgment. Engineering definitions were defined for each of the technologies studied and conceptual design information was used to perform the criteria review for each. This included developing differential operating requirements for each technology option including their power and water requirements and identifying and compiling their industry experience, reliability, and uncertainties. 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-up 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. Specifically, this section requires that National Pollutant Discharge Elimination System (NPDES) permits for facilities with cooling water intake structures to 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 that remove or otherwise impact significant quantities of aquatic organisms present 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) were addressed in the Phase I rules, initially promulgated in December 2001. Existing power plants were subsequently addressed, along with other industrial facilities, in the Phase II rules, issued in February 2004. Since then, the rule has been challenged, remanded, suspended, and repropoed. The current proposed version of the rule dictates that all existing facilities that withdraw at least 25 percent of their water from an adjacent water body for cooling purposes and have a design intake flow range of 2 million gallons per day (mgd) 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
- Reduce the intake velocity to less than 0.5 feet per second (fps) (through-screen) or below, which would allow most fish to avoid impingement.

Large power plants (water withdraw rates greater than 125 mgd) would also be required to conduct a study to help their local permitting authorities (SWRCB) determine what site-specific controls (if any) would be required to reduce entrainment mortality impacts. Note this version abandoned the original performance standards approach that mandated the calculation of baseline against which reduction in entrainment and impingement can be measured.

The Section 316(b) Phase II final rule is expected to be issued on July 27, 2012. When the final rule becomes effective, it is likely to include an implementation timeline that would drive the implementation of technologies to address 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 SONGS. The SWRCB's *Use of Coastal and Estuarine Waters for Power Plant Cooling Once-Through Cooling Policy* became effective on October 1, 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 Best Technology Available.

Affected facilities, including SONGS, are expected to:

- Reduce intake flow (commensurate with closed-cycle wet cooling) and velocity to less than 0.5 fps (through screen) – Track 1, or
- Reduce impacts to aquatic life comparably by other means – Track 2

This policy is being implemented through a so-called “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 DCCP to meet the policy requirements. This study is a direct outgrowth that adaptive management strategy to implement this Once-Through cooling Policy (Bishop, 2011).

### **Current Cooling Water Intake System and Section 316(b) Compliance History**

SONGS operates two independent cooling water intake structures to provide cooling water to Unit 2 and Unit 3. Each unit's water withdrawal rate is nominally 828,000 gpm or 1,192 mgd. Both units withdraw water from separate, parallel submerged conduits extending 3,183 feet offshore, terminating at a depth of 32 feet in the Pacific Ocean. The submerged end of each conduit is fitted with a velocity cap to minimize fish entrainment by transforming the vertical flow to a lateral flow, which encourages a flight response from fish close to the structure.

The onshore portion of each intake consists of six vertical traveling screens fitted with 3/8-inch mesh panels. Screens are rotated based on the pressure differential between the upstream and downstream faces or manually. A high-pressure spray removes any debris or fish that have become trapped in the screen face. The vertical traveling screens are angled at approximately 30° to incoming flow. This feature, combined with a series of vertical louvers placed in the forebay, guides the fish to a quiet zone at the end of the cooling water intake structure. A fish elevator periodically empties captured fish into a 4-foot-diameter conduit that returns them by gravity flow to a submerged location approximately 1900 feet offshore (Tetra Tech, 2008). Also housed in the cooling water intake structure of each unit are four saltwater cooling pumps, each rated 17,000 gpm. These pumps are safety-related and located downstream of the traveling water screens. Operation of one pump is sufficient to supply the saltwater cooling needs for one unit. The total saltwater cooling flow needs for both units is 34,000 gpm (SONGS, 2004).

SONGS is also planning to add a “large marine organism protection device” to reduce the spacing between the exclusion bars to less than 9 inches, in conformance with SWRCB’s Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Water for Power Plant Cooling. (Enercon, 2012).

The SONGS cooling water intake system’s offshore velocity cap and onshore angled traveling screen system collectively help reduce entrainment and impingement impacts to aquatic life. These systems, along with various previous quarterly impingement monitoring programs, have represented SONGS’ ongoing measures to demonstrate compliance with previously applicable Section 316(b) regulatory guidance. This guidance can be described as an overarching federal regulation (40 CFR 125.90(b)) and, broadly expressed, state policies and permit language that collectively required facilities to implement Section 316(b) rules using professional judgment on a case-by-case basis.

## **2.3 Screening Process (A/B Criteria)**

The technology screening process for the Phase I portion of the evaluation will be performed by 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 initially performed for Set A criteria. If the technology satisfies all of the Set A criteria, it will be evaluated against 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 shown below:

- First-of-a-kind to scale
- Operability of general site conditions
- Seismic and tsunami issues
- Structural
- 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.

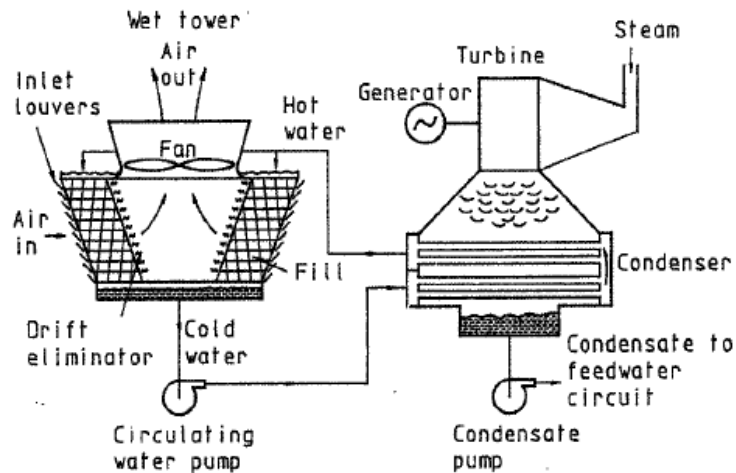
### 3. Technology Description

#### 3.1 Background

The steam that drives the main turbine in a large electric power plant is condensed and cooled by large quantities of water that is circulated through a surface condenser. The circulating water then transfers that heat to the general environment, either directly or indirectly, through another heat transfer process.

The direct method is a once-through cooling system, where the circulating water is pumped from a large source such as the ocean, a river, or a lake, through the surface condenser and returned to the source, where the heat is dissipated. The entire volume of cooling water is supplied from and discharged continuously to the water source. The indirect method is a closed-cycle system, where the circulating water is pumped from its own reservoir through the surface condenser, then through a cooling medium (such as a cooling tower or heat exchanger) where the heat is transferred to the environment, then back to the reservoir. A closed-cycle system uses much less water than the once-through cooling, as the volume of cooling water is continuously recirculated through the system with makeup from a source (for example, the ocean or other water source) supplied only as required to replenish losses to the environment (for example, through evaporation in a cooling tower) and to control the water chemistry in the system. However, use of a closed-cycle system results in lower plant cycle efficiency because the cooling water (heat transfer medium) is recirculated and the water is going to have a higher overall temperature than the cooling water used in a once-through system. The closed-cycle can use either wet or dry cooling methods for cooling, or a hybrid method, which is a combination of both wet and dry methods.

In addition to the thermal requirements associated with condensing the turbine exhaust steam, additional cooling is required for other processes and components in the plant that support the primary function of generating electricity. All of these requirements, collectively, define the overall heat removal requirements for a power plant.



*Figure CC-1. Sample Closed-Cycle System Using a Wet Mechanical (Forced) Draft Cooling Tower  
(Kroger, Detlev G. Air-Cooled Heat Exchangers and Cooling Towers.  
Vol. 1, PennWell Corporation, 2004.)*

SONGS was designed for and operates with once-through cooling systems for both SONGS units. This study evaluates five typical alternative closed-cycle system heat transfer technologies for possible application to

meet the SONGS cooling requirements. These technologies were investigated due to their ability to satisfy the requirements of the Section 316(b), *California Once-Through Cooling Policy*, Phase II. This is because the dry technologies will only require minimal makeup after the closed system is initially charged and the only water sources that will be available for the wet technologies are freshwater and reclaimed water because there are fatal flaws associated with the use of seawater for the wet technologies, which is described in Section 4 of this report. The freshwater and reclaimed water sources are assumed to be available either from wells or piped in from nearby water treatment facilities. The only significant continuous makeup that will be required from the ocean for any of the closed-cycle options will be what is required to support any safety-related systems, which were not evaluated as part of this phase of the study.

The five technologies evaluated are:

- Passive Draft Dry Air Cooling
- Mechanical (Forced) Draft Dry Air Cooling
- Wet Natural Draft Cooling
- Wet Mechanical (Forced) Draft Cooling
- Hybrid Wet/Dry Cooling

Five experienced manufacturers of both wet and dry cooling systems provided input on conceptual designs for each of these technologies based on specific site design criteria. Bechtel also had discussions with each manufacturer regarding the applicability and technical feasibility of the technologies to meet the needs of SONGS. The manufacturers that provided input were Evaptech, Inc. (ET), GEA Power Cooling, Inc. (GEA), Hudson Products Corporation (Hudson), International Cooling Tower, Inc. (ICT), and SPX Cooling Technologies, Inc. (SPX).

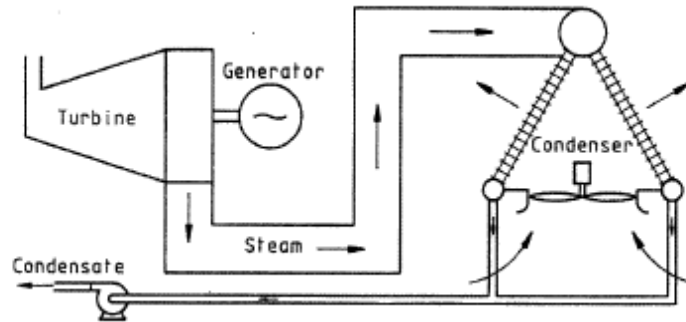
For each of the technologies described, there are several design variations available. Examples include forced (located at air inlet) or induced (located at air outlet) draft fans for the mechanical draft technologies, heat exchanger configuration for the dry technologies, and cross and counter-flow wet tower configurations. A detailed evaluation of which variation is optimum for SONGS will be carried out in the next phase of this study and so many of the variations available are all described in the technology descriptions below.

### 3.2 Dry/Air Cooling

Dry/air cooling systems cool fluids circulated inside of finned tube heat exchangers using conduction, convection, and radiation (sensible heat) to remove heat from the fluid. The heat is transferred to ambient airflow that is induced over the finned tubes by either natural or mechanical draft means. No evaporation of the cooling water is involved and the dry cooling performance is related to the ambient air dry bulb temperature. Dry technologies result in higher cooling water temperatures and, thus, higher turbine backpressure and decreased generator output as compared to wet technologies. This situation is always the case because the dry-bulb temperature is always higher than the wet bulb temperature, which governs the cold water temperature achievable with wet cooling designs, described in Section 3.3. Additionally, dry technologies require greater heat transfer surface area and greater airflow because they do not use the more efficient evaporative cooling process. The advantages of dry systems over wet include minimal makeup water usage and the absence of issues associated with wastewater disposal, drift emissions, and visible plume formation.

There are dry technologies known as air-cooled condensers that condense steam from the turbine directly using ambient air. This requires the exhaust steam from the turbine to be ducted to the location of the air-cooled condensers. Due to the available locations that could accommodate the large air-cooled condensers required for SONGS, the steam duct would exceed the length recommended by air-cooled condensers manufacturers.

The estimated duct lengths for the site would result in a pressure drop so great that the turbines could not operate because of the resulting high backpressure at the exhaust. Therefore, air-cooled condenser technology was not considered in this study.



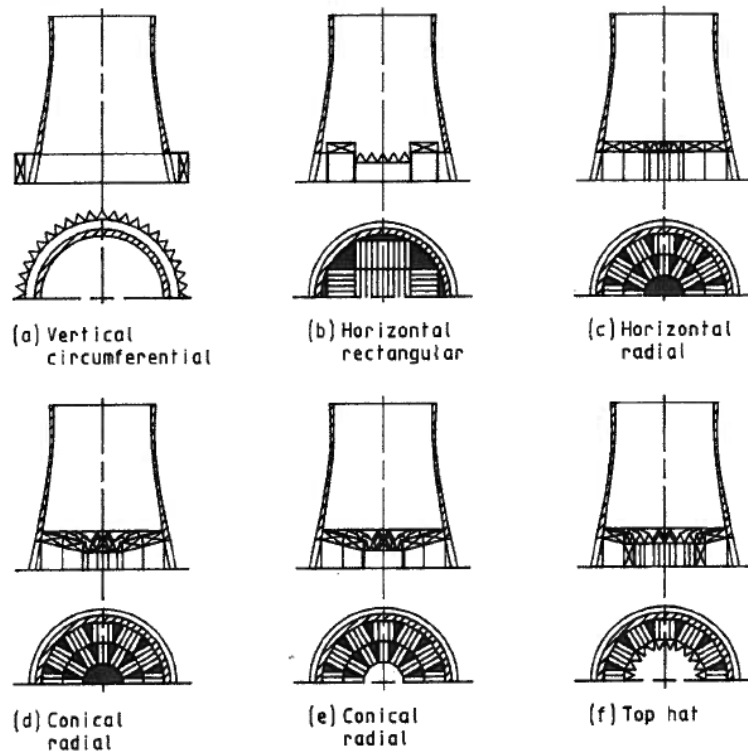
*Figure CC-2. Sample Air-Cooled Condensers (Kroger, Detlev G. Air-Cooled Heat Exchangers and Cooling Towers. Vol. 1, PennWell Corporation, 2004.)*

For this reason, the dry technologies considered in this study are air-cooled heat exchangers, where the turbine exhaust steam would still be condensed in the surface condenser and the circulating cooling water is pumped in a closed loop from the condenser to the air-cooled heat exchangers. The water is circulated in a closed system inside the heat exchanger tubes, which are available in various grades of materials to accommodate use of a variety of water qualities. Any available water at SONGS would be acceptable to use with the dry technologies because continuous makeup is not required, and there are no water loss emissions associated with their use, as described further in Section 4.

There are two dry cooling technologies: passive draft and mechanical draft. The specific names for these technologies vary by manufacturer.

### 3.2.1 Passive Draft Dry/Air Cooling

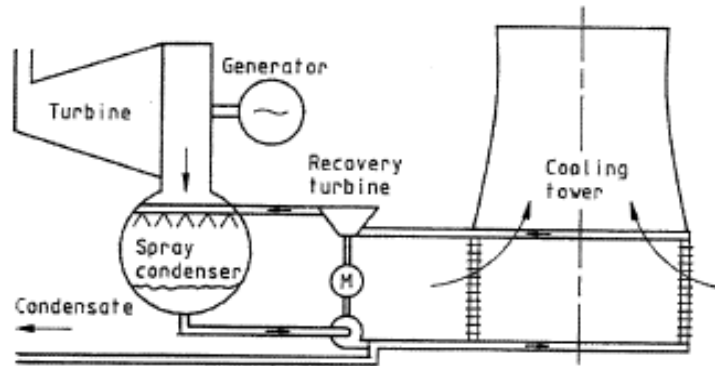
In a passive dry cooling system, the air-cooled finned tubes are arranged in a shell that is usually hyperbolic in shape. The tower is designed to use convection to dissipate the heat from the tubes to the air flowing over them, with the airflow driven by the difference in air temperature and density between the inside and the outside of the tower. The finned tubes are grouped in bundles and can be arranged in various configurations at the base of the tower or stacked inside the tower.



*Figure CC-3. Sample Heat Exchanger Configurations for Passive Draft Dry Air Cooling Towers (Kroger, Detlev G. Air-Cooled Heat Exchangers and Cooling Towers. Vol. 1, PennWell Corporation, 2004.)*

A Heller system couples a passive draft dry/air cooling tower with a spray condenser (more efficient than a surface condenser) and a recovery turbine to maximize the turbine generator output to the fullest extent. For this reason, this is the type of passive draft dry/air cooling system considered in this report.

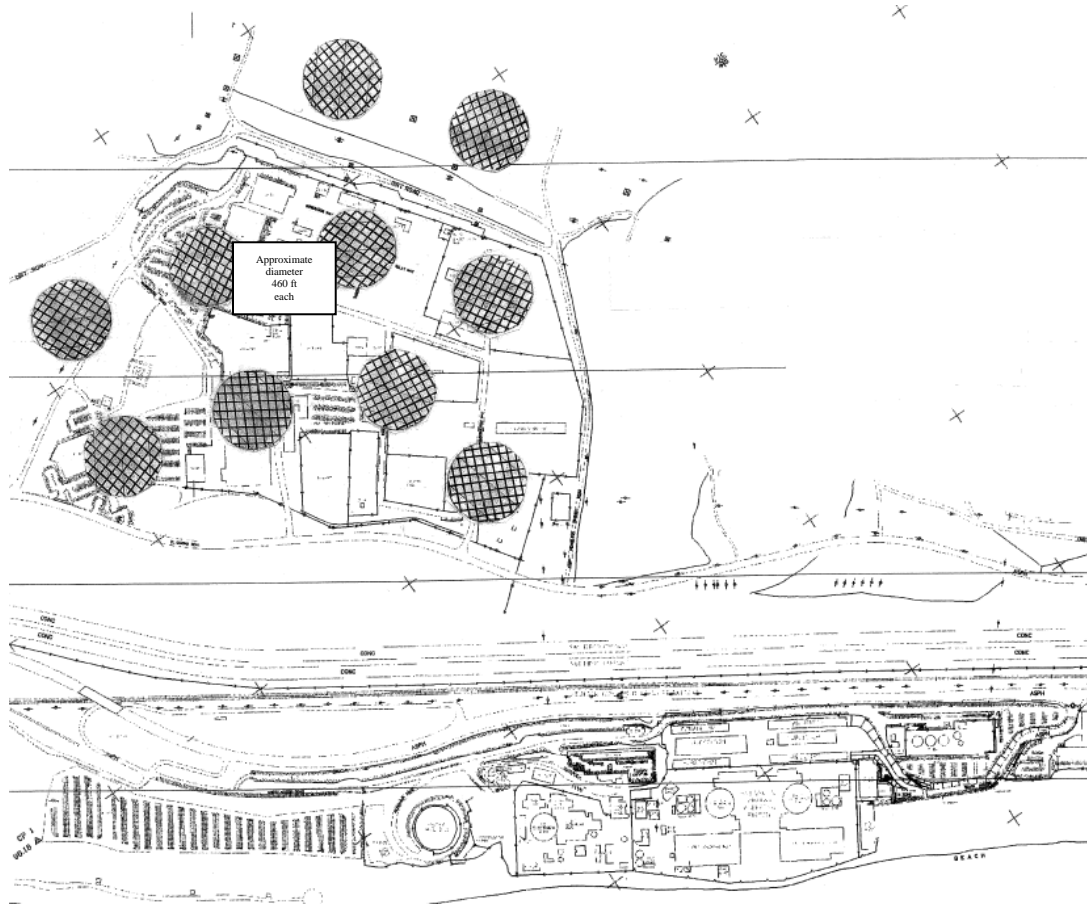
The passive draft dry air cooling tower is less expensive to operate than a comparably sized mechanical draft cooling tower due to the lack of mechanical equipment (fans and motors) required to induce airflow over the finned tubes. To create the required draft, the tower must be very tall, resulting in a higher installed cost than mechanical draft cooling towers, but there are operational cost savings associated with the fact that there are no fans and, thus, no power requirements and maintenance activities associated with them.



*Figure CC-4: Sample Heller System (Kroger, Detlev G.  
Air-Cooled Heat Exchangers and Cooling Towers. Vol. 1, PennWell Corporation, 2004.)*

Based on the design requirements for the site, which are described in detail in Section 4.5, three natural draft towers per unit (60 total for the site) are needed to support SONGS' operation. The towers will be approximately 610 feet in diameter and approximately 570 feet high. The towers will need to be spaced approximately a diameter distance apart to avoid the hot discharge from one tower negatively impacting the performance of a nearby tower (known as interference) or to avoid any of the towers being starved of required incoming airflow. Consequently, the towers will need to be located on the Mesa Complex. A conceptual plot plan is depicted below and it can be seen that to accommodate the large area required for this technology, a number of facilities currently in the Mesa Complex will need to be relocated, or additional land will need to be leased to increase the size of the Mesa. This system will not require substantial makeup water, only potentially a small amount to make up for system losses. This water could be supplied by seawater from the current intake structure from the Pacific Ocean, or fresh or reclaimed water from wells or a nearby water treatment facility.

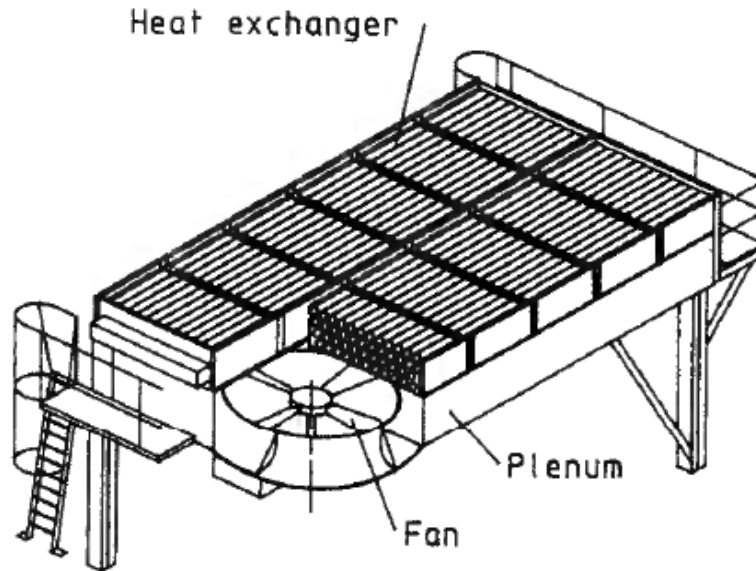




*Figure CC-5. Conceptual Plot Plan Passive Draft Dry Cooling*

### 3.2.2 Mechanical (Forced) Draft Dry/Air Cooling

A mechanical (forced) draft dry air cooling tower also removes heat from the circulating water in air-cooled finned tubes, but relies on fans to drive the airflow over the tubes. This tower does not require a large shell. The finned tubes are bundled and installed in varied arrangements, but often in a horizontal rectangular array to maintain a lower profile. This is the configuration that was considered for SONGS. The fans can be located on the air inlet side of the tube bundles (forced draft) or on the air outlet side of the tube bundles (induced draft), and they can be designed to regulate the airflow based on changing atmospheric conditions.



*Figure CC-6. Sample Forced Draft Tower (Kroger, Detlev G. Air-Cooled Heat Exchangers and Cooling Towers. Vol. 1, PennWell Corporation, 2004.)*

These types of dry towers can have a lower profile and can achieve lower cold water temperatures than the passive draft dry air cooling technology since the airflow quantity is externally controlled. However, these designs produce noise from the fans and these fans require considerable auxiliary power for operation. Special equipment and features can be incorporated into the design of any mechanical draft technology to limit the noise (such as wide chord, low noise fan designs). These optional features would result in additional cost and increased power requirements for the tower.

To dissipate the required heat loads for the site, the mechanical (forced) draft dry air cooling tower would require approximately 1,018,400 square feet of heat exchanger area per unit and 43,700 hp (32.6 MW) input power per unit to run the fans per unit. The towers would, consequently, need to be located on the Mesa Complex. Again, to accommodate the large area required for this dry technology, a number of facilities currently in the Mesa Complex will need to be relocated, or additional land will need to be leased to increase the size of the Mesa.

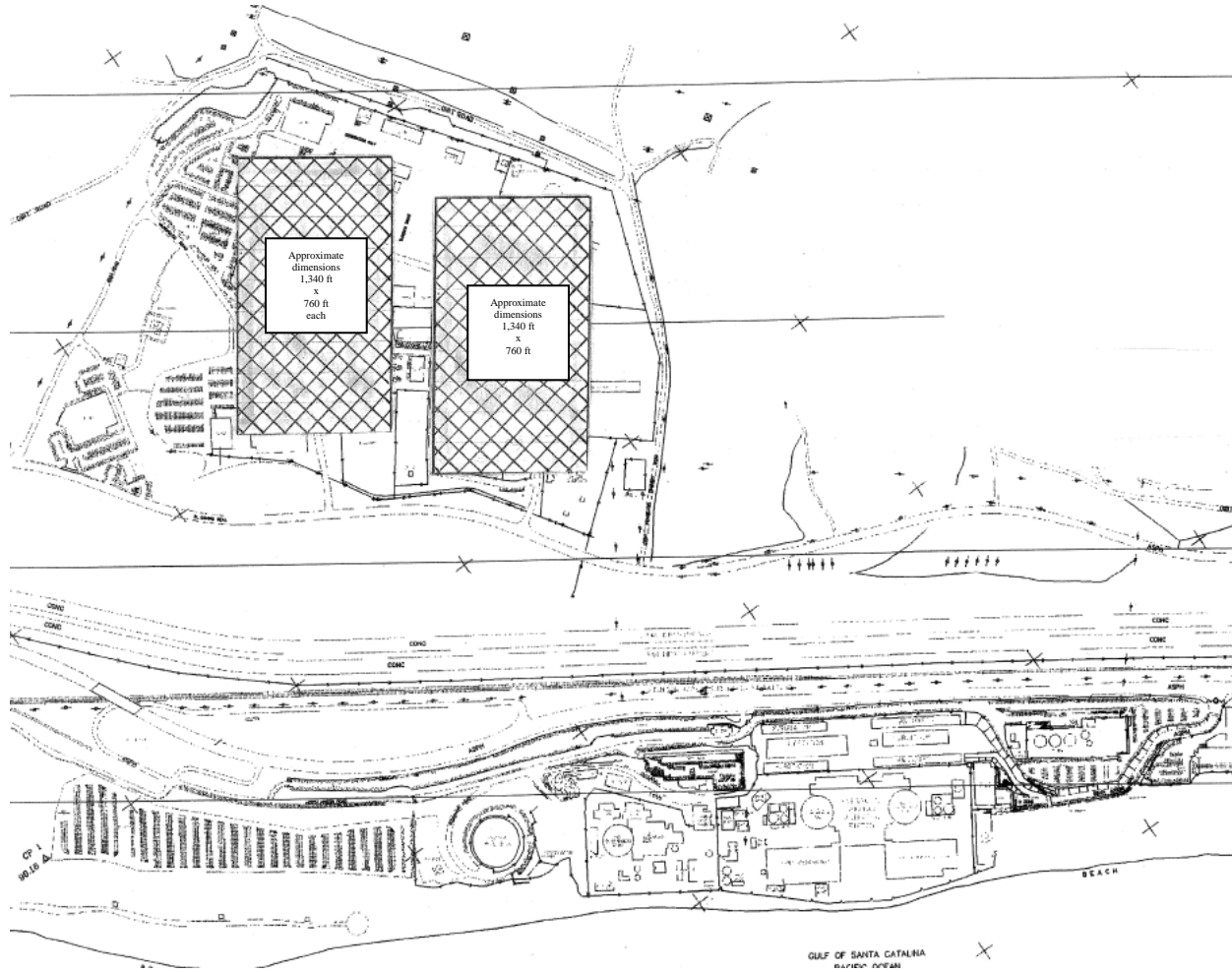


Figure CC-7. Conceptual Plot Plan Mechanical (Forced) Draft Dry Air Cooling Towers

### 3.3 Wet Cooling

In a wet cooling system, the circulating water is cooled primarily by evaporation (latent heat transfer) when it is brought into direct contact with air in a cooling tower. Wet cooling towers use water nozzles to break the water into the smallest droplets possible and then employ fill packs to either break the water into smaller droplets (splash-type fill) or cause them to spread into a fine film (film-type fill), depending on the fill-type used. These actions allow the greatest water surface area possible to be exposed to the cooling air and maximize the time the water and air are in contact, facilitating maximum heat transfer. Evaporation is an effective means of cooling, and, thus, much less heat transfer area (smaller towers) is required for wet technologies compared to dry types.

