California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

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January 23, 2006

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COMMENTS TO PHASE II 316(B) PROPOSAL FOR INFORMATION COLLECTION AND IMPINGEMENT MORTALITY AND ENTRAINMENT CHARACTERIZATION STUDY SAMPLING PLAN FOR AES REDONDO BEACH GENERATING STATION, REDONDO BEACH, CA NPDES PERMIT NO. CA0001201, CI-0536; AND AES ALAMITOS GENERATING STATION, LONG BEACH, CA, NPDES PERMIT NO. CA0001139, CI-6113

Dear Mr. Maghy:

Reference is made to the Phase II 316(b) Proposal for Information Collection (PIC) and Impingement Mortality and Entrainment (IM&E) Characterization Study Sampling Plan (Sampling Plan) submitted for AES Redondo Beach Generating Station (RBGS), dated August 31, 2005, and AES Alamitos Generating Station (Alamitos), dated September 1, 2005. Both PICs were prepared by EPRI Solutions.

The California Water Quality Control Board, Los Angeles Region (Regional Board) staff reviewed each proposal with respect to the requirements of the 316(b) Phase II rule as published on July 9, 2004 (69 FR 41576) and incorporated into the CFR at Parts 9, 122, 123, 124, and 125.

On December 23, 2005, Regional Board staff and the United States Environmental Protection Agency (USEPA) consultant, Tetra Tech, met with your staff and consultants and discussed our preliminary concerns with the subject documents. We have completed our review for the PIC and IM&E Sampling Plan. The following are our comments:

General Comments

1. AES is directed to calculate each facility utilization capacity based on the intake of water through the facility Cooling Water Intake Structure (CWIS) and not on actual electric generation. The Phase II Rule, Federal Register, Volume 69, No. 131, page 41616, Chapter VII.C.5, paragraph 4, states:

> "…the Agency has allowed the calculation of the capacity utilization rate on an intake basis, when the intake is exclusively dedicated to a subset of the plant's generating units, and for determination of the capacity utilization rate based on a binding commitment of future operation below the threshold."

AES may choose to make a commitment to keep the facility intake of water below the 15% threshold. Otherwise, AES is directed to recalculate its utilization capacity based on its historical intake of water.

2. AES is directed to conduct hydrologic modeling to identify the CWIS hydrologic Radius of Influence (ROI) at both facilities. Following the determination of the ROI, AES should evaluate the IM&E impacts within the ROI for each facility.

3. AES is directed to explore and evaluate the feasibility of using other source water, such as reclaimed water from wastewater treatment plants, for once through cooling water, and provide an analysis for our evaluation.

Specific Comments

AES and its contractor (EPRIsolutions) coordinated much of the development of the two PICs for RBGS and Alamitos. As such, Regional Board staff has consolidated its comments when addressing identical sections from the two PICs. A notation indicates whether the comment applies to one facility or both. An assessment of the completeness and rigor of the two proposals is presented below.

Section 1. Introduction (RBGS and ALAMITOS)

On Page 1, AES states that "[a]ll facilities that use Compliance Alternatives 2, 3, and 4 are required to demonstrate a minimum reduction in impingement mortality of 80% [40 CFR] 125.94(b)(1)…[and] reduce entrainment by a minimum of 60% [40 CFR] 125.94(b)(2)."

The Phase II rule does not explicitly state a "minimum" target for performance standards but instead states that a facility opting for Compliance Alternatives 2, 3, or 4 must "reduce impingement mortality…by 80 to 95 percent" and "reduce entrainment by 60 to 90 percent" (40 CFR 125.94(b)(1) and (b)(2)). USEPA expressed the performance standards as ranges rather than as a benchmark value "because of the uncertainty inherent in predicting the efficacy of any one of these technologies… across the spectrum of facilities subject to [the Phase II] rule" (69 FR 41600). Any technologies, operational measures, and/or restoration measures used as part of a compliance strategy should be designed to optimize the performance of the selected measures to allow for variation in calculations and potential fluctuations in impingement mortality and entrainment rates thereby ensuring compliance with the upper end of these performance standards – impingement reduction of 95% and entrainment reduction of 90%.

