C. Alternatives

Section C provides an overview of the alternatives screening process and the methodologies used when considering or eliminating an alternative based on CEQA. This section is organized as follows: Section C.1 describes the CPUC's approach to the Applicant's proposed options to the Proposed Project; Section C.2 provides an overview of the alternatives screening process; and Section C.3 describes the methodology used for alternatives evaluation. Section C.4 describes the alternatives that have been retained for full EIR analysis; full impact analysis for these alternatives is located in the specific issue area chapters in Section D of the Draft EIR. Section C.5 presents the alternatives that were eliminated from EIR analysis and the rationale for their elimination, and Section C.6 describes the No Project Alternative.

SCE proposed several options for the Proposed Project in its February 2004 PEA. During the scoping process (described in Section I), the general public and government agencies suggested alternate technologies for power production such as natural gas power plants, or alternative and renewable energy technologies such as wind, solar, and wave power, and various scenarios for the No Project Alternative. After thorough research of the Proposed Project information and visits to SONGS and the surrounding area, the EIR preparation team developed and analyzed a range of reasonable alternatives to the Proposed Project in accordance with CEQA Guidelines Section 15126.6(b).

C.1 Applicant-Proposed Options

In its February 2004 PEA, SCE presented several options for transport of the RSGs to the SONGS facility. SCE requested approval of all of these options so that it would have future flexibility in selecting the appropriate transport route in coordination with MCBCP and RSG transport contractor based on conditions at the time transport would occur. However, SCE identified one of these transport options as its preferred option (i.e., Beach and Road Route). For the purposes of this EIR, SCE's preferred transport route option constitutes the Proposed Project (as described in Section B, Project Description) and the other options are evaluated as alternatives (see Section C.2.4).

Due to the projected time frame of four to five years between the publication of the Final EIR and the commencement of steam generator replacement at SONGS, it may be necessary for SCE to initiate a different alternative other than the project that may be approved by CPUC. The EIR alternatives represent changes to the transport route of the RSGs from the Del Mar Boat Basin to the SONGS facility. In the event that SCE seeks to initiate a project different than the CPUC-approved option, the CPUC would evaluate the proposed changes and determine if the proposed substitution is substantially different from the project approved by the CPUC. Depending on the alternative, the CPUC would potentially need to revisit the impact analysis through the preparation of an addendum or supplemental EIR. See Section H for details on this process.

C.2 Alternatives Development and Screening Process

One of the most important aspects of the environmental review process is the identification and assessment of reasonable alternatives that would potentially avoid or minimize the impacts of a Proposed Project, including a "No Project" Alternative (CEQA Section 15126.6(e)(1)). This requirement is emphasized in the CEQA Guidelines, Section 15126.6(a), which states:

> ***An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project which would feasibly attain most of the basic objectives but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives.***

Section 15126.6(b) further states that the alternatives analysis shall include alternatives capable of eliminating or reducing the significant environmental impacts of a project, even if those alternatives would hinder the attainment of the project objectives, or would be more costly to implement. However, CEQA does not require the Lead Agency to evaluate every conceivable alternative, or those that are infeasible on economic, technical, legal, or regulatory grounds.

Potential alternatives analyzed were developed based on comments received from the general public, and federal, State, and local agencies during the scoping period (October 1, 2004, through November 1, 2004). As described in Section C.1, alternatives were also developed by the Applicant in its February 2004 PEA. In addition, the EIR preparers conducted an extensive review of potential alternatives to the Proposed Project based on supplemental analysis and field visits.

C.3 Alternatives Screening Methodology

The evaluation of potential alternatives to the Proposed Project was completed using a screening process that consisted of three steps:

Step 1: Clarify the description of each alternative to allow comparative evaluation.

Step 2: Evaluate each alternative using CEQA criteria (defined below).

The advantages and disadvantages of the remaining alternatives were carefully weighed with respect to CEQA criteria for consideration of alternatives. In order to comply with CEQA requirements, each of the proposed alternatives has been evaluated based on the following criteria:

1. Does the alternative meet most basic project objectives?
2. Is the alternative feasible (economic, legal, regulatory, technical)?
3. Does the alternative avoid or substantially lessen any significant effects of the Proposed Project?
4. Would the alternative result in any significant effects that are greater than those of the Proposed Project?

Step 3: Determine the suitability of the each alternative for full analysis in the EIR. If the alternative is unsuitable, eliminate it from further consideration. Infeasible alternatives that clearly offered no potential for overall environmental advantage were removed from further analysis.

C.3.1 Consistency with Project Objectives

This EIR does not endorse, nor is it governed by, the project objectives as defined by SCE; instead it uses these objectives as guidance for determining the positive and negative benefits of the project as proposed by SCE compared to the alternatives. In SCE's February 2004 PEA, the Applicant stated three main objectives for implementing the Proposed Project (SCE, 2004a, p. 3). As identified in Section A, Introduction, the project objectives are to:

- **Extend useful life of steam generators.** The useful life of SONGS 2 & 3 is limited by the life of the OSGs. For SONGS 2, there is a 25 percent probability that the steam generators will not be able to operate beyond the Fuel Cycle 16 RFO, which may begin as early as 2009. For SONGS 3, this probability is equal to 15 percent. For both units, these probabilities accelerate after the Fuel Cycle 16 RFO.
- **Perform steam generator replacement during earliest scheduled outage.** Because of the approximate five-year lead time from SCE's commitment to a vendor for steam generator fabrication to when the replacement steam generators are ready for installation, the earliest time that the steam generator replacement project is feasible is during Fuel Cycle 16 RFO, anticipated in 2009.
- **Ensure continued supply of low-cost power.** SCE believes that replacing the steam generators is cost-effective from a ratepayer perspective. Continued operation of SONGS 2 & 3 provides ratepayer benefits by deferring the costs of replacement base-load generation facilities and transmission system upgrades that will be required when SONGS 2 & 3 shut down.

As stated previously, the CEQA Guidelines require consideration of alternatives capable of avoiding or substantially lessening significant environmental effects of the project, even though they may impede attainment of project objectives to some degree [Section 15126.6(b)]. Therefore, each potential alternative evaluated would not necessarily need to meet all of SCE's objectives identified above.

C.3.2 Feasibility

The CEQA Guidelines (Section 15364) define feasibility as:

> ***" . . . capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."***

The alternatives screening analysis is largely governed by what CEQA terms the "rule of reason," meaning that the analysis should remain focused, not on every possible eventuality, but rather on the alternatives necessary to permit a reasoned choice. Furthermore, of the alternatives identified, the EIR is expected to fully analyze only those alternatives that are feasible, while still meeting most of the project objectives.

In determining the feasibility of alternatives, the factors that may be taken into account include site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, jurisdictional boundaries, and site access/control (CEQA Guidelines Section 15126.6(f)(1)). Factors that can affect the feasibility of an alternative can include:

- **Legal Feasibility.** Do legal protections on lands preclude or substantially limit the feasibility of transporting or storing the steam generators?
- **Regulatory Feasibility.** Do regulatory restrictions substantially limit the feasibility or successful permitting of the replacement or storage of the steam generators? Is the alternative consistent with regulatory standards for nuclear power plant operation and maintenance?
- **Technical Feasibility.** Is the alternative feasible from a technological perspective, considering available technology? Are there any construction, operation, and maintenance difficulties?
- **Economic Feasibility.** Is the alternative so costly that implementation would be prohibitive?

All of the above considerations were assessed for the Proposed Project in the alternatives screening analysis. For each alternative considered, a determination was made as to whether there was anything about the alternative that would be infeasible on technical, legal, economic, or regulatory grounds.

C.3.3 Potential to Eliminate Significant Environmental Effects

A key CEQA requirement for any alternative is that it must have the potential to "avoid or substantially lessen any of the significant effects of the project" (CEQA Guidelines Section 15126.6(a)). If an alternative was identified that does not provide potential overall environmental advantages compared to the Proposed Project, it was eliminated from further consideration. At the screening stage, it is not possible to evaluate all of the impacts of the alternatives in comparison to the Proposed Project with absolute certainty, nor is it possible to definitively quantify or predict all project impacts. However, it is possible to identify elements of an alternative that are likely to be the sources of significant impact and to relate them, to the extent possible, to general conditions in the subject area.