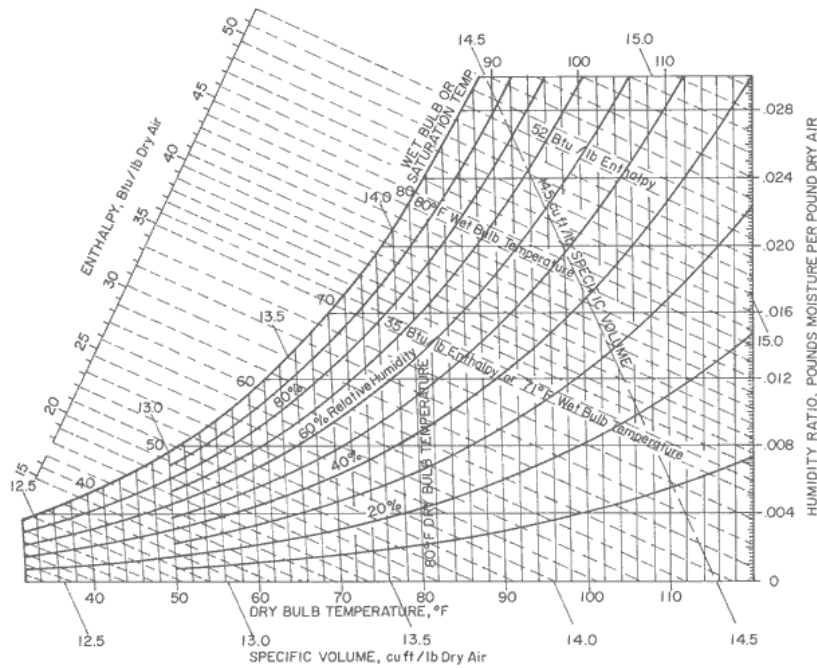


Figure CC-8. Psychrometric Chart

A psychrometric chart illustrates the fact that lines of constant wet bulb temperature are parallel to lines of constant enthalpy, whereas lines of constant dry bulb temperature have no fixed relationship to enthalpy. therefore, the wet bulb temperature governs the performance of wet cooling towers and, theoretically, the lowest cold water temperature achievable is the ambient wet bulb temperature. However, because of inefficiencies in the cooling process, the cold water temperature will not be cooled to the equal the wet bulb temperature. Approach is defined as the difference between the cold water temperature leaving the cooling tower and the wet bulb temperature. The closer the wet bulb is approached, the larger and more expensive the cooling tower becomes, and the more efficiently the power plant operates. The lowest approach achievable depends on whether mechanical draft or natural draft towers are used. Given the requirements of SONGS, the cooling tower manufacturers contacted indicated that an approach of 9°F is achievable with mechanical draft towers and an approach of 12°F is achievable with natural draft towers.

The wet cooling method results in exhaust air being saturated with water (the water evaporated into the air as part of the cooling process). Depending on ambient weather conditions, this saturated exhaust air can recondense as it is discharged to the atmosphere and be visible as a plume. The plume can be significant under certain ambient temperature, humidity and wind conditions, and may appear as a continuous, thick cloud for hundreds of feet in the air and miles away from the tower. The severity and frequency of visible plume was not quantified for each of the various wet technologies as part of this phase of the study, but detailed analysis will be performed as part of Phase II to allow full evaluation of the level of hazard this plume will present. This is an especially important consideration for the wet technologies since these towers will be located so close to the I-5 Interstate highway, as depicted in the conceptual plot plans below.

Makeup water is required to compensate for evaporation, blowdown, and drift losses from the cooling tower. Blowdown is the term applied to the water that is discharged from the system to control concentration of impurities in the circulating water (for example, salt if ocean water is used). Drift is the water lost from the system as liquid droplets entrained in the air stream exiting the tower. Evaporation losses are essentially pure water (contaminants are left behind when the water evaporates), but the drift droplets will contain all of the solids and other chemical constituents present in the circulating water. Therefore, the drift droplets are classified as an air emission source and are subject to air permit considerations. The drift loss from the wet technology types can be limited to 0.0005 percent of the total circulating water flow rate with the application of drift eliminators installed in the towers. Circulating water pH, scale/corrosion, and biological growth are controlled with the addition of specialty treatment chemicals.

Use of wet cooling towers at SONGS will require approximately 14,700 gallons per minute (gpm) of makeup water per unit. This number was determined by assuming that the circulating water system would be run at the highest cycles of concentration allowable while adhering to the available PM-10 emission offsets for DCCP. Running the tower at the highest cycles of concentration possible minimizes the makeup requirements to the fullest extent, but maximizes the negative environmental impacts from the drift. The source of cooling water for the wet and hybrid technologies would be an offsite water source (such as reclaimed or freshwater) because the available PM-10 offsets are insufficient to support tower operation using saltwater. This is described further in Section 4.3.

There are two wet cooling technologies: passive draft and mechanical draft. The specific names for these technologies vary by manufacturer. For each of these types, there are different configurations available for the orientation of the cooling tower internals (cross- and counter-flow arrangements).

For this study, all of the wet technology towers are assumed to be located on the Mesa Complex. As can be seen from the conceptual plot plan, existing structures will likely need to be relocated or additional land will need to be leased by SONGS to accommodate towers in the Mesa. However, it should be noted that there is available area to locate them adjacent to the plant (see possible alternative conceptual plot plan), but this would require relocating a high-traffic parking lot and using state park land—an unlikely situation.



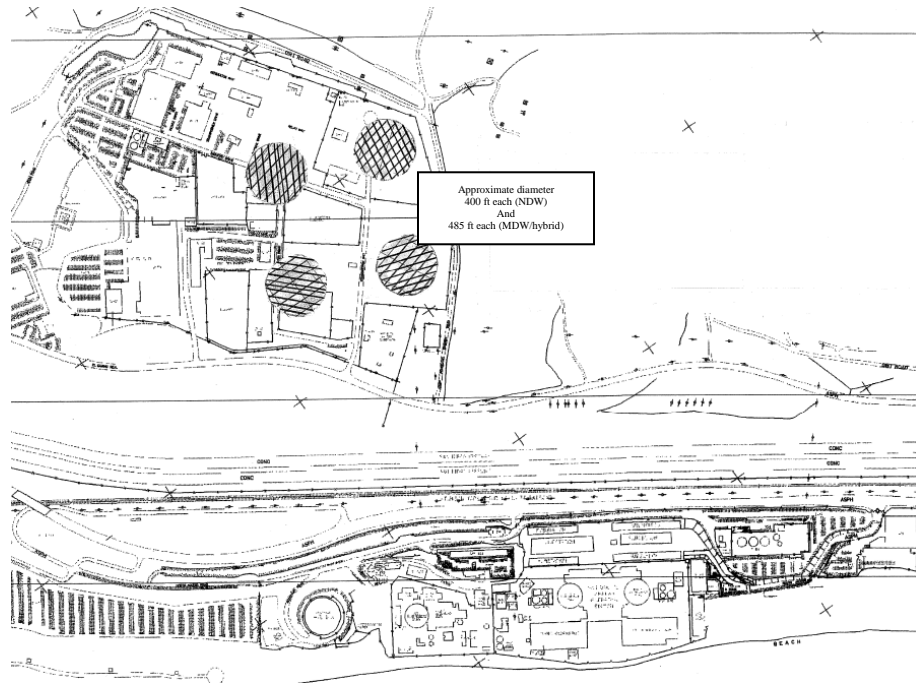


Figure CC-9. Conceptual Plot Plan for Wet Closed-Cycle System Technologies (Wet Natural Draft Cooling, Wet Mechanical (Forced) Draft Cooling, Hybrid)

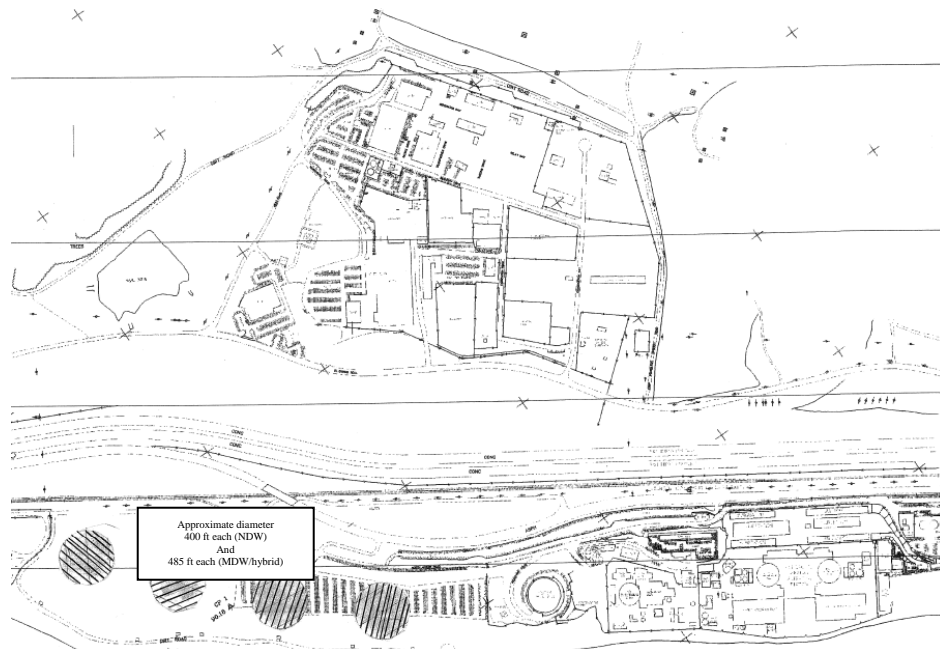
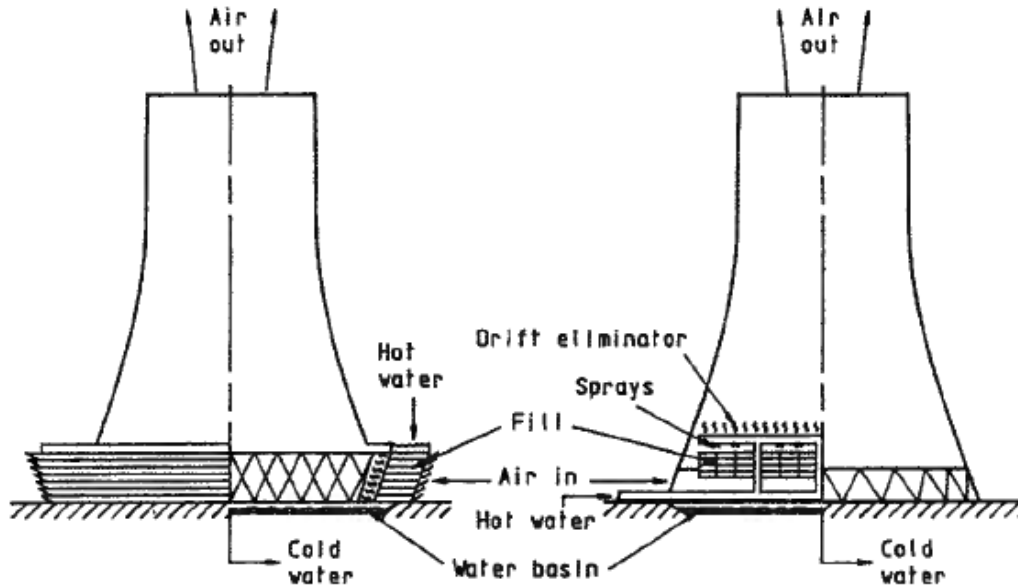


Figure CC-10. Possible Alternative Conceptual Plot Plan for Wet Closed-Cycle System Technologies (Wet Natural Draft Cooling, Wet Mechanics (Forced) Draft Cooling, Hybrid)

### 3.3.1 Wet Natural Draft Cooling

The wet natural draft cooling tower includes tower components (fill, nozzles, drift eliminators) that are contained inside of a shell that can be either steel or concrete. The shell induces a “chimney effect” to create the required draft for cooling. A density difference exists between the ambient air and the air inside of the cooling tower shell above the tower internal components (where the air is hotter and less dense) and this difference induces airflow through a natural draft tower.



*Figure CC-11. Sample Wet Natural Draft Cooling Tower Schematics (Cross and Counter-Flow Internals Configurations) (Kroger, Detlev G. Air-Cooled Heat Exchangers and Cooling Towers. Vol. 1, PennWell Corporation, 2004.)*

SONGS would require approximately two wet natural draft cooling towers per unit, each approximately 400 feet in diameter and 600 feet high.

### 3.3.2 Wet Mechanical (Forced) Draft Cooling

Wet mechanical draft cooling towers use the evaporative wet cooling process, with multiple fans to move the air through the tower. There are both round and rectangular shapes available for the wet mechanical (forced) draft cooling towers for both the tower shapes.



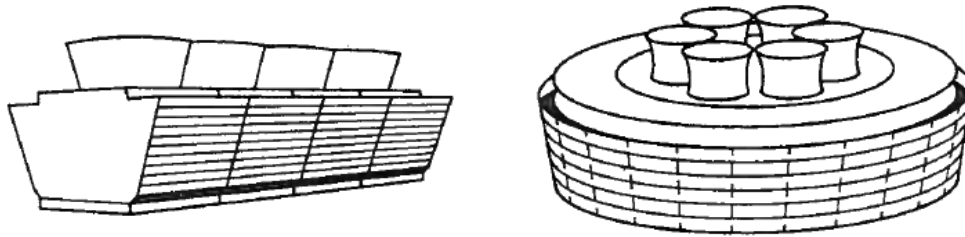


Figure CC-12. Sample Wet Mechanical (Forced) Draft Cooling Configurations – Rectangular In-Line (Left) and Round (Right) (Kroger, 2005)

For SONGS, round towers were considered because this design can maximize the thermal performance since the potential for recirculation is reduced. Recirculation is a phenomenon that occurs when the hot exhaust air leaving a cooling tower is recirculated and reenters the air inlets of the tower. This increases the temperature of the entering air and, thus, increases the temperature of the cold water. The possibility for recirculation increases when a low-pressure region is created on the downwind side of the cooling tower (this occurs with rectangular configurations), and when tower exhaust air velocities are relatively low. In addition, round towers are typically capable of handling higher heat loads using less equivalent land area equivalent than rectangular towers.

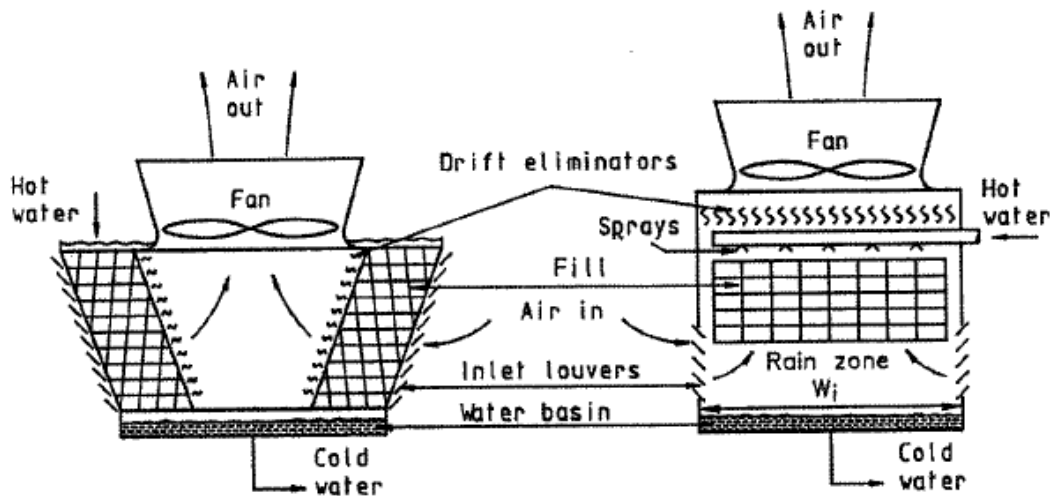


Figure CC-13. Sample Wet Mechanical (Forced) Draft Cooling Tower Schematics (Cross and Counter-Flow Internals Configurations) (Kroger, 2004)

Two round wet mechanical (forced) draft cooling towers per unit approximately 485 feet in diameter and 125 feet high would be necessary to achieve the desired performance at SONGS. Approximately 32 fans would be needed per tower with a total fan input power requirement of 619,200 hp (4.4 MW) per unit.

### 3.4 Hybrid Wet/Dry Cooling

The hybrid cooling tower technology considered in this study is the combination of the wet tower and a dry heat exchanger. Hybrid cooling towers are slightly taller than comparable wet towers due to the addition of the “dry” section. This dry section abates the visible plume because after the plume leaves the lower “wet” section of the tower, it travels upwards through a “dry” section where heated and relatively dry air is mixed with the saturated air in a proportion that results in a mixed discharge air stream that is not at conditions that result in visible plume. This design can also result in slightly reduced evaporative losses as compared to an all wet cooling tower because the dry section can dissipate some of the thermal load without using evaporation (for example, conductive, convective, and radiation heat transfer takes place in the dry section finned tubes). These tower systems result in greater capital and operating and maintenance costs because of the extra equipment associated with the dry section. However, hybrid towers would offer a great advantage to SONGS since they provide the benefit of efficient wet cooling without the visual impact of plume and they are much lower in profile than natural draft towers.

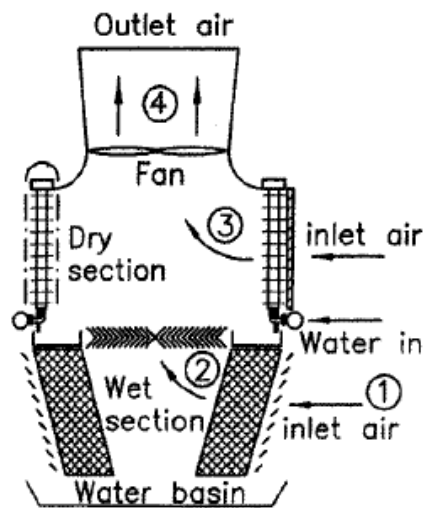


Figure CC-14. Sample Hybrid Cooling Tower Schematic  
(Kroger, 2004)

Taking into consideration the thermal and realistic plume-free requirements at SONGS, a hybrid system would need to consist of two round forced-draft towers per unit. A schematic of this tower type is included below. Each tower has an overall diameter of approximately 485 feet and is 175 feet high. Over 60 fans per tower using a combination of 200 hp and 300 hp would be required to provide airflow over both the wet and dry sections. The collective fan power requirement would reach approximately 16,000 hp (23.8 MW) per unit. When the plume abatement equipment is in operation, the evaporative rate of a hybrid tower is less than that of one operating wet tower. This is because the process used to reduce plume visibility results in some recondensation of the water droplets that had been evaporated into the exiting air stream. The makeup water requirement for the hybrid towers considered in this study is approximately 13,230 gpm per unit. This would need to be supplied by either a fresh or reclaimed water source. The existing once-through intake structure on the ocean would not be used to supply this makeup.

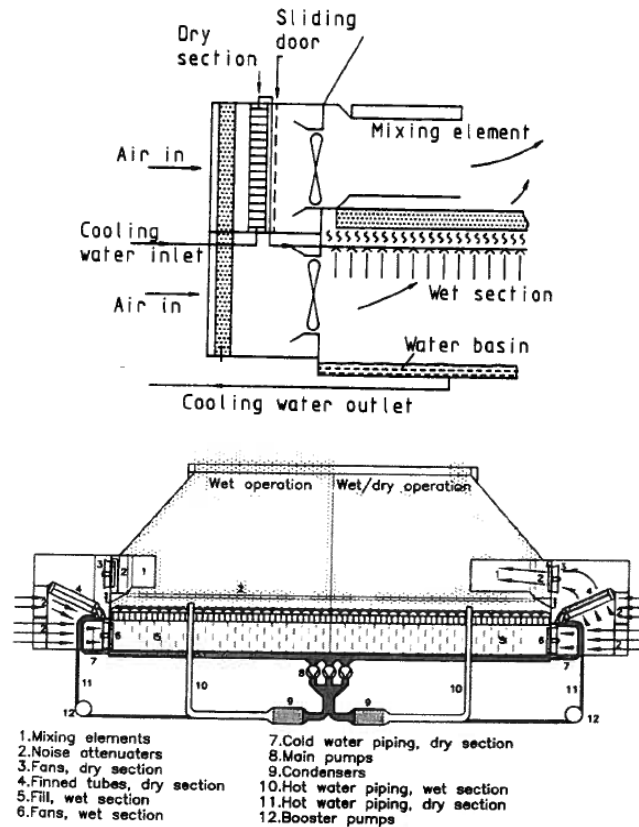


Figure CC-15. Sample Round Configuration Hybrid Cooling Tower Schematic (Kroger, 2004)

Technology Summary

Parameter	Passive Draft Dry/Air Cooling PDD	Mechanical (Forced) Draft Dry/Air Cooling MDD	Wet Natural Draft Cooling NDW	Wet Mechanical (Forced) Draft Cooling MDW	Hybrid Wet/Dry Cooling Hybrid
Total number of towers required for plant (both units)	10	2	4	4	4
Area required per tower, ft <sup>2</sup>	166,171	1,018,400	125,664	184,745	184,745
Total area required (for all towers for the plant, including required spacing in between), ft <sup>2</sup>	6.4 million	2.76 million	1.21 million	1.8 million	1.8 million
Overall tower height, ft	570	94	600	125	175
Makeup requirement per unit, gpm	Insignificant	Insignificant	14,700	14,700	13,230
Fan power requirement per unit, hp	0	43,700	0	619,200	32,000
Fan power requirement per unit, MW	0	32.6	0	14.4	47.6

Note again that all of the sizing and power requirements for the various technologies provided in this Section are approximate based on preliminary discussions with several cooling system manufacturers. The values above may vary depending on the final manufacturer chosen to supply towers for the site. Additionally, these numbers may change if the design requirements for the towers (described in Section 4.5) are modified during detailed design and optimization of a closed-cycle system for SONGS.

## **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 the various closed-cycle system technologies under consideration, as described in Section 3.

This 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) for each tower system based on saltwater, freshwater, and reclaimed water use.

The applicability of each permit/approval to various closed-cycle system and water supply options were evaluated. Those permits and approvals which 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 which would preclude the 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 which would preclude the closed-cooling 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 the dry air-cooled draft cooling system options. 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, which support later stages of construction and operation that are not critical path to the commencement of construction, were also included in the assessment since these items could pose significant operational constraints to future SONGS 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 contacted:

- U.S. Army Corps of Engineers (USACE)
- U.S. Marine Corps (USMC) – Camp Pendleton

- California Public Utility Commission (CPUC)
- California Coastal Commission (CCC)
- California State Lands Commission
- State Water Resources Control Board (SWRCB)
- San Diego Regional Water Quality Control Board (SDRWQCB)
- San Diego Air Pollution Control District (APCD)
- San Diego County Department of Environmental Health

The following sections discuss the relevant key permitting/approval processes for each closed-cycle system type and the three different water supply options. The results are summarized in Tables CC-2 through CC-11 (one for each water supply option) that lists the applicable permits and approvals, determines the critical path review processes and most importantly, highlights those processes which may be fatally flawed.

#### **4.1.2.1 Dry Cooling Systems - Passive Draft Dry/Air Cooling and Mechanical (Forced) Draft Dry/Air Cooling**

The passive draft dry/air cooling option will involve the installation of multiple (10) tall towers in the Mesa Complex. The towers will not produce a visible plume. The mechanical (forced) draft dry/air cooling option will involve installation of two large rectangular (1340 feet by 760 feet) towers also in the Mesa Complex. Water sources for both tower options will include saltwater, freshwater and reclaimed water. The water withdrawal intake system for the saltwater option will require some limited marine work to the existing once-through system intake system. Fresh water will come from a new system of onsite wells or be supplied from undefined external sources (fresh or reclaimed water) which are made available at the site boundary. The reclaimed water option will be treated effluent from wastewater treatment facilities in the area brought to the site via pipeline. For the purposes of this evaluation, this water source is also assumed to be available off the site boundary. The specific permits associated with external sources of freshwater and reclaimed are beyond the scope at this initial assessment, but may be the subject of subsequent evaluations.

#### **U.S. Army Corps of Engineers**

The U.S. Army Corps of Engineers (USACE) is the lead agency for Clean Water Act Section 404 and Section 10 permitting processes, which are focused primarily on impacts to waters of the United States and water-borne navigation. While the passive draft dry/air cooling and mechanical (forced) draft dry/air cooling system is expected to pose limited construction impacts to USACE jurisdictional waters, this option will likely involve Corps permitting – at least for the saltwater source option. The freshwater and reclaimed water supply options will likely not involve work in jurisdictional waters, unless the associated pipelines cross such areas. The impact of those offsite impacts are not addressed in this evaluation.

