B. Project Description

Section B describes the San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project (Proposed Project) proposed by Southern California Edison Company (SCE). Detailed descriptions of the project construction and operation are presented to provide a common understanding of the project parameters considered in Section D, where environmental impacts are evaluated. Sections B.1 and B.2 provide an overview of the Proposed Project and relevant background information. Section B.3 provides detailed descriptions of the transport and delivery of the RSGs to SONGS, removal and storage of the OSGs, and installation and operation of the RSGs. Section B.4 describes decommissioning issues associated with the Proposed Project.

B.1 Overview of Proposed Project

The Proposed Project would be located at SONGS, which occupies an 84-acre site on the California coast in San Diego County near San Clemente. The SONGS site is located entirely within the boundaries of the U.S. Marine Corps Base Camp Pendleton (MCBCP), under an easement granted by the U.S. government (see Figure B-1). The site is adjacent to the Pacific Ocean and San Onofre State Beach. Interstate Highway 5 (I-5) bisects the SONGS facility.

The Proposed Project would replace the OSGs at SONGS 2 & 3. Each SONGS unit consists of two steam generators, for a total of four steam generators at the site, all of which would be replaced as part of the Proposed Project. The OSGs need to be replaced because they are degrading as a result of a variety of corrosion and mechanical factors associated with the original materials. The four major components associated with the Proposed Project are listed below and summarized in the following sections, as well as presented in more detail in Sections B.3.1 through B.3.5.

- Replacement Steam Generator Transport
- Replacement Steam Generator Staging and Preparation
- Original Steam Generator Removal, Staging, and Disposal
- Replacement Steam Generator Installation and Return to Service.

B.1.1 Replacement Steam Generator Transport

The RSGs would be manufactured by an international company specializing in the construction of steam generators for U.S. nuclear facilities. Upon completion, the RSGs would be transported by heavy-lift cargo ship to the Port of Long Beach where they would be transferred to barges and subsequently shipped to Camp Pendleton Del Mar Boat Basin. Since the SONGS 2 & 3 steam generators would be replaced at different times, the RSGs would most likely be delivered in two separate shipment groups, each containing two steam generators. Finally, the RSGs would be unloaded from the barge and transported from the Camp Pendleton Del Mar Boat Basin to temporary enclosures at SONGS.

B.1.2 Replacement Steam Generator Staging and Preparation

Staging, training, and planning activities would be required to prepare for the removal of the OSGs and installation of the RSGs. Temporary staging facilities and areas would be needed to support the RSG project activities and additional project personnel. Temporary facilities would be used to accommodate most

project activities and would consist of offices, fabrication, mock-up, weld testing and training, warehouse, and laydown areas. The RSGs would be staged and protected in an enclosure, which would be located within the SONGS Owner Controlled Area (OCA). In addition to the temporary facilities for staging, a dedicated containment access facility, and additional decontamination and personnel processing facilities may be needed. For more information on temporary facilities and project preparation activities, see Section B.3.3 below.

B.1.3 Original Steam Generator Removal, Staging, and Disposal

The SONGS 2 & 3 containment buildings are over 170 feet high with an inside diameter of 150 feet. To perform steam generator replacement, an opening approximately 28 feet by 28 feet would be created in each containment building above the existing equipment hatch. Before the OSGs are removed from the containment building, they would be drained and cut away from existing piping and supports. The exterior of the OSGs would be decontaminated to the extent possible inside the containment structure and a protective plastic coating would be applied to prevent contaminant leakage. Next, the OSGs would be secured and subsequently transported to a temporary enclosure facility within the OCA, west of I-5. Here the OSGs would be prepared for disposal offsite (the disposal location has not been specified at this time). See Section B.3.4 below for a detailed description of the removal of the steam generators and NRC oversight of these activities.

B.1.4 Replacement Steam Generator Installation and Return to Service

Preparatory work conducted prior to RSG installation would include OSG removal, RSG preparation by the installation contractor, and plant piping system preparation within the containment structure. The RSGs would initially be staged onsite on hardwood cribbing or concrete cribbing blocks or other suitable material until ready for installation preparation, at which time SCE would move them into temporary enclosures for preparatory activities prior to their installation in containment during the sequential planned re-fueling outage. During the re-fueling outage, the RSGs would be moved from the temporary enclosures into the containment buildings. Essentially, installation of the RSGs would occur in the reverse order compared to the removal of the OSGs. Upon completion of steam generator replacement, the opening would be sealed and the containment building returned to its original configuration and integrity. Restoring the containment is described further in Section B.3.5 below.

B.2 Project Background

B.2.1 Project Location

The 84-acre SONGS site is located in San Diego County, entirely within the boundaries of the MCBCP. The site is adjacent to the Pacific Ocean and San Onofre State Beach, and project-related activities would occur near military residences within MCBCP and camping facilities in San Onofre State Beach. The City of San Clemente is the nearest community, approximately four miles north of SONGS. Figure B-1 provides an overview of the area that would be affected by the Proposed Project, including the entire proposed transportation corridor, and Figure B-2 provides a site plan of SONGS.

Figure B-1. Project Location
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Figure B-2. SONGS Site Plan
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B.2.2 SONGS Information and History

SONGS is jointly owned by SCE (75 percent ownership), San Diego Gas & Electric (SDG&E, 20 percent), and the cities of Anaheim (3.16 percent) and Riverside (1.79 percent). SONGS is exclusively operated by SCE. The power plant consists of three nuclear reactor units (pressurized water reactors), known as Units 1, 2, and 3. Unit 1 was operated from 1968 to November 1992 and is currently being decommissioned. Unit 2 began commercial operation in August 1983 and Unit 3 began commercial operation in April 1984. The NRC operating licenses expire for Units 2 and 3 in October 2022.

SONGS operates 24 hours a day. The number of active SONGS personnel fluctuates depending on extenuating plant requirements, such as scheduled fuel replacement outages, routine maintenance, and other special projects. Up to 1,000 support personnel may be added during a re-fueling outage and approximately 1,000 additional employees would be needed for the proposed steam generator replacement project (SCE, 2004e – Response 81).

As noted above, SONGS consists of two operating nuclear reactors housed in separate but adjacent containment buildings. Each unit has a pressurized water reactor coupled with steam generators, feed water systems, and cooling water systems. See Figure B-3 for photos of Units 2 and 3 at the existing SONGS facility.

B.2.3 Existing Operations

SONGS is used for base-load electricity generation. SONGS 2 & 3, which were designed and constructed by Bechtel Power Company in the 1980s, have a rated output of 1,070 MW and 1,080 MW, respectively (2,150 MW total), and generate over 15,000 gigawatt hours per year. This translates into approximately 2,100,000 households that consume electricity generated by SONGS.

Each unit operates on approximately a 21- to 22-month refueling schedule. A refueling outage is a planned period of time (generally averaging 45 days [SCE, 2004b], but recently lasting anywhere from approximately 30 to 60 days [SCE, 2004f – Response 20]. The outage with steam generator replacement is estimated at 115 days [SCE, 2004b]) during which the power plant temporarily ceases operations in order to replenish the enriched uranium needed as fuel to produce electricity. SONGS 2 & 3 have operated for 12 fuel cycles and each is currently operating in its 13th cycle (SCE, 2004e – Response 23). Installation of the RSGs for SONGS 2 & 3 is proposed to occur during the Fuel Cycle 16 RFO currently scheduled to begin in ~~March~~ October 2009 for Unit 2 and ~~September~~ October 2010 for Unit 3.

