



316(b)  
Once Through Cooling  
Deadline: 9/25/06

September 25, 2006

Song Her, Clerk to the Board  
State Water Resources Control Board  
1001 I Street  
Sacramento, CA 95814



Dear Song Her:

Subject: Response to Comments Regarding State Water Resources Control Board Clean Water Act Section 316(b) Scoping Document

Southern California Edison (SCE) would like to respond to comments presented in a letter authored by various nongovernmental organizations (including the California Coastkeeper Alliance, Heal The Bay, Surfrider, United Anglers of California, Inc., etc.) regarding the alleged impacts and possible plant modifications to the San Onofre Nuclear Generating Station (SONGS) to comply with the proposed State 316(b) policy. Although SCE generally opposes many of the comments, some data has been misrepresented and warrants specific responses.

#### **Impacts of Once-Through Cooling (OTC)**

The first group of comments addresses the potential impacts OTC has on the marine environment. The letter quotes data presented at the September 6, 2005 public hearing in Laguna Beach, CA by Dr. Michael Foster from the Moss Landing Marine Laboratory. At this meeting, Dr. Foster claimed in a presentation that approximately 50 million marine and estuarine fish are entrained per day in California by power plant cooling water intake systems (CWIS). Although acknowledged as an estimate, this number has no basis in fact. If calculations of the amount of fish larvae entrained are made using Dr. Foster's data (400-600 fish larvae per 1000 m<sup>3</sup>) and the estimated intake flow of 17 billion gallons a day, the actual estimate is between 25.7 million and 38.6 million individuals, not the stated 50 million. Additionally, this number is based on certain assumptions that exaggerate the total.

The first assumption is that the powerplant CWIS is always operating at maximum flow, but most do not. Any reduced flows due to maintenance or reduced power demand would reduce this impact. Another fallacious assumption is that all fish larvae within the entrained plankton would have survived to adulthood. The truth is that the percentage of fish larvae that survive to adulthood is naturally very small. Fish reproductive strategy is to produce as many eggs as possible to offset high natural mortality. In other words, only a small percentage of the eggs and larvae naturally reach adulthood in any case. This number is difficult to quantify due to numerous environmental, physiological, and species specific differences, so the broad generalizations made by Dr. Foster cannot be supported scientifically with any significant certainty. In fact, all of the coastal power plants are

currently conducting entrainment studies to document the amount of ichthyoplankton that is entrained, so detailed information will be available in their respective Comprehensive Demonstration Study reports, which are likely to be completed near the beginning of 2008.

### **SONGS Impacts on Kelp and Kelp Fish**

A commonly misstated "fact" is that SONGS has destroyed 200 acres of kelp forest, which makes up 10% of the kelp on the entire coast. It was further stated that this kelp would never return. The first error is that the amount of lost kelp was calculated using two separate years of data. The first value is the impact amount that the Marine Review Committee (MRC)<sup>1</sup> estimated to be the potential impact that would be caused by SONGS if all conditions were optimal; in other words, it was the maximum loss possible. Their estimate was that 80 hectares (0.800 km<sup>2</sup> or 197 acres) of kelp was impacted<sup>2</sup>. To come up with a 10% statistic, the Letter rounds up slightly the estimated value from the MRC study (1983) to 200 acres (0.315 sq miles or 0.809 km<sup>2</sup>). Then, this number was compared to the total amount of kelp canopy cover presented by the California Department of Fish and Game for the total canopy coverage along the California Coast in 1999 (3.7 sq miles)<sup>3</sup>. Even if canopy data was an appropriate comparison for the MRC data (which it is not, see below), the use of data 16 years after the proposed impact and at a time when the kelp coverage was very low statewide is inappropriate. The selection of the time period from which data is used will have drastic variations in the "impact" estimates. For example, if data of kelp abundance from the same CDFG source was used from a time period prior to SONGS operation, when the total canopy cover was 53.9 sq miles, the SONGS "impact" would only be 0.5%. At another point of time, one after the start-up of SONGS (1989), and closer to the actual MRC study, the total acreage for coastal California was 17.5 sq miles. This would result in only a 1.8% decrease.