Appendix 1 (Notice of Preparation and Initial Study) presents a summary of the potential significant effects of the Proposed Project. This impact summary was prepared prior to completion of the EIR analysis; therefore, it may not be complete in comparison to the detailed analysis presented in Section D of the EIR. However, the potential impacts stated in Appendix 1 are representative of those resulting from preliminary review of the Proposed Project and were therefore used to determine whether an alternative met this CEQA requirement.

C.3.4 Summary of Screening Results

This section provides a summary of the alternatives identified and evaluated in this Draft EIR, and those potential alternatives that have been identified and eliminated from further analysis. The Proposed Project alternatives that are evaluated in this Draft EIR are detailed below in Section C.4 and illustrated in Figures C-1a through C-1d. Section C.5 identifies the potential alternatives that have been analyzed and eliminated from further consideration because they do not meet the criteria in Section C.3, and explains the reasons for elimination.

Alternatives Evaluated in this EIR

- *RSG Transport Alternatives (Inland Routes)* (Section C.4.2)
  - I-5/Old Highway 101 Route
  - MCBCP Inland Route
- *OSG Disposal Alternative* (Section C.4.3)
  - OSG Onsite Storage
- *No Project Alternative* (Section C.6)
  - Replacement Generation Facilities
  - Replacement Transmission Facilities
  - Alternative Energy Facilities (Solar, Thermal, Photovoltaics, Wind, Geothermal, Hydroelectric, Biomass and Fuel Cell Technologies)
  - System Enhancement Options (Demand-side Management and Distributed Generation)

Figure C-1a. Alternative Transport Routes
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Figure C-1b. Alternative Transport Routes
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Figure C-1c. Alternative Transport Routes
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Figure C-1d. Alternative Transport Routes
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Alternatives Evaluated and Eliminated from this EIR

- *RSG Transport Alternatives* (Section C.5.2)
  - Transport by Rail
  - Transport by Highway
  - Skull Canyon Option
  - Beach Landing Options
- *Replacement Steam Generator Offloading Alternatives* (Section C.5.3)
  - MCBCP Offloading Alternatives
  - Oceanside Harbor Offloading Alternative
  - Dana Point Harbor Offloading Alternative

C.4 Alternatives Evaluated in this EIR

C.4.1 Introduction

The EIR preparers conducted a thorough review of the options identified in SCE's PEA, examining various environmental issues associated with each potential alternative. In order to identify any additional alternatives, the EIR preparation team conducted a comprehensive review of the project information provided by the Applicant and conducted a reconnaissance of the project site and surrounding area. Using the information garnered from this research, the EIR preparers evaluated a range of options that may reduce potential impacts associated with the Proposed Project.

This section describes the alternatives that have been retained for full EIR evaluation within each individual issue area in Section D. As stated in Section C.1, all alternatives proposed by SCE have been advanced to full environmental impact analysis. After detailed analysis of the project area, the EIR preparation team was not able to identify any additional RSG transport alternatives that satisfied the requirements stated in Section C.3: consistency with project objectives, feasibility, and potential to eliminate significant environmental effects. However, the EIR preparation team identified a potential alternative for onsite OSG storage, which has been carried forward for analysis. All other potential alternatives were eliminated because they either were not feasible or did not reduce the potential impacts associated with the Proposed Project. See Section C.5 for a detailed analysis of the potential alternatives evaluated and eliminated.

Sections C.4.2 through C.4.5 identify and present analysis of the Proposed Project alternatives that have been evaluated in this EIR. Figures C-1a through C-1d provide an illustration of the Proposed Project transportation alternatives evaluated in the Draft EIR.

C.4.2. Transportation Route Alternatives

The Inland Route Transport Options were presented by SCE in the PEA and would use a variety of existing roads with some off-road transitions to transport the RSGs to SONGS 2 & 3. These options involve use of I-5, as well as lands on MCBCP east and west of I-5 as depicted in Figures C-1a through C-1d.

Travel on I-5 would occur during non-peak hours, as directed by Caltrans, to reduce traffic delays. Non-peak hours are generally expected to be at night. However, specific hours would be determined at a later time in coordination with and at the direction of Caltrans and could include transport at any time during the day. The basic equipment to be used and methods for barge offloading, transporter loading, and trip numbers for these options would be similar to those described for the Proposed Project (the Beach and Road Route).

Therefore, this section focuses on the specific descriptions of the two Inland Route Transport Options (the I-5/Old Highway 101 Route Alternative and the MCBCP Inland Route Alternative), which cover the range of route segments that may be used. Some combination of these segments could be used when transport actually occurs. This discussion addresses each of the possible route segments.

C.4.2.1 I-5/Old Highway 101 Route Alternative

Alternative Description

I-5/Old Highway 101 Route Description and Procedure

Specialized transporters would be used to transport the RSGs between the Camp Pendleton Del Mar Boat Basin and SONGS 2 & 3. This approximately 14-mile route would occur almost entirely on I-5 and west of I-5, except for a 0.8-mile segment, east of I-5, on Cockleburr and Stuart Mesa Roads. The I-5/Old Highway 101 Route is depicted in Figures C-1a through C-1d as segments K and L on MCBCP (Figure C-1a), M and N off MCBCP (Figure C-1a), O through Q on MCBCP (Figure C-1a), R, S, and F off MCBCP (Figure C-1b), G and H on MCBCP (Figure C-1c), and I and J off MCBCP (Figures C-1c and C-1d).

Several types of transporters may be used, all with similar characteristics to carry the designated load. The specific type of transporter would be determined in the future. The range of transporters, either a self-propelled or towed system, would use rubber tires. A rubber-tired transporter can either be self-propelled or use one or more prime movers. In any case, the transporter's size and load capability would be within industry standard design specifications to transport the load over the selected route safely. Generally, current considerations assume that a Caltrans-approved transporter would be used for transport of the RSG on I-5. Other methods of transport operations would be similar to those for the Proposed Project. A description of the I-5/Old Highway 101 Route follows:

Segment K. The RSGs would be offloaded to the transporter from the barge at the Camp Pendleton Del Mar Boat Basin as described for the Proposed Project, but instead of traveling north, the transporter would travel east through Camp Pendleton Del Mar on Harbor Road to A Street at the western edge of I-5 (Figure C-1a). Overhead utilities would need to be temporarily relocated to provide clearance for the transporter.

Segment L. The transition from the northeast corner of A Street to the southbound lanes of I-5 may require installation of a temporary on-ramp from MCBCP to the southbound lanes of I-5, which would be removed following transit (Figure C-1a). The expected requirements may include an approximate 220-foot-long and 50-foot-wide asphalt pathway that could be placed over compacted road base. The existing drainage flows along I-5 would be maintained.

Segment M. The transporter would travel 2.1 miles northbound in the southbound lanes of I-5, at a speed not exceeding 10 mph. The Santa Margarita River would be crossed using the I-5 bridge, and a special arrangement of transporters and prime movers would be used (Figure C-1a). A conceptual design of this crossing is provided in Figure C-2. These transporters, necessary to maintain the structural integrity of

Figure C-2. Conceptual Drawing of Transport Over the Santa Margarita Bridge
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the I-5 bridge over the Santa Margarita River, would spread the RSG load over up to four traffic lanes. No other vehicular traffic in the southbound lanes of I-5 would be possible. This portion of the transport would also require use of up to eight prime movers, including standbys. The southbound lanes of I-5 would likely be closed for about two hours.

Segment N. The Cockleburr and Cook Road overpasses on I-5 (18'-1" and 23'-3" clearances, respectively) are too low to allow continued passage of the steam generators. To circumvent these two overpasses, a transition may be fabricated onto Coaster Way, the existing rail frontage road. The center divider between the northbound and southbound lanes of I-5 would be temporarily replaced with K-rail and the median may be paved with asphalt (Figure C-1a). The I-5 center divider would be restored following transit. An asphalt pathway may be installed to connect the northbound section of I-5 and Coaster Way. Crossing the northbound lanes would require full closure of I-5. The existing median on the east/west leg of Coaster Way may also be removed temporarily and would be restored following transit. Crossing the San Diego Northern Railroad tracks would also require temporary closure of the railroad.

Segments O and P. The transporter would return to MCBCP, east of I-5 on Coaster Way. An asphalt transition road may be installed for the dual-lane transporter to turn from Coaster Way onto Cockleburr Road (Figure C-1a). The existing guardrail would be temporarily replaced with K-rail and restored following transit.