B.2.4 Steam Generator Characteristics

Both SONGS units use two Combustion Engineering Model 3410 recirculating steam generators (SCE, 2004c). Each generator consists of U-tube heat exchangers that convert heat from the reactor coolant system into steam to drive the turbine generators and produce electricity (Figure A-1). The steam generators were designed and constructed in the late 1970s and early 1980s. The OSGs are approximately 22 feet in diameter in the upper dome section and 14 feet in diameter in the lower section, 65 feet high, and weigh 620 tons. At this size, these steam generators would be among the largest in the nuclear industry to be replaced. Figure B-4 summarizes some of the dimensions and parameters of the original steam generators.

Each OSG has 9,350 alloy 600 MA U-tubes (SCE, 2004c). Alloy 600 MA is a type of iron-nickel alloy used in most OSGs worldwide. All pressurized water reactor (PWR) nuclear power units placed in service before 1985 used first generation alloy 600 MA, including SONGS 2 & 3 (SCE, 2004c). This alloy degrades

Figure B-3. Photographs of SONGS 2 and 3
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Figure B-4. Original Steam Generator - Dimensions and Operating Parameters
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over time as a result of a variety of corrosion and mechanical factors, which includes stress corrosion cracking, intergranular attack stress corrosion cracking, denting, and flow-induced vibrations causing tube wear to occur (SCE, 2004c). Alloy 600 MA degradation affects all steam generators at SONGS 2 & 3. Current RSGs use a third generation material known as Alloy 690, which has performed very well with no signs of corrosion (SCE, 2004c).

Because of operational-related degradation, many of the OSGs constructed in the 1960s, 1970s, and 1980s have been replaced or have pending replacement projects. There are 53 PWRs now operating in the United States that have or had steam generators with the same design and material properties as SONGS 2 & 3 (SCE, 2004c). Of these 53 units, 35 have undergone steam generator replacement and 15 have replacement programs underway. Of the 35 facilities, the average age of replacement was 17 years. For the remaining 15 facilities, the average age at planned replacement is projected to be 24 years (SCE, 2004c). By 2009, SONGS Units 2 & 3 will have been operating for 26 years and 25 years, respectively.

B.3 Project Components

The Proposed Project is complicated by numerous challenges unique to the SONGS 2 & 3 site when compared to other nuclear power plants. The equipment hatch into the containment structure cannot be used because it is located at grade, making it impossible to lift and orient the replacement steam generators. This requires that a temporary construction opening be created in the containment structure of each unit, which in turn requires removal and restoration of containment tendons. De-tensioning tendons of the type at SONGS 2 & 3 has never been attempted at another operating nuclear plant. Most of the tendons are not designed to be de-tensioned or removed. Furthermore, SONGS 2 & 3 is an unusually compact site, presenting significant challenges for locating temporary facilities and material staging (SCE, 2004d). Although the replacement steam generators would be massive, they would be non-radioactive until they are installed at SONGS.

The replacement steam generators would be designed to match the specifications of the original steam generators. As such, the steam generator replacement project would not result in any change in the rated capacity output (MW) of the units, and it would not change the basic power plant operation in any other way. For example, the Proposed Project would not affect the fuel consumption rate, the cooling water intake rate, or the thermal discharge of SONGS 2 & 3.

B.3.1 Fabrication and Delivery of Replacement Steam Generators

Fabrication of Replacement Steam Generators

The replacement steam generators would be fabricated by Mitsubishi Heavy Industries, Ltd., of Japan, one of six international companies that manufacture steam generators for U.S. nuclear utilities. (The other companies are located in South Korea, Spain, France, Canada, and Italy [SCE, 2004d].) Fabrication, delivery, and onsite preparation of these generators requires a lead-time of approximately five years (SCE, 2004d). This manufacturing time depends on the backlog at the steam generator manufacturing facility, including the tubing mill and foundry. SCE received proposals from prospective manufacturers in 2004 and ordered the RSGs from Mitsubishi in late 2004. In order to avoid forced outages, this EIR is being prepared well in advance of the scheduled outages when steam generator replacements would occur. Table B-1 provides a preliminary timeline of milestones for the Proposed Project.

Delivery of Replacement Steam Generators to Project Area

Heavy-lift cargo ships would be used to transport the RSGs from the manufacturer's port to the Port of Long Beach. Traditional shipping methods would be used in compliance with applicable regulations such as: federal Title 33, which regulates Navigation and Navigable Waterways and includes the International Navigational Rules Act of 1977 (33 CFR 80–82), the Inland Navigation Rules Act of 1980 (33 CFR 84-90), and the Maritime Transportation Security Act; the California Harbors and Navigation Code; and the Port of Long Beach Harbor Commission Policies. At the port of Long Beach, the RSGs would be offloaded onto barges and shipped to the Camp Pendleton Del Mar Boat Basin. Transportation presents many challenges because of the size of the RSGs and the relative inaccessibility of SONGS 2 & 3. Steam generator replacement projects have occurred at other nuclear facilities in the U.S., but normally they are accomplished with delivery to a dock area at the power plant site.

Table B-1. Proposed Project Timeline

Key Steps in Steam Generator Replacement	Planned Timeframe
Issue Contract to RSG Fabricator	September 2004
Engineering and Materials Acquisition	2004 to 2005
Unit 2 Start Tubing Manufacture	September 2005
Unit 3 Start Tubing Manufacture	September 2006
Complete Fabrication of RSGs	September to October 2008
Arrival of RSGs at Project Area	October to February 2008-2009 and 2009-2010
Unit 2 Refueling Outage Begins	~~March~~ October 2009
Unit 3 Refueling Outage Begins	~~September~~ October 2010
Steam Generator Disposal	March 2010 to February 2011

Source: SCE, 2004d; SCE, 2004l; and SCE, 2004m.

Transporting the RSGs from the manufacturer to SONGS would likely require two separate shipments, each with two RSGs. Each shipment would supply the RSGs for one reactor unit at SONGS. The shipment for Unit 2 is expected to occur some time between October 2008 and February 2009, while shipment for Unit 3 would be expected to occur between October 2009 and February 2010. It is expected to take four to six weeks to transport the RSGs from the manufacturer to Long Beach.

Barges would enter the Camp Pendleton Del Mar Boat Basin and be moored at an existing bulkhead on the northwestern corner of the boat basin (see Figure B-5). No work on the sea floor would occur (SCE, 2004e – Response 37). The existing bulkhead would support this operation without modification. SCE believes that this type of activity is consistent with MCBCP's current use of the boat basin, which includes shipments of large military equipment to MCBCP for its own operations, and that the area is already suited to accommodate the steam generators and associated equipment (SCE, 2004e – Response 33). SCE anticipates that depending on the delivery schedule and the availability of the transporter, the maximum time the RSGs may have to be staged at the boat basin would be about 18 days (SCE, 2004m – Response PD-01).

Use of facilities in Camp Pendleton and transport across MCBCP would require approval by the MCBCP Commanding General. Such an approval would be based on a separate analysis to determine which transportation route option within MCBCP is environmentally superior and/or the least impacting upon the Base mission. Impacts to MCBCP activities would be subject to NEPA review as part of the decision by the Commanding General~~minimized by coordinating with the Commanding Officer~~. Once SCE's activities within MCBCP are approved, they would become part of MCBCP's operations. The final segment of delivery from MCBCP to the SONGS site would occur on land, using heavy-haul ground transporters.