Sections 2.1 – 2.4 (RBGS and ALAMITOS)

Please see comments for Section 2.6 (ALAMITOS) on the definition of a CWIS.

Section 2.4. Existing Hydraulic Conditions (RBGS)

The ROI is used to develop a defensible sampling plan and compliance determination. AES may propose a reasonable methodology to calculate the ROI.

In the absence of that, AES may calculate the ROI for each of its facilities based on theoretical basis of a depth averaged, radial flow boundary layer at which a velocity perturbation of 0.01% from the intake flow velocity is calculated.

Following the determination of the ROI, AES should evaluate the IM&E impacts within the ROI, including any cumulative impacts from other CWIS, e.g., Los Angeles Department Water of Power's Scattergood Generating Station and El Segundo Power Plant within the RBGS ROI.

Section 2.5. Existing Hydraulic Conditions (ALAMITOS)

On page 16, AES states that "[t]he flow through the harbor created by Alamitos prevents the harbor from becoming stagnant and removes garbage from the water. Thus, operation of the power plant may provide a benefit to the overall water quality of the harbor."

Turnover in the harbor and marina portions of Alamitos Bay resulting from the operation of ALAMITOS and the Los Angeles Department of Water and Power's (LADWP) Haynes Generating Station may improve some aspects of water quality in Alamitos Bay. Such benefits, however, are outside the scope of the Phase II rule and cannot be easily characterized or quantified using the methodology presented in Section XII of the preamble to the Phase II rule (69 FR 41655). As discussed in the Phase II rule, benefits are directly attributable to reductions in impingement mortality and entrainment at the existing CWIS and do not account for improved water quality that may result from the operation of a cooling water system.

Similar to Section 2.4 above, AES may calculate the ROI based on theoretical basis of a depth averaged, radial flow boundary layer at which a velocity perturbation of 0.01% from the intake flow velocity is calculated.

Then, AES should evaluate the IM&E impacts within the ROI, including any cumulative impacts from other CWIS, e.g., the Haynes Generating Station within the Alamitos ROI.

Section 2.5. Applicable Performance Standards (RBGS)

Regional Board staff agrees that the CWIS demonstrating a capacity utilization rate of less than 15%, is subject to impingement mortality standards only. A CWIS with a capacity utilization rate in excess of 15%, is subject to both impingement mortality and entrainment standards.

However, the Phase II Rule, Federal Register, Volume 69, No. 131, page 41616, Chapter VII.C.5, paragraph 4, states:

> "…the Agency has allowed the calculation of the capacity utilization rate on an intake basis, when the intake is exclusively dedicated to a subset of the plant's generating units, and for determination of the capacity utilization rate based on a binding commitment of future operation below the threshold."

AES may choose to make a commitment to keep the facility intake of water below the 15% threshold. As such, the Regional Board staff directs the Discharger to provide additional information, either in a revised PIC or the final comprehensive demonstration study, discussing potential modifications or redevelopment projects associated with the Units 5&6 CWIS, if any, as well as scenarios under which the intake structure may operate at increased capacity for extended periods of time during the term of the reissued permit.

Alternatively, AES is directed to recalculate its utilization capacity based on its historical intake of water, and proceed accordingly.

Section 2.6. Applicable Performance Standards (ALAMITOS)

On page 17, AES states that "Alamitos has one intake structure each for Units 1&2, and one intake structure for Units 3&4 and Units 5&6 located at the end of a separate intake canal [sic]. Therefore, one can consider the capacity utilization rate to be applied independently for each CWIS.