Segments Q and R. Ramps would be used to move the transporter over the San Diego Northern Railroad tracks and across the northbound lanes of I-5 to the southbound lanes directly east of the Navy Landing Craft Assault Center facility (Figure C-1a). Similar to Segment N, Segment Q would require full closure of the railroad and I-5 as the transporter would cross the northbound lanes. The existing fence would be removed temporarily and restored following transit, and an asphalt transition possibly installed. The I-5 center median rail would be temporarily replaced with K-rail, which would be removed temporarily for each transit and restored following transit. Each of the railroad crossings would take less than one hour. SCE proposes to coordinate in the future with the railroad operators to avoid disruption of rail traffic (SCE, 2004e – Response 49).

Segment S. The transporter would travel 3.7 miles northbound in the southbound lanes of I-5, at a speed not exceeding 10 mph. The route then would travel the I-5 bridge over the Uniform Training Area dirt road and Las Flores Creek (Figure C-1b). As with Segment M above, no other traffic would be possible in the southbound lanes of I-5. The southbound lanes of I-5 would likely be closed for about two hours.

Return to Proposed Project (Beach and Road Route). The transporter would then progress northbound on I-5 past Skull Canyon via Segment F (Figure C-1b), as described under the Proposed Project. The transporter would then exit I-5 and return to MCBCP just north of Skull Canyon, west of I-5 via Segment G (Figure C-1c). The remainder of the I-5/Old Highway 101 Route would be identical to the Beach and Road Route described in the Section B (Project Description), via Segments H, I, and J (Figures C-1c and C-1d). Segments F, G, and H would be within MCBCP, and Segment I would be within the San Onofre State Park Campground.

I-5 / Old Highway 101 Route Schedule

Each trip on the I-5/Old Highway 101 Route would require approximately 10 to 15 days. The unloaded return trips would be at faster speeds and would take less time. Transport of each RSG by a transporter would require overnight layovers along the route through this period except on I-5, where transport would occur during non-peak hours, as directed by Caltrans. The transport would be composed of several activities that would proceed in the following general sequence: pre-transport activity, transport corridor preparation (specific to the vehicles and the surfaces to be crossed), and transport. Although this activity is expected to occur from October 2008 through February 2009, it could occur during the same months in different years depending on vendor supply, operational considerations, and RFO planning needs.

Other Transport Considerations for I-5 / Old Highway 101 Route

The labor force, support activities, refueling, and other aspects of transport would be similar to those for the Beach and Road Route. There would be no direct crossing of natural drainage courses with this option. All crossings would use existing bridges.

I-5 / Old Highway 101 Route Equipment and Material

The associated heavy transportation and support equipment would be diesel, electric, and/or gasoline-operated. Several types of transporters may be used, all with similar characteristics to carry the designated load. The specific type of transporter would be determined in the future. The potential range of expected equipment, however, is characterized in the following description. Note that the following equipment would not be used simultaneously.

The transporter equipment would include:

- Two 1,500-hp diesel-powered prime movers.
- Up to six 460-hp, diesel-powered prime movers.
- Four 50-hp hydraulic pump motors.

The service fleet would include:

- Three 400-hp, diesel-powered tractor/transporters to be used as needed to shuttle gear.
- Two diesel-powered, 18-ton forklifts to move and load equipment onto tractor/transporters and trucks as needed.
- Five 1-ton-capacity, diesel-powered tire/utility/mechanic trucks.
- One diesel-powered lifting device to set and remove ramps for barge unloading.
- Up to sixteen gasoline-powered pickup trucks/autos/sport utility vehicles for utility, personnel, miscellaneous, and light-duty material transport.
- Three gasoline-powered bucket trucks.
- When needed, approximately six gasoline-powered and six diesel-powered traffic-control vehicles with an associated six trailer-mounted arrow boards.
- Four diesel-powered, 1-ton utility pickups.
- Four 110-volt, gasoline-powered generators and trailer-mounted light towers.

Transportation equipment would be fitted with appropriate mufflers, and all engines would be maintained regularly according to manufacturer specifications. The specific pieces of equipment to be used and their configurations may vary from the above list. This equipment list, however, provides a representative higher range of equipment reasonably expected to be used.

Materials that would be transported by truck to the site contain fuel and lubricants, and drinking water. Potential solid waste (e.g., trash) would be disposed of properly in appropriate receptacles. Work crews would use portable chemical toilets.

I-5/Old Highway 101 Route Spill Control

In the event of equipment spills or leaks, spill-recovery equipment would be used consistent with the appropriate regulatory spill-prevention guidance and hazardous waste management programs as implemented by the SONGS 2 & 3 Spill Contingency Plan and requirements of MCBCP.

Portable toilets would be secured to the truck bed during transport. The portable toilet vehicle or other vehicles would carry shovels and absorbent materials in the forms of absorbent socks or "pigs," and rags in accordance with combined MCBCP and SONGS 2 & 3 spill prevention procedures. If used, spent absorbent materials would be collected in plastic bags, as well as contaminated sand or earth. These collected materials would be returned to SONGS 2 & 3 for disposal in accordance with the SONGS 2 & 3 Site Spill Prevention and Hazardous Waste Programs and requirements of MCBCP.

Maintenance of I-5/Old Highway 101 Route

Caltrans performed a preliminary evaluation of the bridges at Santa Margarita, Aliso Creek, Los Flores Creek, and Las Pulgas Road, and found that crossing these bridges would not cause structural damage as long as speed restrictions (10 mph) are observed and the transporter meets the Caltrans requirements and passes a Caltrans inspection (SCE, 2004e – Response 18; and SCE, 2004d – Appendix D).

For the portion of the transit onto I-5, the fence between the disturbed dirt roads of MCBCP and I-5 would be removed and restored following transit. This would occur for each transport leg of each transport cycle.

I-5/Old Highway 101 Route Layover Stops

Layover stops would be provided as necessary. In this case, these areas would be along existing roads in previously disturbed areas.

Rationale for Full Analysis

This alternative would meet the project objectives, while reducing potential impacts to sensitive biological resources along the shoreline. Total transport emissions would also be slightly less than the Proposed Project because of the slightly shorter transport route length. Based on the Applicant's analysis and an evaluation of the route conducted by the EIR preparers, no legal, regulatory, or technical constraints have been identified that would affect the feasibility of this alternative.

C.4.2.2 MCBCP Inland Route Alternative

Alternative Description

MCBCP Inland Route Description and Procedure

The MCBCP Inland Route is similar to the I-5/Old Highway 101 Route, except for its specific route. Therefore, aspects of schedule and transport equipment would be similar to those described above in Section C.4.2.1. This approximately 18-mile transport option would occur east and west of I-5 and on I-5, with most of the route on roads in MCBCP. The MCBCP Inland Route is depicted in Figures C-1a through C-1d as segments T through Z (including Segments K and P, from the I-5/Old Highway 101

Route Alternative) would occur on MCBCP (Figures C-1a through C-1d), and Segments AA through AD (and Segment J) would occur off MCBCP (Figure C-1d). No segments of the MCBCP Inland Route would occur in San Onofre State Park.

Segments K and T. As with the other route options, the RSGs would be offloaded to the transporter from the barge at the Camp Pendleton Del Mar Boat Basin, and similar to the I-5/Old Highway 101 Route Alternative, the first segment of travel would occur east of the boat basin on Harbor Road. The transporter would then travel along the San Diego Northern Railroad and Fallbrook Spur tracks to pass under I-5. The tracks would be crossed using ramps at the Fallbrook Junction Gate. The transporter would travel adjacent to the Fallbrook Spur tracks until east of the I-5 northbound overpass (Figure C-1a). The existing Fallbrook Spur tracks in this area would be protected to allow the transporter to travel the center of the path. After the final transit, the protection would be removed.

Segments U and V1/V2. Movement on MCBCP roadways may require travel only at night or non-peak hours, as directed by MCBCP, to minimize the impact on normal vehicle traffic. MCBCP security would play a role in traffic control and the possibility of detouring conventional traffic on Basilone Road while the steam generators are in transit. These segments would involve traveling along the Fallbrook Spur tracks and portions of Lemon Grove Road, Vandergrift Road, and Stuart Mesa Road, depending on the direction provided by MCBCP (Figures C-1a).