Obviously comparing different years of canopy cover allows for substantial variations and greatly over-exaggerates impacts. The reason is that kelp canopy is highly variable and affected by a great many factors. The natural life cycle of kelp causes fluctuations in canopy cover due to natural die-offs. This will create decreases in overall canopy cover, but as new kelp recruits and grows to adult size, the canopy returns. Thus, kelp growth is measured over a number of years and compared to similar sites to obtain a fair evaluation of kelp impacts.

The Kelp Survey Consortium measures canopy coverage in Orange and San Diego Counties, much like the data that CDFG reported. The consortium has been conducting aerial surveys since 1983<sup>4</sup>. According to the Kelp Survey Consortium, canopy cover for the SOK kelp bed was only measured to be 0.102 km<sup>2</sup> during the same time period, not

<sup>1</sup> The MRC was created by the California Coastal Commission (CCC) and oversaw a \$50 million, 15 year study of the potential impacts of SONGS.

<sup>2</sup> Marine Review Committee, 1989. Final Report of the Marine Review Committee to the California Coastal Commission.

<sup>3</sup> California Department of Fish and Game, 2001. California's Living Marine Resources: A Status Report.

<sup>4</sup> Kelp Survey Consortium 2005, Status of the Kelp Beds 2004, San Diego and Orange Counties, Prepared by MBC Applied Environmental Services.

the 0.809 km<sup>2</sup> estimated by the MRC. The total for Region 9 for that year was only 0.639 km<sup>2</sup>. This again shows that the actual impacts to kelp were overestimated. But, it also showed that the amount of kelp actually increased offshore, and was at a record high in 1990 (0.763 km<sup>2</sup>). So in fact, the kelp did return after SONGS Units 2 and 3 began operation in 1983 and 1984.

Further complicating this comparison is that the MRC study did not use simple canopy cover to determine the amount of impact. The MRC conducted detailed surveys of the bottom of the ocean in the area. This included transects in which individual plants were counted and the use of side scanning sonar. The area estimated was what "could" be present during an ideal year. If this methodology was utilized in determining the areas listed above, the values would be substantially higher, further decreasing the percentage numbers.

Testimony by Wheeler North, a world-renown kelp expert, indicated that the impact was not nearly as severe and the CCC eventually concluded that the impacts could be mitigated with 61 Ha (0.61 km<sup>2</sup> or 150 acres) of artificial reef.

The Letter also states that there was an 80% reduction in the kelp fish population. However, the MRC study had determined that there was 70% decrease in abundance of kelp bottom fish and a 17% decline in abundance of kelp fish living in the water column. The percentage is from a comparison of the abundance numbers of fish on the SOK and the San Mateo Point reference station. Thus, it should be noted that these decreases are localized within the SOK and not the entire coastline. It should be noted that San Mateo Point tends to be more productive and better habitat due to its location on a point. This allows for natural currents to flow through the area, bringing nutrients and food, and producing an overall more robust kelp community.

### **Large Fish Kills**

The Letter references an August 2005 fish kill at SONGS due to entrainment. The fish kill represented over 5 tons of northern anchovies. Large kills such as the one listed are abnormal and highly infrequent. In the operational history of SONGS Units 1, 2, and 3 (1968 to present), only 6 of these events have occurred. The causes of these large impingements are typically weather related in which water temperatures are atypical or local runoff and storms have created high levels of turbidity bringing fish closer to the intake structures. These large kills generally represent a single species indicating that a large school of the fishes was present offshore. A comparison to the commercial fisheries take of anchovies would put the magnitude of this impact into perspective (See Comparisons of OTC to Other Marine Impacts below).