At 40 CFR 125.93, USEPA defines "cooling water intake structure" as "[T]he total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S." The intake canal is common to Units 1&2 and Units 3&4 with the source water being Los Cerritos Channel. The CWIS for Units 1&2 and Units 3&4 cannot be considered "independently" as it applies to performance standards for entrainment and/or impingement mortality. As shown below, the five year average electrical generation rate for Units 1-4, which share the intake structure, is 22.2%.

Generating Units	2000 (%)	2001 (%)	2002 (%)	2003 (%)	2004 (%)	5-year average
AL 1	6.03	9.95	9.48	7.9	6.19	**7.9**
AL 2	14.93	20.66	11.17	8.25	6.55	**12.3**
AL 3	30.13	45.52	35.69	49.77	22.9	**36.8**
AL 4	40.6	47.6	23.89	28.11	18.4	**31.7**
Cumulative 5-year average for Units 1-4						**22.2**

Impingement mortality and entrainment performance standards are applicable to the intake structure that serves Units 1-4. The description of the CWIS for Units 1-4 presented in Sections 2.2 and 2.3 should be revised to reflect the common use of the single intake canal. Likewise,

the description of the CWIS for Units 5&6 presented in Section 2.4 should be expanded to include the intake canal.

Further, any contemplated compliance plan must consider the combined impingement and entrainment impacts that reflect the common use of the single intake canal.

Section 2.6. Conformance with the Calculation Baseline (RBGS)
Section 2.7. Conformance with the Calculation Baseline (ALAMITOS)

Regional Board staff does not have any comment at this time.

Section 3.1. Taking Credit for Existing Use of Fish Protection Technologies and Operational Measures Under the Rule's Calculation Baseline (RBGS)

Regional Board staff notes AES intends to seek credits for reductions in impingement mortality and entrainment that may be achieved through the use of existing technologies and operational measures. Such measures include: velocity cap; return of impinged organisms to the source waterbody; and the location of the intake structure at a submerged offshore location. Any reductions demonstrably shown to be the result of the use of these measures may be applied to the applicable performance standards for the facility, subject to Executive Officer approval.

Regional Board staff requests additional information on the "quantification of the live returned fishes" noted by AES on page 20. Specifically, AES should provide a discussion as to what constitutes "live" in this context (i.e., initial or extended survival) and what methods will be used to make this assessment.

AES intends to demonstrate deviations from baseline due to current operations and technologies that reduce impingement. They also plan to evaluate the potential for credit for existing impingement reduction through a demonstration that live impinged fish are returned to the source water. As described, the velocity cap study appears to be a site-specific study, but the PIC is unclear as to how the percent impingement mortality reduction due to the cap and intake location will be established. The description of the reverse-flow sampling technique (designed to be used in the estimation of the impingement rates for a near shore, surface intake structure with no velocity cap) needs to be described in more detail. It is unclear how this study will be performed in such a way to relate the observed impingement rates to base-line conditions. Also, the location of the current intake and the experimental intake are not independent of each other in space or time. Therefore, additional information is required to demonstrate how this study is a valid test of the effectiveness of this technology or operational design.

Section 3.1. Use of Restoration under Compliance Alternative 3 (ALAMITOS)
Section 3.2. Use of Restoration under Compliance Alternative 3 (RBGS)

In both documents, AES notes that it "views restoration as a preferred method for meeting the entrainment reduction performance standard." At 69 FR 41609, USEPA notes:

> "Facilities that propose to use restoration measures must demonstrate to the [Regional Board] that they evaluated the use of design and construction technologies and operational measures and determined that the use of restoration measures is appropriate because meeting the applicable performance standards or requirements through the use of other technologies is less feasible, less cost-effective, or less environmentally desirable. "

AES does not provide the basis for its stated preference and appears to have made a conclusion regarding compliance before completing required elements of the Comprehensive Demonstration Study. The preamble to the Phase II rule, as quoted above, makes clear the preference for a technology or operational (excluding restoration) approach, either in whole or in part, to meet the performance standards. Restoration is intended to be used as a supplement to, or in some cases a replacement for, other approaches only when it is more feasible, more cost effective or more environmentally desirable.