Segment W. The transporter would follow Stuart Mesa Road north from Vandergrift Road within MCBCP. The Stuart Mesa Road Bridge over the Santa Margarita River has an approximately 220-foot-long and 25-foot-wide roadway (Figure C-1a). The bridge is constructed of eight bents with an average spacing of 24 feet, each comprising five octagonal piles. Preliminary evaluation indicates that no structural modifications would be necessary. In the vicinity of Cockleburr Canyon, this option would follow Segment P on Stuart Mesa Road, as described for the I-5/Old Highway 101 Route (Figure C-1a).

Segments X and Y. The transporter would continue north on Stuart Mesa Road, Las Pulgas Road, and El Camino Real through MCBCP over Los Flores Creek and to the east of I-5, Skull Canyon, and the San Onofre State Park Campground. The interconnected roads within MCBCP would be used to travel roughly nine miles to a point north of the immigration checkpoint facility along I-5 (Figures C-1b through C-1d).

Segment Z. The transporter would approach I-5 north of the immigration checkpoint facility along a short paved access road that connects to El Camino Real (Figure C-1d). This road and the checkpoint parking lot adjacent to I-5 can be used to allow the transporter to transition onto I-5 just north of the checkpoint.

Segments AA and AB. The transporter would enter I-5 and travel approximately 2.1 miles northbound in the southbound lanes of I-5. The guardrail in the I-5 center divider near the immigration checkpoint would be temporarily replaced with K-rail and restored after transit, and the median may be paved with asphalt temporarily. With these adaptations, the transporter could proceed across the northbound lanes of I-5 with a brief lane closure, then onto the southbound lanes traveling north (Figures C-1d). The southbound lanes of I-5 would likely be closed for about two hours.

Segments AC and AD. Directly east of the North Road/Old Highway 101 intersection, the transporter would leave the southbound lanes of I-5, possibly using a paved transition. The transition would lead to ramps that would bridge over the existing San Diego Northern Railroad tracks ballast to a second transition. This transition would accommodate the grade differential between the top of the San Diego

Northern Railroad tracks and North Road (Figure C-1d). The existing island at the intersection would be removed temporarily, and the existing storm drain plated over to prevent damage during the transport. The island would be restored and the storm drain plate removed following transit.

As with the other options, the transporter would enter the SONGS OCA by either the North or South Access Gates (Segment J); the entrance gate may require temporary modification to allow the transporter to pass. The transporter would then move within the OCA to the Steam Generator Temporary Staging area.

Maintenance of MCBCP Inland Route

SCE provided to CPUC an analysis from the Sheedy Drayage Company of the Stuart Mesa Road bridges crossing Santa Margarita River and Los Flores Creek. The Sheedy Analysis found that structural alterations to the bridges would not be necessary to protect them from overstressing during crossing (SCE, 2004e – Response 18, Attachment 18).

Rationale for Full Analysis

This alternative would meet the project objectives while avoiding potential impacts to sensitive biological resources along the shoreline, reducing traffic disruption along I-5, and avoiding recreational impacts to San Onofre State Beach. Based on the Applicant's analysis and an evaluation of the route conducted by the EIR preparers, no legal, regulatory, or technical constraints have been identified that would affect the feasibility of this alternative.

C.4.3 OSG Disposal Alternative

The EIR preparation team examined various options for long-term storage of OSGs at SONGS. Onsite storage of the OSGs is considered potentially feasible and would satisfy the project objectives. Therefore, an onsite storage alternative has been included for full consideration in the Draft EIR.

C.4.3.1 OSG Onsite Storage Alternative

Alternative Description

As stated in the PEA, SCE performed preliminary evaluations of alternate disposal options to be considered in the event that SONGS is unable to use Envirocare (located in Clive, Utah) for permanent disposal of the original steam generators. The status of the disposal sites within the United States changes periodically, so it is difficult to develop firm contingency plans at the conceptual stage of the project. Although most plants replacing steam generators (e.g., Palo Verde, Oconee, Calvert Cliffs, and Sequoyah) have elected to store the OSGs onsite and deferred disposal to decommissioning, SCE stated it would prefer to pursue offsite disposal of the OSGs at a licensed facility for the following two reasons: (1) the area of SONGS 2 & 3 where SCE is currently permitted to store radioactive material is very compact; and (2) disposal of these components directly following removal both eliminates the uncertainty of future burial costs and avoids deferral of this work until plant decommissioning (SCE, 2004c).

Under the OSG Onsite Storage Alternative, the long-term storage of the four OSGs for the remainder of the operating life of SONGS would occur on the SONGS site in a suitable onsite enclosure designed to meet all applicable regulatory requirements. The OSG Onsite Storage Alternative includes the siting and construction of an OSG Storage Facility for the containment of hazardous materials (low-level radioactive waste) during long-term storage, as well as the transport of the OSGs from the SONGS 2 & 3 containment buildings to the onsite OSG Storage Facility. NRC regulations (10 CFR 20 and 40 CFR 190) require that the OSG Storage Facility be constructed on a reinforced concrete mat foundation or an independent floor with spread footings and the walls and roof must be constructed with reinforced concrete to block gamma ray radiation. Overall, this alternative would require the construction of a large concrete structure, approximately 12,000 square feet (120 feet by 100 feet) in size and 30 feet high. The OSGs would be kept in storage until an alternate disposal site would become available that would allow the SCE to ship the OSGs from their onsite enclosure to a licensed disposal facility.

The OSG Storage Facility would be constructed to store and secure all four OSGs on their sides. Construction of the OSG Storage Facility would proceed according to the following steps:

- Relocation of facilities on the facility site, if necessary, including underground electrical conduits and grounding grid, firewater, domestic water, and sewer lines.
- Excavation for the structures and utilities.
- Installation of utilities and construction of the foundation slab, walls, and roof.
- Backfill, grading, and paving around the completed structure.

Earthmoving equipment would be used to excavate existing soil in preparation for the structure's foundation and associated utilities. The OSG Storage Facility would be a reinforced concrete structure constructed either on a reinforced concrete mat foundation or on an independent floor slab. Concrete would come from a temporary onsite batch plant, and the necessary water would come from SCE's existing water supply system. Other materials used in the construction would be reinforcing steel, structural steel, fine and course aggregate, and drainage pipe and wire for utility relocation. Restoration of the area surrounding the OSG Storage Facility would be performed after construction has been completed. This would consist of backfill and asphalt paving around the perimeter.

The walls and roof of the OSG Storage Facility would be made of reinforced concrete to meet maximum permissible dose limits as prescribed by NRC regulation 10 CFR 20, Standards for Protection Against Radiation; and EPA regulation 40 CFR 190, Environmental Radiation Protection Standards for Nuclear Power Operations. These regulations set specific dose limits for radiation exposure; however, they do not dictate specific design features or construction standards that must be incorporated into building design. Design and performance-based features would be dictated by 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste; NRC Regulatory Guide 1.29, Seismic Design Classification, which includes seismic-related building criteria; and NUREG-0819, Appendix 11.4-A, Design Guidance for Temporary Onsite Storage of Low Level Radioactive Waste. Access into the OSG Storage Facility would be controlled using locked personnel access doors. The OSG Storage Facility design would satisfy the intent embodied in NRC Generic Letter 81-38, Storage of Low Level Radioactive Wastes at Power Reactor Sites; the commitments of the SONGS operating license; and any governing State and local building codes.

SCE has not identified a potential site for an OSG Storage Facility on the SONGS site. However, there are two general areas identified by the EIR preparers, shown in Figure C-3, where the siting and construction of such a facility may be possible. One potential location for the OSG Storage Facility is the area northwest of SONGS 2 & 3 in the general vicinity of Unit 1, which is currently being decommissioned. This area is constrained in size, but may have adequate area to accommodate the OSG Storage Facility, subject to plans for other uses of this area after Unit 1 is decommissioned and dismantled. As described above, a building approximately 12,000 square feet in size would need to be constructed to store the OSGs. Another potential location is the Mesa area of the SONGS facility east of I-5, which includes various support and ancillary facilities for SONGS, including offices, warehouses, and storage yards. Use of a site in the Mesa area would involve transport of the dismantled OSGs by truck along existing roadways from SONGS 2 & 3 to the OSG Storage Facility constructed in the Mesa area. Various constraints, such as availability of adequate space for the facility at specific locations, potential for interference with routine facility operations, and the need to ensure adequate security, would influence the selection of a specific site within either of these two general locations.