B.3.2 Replacement Steam Generator Transport

Once the RSGs arrive at the Camp Pendleton Del Mar Boat Basin, they must be transported from the shipping vessel to SONGS 2 & 3. SCE requests approval of a range of transport route options. The "Beach

and Road Route" is the preferred option and the Proposed Project, and other "Inland" options are described as project alternatives in Section C of this EIR. The Beach and Road Route would involve transport of the RSGs by the beach and existing roads.

The RSG vendor's manufacturing or shipping schedule is not known at this time. As discussed above, the four RSGs would most likely be shipped to Camp Pendleton Del Mar Boat Basin two at a time, in two separate deliveries. SCE proposes to use either one or two transporters per delivery. Accordingly, the transport activities involve trips along the transport route from the Camp Pendleton Del Mar Boat Basin to SONGS 2 & 3 and back again until the last replacement steam generator reaches SONGS 2 & 3 as follows:

- If one delivery occurs, using one transporter requires a total of seven one-way trips.
- If one delivery occurs, using two transporters requires a total of three one-way trips.
- If two deliveries occur, using one transporter requires three one-way trips per delivery, for a total of six one-way trips for the two deliveries.
- If two deliveries occur, using two transporters requires one one-way trip per delivery for a total of two one-way trips for the two deliveries.
- After the delivery (or deliveries) of the replacement steam generators, the transporters would be dismantled at SONGS 2 & 3 and removed using traditional highway transportation methods.

The size and weight of the replacement steam generators and transporters would be accommodated by the existing roadways with minor modifications to clear obstructions or provide transitions as described below (SCE, 2004e – Responses 38 and 95). Except for the transitions, no new roads would need to be constructed.

B.3.2.1 Beach and Road Route

The Beach and Road Transport Route consists of transporting the RSGs approximately 15 miles from the Camp Pendleton Del Mar Boat Basin to SONGS 2 & 3. The Beach and Road Route is depicted in Figures B-6a through B-6d. This route would be entirely west of I-5, within MCBCP, except for a short stretch along I-5 to bypass Skull Canyon and a portion along Old Highway 101 through San Onofre State Park. This route is described in more detail below.

In the late 1970s, the original steam generators were transported along the beach to SONGS 2 & 3 on a similar route during original construction of SONGS 2 & 3. Additionally, the Beach and Road Route previously received environmental approvals from the California Coastal Commission and MCBCP for transport of the decommissioned SONGS Unit 1 reactor vessel in the reverse direction (SCE, 2003) (see Section A, Introduction). The MCBCP uses these lands for training purposes, which involves frequent movement along the beach and other roads with heavy, tracked vehicles, and the beach portion of this route is an active military transport corridor. Transport across MCBCP requires approval by the MCBCP Commanding General and an additional NEPA analysis in support of the decision by the Base Commanding General to allow use of the route.

Beach and Road Route Schedule

Transport of the RSGs is currently expected to occur some time between the months of October and February during the winters of 2008 to 2009 and 2009 to 2010. Each trip would require approximately 8 to 12 days, although the actual time may vary up or down from this estimate. 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 beach portion of the route through this period. The transport would be composed of several activities proceeding in the following general sequence: pre-transport activity, trans-

Figure B-5. Del Mar Boat Basin RSG Offloading Location
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Figure B-6a. Proposed RSG Transport Route
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Figure B-6b. Proposed RSG Transport Route
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Figure B-6c. Proposed RSG Transport Route
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Figure B-6d. Proposed RSG Transport Route
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port corridor preparation (specific to wheel or track vehicles and the surface to be crossed), and transport. The schedule for transport along the beach has been selected to avoid potential adverse impacts on nesting birds as a primary consideration, and the proposed range of months for transport is important for avoiding such potential impacts. The year of transport is therefore irrelevant to this specific issue. SCE expects that the timing of the transport would depend on vendor supply, operational considerations, and RFO planning needs.

Barge Unloading and Transport Preparation

The barge would enter the Camp Pendleton Del Mar Boat Basin where the RSGs would be offloaded. The barge would then leave the Camp Pendleton Del Mar Boat Basin after the RSGs are offloaded. The transfer of the RSGs from the barge to the transporter would make use of a temporarily placed ramp, spacer barge, or other suitable construct that serves to bridge the gap between the land at the bulkhead and the barge. A system of mats and/or steel plates may also be used, if necessary, to safely bridge the barge and dock bulkhead gap.

Safe transport of the RSGs depends on favorable weather conditions. SCE would track the weather before transport of each unit. The National Oceanic & Atmospheric Administration (NOAA) National Weather Service internet site and the Coast Guard Marine Forecast or similar sources may be used as the primary data sources. The threshold for deciding whether to proceed with the transport would be a forecast for no rain that could significantly increase water flow in the Santa Margarita River or beach areas. The river would be monitored by a SCE-appointed monitor for potential excess water flow before transport. The transporter would not depart unless the flow in the riverhead at the beach is at a rate at which the transporter can safely transit. During the crossing, SCE would incorporate guidance on the ford crossing method based on best management practices specified by the Electric Power Research Institute (EPRI) in their report titled "Best Management Practices (BMPs) Manual for Access Road Crossings of Wetlands and Waterbodies" (Report No. 1005188, March 2002) or a similar source. Using the Scripps Institution of Oceanography Sea Swell Forecast Model or other suitable model(s), SCE would also confirm that unusually high tide or sea swell levels are not forecasted.

Beach and Road 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. Several types of transporters may be used, and all have 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. The transporter would be either a self-propelled or a towed system and would use either tracks or rubber tires. The transporter's size and load capability would be within industry standard design specifications to transport the load safely over the route selected. The total weight of the steam generator and transporter is expected to be approximately 750 tons. The estimated width of the transporter that would be used on the Beach and Road Route is expected to be approximately 25 feet, and the total length is expected to be approximately 150 feet. The exact weight, width, and length of the transporter would not be known until after a final vendor is selected. The objective of transporter selection would be to distribute the load safely and uniformly over a large surface area, reducing excessive loads and impacts on existing surfaces (beach sand, dirt road beds, and engineered pavements), and to decrease the potential impact on buried utilities, such as piping, where present or nearby.

The transporter would travel no more than 10 miles per hour during transport of the RSGs. The unloaded return trips would be at faster speeds and would take less time. Even with a self-propelled transporter, one or more prime movers capable of pushing and/or pulling the transporter along the haul route would

also be used. The RSGs may be transported during two delivery cycles, with two RSGs shipped per cycle. A maximum of seven trips would be required if all steam generators arrive and are transported using only one transporter. A detailed description of the Beach and Road Route follows:

Segments A and B. After leaving the Camp Pendleton Del Mar Boat Basin, the transporter would travel north on military roads. From the concrete road behind the Camp Del Mar recreational vehicle park at the north end of Camp Pendleton's Camp Del Mar Beach and Recreation Area (Camp Del Mar), the transporter would follow the Amphibious Tracked Vehicle access to proceed to the beach and continue past the Santa Margarita Estuary (Figure B-6a).

Segment C. North of the estuary, the transporter would proceed along military transit routes on the beach above the tide line for approximately eight miles (Figures B-6a and 6b).

Segment D. The route then would follow a military transport dirt road that heads east-northeast from Red Beach at the MCBCP Uniform Training Area to the Las Pulgas Road Gate (Figure B-6b).