For minor impacts the Corps has established a general permit program (nationwide permit) for a host of less significant work processes involving waters of the United States. So it is possible that these saltwater tower options will demand a nationwide permit. If the marine work associated with these cooling tower options exceeds that threshold allowed by the nationwide permit or is otherwise deemed significant, SONGS would then be faced with securing a new individual Section 404/10 permit.

While individual Section 404 permit review periods can often be lengthy, the Corps representative for the SONGS area explained that all USACE facilities have goal to issue an individual Section 404 permit within 120 days of deeming the associated application complete (Lambert, 2012). This period is a goal, not a statutory commitment. Consequently, in many cases this goal is not realized. These delays are often associated with the mandated consulting processes that need to be pursued with the State Historic Preservation Office,

U.S. Fish and Wildlife Service, or National Marine Fisheries Service. In other cases there are extensions of public notice periods or scheduling complications for the public hearing. The applicant for the Section 404/10 permit has to directly pursue consultations with California Coastal Commission (CCC) and SWRCB. Receipt of an individual Section 404 permit is contingent on previous receipt of permits from the CCC and SWRCB.

This difficult situation is impeded further by the under staffed local USACE offices (two to three permit writers), so permit review durations have been getting longer. For the more complex and contentious situations, the permitting process can extend to 1–2 years. Hence, the USACE permits are often characterized as the critical path permitting process.

Despite the potential for review periods longer than the 120 day target, the USACE did not see any barriers or fatal flaws regarding the Section 404 permitting process for near-shore marine work associated with changes to the existing saltwater intake system. The freshwater and reclaimed water supply options for the passive draft dry air cooling or mechanical (forced) draft dry air cooling system offsite are assumed to be available at the property boundary and so do not pose any immediate or significant concerns.

### **U.S. Marine Corps – Camp Pendleton**

SONGS is located on leased property that is part of the USMC Camp Pendleton. Any significant physical improvements to the SONGS facility, such as addition of either the passive draft dry/air cooling and mechanical (forced) draft dry/air cooling towers, are potentially subject to a formal review and approval process by the USMC and U.S. Department of the Navy.

SONGS resides on land that is subdivided into two leases and 9 easements. The SONGS lease grants the USMC and the U.S. Department of the Navy authority to review and improve physical improvements on the subject property. While this authority does not formally extend to offshore properties, the USMC is also interested in any offshore work in the area, since it could potentially impact their offshore training activities.

The USMC representative (Rannals, 2012) explained that any new facility over 50 feet (above ground level) on the SONGS property could affect their training operations (for example, low altitude helicopter operations). The tall (570 feet) passive draft dry air cooling towers and the mechanical draft (forced) dry tower (94 feet) will likely present an impact to training operations (for example, low-altitude helicopter operations near the Mesa Complex). Both tower options will present an aesthetic impact to the “family housing section” located north of the SONGS property. There will be no visible plume or salt emissions from these dry systems. The USMC may also be interested in any cooling system-related impacts to the SONGS Unit 1 outfall area, which also houses the Camp Pendleton sanitary water treatment system outfall.

The review and approval process for new cooling system facilities at SONGS will be a several month process (as much as 6 months). The application submitted to the USMC/Camp Pendleton (with appropriate site plan drawings and associated written descriptions) would be initially reviewed by the Camp Pendleton staff. This staff would compile their findings and make a recommendation to the Camp Pendleton Base Commander regarding the application. With this input, the Base Commander would then develop and submit a recommendation to the USMC headquarters and subsequently to the U.S. Department of Navy. The U.S. Department of the Navy would provide the final approval/denial of the proposed new SONGS facility on leased Camp Pendleton property.

The USMC will look very closely at any modifications at the SONGS facility that would jeopardize its primary training objectives (low altitude helicopter operations). As the tall passive draft dry air cooling and me-



chanical (forced) draft dry/air cooling towers may impact this training, this cooling option (for any water supply option) may be characterized as potentially presenting a fatal flaw in regards to securing the necessary U.S. Department of Navy lease.

### **California Public Utility Commission**

SONGS is regulated by the CPUC, which is charged with overseeing investor-owned public utilities. Given the lack of significant county involvement on this federal property, the CPUC will likely be designated the lead agency for the CEQA review process. CEQA is 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 new passive draft dry air cooling or mechanical (forced) draft dry/air cooling tower system will certainly trigger preparation of Environmental Impact Report, which along with other financial information, would ultimately support the process to determine if SCE can recover the costs associated with this cooling system technology. This Environmental Impact Report is also used by other state agencies to support their respective review and approval processes.

Following finalization of the Environmental Impact Report, the CPUC will evaluate whether to certify CEQA compliance. This certification then supports their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.

While the CPUC-sponsored review process and decision regarding cost recovery will likely be a lengthy, complex and contentious process, there are no clear environmental barriers, which preclude completion of the CEQA review for the passive draft dry air cooling or mechanical (forced) draft dry/air cooling technology option (for any water supply option).

### **California Coastal Commission**

The CCC has a broad mandate to protect the coast resources of California which include the SONGS facility and any related site where the passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers could be sited, including the Mesa Complex. Consequently, the CCC's environmental concerns address a broad range of subject matter include visual resources, land and marine-based biological resources, land use and socioeconomic concerns (for example, recreational use/access). Despite this comprehensive focus, the CCC has little in the way of specific, objective criteria, which could be used to effectively screen either dry system cooling option from further consideration.

The CCC representatives (Detmer & Luster 2012) indicated that the Commission recognized that there were no great options to the existing once-through cooling system at SONGS. The CCC believes that almost all of the cooling system technology replacement options present some sort of negative impacts. Given that basis, the CCC appears to be resigned to consider options which may present additional onshore impacts to help mitigate the offshore environmental consequences of the existing once-through cooling. The CCC 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 cooling system options from consideration, including passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers.

The only potential fatal flaw trigger may be related to the tall passive draft dry air cooling structures and, to a lesser extent, the mechanical (forced) draft dry/air cooling structures, which will be situated on the Mesa



Complex. The CCC freely admitted that they would be very concerned with visual impacts from large cooling tower structures and towering plume columns. While this technology will not produce a visible plume, the tower size and location in somewhat elevated Mesa Complex could be an impediment to securing the Commission's Coastal Development Permit. The lower profile mechanical (forced) draft dry air cooling towers would not present this visual fatal flaw, but its expansive horizontal dimensions could prove troubling.

The passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers would not involve significant offshore construction efforts, so the CCC 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 CCC would obviously view the reduction of thermal impact from the cooling system discharge (significantly reduced cooling tower blowdown discharge volume) and reduced entrainment/impingement impacts (reduced water withdrawal rates) as wholly positive outcomes from the application of a passive draft dry air cooling or mechanical (forced) draft dry/air cooling system. 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 Section 316(b) *California Once-Through Cooling Policy*, Section Phase II criteria or NPDES thermal discharge considerations.

The CCC review and approval process is mostly aligned with the CEQA review process. That is, any application for a Coastal Development Permit will be dependent on information which is generated by associated Environmental Impact Report development process. Consequently, the CCC permit review process will also be aligned with CEQA and consequently its duration will mirror the CEQA timeline (6 months – 1 year). That period offers evidence that the Coastal Development Permit could be a critical path permitting process for the passive draft dry air cooling or mechanical (forced) draft dry/air cooling tower system (all water supply options).

### **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 tracks – 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. It is unlikely that this option would apply to any of the potential cooling system options which require marine work.
- **Mitigated Negative Declaration** - applicable for work which poses minor environmental impacts, during noncritical seasons, for limited period of time. The current SONGS marine mammal screening retrofit work has been reviewed and approved via mitigated negative declaration.
- **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 periods (months). This review process is not fast-track and could extend for a year.

The passive draft dry air cooling and mechanical (forced) draft dry/air cooling technologies could potentially require revisions of the current cooling system infrastructure in subaqueous lands. Commission representatives (DeLeon & Oggins, 2012) explained that recent experience regarding the progress of the lease approval

process for nonnuclear facilities with existing once-through systems has been slow. Most of these 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 passive draft dry air cooling or mechanical (forced) draft dry/air cooling system-related limited marine work may allow one to follow the more expeditious Mitigated Negative Declaration path, avoiding the longer, more complex Environmental Impact Report/CEQA review path. Consequently, the State Lands Commission lease will probably not represent a significant permitting hurdle for these dry system cooling technologies (for any water supply option).

### **State Water Resources Control Board - San Diego Regional Water Quality Control Board**

While the SWRCB has overall permit authority for California's two active nuclear power stations, the SDRWQCB has the follow-on inspection and enforcement role for the issue permits. For SONGS, the SWRCB expects to modify the existing NPDES permit, potentially issue a new waste discharge requirements permit for construction impacts to jurisdictional streambed areas, and finally, grant the construction project coverage under the general storm water permit for construction activity to address-related storm water management issues.

The passive draft dry air cooling system will require the current SONGS NPDES permit to be revised to address the expected changes to the cooling system discharge (blowdown) quantity and quality and compliance with the provisions of Section 316(b) *California Once-Through Cooling Policy*, Phase II requirements (reduction of impingement and entrainment impacts to marine resources). For a saltwater supply, this revision will reflect the expected increase in water treatment additives to the circulating water system, the significantly reduced saltwater withdrawal rates, altered storm water management features, and the reduced discharge of a more saline blowdown effluent. The *California Once-Through Cooling Policy*, Section 316(b) requirements are inapplicable if the towers are supplied from freshwater and reclaimed water sources. The reduced discharge from this system is less saline, even considering multiple cycles of concentration.

The waste discharge requirements permit may be required if the development of the passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers impacts jurisdictional streambeds (waters of the state). The waste discharge requirements will be coordinated with the California Department of Fish and Game Streambed Alteration Agreement, which addresses biological resource and habitat protection issues in these same streambeds.

Both the SWRCB and SDRWQCB representatives (Morris, 2012 and Jauregui, 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 saltwater passive draft dry air cooling or mechanical (forced) draft dry air cooling tower system. The SDRWQCB and SWRCB will not necessarily preclude any cooling system options from consideration, even if these options fall short of full compliance with the performance criteria tied to Section 316(b) *California Once-Through Cooling Policy*, Phase II rules (that is, through-screen velocity less than 0.5 fps and entrainment/impingement levels equivalent that associated with a closed-cycle cooling system). The saltwater passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers can obviously demonstrate compliance with the *California Once-Through Cooling Policy* and Section 316(b) Phase II rules. The fresh or reclaimed water-supplied tower system completely avoids these compliance issues.

The SDRWQCB is ultimately a political body (9 individuals), whose members are interested in reviewing information/evidence from the applicant and from their own technical staff regarding the feasibility and im-

pacts of various cooling system alternatives. Consequently, none of the SWRCB permits represent a fatal flaw or critical path permitting process to the passive draft dry air cooling or mechanical (forced) draft dry/air cooling technology (for any water supply option).

### **San Diego Air Pollution Control District**

SONGS is located within the San Diego APCD, 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 (Annicchiarico, 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 which 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 which generate significant particulate emissions (closed cooling cycle systems), air quality permits/approvals are not expected to play an appreciable role for the passive draft dry air cooling or mechanical (forced) draft dry/air cooling system—systems that are not expected to generate any additional operational air emissions.

### **San Diego County Department of Environmental Health**

As SONGS is located entirely on leased federal property that is part of the USMC Camp Pendleton, any significant physical improvements to the SONGS facility are not subject to San Diego County review. The review process is essentially delegated to the USMC and U.S. Department of the Navy. Consequently, most of the San Diego County departments of (Planning and Land Use, Public Works, and Building Division) do not directly regulate SONGS.

Despite the fact that the county oversight for SONGS is constrained, there are six separate ongoing county lead regulatory programs at this facility (Mache, 2012). County Environmental Health Department has received CalEPA approval to be the Certified Unified Program Agency responsible for management of the following programs:

- California Aboveground Storage Tank Program – mandates development and implementation of a Spill Prevention and Countermeasure Control Program (SPCC) and tank inspections.
- California Underground Storage Tank Monitoring Program – addresses fuel storage and leak detection in Mesa Complex and power block area.
- Hazardous Waste Storage and Treatment – includes small proprietary oil separation facility.
- Medical Waste Disposal – a county ordinance makes this an Environmental Health Department responsibility.
- Clean Air Act 112r Risk Management Plan – addresses onsite aqueous ammonia storage
- Hazardous Material Business Plan – addresses storage of greater than 55 gallons of chemicals with potential for offsite impacts and addresses the facility’s Emergency Planning and Community-Right-to-Know (EPCRA) responsibilities.

While the relevance of the various cooling system options to these six regulatory programs may not be immediately apparent, the passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers will

require additional chemical additives, generate new waste streams, and potentially force the relocation of existing chemical and fuel storage systems. While these changes may result in a fairly involved revision process for many of associated management plans, this work does not appear to present any obvious county-sponsored regulatory barriers to the Passive draft dry air cooling and mechanical (forced) draft dry/air cooling system (for any water supply option) or represent critical path permitting processes.

### **Other Agencies**

In addition to the key regulatory agencies described above, there are a number of regulatory agencies which could potentially play a role in the permitting of the passive draft dry air cooling or mechanical (forced) draft dry/air cooling options. The construction of a passive draft dry air cooling and mechanical (forced) draft dry/air cooling tower system will demand the addition of circulating water pipes, which will circulate water between the condensers in the power block area (SONGS Coastal Complex) and the cooling towers located in the Mesa Complex. Consequently, these pipelines will traverse the intervening Interstate-5 Highway, the North Coast Transit District Railway (used by Burlington Northern Santa Fe) and US Highway 101. While the tunnel boring methods can be used, such that construction will be able to progress with no traffic or rail disruptions, there will be a follow-on engineering investigation and permitting activity. Based on previous studies (Enercon) it is likely this effort will demand a full engineering and geotechnical survey which will subsequently support the process to secure multiple right-of-way encroachment permits from Caltrans. The overall design and installation of these saltwater circulating water lines will be subject to considerable review to confirm compliance with each organizations guidelines, codes and criteria. Given the undefined source of reclaimed and freshwater supplies to these cooling tower systems, it is not clear whether these water sources will require similar tunneling efforts.

The tall passive draft dry air cooling towers and, to a lesser extent, the mechanical (forced) draft dry/air cooling towers, will significantly alter the overall profile of the SONGS facility and passive draft dry/air towers are likely to require cranes over 200 feet above local ground level. As the towers and related cranes have the potential to be obstructions to aviation, related Notices of Proposed Construction or Alteration will need to be filed with the FAA to facilitate their review. The relatively low profile mechanical (forced) draft dry/air cooling towers are large structures, but they will not alter the overall profile of the Mesa Complex as significantly. These towers and any related construction equipment are below the FAA 200 foot threshold and so the mechanical (forced) draft dry/air cooling towers will likely not warrant the submittal of related Notices of Proposed Construction or Alteration with the FAA.

The U.S. Fish and Wildlife Service, California Department of Fish and Game, and California Office of Historic Preservation, for example, often play significant regulatory roles in power plant upgrade projects. The passive draft dry air cooling or mechanical (forced) draft dry/air cooling tower systems will likely be situated where the uplands and subaqueous lands has been previously disturbed, which would essential preclude new impacts to previously undiscovered sensitive biological or cultural resources. Finally, the California Energy Commission will be largely excluded from the permitting processes primarily because these dry cooling tower systems will not boost currently power levels of the SONGS facility, let alone reach the 50 MW threshold that would mandate California Energy Commission review.

### **Summary**

The external approval and permitting assessment for the passive draft dry air cooling or mechanical (forced) draft dry/air cooling systems identified a list of potentially applicable federal, state, and local permits and approvals. These permits lists are shown in Tables CC-2 through CC-5. The air-cooled process effectively mitigates all of the serious air quality concerns of the equivalent wet saltwater tower systems, while maintaining

an intake system, which is fully aligned with the requirements of the *California Once-Through Cooling Policy*. The main permitting challenges in this case are associated with the use of the entire Mesa Complex for industrial purposes. The CCC and CEQA review process and the associated permitting process may be contentious and lengthy. However, these permit processes are not expected to represent fatal flaws, which would preclude the passive draft dry air cooling or mechanical (forced) draft dry/air cooling from further consideration.

The assessment also indicated that the Section 404 permit and the CEQA review process will likely represent the critical path review and approval processes (approximately 12 month) for the passive draft dry air cooling or mechanical (forced) draft dry/air cooling towers. This critical path process does not represent barrier to development of this cooling technology system.

#### **4.1.2.2 Wet Natural Draft Cooling, Wet Mechanical (Forced) Draft Cooling and Hybrid Wet/Dry Cooling (Hybrid)**

The wet natural draft cooling tower cooling system option will demand the installation of multiple tall hyperbolic structures (approximately 600 feet above ground level) in the SONGS Mesa Complex area. The wet natural draft cooling system option will involve the installation of multiple (four) wet natural draft cooling towers approximately 125 feet tall in this same location. The Wet natural draft cooling and wet mechanical (forced) draft cooling tower plumes will be unabated and produce significant visible plumes.

The hybrid wet/dry tower cooling system option will involve the installation of multiple (five) of hybrid wet/dry round towers (175 feet high, 485 feet in diameter) also in the SONGS Mesa Complex. These towers, however, will be plume abated, which should limit the incidence of visible plumes.

Water sources for all of the wet tower systems will include saltwater, freshwater, and reclaimed water. The water withdrawal intake system for the saltwater option will require some limited marine work to the existing once-through system intake system. Freshwater will come from a new system of onsite wells or be supplied from undefined external sources, which are made available at the site boundary. The reclaimed water option will depend on water coming treated effluent from wastewater treatment facilities in the area via pipeline. For the purposes of this evaluation, this water source is also assumed to be available at the site boundary. The specific permits associated with external sources of freshwater and reclaimed water are beyond the scope of this initial assessment, but may be the subject of subsequent evaluations.

#### **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 primarily on impacts to waters of the United States and waterborne navigation. While the wet cooling tower systems are expected to pose limited construction impacts to USACE jurisdictional waters, these cooling tower options will likely involved USACE permitting—at least for the saltwater source option. The freshwater and reclaimed water supply options will likely not involve work in jurisdictional waters, unless the associated pipelines cross such areas. The impact of those offsite impacts are not addressed in this evaluation.

For minor impacts, the USACE has established a general permit program (nationwide permit) for a host of less significant work processes involving waters of the United States. Therefore, it is possible that the wet natural draft cooling tower saltwater option will demand a nationwide permit. If the marine work associated with this cooling tower option exceeds that threshold allowed by the nationwide permit or is otherwise deemed significant, SONGS would then be faced with securing a new individual Section 404/10 permit.

While individual Section 404 permit review periods can often be lengthy, the USACE representative for the SONGS area explained that all USACE facilities have a goal to issue an individual Section 404 permit within 120 days of deeming the associated application complete (Lambert, 2012). This period is a goal, not a statutory commitment. Consequently, in many cases this goal is not realized. These delays are often associated with the mandated consulting processes that need to be pursued with the State Historic Preservation Office, U.S. Fish and Wildlife Service, or National Marine Fisheries Service. In other cases, there are extensions of public notice periods or scheduling complications for the public hearing. The applicant for the Section 404/10 permit has to directly pursue consultations with CCC and SWRCB. Receipt of an individual Section 404 permit is contingent on previous receipt of permits from the CCC and SWRCB.

This difficult situation is impeded further by the under staffed local USACE offices (two to three permit writers), so permit review durations have been getting longer. For the more complex and contentious situations, the permitting process can extend to 1 to 2 years. Hence, the USACE permits are often characterized as the critical path permitting process.

Despite the potential for review periods longer than the 120-day target, the USACE did not see any barriers or fatal flaws regarding the Section 404 permitting process for near-shore marine work associated with changes to the existing saltwater intake system. (Lambert, 2012) The freshwater and reclaimed water supply options for the wet natural draft cooling tower system offsite are assumed to be available at the property boundary and so do not pose any immediate or significant concerns.

### **USMC – Camp Pendleton**

SONGS is located on leased property that is part of the USMC Camp Pendleton. Any significant physical improvements to the SONGS facility, such as addition of the wet cooling tower systems, are potentially subject to a formal review and approval process by the USMC and U.S. Department of the Navy.

SONGS resides on land that is subdivided into two leases and nine easements. The SONGS lease grants the USMC and the U.S. Department of the Navy authority to review and improve physical improvements on the subject property. While this authority does not formally extend to offshore properties, the USMC is also interested in any offshore work in the area, since it could potentially impact their offshore training activities.

The USMC representative (Rannals, 2012) explained that any new facility over 50 feet (above ground level) on the SONGS property could affect their training operations (for example, low-altitude helicopter operations). Visible cooling tower plumes, such as from a tall wet natural draft cooling and lower profile wet mechanical (forced) draft cooling tower systems would present a significant impact to training operations (for example, low-altitude helicopter operations near the Mesa area of the SONGS property). The plume-abated hybrid system would obviously not generate this plume. All of the towers will result in aesthetic and salt deposition impacts to the “family housing section” located to the north of the SONGS property. Obviously, the saltwater option will generate more significant salt deposition than the fresh or reclaimed water options. The USMC may also be interested in any cooling system-related impacts to the SONGS Unit 1 outfall area, which also houses the Camp Pendleton sanitary water treatment system outfall.

The review and approval process for new cooling system facilities at SONGS is a several month process (as much as 6 months). The application submitted to the USMC/Camp Pendleton (with appropriate site plan drawings and associated written descriptions) would be initially reviewed by the Camp Pendleton staff. This staff would compile their findings and make a recommendation to the Camp Pendleton Base Commander regarding the application. With this input, the Base Commander would then develop and submit a recommendation to the USMC headquarters and subsequently to the Department of Navy. The U.S. Department of the



Navy would provide the final approval/denial of the proposed new SONGS facility on leased Camp Pendleton property.

It is fairly clear that the USMC looks very closely at any modifications at the SONGS facility that would jeopardize its primary training objectives, which include low-altitude helicopter operations in the SONGS Mesa area. Hence, the wet closed cooling systems options that are tall and/or that will generate visible plumes will be closely scrutinized. Ultimately, the wet natural draft cooling and wet mechanical (forced) draft cooling tower options may not receive final USMC/Navy Department approval of an amended lease. The hybrid tower systems lower profile plume and abatement feature may be key considerations in the final USMC/U.S. Navy Department lease review process. Thus, the Wet natural draft cooling and wet mechanical (forced) draft cooling tower technologies (for any water supply option) may be characterized as potentially presenting a fatal flaw in regards to securing the necessary Department of Navy lease. The hybrid system has much better chance of securing this lease.

### **California Public Utility Commission**

SONGS is regulated by the CPUC, which is charged with overseeing investor-owned public utilities. Given the lack of significant county involvement on this federal property, the CPUC will likely be designated the lead agency for the CEQA review process. CEQA is regulatory statute that 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.

All of the proposed new wet tower system will certainly trigger preparation of Environmental Impact Report, which along with other financial information, would ultimately support the process to determine if Southern SCE can recover the costs associated with this cooling system technology. This Environmental Impact Report is also used by other state agencies to support their respective review and approval processes.

Following finalization of the Environmental Impact Report, the CPUC will evaluate whether to certify CEQA compliance. This certification then supports their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.

While the CPUC-sponsored review process and decision regarding cost recovery will likely be a lengthy, complex, and contentious process, there are no clear environmental barriers that preclude completion of the CEQA review for the wet natural draft cooling tower technology option (for any water supply option).

### **California Coastal Commission**

The CCC has a broad mandate to protect the coast resources of California, which include the SONGS facility and any related site where the wet cooling towers could be sited, including the Mesa Complex. Consequently, the CCC's environmental concerns address a broad range of subject matter including visual resources, land and marine-based biological resources, land use and socioeconomic concerns (for example, recreational use/access). Despite this comprehensive focus, the CCC has little in the way of specific, objective criteria that could be used to effectively screen the wet tower options from further consideration.

The CCC representatives (Detmer & Luster 2012) indicated that the Commission recognized that there were no great options to the existing once-through cooling system at SONGS. The CCC believes that almost all of the cooling system technology replacement options present some sort of negative impacts. Given that basis, the CCC appears to be resigned to consider options that may present additional onshore impacts to help mitigate the offshore environmental consequences of the existing once-through cooling. The CCC 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 cooling system options from consideration, including the wet cooling towers.

The only potential fatal flaw trigger may be related to the rather tall wet natural draft cooling tower structure and the even more visually intrusive unabated cooling tower plume, which is also a feature of the wet mechanical (forced) draft cooling towers. The CCC freely admitted that they would be very concerned with visual impacts from large cooling tower structures and towering plume columns. Therefore, this visual resource issue has the potential to be a barrier to the secure the Commission's Coastal Development Permit for the wet natural draft cooling and wet mechanical (forced) draft cooling towers. The lower profile plume abated hybrid towers would likely mitigate CCC visual resource concerns.

The wet towers would not involve significant offshore construction efforts, so the CCC 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 CCC would obviously view the reduction of thermal impact from the cooling system discharge (significantly reduced cooling tower blowdown discharge volume) and reduced entrainment/impingement impacts (reduced water withdrawal rates) as wholly positive outcomes from the application of wet natural draft cooling tower systems. 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 Section 316(b), *California Once-Through Cooling Policy*, Phase II criteria or NPDES thermal discharge considerations.

The CCC review and approval process is mostly aligned with the CEQA review process. That is, any application for a coastal development permit will depend on information, that is generated by an associated Environmental Impact Report development process. Consequently, the CCC permit review process will also be aligned with CEQA and consequently its duration will mirror the CEQA timeline (6 months–1 year). That period offers evidence that the coastal development permit could be a critical path permitting process for the wet tower systems (all water supply options).

### **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 tracks, 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. It is unlikely that this option would apply to any of the potential cooling system options that require marine work.
- **Mitigated Negative Declaration** - applicable for work that poses minor environmental impacts, during noncritical seasons, for limited periods of time. The current SONGS marine mammal screening retrofit work has been reviewed and approved via *Mitigated Negative Declaration*.
- **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 periods (months). This review process is not fast-track and could extend for a year.