Rationale for Full Consideration

This alternative is feasible, and provides a viable alternative to offsite disposal. However, this alternative would potentially increase community members' concerns regarding radiological exposure due to natural or human-caused catastrophic accidents. Because this alternative meets the project objectives and no legal, regulatory, or technical constraints were identified, this alternative has been evaluated in the EIR.

C.5 Alternatives Eliminated from Full EIR Evaluation

C.5.1 Introduction

As discussed in Section C.3, alternatives were assessed for their ability to achieve the three-pronged goal for alternatives development in which alternatives should:

- Reasonably achieve most project objectives,
- Be feasible (legal, regulatory, technical, and economic), and
- Avoid or reduce some of the potentially significant environmental impacts of the Proposed Project.

In developing alternatives to the Proposed Project, the EIR preparers thoroughly analyzed all material provided by SCE, including the Application, supporting exhibits, PEA, and responses to data requests. In addition, the EIR preparers participated in several site visits at the SONGS facility and surrounding area during which an investigation of possible transport routes was conducted. The EIR preparers also conducted a public scoping process to solicit information on alternatives from public agencies as well as the public at large. As described previously, the general public and government agencies did not offer any specific alternatives to the Proposed Project other than various alternatives for the No Project Alternative.

The EIR preparers took into account the specific engineering requirements for transporting and housing the oversized and heavy pieces of equipment during the alternatives development. These requirements, in combination with the simple road network and limited working space at SONGS, limited the availability of alternatives to transportation and storage of the RSGs and OSGs at SONGS. The EIR preparers analyzed all storage and transport alternatives for the Proposed Project. No additional alternatives (outside of what SCE has already developed and presented in its PEA) were identified that would provide a benefit to the environment or lessen the impacts of the Proposed Project. This section documents the detailed review of all potential alternatives to the Proposed Project. Locations of the alternatives eliminated from full evaluation are depicted in Figure C-4.

Figure C-3. Potential Onsite OSG Storage Facility Locations
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Figure C-4. Alternatives Eliminated from Full EIR Evaluation

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C.5.2 Replacement Steam Generator Transport Alternatives

C.5.2.1 Transport by Rail

Alternative Description

This alternative was included in SCE's PEA and would include transporting the RSG units by railroad to the SONGS facility from: (1) MCBCP Del Mar Boat Basin via a new rail spur; or (2) from Long Beach Harbor and transferred to railcar at the Burlington Northern Santa Fe rail spur.

Rationale for Elimination

Under the Transport by Rail Alternative from MCBCP Del Mar Boat Basin, a rail spur would need to be constructed in an area near environmentally sensitive vernal pools east of the Del Mar Boat Basin. Additionally, the existing through-truss-type rail bridge crossing of the Santa Margarita River just north of Oceanside is less than 16 feet wide and would be too narrow to accommodate the RSGs without bridge replacement. Furthermore, several railroad overpasses are not high enough to accommodate the overall height of the RSGs and railcar in this frequently used transportation corridor. A variety of environmental impacts would occur from the various activities needed to construct a new rail spur from the Del Mar Boat Basin and to make necessary modifications to bridge crossings and overpasses. These would include temporary noise, air quality, erosion, and transportation impacts, and potential long-term impacts such as displacement of habitat by the new railroad spur.

Transporting the RSGs from Long Beach Harbor by rail would also encounter many clearance interferences along the rail route and the weight limitations on the San Mateo Rail Bridge. Therefore, rail transport was eliminated from full consideration due to technical feasibility concerns and increased environmental impacts associated with new rail spur, bridge, and overpass construction compared to the Proposed Project.

C.5.2.2 Transport by Highway

Alternative Description

This alternative was included in SCE's PEA and would consist of transporting the generators from Long Beach Harbor by highways and roads. This is a distance of approximately 50 miles through highly urbanized portions of Los Angeles and Orange Counties. No specific route for this alternative has been identified by SCE. Multiple routes and variations are possible between Long Beach Harbor and SONGS, but all would involve combinations of the use of surface streets and freeways. Routes would need to have high vertical clearances (at least 25 feet) as well as adequate width to accommodate the large transport vehicles.

Rationale for Elimination

Numerous constraints would be encountered with a roadway and highway route between Long Beach Harbor and SONGS. The excessive weight of the RSGs would create weight limitations or load issues on bridges, such as near Dana Point and over San Mateo Creek, neither of which could be easily bypassed. In addition, the height of the RSGs would require temporary removal and/or raising of a significant number of overhead wires and structures, making the transport difficult to manage over the long travel distance. This alternative would also have a much greater potential to disrupt traffic than the Proposed Project. As a result of these technical feasibility issues and potential for significant impacts, the Transport by Highway Alternative was eliminated from full consideration in this EIR.

C.5.2.3 Skull Canyon Option

Alternative Description

This alternative was included in SCE's PEA and would transport the RSGs north along the beach to the mouth of Skull Canyon instead of transitioning to I-5. This alternative represents a variation of SCE's proposed Beach and Road Route (the Proposed Project), but would avoid the need to travel along I-5 by instead entering the mouth of Skull Canyon from the beach and traveling inland along an existing dirt road that runs along the bottom of the canyon. As the Skull Canyon road approaches I-5, it climbs up the north side of the canyon and connects with Segment G of SCE's proposed Beach and Road Route. Various improvements to the Skull Canyon road would be needed to accommodate the RSG transport vehicle, including cut-and-fill grading to provide a road surface of suitable width and gradient. None of this grading would be required for the proposed Beach and Road Route.

Rationale for Elimination

While this alternative is feasible, it was eliminated from full consideration because of the extent of compacted fill and grading that would be required at the base of the canyon to improve the road for RSG transport, and the long duration that the graded areas would have to remain in place to accommodate the transport cycles of the RSGs. The earth movement and equipment operations needed to conduct the grading would create additional air pollutant emissions and disturb native habitat. The grading would also produce adverse visual impacts that would not be experienced with the Proposed Project. As such, this alternative would create greater aesthetic, air quality, and biological impacts than the Proposed Project and, therefore, was eliminated from further consideration.

C.5.2.4 Beach Landing Options

Alternative Description

This alternative was presented by SCE in the PEA and would include the installation of a barge landing facility at MCBCP's Red, Gold, or Green Beaches, which are located south of SONGS. This alternative would involve constructing facilities at one of these beaches to land the barges transporting the RSGs from Long Beach Harbor. These facilities would consist of either a pier extending into water deep enough to accommodate the draft of a barge or a dredged channel that would allow barges to reach a slip at the shore. After landing at one of these beaches, the RSGs would be transported by land to SONGS along the northern portion of the Beach and Road Route using the same type of transport vehicle as the Proposed Project.

Rationale for Elimination

It is currently infeasible to bring in a barge at Red and Gold Beaches because they are too shallow near shore. As such, a lengthy pier (i.e., greater than 1,200 feet) would be required to reach a moored barge in deeper water or, alternately, dredging of the seafloor would be required for a similar distance to construct a barge slip at the shore. Green Beach is slightly steeper than the other two beaches; however, it would still require similar accommodations to bring in a barge. In addition, Green Beach is adjacent to and in full view of the active San Onofre State Park, a popular surfing beach. Overall, the Beach Landing Options would not eliminate potential impacts of the Proposed Project and instead would create potentially significant impacts on the marine environment that could be avoided by the Proposed Project. Therefore, the Beach Landing Options were eliminated from full consideration in this EIR.

C.5.3 Replacement Steam Generator Offloading Alternatives

This section documents the EIR preparation team's review of potential offloading alternatives for the RSGs. Discussion of the feasibility of all potential offloading locations is presented in the following sections beginning with possible alternate landing locations at MCBCP, followed by evaluation of potential landing locations in Oceanside and Dana Point.

C.5.3.1 MCBCP Offloading Alternatives

Alternative Description

SCE identified MCBCP Del Mar Boat Basin as the preferred offloading location for the Proposed Project (SCE, 2004a). As stated in Section B (Project Description), barges would be moored at an existing bulkhead on the northwestern corner of the boat basin, which is already suited to accommodate the barges, RSGs, and associated offloading and transport equipment. While the MCBCP Del Mar Boat Basin is the preferred offloading location, alternative RSG offloading locations were considered within the Del Mar Boat Basin, such as other existing bulkheads at the perimeter of the boat basin, the docks at the southern end of the boat basin, or other locations around the perimeter of the boat basin where improvements could be made to create a suitable offloading locations.