Segment E. The transporter would follow the dirt road to the Las Pulgas gate and then turn north and follow the MCBCP dirt road that runs parallel to I-5 for approximately 0.2 miles (Figure B-6b).

Segment F. The transporter would bypass Skull Canyon by transitioning across an open area to the southbound lanes of I-5 through a temporary opening in the MCBCP fence that would be restored following transit. With assistance from Caltrans and California Highway Patrol, appropriate traffic control would be implemented. Smaller support equipment may avoid I-5 by using existing, unmodified military dirt roads through Skull Canyon. These activities would not require grading on the beach or roads. The transporter would remain on I-5, outside of MCBCP, for approximately 0.2 miles and then transition back to the MCBCP dirt road by passing through a temporary opening in the MCBCP fence that would be restored following transit (Figure B-6b). The duration of the I-5 closure for traveling this segment would be approximately one hour (SCE, 2004i – Response 117).

Segment G. The transporter would then follow the dirt road north approximately one mile before moving onto paved Old Highway 101 (Figures B-6c).

Segments H through J. The transporter would continue north on Old Highway 101 for approximately 5.5 miles. Segment H would be approximately 2.5 miles on the paved Old Highway 101 within MCBCP. After leaving MCBCP, Segment I would be approximately 3.0 miles on Old Highway 101 through the San Onofre State Park Campground, through which the transporter would continue north to the entrance gate and continue north on paved roads to the SONGS 2 & 3 site (Figures B-6c and 6d). For transit along Old Highway 101, which is the main access road for the park, flagmen would be used to direct park traffic around the transporter in an orderly manner. Culverts under Old Highway 101 would be protected with placement of steel plates, mats, or ramps during their crossings if necessary (SCE, 2004e – Response 40).

The transporter would enter the SONGS Owner Controlled Area 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.

Matting may be used as necessary to facilitate transport and protect surfaces along portions of the route depending on the type of transporter used. A self-propelled, tracked transporter may not require matting on the beach for these purposes; however, it may require matting on the paved or improved road surfaces. Conversely, a wheeled transporter may require matting on the beach but not on paved or improved road surfaces. Examples of matting applications are described under "Beach and Road Route Matting" (below).

Beach and Road Route Labor Force

Approximately 60 to 70 personnel would be deployed for transportation activities on the Beach and Road Route. SCE personnel would observe and coordinate contractor activity and liaison with appropriate governing authorities. The RSGs would be attended during transport and security would be provided at all times. At least one biological monitor appointed by SCE would be present during transport to observe and implement potential biological mitigation provisions. The labor force used during transport would include both skilled and unskilled labor. No personnel would be housed on the transportation route.

Beach and Road 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. Not all of the following equipment would be used simultaneously.

The transporter equipment would include:

- Four 450-horsepower (hp), diesel-powered, self-propelled, hydraulic-platform transporters (or equivalent hp rating if either wheeled or tracked machines).
- Two 460-hp, diesel-powered prime movers to assist in managing the loads on grades.
- Six 5-hp gasoline powered 110-volt, gasoline-powered generators to drive four 50-hp hydraulic pumps.

The service fleet would include:

- Six 435-hp, diesel-powered tractor/transporters to be used as needed to shuttle gear.
- Three 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.
- Eight 200-hp miscellaneous utility vehicles.
- One diesel-powered lifting device to set and remove ramps for barge unloading.
- Four diesel-powered, portable light towers.
- Three gasoline-powered bucket trucks to be used at the boat basin.
- Approximately six gasoline-powered traffic-control vehicles and arrow boards when needed.

All transportation equipment would be fitted with appropriate mufflers and all engines 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, lubricants, and drinking water. Refueling would not be permitted on the beach portion of the route unless an emergency occurs. Potential solid waste (e.g., trash) would be disposed of properly in appropriate receptacles. Work crews would use portable chemical toilets.

Beach and Road Route Matting

Mats may be used to facilitate transport on the beach to minimize disturbance of beach sands and/or to facilitate transit (for instance, a wheeled transporter may require matting, whereas a tracked transporter may not). Suitable, available manufactured mats would be used if needed. As an example, SCE anticipates that such mats may be similar to Soloco's DURA-BASE mats, which are currently available and satisfy the load-carrying design criteria. DURA-BASE or similar mats were also proposed for facilitating transport of the decommissioned SONGS Unit 1 reactor. If needed for the RSG transport route, each mat would be set in place to cover the area necessary for the width of the transporter. The mats allow weight to be distributed across a large surface area while remaining stable and strong. This type of mat has been used to transport heavy loads through wetlands, marshlands, soft subgrades, beach sands, and areas of open water several inches deep in a range of weather conditions without damaging the underlying environments.

The specific mats may vary somewhat from this example. Figures B-7 and B-8 depict a conceptual drawing of mat placement as was proposed for the transport of the SONGS Unit 1 reactor. Mats would be laid out to an appropriate length to form a 25-foot-wide temporary roadway. The transporter would traverse the mat surface at a very slow rate (approximately 4 mph maximum). When the transporter approaches the end of the current section of mats, it may be positioned on a turnout area of mats assembled adjacent to the mat roadway. The crew would move the mats forward to extend the roadway along the transport route. The transport would resume after the mats are "leapfrogged" forward to extend the roadway. Thus, the transportation route along the beach is expected to be less than 30 feet wide, except for the turnout areas, where it would be approximately 60 feet wide. The transporter would stop at nightfall along the beach. The mats may be moved to form the roadway in front of the transporter for the next day during the night. Besides moving the mats, other nighttime work may include servicing of vehicles or security operations (SCE, 2004g – Response 44). Broad-coverage lighting would be supplied to facilitate night work. The lights would be directed toward the ocean or along the route and away from inland habitat along the beach. A simplified matting configuration is expected to be used on paved roads or firm dirt roads if needed in such areas.

Beach and Road Route Natural Drainage Crossings

The Beach and Road Route would pass through several natural drainages, including the Santa Margarita River, along the beach portion of the route. The natural drainages would be crossed using the ford crossing method (SCE, 2004a). The ford crossings of each drainage would be accomplished using mats as described above if a wheeled transporter is used and mats are deemed necessary. No matting may be required if a tracked transporter is used. In all cases, crossing natural drainage areas would be accomplished in a manner to cross safely with the load as quickly as possible while minimizing impact on the surface. No permanent bridges or structures would be constructed in or adjacent to waters of the United States that are crossed.

Many of the drainages are expected to be dry during crossing. Therefore, no water flow, including potential tidal exchange through a drainage channel, is expected to be present in most of the drainages. In many cases, no distinct drainage channel would be present on the beach at the transit route when the drainages do not have water flow. Crossings of each dry drainage (either over the portion of the beach without a channel or over the potential dry channel) would be accomplished in the same manner as the rest of the beach route.

While many of the drainages are expected to be dry, water flow may occur in some of the channels. For example, the Santa Margarita River has had water flow to the Pacific Ocean across the beach throughout most of 2002 and 2003, with tidal exchange to the Santa Margarita Estuary. The mouth of the Santa Margarita River at the Pacific Ocean has also been known to close off, even in winter periods. Therefore,

Figure B-7. Conceptual Mat Placement for Two Inches of Water Flow
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Figure B-8. Conceptual Mat Placement for Four Inches of Water Flow
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it is unknown whether the Santa Margarita River would have flow during the transport. Most of the other drainages that would be crossed during transport have water flow only during extended rains. Therefore, these other drainages are expected to be dry, but could have water flows to the Pacific Ocean.