The wet tower technologies could potentially require revisions of the current cooling system infrastructure in subaqueous lands. Commission representatives (DeLeon & Oggins, 2012) explained that recent experience regarding the progress of the lease approval process for nonnuclear facilities with existing once-through systems has been slow. Most of these 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 wet cooling tower systems expected limited marine work may allow one to follow the more expeditious Mitigated Negative Declaration path, avoiding the longer, more complex Environmental Impact Report/CEQA review path. Consequently, the State Lands Commission lease will probably not represent a significant permitting hurdle for the wet cooling tower systems (for any water supply option).

### **State Water Resources Control Board - San Diego Regional Water Quality Control Board**

While the SWRCB has overall permit authority for California's two active nuclear power stations, the SDRWQCB has the follow-on inspection and enforcement role for the issue permits. For SONGS, the SWRCB expects to modify the existing NPDES permit, potentially issue a new waste discharge requirements permit for construction impacts to jurisdictional streambed areas, and finally, grant the construction project coverage under the general storm water permit for construction activity to address related storm water management issues.

The wet tower systems will require the current SONGS NPDES permit to be revised to address the expected changes to the cooling system discharge (blowdown) quantity and quality and compliance with the provisions of Section 316(b), *California Once-Through Cooling Policy*, Phase II requirements (reduction of impingement and entrainment impacts to marine resources). For a saltwater supply, this revision will reflect the expected increase in water treatment additives to the circulating water system, the significantly reduced saltwater withdrawal rates), altered storm water management features, and the reduced discharge of a more saline blowdown effluent. The Section 316(b), *California Once-Through Cooling Policy* requirements are inapplicable if the towers are supplied from freshwater and reclaimed water sources. The reduced discharge from this system is less saline, even considering tower operation with multiple cycles of concentration.

The waste discharge requirements permit may be required if the development of the wet tower cooling system impacts jurisdictional streambeds (waters of the state). The waste discharge requirements will be coordinated with the California Department of Fish and Game Streambed Alteration Agreement, which addresses biological resource and habitat protection issues in these same streambeds.

Both the SWRCB and SDRWQCB representatives (Morris, 2012 and Jauregui, 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 saltwater wet tower system. The SDRWQCB 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 the *California Once-Through Cooling Policy* and 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-cycle cooling system). The saltwater cooling tower systems, however, can obviously demonstrate compliance with the *California Once-Through Cooling Policy* and Section 316(b) Phase II rules. The fresh or reclaimed water-supplied tower system completely avoids Section 316(b)-related compliance issues.

The SDRWQCB is ultimately a political body (9 individuals), whose members are interested in reviewing information/evidence from the applicant and from their own technical staff regarding the feasibility and im-

pacts of various cooling system alternatives. Consequently, none of the SWRCB permits represent a fatal flaw or critical path permitting process to the wet cooling tower systems (for any water supply option).

### **San Diego Air Pollution Control District**

SONGS is located within the San Diego APCD, 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. Given this regional status, the particulate emissions from the operation from a wet tower saltwater system can be expected to present a significant regulatory challenge, especially for the saltwater supply option.

From previous studies (Enercon), it is clear that a saltwater wet tower system (unabated) will generate particulate emissions in quantities that will exceed the major source threshold for PM-10 (100 tons/year). If the SONGS facility was already a major source of a criteria air pollutant (that is, maintaining a major source air permit), this threshold drops to the major modification level of 15 tons/year.

Given this status, the addition of any of the saltwater wet cooling systems is expected to increase PM-10 emissions by more than 100 tons per year, which will make the SONGS subject to a formal New Source Review process. This process will eventually culminate in forcing SONGS to secure PM-10 emissions offsets in response to the new cooling tower-related particulate emissions. The fresh and reclaimed water-supplied wet cooling towers will likely not trigger this 100 ton threshold.

The San Diego APCD representative (Annicchiarico, 2012) explained that they maintain a registry of emission reduction credits for PM-10. There is no PM-2.5 registry. The total PM-10 tons/year emission reduction credit (that is, emission offsets) available in this District totals approximately 207 tons/year (see Table CC-17) for an excerpt of this summary. These emissions are retained or owned by a number of different companies or organizations. The emission reduction credits are available for sale or they can be retained by the Owners for future use. Alternatively, the interested party can generate additional emission reduction credits by shutting down additional sources of PM-10 either within their direct control or via separate third-party arrangements.

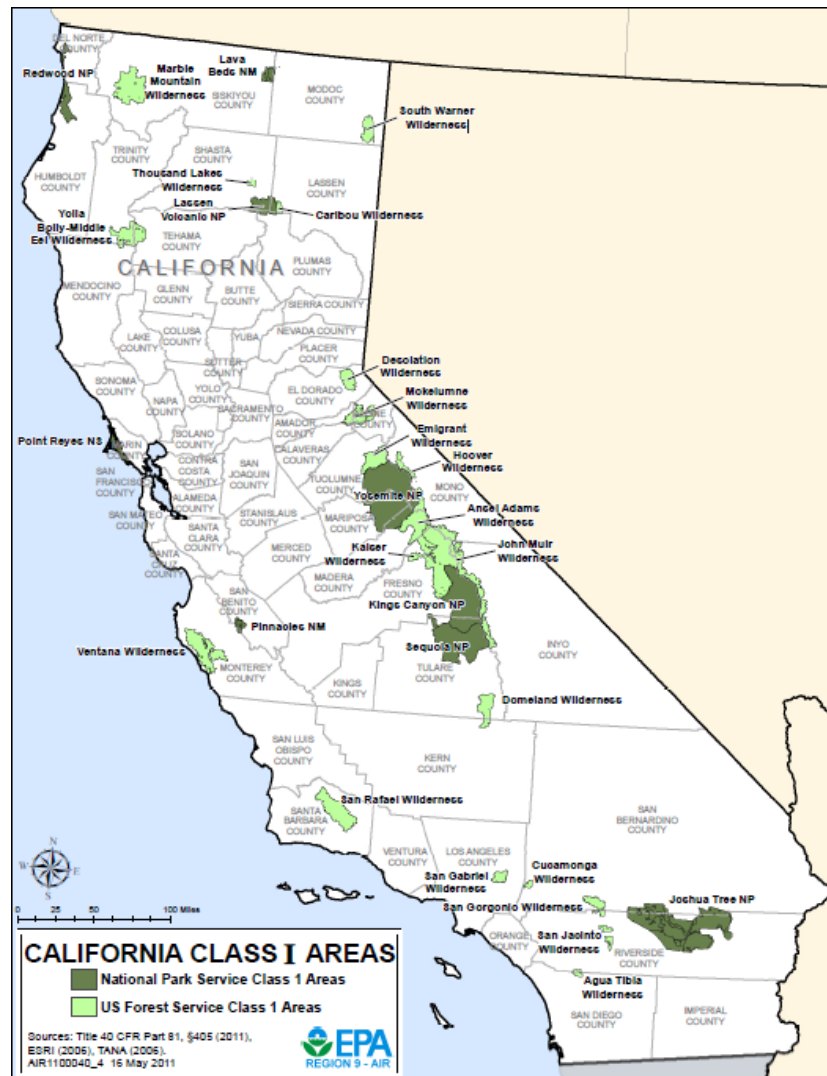
The saltwater cooling towers are expected to generate PM-10 emissions far in excess of 207 tons/year. It is likely that the fresh or reclaimed water options for closed cooling systems could also generate substantial PM-10-related emissions. To offset these PM-10 emissions from these tower systems, SCE would need to purchase these available emission reduction credits and potentially supplement this with other emission reduction credits. SCE could generate these emission reduction credits directly through PM-10 emission reductions within their own fleet of regulated sources or they could encourage others to make similar reductions.

In addition to the issue of available emission offsets, there is the issue of visibility impacts on the nearest visibility sensitive areas, so-called Class I areas, which 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. The air quality and visibility impact of the saltwater towers particulate emission will have to be assessed on the closest Class I areas to SONGS (Agua Tibia Wilderness, San Geronio Wilderness Area, San Jacinto Wilderness, San Gabriel Wilderness, Cucamonga Wilderness, and Joshua Tree National Park). See Figure CC-1 for the location of these areas.

In summary, there are only a finite number of PM-10-related emission credits available from a disparate set of Owners, who are not necessarily ready or willing to sell these credits. The process to generate additional PM-10 emission reduction credits not expected to close this gap between available offsets and the annual fa-

cility PM-10 emissions. Thus, the particulate emissions from the saltwater towers combined with the insufficient particulate emission offsets means that SONGS will most likely not be able to secure the necessary major source air permit to support wet natural draft cooling saltwater tower operation. The air quality and visibility impacts to nearby Class I areas from the cooling tower particulate emissions are also a potentially significant issue, but they are a second order consideration relative to the emission offset situation. The lack of sufficient PM-10 emission offsets is a clear fatal flaw condition for saltwater wet towers that will preclude this cooling system from further consideration. There is not such fatal flaw for the fresh and reclaimed water-supplied wet natural draft cooling towers.

Figure CC-16. Southern California Class I Areas



Re: [http://www.epa.gov/region9/air/maps/pdfs/AIR1100040\\_4.pdf](http://www.epa.gov/region9/air/maps/pdfs/AIR1100040_4.pdf)

### **San Diego County Department of Environmental Health**

Because SONGS is located entirely on leased federal property that is part of the USMC's Camp Pendleton, any significant physical improvements to the SONGS facility are not subject to San Diego County review. The review process is essentially delegated to the USMC and U.S. Department of the Navy. Consequently, most of the San Diego County Departments (Planning and Land Use, Public Works, and Building Division) do not directly regulate SONGS.

Despite the fact that the county oversight for SONGS is constrained, there are six separate ongoing county-led regulatory programs at this facility (Mache, 2012). The County Environmental Health Department has received CalEPA approval to be the Certified Unified Program Agency responsible for management of the following programs:

- California Aboveground Storage Tank Program – mandates development and implementation of an SPCC and tank inspections.
- California Underground Storage Tank Monitoring Program – addresses fuel storage and leak detection in Mesa Complex and power block area.
- Hazardous Waste Storage and Treatment – includes small proprietary oil separation facility.
- Medical Waste Disposal – a county ordinance makes this an Environmental Health Department responsibility.
- Clean Air Act 112r Risk Management Plan – addresses onsite aqueous ammonia storage
- Hazardous Material Business Plan – addresses storage of greater than 55 gallons of chemicals with potential for offsite impacts and addresses the facility's EPCRA responsibilities.

While the relevance of the various cooling system options to these six regulatory programs may not be immediately apparent, the wet cooling tower systems will require additional chemical additives, generate new waste streams, and potentially force the relocation of existing chemical and fuel storage systems. While these changes may result in a fairly involved revision process for many of associated management plans, this work does not appear present any obvious county-sponsored regulatory barriers to the wet cooling tower systems (for any water supply option) or represent critical path permitting processes.

### **Other 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 wet cooling tower options.

The construction of any saltwater wet cooling tower system will demand the addition of multiple large circulating water pipes, which will circulate water between the condensers in the power block area (Songs Coastal Complex) and the cooling tower facility located in the Mesa Complex. Consequently, these pipelines will traverse the intervening Interstate-5 Highway, the North Coast Transit District Railway (used by Burlington Northern Santa Fe) and US Highway 101. While the tunnel boring methods can be used, such that construction will be able to progress with no traffic or rail disruptions, there will be a follow-on engineering investigation and permitting activity. Based on previous studies (Enercon), it is likely the this effort will demand a



full engineering and geotechnical survey which will subsequently support the process to secure multiple rights-of-way encroachment permits from Caltrans. The overall design and installation of these circulating water lines will be subject to considerable review to confirm compliance with each organizations guidelines, codes, and criteria. Given the undefined source of reclaimed and freshwater supplies to these cooling tower systems, it is not clear whether these water sources will require similar tunneling efforts.

The wet natural draft cooling towers will significantly alter the overall profile of the SONGS facility and they require cranes over 200 feet above local ground level. As the towers and related cranes have the potential to be obstructions to aviation, related Notices of Proposed Construction or Alteration will need to be filed with the FAA to facilitate their review. The wet mechanical (forced) draft cooling and hybrid cooling towers will also alter the overall profile of the low-profile Mesa Complex, but these tower systems and the related construction equipment are below the 200 foot FAA threshold. Consequently, the wet mechanical (forced) draft cooling and hybrid systems will not warrant the submittal of related Notices of Proposed Construction or Alteration with the FAA.

The U.S. Fish and Wildlife Service, California Department of Fish and Game, and California Office of Historic Preservation, for example, often play significant regulatory roles in power plant upgrade projects. The wet tower systems will likely be situated where the uplands and subaqueous lands has been previously disturbed, which would essential preclude new impacts to previously undiscovered sensitive biological or cultural resources. Finally, the California Energy Commission will be largely excluded from the permitting processes primarily because the wet natural draft cooling tower systems will not boost currently power levels of the SONGS facility, let alone reach the 50 MW threshold that would mandate California Energy Commission review.

### **Summary**

The external approval and permitting assessment for the wet tower systems identified a list of potentially applicable federal, state, and local permits and approvals that, not surprisingly, focused on its significant impacts to local air quality and the coastal zone. The permit lists are shown in Tables CC-2 through C-11. While the efforts to conduct a successful CEQA review and secure the requisite USACE Section 404 permit, CCC Coastal Development Permit, State Lands Commission Lease, NPDES permit modification will represent challenges, the air quality permitting process is constrained to be a clear fatal flaw for the saltwater supply option.

As noted earlier, San Diego APCD is a non-attainment area for PM-10 and the finite number of PM-10-related emission credits available fall well short of the amount necessary to offset the wet cooling tower-generated salt emissions. The gap is too large to encourage any attempts to generate additional particulate offsets from reducing the particulate emissions from local industrial sources of particulates. Without these offsets, SONGS would most likely not be able to secure the necessary major source air permit to support saltwater wet tower operation. The saltwater cooling tower technology cannot be considered a viable option. While the fresh and reclaimed water supply wet cooling tower options do not have a definitive fatal flaw, the aesthetic impacts and training impacts to the USMC training posed by the wet natural draft cooling and wet mechanical (forced) draft cooling tower systems may prove to be significant barriers to development.

## 4.2 Impingement/Entrainment Design:

### 4.2.1 General Discussion

The USEPA Section 316(b) Phase II regulations define impingement taking place when organisms are trapped against intake screens by the force of water being drawn through the cooling water intake structures and entrainment occurring when organisms are drawn through the cooling water intake structure into cooling system. The Phase II regulations require that impingement mortality be reduced by 80 to 95 percent and that entrainment be reduced by 60 to 90 percent from the calculation baseline. The calculation baseline for impingement and entrainment mortality is based on a cooling water intake structure designed without consideration of environmental impacts. The California SWRCB has proposed a Section 316(b) policy that would require the state's coastal generating stations that currently use once-through cooling to be retrofitted with closed-cycle cooling, or to otherwise provide the same level of impingement and entrainment reduction as would be provided by closed-cycle cooling.

### 4.2.2 Detailed Evaluation

Use of any of the closed-cycle technologies evaluated in this report will be acceptable with respect to impingement/entrainment design in accordance with 316 (b). The dry technologies will not require a continuous water makeup source after the closed system is initially charged because there will not be any evaporative or drift losses and makeup will only be required to account for any small system leaks or other losses. Due to the fatal flaw associated with permitting seawater use, as described in Section 4.1, the only water sources that can be used for the wet and hybrid technologies are freshwater and reclaimed water. These sources are assumed to be available from wells and water treatment facilities and, thus, impingement/entrainment associated with intake structures from oceans or other open water sources would not be present. The only significant continuous makeup that will be required from the ocean for any of the closed-cycle options will be what is required to support any safety-related systems, which is outside the scope of this study

## 4.3 Offsetting Environmental Impacts

### 4.3.1 General Discussion

The environmental offsets are an environmental management tool which 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 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 Diego 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, multi-disciplinary 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 with the construction and operation of the closed-cycle cooling tower systems 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 each closed-cycle system technology. 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 Tables CC-12 through CC-16.

##### 4.3.2.1 Passive Draft Dry/Air Cooling and Mechanical Draft (Forced) Dry

###### Air

Fugitive dust from earthwork and concrete activities associated with development of the passive draft dry air cooling and mechanical (forced) draft dry air cooling tower systems could be significant. Diesel and gasoline engine emission-related air emissions can be expected from workforce personal vehicles, over-the-road project, and off-road construction vehicles and equipment. There will be air emission sources on temporary offshore platforms or barges. Construction supplies and related circulating piping-related equipment deliveries may be significant in the early phases of construction. Collectively, these transient air quality impacts can be characterized as small negative.

As opposed to the wet form of these tower systems, the cooling water in this process is wholly maintained within a closed system. There are no drift losses and no condensed plume. Consequently, there are no particulate (salt) emissions or related impacts from these dry tower systems.

The air-cooled draft tower systems will likely have a minor negative impact on SONGS overall plant efficiency, due to increases in cooling water temperature relative to the existing once-through system. The resulting decreases in power generation may result in minor increases in greenhouse gas or other pollutant emissions locally, if the replacement power comes from fossil power sources. The towers operational impacts collectively represent a small negative impact.

### **Surface Water**

The addition of saltwater air-cooled draft towers will involve some marine-based construction activities to re-fashion the intake system for the reduce closed-cycle cooling system withdrawal rates. This will have the potential to generate significant water quality impacts. Construction of the improvements to the near-shore intake and connecting piping will result in localized turbidity impacts from disruption of the local seabed. The construction efforts associated with building the cooling tower structures are expected to result in significant land-based disturbance and storm water-related impacts. Collectively, these surface water impacts are characterized as a moderate negative impact.

The saltwater-supplied dry tower system will substantially reduce seawater withdrawals rates even relative to a wet passive draft system because there are no drift or evaporative losses. The fresh and reclaimed water usage rates will be further reduced, relative to the seawater withdrawal, because these higher quality water sources will likely require reduced system blowdown

Freshwater surface water use for industrial cooling purposes poses a moderate negative impact, in that such a valuable resources is generally devoted to a higher use (potable water, recreational use). Industrial use of this wastewater provides a small positive benefit, as this process reduces the overall volume of the final effluent reaching the environment.

### **Groundwater**

While groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete), there is likely sufficient existing onsite water supplies to satisfy these needs.

Onsite groundwater resources will not be used in support of saltwater passive air cooling draft tower operation. However, this water resource could be used to satisfy or contribute to the operational water needs of the freshwater air-cooled draft towers or used to supplement the water needs of the reclaimed water supported cooling tower system.

Groundwater use for industrial cooling purposes poses a moderate negative impact, in that such a valuable resources is generally devoted to a higher use (for example, potable water, recreational use).

### **Waste**

Constructions-related wastes, demolition wastes, and recyclable metals associated with modification of the existing inshore portions of the intake system, will be generated during course of development of the towers. The proposed location of the towers, the entire Mesa Complex, will require demolition of existing structures and some earthwork. The associated earthwork material balance has not been prepared for this initial phase of the assessment. Marine dredge spoil volumes will also be generated.

The final disposition of these materials has not been determined. Most of the non-soil-related construction wastes are expected to have salvage value and therefore, not represent a burden to offsite disposal facilities. Disposal of surplus soil/rock or marine spoils, whether directed to an onsite or offsite disposal area, will represent a moderate construction negative impact.

Physical inspection and cleaning of this intake system, as part of the maintenance program, may generate additional biological wastes if a new inshore location is used. Collection and disposal of these marine wastes, therefore, can be categorized an operational small negative impact.

### **Noise**

Previous studies have concluded from consultations with the County of San Diego County, city of San Clemente and Camp Pendleton, that noise levels from industrial operations should not exceed 70 dBA at the nearest public receptor (Tetra Tech, 2008). Noise impacts from construction activities associated with the passive draft dry air cooling and mechanical (forced) draft dry air cooling towers could be significant, but distance to the nearest offsite public receptor (new Camp Pendleton Housing to the northwest) is expected to provide sufficient mitigation. The construction of the redesigned near-shore intake system is not expected generate significant noise impacts for land-based locations. Buffer areas around this marine construction zones will likely be established for safety reasons, but which will also serve to reduce noise impacts to off-shore noise receptors (watercraft) and shoreline recreational areas (for example, San Onofre State Beach). Given the potential for noise impacts to the USMC housing and along the immediate shoreline recreational areas, the construction activities could pose a small negative impact.

Operational noise levels are expected to increase because of the passive draft dry air cooling tower flow-related noise. The mechanical (forced) draft dry air cooling towers will also generate transformer and fan noise. While the noise-related impacts to local Mesa Complex office buildings could rise above the target exposure limit, noise limits cannot be enforced on SONGS property (Enercon). The expected impact to the USMC housing areas is expected to be below 70 dBA. The increase in operational noise levels from passive air cooling draft cooling tower operation and the resulting impacts to occupied Mesa Complex areas translates to an operational small negative impact.

### **Land Use**

Construction activities associated with this system will essentially occupy the entire Mesa Complex area and impact an area near the existing inshore portion of the intake system. The addition of these dry/air-cooled cooling towers to the Mesa Complex will represent a fundamental change to an area, which had not been used for direct power plant operations. The construction activities will likely disturb significant portions of the Complex that were occupied by office, storage, and parking facilities or previously unoccupied or undisturbed.

The marine work associated with modification of the intake system could temporarily preclude normal recreational activities in waters in the immediate construction areas. Buffer zones will be created and maintained during the course of construction for the safety of the workforce and public. The potential temporary restriction of normal public access in these marine areas, combined with the significant construction activities in the Mesa Complex, represents a moderate construction-related negative impact for these cooling technology options.

The passive draft dry air cooling and mechanical draft dry air cooling tower systems and the modified inshore intake system collectively pose significant changes to the existing land use. The Mesa Complex will be become part of the operating power plant with all of the attendant security and maintenance provisions. The modified intake system could represent a minor change to land use in previously undeveloped subaqueous areas adjacent to the near inshore portions of the existing intake system. Given these impacts, the passive air cooling draft cooling tower system is expected to offer an operational moderate negative impact.

### **Marine Ecological Resources**

Reconfiguring inshore portions of the existing intake system for the passive dry/air cooling draft towers will result in significant localized turbidity impacts and some temporary and permanent loss of the biological pro-

ductive near-shore marine habitat area—a small negative impact. Construction of the freshwater and reclaimed water-supplied tower system will have no effect on marine resources—a moderate positive impact.

Operationally, the saltwater-supplied air-cooled draft cooling system can effectively mitigate impacts to marine resources by limiting the through-screen velocity to less than 0.5 fps and reduce entrainment impacts because of it substantially reduced water withdrawal rate. The fresh or reclaimed water-supplied tower system completely avoids a seawater withdrawal and so completely avoids operational impacts to marine resources. Consequently, the passive dry/air cooling draft cooling tower system will, operationally, offer large positive impact relative to the current situation.

### **Terrestrial Ecological Resources**

Much of the lands that will be used for the air-cooled cooling tower systems have been altered during the course of development of the Mesa Complex. Consequently, the area to be developed has limited habitat potential and it has limited wildlife use (Enercon). Construction of the tower system will pose, at most, a small negative impact.

The fully constructed mechanical dry air cooling or passive draft dry air cooling tower system will be situated in a largely developed area, so there is limited potential for permanent loss of passive air cooling draft habitat areas or other areas with significant ecological value or sensitivity. This also equates to an operational small negative impact.

### **Cultural and Paleontological Resources**

As described above, construction of the air-cooled cooling tower systems will largely occur in previously disturbed lands that are unlikely to harbor cultural or paleontological resources. Installation of the refashioned intake system will be confined to subaqueous lands, so there is little or no potential to discover new cultural or paleontological resources in that submerged area. Consequently, construction of the mechanical dry/air cooling or passive draft dry air cooling tower systems could pose a small negative impact.

The fully constructed tower systems (draft dry air cooling or passive draft dry air cooling) will be situated in a largely developed area, so there is limited potential for permanent loss of areas with significant cultural or paleontological resources. The same is true for the near-shore intake facility.

### **Visual Resources**

Construction of the tall dry/air cooling towers in the Mesa Complex will probably represent a significant visual impact during construction. Construction of the towers will pose a large negative impact. Construction of the passive draft dry air cooling (less than 50 feet above ground level) in the same areas will probably not represent a significant visual impact during construction and, therefore, at most will represent a small negative impact.

The relatively tall profile dry/air cooling system will not produce a visible plume, nor increase local fogging conditions. However, the operational visual resource impacts will be significant by virtue of the tall tower structures alone.

The relatively low profile air-cooled system will not produce a visible plume, nor increase local fogging conditions. There are no operational visual resource impacts with the passive draft dry air cooling system.



### **Transportation**

Increased commuting traffic from the construction workforces and construction deliveries could worsen the existing level of service on local roads during construction of the air-cooled tower systems. The construction period means that related traffic impacts will not be transitory and the peak workforce maybe significant. Consequently, the transportation-related construction impacts should be considered a small negative impact.

Operationally, the air-cooled draft tower system will increase maintenance and service requirements, but any related maintenance staff increases are expected to be modest. The air-cooled system will not produce a visible plume and pose not supplemental fogging or icing impacts. Consequently, the draft dry air cooling or passive draft dry air cooling systems will not pose any significant operational ground level transportation impacts. The tall draft dry air cooling towers could still impact USMC training helicopter operations.

### **Socioeconomic Issues**

While there will be 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).

Operational maintenance staff levels will increase in response to increased cooling tower and intake system maintenance, but not result in any related community service or resource concerns.

### **Summary**

Tables CC-12 and CC-13 summarize 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 draft dry air cooling and passive draft dry air cooling tower systems, with the exception of the visual resource and land use impacts, the construction impacts can be characterized as generally having small negative impact significance in that much of the work will progress on previously developed land or in marine areas that are on, or near previously disturbed near-shore subaqueous land.

Operationally, air-cooled cooling towers offer a mixed story regarding environmental impacts. The air-cooled system avoids the particulate emission and visual plume issues, but it still poses significant land use and visual impacts, at least for the draft dry air cooling system. These negative impacts are tempered by this closed-cycle cooling technology's ability to effectively mitigate the impingement, entrainment, and thermal impacts to marine life associated with the current once-through system. Viewed collectively, the construction and operational environmental impacts of mechanical dry air cooling and passive draft dry/air cooling towers (all water supply options) offer no clear overall consensus.