Rationale for Elimination

The alternative RSG offloading locations within the Del Mar Boat Basin offer no functional or environmental advantages compared to the Proposed Project. The existing bulkhead where the RSGs would be offloaded under the Proposed Project was specifically designed for this type of offloading activity and would require no improvements or modifications to accommodate RSG offloading. Other locations in the boat basin would require some degree of modification to support RSG offloading operations. In addition, the use of alternative mooring and RSG offloading locations would not reduce or eliminate any potential environmental impacts compared to the Proposed Project. Environmental conditions at the other potential offloading locations in the boat basin would be substantially similar to those at SCE's proposed offloading location, and the distance to the SONGS facility would be basically identical. The impacts that would result from the modifications necessary to create a suitable offloading area at another location, even if minor, would make alternate offloading locations less environmentally desirable. Consequently, offloading alternatives within MCBCP were eliminated from full consideration in the EIR.

C.5.3.2 Oceanside Harbor Offloading Alternative

Alternative Description

The Oceanside Harbor Offloading Alternative would involve the delivery of the RSGs from the Port of Long Beach to the Oceanside Harbor via barge. The Oceanside Harbor District identified one feasible location for RSG offloading with the harbor. The barges would enter the Oceanside Harbor and would likely be moored at a location east of the North Jetty, between the entrances to the North Harbor and South Harbor. However, the District expressed concern over potential damage that could be caused to the rip-rap embankment that surrounds the harbor by the barge and the heavy offloading and transport equipment. Various potential constraints would have to be investigated to confirm the feasibility of this alternative, including shallow water depth at the potential offloading location, tight turning radii along harbor roads, a steep gradient on the road exiting the harbor, and the need to temporarily remove obstacles to overhead clearance.

Using the methods described in Section B (Project Description), a transporter would transport the RSGs from Oceanside Harbor to SONGS, located approximately 15 miles northwest of the harbor. Due to the size of the RSGs, the transporter would only carry one RSG per trip. Depending upon the number of delivery cycles needed to transport the RSGs from the Port of Long Beach to Oceanside Harbor, at least one RSG would be temporarily stored in the parking area adjacent to the offloading site during each delivery cycle. Temporary storage of the RSGs at the Oceanside Harbor would likely require the issuance of a CDP from the City of Oceanside (Oceanside, 2005).

The transporter would carry the RSGs from the Oceanside Harbor to MCBCP, at which point it would follow one of the two previously described Inland Route Transport Options. In order to exit Oceanside Harbor, the transporter would travel along Harbor Drive to the southern gate at MCBCP, southeast of the MCBCP Del Mar Boat Basin.

Rationale for Elimination

The Oceanside Harbor Offloading Alternative would introduce a number of impacts during offloading of the RSGs. Offloading and transport of the RSGs through Oceanside Harbor would temporarily preclude use of some harbor areas, including public recreational areas. The potential offloading location identified by the Harbor District is a public recreation area used for picnicking and recreation vehicle camping. Boat operations in the harbor would be temporarily disrupted during RSG offloading and surface roadways around the harbor would need to be temporarily closed during land transport of the RSG out of the harbor area. These impacts would be less severe under the Proposed Project because the Del Mar Boat Basin is a special use harbor area exclusively used to support MCBCP's military mission and does not include recreational boating use by the general public. Oceanside Harbor is a busy public harbor that supports substantial recreational boating activities and other shoreline recreational activities. As a result, impacts to harbor operations and public recreation would be greater with the Oceanside Harbor Offloading Alternative.

Transport of the RSGs along arterial roads and I-5 would follow the Inland Route Transport Options previously identified in Section C.4. These routes have been identified as feasible alternatives to the Proposed Project, and the impacts associated with transport along these routes are discussed in each issue area. Because Oceanside Harbor is located over a mile further from SONGS than the Del Mar Boat Basin, air quality impacts from transport vehicle emissions would be greater for Oceanside Harbor Offloading Alternative than the Proposed Project. Also, the Oceanside Harbor Offloading Alternative would involve additional travel on public roadways in the vicinity of the harbor before moving onto one of the routes of the Inland Route Transport Options.

The Oceanside Harbor Offloading Alternative would be similar to the Inland Route Transport Options, with the exception of the RSG offloading site. However, RSG offloading and storage under the Oceanside Harbor Offloading Alternative would result in greater impacts to recreation than under the Proposed Project or the Inland Route Transport Options. Also, its offloading location is less advantageous than the Del Mar Boat Basin because it is further from SONGS. As the Proposed Project and the Inland Route Transport Options would be environmentally superior to the City of Oceanside Offloading Alternative, this alternative was eliminated from full consideration in this EIR.

C.5.3.3 Dana Point Harbor Offloading Alternative

Alternative Description

The Dana Point Harbor Offloading Alternative would involve the delivery of the RSGs from the Port of Long Beach to the Dana Point Harbor via barge. The barges would enter the Dana Point Harbor and would likely be moored at the boat launch at the southern end of the harbor area. Using the methods described in Section B (Project Description), a transporter would transport the RSGs from Dana Point Harbor to SONGS, located approximately nine miles southeast of the harbor. Due to the size of the RSGs, the transporter would carry one RSG per trip. Depending upon the number of delivery cycles needed to transport the RSGs from the Port of Long Beach to Dana Point Harbor, at least one RSG may need to be temporarily stored in the parking area adjacent to the boat launch during each delivery cycle. Temporary storage of the RSGs at the Dana Point Harbor would likely require the issuance of a CDP from the City of Dana Point (Dana Point, 2005).

In the City of San Clemente, just south of Dana Point Harbor, there are at least two overpasses across I-5 that may not be high enough to accommodate the overall height of the RSGs and the transporter, which would be at least 25 feet (with the 22-foot diameter RSG plus transporter bed height). Assuming that transport along I-5 is feasible, the transporter would likely use both arterial roads and I-5 for the RSG delivery route. In order to exit the boat launch, existing entrance/exit gates would need to be removed. The transporter would travel northeast along Dana Point Harbor Drive, until it reached Highway 1 (Pacific Coast Highway). The transporter would travel east along Highway 1 and would merge onto I-5, heading southeast towards SONGS. Travel along I-5 would occur for approximately eight miles. At the Basilone Road exit, the transporter would exit I-5 and travel southeast along Old Highway 101, through San Onofre State Park, and could enter the SONGS Owner Controlled Area through the North Access Gate.

Due to the low height of a railroad overpass at the intersection of Highway 1 and El Camino Real, in the City of Dana Point, travel along arterial roads in order to bypass I-5 would be infeasible. As stated above, travel may also be infeasible along I-5 due to the height of the overpasses in the City of San Clemente. Consequently, transport of the RSGs from Dana Point Harbor to SONGS may be limited to a beach route.

Rationale for Elimination

Due to inadequate vertical clearances at multiple overpasses between Dana Point Harbor and SONGS and the inability to bypass all of these overpasses, the Dana Point Harbor Offloading Alternative is not technically feasible. In addition, the Dana Point Harbor Offloading Alternative would result in numerous impacts during offloading and transport of the RSGs. Offloading of the RSGs would temporarily preclude use of the boat launch in Dana Point Harbor and temporary storage of the RSGs would preclude use of a portion of the adjacent parking lot. Because Dana Point Harbor is a busy public harbor that supports substantial recreational boating activities and other shoreline recreational activities, impacts to public recreation would be significant. While temporary recreational impacts would also occur under the Proposed Project, such impacts would be smaller in magnitude and would not be as significant as the Dana Point Harbor Offloading Alternative.

Even if surface transport of the RSGs between Dana Point Harbor and SONGS proved feasible, the potential use of I-5 and surface roadways in Dana Point would result in greater impacts to traffic and circulation than the Proposed Project. In addition to low overpass clearances, various other constraints would have to be addressed for surface transport between Dana Point Harbor and SONGS, including tight turning radii on local roads and the need to temporarily remove obstacles to overhead clearance, such as tree limbs, street lights, and traffic signals.

Overall, potential impacts to recreation and traffic would be greater than under the Proposed Project. As the Proposed Project would be environmentally superior to the Dana Point Harbor Offloading Alternative, this alternative was eliminated from full consideration in this EIR.

C.6 No Project Alternative

CEQA requires an evaluation of the No Project Alternative so that decision-makers can compare the impacts of approving the project with the impacts of not approving the project. According to CEQA Guidelines [Section 15126.6(e)], the No Project Alternative must consider (a) the baseline environmental conditions at the time of the Notice of Preparation (NOP), and (b) the events or actions that would be reasonably expected to occur in the foreseeable future if the project were not approved.

