October 20, 2011

Jonathan Bishop, Chair and Committee Members
Review Committee for Nuclear Fueled Power Plants
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814
Via Email: lwarddrip@waterboards.ca.gov

RE: Comments on October 1, 2011 Scope of Work Report by the Review Committee to Oversee Special Studies for the Nuclear-fueled Power Plants Using Once-through Cooling.

Dear Chair Bishop and Committee Members:

The undersigned groups respectfully submit the following comments on the October 1, 2011 Scope of Work Report by Committee for Nuclear Fueled Power Plants through Cooling. Thank you for the opportunity to comment on this essential matter.

Once-through cooling is responsible for "reducing important fisheries" and has contributed to the "overall degradation of the State's marine and estuarine environments" for decades. [1] The impingement and entrainment impacts on marine mammals, sea turtles, and fish from the two nuclear plants in California are particularly significant, as they withdraw more water than all of the other once-through cooled plants combined.[2] To insure the State Water Resources Control Board's Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (OTC Policy) achieves its goal to protect marine resources from the "ongoing, critical impact"[3] caused by once-through cooling, it is essential that the Water board fully implement its OTC policy as it affects the San Onofre Nuclear Generating Station (SONGS) and Diablo Canyon Nuclear Power Plant (Diablo Canyon).

The special studies called for in the OTC Policy are designed to "investigate alternatives for the nuclear-fueled power plants to meet the requirements of the Policy."[4] To that end, the Scope of Work Report must set the framework and solicit only special studies that will ensure development of feasible solutions for compliance.

We reviewed the Scope of Work Report for the special studies and were pleased to see improvements in this draft from previous drafts. However, we still have concerns and offer the following comments and suggestions for edits.

[1] Cal. State Water Res. Control Bd., Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, Final Substitute Environmental Document 1 (2010).
[2] *Id*. at 33, Table 2.
[3] I*d.* at 2.
[4] Cal. State Water Res. Control Bd., Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant cooling. Sec. 3.D.(1) [hereinafter "OTC Policy"]

1. **The Scope of Work should make clear that cost may not be used to determine feasibility under Track 1.**
2. **Requiring a technology to have been previously demonstrated in a power plant-scale application in order to be deemed feasible is counter to Clean Water Act § 316(b).**[5]
3. **Effectiveness of a technology to reduce impingement and entrainment should be prioritized in the feasibility determination.**
4. **The Scope of Work should not restrict the technologies to be examined, and instead and should allow for evaluation of combinations of multiple technologies, upon the discretion of the third party contractor.**
5. **Review of technologies should be prioritized based on minimizing environmental impacts. Wire screen and mesh technologies alone are likely not effective environmental solutions.**

Recommendations:

1. **The Scope of Work should make clear that cost may not be used to determine feasibility under Track 1.**

For the definition of "not feasible" the Scope of Work correctly looks to the OTC Policy; however, only the first half of the definition is given. The definition is listed in a footnote under Section 3.3 -Guidance for Feasibility Assessment, but the second sentence of the definition in the OTC policy which reads "cost is not a factor to be considered when determining feasibility under Track 1"[6] is conspicuously absent from the Scope of Work. **We request that the full definition of feasibility be included in the Scope of Work.**

Specifically, we ask that the language in the footnote under section 3.2 be modified as follows (modifications italicized and underlined):

> "Not feasible," for purposes of this work product, will be defined as it is in the Policy; that is, "Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. *Cost is not a factor to be considered when determining feasibility under Track 1*."

As currently written, the Scope of Work Report includes costs under several of the criterions listed for the Feasibility Assessment checklist, including Section 3.3.6-Seismic issues and Section 3.3.11-Detailed Cost and Schedule. Further, under Section 3.4-Evaluation Process, it states that "each technology shall be evaluated based on cost." Because of the potential for confusion to the third party that will be responsible for carrying out the special studies, **we strongly urge you to revise the Scope of Work to very clearly explain that while cost information can and should be reported in the evaluation of the technology options, it is not to be considered as a factor for feasibility under Track 1.**

The OTC Policy contains two instances where costs to be considered in relation to the nuclear plants, but these two instances are NOT exceptions to the "not feasible" determination.