### **Impacts to Marine Mammals**

Impacts to marine mammals and sea turtles are well documented and reported to the National Marine Fisheries Service (NMFS) on a monthly basis in Marine Mammal Stranding Reports. It should be noted that SONGS has developed a program to minimize

the impacts to marine mammals and sea turtles. This includes procedures for capturing and removing the animals from the system. Over \$35,000 of research was conducted to design cages to capture harbor seals and California sea lions. The cages are deployed in SONGS fish return system whenever a marine mammal is sighted. Once captured, the mammals are released back to the ocean. Sea turtles are tagged and released. Harbor seals and sea turtles have a high survivability percentage, with sea turtles survival being nearly 100%.

### **Comparisons of OTC to Other Marine Impacts**

The Letter also states that owners of facilities that utilize OTC are suggesting that they "should not be regulated to the required extent of the law because other threats to marine life, such as fishing, have greater impacts than OTC." The intent of the comparison was to illustrate the level of significance of the impacts, not to infer that that the plants should not to be regulated. In the case of SONGS, the vast majority of the fish impinged at SONGS (more than 95%) is made up of 3 species: northern anchovies, Pacific Sardines, and queenfish. Northern anchovies and Pacific Sardines are pelagic species that are commonly fished by the commercial fishing industry. For example, live bait fishing is comprised of primarily northern anchovies and sardines, but also includes white croaker and queenfish. These pelagic fish travel much of the coast and range from Baja California as far north as Washington and Canada (depending on the species) and are subjected to many regional pressures, with fishing being a very large one. This type of fishing closely mimics the entrainment of adult fish at SONGS. So comparisons made to the State Water Board during the public comment period in December 2005 in Oakland, CA were to show the relative significance of the two similar impacts. In the cases of northern anchovies and Pacific sardines, the relative impacts were 4% and 0.2%, respectively<sup>5</sup>. The point is that the fishing guidelines and population assessments have been conducted on these species, and the fishing industry is regulated in such a manor that they do not impact the overall sustainability of the fish populations. Thus, if the impact from SONGS on these species is only a small percentage of the fishing impact, then SONGS also does not significantly impact these species.

### **Feasibility of Closed Cycle Cooling**

Another comment made by the Letter was that a review of aerial photography indicates that there is adequate space at SONGS for cooling towers. Unfortunately, this photography did not include overlays of property ownership. SCE does not own any of the land that SONGS is situated on. SCE leases the property from the U.S. Department of the Navy. Simply finding property surrounding the SONGS site and alleging that it may be used for cooling towers is a gross simplification of the issue. Furthermore, one of the areas suggested by the Letter is on land that is used by the California State Parks. More importantly, a simple search of the California Natural Diversity and Database (CNDDB) shows the potential for several sensitive species in the area proposed. These include San Diego fairy shrimp (*Brachinecta sandiegonensis*), two native and rare plants, little mouse tail (*Myosarus minimus ssp. Apus*) and Pendleton's eryngo (*Erygium*

<sup>5</sup> Southern California Edison's comments to the SWRCB, December 2005, Oakland, CA

*pendletonensis*), and burrowing owls (*Athene cunicularia*) (See attached Figure). Further site analysis shows that the plant community is classified as coastal sage scrub habitat that is critical for the California gnatcatcher (*Poliophtila californica californica*). Thus, a thorough, professional analysis of potential land use impacts identifies several highly probable regulatory constraints to cooling tower siting.

Furthermore, land is only one of the factors influencing the potential to use closed cycle cooling. During the MRC research, an extensive study was conducted to determine the feasibility of installing cooling towers at SONGS. The majority of the committee rejected the cooling tower option because "technical, environmental, and safety disadvantages and high costs outweigh its advantages at SONGS."<sup>6</sup> The CCC accepted this recommendation. The issues included the potential impacts to sensitive habitat on the bluffs, visual impacts to a well-known and heavily used State Park (San Onofre), salt drift and the environmental consequences, noise impacts, and potential changes in climate that would create fog hazards on Interstate 5. There was substantial concern regarding the disposal of the blowdown water in these cooling towers. This water would be highly concentrated with salts and other minerals and would have to be discharged to the ocean.