Crossings of drainages with flowing water, including the Santa Margarita River, would not occur if the depth of water flow exceeds six inches. Flows of six inches deep or less would be crossed using base mats if deemed necessary to create a ford that allows water to flow under the roadway mats, as illustrated in Figures B-7 and B-8. These figures were developed for the SONGS Unit 1 Reactor Vessel Transport Project but characterize the methods that could be employed for the Proposed Project.

The exact configuration of this matting may vary, but it would allow water to flow under the matting without reconfiguring the channel at the crossing location. Flow conditions would be assessed during transport to determine the specific arrangement of mats for each crossing. Crossings would be generally accomplished by temporarily placing several layers of base mats, timbers, or other suitable material across the flowing channel and perpendicular to the direction of the roadway mats. Spaces would be left between the base mats to allow water flow. One or more layers of mats would then be extended in the direction of the roadway mats to span gaps between the base mats, an approach that would allow the transporter to be moved over the respective drainage. All mats would be removed immediately after the crossing has been completed. It should be noted that mats may not be necessary for a ford crossing using a tracked transporter or possibly a wheeled vehicle.

Beach and Road Route Spill Control

The transporter and associated prime mover(s) would not need to be refueled on the beach unless there was an emergency. Other vehicles and equipment using diesel fuel or gasoline would be refueled off the MCBCP. In the event of equipment spills or leaks, including emergency refueling, 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. Drip pans or other collection devices would be placed under the equipment at night to capture drips or spills. Equipment would be inspected daily for leakage or potential failures.

Portable toilets would be secured to the truck bed during transport. Toilets would be changed, rather than serviced on the beach. 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.

Beach and Road Route Routine Maintenance

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.

Beach and Road Route Layover Stops

The length of matting set up and traversed during daylight hours would determine layovers. The layover locations would not be located in the Santa Margarita River or other drainage areas, or immediately west of the Navy Landing Craft Assault Center facility.

Numerous potential stopping areas exist along the route that can be used if needed. Layover stopping areas on the beach portion of the Beach and Road Route include those of unvegetated sand above the expected high-tide line. Layover stopping areas on dirt and paved roads may be at a location where required traffic movement by other vehicles would not be impaired.

B.3.3 Replacement Steam Generator Staging and Preparation

Site planning, temporary facility construction or modification of existing buildings, and other preparation activities would need to occur at SONGS prior to the removal of the OSGs and the installation of the RSGs. Temporary facilities would be used to house most project activities and would consist of offices, fabrication, mock-up, weld testing, warehouse, and laydown areas. To the extent possible, existing SONGS structures and facilities would be used or otherwise support the RSG activities. Although SCE has not yet determined the specific locations for the temporary structures, all temporary facilities would be located on previously developed and/or disturbed areas, many of which would be located east (i.e., the Mesa) and west of I-5 (see Figure B-2).

In addition to the above temporary facilities, a dedicated containment access facility and additional decontamination and personnel processing facilities would be needed. Figure B-2 is a map showing all associated project facilities within the SONGS site. A more detailed description of the temporary structures and other required facilities is provided below. All such facilities would be built according to appropriate codes with full consideration for employee health and safety, as well as utilities and service systems.

Many activities associated with steam generator replacement are already authorized by existing permits and approvals. Table B-2 provides a list of applicable existing permits.

Table B-2. Existing SONGS 2 & 3 Permits Applicable to the Steam Generator Replacement Project

Permit Description	Agency	Permit No.	Permitted Equipment or Activity
Stormwater Permit	San Diego RWQCB	Stormwater Permit 937003198	Concrete cutting
NPDES Permit	San Diego RWQCB	NPDES Permit Unit2 CA0108073; Unit3 CA0108181	Concrete cutting
NPDES Permit	San Diego RWQCB, Department of Environmental Health	NPDES Permit Unit2 CA0108073; Unit3 CA0108181	Steam generator draining
Health Permit	Department of Environmental Health, Hazardous Materials Program or Mixed Waste Program	Health Permit HO4692; EPA ID CAD000630921	Tensioning cable (grease)
Health Permit	Department of Environmental Health, Hazardous Material Program or Mixed Waste Program	Health Permit HO4692; EPA ID CAD000630921	Glass bead blasting (rental)
Health Permit	Department of Environmental Health, Hazardous Material Program or Mixed Waste Program	Health Permit HO4692; EPA ID CAD000630921	Asbestos, insulation/ gasket removal
Health Permit	Department of Environmental Health, Hazardous Material Program or Mixed Waste Program	Health Permit HO4692; EPA ID CAD000630921	Lead/lead paint removal

Source: SCE, 2004a, Table 3.2-1

Plans and procedures for the Proposed Project have not yet been developed. SCE would need to prepare project-specific plans or use existing plans and procedures when appropriate for certain unique activities such as concrete cutting or steam generator draining. However, SCE would use its existing plans and procedures for all activities taking place within the OCA. These plans provide the core elements that

would be incorporated into any needed plans for steam generator removal or offsite transportation. Existing procedures, plans, and programs that would be used include (SCE, 2004g – Response 6):

- Best Management Practices
- Occupational Safety and Health Program
- Accident Prevention Manual
- Fire Protection Program
- Fire Information, Rules, and Education Manual
- SONGS 2 & 3 Containment Pre-Fire Plans
- Spill Contingency Plan
- Spill Prevention Control & Countermeasures Plan

B.3.3.1 Steam Generator Staging

The RSGs would be staged onsite on hardwood cribbing or concrete cribbing blocks or other suitable material before their installation in containment during the sequential planned RFO. Once the RSGs arrive onsite, SCE may stage them outside until ready for installation preparation, at which time SCE would move them into temporary modular or tent-type enclosures for preparatory activities (e.g., preparing nozzles for welding and removing welded caps). Temporary enclosures would be large enough to accommodate the steam generators with adequate space for preparation activities.

B.3.3.2 Temporary Warehouse and Laydown Area

Temporary warehouse facilities and laydown areas east (i.e., the Mesa) and west of I-5 on disturbed areas would be required. The Mesa is on the east side of I-5, east of the SONGS 2 & 3 OCA (see Figure B-2). The Mesa area has office buildings, a campground area with approximately 245 spaces used for housing during RFOs, and other supporting facilities. The warehouse and laydown facilities would support activities such as material storage, receiving, and processing.

B.3.3.3 Personnel Training and Mock-up Facilities

A training facility would be required to house a steam generator mock-up, which would be used to train personnel in activities such as cutting, templating, machining, welding, and other specialized procedures to be used during OSG removal and installation of the RSGs. The existing mock-up facility at the Mesa and/or a temporary mock-up facility would be installed on existing developed and disturbed property within the OCA or on the Mesa side.

B.3.3.4 Fabrication Facility

A temporary fabrication facility would be required for welding and shop fabrication activities. The facility, which would be located at the Mesa, would be used to prefabricate pipe system components, special tools, electrical make-ups, and to weld piping spool pieces.

B.3.3.5 Office and Subcontractor Facilities

The project team office space would be sized to house both the prime contractor and the SCE project team in one area. Office space for approximately 200 people would be required. This facility would be in the OCA to be close to major work activities, which would enable more effective and efficient management of steam generator replacement project activities. Major subcontractors may also elect to use their own office facility (e.g., trailers) while mobilized at the job site. The installation contractor would need

to coordinate the location of these facilities with SCE on existing, developed property. Temporary office facilities (e.g., trailers), if required by subcontractors, would require water, power, sanitation, and telephone services. Required services would be provided by the SONGS facility.