First, the OTC Policy states that the "special studies shall investigate alternatives for the nuclear-fueled power plants to meet the requirements of this Policy, including costs."[7] Because the special studies are intended to examine a range of possible options for the nuclear facilities to comply with the OTC Policy, it is logical for studies to examine that costs. Including cost information in the studies may help PG&E and

[5] "The most salient characteristic of [the CWA] statutory scheme, articulated time and again by its architects and embedded in the statutory language is that it is technology-forcing, not one driven by cost considerations or an assessment of the desirability of reducing adverse environmental impacts in light of the cost of doing so. *Riverkeeper, Inc. v. U.S. EPA*, 475 F.3d 83, 99 (2d Cir. 2007), quoting in part *NRDC v EPA*, 822 F.2d 104, 123 (D.C. Cir. 1987).
[6] OTC Policy Section 5 Definition of Terms *Not Feasible*.
[7] OTC Policy Section 3.D.(1)

Southern California Edison choose between one or more possible options for compliance. Importantly, however, costs are still not to be considered a factor for the feasibility determination.

Second, the OTC Policy states that when the State Board is considering the results of the special studies and evaluating whether the Policy needs to be modified with respect to the nuclear plants, then the State Board may base a decision on whether to modify the policy based on costs of compliance in terms of total dollars and dollars per megawatt hour of electrical energy produced over an amortization period of 20 years.[8] Again, this is not an exception to the definition of "not feasible" which explicitly states that costs are not a factor.

2. **Requiring a technology to have been previously demonstrated in a power plant-scale application in order to be deemed feasible is counter to the Clean Water Act § 316(b).**

Section 3.3.1 – Feasibility Assessment/First of Kind of Scale states that a criterion for feasibility analysis is to "identify that the proposed technology is commercially obtainable and has been demonstrated in a power plant-scale application considering the unique nature of the site settings and physical characteristics; particularly from the perspective of cooling tower retrofit or alternative cooling retrofit." As currently worded it suggests in order to be deemed feasible a technology must have been previously demonstrated in a similar plant elsewhere. Given the unique characteristics of SONGS and Diablo Canyon, it is conceivable that none of the technologies to be evaluated have been demonstrated in a similar power plant elsewhere. Moreover, this requirement is counter to the technology-forcing imperative of Clean Water Act § 316(b).[9] **We recommend that the Committee reword Section 3.3.1 to clarify that previous demonstration of the proposed technology at a similar plant should not be used as a determinant of feasibility. New technologies should be considered.** The point of the special studies should be to evaluate all possible technologies, new or otherwise that could be used to comply with the OTC policy.

Further, "commercially obtainable" is not defined. We recommend clarifying this term and defining it to include parts and systems that could be custom-designed for SONGS and Diablo Canyon.

Specifically, we ask that the language in the footnote under section 3.2 be modified to read:

> Identify whether the proposed technology has been demonstrated in a power plant-scale application. Identify whether the technology is commercially obtainable. Regardless of previous application scales, evaluate whether the technology would work considering the site settings and physical characteristics of the nuclear plant; particularly from the perspective of cooling tower retrofit or alternative cooling retrofit.

3. **Effectiveness of a technology to reduce impingement and entrainment should be prioritized in the feasibility determination.**

Section 3.3 – Guidance for Feasibility Assessment Criterion Checklist. Since the OTC Policy and the Clean Water Act § 316(b) mandates the best technology available for minimizing adverse environmental impacts, we suggest that the criterion checklist be re-ordered to put "Impingement/Entrainment Design" and "Offsetting Environmental Practices" at the top as it is essential these areas are met. This is not to discredit the others (e.g. seismic issues, operability general site conditions, etc.), but the importance of these criteria should be prominent since the driving factor for the state OTC policy is to minimize marine life impacts.

[8] OTCY Policy Section 3.D.(7)

[9] *Riverkeeper, Inc. v. U.S. EPA*, 475 F.3d 83, 107-108 (2d Cir. 2007) ("The statutory directive requiring facilities to adopt the *best* technology cannot be construed to permit a facility to take measures that produce second best results, especially given the technology forcing imperative behind the Act.").