The baseline environmental conditions are described in the EIR for each environmental discipline as the "environmental baseline" or "setting." The environmental baseline or setting consists of the environmental conditions that exist at the time of analysis (i.e., October 2004 NOP issuance date for the Proposed Project). The baseline serves as a snapshot of current environmental conditions at the time of analysis.

For the No Project Alternative, the events or actions that are reasonably expected to occur in the foreseeable future include continued operation of the OSGs. Therefore, the OSGs would continue to degrade as a result of a variety of corrosion and mechanical factors associated with the original materials. For safety reasons, those tubes within the steam generators that show signs of degradation must be plugged and taken out of service. The OSGs will eventually reach a state where, according to SONGS' NRC operating licenses, they must be replaced or the unit must be shut down. Based on SCE's projections, it is assumed that the original steam generators will reach the end of their operating life in as early as 2009 and the plant would be shut down.

The No Project Alternative would include the continued use of the OSGs through 2009. At that point, the steam generators would need to be shut down and SONGS 2 & 3 would no longer be available for generating electricity. Decommissioning of SONGS 2 & 3 may occur shortly after shutdown, although there are other possible outcomes such as license or facility transfer to another entity which could result in some form of continued operations at SONGS.

SONGS is a base-loaded facility that operates at approximately an 88 percent annual capacity factor, typically operating 24 hours a day, 7 days a week except for refueling periods. As a result, the No Project Alternative would result in the loss of approximately 2,150 MW of base-load system generation capacity in 2009. Power for approximately 2,100,000 households throughout California, or approximately 5 percent of the total power consumed in the State, would need to be provided by other means, such as new transmission or generation facilities. In addition, the State's transmission system would need to be modified since power from SONGS is an essential component of the transmission system.

The specific configuration of new generation or transmission facilities needed under the No Project Alternative would vary depending on a number of uncontrollable factors (e.g., need, market forces). The replacement facilities would likely be installed in a location with convenient and economical access to fuel supplies, existing transmission facilities, and load centers. Construction and operation of replacement generation and transmission capacity would be subject to separate permitting processes that would need to be completed in the future. At this point, it is assumed that SCE would need to take an integrated approach to procure 2,150 MW of replacement power for its customers before 2009.

If neither the Proposed Project nor an alternative were approved, SCE and ISO would evaluate updated load forecasts and consider alternative courses of action that could be implemented to provide adequate electrical service to the SONGS service area. These alternative sources of electrical power include replacement generation facilities, replacement transmission facilities, alternative energy technologies, and system enhancement options.

It is not known at this time what courses of action would be taken to provide power service to the SONGS service area if SONGS shuts down. However, the No Project Alternative assumes that, at the very least, 2,150 MW of power generation, the amount of capacity at SONGS, must be replaced through other methods when SONGS shuts down. As stated in Section C.6.1 below, it is assumed that the most likely method of replacing this power generation is through the construction of at least four combined cycle gas turbine power plants. This assumption would likely occur under the No Project Alternative because there are environmental and safety concerns associated with other common base-load generation sources such as nuclear, coal, and oil. This, however, does not preclude the potential use of alternative energy technologies, but due to unique technical feasibility limitations, these generation sources are unable to be sole replacement generation for base-load facilities such as SONGS.

C.6.1 Replacement Generation Facilities

Natural gas provides the fuel for most new power generation facilities. Natural gas-fired generation in California is expected to increase from 36 percent in 2004 to 43 percent in 2013 (CEC, 2003b). It is anticipated that environmental and safety concerns are likely to preclude the addition of new nuclear, hydroelectric, and coal- and oil-fired generation as replacement power for SONGS.

SCE has stated in its PEA that it would need to design, permit, and construct several combined cycle natural gas turbine power plants somewhere in southern California or Arizona to replace the output of SONGS under the No Project Alternative (if SONGS output were replaced exclusively with combined cycle gas turbine power plants, as many as four to five plants could need to be constructed [2,150 MW at 500 MW per plant]). These combined cycle gas turbine power plants are typically configured in a two-on-one design (two gas turbines and one steam turbine with associated heat recovery steam generators and duct burners). Considering auxiliary power requirements for the plant, the nominal net capacity output for General Electric Frame 7F Technology combustion turbines would be 500 MW. The capital cost for constructing this hypothetical 500 MW power plant is assumed to be approximately $500 million (CEC, 2002).

Approximately 25 to 30 acres of land are needed to construct and operate a typical 500 MW combined cycle power plant (CEC, 2002). Combined cycle power plants using evaporative cooling consume about six acre-feet of either fresh or recycled/reclaimed water per year per MW based on expected capacity factors. In addition, a new high efficiency combined cycle power plant would burn approximately 3.25 million cubic feet of natural gas per hour. The natural gas would need to be delivered through a pipeline system that can support the level of natural gas needed for a base-load power plant. See Figure C-5 for an illustration of the natural gas pipeline infrastructure in southern California, which may facilitate the delivery of natural gas to a replacement base-loaded power plant in the absence of the power normally distributed by SONGS.

Each new power plant would also require new transmission lines, as well as new or upgraded substations. See Section C.6.2 for a detailed discussion of transmission lines that may be needed under the No Project Alternative.

C.6.2 Replacement Transmission Facilities

Any large-scale replacement generation facilities would need to connect to the SCE and SDG&E transmission grid, which is currently configured to receive a large amount of power from SONGS. This network would need to be rerouted to reflect the changed generation locations. Alternatively, new transmission facilities could be used as a substitute for in-State generation by improving access to generation in surrounding states. Shutdown of SONGS would likely cause segments of the 500 kV transmission system connected to SONGS to become obsolete, which would necessitate significant reconfiguration of the transmission grid in the area.

Developing new transmission facilities requires roughly ten years of advance planning. Demonstrating need, securing environmental approvals and rights-of-way, and time-consuming construction activities contribute to the long lead-time needed for transmission planning. Because of the difficulty of securing new rights-of-way, replacement transmission facilities would likely follow existing major paths.

See Figure C-6 for an illustration of the major transmission infrastructure in southern California, which demonstrates how the grid currently relies upon a substantial generation source at SONGS.

C.6.3 Alternative Energy Technologies

As another option to replace SONGS generation, the CPUC examined the principal renewable and other alternative electricity generation technologies. Alternative generation technologies are notable in that they do not burn fossil fuels. These alternative technologies include solar thermal, photovoltaics, wind, geothermal, hydropower, fuel cells, and biomass. The technologies do not rely on a finite supply of fossil fuel, consume little water, and generate either zero or reduced levels of air pollutants and hazardous wastes. These technologies do, however, cause environmental impacts. They also have unique technical feasibility limitations. High costs and, in some cases, limited dispatchability inhibit their market penetration. The following sections summarize the current status of each of the seven alternative energy technologies.

California intends to manage its dependence on natural gas by using renewable energy technologies as established by the Renewables Portfolio Standard (RPS) program. The RPS requires that utilities, including SCE, supply at least 20 percent of sales from renewable energy resources by 2017. SCE has reported that it expects to meet this target well in advance of the 2017 goal (CEC, 2003b).

C.6.3.1 Solar Thermal

Solar thermal power generation uses high temperature solar collectors to convert the sun's radiation into heat energy, which is then used to run steam power systems. Solar thermal is suitable for distributed or centralized generation, but requires far more area than conventional power plants. Solar parabolic trough systems, for instance, use approximately five acres to generate one MW. Assuming that a parabolic trough system was located in a maximum solar exposure area, such as in a desert region, generation of 100 MW would require 500 acres. While the plants do not generate problematic air emissions and have relatively low water requirements, construction of solar thermal plants leads to potential habitat destruction and substantial aesthetic changes. Solar thermal can be a good peak power source because it collects the sun's radiation during daylight hours and generates power during peak usage periods. Because solar thermal power is not available 24 hours per day, it is typically not acceptable for base-load applications.