#### **4.3.2.2 Wet Natural Draft Cooling, Wet Mechanical Draft (Forced) Cooling Towers, Hybrid Wet/Dry Cooling Towers**

##### **Air**

Fugitive dust from earthwork and concrete activities associated with development of the wet cooling tower systems could be significant. Diesel and gasoline engine emissions-related air emissions can be expected from workforce personal vehicles, over-the-road project, and off-road construction vehicles and equipment. There will be air emission sources on temporary offshore platforms or barges. Construction supplies and re-

lated circulating piping-related equipment deliveries may be significant in the early phases of construction. Collectively, these transient air quality impacts can be characterized as small negative.

From previous studies (Enercon) it is clear that a saltwater wet towers tower system will generate significant particulate emissions in quantities that will exceed the major source threshold for PM-10 (estimated 916 tons year). The resulting deposition of salt from these cooling tower drift emissions will impact salt-sensitive species and increase onsite equipment corrosion potential. Related corrosion repairs could generate upwards of 50 tons of volatile organic compound from resurfacing and painting of impacted equipment. Obviously, these impacts would be reduced when considering fresh and reclaimed water supplies.

The particulate (salt drift) emission may also pose visibility impacts on the nearest visibility sensitive areas, so-called Class I areas which 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. The closest Class I areas to SONGS are Agua Tibia Wilderness, San Gorgonio Wilderness Area, San Jacinto Wilderness, San Gabriel Wilderness, Cucamonga Wilderness, and Joshua Tree National Park. See Figure CC-1 for the location of these areas.

The wet tower systems will likely have a minor negative impact on SONGS overall plant efficiency, due to increases in cooling water temperature relative to the existing once-through system. The resulting decreases in power generation may result in minor increases in greenhouse gas or other pollutant emissions locally if the replacement power comes from fossil power sources.

The saltwater tower operational impacts (deposition, corrosion, visibility) collectively represent a large negative impact. The freshwater and reclaimed water pose reduced air impacts, because the more limited PM-10 emissions given this water supply.

### **Surface Water**

The addition of saltwater wet towers will involve some marine-based construction activities to refashion the intake system for the reduce closed-cycle cooling system withdrawal rates. This will have the potential to generate significant water quality impacts. Construction of the inshore intake system and connecting piping will result in localized turbidity impacts from disruption of the local seabed. The construction efforts associated with building the cooling tower structures are expected to result in significant land-based disturbance and storm water-related impacts. Collectively, these surface water impacts are characterized as a moderate negative impact.

The saltwater tower system will substantially reduce seawater withdrawals rates (+90 percent reduction). Obviously, the fresh and reclaimed water usage rates will be further reduced relative to the seawater withdrawal because of the increased cycles of concentrations that are possible for these higher quality water resources.

Freshwater surface water use for industrial cooling purposes poses a moderate negative impact, in that such a valuable resources is generally devoted to a higher use (potable water, recreational use). Industrial use of this wastewater provides a small positive benefit, as this process reduces the overall volume of the final effluent reaching the environment.

### **Groundwater**

While groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete), there is likely sufficient existing onsite water supplies to satisfy these needs.

Onsite groundwater resources will not be used in support of saltwater wet tower operation. However, this water resource could be used to satisfy or contribute to the operational water needs of the freshwater wet towers or used to supplement the water needs of the reclaimed wet tower system.

Groundwater use for industrial cooling purposes poses a moderate negative impact, in that such a valuable resource is generally devoted to a higher use (potable water, recreational use).

### **Waste**

Construction-related waste, including demolition wastes and recyclable metals associated with modification of the existing inshore portions of the related intake system, will be generated during the outage. Marine dredge spoil volumes will be generated. The final disposition of these materials has not been determined. Most of the construction wastes are expected to have salvage value and therefore, not represent a burden to offsite disposal facilities. Disposal of the marine sediment, whether directed to an onsite or offsite disposal area, will represent a moderate construction negative impact.

Physical inspection and cleaning of the related intake system, as part of the maintenance program, is likely to generate additional biological wastes. The new inshore location may make these waste quantities significant. Collection and disposal of these marine wastes, therefore, can be categorized a moderate operational negative impact.

### **Noise**

Previous studies have concluded from consultations with the County of San Diego County, City of San Clemente and Camp Pendleton, that noise levels from industrial operations should not exceed 70 dBA at the nearest public receptor (Tetra Tech, 2008). Noise impacts from construction activities associated with the wet natural draft cooling towers could be significant, but distance to the nearest offsite public receptor (new Camp Pendleton Housing to the northwest) is expected to provide sufficient mitigation. The construction of the redesigned near-shore intake system is not expected generate significant noise impacts for land-based locations. Buffer areas around this marine construction zones will likely be established for safety reasons, but which will also serve to reduce noise impacts to offshore noise receptors (watercraft) and shoreline recreational areas (for example, San Onofre State Beach). Given the potential for noise impacts to the USMC housing and along the immediate shoreline recreational areas, the construction activities could pose a small negative impact.

Operational noise levels are expected to increase because of related motors, power transmission units, and fans for the mechanically driven wet tower systems and cascading water effects for all of the wet towers. While the noise-related impacts to local Mesa Complex office buildings could rise above the target exposure limit, noise limits cannot be enforced on SONGS property (Enercon). The expected impact to the USMC housing areas is expected to be below the 70 dBA threshold. The increase in operational noise levels from wet cooling tower operation and the resulting impacts to occupied Mesa Complex areas translates to an operational small negative impact.

### **Land Use**

Construction activities associated with this system will be confined to the Mesa Complex area and along the inshore area of the existing intake system. The addition of wet cooling towers to the Mesa Complex will represent a fundamental change to an area which had not been used for direct power plant operations. The construction activities will likely disturb significant portions of the Complex that were occupied by office, storage, and parking facilities or previously unoccupied or undisturbed.

The marine work associated with modification of the intake system could temporarily preclude normal recreational activities in waters in the immediate construction areas. Buffer zones will be created and maintained during the course of construction for the safety of the workforce and public. The potential temporary restriction of normal public access in these marine areas combined with the significant construction activities in the Mesa Complex represents a moderate construction-related negative impact for this cooling technology option.

The wet cooling tower systems and the modified inshore intake system collectively pose significant changes to the existing land use. The Mesa Complex will become part of the operating power plant with all of the attendant security and maintenance provisions. The modified intake system could represent a minor change to land use in previously undeveloped subaqueous areas adjacent to the existing near-shore portions of the existing intake system. Given these impacts, the wet cooling tower systems are expected to offer a moderate term negative impact.

### **Marine Ecological Resources**

Reconfiguring inshore portions of the existing intake system for the wet cooling towers will result in significant localized turbidity impacts and some temporary and permanent loss of the biological productive near-shore marine habitat area – a small negative impact. Construction of the freshwater and reclaimed water-supplied tower system will have no effect on marine resources – a moderate positive impact.

Operationally, the saltwater wet cooling system can effectively mitigate impacts to marine resources by limiting the through-screen velocity to less than 0.5 fps and reduce entrainment impacts because of its substantially reduced water withdrawal rate. The fresh or reclaimed water-supplied tower system completely avoids a seawater withdrawal and so completely avoids operational impacts to marine resources. Consequently, the wet cooling tower system will, operationally, offer large positive impact relative to the current situation.

### **Terrestrial Ecological Resources**

Much of the lands that will be used for the wet cooling tower system have been altered during the course of development of the Mesa Complex. Consequently, the area to be developed has limited habitat potential and it has limited wildlife use (Enercon). Construction of the tower system will pose, at most, a small negative impact.

The fully constructed tower system will be situated in a largely developed area, so there is limited potential for permanent loss of natural habitat areas or other areas with significant ecological value or sensitivity. This also equates to an operational small negative impact.

### **Cultural and Paleontological Resources**

As described above, construction of the wet cooling tower system will largely occur in previously disturbed lands that are unlikely to harbor cultural or paleontological resources. Installation of the refashioned intake system will be confined to subaqueous lands, so there is little or no potential to discover new cultural or paleontological resources in that submerged area. Consequently, construction of the tower system could pose a small negative impact.

The fully constructed tower system will be situated in a largely developed area, so there is limited potential for permanent loss of areas with significant cultural or paleontological resources. The same is true for the near-shore intake area, which may undergo some modification. However, the salt deposition and plume impaction from saltwater wet tower operation could accelerate the decay of local surface resources. Collectively, operation of these tower systems could pose a small negative impact.

### **Visual Resources**

Construction the very tall wet natural draft cooling towers will demand equality tall construction equipment (for example, cranes, scaffolding). As the towers get larger during the course of development, the visual impacts will increase and becoming increasingly out of character with the low profile structures in Mesa Complex area. Construction of the towers will pose a moderate negative impact. Construction of the relatively low-profile wet mechanical (forced) draft cooling in this same area will probably not represent a significant visual impact during construction and is expected pose a reduced small negative impact. Finally, the somewhat taller hybrid tower may be a relatively prominent feature in Mesa Complex area, an area dominated by lower profile structures. The construction of the hybrid towers can be expected to pose a moderate negative visual impact.

The operating wet natural draft cooling and wet mechanical (forced) draft cooling with its potentially towering unabated plume will be very visually intrusive to the local coastal community. It will be especially intrusive to the nearest public neighbors, the Camp Pendleton “family housing section”, located to the northwest of the Mesa Complex. These towers and associated plumes will also represent potential hazards to USMC helicopter training operations which occur near the Mesa Complex. Operation of the wet natural draft cooling and wet mechanical (forced) draft cooling towers will pose a large negative impact. The hybrid cooling tower structure will include plume abatement features, which are expected to largely avoid generating a visible plume, thereby mitigating most of the visual impacts Camp Pendleton neighbors and reducing its operational impact to a moderate level.

### **Transportation**

Increased commuting traffic from the construction workforces and construction deliveries could worsen the existing level of service on local roads during construction of the wet tower systems. The estimated construction activities duration and workforce needs are described further in Section 4.8. Consequently, the transportation-related construction impacts should be considered a small negative impact.

Operationally, the wet tower systems will increase maintenance and service requirements, but any related maintenance staff increases are expected to be modest. Operation of the tower system also has the potential to increase the hours of local fogging (and to a lesser extent, icing) on the nearby road systems, which include an interstate highway. The fogging impacts (from the wet natural draft cooling and wet mechanical (forced) draft cooling towers) could also impact the low altitude USMC helicopter training activities from nearby Camp Pendleton and local boating. The fogging impacts from wet natural draft cooling and wet me-

chanical (forced) draft cooling tower operation qualify as a moderate negative impact. The hybrid tower system has only very limited to potential to increase local fogging and icing conditions so this system only poses a small negative impact.

### **Socioeconomic Issues**

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

Operational maintenance staff levels will increase in response to increased wet cooling tower and intake system maintenance and corrosion impacts (saltwater towers only), but not result in any related community service or resource concerns.

### **4.3.3 Summary**

Tables CC-14 through CC-16 summarize 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 wet cooling tower systems, with the exception of the visual resource and land use impacts, the construction impacts can be characterized as generally having small negative impact significance in that much of the work will progress on previously developed land or in marine areas that are on, or near previously disturbed near-shore subaqueous land.

Operationally, wet cooling towers offer a diverse story regarding environmental impacts. The tall profile wet natural draft cooling towers and their condensed plumes generate significant negative visual impacts. The wet mechanical (forced) draft cooling tower, though lower profile also generates significant plume impacts. The towering plumes may increase the frequency and severity of local fogging conditions leading to hazardous road, flying, and boating conditions. Only the hybrid towers plume abatement features effectively mitigate the plume visual resource and transportation impacts of the other tower systems.

The saltwater wet towers all pose significant deleterious air quality and corrosion impacts from cooling tower drift salt emissions. These clearly large negative impacts are tempered by this closed-cycle cooling technology's ability to effectively mitigate the impingement, entrainment, and thermal impacts to marine life associated with the current once-through system. Viewed collectively, the construction and operationally environmental impacts of the wet saltwater towers have definitive overall negative impact. The other water supply options offer no clear overall positive or negative consensus.

## **4.4 First-of-a-kind**

### **4.4.1 General Discussion**

All five closed-cycle cooling systems are not first-of-a-kind technologies. All technologies have reference towers of comparable sizes that have been built and in operation for several years in the power industry, and some at nuclear sites. The SONGS site is not subject to weather extremes (extreme heat or cold) and thus the conditions the technologies would be subject to do not present any kind of first-of-a-kind risk. Detailed seismic analysis of each manufacturer's technology design was not performed as part of Phase I, but most of the technologies have been installed in areas of high seismic activity and thus it is assumed that no first-of-a-kind fatal flaw is present with respect to seismic design. This is also described in more detail in Section 4.6.



## 4.4.2 Detailed Evaluation

There are an extensive number of references available for each technology, but there are only a couple given below because it is felt they are some of the more relevant references since they are of comparable size or similar applications to what is required for SONGS.

### Passive Draft Dry Cooling Towers

1. Kendal coal-fired power plant, 6 x 686 MWe, South Africa
2. Qinling coal-fired power plant, 2 x 660 MW, China
3. Zuoquan coal-fired power plant, 2 x 660 MW, China
4. Yangcheng thermal power plant, 2 x 600 MWe, China
5. Razdan PS, 2 x 310 MWe & 4 x 200 MWe, Armenia
6. Gebze & Adapazari combined cycle power plant, 3 x 800 MWe, Turkey

### Mechanical (Forced) Draft Dry Cooling Towers

Note that the following reference list is applicable for mechanical draft air-cooled heat exchangers, which is the mechanical (forced) draft dry air cooling technology considered in this study. Mechanical draft air-cooled condensers are not included in the list below

1. Bilibino nuclear power plant, 4 x 12 MWe, Russia (only known dry-cooled nuclear power plant in the world)
2. Mondugno combined cycle power plant, 800 MWe, Italy
3. Kaneka co-gen, 60 MWe, Japan (located at sea shore)

### Hybrid Wet/Dry Cooling Towers (Circular)

1. Neckarwestheim Nuclear Power Station (GKN 2), 1400 MWe, Germany
2. Sarlux integrated gasification combined cycle, 548 MWe, Italy

### Wet Natural Draft Cooling Towers:

1. Beaver Valley Nuclear Station Unit 2, 846 MWe, USA-Pennsylvania
2. Grand Gulf Nuclear Station, Unit 1, 1297 MWe, USA- Mississippi
3. Watts Bar Nuclear Power Plant, Unit 1, 1123 MWe, USA-Tennessee
4. Rancho Seco Nuclear Generating Station, USA-California (has been decommissioned)

### Wet Mechanical (Forced) Draft Cooling Towers (Circular):

1. Palo Verde Nuclear Generating Station, > 4,000 MWe, USA-Arizona
2. Great River Energy Coal Creek Station, 1,100 MWe, USA-North Dakota
3. Chinon B Nuclear Power Plant, 4 x 905 MWe, France
4. Columbia Generating Station nuclear, 1190 MWe, USA – Washington
5. River Bend Station nuclear Unit 1, 989 MWe, USA – Louisiana

## 4.5 Operability General Site Conditions

### 4.5.1 General Discussion

The current source of cooling water for SONGS is the Pacific Ocean. The Pacific Ocean is the most reliable source of cooling water at SONGS, ensuring an uninterrupted supply for the cooling requirements of operating plant as well as the nuclear safety-related systems. Conceptual designs were developed for five closed-

cycle cooling systems to minimize any negative impacts to current plant configuration, operation, and output as much as possible. The design bases were developed from site climatic conditions and enveloping thermal criteria that would mimic once-through cooling operation as closely as possible, by considering the lowest realistic cold water temperature achievable with a specific technology with high ambient temperatures.

#### **4.5.2 Detailed Evaluation**

This study performed for evaluation of closed-cycle cooling water system is based on the existing cooling requirements for circulating water system for SONGS Units 2 and 3. The circulating water system is currently designed to condense exhaust steam from the low-pressure turbines and to dissipate heat loads associated with turbine plant cooling water heat exchangers, saltwater cooling system heat exchangers and other associated cooling loads. The documents providing technical information obtained from SCE were largely used to develop the basis for the closed-cycle cooling tower design. Where possible, the questionable values and/or clarifications were verified and/or confirmed by SCE.

Although most of current seawater entering the intake structure is pumped through the main condenser via circulating water system, a smaller portion of intake seawater flows into saltwater cooling system pumps. The saltwater cooling system provides the ultimate heat sink for the nuclear safety-related component cooling system. Redundancy is provided by two independent trains of saltwater cooling system for each unit at SONGS. Each train is designed to provide 100 percent of design heat transfer requirement capacity, using one of two pumps in each train. This ultimate heat sink is capable of providing adequate cooling water to shutdown and cooldown both units or to mitigate the consequences of an accident in one unit and shutdown and cooldown the other unit (System Description, 2004). Due to the safety-related requirements of the saltwater cooling system, the conceptual design of the closed-cycle cooling system for SONGS will not include modifying the existing Saltwater Cooling system and the closed-cycle cooling system described in this study shall not be safety-related equipment. In event of a failure in the closed-cycle cooling system, the plant will be able to achieve the safe shutdown under its current safety design features.

The design heat duty and circulating water flows for the conversion of SONGS Units 2 and 3 once-through cooling systems are summarized in the table below. The information was obtained from the system descriptions for the circulating water system, turbine plant cooling water system, and saltwater cooling system.

**Design Heat Load and Flow Rates - SONGS Units 2 and 3**

		<b>Current Once-Through Cooling System</b>	<b>Closed-Cycle Cooling System</b>
Main Condenser, each unit	MMBtu/hr	7,950	7,950
Turbine Plant Cooling Water Heat Exchangers, each unit	MMBtu/hr	114	114
Saltwater Cooling System Heat Exchangers, each unit	MMBtu/hr	177	0
Total Heat Load, each unit	MMBtu/hr	8,241	8,064**
Temperature Rise, each unit	F	19	19
Circulation Water Flow, each unit	gpm	860,000	848,842

\*\* Heat Duty includes Turbine plant cooling water heat exchangers, but does not include saltwater cooling system duty, because this safety-related system will not be serviced by the closed-cycle cooling towers.

**Site Ambient Conditions at SONGS**

SONGS is in San Diego County, approximately 2.5 miles south of San Clemente. The design ambient temperatures (dry and wet bulb) used for the development of overall cooling tower design are based on the 0.4 percent exceedance temperatures as obtained from Engineering Weather Data for San Clemente, California.

Design dry bulb temperature: 79 F

Design wet bulb temperature: 70 F

Plume free design point (dry bulb) Relative Humidity, RH): 33° F/90%

**Plant Performance**

The size of a closed-cycle cooling system tower is primarily based on the thermal load rejected to the cooling tower and approach to ambient dry or wet bulb temperatures. A closer approach will result in the larger tower producing colder water temperature assuming design cooling range and terminal temperature difference remain unchanged.

Due to physical area constraints at the SONGS site, conceptual design of cooling towers is focused on limiting the physical size of tower. The vendors have designed the passive draft dry/air and mechanical (forced) draft dry/air cooling towers based on approach of 20°F to design dry bulb temperature, while for wet natural draft and wet mechanical (forced) draft including hybrid wet/dry (hybrid) cooling towers with approach of 12°F and 8°F respectively to wet bulb temperature. These approaches were developed based on iterative investigations with closed-cycle cooling technology suppliers. The cooling towers with these approach temperatures shall provide the cold water temperatures exceeding the existing maximum allowable temperature. This may impact design and operation of closed cooling water system components which will be evaluated in details during Phase II.

The estimated condenser pressure, steam turbine gross output change, and parasitic loads were developed using SCE heat balances and the Alstom Turbine Generator correction curve provided by SCE and are summarized as follows:

	<b>Operational Impacts Per Unit</b>					
	Current - once- through cooling system	Passive Draft Dry (PDD)	Mechanical (Forced)Draft Dry (MDD)	Hybrid Wet/Dry Cooling (Hybrid)	Wet Natural Draft (NDW)	-Wet Mechanical (Forced)Draft (MDW)
Ambient dry bulb temperature, °F	79	79	79	79	79	79
Ambient wet bulb temperature, °F	70	70	70	70	70	70
Design						
Circulating water flow each unit, gpm	860,000	850,000	850,000	850,000	850,000	850,000
Cooling water inlet temperature, °F at Tower	-	118	118	97	99	97
Cooling water outlet temperature, °F at Tower		99	99	78	82	78



Condenser cleanliness factor, %		85	85	85	85	85
Condenser pressure, in HgA	1.99/2.55	4.2/5.2	4.2/5.2	2.43/3.09	3.16/4.02	2.43/3.09
Steam Turbine output change, %	Base (Note 1)	-6.7	-6.7	-1.2	-3.3	-1.2
Steam Turbine output change, MW	Base (Note 1)	-81.9	-81.9	-14.2	-40.7	-14.2
Tower fans auxiliary load, MW	Base	0	32.6	24.0	0	14.4
Additional CW pumps auxiliary load change (Note 3), MW	Base	19.5	19.5	14.5	14.5	14.5

**Notes:**

1. The base steam turbine output: 1,217,892 kWe.
2. Base steam turbine output and backpressure from SCE heat balance Units 2 and 3, 100 percent reactor power- VWO
3. Additional circulating water auxiliary loads change represent the difference between the new circulating water pumps for the closed-cycle cooling towers and existing circulating water pumps for once-through cooling system. It does not reflect any auxiliary load changes to other circulating water systems and/or closed component cooling systems.

The turbine output changes provided above will vary with ambient conditions. Based on engineering weather data, high ambient conditions were selected for the analysis because the highest temperatures for the site would result in the worst performance from the cooling equipment and, thus, the *Operational Impact Per Unit* table above is an approximation of the highest impacts to current plant operation, as well as the greatest output delta in between the technologies. The analysis was also done this way to ensure that the turbine could operate under all ambient conditions for each technology.

The quantitative effects of wind on each technology were not considered in this study, but it is important to note that wind can cause substantial performance degradation for the mechanical draft technologies by impacting fan performance. Site-specific wind analysis can be performed as part of Phase 2.

**LP Turbine Exhaust Pressure**

The condenser pressure will be higher than existing once-through cooling system due to ambient dry and wet bulb conditions being higher than for once-through cooling water temperature. The condenser pressure is expected to be in the range of approximately 4.2 to 5.2 inches HgA for the dry/air closed-loop cooling systems, while it is about 3.1 to 4.1 inches HgA for wet closed-loop cooling systems at the ambient design dry bulb/wet bulb temperatures. This will place the LP turbine to operate in the Zone D (Reference: General Diagram-Turbine LP Exhaust Pressure Operational Limits for SONGS Unit 2 & 3, 30000, Rev 3 dated 08/27/2007) where above 45 percent plant load, pre-trip alarm will not occur at the condenser pressure below 6.0 inches HgA. The *Turbine LP Exhaust Pressure Operational Limits* diagram states that continuous operation in this zone is not recommended, but there is no specific time limit. Since no time limit is specified for operation in Zone D, it will be acceptable to operate the plant in the Zone D as long as the condenser pressure does not exceed 6.0 inches HgA.

As the LP turbine exhaust pressure increases, the annulus velocity decrease resulting in higher leaving losses and potentially heating up the last stage blades. Additional evidence at higher exhaust pressure may produce vortex action which may results in the water erosion at the root on the discharge side of last stage rotating

blades. The LP turbine is normally designed with not to exceed exhaust pressure based on the last stage blade size and load operation (steam/moisture flow rates) so that annulus velocity does not fall below a specific limit. The manufacturers normally develop the LP turbine exhaust pressure performance curve, limits, and alarms to protect the last stage blades from potential damaging.

#### **Reduction in Power Generation**

Because of higher condenser pressure than the existing condenser pressure associated with the once-through cooling, the power output of the plant will be lower. The reduction in plant power generation is expected to be approximately 6.7 percent for dry/air (passive draft dry air cooling and passive draft dry air cooling) cooling systems and in the range of 1.2 percent to 3.3 percent for the wet (hybrid, wet natural draft cooling, and wet mechanical (forced) draft cooling) cooling systems and additional parasitic loads required by the closed-cycle cooling systems.

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#### **Potential Modifications to Main Condenser and Other Cooling Components**

The budgetary quotes and physical sizing of closed-loop cooling towers obtained from vendors are based on the existing thermal loads on the main condenser and other associated cooling components. However, some potential modifications to main condenser may be required due to higher circulating water pressure resulting from increased total circulating water pumps head required to raise water to higher elevation of the cooling tower. The other associated cooling components may also require modifications due to potentially exceeding maximum allowable temperature of cold water temperature resulting from higher ambient conditions and cooling tower design and practically achievable approach temperatures. The increase in circulating water pressure is estimated to be in the range of 200 to 250 percent based on wet and dry closed-cycle systems respectively for SONGS which will most likely require significant modifications to the main condenser.

The closed-cycle cooling systems will be designed to supply circulating water with flows, pressures, and temperatures as close as possible to existing conditions at SONGS. Since the cooling water tower design is normally based on the approach temperatures to ambient conditions, the cold water temperatures from the cooling tower design will be higher compared to existing conditions. Similarly the cold water pressures will also be relatively higher due to cooling tower elevation. As a result of this, the changes to the pumps, valves, and other cooling components operation, if any, may occur which will be evaluated in details during Phase II.

## **4.6 Seismic and Tsunami Issues**

### **4.6.1 General Discussion**

SONGS is located on the southern California coast, near San Clemente. It is situated on the coastal plain at the base of the western foothills of the Santa Margarita Mountain Range. A seawall, the top elevation of

which is at elevation 30 feet, is in place between the Pacific Ocean and the plant to afford wave protection (NUREG, 1981).

The calculated maximum tsunami runup is 27.5 feet above mean lower low water due to a 6 foot storm wave occurring during the design still water level of 15.6 feet mean lower low water. This is 2.5 feet below the top of the seawall (NUREG, 1981).

The design still water event is the result of combined 10 percent exceedance spring high tide (7.0 feet), storm surge (2.0 feet), sea level anomaly (0.33 feet) and a maximum tsunami runup (6.27 feet) from a locally generated tsunami. Distant tsunami generators (subterranean earthquakes, submarine landslides, etc) are less severe than the locally generated tsunami (NUREG, 1981).

All of the closed-cycle technology applications being considered for SONGS would be constructed in an area of the plant that is inland from the plant site, across the interstate highway, and well above the maximum tsunami wave run-up.

#### **4.6.2 Detailed Evaluation**

The cooling towers are to be located at higher elevations and further from the shoreline (relative to the plant's existing safety-related structures) so the tsunami protection of the cooling towers will be superior to that of the rest of the plant. It is possible that additional tsunami protection will be mandated by the NRC as a beyond-design-basis concern for the entire plant at a later time in view of post-Fukushima concerns. However, this is outside of the scope of the current evaluation.