B.3.3.6 Containment Access Facility

Provisions would be made for a temporary facility whereby personnel entering the containment building would have direct access. The containment access facility would provide an alternate access point for the large number of personnel who would be working on the Proposed Project to avoid adverse impacts on the normal access facility. The facility, which would be removed upon completion of the RFO, would be in close proximity to the containment buildings on existing, developed land.

B.3.3.7 In-Processing Facility for Additional Personnel

SCE would provide an additional temporary in-processing facility to support in-processing of steam generator replacement project personnel. Activities supported by this facility include security background paperwork, site badging, and fingerprinting. SCE would locate this facility within the Mesa, east of I-5.

B.3.3.8 Parking

Parking accommodations for up to 1,000 additional personnel onsite would be necessary for the Proposed Project, in addition to craft and management support personnel associated with ordinary RFO work (1,000 additional personnel). There would be adequate parking space available at the north parking area (Parking Lot 4) and the Mesa. Personnel could then walk to the north security access facility, or potentially use shuttle buses. Shuttles that support the additional parking at the Mesa would be provided as necessary.

SCE expects workers for the Proposed Project and workers for the RFO to arrive in a vehicle occupancy rate of between one and two, and that there would be two shifts staggered over three periods, resulting in six vehicular shifts each day. A portion of the temporary workers would also arrive using carpool or vanpool. Based on these assumptions, SCE anticipates about 200 vehicles accessing the SONGS site for each shift change (SCE, 2004f – Response 119). Currently, no vehicle search is required, and during the refueling outages, SCE normally moves the security check-point further onto SONGS property to minimize the queue on public roads (SCE, 2004f – Response 120).

B.3.4 Original Steam Generator Removal, Staging, and Disposal

Handling the reactor fuel and original steam generators and all other work with radioactive materials must be conducted in accordance with federal requirements. As such, SCE must comply with 10 CFR 20 *Standards for Protection Against Radiation* limits. These regulations establish standards for protection against radiation during activities conducted under licenses issued by the NRC.

B.3.4.1 Reactor Fuel Movement

All fuel would be removed from the reactor vessel before the original steam generators are removed from their enclosures (SCE, 2004e – Response 22) as part of the RFO and prior to removal of the original steam generators. SCE would move the reactor fuel to the used fuel pool. This movement of the reactor fuel is a normal activity performed at each RFO. As with all RFOs at SONGS 2 & 3, this would be done according to procedures developed to comply with industry codes and standards and NRC regulations and directives.

B.3.4.2 Prepare for and Create Containment Opening

Concrete Cutting for Containment Access

The SONGS 2 & 3 containment buildings are over 170 feet high with an inside diameter of 150 feet. Each containment building is composed of reinforced concrete walls over four feet thick with an interior steel liner and tensioned with horizontal and vertical tendons. To perform steam generator replacement, an opening approximately 28 feet by 28 feet would be created in each containment building above the existing equipment hatch. The process of creating the opening would include activities such as de-tensioning and removing tendons, removing concrete, cutting rebar, and cutting and removing a section of the steel liner. Concrete may be cut using hydro-lazing (high pressure water) or other mechanical cutting and chipping removal methods (drilling, sawing, and chipping). The hydro-lazing method uses from 12 to 18 500-hp diesel-driven water pumps each running for a maximum of 200 hours over a 10- to 14-day period to create each containment structure opening. The other mechanical concrete cutting and chipping removal methods are expected to need less diesel-driven equipment.

SCE anticipates that the water for hydro-lazing would be available from the South Coast Water District through the normal water supply system for the SONGS site (SCE, 2004f – Response 53). The steel liner on the interior face of the containment wall would remain in place until all fuel is removed from the reactor vessel and placed in a separate building in order to maintain containment structural integrity during fuel movement (SCE, 2004e – Response 21).

Regardless of the concrete removal method chosen, SCE proposes to obtain all appropriate permits and meet all applicable compliance conditions. Existing controls and measures used during normal RFOs would be employed to control radioactive materials (solid, liquid, or gas) in accordance with SONGS 2 & 3 programs and procedures. Waste materials, such as oil, grease, concrete, and rebar would be collected and either be recycled or disposed of according to existing SONGS 2 & 3 standard disposal procedures, which conform to appropriate regulatory standards.

Structural Integrity of Containment

SCE expects the containment to maintain acceptable integrity with the construction opening in place. This is based primarily on industry experience with cutting containment walls at other facilities with similar Combustion Engineering designs. While complex, the process is becoming common in the nuclear power industry as more plants age. A total of seven of the fourteen operating Combustion Engineering units have had steam generator replacements where the containment structure had to be cut to replace the steam generators, as would be necessary at SONGS. A structural analysis for the containment buildings would be completed during the engineering phase of the project (SCE, 2004f – Response 26). After steam generator replacement, the opening would be sealed and the containment building returned to its original configuration and integrity, as described below.

NRC Oversight of Containment Structure Modifications

The NRC would oversee the Proposed Project including the activity of creating and repairing openings in the containment structures of SONGS 2 & 3 because the NRC recognizes that steam generator replacement is a modification that can affect the plant safety analysis (i.e., the Safety Analysis Report, or SAR), the containment structure, and plant operational characteristics. Comprehensive NRC inspection and oversight would occur as described by NRC Inspection Procedure 50001 (NRC, 2000).

The site-specific comprehensive inspection plan developed and implemented by NRC would have three major overall objectives:

- To verify that the design changes and engineering evaluations are completed in accordance with facility license requirements, applicable codes and standards, licensing commitments and applicable regulations;
- To verify that nuclear and radiological safety are maintained during steam generator replacement; and
- To verify that the steam generator post-installation test program is satisfactorily implemented, including a check of its technical adequacy and its conformance with all other applicable requirements.

NRC inspection guidelines discuss areas of interest related to the steam generator replacement generally, and to the temporary opening in the containment specifically. Inspectors may include monitoring of these items in their oversight activities. Two NRC inspectors are assigned full time to the SONGS facility and would be expected to perform most of the NRC monitoring and oversight work. They would be supplemented by other inspectors from other NRC offices and others as needed from elsewhere in order to carry out the monitoring and inspection responsibilities (NRC, 2000).

B.3.4.3 Original Steam Generator Removal

Steam generator replacement requires removal of the two original steam generators per unit. Before the original steam generators can be removed from the containment building, they would be drained and cut away from existing piping and supports. The majority of loose contamination would be removed from the OSG exterior while the OSG is located inside containment. The OSG would then be coated to affix loose contamination during the process of removing the steam generators. Because coating would occur within containment and within a temporary enclosure facility, no coating materials would be expected to contact the ground or groundwater (SCE, 2004e – Response 29). All openings to the OSG would be covered or plugged. The primary side water drained from the original steam generators, which is radioactive, would be stored on site for reuse after the refueling and steam generator replacement. The secondary-side water, which is demineralized, would be discharged to the ocean pursuant to SONGS existing NPDES permit (SCE, 2004e – Response 54).

Detailed methods for encapsulating the OSG and cutting them into smaller pieces have not been developed. According to SCE (SCE, 2004f – Response 28), the encapsulation material, which is similar to paint, would be applied to the exterior of the OSGs using paint brushes and rollers and/or paint sprayers. The coating material would probably be similar to that used on the decommissioned Unit 1 steam generator, which was not a hazardous substance (SCE, 2004f – Response 71). When the encapsulation material dries, the loose contamination would be encapsulated or fixed in place. The original steam generators would be removed through the opening created in the side of the containment buildings.