Figure C-5. Natural Gas Pipeline Infrastructure in Southern California
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Figure C-6. Transmission Infrastructure in Southern California
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C.6.3.2 Photovoltaics

Photovoltaic (PV) power generation uses special semiconductor panels to directly convert sunlight into electricity. Arrays built from the panels can be mounted on the ground or on buildings where they can also serve as roofing material. Electricity generation from solar technologies, including both photovoltaic and solar thermal systems, currently totals about 0.3 percent of the State's electricity production. PV systems can have negative visual impacts, especially if ground mounted. Unless they are constructed as integral parts of buildings, PV systems require about four acres of ground area per MW of generation. Assuming that a PV system was located in a maximum solar exposure area, generation of 100 MW would require 400 acres. PV installations are highly capital intensive, and manufacturing of the panels generates some hazardous wastes. The day-time power output of PV systems closely matches California's peak electrical demands. The intermittent nature of the power, however, makes PV systems unsuitable for base-load applications.

C.6.3.3 Wind Turbines

Wind turbines capture kinetic energy from the wind and use it to turn electric generators. Wind farms currently account for 1.3 percent of California's electrical capacity. Future development of the wind resources in the Tehachapi area will add another 4,300 MW of wind generation by 2010. Capacities of a single wind turbine range from 400 watts up to 3.6 MW. Wind farms made up of multiple turbines typically require 5 to 17 acres per MW generated. Thus, production of 100 MW would use a minimum of 500 acres. Wind turbine "footprints," however, utilize only about 5 percent of the land on which the system is built. This allows dual use of a site, such as for agriculture or ranching.

A significant barrier to wind power development is the lack of available transmission access in areas with wind resources. Other major challenges to siting wind farms are the bird mortality resulting from collisions with turbine blades, and the noise of the rotors. Visual consequences are also concerns for siting wind farms. Because the power output is intermittently generated during the day or during certain seasons, depending on the location, wind turbines can be viable alternatives to conventional peak-shaving power plants. However, their intermittent power makes them unsuitable for base-load applications.

C.6.3.4 Geothermal Power

Geothermal power plants employ high pressure steam and hot water from naturally occurring subsurface geothermal reservoirs to drive turbines and generate electricity. Condensed steam and used water are injected back into the geothermal reservoir to sustain production. Geothermal plants account for approximately five percent of California's power, and range in size from under 1 MW to 110 MW. Mercury and arsenic from geothermal reservoirs can concentrate, leading to hazardous waste generation. Cooling tower drift (water and impurities entrained in discharged vapor) from reservoirs with high boron content can be harmful to surrounding plant life. Geothermal reservoirs typically contain hydrogen sulfide, which smells like rotten eggs and is toxic at high concentrations and explosive in air. Visual impacts of geothermal plants can also be barriers to their siting, especially in national forests, recreation areas, and undeveloped rural areas. Geothermal plants typically operate as base-load facilities and require 0.2 to 0.5 acres per MW. Generation of 100 MW would require at least 20 acres and many miles of new transmission facilities to deliver the power. Geothermal plants must be built near geothermal reservoir sites, because steam and hot water cannot be transported long distances without significant thermal energy loss. Future geothermal development could occur in Imperial, Modoc, Mono, and Siskiyou Counties (CEC, 2003a).

C.6.3.5 Hydroelectric Power

Hydroelectric power uses the energy of falling water to turn turbines and generate electricity. Power production increases with both greater water flow and greater fall. California hydropower plants range in size from less than 0.1 MW to over 1,200 MW. Hydropower currently provides 15 percent of the State's electricity production, generally in base-load applications. Hydropower facilities typically require 14 acres per MW of generation. Production of 100 MW would require inundation of about 1,400 acres. Hydropower generates no emissions or hazardous effluents and requires no fuel. However, building dams and reservoirs inundates streams and riparian lands, resulting in permanent ecological changes such as habitat destruction and barriers to fish passage. Large reservoir construction can lead to high volume releases during storms or dam failures, which can cause flooding downstream. Storage reservoirs can also alter downstream water temperatures and restrict normal sediment transport, resulting in sedimentation and turbidity downstream when poor quality water is released from reservoirs. Hydropower development can change recreational uses of the area from "dispersed forms" (stream fishing, hiking, and whitewater boating) to "concentrated uses" (boating and camping on and around reservoirs). However, development of new hydropower facilities is limited due to the severe environmental concerns and the lack of appropriate sites.

C.6.3.6 Biomass Power

Biomass power is generated from plant and animal wastes as well as from crops grown especially for energy purposes. Most biomass electricity is generated by burning these fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned. Wood is the most commonly used biomass for power generation. Currently, 2.2 percent of the State's electricity derives from biomass and waste-to-energy sources. To save on high transportation costs, biomass plants generally are located near the source of biomass. Most biomass plant capacities are in the 3 to 10 MW range. Cooling water needs can be high for large plants. If "energy crops" are used to fuel the plant, typically 800 acres of agricultural land are required per MW of power production. Generation of 100 MW would require approximately 80,000 acres of agricultural operations to provide biomass. Biomass plants are labor-intensive to run, requiring a significantly larger staff than for comparable natural gas plants. Liquid wastes are generated by biomass plants and require careful monitoring and treatment. Biomass plants typically generate more air emissions per unit of energy than natural gas plants, and they generate ash that creates a disposal concern. Siting biomass plants and use of the accompanying land for energy crop production can lead to significant habitat destruction. Biomass plants can be used for both base-load and peaking applications.

C.6.3.7 Fuel Cells

Fuel cells convert the energy from a chemical reaction between a fuel (such as hydrogen) and an oxidizer (e.g., oxygen) into electricity. Fuel cells have ultra-low air emissions, and operate similarly to batteries, but do not run down or require recharging. They run as long as fuel and oxidizer are supplied to them, and can operate using fuel gases from biomass conversion. Even small fuel cells can perform at high efficiencies. Fuel cell power plants from 10 kW to 3 MW have been field demonstrated in California. However, due to the required development time and cost, the use of fuel cells is not forecasted to be practical until after 2020.

Many fuel cell power plants require a fossil fuel such as natural gas to operate and thus must be located where the fuel can be delivered. In general, fuel cell plants require more land than combined cycle power plants, but emit about the same amount of carbon dioxide. No water-cooled systems are required by fuel cells; thus, water use and thermal discharges are avoided. Fuel cells generate some hazardous waste, including periodic removal and disposal of absorption beds. The elevated pressures (3 to 7 atmospheres) and explosion hazards of fuels such as hydrogen or natural gas present some public safety issues.

C.6.4 No Project Alternative Scenario: System Enhancement Options

These "non-wires" generation options would not involve the construction of new major generation facilities or transmission lines. Some level of demand-side management (e.g., conservation) and distributed generation would likely occur as a component of the No Project Alternative.

C.6.4.1 Demand-Side Management

Demand-side management programs reduce customer energy consumption and overall electricity use. Because there would be no construction, there would be no new environmental impacts created from this alternative. Some programs also attempt to shift energy use to off-peak periods.

The CPUC supervises various demand-side management programs administered by the regulated utilities, and many municipal electric utilities have their own demand-side management programs. The combination of these programs constitutes the most ambitious overall approach to reducing electricity demand administered by any state in the nation.

Reducing demand is an essential part of SCE's operations. However, the available energy savings from these programs are insufficient to maintain service reliability to SCE customers in the face of population and employment growth. Under the No Project Alternative, energy conservation would offset only a small fraction of the energy supply lost by the shutdown of SONGS.

C.6.4.2 Distributed Generation

According to the California Energy Commission, distributed generation (DG) is the widespread generation of electricity from facilities that are smaller than 50 MW in net generating capacity. Most DG facilities are very small, for example, a fuel cell could provide power in peak demand periods for a single hotel building. More than 2,000 MW of DG are now in place in California. Small business and retail customers of electricity normally install these systems to offset the power drawn from a utility such as SCE. Over the next ten years, the CPUC aims to provide incentives for up to 3,000 MW of new distributed generation State-wide, for customers who wish to install new "clean" onsite DG up to 1 MW (Self-Generation Incentive Program).

Under the No Project Alternative, DG units owned by SCE or by industrial, commercial, institutional or residential energy consumers would reduce the need for replacement generation or transmission facilities. There are many available DG technologies, including microturbines, internal combustion engines, combined heat and power (CHP) applications, fuel cells, photovoltaics and other solar energy systems, wind, landfill gas, digester gas and geothermal power generation technologies. Local jurisdictions such as cities, counties, and air districts, would need to conduct environmental reviews and issue required approvals or permits for these facilities. While DG technologies are recognized as important resources to the region's ability to meet its long-term energy needs, DG does not provide a means for SCE to offset a substantial portion of the energy supply lost by the shutdown of SONGS.

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