For seismic requirements, the current California Building Code invokes American Society of Civil Engineers Standard 7-05. It is likely that by 2015, the next version, ASCE 7-10, will be invoked in the new California Building Code. In either case, Table 15.4-2 of ASCE 7 places no height limit on cooling towers. As such, seismic/structural design will be feasible strictly from code compliance standpoint for steel/concrete cooling towers of any height.

Seismic and wind load considerations: passive draft dry/air cooling towers and the wet natural draft cooling towers will be tall and will require the shell to be discontinued at the base to allow air passage, using braced legs at supports. Failure of any of the bracing members can lead to shell buckling and/or general loss of gravity load carrying capability. Also, there is a potential for significant change in lateral stiffness and strength at the base because of the change from shell to braces. The subject applications are in areas of high seismic requirements, so these considerations will result in passive draft dry air cooling and wet natural draft cooling structural elements and connections that are quite robust and difficult to detail (in terms of seismic detailing requirements).

Wind loads can be significant, and are a governing design consideration for tall towers. The wind load analysis can be further complicated because of "group effect," which will be significant because of the relatively close spacing of the towers envisioned for SONGS. This will require wind tunnel testing and expert assessments to develop sound wind-resistant design.

Finally, because of their size and aesthetic impact (such tall towers are signature structures that dwarf everything around them), it is likely that they will receive intense scrutiny from building officials, peer reviewers, and interveners. All these factors will drive up the cost of design and construction for passive draft dry air cooling and wet natural draft cooling options.



The hybrid wet/dry cooling (hybrid) towers have two levels of fan decks (lower deck for “wet section” and upper deck for “dry section”), resulting in an additional 60-ft height relative to the cooling tower associated with wet mechanical (forced) draft cooling. For both cases, it is assumed that the vertical heat exchangers on the outer perimeters will be supported off the latticed structural framing at the base of the cooling tower. The additional 60-foot height of the hybrid tower will result in higher seismic loads on the supporting structural elements.

At approximately 100-ft tall, the cooling towers for mechanical forced draft dry air towers have the lowest height profile, which is very desirable from seismic/structural design standpoint. At approximately 120-ft tall, the wet mechanical (forced) draft cooling towers will also be relatively short and desirable from seismic/structural standpoint.

### **Summary**

All cooling technologies are considered viable from a tsunami, seismic and structural perspective. However, from efficient design and construction perspective, the mechanical forced draft dry air tower is considered most attractive for SONGS. The hybrid wet/dry cooling tower option is also considered to be efficient option, and warrants further consideration when making the final selection.

## **4.7 Structural**

### **4.7.1 General Discussion**

Design criteria will be similar to the existing structures and any of the closed-cycle technologies can be properly designed against design seismic requirements and wave forces.

### **4.7.2 Detailed Evaluation**

Structural considerations are included in the *Seismic and Tsunami* discussion in Section 4.6, above.

## **4.8 Construction**

### **4.8.1 General Discussion**

The Closed Cooling Systems for SONGS 2 & 3 are considered feasibly constructible based on current day construction methods, practice, and knowledge. However, all of the systems will have their own challenging issues, and degree of difficulty.

The construction work activities for all the closed cooling systems are very similar for each technology, but will vary in quantities and schedule duration for accomplishing the tasks. The basic work activities are as follows:

- Closed-cycle cooling system work activities
- Mobilization/temporary facilities/utilities and training
- Install temporary environmental controls
- Excavate and grade tower areas
- Excavate pump house/water treatment areas
- excavate underground piping, ducts, and electrical bank areas
- Install f grounding

- Install piling/foundations/slabs/basins (towers/pump houses/electrical building)
- Install underground ducts/electrical duct bank and underground piping/valves
- Install backfill
- Install structures (towers/pump houses/electrical buildings)
- Install pumps/motors/mechanical equipment/duct/HVAC
- Install ground piping, valves, hangers and supports
- Install electrical equipment (motor control centers/switchgear/transformers)
- Install aboveground conduit and cable tray
- Install power and control cable/terminations
- Install lighting, aviation lighting/lightening protection
- Control room modifications
- Start up testing
- Replacement system tie-ins and decommissioning modifications to existing equipment that will no longer be needed.
- Commissioning
- Clean up and demobilize

#### **4.8.2 Detailed Evaluation**

All the closed-cycle cooling technology options for SONGS will require tunneling under the I-5 San Diego Freeway and the Old Pacific Highway. While it may be difficult and challenging, it is feasible to perform sleeve jacking, directional drilling, and tunnel boring technologies to accomplish the task of installing the circulating water duct/pipe under the I-5 and Old Pacific Highway.

- Use of passive draft dry technology will require three towers per unit for a total of six towers, all of which will not fit on the currently leased Mesa site area. Either some of the towers or some of the existing facilities will need to be placed outside the Mesa area requiring clearing, excavation and grading. Complete construction of the passive draft air cooling towers is estimated to take approximately 6 years using a peak workforce of 500.
- Mechanical forced draft dry technology will require one mechanical (forced) draft dry/air cooling tower per unit for a total of two towers, both of which will fit on the currently leased Mesa site area. This option will require considerable demolition to remove current structures from the required cooling tower footprint. The excavation quantity and construction times will be developed during Phase 2 of this study but based on a review preliminary estimate is that complete construction of the mechanical draft dry/air cooling towers for both units is estimated to take approximately 6 years using a peak workforce of 500.
- The hybrid, natural draft wet, and mechanical (forced) draft wet technologies will require two towers per unit for a total of four towers. The footprint of the four towers will fit on the currently leased Mesa site area. This option will require some clearing and grading, but demolition of the current structures on the Mesa would not be required. The excavation quantity and construction times will be developed during Phase II of this study but based on a review preliminary estimate is that complete construction of any of the wet technologies for both units is estimated to take approximately 6 years using a peak workforce of 500.

## 4.9 Maintenance

### 4.9.1 General Discussion

Compared to the existing once-through system, there are considerably greater operation and maintenance efforts associated with use of any of the closed-cycle cooling technologies. O&M major concerns are mainly associated with the mechanical draft technologies and include ensuring proper lubrication and operational settings of associated mechanical components. Additionally, routine inspection activities are necessary to ensure that the materials remain in good condition. All of the technologies require maintenance and inspections to ensure the water distribution and heat transfer surfaces are in optimum condition and not clogged or dirty. The environmental impacts associated with the increase in activities were evaluated in Section 4.3 and a detailed list of the major actions that should be performed as part of a diligent maintenance program for each of the 5 technologies is included below. No fatal flaws are associated with any of these activities as long as proper personal protective equipment is considered, site operational safety procedures are closely followed (including lock-out, tag-out when required, etc.), and the cooling tower manufacturer is required to provide permanent access with appropriate barriers (such as ladders with locking spring-loaded gates to all levels requiring maintenance access) for the supplied technology. While no fatal flaws are apparent, the scale of job-hours required for completion of the activities will need to be considered and planned for and SONGS may need to hire additional personnel with the sole responsibility of ensuring the maintenance requirements are met for the selected technology.

There are additional equipments that could be purchased that can help to reduce jobhours required to perform gear-box lubrication oil change-out and reduce the volume of hazardous waste disposal of used oil. These include oil filtration systems and their purchase and use is at the discretion of SONGS personnel.

### 4.9.2 Detailed Evaluation

The following tabulates some of the major cooling tower maintenance activities and it indicates to which technology the activity is applicable. Ultimately, the tower supplier will provide a recommended maintenance schedule for the technology provided. The following maintenance activities are typical of what is recommended during normal tower operation. Additional activities may be required during extended shut-down or other abnormal operational modes

Activity	Recommended Frequency (Tower Supplier Should be Consulted to Develop Formal Program for the Selected Technology)	Passive Draft Dry/Air Cooling	Mechanical (Forced) Draft Dry/Air Cooling	Wet Natural Draft Cooling	Wet Mechanical (Forced) Draft Cooling	Hybrid Wet/Dry Cooling
Check condition of finned-tube heat exchangers	Quarterly	✓	✓			✓
Cleaning of fins on heat exchanger tube bundles	Semiannually or as needed	✓	✓			✓
Operating ball cleaning system for tube internal surfaces	Semiannually or as needed	✓	✓			✓
Check for and repair/replace missing or broken water distribution pipes or nozzles	Monthly	✓	✓	✓	✓	✓

Activity	Recommended Frequency (Tower Supplier Should be Consulted to Develop Formal Program for the Selected Technology)	Passive Draft Dry/Air Cooling	Mechanical (Forced) Draft Dry/Air Cooling	Wet Natural Draft Cooling	Wet Mechanical (Forced) Draft Cooling	Hybrid Wet/Dry Cooling
Weigh fill packs to characterize fouling	Annually			✓	✓	✓
Check for and repair/replace missing or broken fill packs	Quarterly			✓	✓	✓
Check for and repair/replace missing or broken drift eliminator packs	Quarterly			✓	✓	✓
Check for and repair/replace missing or broken drift eliminator seals	Quarterly			✓	✓	✓
Check oil level in gear box	Daily		✓		✓	✓
Check for foreign material in gear box oil	Every 2 weeks		✓		✓	✓
Replace oil in gear box	Semiannually		✓		✓	✓
Check backlash and endplay of gear box shafts	Semiannually		✓		✓	✓
Ensure no buildup or other deposits are present on exterior surface of gear box (any inhibitors of proper cooling)	Semiannually		✓		✓	✓
Inspect gear box gears for wear and corrosion	Semiannually		✓		✓	✓
Check and adjust alignment of driveshaft	Semiannually		✓		✓	✓
Check and adjust fan pitch angles	Quarterly		✓		✓	✓
Check and adjust fan blade tracking	Quarterly		✓		✓	✓
Check and adjust fan blade tip clearance	Quarterly		✓		✓	✓
Check tightness of fan bolts	Quarterly		✓		✓	✓
Ensure fan weepholes are clear	Quarterly		✓		✓	✓
Check tightness of structural connecting bolts	Annually	✓	✓	✓	✓	✓
Check for and replace any fan blade wear or defects	Quarterly		✓		✓	✓
Check operating mechanical equipment for excessive noise	Daily		✓		✓	✓
Check vibration levels of operating mechanical equipment	Daily		✓		✓	✓
Check condition and repair if necessary – concrete shell	Annually	✓		✓		
Check proper attachment and condition of the airseal	Annually			✓		

Activity	Recommended Frequency (Tower Supplier Should be Consulted to Develop Formal Program for the Selected Technology)	Passive Draft Dry/Air Cooling	Mechanical (Forced) Draft Dry/Air Cooling	Wet Natural Draft Cooling	Wet Mechanical (Forced) Draft Cooling	Hybrid Wet/Dry Cooling
Check condition of protective epoxy coating/sheeting - steel shell	Annually			✓		
Check for scale, algae, etc. to ensure water treatment is adequate	Weekly			✓	✓	✓
Check cold water basin level	Daily			✓	✓	✓
Inspect cold water basin and repair any cracks or coating defects as necessary	Semiannually			✓	✓	✓
Relubricate motor bearings	Semi-annually		✓		✓	✓
Ensure no buildup or other deposits are present on exterior surface of motor (any inhibitors of proper motor cooling)	Semiannually		✓		✓	✓
Check proper operation of valves	Monthly	✓	✓	✓	✓	✓
Lubricate valves	Quarterly	✓	✓	✓	✓	✓
Check proper operation of dampers	Monthly					✓
Check condition of flanged and threaded connections and replace gaskets as necessary	Monthly	✓	✓	✓	✓	✓
Check steel structures for evidence of corrosion	Annually	✓	✓	✓	✓	✓
Check function of and replace bulbs as necessary – aircraft warning lights on top of shell	Daily	✓		✓		

## 5. Conclusion

Replacing the SONGS once-through cooling systems with any of the 5 variants of closed cycle cooling technology evaluated is technically feasible. These 5 variants will thus likely be viewed as complying with the Section 316(b), *California Once-Through Cooling Policy*, Phase II rules on impingement and entrainment reduction because those reductions are considered equivalent to reductions in intake flow rate.

Using closed cycle technology for all of the existing once-through cooling systems—except for safety-related systems and components—results in dramatic reduction of cooling water withdrawals from the Pacific Ocean.

For the wet and hybrid technologies, it was determined that saltwater is not feasible for use as the circulating water due to significant PM-10 emissions and lack of related necessary offsets, as described in Section 4.1. The only water sources that can be used are fresh and reclaimed water, which are assumed to be available from wells and water treatment facilities, and, thus, impingement/entrainment concerns are eliminated. The dry technologies will not require a continuous water makeup source after the closed system is in-

initially charged because there will be no evaporative or drift losses and makeup will only be required for small system leaks or other minimal losses. Thus, impingement/entrainment concerns are minimized.

The saltwater demand of the safety-related, once-through cooling system is approximately 2 to 5 percent of the current total saltwater demand. By substituting closed cooling cycles for all but that system, the saltwater demand is reduced by approximately 95 to 98 percent.

It must be noted that the feasibility of closed cycle cooling includes substantial technical and operational challenges. These include routing and constructing the plant infrastructure for the tower circulating/cooling water in such fashion as to minimize disruption of current operation of both Units, the tower location and construction challenges, the significant de-rate of the units' electrical output due to increased condenser back pressure and lower plant efficiency, and the parasitic loads and the added maintenance burden associated with the mechanical draft tower technologies. Equally significant are the predictably contentious permitting process and the visual impacts resulting from the imposing tower sizes and the discharge plumes. The table below highlights the major challenges.

Nonetheless, these challenges do not represent fatal flaws at this stage of the assessment. See Table CC-1 for a summary presentation of the Phase 1 findings and conclusions.

The 5 variants of closed cycle cooling are therefore candidate for further detailed evaluation in Phase II of this study.

	<b>Passive Draft Dry/Air Cooling (PDD)</b>	<b>Mechanical (Forced) Draft Dry/Air Cooling (MDD)</b>	<b>Wet Natural Draft Cooling (NDW)</b>	<b>Wet Mechanical (Forced) Draft Cooling (MDW)</b>	<b>Hybrid Wet/Dry Cooling (Hybrid)</b>
Estimated Decrease in Turbine Output per Unit , MW	81.9	81.9	14.2	14.2	40.7
Estimated Total Plot Area Requirement for Both Units, ft <sup>2</sup>	6.4 million	2.76 million	1.21 million	1.8 million	1.8 million
Visible Plume	No	No	Yes	Yes	No
Associated Air Emissions	No	No	Yes	Yes	Yes
Construction of circulating water piping under I-5 and Old Coast Hwy	Yes	Yes	Yes	Yes	Yes
Required Parasitic Loads per Unit (includes fan power and increased circulating water pump power), MW	19.5	52.1	14.5	38.5	28.9
Contentious Permitting process	yes	yes	yes	yes	yes



## 6. References

The list of all SONGS documents that were furnished to Bechtel and that have been used to develop the input data and evaluation criteria are as follows:

(<http://www.sdapcd.org/permits/ERCs.pdf>).

California Coastal Power Plants: Alternative Cooling System Analysis for San Onofre Nuclear Generating Station, prepared by Tetra Tech

Circulating Water System for Unit 2 and 3 – System Description SD-S023-280, Revision 14

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Feasibility Study for Installation of Cooling Towers at San Onofre Nuclear Generating Station, Enercon Services, Inc, September, 2009

General Diagram – Turbine LP Exhaust Pressure Operational Limits (30000, Rev 3) for SONGS 2 & 3

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Saltwater Cooling System for Unit 2 and 3 – System Description SD-S023-410, Revision 7

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Turbine Generator Output vs Condenser Pressure Correction Curve – Drawing no. TS24851B, Issue B for SONGS Units 2 and 3.

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**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if the NEPA is triggered, it could involve a 12-18 month review period.	NA	NA	NA
U.S. Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the U.S. Department of Navy approvals are needed to amend the lease to allow for addition of a passive air-cooled draft tower on SONGS leased property or adjacent Camp Pendleton lands. This tall tower system will not produce a visible plume, but could impact USMC training programs (low-level helicopter training).	~ 6 months	No	No
Section 404/10 Permit – U.S. Army Corps of Engineers (USACE)	Refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of U.S. and will involve work in navigable waters. Individual form of permit will be required.	120 days from complete application (goal) ~12 months (expected)	Potential	No
Section 401 Water Quality Certificate – U.S. Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Section 401 permit process will parallel Section 404 permit process.	~12 months (expected)	No	No
Nationwide Permit – U.S. Army Corps of Engineers	Not applicable - the refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of U.S. that cannot be addressed by the nationwide permitting process.	Not applicable	No	No
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Applicable because natural draft towers will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No





**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Applicable because temporary structures (for example, cranes) will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by U.S. Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed PDD technology. The CEQA review process trigger development of a comprehensive EIR.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. A PDD system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	No	No
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the PDD system, the full use of the Mesa Complex by this cooling system may prove to be a contentious issue.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	No



**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of passive air-cooled draft cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Air Pollution Control District	Not applicable - the PDD towers will not generate any additional operational air emissions.	Not applicable	No	No
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Not applicable - the PDD towers will not generate any additional operational air emissions.	Not applicable	No	No
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - the PDD towers will not generate any operational additional air emissions.	Not applicable	No	No
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No
NPDES Industrial Discharge Permit – San Diego Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit which is based on a once-through system. The water withdrawal and discharge will be significantly decreased, but there will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the PDD system is not expected to generate significant issues.	~6 months	No	No





**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the PDD towers will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the PDD towers will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	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, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual PDD tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	NA	NA
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if PDD tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No

**Table CC-2.  
Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling  
(Saltwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if PDD tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the PDD towers, unless current SONGS ID will be used.	1-2 weeks	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new PDD towers could force the relocation of underground tanks mandating new permits from the county and revised inspection programs.	1-2 months	No	No

**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support PDD tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (for example, 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the county.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the county, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) - San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The potential for offsite freshwater to supply to the PDD towers is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	No new wells to be developed will be developed in support of the saltwater cooling towers.	Not applicable – saltwater option.	NA	NA

**Table CC-2.**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
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 SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not a Preconstruction Approvals	No	No
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of PDD towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	Assuming placement of the PDD towers in the Mesa Complex, three encroachment permits and related engineering study will be needed to support routing of cooling water supply pipes under Interstate-5, U.S. Highway-101.	1-3 months	No	No

Consequently, all of the closed-cycle cooling systems are offered as candidates for further investigation in Phase 2 of this study.

**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	Not applicable	NA	NA
U.S. Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the U.S. Department of Navy approvals are needed to amend the lease to allow for addition of a PDD towers on SONGS leased property or adjacent Camp Pendleton lands. This tall tower system will not produce a visible plume, but could impact USMC training programs (low-level helicopter training).	~ 6 months	NA	No
Section 404/10 Permit – U.S. Army Corps of Engineers (USACE)	Not applicable – water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – U.S. Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters. Potential impacts to waters of U.S. (wetland impacts and discharges of dredge or fill material into waters).	Not applicable	NA	NA
Nationwide Permit – U.S. Army Corps of Engineers	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	No	No
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No

**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Applicable because natural draft towers will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Applicable because temporary structures (for example, cranes) will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by U.S. Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed PDD technology. Following finalization of the requisite Environmental Impact Report, the CPUC will need to certify CEQA compliance to support their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. PDD towers will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	NA	NA



**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the PDD system, the full use of the Mesa Complex by this cooling system may prove to be a contentious issue.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	No
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of a PDD system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Regional Air Pollution Control District	Not applicable - the PDD towers will not generate any additional operational air emissions.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Not applicable - the PDD towers will not generate any additional operational air emissions.	Not applicable	NA	NA
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - the PDD towers will not generate any operational additional air emissions.	Not applicable	NA	NA
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – Regional Water Quality Control Board (RWQCB) and State Water Resources Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit, which is based on a once-through system. The water withdrawal from the ocean will be discontinued and the discharge will be significantly decreased. There will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect a PDD system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with PDD towers will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with PDD towers will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA

**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual PDD tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	No	No
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if PDD tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if PDD tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No

**Table CC-3  
Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (Preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new PDD towers could force the relocation of underground tanks mandating new permits from the county and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support PDD tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (for example, 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the county.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA



**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the county, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The delivery of offsite freshwater to the site is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	The freshwater supply option could demand the addition of onsite wells.	1 -2 weeks (freshwater supply option)	No	No
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Resource Conservation (RC) Land Use Management Approval	While local municipality rules may supersede this regional land use//watershed protection-related project approval process, this is not the case for SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not Preconstruction Approvals	No	No

**Table CC-3**  
**Environmental Permit/Approval Assessment: Passive Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (Preconstruction)	Critical Path	Fatal Flaw
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of PDD towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	The freshwater and reclaimed water pipeline routes have not been determined. Encroachment permits and related engineering studies remain a possibility.	2-3 months	No	No

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	NA	NA	NA
U.S. Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the U.S. Department of Navy approvals are needed to amend the lease to allow for addition of a mechanical air-cooled draft tower on SONGS leased property or adjacent Camp Pendleton lands. This tower system will be relatively low profile and not produce a visible plume.	~ 6 months	No	No
Section 404/10 Permit – U.S. Army Corps of Engineers (USACE)	Refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of U.S. and will involve work in navigable waters. Individual form of permit will be required.	120 days from complete application (goal) ~12 months (expected)	Potential	No
Section 401 Water Quality Certificate – U.S. Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Section 401 permit process will parallel Section 404 permit process.	~12 months (expected)	No	No
Nationwide Permit – U.S. Army Corps of Engineers	Not applicable - the refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of U.S. that cannot be addressed by the Nationwide permitting process.	Not applicable	No	No
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No



**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable – MDD towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable – MDD towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by U.S. Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed MDD technology. The CEQA review process trigger development of a comprehensive EIR.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. An MDD tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	No	No
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the MDD tower system, the full use of the Mesa Complex by this cooling system may prove to be a contentious issue.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	No

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of mechanical air-cooled draft cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Air Pollution Control District	Not applicable - the MDD tower system will not generate any additional operational air emissions.	Not applicable	No	No
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Not applicable - the MDD tower system will not generate any additional operational air emissions.	Not applicable	No	No
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - the MDD tower system will not generate any operational additional air emissions.	Not applicable	No	No
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – San Diego Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit which is based on a once-through system. The water withdrawal and discharge will be significantly decreased, but there will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the MDD tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the MDD tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the MDD tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	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, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	NA

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
2081 Permit for California Endangered Species Act of 1984 (Fish and Game Code, §2050 through 2098) – California Department of Fish & Game (CDFG)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	NA	NA
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the county and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support MDD cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (for example, 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the county.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the county, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The potential for offsite freshwater to supply the cooling towers is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	No new wells to be developed will be developed in support of the saltwater cooling towers.	Not applicable – saltwater option.	NA	NA
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
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 SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not a Preconstruction Approvals	No	No
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of MDD towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA

**Table CC-4**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling (Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	Assuming placement of the MDD towers in the Mesa Complex, three encroachment permits and related engineering study will be needed to support routing of cooling water supply pipes under Interstate-5, US Highway-101.	1-3 months	No	No





**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	Not applicable	NA	NA
U.S. Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the U.S. Department of Navy approvals are needed to amend the lease to allow for addition of MDD towers on SONGS leased property or adjacent Camp Pendleton lands. This tower system will be relatively low profile and not produce a visible plume.	~ 6 months	NA	Potential
Section 404/10 Permit – U.S. Army Corps of Engineers (USACE)	Not applicable – water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – U.S. Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters. Potential impacts to waters of U.S. (wetland impacts and discharges of dredge or fill material into waters).	Not applicable	NA	NA
Nationwide Permit – U.S. Army Corps of Engineers	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	No	No
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No

**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable – MDD towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable – MDD towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by U.S. Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed MDD tower technology. Following finalization of the requisite Environmental Impact Report, the CPUC will need to certify CEQA compliance to support their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. Mechanical air-cooled Draft Tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	NA	NA

**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the MDD tower system, the full use of the Mesa Complex by this cooling system may prove to be a contentious issue.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	No
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of an MDD cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Regional Air Pollution Control District	Not applicable - the MDD tower system will not generate any additional operational air emissions.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Not applicable - the MDD tower system will not generate any additional operational air emissions.	Not applicable	NA	NA
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - the MDD tower system will not generate any operational additional air emissions.	Not applicable	NA	NA
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – Regional Water Quality Control Board (RWQCB) and State Water Resources Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit, which is based on a once-through system. The water withdrawal from the ocean will be discontinued and the discharge will be significantly decreased. There will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the MDD tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the MDD tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the MDD tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA

**Table CC-5  
Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	No	No
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No

**Table CC-5  
Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the county and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support MDD cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (for example, 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the county.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA



**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the county, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The delivery of offsite freshwater to the site is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	The freshwater supply option could demand the addition of onsite wells.	1 -2 weeks (freshwater supply option)	No	No
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Resource Conservation (RC) Land Use Management Approval	While local municipality rules may supersede this regional land use//watershed protection-related project approval process, this is not the case for SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not Preconstruction Approvals	No	No



**Table CC-5**  
**Environmental Permit/Approval Assessment: Mechanical (Forced) Draft Dry/Air Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of MDD towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	The freshwater and reclaimed water pipeline routes have not been determined. Encroachment permits and related engineering studies remain a possibility.	2-3 months	No	No

**Table CC-6.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Saltwater)  
San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	NA	NA	NA
Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of NDW towers on SONGS leased property or adjacent Camp Pendleton lands. The unabated plume from this tower may impact the low –level helicopter training missions and produce deleterious salt deposition impacts to the new Camp residential areas to the northwest. This could be a potential fatal flaw.	~ 6 months	NA	Potential
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of the U.S. and will involve work in navigable waters. Individual form of permit will be required.	120 days from complete application (goal) ~12 months (expected)	Potential	No
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Section 401 permit process will parallel Section 404 permit process.	~12 months (expected)	No	No
Nationwide Permit – US Army Corps of Engineers	Not applicable - the refashioning of the existing intake system for closed-cycle cooling will generate significant impacts to waters of the U.S. that cannot be addressed by the Nationwide permitting process.	Not applicable	No	No

**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Applicable because NDW towers will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Applicable because temporary structures (e.g., cranes) will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed NDW cooling tower technology. The CEQA review process trigger development of a comprehensive EIR.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. An NDW system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	No	No