B.3.4.4 Original Steam Generator Staging

The original steam generators would be staged in a temporary enclosure facility within the Owner Controlled Area, west of I-5, upon their removal from containment. The OSGs would contain low-level radioactive contamination. Radioactive contamination at SONGS 2 & 3 is monitored and controlled according to site procedures and NRC requirements, including 10 CFR 20. Appropriate access controls, ventilation, and radiological shielding would be applied as necessary during staging.

B.3.4.5 Original Steam Generator Disposal

Preparation of the original steam generators for disposal would occur in a temporary enclosure facility in the Owner Controlled Area, west of I-5. The original steam generators would be classified as Class A low-level radioactive waste (LLRW, defined in 10 CFR 61), and they would require disposal at a licensed facility. Although other nuclear power plants replacing steam generators in the U.S. normally elect to store the original steam generators on site and defer disposal until commissioning, SCE proposes immediate disposal. SCE prefers immediate offsite disposal for the original steam generators because it conserves use of the limited space at the site and removes uncertainty concerning future disposal costs. The activities of preparing the OSGs for offsite transport and disposal would be similar regardless of disposal location. SCE has not specified a disposal location, but the likely destination would be Envirocare of Utah, Inc., at Clive, Utah (SCE, 2004d).

To prepare the original steam generators for shipment, the upper section (e.g., the steam dome and internal components) would be removed from the lower section of the steam generator. The steam dome would be cut up to reduce the volume of waste, likely with the use of a plasma arc (SCE, 2004f – Response 28). The disposal process would take approximately one year to complete with disposal activities commencing after the end of the outage (SCE, 2004e – Response 30).

Detailed methods for cutting the OSG into smaller pieces would be developed during the engineering phase. According to SCE (SCE, 2004f – Response 28), the segmentation process would take place in the temporary enclosure facility. As needed during the process, SCE would use radiological shielding to protect workers performing the work, radiological controls to manage the radioactive material, and ventilation controls designed to virtually eliminate the release of contamination. The workers involved in the activity would wear protective clothing to protect against contamination and would be monitored by radiation protection personnel.

The cut-up steam dome and other destroyed components of the original steam generators would then be loaded into shipping containers for transport to a licensed LLRW disposal facility. Details for loading the original steam generators onto rail cars have not been developed, but they would probably involve lifting the components from a multi-wheeled land transporter using portable hydraulic jacks and positioning the railcar underneath. The pieces would be transported for disposal according to U.S. Department of Transportation (DOT), NRC, and SONGS 2 & 3 transportation and disposal procedures (i.e., the SONGS procedure titled *Shipment of Radioactive Waste for Land Disposal at the Envirocare Bulk Waste Disposal and Treatment Facilities at Clive, Utah* [SCE, 2004i – Response 55]). Packaging and disposal requirements for Class A LLRW are specified by the NRC, and they are generally less stringent than requirements for Class B or C waste, which contain greater concentrations of radioactive elements. SCE anticipates that all of the LLRW created by the project would be Class A (SCE, 2004h).

SCE proposes to follow the guidance provided in NRC Generic Letter 96-07 (*Interim Guidance on Transportation of Steam Generators*). This letter provides NRC and DOT guidance on radioactive material transportation requirements, as they apply to transportation of discarded steam generators (SCE, 2004f – Response 11). By applying the guidance of the NRC letter, a DOT exemption for the shipping package (i.e., the steam generator) is the only federal agency approval required for shipping the original steam generators. In accordance with 49 CFR 107, SCE would need to demonstrate that the unpackaged, sealed steam generator provides the safety equivalent to an "Industrial Packaging." If the exemption (from the requirement that the original steam generator be packaged) is not granted, then the original steam generators must be shipped in an Industrial Packaging or Type A package, pursuant to 49 CFR 173.427 (NRC, 1996).

Transport by rail does not specifically require SCE to coordinate with the Federal Railroad Administration, an agency within the DOT. For the portions of the original steam generator that are transported by road, SCE would obtain the appropriate state permits (SCE, 2004i – Response 32).

The Envirocare of Utah facility is licensed to accept only Class A waste. At Envirocare of Utah, waste material is placed in above-ground, engineered disposal cells that are patterned after Department of Energy and U.S. EPA specifications meeting 40 CFR 264 and NRC disposal requirements. In accordance with the Envirocare license requirements, regular debris would be compacted into disposal cells and larger oversized debris, such as major steam generator components, would be placed in a disposal "lift" and surrounded by soil or a slurry for compaction and to eliminate voids (SCE, 2004k – Response 05).

B.3.5 Replacement Steam Generator Installation and Return to Service

Using the containment opening created for removal of the original steam generators, the replacement steam generators would be installed. The RSGs would occupy the location vacated by the original steam generator, and installation would include supports and fit-up and weld connecting piping. SCE would then remove the temporary runway and structures through the temporary construction opening and rebuild any interior walls, attachments, piping, or other obstructions removed.

Finally, the temporary construction opening would be closed by reconstructing the containment building to return it to its original configuration and integrity. The first step in restoring the containment would be preparing the edges of the steel containment liner and previously removed liner section for rewelding. SCE would move the previously removed liner section into place and weld it to the containment liner. The next steps involve installing the rebar and tendon sheaths and restoring the containment building concrete. Following concrete restoration, SCE would install and tension new tendons that pass through the temporary construction opening and re-tension any other tendons that were de-tensioned but not removed. The tendons may not be tensioned until the concrete has cured to a level of strength capable of withstanding the force (SCE, 2004d).

Although the plan for maintaining structural integrity would be developed during the engineering phase of the project, the safety of the restored containment building would be inspected, monitored, and assessed by the NRC during and after restoration, as described above (NRC, 2000). The NRC has yet to review SCE's proposed plan for restoring the containment, but SCE must eventually prepare an engineering evaluation that describes whether the steam generator replacement project would affect operation and safety of the facility. The NRC must then review the engineering evaluation (under the 10 CFR 50.59 process) and determine whether facility safety would be compromised by creating or restoring the temporary construction opening.

Return to service testing would ensure that SONGS 2 & 3 are ready for service. As a routine NRC license requirement, required on an approximate ten-year frequency, SCE would conduct an Integrated Leak Rate Test (ILRT). Although not specifically part of this project, the Integrated Leak Rate Test would be conducted after the containment structure has been sealed at the completion of the RSG installation. Regardless of the steam generator replacement activity, the ILRT would be conducted. The most recent ILRT was conducted in 1995. The next routine ILRT would be due during an RFO closest to 2005, but SCE would propose to postpone this test date, with the concurrence of the NRC, until the Cycle 16 RFO. SCE does not expect NRC to deny such an extension request.

B.4 Decommissioning

Safe decommissioning of the site at the end of power plant life is a requirement of the NRC licenses for SONGS 2 & 3. As described in Section A, the NRC licenses for Units 2 and 3 are set to expire in 2022. Civilian nuclear facilities must be decommissioned by safely removing the facility from service and reducing the residual radioactivity to a level that permits eventual release of the property and termination of the operating license (10 CFR 20). The steam generator replacement project would not change the decommissioning activities, but it would prevent any need for early decommissioning.