4. **The Scope of Work should not restrict the technologies to be examined, and instead and should allow for evaluation of combinations of multiple technologies, upon the discretion of the third party contractor.**

Section 3.5 – Technologies to be Evaluated limits evaluation of industrial technologies to the list of seven proposed options in the Report. Limiting evaluation to these seven technologies excludes the possibility of assessing new or updated technologies that become available within the allowed evaluation period. We suggest that the Committee allow for that possibility. Moreover, the selected contractor may, based on their industry knowledge and expertise, be aware of other extant technologies not included in the list in Section 3.5. **We recommend that the contractor be allowed to propose evaluation of alternate technologies after consultation with the Committee.**

It is furthermore conceivable that multiple technologies listed in Section 3.7 could work synergistically. Particularly for Track 2 solutions, a combination of technologies could allow the plant to reach the necessary reduction in impingement and entrainment. The Report already alludes to this possibility in Section 3.3.4: "Reductions in impingement and entrainment achievable by each technology (or combination of technologies) being considered will be measured and discussed…" For example, we would have concerns about intake relocation, deep water offshore intakes or variable speed pumps as a sole means to reach compliance with the Policy, but we believe that there may be value in evaluating their effectiveness when paired with other technologies to achieve compliance. We recommend that these technologies be researched in combination with others listed in the Scope of Work (e.g. screens and wedgewire). However, the language of Section 3.5 does not allow for or encourage the assessment of a combination of technologies. We recommend that the contractor be prompted to consider combinations of multiple technologies in their assessment.

To prevent the unnecessary and potentially detrimental exclusion of viable alternatives, we recommend modifying Section 3.5 as follows (modifications underlined and italicized):

> Evaluation *shall include but not* be limited to the following industrial technologies, and any combination of technologies therewith, as addressed in the reports and evaluations listed for each nuclear site. *The selected contractor may propose alternative technology solutions for evaluation and assessment that they deem to be a potential fit, based on industry knowledge and expertise.*

5. **Review of technologies should be prioritized based on minimizing environmental impacts. Wire screen and mesh technologies alone are likely not effective environmental solutions.**

Section 3.5 – Technologies to be Evaluated. It is unclear whether or not the list of technologies to be evaluated in the Scope of Work is ranked in order of preference. We recommend that closed-cycle cooling systems be given priority for assessment, as they will be most likely to meet Track 1 compliance. SONGS in particular has had significant impingement and entrainment impacts: The estimated annual entrainment at SONGS based on average flow is 6.8 billion larval fish, while the estimated annual impingement is 1.3 million individuals.[10] According to the National Marine Fisheries Service, from 1988-2004 SONGS reported takes of 457 marine mammal and 27 sea turtles[11] - far more than any other power plant in the state. Due to the considerable marine life impacts of nuclear plants, we recommend that priority research be given to closed-cycle cooling system technologies.

We are also concerned that screen technologies alone (e.g. fine mesh screen systems and wedgewire screens) will not be effective in the marine environment. These technologies have not been thoroughly tested in

[10] Cal. State Water Res. Control Bd and Cal. Env't Prot. Agency, *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling Final Substitute Environmental Document,* May 4, 2010. Tables 2 & 3.
[11] National Marine Fisheries Service Stranding Network, June 2005.

highly productive ocean environments, where biofouling is common and may interfere with functionality.[12] [13] We are further concerned that the mortality and harm caused to marine organisms by these technologies may be underestimated because there is little-to-no data supporting the effectiveness of wedgewire screens at minimizing entrainment and impingement at the large scale necessary for California's nuclear power plants in an open coast marine environment. Specifically, although entrainment may be reduced with flow speeds less than 0.5 ft/second and with 1-2 mm wedge-wire screens, we are concerned that smaller larvae and eggs which are no longer entrained may now be impinged. We understand that flow models have shown that with the correct positioning in the current underwater, the flow over the wedge-wire screen is supposed to continuously sweep passive particles like eggs and larvae away from the screen surface.[14] However, modeling is not the same as empirical evidence, and we are concerned that there may still be unknown levels of injury or mortality from impact or impingement on the wedge-wire screen.

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Thank you for the opportunity to comment on the issues relating to the Scope of Work Report for nuclear-fueled power plants using once-through cooling and for considering our recommendations. We look forward to continuing to work with the Review Committee and State Water Board to ensure the timely and successful implementation of the OTC Policy at SONGS and Diablo Canyon.

Sincerely,

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cc: Charlie Hoppin, Chair, State Water Resources Control Board
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[12] *Field Evaluation of Wedgewire Screens for Protecting Early Life Stages of Fish at Cooling Water Intakes.* EPRI, Palo Alto, CA: 2005. 1010112.
[13] *West Basin Ocean Water Desalination Demonstration Facility Intake Effects Assessment.* Quarterly Progress Report, First Quarter 2011. Tenera Environmental, San Luis Obispo, CA. April 29, 2011
[14] *Overview of Desalination Plant Intake Alternatives*. Wateruse Association Desalination Committee. http://www.watereuse.org/sites/default/files/u8/Intake%20White%20Paper.pdf