The engineering assessment that was made during the MRC review period concluded that the construction of cooling towers would cost \$300 million (1990) dollars. Annual operation costs would be \$30 million dollars. Net power output would be reduced by 83 MW due to additional power required to operate the towers, which would be provided from fossil fuel sources that would increase emissions of air pollutants.<sup>7</sup> This value did not include the costs of environmental compliance and mitigation. This value, even in 1990 dollars, is larger than the stated \$100 million per 1,000 MW of capacity stated in the comment letter. The reason being is that the Letter's value was based on an "easy" retrofit, without any credible analysis. SONGS has several site specific factors that greatly influence the cost to build and operate cooling towers. One is the fact that the towers would have to be placed on the bluffs, at a substantially higher elevation than the plant, making the engineering of these structures difficult. The Electric Power Research Institute estimates that a difficult retrofit is actually \$250 million per 1000 MW of capacity<sup>8</sup>.

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It should be emphasized that detailed analyses of all compliance alternatives will be included in the Comprehensive Demonstration Study report that is a part of the required 316(b) process, which includes the evaluation of closed cycle cooling. The studies will incorporate facility specifics and environmental concerns. Simply showing an aerial photo is an overly simplistic approach that provides no basis for an informed discussion.

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<sup>6</sup> Marine Review Committee, 1989. Final Report of the Marine Review Committee to the California Coastal Commission

<sup>7</sup> PLG, Assessment of Marine Review Committee Recommendations for SONGS Units 2 and 3, February 1990.

<sup>8</sup> As presented by the California Council for Environmental and Economical Balance (CCEEB) at the December 7, 2005 public meeting.

## Offshore Intakes

Another comment made was that credit should not be given for offshore intakes because "there was no evidence that this structural design was originally intended to reduce entrainment." However, the SONGS intake structures were specifically designed to reduce entrainment and impingement through employment of an offshore velocity cap, location at midwater depth and distant from the shoreline, and the employment of a fish return system.

## Economic Calculation

On page 13, the Letter indicates that the cost of installing cooling towers at SONGS and PG&E's Diablo Canyon nuclear power plant is insignificant based upon the value of the revenue stream earned by operation of the power plants at a 90% capacity factor at current wholesale electricity rates. However, SONGS, like PG&E's Diablo Canyon project, do not sell energy on the wholesale market. That energy is provided to our customers at rates set by the California Public Utilities Commission. Thus, it is inappropriate to claim that the cost of installing cooling towers is a fraction of the revenue stream. Rather, the cost is an additional burden imposed on the ratepayers of California which must be justified.

The Letter states that the economic cost of lost generation during cooling tower installation is not that great because the power plants are taken out of service periodically anyway. However, SONGS Units 2 and 3 do not have planned outages at the same time, and are designed to operate continuously for 18 months between refuelings.

## Mitigation

Finally, the subject of mitigation was discussed. SCE has already commented on mitigation in our earlier letter, but there is one additional point that should be made. The overall benefit that mitigation can create is substantial. Restoration of coastal wetlands not only benefits fish species, but is an overall benefit to the entire ecosystem. An example of this is the SONGS mitigation project that has been approved by the CCC, the San Dieguito Wetlands restoration and creation. This 150-acre wetland restoration project is designed to provide spawning habitat for a variety of fish species, but will have positive effects on several endangered species, including the California least tern (*Sterna antillarum browni*), the light-footed clapper rail (*Rallus longirostris levipes*), and the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*). It will also provide a lasting endowment for the maintenance and preservation of the area, including a public involvement and education program. Another mitigation program that was funded by SCE was the Hubbs-Seaworld white seabass hatchery. This program has been highly successful and has been well received. These two programs are valuable and provide substantial benefits to the community and the environment on a whole, and are consistent with some of the signature organization's missions. The potential long lasting benefits of restoration should not be ignored and should be encouraged.

Thank you for allowing the opportunity to comment on the above issues. If you have any further questions regarding these comments, please feel free to contact me at (626) 302-3066.

Sincerely,

A handwritten signature in cursive script that reads "Patrick Tennant". The signature is written in black ink and is positioned above the printed name.

Patrick Tennant  
Aquatic Biologist

Cc: State Water Board Members  
Dominic Gregorio