**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the NDW tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of an NDW cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to construct.	Permit review process is not expected to be successful.	Potentially	Yes

**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to operate.	Permit review process is not expected to be successful	No	Yes
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	A Title V Federal Operating Permit will be needed. The lack of sufficient PM-10 offsets will effectively preclude receipt of this permit.	Permit review process is not expected to be successful	No	Yes
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – San Diego Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit which is based on a once-through system. The water withdrawal and discharge will be significantly decreased, but there will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the NDW tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the NDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the NDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA

**Table CC-6.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Saltwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	NA	NA
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No



**Table CC-6.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Saltwater)  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support NDW cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA



**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The potential for offsite freshwater to supply the cooling towers is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	No new wells to be developed will be developed in support of the saltwater cooling towers.	Not applicable – salt water option.	NA	NA
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
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 SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not a Preconstruction Approvals	No	No

**Table CC-6.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of NDW towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	Assuming placement of the NDW towers in the Mesa Complex, three encroachment permits and related engineering study will be needed to support routing of cooling water supply pipes under Interstate-5, US Highway-101.	1-3 months	No	No

**Table CC-7.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	Not applicable	NA	NA
Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of an NDW tower on SONGS leased property or adjacent Camp Pendleton lands. The unabated plume from this tower may impact the low –level helicopter training missions. This could be a potential fatal flaw.	~ 6 months	NA	Potential
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Not applicable – water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters. Potential impacts to waters of the U.S. (wetland impacts and discharges of dredge or fill material into waters).	Not applicable	NA	NA
Nationwide Permit – US Army Corps of Engineers	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	No	No

**Table CC-7.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Applicable because NDW towers will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Applicable because temporary structures (e.g., cranes) will be taller than 200 feet above ground level and represent a potential obstruction to local Camp Pendleton aircraft.	1-2 months	No	No
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed NDW cooling tower technology. Following finalization of the requisite Environmental Impact Report, the CPUC will need to certify CEQA compliance to support their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. An NDW tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	NA	NA

**Table CC-7.  
Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
(Reclaimed and Freshwater)  
San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the NDW tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of an NDW cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Regional Air Pollution Control District	With freshwater and reclaimed water, the NDW towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	With freshwater and reclaimed water, the NDW towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - a Title V Federal Operating Permit will not be needed.	Not applicable	NA	NA
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA

**Table CC-7.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No
NPDES Industrial Discharge Permit – Regional Water Quality Control Board (RWQCB) and State Water Resources Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit, which is based on a once-through system. The water withdrawal from the ocean will be discontinued and the discharge will be significantly decreased. There will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the NDW tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the NDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the NDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA



**Table CC-7.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	No	No
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No

**Table CC-7.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support NDW cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA

**Table CC-7.**  
**Environmental Permit/Approval Assessment: Wet Natural Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The delivery of offsite freshwater to the site is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	The freshwater supply option could demand the addition of onsite wells.	1 -2 weeks (freshwater supply option)	No	No
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Resource Conservation (RC) Land Use Management Approval	While local municipality rules may supersede this regional land use//watershed protection-related project approval process, this is not the case for SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not Preconstruction Approvals	No	No

**Table CC-7.  
 Environmental Permit/Approval Assessment: Wet Natural Draft Cooling  
 (Reclaimed and Freshwater)  
 San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of NDW towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	The freshwater and reclaimed water pipeline routes have not been determined. Encroachment permits and related engineering studies remain a possibility.	2-3 months	No	No

**Table CC-8.  
Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling  
(Saltwater)  
San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	NA	NA	NA
Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of a MDW tower on SONGS leased property or adjacent Camp Pendleton lands. The unabated plume from this tower may impact the low –level helicopter training missions and produce deleterious salt deposition impacts to the new Camp residential areas to the northwest. This could be a potential fatal flaw.	~ 6 months	NA	Potential
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of the U.S. and will involve work in navigable waters. Individual form of permit will be required.	120 days from complete application (goal) ~12 months (expected)	Potential	No
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Section 401 permit process will parallel Section 404 permit process.	~12 months (expected)	No	No

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable – MDW towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable – MDW towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed MDW cooling tower technology. The CEQA review process trigger development of a comprehensive EIR.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC MDW tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	No	No

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the MDW tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of MDW cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to construct.	Permit review process is not expected to be successful.	Potentially	Yes



**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to operate.	Permit review process is not expected to be successful	No	Yes
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	A Title V Federal Operating Permit will be needed. The lack of sufficient PM-10 offsets will effectively preclude receipt of this permit.	Permit review process is not expected to be successful	No	Yes
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – San Diego Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit which is based on a once-through system. The water withdrawal and discharge will be significantly decreased, but there will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the MDW tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the MDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the MDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	NA	NA
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support MDW cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The potential for offsite freshwater to supply the cooling towers is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	No new wells to be developed will be developed in support of the saltwater cooling towers.	Not applicable – salt water option.	NA	NA
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No

**Table CC-8.**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Saltwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
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 SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not a Preconstruction Approvals	No	No
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of MDW towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	Assuming placement of the MDW towers in the Mesa Complex, three encroachment permits and related engineering study will be needed to support routing of cooling water supply pipes under Interstate-5, US Highway-101.	1-3 months	No	No

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	Not applicable	NA	NA
Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of a MDW towers on SONGS leased property or adjacent Camp Pendleton lands. The unabated plume from this tower may impact the low-level helicopter training missions. This could be a potential fatal flaw.	~ 6 months	NA	Potential
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Not applicable – water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters. Potential impacts to waters of the U.S. (wetland impacts and discharges of dredge or fill material into waters).	Not applicable	NA	NA
Nationwide Permit – US Army Corps of Engineers	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	No	No

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable – MDW towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable – MDW towers will be less than 200 feet above ground level threshold for FAA review.	Not applicable	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed MDW cooling tower technology. Following finalization of the requisite Environmental Impact Report, the CPUC will need to certify CEQA compliance to support their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. MDW tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	NA	NA



**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the MDW tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of MDW cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Regional Air Pollution Control District	With freshwater and reclaimed water, the MDW towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	With freshwater and reclaimed water, the MDW towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - a Title V Federal Operating Permit will not be needed.	Not applicable	NA	NA
Title IV Acid Rain Permit - USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No
NPDES Industrial Discharge Permit – Regional Water Quality Control Board (RWQCB) and State Water Resources Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit, which is based on a once-through system. The water withdrawal from the ocean will be discontinued and the discharge will be significantly decreased. There will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the MDW tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the MDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the MDW tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	Not applicable	NA	NA

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	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 - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	No	No
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support MDW cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The delivery of offsite freshwater to the site is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	The freshwater supply option could demand the addition of onsite wells.	1 -2 weeks (freshwater supply option)	No	No
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Resource Conservation (RC) Land Use Management Approval	While local municipality rules may supersede this regional land use//watershed protection-related project approval process, this is not the case for SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not Preconstruction Approvals	No	No

**Table CC-9**  
**Environmental Permit/Approval Assessment: Wet Mechanical (Forced) Draft Cooling**  
**(Reclaimed and Freshwater)**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of MDW towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	The freshwater and reclaimed water pipeline routes have not been determined. Encroachment permits and related engineering studies remain a possibility.	2-3 months	No	No

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	NA	NA	NA
Department of Navy and U.S. Marine Corps – Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of a hybrid wet/dry tower on SONGS leased property or adjacent Camp Pendleton lands. The saltwater tower will potentially pose deleterious salt deposition impacts to the new Camp residential areas to the northwest.	~ 6 months	No	No
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Refashioning of the existing intake system for closed-cycle cooling is likely to generate significant impacts to waters of the U.S. and will involve work in navigable waters. Individual form of permit will be required.	120 days from complete application (goal) ~12 months (expected)	Potential	No
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Section 401 permit process will parallel Section 404 permit process.	~12 months (expected)	No	No
Nationwide Permit – US Army Corps of Engineers	Not applicable - the refashioning of the existing intake system for closed-cycle cooling will generate significant impacts to waters of the U.S. that cannot be addressed by the Nationwide permitting process.	Not applicable	No	No

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable - hybrid wet/dry towers will be less than 200 feet above ground level threshold for FAA review.	1-2 months	NA	NA
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable - hybrid wet/dry towers will be less than 200 feet above ground level threshold for FAA review.	1-2 months	NA	NA
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed hybrid wet/dry cooling tower technology. The CEQA review process trigger development of a comprehensive EIR.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. Hybrid wet/dry Tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	No	No



**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the hybrid wet/dry tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of hybrid wet/dry cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to construct.	Permit review process is not expected to be successful.	Potentially	Yes

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	Major source air permit will be required to account for the significant emission of PM-10 (>100 tons/year). The San Diego Air Pollution Control District is designated a state non-attainment area for PM-10 and PM-2.5 which will necessitate securing PM-10 emission offsets. Currently, only 207 tons of PM-10 credits are available in this District. Given the improbable case where additional emission offsets can be generated, the lack of sufficient PM-10 offsets will effectively preclude the ability to receive an associated major source air permit to operate.	Permit review process is not expected to be successful	No	Yes
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	A Title V Federal Operating Permit will be needed. The lack of sufficient PM-10 offsets will effectively preclude receipt of this permit.	Permit review process is not expected to be successful	No	Yes
Title IV Acid Rain Permit – USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No
NPDES Industrial Discharge Permit – San Diego Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit which is based on a once-through system. The water withdrawal and discharge will be significantly decreased, but there will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the hybrid wet/dry tower system is not expected to generate significant issues.	~6 months	No	No

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the hybrid wet/dry tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the hybrid wet/dry tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	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, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	NA
2081 Permit for California Endangered Species Act of 1984 (Fish and Game Code, §2050 through 2098) – California Department of Fish and Game (CDDG)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	NA	NA
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No

**Table CC-10.  
Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support hybrid wet/dry cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The potential for offsite freshwater to supply the cooling towers is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	No new wells to be developed will be developed in support of the saltwater cooling towers.	Not applicable – salt water option.	NA	NA

**Table CC-10.**  
**Environmental Permit/Approval Assessment: Saltwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
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 SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not a Preconstruction Approvals	No	No
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of hybrid wet/dry towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	Assuming placement of the hybrid wet/dry towers in the Mesa Complex, three encroachment permits and related engineering study will be needed to support routing of cooling water supply pipes under Interstate-5, US Highway-101.	1-3 months	No	No

**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
National Environmental Policy Act – BLM or Other Responsible Lead Federal Agency (Record of Decision, Right of Way)	Not applicable – if Project does not constitute major federal action (federal land, funding). Please note that if NEPA is triggered it could involve a 12-18 month review period.	Not applicable	NA	NA
Department of Navy and U.S. Marine Corps– Camp Pendleton Lease	USMC Camp Pendleton and ultimately the Department of Navy approvals are needed to amend the lease to allow for addition of a hybrid wet/dry tower on SONGS leased property or adjacent Camp Pendleton lands. The unabated plume from this tower may impact the low –level helicopter training missions. This could be a potential fatal flaw.	~ 6 months	NA	Potential
Section 404/10 Permit – US Army Corps of Engineers (USACE)	Not applicable – water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Section 401 Water Quality Certificate – US Army Corps of Engineers (USACE) & Regional Quality Control Board (RWQCB)	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	NA	NA
Nationwide Permit – US Army Corps of Engineers	Not applicable – the water supply is assumed to be available at the site boundary. There are no impacts to jurisdictional waters.	Not applicable	No	No
Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area (Mesa Complex).	Potentially part of CEQA Review	No	No
Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA), Permanent Facilities	Not applicable - hybrid wet/dry towers will be less than 200 feet above ground level threshold for FAA review.	1-2 months	No	No

**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Notice of Proposed Construction or Alteration – FAA, Temporary Construction Facilities	Not applicable - hybrid wet/dry towers will be less than 200 feet agl threshold for FAA review.	1-2 months	No	No
Multiple-Use Class L Limited Land Use Designated Utility Corridor – Bureau of Land Management (BLM) or Other Responsible Federal Agency	Superseded by Department of Navy lease arrangement with SONGS.	Not applicable	No	No
California Public Utility Commission (CPUC) Approval	CPUC will likely be the lead agency for the CEQA compliance regarding the proposed hybrid wet/dry cooling tower technology. Following finalization of the requisite Environmental Impact Report, the CPUC will need to certify CEQA compliance to support their subsequent decision regarding whether the costs associated with the new cooling system can be reclaimed via a consumer rate base adjustment.	12 months nominally	Potential	Potential
California Energy Commission (CEC) – Final Decision	Not applicable - this process is only applicable if there is a power capacity (increase) > 50 MW, the threshold for review by the CEC. Hybrid wet/dry Tower system will not result in increased power output, so there will be no CEC-sponsored CEQA review or specific permits or approvals.	Not applicable	NA	NA
Coastal Development Permit - California Coastal Commission/Local Coastal Programs	Applicable for cooling tower development within the coastal zone which includes all of the SONGS property in the Coastal Complex (west of I-5) and the Mesa Complex to the east. While there are no initial fatal flaws with the hybrid wet/dry tower system, the extreme height of the tower system and unabated plume could result in visual impacts which are ultimately found unacceptable by the Commission.	A 3 to 9 month process is advertised, but longer if CEQA review process (CEQA/EIR) is triggered.	Potential	Potential



**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Coastal Development Lease – California State Lands Commission and potential CEQA Lead Agency	The State Land Commission will evaluate the expected impacts to marine environment associated with addition of hybrid wet/dry cooling tower system and determine if a Categorical Exemption (unlikely) or Mitigated Negative Declaration applies. These impacts could trigger the Commission to initiate the CEQA/EIR review process.	Dependent of the duration of the CEQA/EIR process (> 1 year).	Potential	No
Regional Pollution Control District Permit to Construct (ATC) – San Diego Regional Air Pollution Control District	With freshwater and reclaimed water, the hybrid wet/dry towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Regional Control District Permit to Operate (PTO) – San Diego Air Pollution Control District	With freshwater and reclaimed water, the hybrid wet/dry towers do not require a major source air permit because of PM-10 emissions (<100 tons/year) and will therefore not require PM-10 emission offsets.	Not applicable	NA	NA
Title V Federal Operating Permit – San Diego Air Pollution Control District and USEPA	Not applicable - a Title V Federal Operating Permit will not be needed.	Not applicable	NA	NA
Title IV Acid Rain Permit – USEPA	Not applicable – no major sources of acid rain air pollution	Not applicable	NA	NA
Dust Control Plan – San Diego Air Pollution Control District	Construction projects that emit particulate matter must comply with PM-10 standards via a Dust Control Plan.	Plans development: 1 month	No	No

**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
NPDES Industrial Discharge Permit – Regional Water Quality Control Board (RWQCB) and State Water Resources Board	Changes in the quantity and quality of the cooling system discharge will necessitate a change in the NPDES permit, which is based on a once-through system. The water withdrawal from the ocean will be discontinued and the discharge will be significantly decreased. There will be changes in the water treatment processes (additional biocides and other treatment chemicals). The modification of the current NPDES permit to reflect the hybrid wet/dry tower system is not expected to generate significant issues.	~6 months	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, San Diego Regional Water Quality Control Board (RWQCB)	Land disturbances associated with the hybrid wet/dry tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	Electronic submittal – 1 week process	No	No
Storm Water Pollution Prevention Plan (SWPPP) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity – San Diego Regional Quality Control Board (RWQCB)	Land disturbances associated with the hybrid wet/dry tower system will substantially exceed the 1 acre threshold level necessitating the submittal of Notice of Intent (NOI) and development of Storm Water Pollution Prevention Plan.	SWPPP development process (3-months)	No	No
Notice of Intent (NOI) – National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity, San Diego Regional Water Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no operational phase Notice of Intent for this facility.	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, Regional Quality Control Board (RWQCB)	Not applicable - SONGS NPDES permit addresses operational storm water – there is no separate operational phase SWPPP.	Not applicable	NA	NA

**Table CC-11.  
Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower  
San Onofre Nuclear Generating Station (cont.)**

<b>Permit/Approval</b>	<b>Assessment</b>	<b>Permit Review Period (preconstruction)</b>	<b>Critical Path</b>	<b>Fatal Flaw</b>
2081 Permit for California Endangered Species Act of 1984 (Fish and Game Code, §2050 through 2098) – California Department Fish and Game (CDFG)	Not applicable - if eventual cooling tower site area is within a developed or disturbed area.	Potentially, part of CEQA Review	No	No
Lake and Streambed Alteration Agreement - California Department of Fish & Game (CDFG)	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed areas (waters of the state).	1-2 months, (if application complete) Note recent history indicates this could extend to 4 to 6 months.	No	No
Waste Discharge Requirements (WDR) – San Diego Regional Water Quality Control Board	Potentially applicable - if cooling tower site area disturbance involves impacts to jurisdictional streambed (waters of the state)	4-6 months	No	No
Section 106 Review – Office of Historic Preservation (OHP)	Potential for Historical Review – part of CEQA review process.	Integral to CEQA review process.	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Construction Phase - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	Potentially necessary for construction of the towers, unless current SONGS ID will be used.	1-2 weeks	No	No
Notification of Waste Activity - RCRA Hazardous Waste Identification Number (Small Quantity Generator) – Operation - Department of Toxic Substance Control, USEPA, San Diego County Department of Environmental Health - California Unified Program Agency	SONGS likely will continue to be able to continue to use their existing hazardous waste ID number. There will be no impacts to the onsite hazardous treatment facility (oil separation unit).	Not Preconstruction Permit	No	No
SPCC Plan - 40 CFR 112 and Aboveground Petroleum Storage Act – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	SONGS will likely have to modify their existing SPCC plan in response to potential for new aboveground storage tanks of applicable petroleum materials.	1-2 months plan development	No	No

**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Underground Storage Tank Permit - San Diego County Department of Environmental Health - California Unified Program Agency and State Water Resources Board	The new cooling towers could force the relocation of underground tanks mandating new permits from the County and revised inspection programs.	1-2 months	No	No
Risk Management Plan (Clean Air Act 112r) – San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new volatile chemicals are needed to support hybrid wet/dry cooling tower operation, a Risk Management Plan may be needed to assess the offsite impacts of a release of the subject chemical.	Not a preconstruction requirement.	No	No
Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 311 & 312 - San Diego County Department of Environmental Health - California Unified Program Agency and USEPA	If new chemicals are stored in quantities that exceed applicable thresholds (e.g., 10,000 lbs for hazardous chemicals, 500 lbs for extremely hazardous chemicals), additional notification reports will need to be sent to the County.	Not a preconstruction requirement	No	No
Land Use Zones/Districts Approval - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Condition Use Plan Amendment - San Diego County Department of Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Grading Plan Approval or Permit - San Diego County Department of Public Works & Planning and Land Use	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA
Erosion and Sediment Control Plan (Rain Event Action Plan) - San Diego County Department of Public Works	Similar to construction phase SWPPP. No separate submittal is expected to be directed to the County, since the SONGS property is entirely situated on federal property (USMC Pendleton property).	Not applicable	NA	NA
Building Permit (including plumbing and electrical) – San Diego County Building Division	Not applicable - the SONGS property is entirely situated on federal property (USMC Camp Pendleton property).	Not applicable	NA	NA

**Table CC-11.**  
**Environmental Permit/Approval Assessment: Reclaimed and Freshwater Hybrid Wet/Dry Tower**  
**San Onofre Nuclear Generating Station (cont.)**

Permit/Approval	Assessment	Permit Review Period (preconstruction)	Critical Path	Fatal Flaw
Domestic Water Supply Permit (public potable water) -San Diego County Department of Environmental Health	Not applicable – no new potable water systems are planned. The delivery of offsite freshwater to the site is not addressed by this permit.	Not applicable	NA	NA
San Diego County Well Water Permit - San Diego County Department of Environmental Health	The freshwater supply option could demand the addition of onsite wells.	1 -2 weeks (freshwater supply option)	No	No
California Department of Transportation (Caltrans) – Oversize/Overweight Vehicles	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Caltrans Heavy Haul Report (transport and delivery of heavy and oversized loads)	Potentially applicable - if some of the tower elements prove to be oversized.	Not a preconstruction requirement.	No	No
Resource Conservation (RC) Land Use Management Approval	While local municipality rules may supersede this regional land use//watershed protection-related project approval process, this is not the case for SONGS.	1-4 months, if application complete	NA	NA
Temporary Power Pole – Local municipality or San Diego County Public Works Department	Local power poles may be needed during the course of construction.	Not Preconstruction Approvals	No	No
Fire Safety Plan Approval, Certificate of Occupancy, Flammable Storage – San Diego County Fire Department	While the addition of hybrid wet/dry towers may require revisions to the existing Fire Safety Plan, the tower system is not expected to include new occupied structures,	1 month for approval of Fire Safety Plan.	No	No
Sewer and Sewer Connections – San Diego County Environmental Health Department	Not applicable - no new sanitary connections are envisioned.	Not applicable.	NA	NA
Road Crossing or Encroachment Permit (NCTD/BNSF, and Caltrans)	The freshwater and reclaimed water pipeline routes have not been determined. Encroachment permits and related engineering studies remain a possibility.	2-3 months	No	No

**Table CC-12**  
**Offsetting Impacts for Passive Draft Dry/Air Cooling**  
**San Onofre Nuclear Generation Station**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	<p>Increase in greenhouse gases, NOx, Volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, and commuting workforce.</p> <p>Fugitive dust emissions from land disturbance and potential concrete batch plant.</p>	<p>Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short term loss of SONGS generation during the associated plant outages and the ongoing decreases SONGS output from associated auxiliary loads and reduced thermal efficiency.</p> <p>There are no drift losses or condensed plume from operation of this system. Consequently, there are no particulate emissions (salt) or related impacts</p>	<p>Small temporary increase in CO<sub>2</sub> greenhouse gas emissions from temporary increase in commuting traffic during associated plant outage.</p>	<p>Small Negative</p>	<p>Large Negative (saltwater)</p> <p>Small Negative (fresh and reclaimed water)</p>
Surface Water	<p>Increased potential for soil erosion and sedimentation as well as other storm water contamination threats from material storage, handling and related spills.</p> <p>Construction activities will have the potential to generate turbidity impacts from disruption of near-shore habitats near the intake where some marine work will be pursued.</p>	<p>Saltwater - significantly reduced seawater withdrawals, reduced thermal discharge impacts (lower temperature, reduced flow), and increased residual biocides in the cooling system discharge.</p> <p>Fresh and Reclaimed Water - an increase in residual biocides in the cooling system discharge. This involves an industrial use of an otherwise potable water source and a wastewater.</p>	<p>Only significant make-up required from any of the potential sources is the initial charge of the closed system. No considerable continuous make-up flow required from any of the sources.</p>	<p>Small Negative</p>	<p>Small Positive (saltwater, reclaimed water)</p> <p>Small Negative (freshwater)</p>

**Table CC-12.**  
**Offsetting Impacts for Passive Draft Dry/Air Cooling**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Groundwater	Additional groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete).	Onsite groundwater resources will not be used in support of saltwater PDD tower operation. Groundwater could be used to satisfy or contribute to the operational water needs of the freshwater PDD towers or used to supplement the water needs of the reclaimed water cooling tower system.	Minimal for dry technologies	Small Negative	Small Positive (saltwater)  Moderate Negative (freshwater and reclaimed water)
Marine Ecological Resources	Saltwater - new localized disruptions to inshore marine habitat from installation of new inshore intake system.  Fresh and Reclaimed Water – no impacts to marine resources.	Permanent lost of inshore marine habitat.  Saltwater - reduced impingement and entrainment from reduced water withdrawals (+95% reduction in withdrawals, influent velocity < 0.5 foot/second and reduced and appropriate screening).  Freshwater and Reclaimed Water – no seawater withdrawals, so no impingement or entrapment impacts to marine life.	Assessment of loss of acres of sub-tidal habitat pending later assessment phase.	Small Negative (saltwater)  None (fresh and reclaimed water)	Large Positive
Waste	Increased generation of demolition, marine spoils, and construction-related wastes.	Increased generation of wastes from cooling tower maintenance activities and collection of wastes from the modified inshore intake system.	Earthwork material balance pending later assessment phase See Section 4.8 for estimated construction wastes to landfill.	Small Negative	Small Negative

**Table CC-12.**  
**Offsetting Impacts for Passive Draft Dry/Air Cooling**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Noise	Increased noise from construction activities associated with development of the cooling tower installation and associated intake modifications.	Increased noise from operation of the cooling tower system (pump, and motor noise).	Construction activities and operation of the PDD cooling cycle system will not result in an exceedance of the local noise criteria (nominally 70 dBa at nearest public noise receptor).	Small Negative	Small Negative
Land Use	Construction activities will be occurring on previously occupied, undeveloped or undisturbed land in the Mesa Complex. Some marine work will be necessary to modify the inshore portions of the existing intake system.	Significant re-purposing of previously occupied, undeveloped or undisturbed land for industrial purposes.	See Section 4.8 for estimated construction and excavation areas.	Moderate Negative	Moderate Negative
Terrestrial Ecological Resources	Since construction will be confined to the largely developed Mesa Complex, there is limited potential to disturb habitats or other areas with significant ecological value or sensitivity.	The tower system is located in a largely developed area, so there is limited potential for permanent loss of habitat areas or other areas with significant ecological value or sensitivity.	See Section 4.8 for estimated construction and excavation areas.	Small Negative	Small Negative
Cultural & Paleontological Resources	Limited to potential for discovery of new cultural or paleontological resources in the newly developed portions of the Mesa Complex.	Operation of the air-cooled system will pose no impacts to cultural or paleontological resources.	N/A	Small Negative	None
Visual Resources	The construction of the tall PDD cooling towers in the Mesa Complex will have a significant local visual impact.	The tall tower system will produce no visible plume, but will still present a significant visual impact.	See Section 3 for description of technology, including heights	Large Negative	Large Negative



**Table CC-12.**  
**Offsetting Impacts for Passive Draft Dry/Air Cooling**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Transportation	Increased traffic from the construction workforce will worsen the existing level of service on local roads.	There will be no condensed plume and so additional fogging or icing impacts.	See Section 4.8 for estimated construction duration.	Small Negative	None
Socioeconomic	While there will be 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 may increase to address cooling tower system operation.	See Section 4.9	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.