The Proposed Project would enable SONGS 2 & 3 to operate up to the end of the license terms, at which time the plant owner would need to either renew the NRC licenses or decommission the units. For further details on license renewal, please refer to Section G of this EIR. Without the Proposed Project, SCE could be forced to begin decommissioning earlier because the useful life of SONGS 2 & 3 would be limited by the deteriorating condition of the OSGs.

B.5 Applicant-Proposed Measures

Preliminary analysis of environmental impacts conducted by SCE resulted in the need for project design measures to avoid potential impacts. SCE identified these measures referred to as Applicant-Proposed Measures (APMs), and proposes to implement them in areas affected by the Proposed Project outside of MCBCP. The assessment of impacts assumes that the APMs would be imposed as conditions of CPUC project approval and that implementation of each APM will be monitored by the CPUC. Implementation of measures on MCBCP would require approval by the Base Commanding General. The measures to be included as part of SCE's Proposed Project are shown in Table B-3 below.

Table B-3. Applicant-Proposed Measures

Resource Area	Potential Impact	Applicant-Proposed Measures
Air Quality	Potential dust generation impacts could occur from transport operations on unpaved roads, although this is not expected because of the compacted nature of the roads and the slow speed of the transport. Dust may be generated during concrete crushing activities.	**AQ-1:** Standard Dust Control Measures will be applied where necessary. Unpaved surfaces will be dampened with a water truck to minimize fugitive dust if dust generation becomes a problem. Given the existing hard compaction of the unpaved roads on MCBCP and the slow speed of the transport on these roads, dust generation is not expected to be a problem and dust suppression is not expected to be required; however, it will be available if needed. Dust generation on the beach transport is not expected because the beach sand particles are too large to generate dust. Dust generated during concrete crushing will be suppressed with water.
Biological Resources	Potential impacts on sensitive habitat/species beyond the designated project area.	**Bio-1:** A biological monitor will be appointed by SCE as necessary. The monitors will be present during transport- related activities to ensure that additional disturbance does not occur.
	Project lighting has the potential to disrupt normal species activity.	**Bio-2:** Project lighting will be directed away from the land where potential wildlife resources may exist.
	Impacts on vegetated areas will occur.	**Bio-3:** Areas of vegetation disturbance at the transition areas will be revegetated to restore prior conditions.
Cultural Resources	Potential impacts on the Historic El Camino Real road surface could occur during transport.	**CR-1:** If a qualified engineer determines that road compression damage is possible once a specific transporter is selected, protective matting or other suitable protection will be laid down on the road during transport.
	Potential impacts on the historic San Diego Northern Railroad could occur during transport crossing.	**CR-2:** The historic San Diego Northern Railroad will be protected in areas where it will be crossed.

Table B-3. Applicant-Proposed Measures

Resource Area	Potential Impact	Applicant-Proposed Measures
Geology & Soils	Impacts on soils during structure placement could occur at SONGS.	**Geo-1:** Erosion control measures will be implemented and no structures will be placed on expansive soils without mitigation.
Hazards & Hazardous Materials	Potential impacts on workers during preparation and installation activities at SONGS.	**Haz-1:** To minimize potential impacts on workers, the work areas will be decontaminated as necessary before work begins. Additionally, temporary lead shielding will be installed in the work areas as appropriate. To install the RSGs, pipes need to be welded to the RSG. To minimize the radiation dose to workers, the inside of each primary system pipe will be decontaminated and where possible, machine welding will be used. As with all tasks in radiation areas at SONGS 2 & 3, employees trained specifically in radiation protection practices will monitor work activities to ensure personnel radiation exposure is minimized. SONGS health and safety procedures will be followed.
Hydrology & Water Quality	Impacts on water quality could occur during enclosure installation. Potential impacts to water quality if a spill occurs during transport or during other activities.	**Hydro-1:** BMPs for erosion control will be applied as needed. The likelihood for impacts on water quality is very low. **Hydro-2:** In the unlikely event of a spill or leak, containment measures would be implemented to prevent the spill from reaching surface waters. If soils become contaminated, they will be collected, disposed of at an approved site, and the disturbance areas restored.
Transportation & Traffic	Impacts from steam generator transport on I-5 will cause delays.	**Traffic-1:** Submission and approval of a detailed traffic control plan indicating required lane closures, hours of operation, appropriate signage and warning devices, and required work areas will be required by Caltrans for transport of equipment. **Traffic-2:** Trained vehicle operators to ensure the safe operations of equipment transport vehicles or vehicles associated with the equipment transportation. **Traffic-3:** Necessary cones, barricades, signs, and additional warning devices as specified by the traffic control plan. **Traffic-4:** Trained flaggers and other workers to direct traffic around the equipment transport vehicles, and necessary communication equipment, signs, signals, safety vests, and hard hats. **Traffic-5:** Inland Transport Options may require detours.
	Additional workers required during the Proposed Project will increase commuter traffic in the project area.	**Traffic-6:** Vanpools are anticipated to be used to decrease potential worker/commuter traffic delays. Shifts will be staggered ~~to spread the traffic over large~~ over three periods ~~of time~~ to avoid adverse effects.

Source: Attachment #123 to Response to April 15, 2004 Deficiency Notice (SCE, 2004j).
N/A = Not applicable; no adverse impacts; therefore, no mitigation measures required.

B.6 References

NRC Generic Letter 96-07, Interim Guidance on Transportation of Steam Generators, December 5, 1996.

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SCE (Southern California Edison). 2003. Environmental Assessment for the Transport of the SONGS Unit 1 Reactor Pressure Vessel Package Transport System on Marine Corps Base Camp Pendleton. Prepared for SCE by URS. January 22.

_____. 2004a. Proponent's Environmental Assessment (PEA) for the San Onofre Nuclear Generating Station Steam Generator Replacement Project. Submitted to the California Public Utilities Commission. February 27.

_____. 2004b. Application of Southern California Edison (U 338 E) for Authorization: (1) to replace San Onofre Nuclear Generating Station Unit Nos. 2 & 3 (SONGS 2 & 3); (2) establish ratemaking for cost recovery; and (3) address other related steam generator replacement issues. February 27.

_____. 2004c. Application 04-02, Exhibit SCE-2, Condition of Steam Generators and Expectations For Continued Operation of Original Steam Generators. February.

_____. 2004d. Application 04-02-026, Exhibit SCE-3, SGRP Scope of Work, Cost Estimate, and Cost Controls Parts 1 and 2. February.

_____. 2004e. Response to April 15, 2004, Deficiency Notice. May 17.

_____. 2004f. Response to April 15, 2004, Deficiency Notice. May 24.

_____. 2004g. Response to April 15, 2004, Deficiency Notice. June 1.

_____. 2004h. Application 04-02-026, Exhibit SCE-9, Augmented Testimony. June 1.

_____. 2004i. Response to April 15, 2004, Deficiency Notice. June 7.

_____. 2004j. Attachment #123 to Response to April 15, 2004, Deficiency Notice. June 7.

_____. 2004k. Response to Verbal Data Request during 9/13/04 Teleconference with the California Public Utilities Commission and Aspen Environmental Group. September 29.

_____. 2004l. Email from William Messner, Attorney, Environment, Property, and Local Governance Section, Southern California Edison Company Law Department, to Jon Davidson, Vice President, Aspen Environmental Group and Nicolas Procos, Regulatory Analyst, California Public Utilities Commission. November 8.

_____. 2004m. Response to Data Request Set ED-SCE-04. December 3.