**Table CC-13.  
Offsetting Impacts for Mechanical Draft Dry/Air Cooling  
San Onofre Nuclear Generation Station**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	<p>Increase in greenhouse gases, NO<sub>x</sub>, volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, and commuting workforce.</p> <p>Fugitive dust emissions from land disturbance and potential concrete batch plant.</p>	<p>Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short term loss of SONGS generation during the associated plant outages and the ongoing decreases SONGS output from associated auxiliary loads and reduced thermal efficiency.</p> <p>There are no drift losses or condensed plume from operation of this system. Consequently, there are no particulate emissions (salt) or related impacts</p>	<p>Small temporary increase in CO<sub>2</sub> greenhouse gas Emissions from temporary increase in commuting traffic during associated plant outage.</p>	<p>Small Negative</p>	<p>Large Negative (saltwater)</p> <p>Small Negative (fresh and reclaimed water)</p>

**Table CC-13.  
Offsetting Impacts for Mechanical Draft Dry/Air Cooling  
San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
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**Table CC-13.**  
**Offsetting Impacts for Mechanical Draft Dry/Air Cooling**  
**San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Surface Water	<p>Increased potential for soil erosion and sedimentation as well as other storm water contamination threats from material storage, handling and related spills.</p> <p>Construction activities will have the potential to generate turbidity impacts from disruption of near-shore habitats near the intake where some marine work will be pursued.</p>	<p>Saltwater - significantly reduced seawater withdrawals, reduced thermal discharge impacts (lower temperature, reduced flow), and increased residual biocides in the cooling system discharge.</p> <p>Fresh and Reclaimed Water - an increase in residual biocides in the cooling system discharge. This involves an industrial use of an otherwise potable water source and a wastewater.</p>	<p>Only significant make-up required from any of the potential sources is the initial charge of the closed system. No considerable continuous make-up flow required from any of the sources. Need velocity and flow characterization?</p>	<p>Small Negative</p>	<p>Small Positive (saltwater, reclaimed water)</p> <p>Small Negative (freshwater)</p>
Groundwater	<p>Additional groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete).</p>	<p>Onsite groundwater resources will not be used in support of saltwater mechanical air cooling draft tower operation.</p> <p>Groundwater could be used to satisfy or contribute to the operational water needs of the freshwater mechanical air cooling draft towers or used to supplement the water needs of the reclaimed water cooling tower system.</p>		<p>Small Negative</p>	<p>Small Positive (saltwater)</p> <p>Moderate Negative (freshwater and reclaimed water)</p>

**Table CC-13.  
Offsetting Impacts for Mechanical Draft Dry/Air Cooling  
San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Marine Ecological Resources	<p>Saltwater - new localized disruptions to inshore marine habitat from installation of new inshore intake system.</p> <p>Fresh and Reclaimed Water – no impacts to marine resources.</p>	<p>Permanent lost of inshore marine habitat.</p> <p>Saltwater - reduced impingement and entrainment from reduced water withdrawals (+95% reduction in withdrawals, influent velocity &lt; 0.5 foot/second and reduced and appropriate screening).</p> <p>Freshwater and Reclaimed Water – no seawater withdrawals, so no impingement or entrapment impacts to marine life.</p>	Sub-tidal land impacts – subsequent assessment	<p>Small Negative (salt water)</p> <p>None (fresh and reclaimed water)</p>	Large Positive
Waste	Increased generation of demolition, marine spoils, and construction-related wastes.	Increased generation of wastes from cooling tower maintenance activities and collection of wastes from the modified inshore intake system.	Construction wastes – subsequent assessment	Small Negative	Small Negative
Noise	Increased noise from construction activities associated with development of the cooling tower installation and associated intake modifications.	Increased noise from operation of the cooling tower system (fan, pump, and motor noise).	Construction activities and operation of the mechanical air cooling draft cooling cycle system will not result in an exceedance of the local noise criteria (nominally 70 dBa at nearest public noise receptor).	Small Negative	Small Negative

**Table CC-13.  
Offsetting Impacts for Mechanical Draft Dry/Air Cooling  
San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Land Use	Construction activities will be occurring on previously occupied, undeveloped or undisturbed land in the Mesa Complex. Some marine work will be necessary to modify the inshore portions of the existing intake system.	Significant re-purposing of previously occupied, undeveloped or undisturbed land for industrial purposes.	Construction Area – subsequent assessment	Moderate Negative	Moderate Negative
Terrestrial Ecological Resources	Since construction will be confined to the largely developed Mesa Complex, there is limited potential to disturb mechanical air cooling draft habitats or other areas with significant ecological value or sensitivity.	The tower system is located in a largely developed area, so there is limited potential for permanent loss of mechanical air cooling draft habitat areas or other areas with significant ecological value or sensitivity.	Construction Area – subsequent assessment	Small Negative	Small Negative
Cultural & Paleontological Resources	Limited to potential for discovery of new cultural or paleontological resources in the newly developed portions of the Mesa Complex.	Operation of the air-cooled system will pose no impacts to cultural or paleontological resources.		Small Negative	None
Visual Resources	The low profile mechanical air cooling draft cooling towers in the Mesa Complex will have a limited visual impact.	The low profile tower system will produce no visible plume, nor lead to increased fogging conditions.		Small Negative	None
Transportation	Increased traffic from the construction workforce will worsen the existing level of service on local roads.	There will be no condensed plume and so additional fogging or icing impacts.		Small Negative	None

**Table CC-13.  
 Offsetting Impacts for Mechanical Draft Dry/Air Cooling  
 San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Socioeconomic	While there will be 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 may increase to address cooling tower system operation.		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.



**Table CC-14.  
Offsetting Impacts for Natural Draft Towers  
San Onofre Nuclear Generation Station**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	<p>Increase in greenhouse gases, NO<sub>x</sub>, volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, and commuting workforce.</p> <p>Fugitive dust emissions from land disturbance and potential concrete batch plant.</p>	<p>Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short term loss of SONGS generation during the associated plant outages and the ongoing decreases SONGS output from associated auxiliary loads and reduced thermal efficiency.</p> <p>Saltwater - Increased salt deposition from cooling tower drift emissions will impact offsite salt-sensitive vegetation and increase onsite equipment corrosion potential. There will be increased volatile organic compound emissions from supplemental corrosion control measures (resurfacing/painting). The salt emissions could pose visibility impacts on sensitive Class I areas in Southern California.</p> <p>Fresh and Reclaimed Water: Some salt deposition from cooling tower drift emissions. Onsite corrosion and Class I visibility should not be an issue.</p>	<p>Small temporary increase in CO<sub>2</sub> greenhouse gas emissions from temporary increase in commuting traffic during associated plant outage.</p> <p>Additional (pending) tons of CO<sub>2</sub> greenhouse gas emissions from associated plant outages.</p> <p>Additional (pending) tons/year of CO<sub>2</sub> greenhouse gas emissions from unit from reduced plant efficiency.</p> <p>Additional 916 tons/year of PM-10 from cooling systems.</p> <p>Additional significant volatile organic compound from painting and reflight volatile organic compound finishing operations.</p>	Small Negative	<p>Large Negative (saltwater)</p> <p>Small Negative (fresh and reclaimed water)</p>

**Table CC-14.**  
**Offsetting Impacts for Natural Draft Towers**  
**San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Surface Water	<p>Increased potential for soil erosion and sedimentation as well as other storm water contamination threats from material storage, handling and related spills.</p> <p>Construction activities will have the potential to generate turbidity impacts from disruption of near-shore habitats near the intake where some marine work will be pursued.</p>	<p>Saltwater - significantly reduced seawater withdrawals, reduced thermal discharge impacts (lower temperature, reduced flow), and increased salinity and residual biocides in the cooling system discharge.</p> <p>Fresh and Reclaimed Water - decrease in salinity and an increase in residual biocides in the cooling system discharge. This involves an industrial use of an otherwise potable water source and a wastewater.</p>		Small Negative	<p>Small Positive (saltwater, reclaimed water)</p> <p>Small Negative (freshwater)</p>
Groundwater	<p>Additional groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete).</p>	<p>Onsite groundwater resources will not be used in support of saltwater natural draft tower operation. Groundwater could be used to satisfy or contribute to the operational water needs of the freshwater natural draft towers or used to supplement the water needs of the reclaimed water cooling tower system.</p>		Small Negative	<p>Small Positive (saltwater)</p> <p>Moderate Negative (freshwater and reclaimed water)</p>



**Table CC-14.**  
**Offsetting Impacts for Natural Draft Towers**  
**San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Marine Ecological Resources	<p>Saltwater - new localized disruptions to inshore marine habitat from installation of new inshore intake system.</p> <p>Fresh and Reclaimed Water – no impacts to marine resources.</p>	<p>Permanent lost of inshore marine habitat.</p> <p>Saltwater - reduced impingement and entrainment from reduced water withdrawals (90-95% reduction in withdrawals, influent velocity &lt; 0.5 foot/second and reduced and appropriate screening).</p> <p>Freshwater and Reclaimed Water – no seawater withdrawals, so no impingement or entrapment impacts to marine life.</p>	Sub-tidal Impacts – subsequent assessment.	<p>Small Negative (salt water)</p> <p>None (fresh and reclaimed water)</p>	Large Positive
Waste	Increased generation of demolition, marine spoils, and construction-related wastes.	Increased generation of wastes from cooling tower maintenance activities and collection of wastes from the modified inshore intake system.	Waste volume – subsequent assessment	Small Negative	Small Negative
Noise	Increased noise from construction activities associated with development of the cooling tower installation and associated intake modifications.	Increased noise from operation of the cooling tower system (cascading water, pump, and motor noise).	Construction activities and operation of the natural draft cooling cycle system will not result in an exceedance of the local noise criteria (nominally 70 dBa at nearest public noise receptor).	Small Negative	Small Negative

**Table CC-14.**  
**Offsetting Impacts for Natural Draft Towers**  
**San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Land Use	Construction activities will be occurring on previously occupied, undeveloped or undisturbed land in the Mesa Complex. Some marine work will be necessary to modify the inshore portions of the existing intake system.	Significant re-purposing of previously occupied, undeveloped or undisturbed land for industrial purposes.	Construction area – subsequent assessment.	Moderate Negative	Moderate Negative
Terrestrial Ecological Resources	Since construction will be confined to the largely developed Mesa Complex, there is limited potential to disturb natural habitats or other areas with significant ecological value or sensitivity.	The tower system is located in a largely developed area, so there is limited potential for permanent loss of natural habitat areas or other areas with significant ecological value or sensitivity.	Construction area – subsequent assessment	Small Negative	Small Negative
Cultural & Paleontological Resources	Limited to potential for discovery of new cultural or paleontological resources in the newly developed areas.	Increased salt deposition and plume impaction from the tower operation may accelerate decay of local surface resources.	Salt deposition 916 ton/year on surrounding lands	Small Negative	Small Negative
Visual Resources	New temporary visual impact to local areas from construction cranes and other high profile construction equipment.	Generation of significant visual impacts from tall cooling tower structures and the associated plumes, including possible impacts to local USMC training operations.		Moderate Negative	Large Negative
Transportation	Increased traffic from the construction workforce will worsen the existing level of service on local roads.	Increased hours of local fogging and icing on local roads and impacts to low altitude USMC helicopter training activities from nearby Camp Pendleton.		Small Negative	Moderate Negative

**Table CC-14.**  
**Offsetting Impacts for Natural Draft Towers**  
**San Onofre Nuclear Generation Station) (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Socioeconomic	While there will be 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 may increase to address cooling tower system operation and corrosion mitigation (for the salt tower system).		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.

**Table CC-15.  
Offsetting Impacts for Wet Mechanical Draft Cooling System  
San Onofre Nuclear Generation Station**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	<p>Increase in greenhouse gases, NOx, volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, and commuting workforce.</p> <p>Fugitive dust emissions from land disturbance and potential concrete batch plant.</p>	<p>Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short term loss of SONGS generation during the associated plant outages and the ongoing decreases SONGS output from associated auxiliary loads and reduced thermal efficiency.</p> <p>Saltwater - Increased salt deposition from cooling tower drift emissions will impact offsite salt-sensitive vegetation and increase onsite equipment corrosion potential. There will be increased volatile organic compound emissions from supplemental corrosion control measures (resurfacing/painting). The salt emissions could pose visibility impacts on sensitive Class I areas in Southern California.</p> <p>Fresh and Reclaimed Water: Some salt deposition from cooling tower drift emissions. Onsite corrosion and Class I visibility should not be an issue.</p>	<p>Small temporary increase in CO<sub>2</sub> greenhouse gas emissions from temporary increase in commuting traffic during associated plant outage.</p> <p>Additional (pending) tons of CO<sub>2</sub> greenhouse gas emissions from associated plant outages.</p> <p>Additional (pending) tons/year of CO<sub>2</sub> greenhouse gas emissions from unit from reduced plant efficiency.</p> <p>Additional 916 tons/year of PM-10 from cooling systems.</p> <p>Additional significant volatile organic compound from painting and refinishing operations.</p>	Small Negative	<p>Large Negative (saltwater)</p> <p>Small Negative (fresh and reclaimed water)</p>

**Table CC-15.**  
**Offsetting Impacts for Wet Mechanical Draft Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Surface Water	<p>Increased potential for soil erosion and sedimentation as well as other storm water contamination threats from material storage, handling and related spills.</p> <p>Construction activities will have the potential to generate turbidity impacts from disruption of near-shore habitats near the intake where some marine work will be pursued.</p>	<p>Saltwater - significantly reduced seawater withdrawals, reduced thermal discharge impacts (lower temperature, reduced flow), and increased salinity and residual biocides in the cooling system discharge.</p> <p>Fresh and Reclaimed Water - decrease in salinity and an increase in residual biocides in the cooling system discharge. This involves an industrial use of an otherwise potable water source and a wastewater.</p>	Velocity and Flow characterization – subsequent assessment.	Small Negative	<p>Small Positive (saltwater, reclaimed water)</p> <p>Small Negative (freshwater)</p>
Groundwater	Additional groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete).	<p>Onsite groundwater resources will not be used in support of saltwater wet mechanical draft tower operation.</p> <p>Groundwater could be used to satisfy or contribute to the operational water needs of the freshwater wet mechanical draft towers or used to supplement the water needs of the reclaimed water cooling tower system.</p>		Small Negative	<p>Small Positive (saltwater)</p> <p>Moderate Negative (freshwater and reclaimed water)</p>

**Table CC-15.**  
**Offsetting Impacts for Wet Mechanical Draft Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Marine Ecological Resources	<p>Saltwater - new localized disruptions to inshore marine habitat from installation of new inshore intake system.</p> <p>Fresh and Reclaimed Water – no impacts to marine resources.</p>	<p>Permanent lost of inshore marine habitat.</p> <p>Saltwater - reduced impingement and entrainment from reduced water withdrawals (90-95% reduction in withdrawals, influent velocity &lt; 0.5 foot/second and reduced and appropriate screening).</p> <p>Freshwater and Reclaimed Water – no seawater withdrawals, so no impingement or entrapment impacts to marine life.</p>	Sub-tidal impacts – subsequent assessments.	<p>Small Negative (salt water)</p> <p>None (fresh and reclaimed water)</p>	Large Positive
Waste	Increased generation of demolition, marine spoils, and construction-related wastes.	Increased generation of wastes from cooling tower maintenance activities and collection of wastes from the modified inshore intake system.	Waste Volume – subsequent assessment	Small Negative	Small Negative
Noise	Increased noise from construction activities associated with development of the cooling tower installation and associated intake modifications.	Increased noise from operation of the cooling tower system (cascading water, pump, and motor noise).	Construction activities and operation of the wet mechanical draft cooling cycle system will not result in an exceedance of the local noise criteria (nominally 70 dBA at nearest public noise receptor).	Small Negative	Small Negative

**Table CC-15.**  
**Offsetting Impacts for Wet Mechanical Draft Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Land Use	Construction activities will be occurring on previously occupied, undeveloped or undisturbed land in the Mesa Complex. Some marine work will be necessary to modify the inshore portions of the existing intake system.	Significant re-purposing of previously occupied, undeveloped or undisturbed land for industrial purposes.	Construction Area – subsequent assessment	Moderate Negative	Moderate Negative
Terrestrial Ecological Resources	Since construction will be confined to the largely developed Mesa Complex, there is limited potential to disturb wet mechanical draft habitats or other areas with significant ecological value or sensitivity.	The tower system is located in a largely developed area, so there is limited potential for permanent loss of wet mechanical draft habitat areas or other areas with significant ecological value or sensitivity.	Construction Area – subsequent assessment	Small Negative	Small Negative
Cultural & Paleontological Resources	Limited to potential for discovery of new cultural or paleontological resources in the newly developed areas.	Increased salt deposition and plume impaction from the tower operation may accelerate decay of local surface resources.	Salt deposition 916 ton/year on surrounding lands	Small Negative	Small Negative
Visual Resources	The low profile wet mechanical draft cooling towers in the Mesa Complex will have a limited visual impact.	Generation of significant visual impacts from tall cooling tower structures and the associated plumes, including possible impacts to local USMC training operations.		Small Negative	Large Negative
Transportation	Increased traffic from the construction workforce will worsen the existing level of service on local roads.	Increased hours of local fogging and icing on local roads and impacts to low altitude USMC helicopter training activities from nearby Camp Pendleton.		Small Negative	Moderate Negative

**Table CC-15.**  
**Offsetting Impacts for Wet Mechanical Draft Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Socioeconomic	While there will be 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 may increase to address cooling tower system operation and corrosion mitigation (for the salt tower system).		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.





**Table CC-16.**  
**Offsetting Impacts for Hybrid Wet/Dry Cooling System**  
**San Onofre Nuclear Generation Station**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Air	<p>Increase in greenhouse gases, NOx, volatile organic compound, CO, and particulate matter from construction equipment, material deliveries, and commuting workforce.</p> <p>Fugitive dust emissions from land disturbance and potential concrete batch plant.</p>	<p>Increased greenhouse gas emissions from replacement fossil-fuel generation to offset the short term loss of SONGS generation during the associated plant outages and the ongoing decreases SONGS output from associated auxiliary loads and reduced thermal efficiency.</p> <p>Saltwater - Increased salt deposition from cooling tower drift emissions will impact offsite salt-sensitive vegetation and increase onsite equipment corrosion potential. There will be increased volatile organic compound emissions from supplemental corrosion control measures (resurfacing/painting). The salt emissions could pose visibility impacts on sensitive Class I areas in Southern California.</p> <p>Fresh and Reclaimed Water: Some salt deposition from cooling tower drift emissions. Onsite corrosion and Class I visibility should not be an issue.</p>	<p>Small temporary increase in CO<sub>2</sub> greenhouse gas emissions from temporary increase in commuting traffic during associated plant outage.</p> <p>Additional (pending) tons of CO<sub>2</sub> greenhouse gas emissions from associated plant outages.</p> <p>Additional (pending) tons/year of CO<sub>2</sub> greenhouse gas emissions from unit from reduced plant efficiency.</p> <p>Additional 916 tons/year of PM-10 from cooling systems.</p> <p>Additional significant volatile organic compound from painting and refinishing operations.</p>	Small Negative	<p>Large Negative (saltwater)</p> <p>Small Negative (fresh and reclaimed water)</p>

**Table CC-16.**  
**Offsetting Impacts for Hybrid Wet/Dry Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Surface Water	<p>Increased potential for soil erosion and sedimentation as well as other storm water contamination threats from material storage, handling and related spills.</p> <p>Construction activities will have the potential to generate turbidity impacts from disruption of near-shore habitats near the intake where some marine work will be pursued.</p>	<p>Saltwater - significantly reduced seawater withdrawals, reduced thermal discharge impacts (lower temperature, reduced flow), and increased salinity and residual biocides in the cooling system discharge.</p> <p>Fresh and Reclaimed Water - decrease in salinity and an increase in residual biocides in the cooling system discharge. This involves an industrial use of an otherwise potable water source and a wastewater.</p>	Velocity and Flow Characterization – subsequent assessment	Small Negative	<p>Small Positive (saltwater, reclaimed water)</p> <p>Small Negative (freshwater)</p>
Groundwater	<p>Additional groundwater resources could be used to satisfy increase freshwater construction water demands (compaction, dust control, concrete).</p>	<p>Onsite groundwater resources will not be used in support of saltwater hybrid wet/dry tower operation. Groundwater could be used to satisfy or contribute to the operational water needs of the freshwater hybrid wet/dry towers or used to supplement the water needs of the reclaimed water cooling tower system.</p>		Small Negative	<p>Small Positive (saltwater)</p> <p>Moderate Negative (freshwater and reclaimed water)</p>

**Table CC-16.**  
**Offsetting Impacts for Hybrid Wet/Dry Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Marine Ecological Resources	<p>Saltwater - new localized disruptions to inshore marine habitat from installation of new inshore intake system.</p> <p>Fresh and Reclaimed Water – no impacts to marine resources.</p>	<p>Permanent lost of inshore marine habitat.</p> <p>Saltwater - reduced impingement and entrainment from reduced water withdrawals (90-95% reduction in withdrawals, influent velocity &lt; 0.5 foot/second and reduced and appropriate screening).</p> <p>Freshwater and Reclaimed Water – no seawater withdrawals, so no impingement or entrapment impacts to marine life.</p>	Sub-tidal impacts – subsequent assessment	<p>Small Negative (salt water)</p> <p>None (fresh and reclaimed water)</p>	Large Positive
Waste	Increased generation of demolition, marine spoils, and construction-related wastes.	Increased generation of wastes from cooling tower maintenance activities and collection of wastes from the modified inshore intake system.	Waste Volume – subsequent assessment	Small Negative	Small Negative
Noise	Increased noise from construction activities associated with development of the cooling tower installation and associated intake modifications.	Increased noise from operation of the cooling tower system (cascading water, pump, and motor noise).	Construction activities and operation of the hybrid wet/dry cooling cycle system will not result in an exceedance of the local noise criteria (nominally 70 dBa at nearest public noise receptor).	Small Negative	Small Negative

**Table CC-16.**  
**Offsetting Impacts for Hybrid Wet/Dry Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Land Use	Construction activities will be occurring on previously occupied, undeveloped or undisturbed land in the Mesa Complex. Some marine work will be necessary to modify the inshore portions of the existing intake system.	Significant re-purposing of previously occupied, undeveloped or undisturbed land for industrial purposes.	Construction area – subsequent assessment	Moderate Negative	Moderate Negative
Terrestrial Ecological Resources	Since construction will be confined to the largely developed Mesa Complex, there is limited potential to disturb sensitive habitats or other areas with significant ecological value or sensitivity.	The tower system is located in a largely developed area, so there is limited potential for permanent loss of habitat areas or other areas with significant ecological value or sensitivity.	Construction area – subsequent assessment	Small Negative	Small Negative
Cultural & Paleontological Resources	Limited to potential for discovery of new cultural or paleontological resources in the newly developed areas.	Increased salt deposition and plume impaction from the tower operation may accelerate decay of local surface resources.	Salt deposition 916 ton/year on surrounding lands	Small Negative	Small Negative (Saltwater)
Visual Resources	The 175 foot towers will be a prominent feature in the low profile Mesa Complex.	Plume abatement features will mitigate visible plume issue, but towers will remain prominent feature in the Mesa Complex.		Moderate Negative	Moderate Negative
Transportation	Increased traffic from the construction workforce will worsen the existing level of service on local roads.	Limited additional fogging and icing impacts on local roads and impacts to local aviation.		Small Negative	Small Negative

**Table CC-16.**  
**Offsetting Impacts for Hybrid Wet/Dry Cooling System**  
**San Onofre Nuclear Generation Station (cont.)**

Category	Impacts – Construction	Impacts – Operations	Magnitude	Construction Impact Significance	Operation Impact Significance
Socioeconomic	While there will be 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 may increase to address cooling tower system operation and corrosion mitigation (for the salt tower system).		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.

**Table CC-17.**  
**San Diego APC Emission Reduction Credit Banking Registry Summary**  
**December 30, 2011**

Company Name	Certificate No.	PM-10	SOx
Castillo Power II, LLC	978938-02	0.0	0.0
	978938-03	2.8	0.0
	978938-04	0.0	8.1
	981518-03	0.0	0.0
	951518-04	0.1	0.7
City of San Diego, Metropolitan Wastewater Department	950766-04	0.63	
Dynegy South Bay, LLC	2011-000050-04	12.6	
Element Markets	070823-04		0.3
	070823-05	0.3	
General Dynamics, Convair	951022-04		0.1
	951022-04	1.5	
General Dynamics Property, Inc.	970809-03	0.46	
	970809-04		0.02
Grey K Environmental Fund, LP	060328-08	0.2	
	060328-07	0.4	
Hanson Aggregates, Pacific SW Region	980772-04	0.09	
HG Fenton Material Company	41106-03	129.10	
	930902-04	1.06	
	930902-05		1.0
	975070-03	0.1	
	975070-04		0.1
	975733-03	0.2	
National Steel & Shipbuilding	40994-01	0.1	
	40995-01	0.09	
	40995-05		0.27
	40996-01	0.01	
	40996-04		0.35
	40997-01	0.45	
	40997-05		0.04
Naval Station, San Diego	950949-03	1.09	
	950949-02	0.04	
	940206-05		0.04
NAVERUS, Inc.	040203-02	0.1	
	978227-03	0.1	
	981024-02	0.17	
	981024-05		0.09
	981954-03		0.28
	981954-04	0.61	



**Table CC-17.**  
**San Diego APC Emission Reduction Credit Banking Registry Summary**  
**December 30, 2011 (cont.)**

Company Name	Certificate No.	PM-10	SOx
Olduvai Gorge, LLC	091004-04	0.85	
	091004-05		0.1
Po Pico Energy Center, LLC	2011-000048-04	27.40	
	2011-000048-05		1.8
	2011-000049-04	9.50	
	2011-000049-05		1.7
Ralston Purina	50055-01	0.5	
	50055-02		4.6
SDG&E	921291-04	2.9	
South Coast Materials Company	940101-04	2.9	
	940101-01	10.8	
	950171-04	0.01	
	950171-05		0.1
STMicroelectronics, Inc.	978887-04	0.1	
SW Division, Naval Facilities Engineering Cmd.	970312-01	2.0	
US Foam	974375-05	0.1	
UN Communication Station	940560-02		0.49
	940560-03	0.34	
	940561-04		0.01
	940561-04		0.01
TOTALS (tons/yr)		206.81	20.21

Re: <http://www.sdapcd.org/permits/ERCs.pdf>.