On page 22 (RBGS) and page 20 (ALAMITOS), AES states "AES plans to fully evaluate available technologies and/or operational measures to demonstrate that restoration is more feasible, cost-effective or environmentally desirable than…meeting performance standards through use of technologies and/or operational measures." This statement again appears to reflect a pre-determination as to the compliance strategy ultimately adopted by RBGS and ALAMITOS. Regional Board staff agrees with USEPA in placing emphasis on a rigorous analysis of technologies and/or operational measures (excluding restoration) to meet the performance standards and only incorporate restoration measures where necessary.

On page 22 (RBGS) and page 20 (ALAMITOS), AES states "the analysis of IM&E data described in Attachment B will be used in determining the amount of restoration necessary to provide a minimum benefit equivalent to an 80% impingement mortality reduction and 60% entrainment reduction." The use of additional monitoring data, as discussed by AES, should not be limited to determinations of the levels of restoration, if any, that may be part of a final compliance strategy but instead be used when evaluating all options for compliance. Please see comments for *Section 1. Introduction,* above, regarding the notion of minimum levels in performance standard ranges.

Section 3.3. Use of Fish Protection Technologies and/or Operational Measures under Compliance Alternatives 3 and 4 (RBGS)

On page 22, AES states "In the event that use of restoration measures are not available to offset entrainment losses, the following technologies and operational measures will be evaluated[.]" As noted above, the Regional Board staff agrees with USEPA's assertion that emphasis be placed on technologies and/or operational measures instead of restoration measures. Regional Board staff believes all technologies discussed in Section 3.2, as well as

additional measures, should be evaluated without regard to the availability of restoration as a compliance option.

Narrow-Slot Cylindrical Wedgewire Screens
Regional Board staff supports the evaluation of newer technologies and existing technologies in non-traditional applications.

Fine-mesh Ristroph Traveling Water Screens
Regional Board staff agrees that fine-mesh Ristroph traveling screens should be evaluated for use at RBGS. In addition to the study elements presented by AES, Regional Board staff requests additional discussion as to the viability standards used to determine an overall survival rate for entrainable organisms impinged on the screens and returned to a waterbody. Regional Board staff also requests a discussion of any variations in the design and/or operation of the screens that will be evaluated (e.g., frequency of screen rotation; different spray wash pressures; number, spacing, and construction materials used for Ristroph buckets).

On page 23, AES notes that "it will be essential to perform laboratory and/or field studies to verify that survival of entrainable organisms is higher than the existing survival through the condenser system." The Phase II rule is clear that a reduction in entrainment, not entrainment mortality, is the basis for the performance standard. Regional Board staff notes that, at 69 FR 41620, the Phase II rule

> "does allow facilities to use the results of a well-constructed, site-specific, entrainment survival study, approved by the [Regional Board] in their benefits assessment when seeking site-specific entrainment requirements. The [Regional Board] must review and accept the study before the results are incorporated into the benefits assessment."

Regional Board staff requests that if such a study is intended, the study plan be submitted for review prior to the commencement of any evaluation.

Use of an Approved Technology under Compliance Alternative 4
Regional Board staff supports the evaluation of newer technologies and existing technologies in non-traditional applications for possible inclusion as an approved technology that may be made available to other similar facilities. Regional Board staff also supports cooperative efforts among dischargers subject to the Phase II rule in evaluating different technologies.

Technologies/Operational Measures Not Discussed (RBGS)
Section 3.3 (RBGS) notes the potential use of operational measures under Compliance Alternatives 3 and 4 yet no further discussion is offered in the subsequent section. Regional Board staff requests additional information about any operational measures, including flow reduction, seasonal operation adjustments to mitigate any losses that may occur during spawning or migration seasons, and alternative sources of cooling water that may be applicable at RBGS. In addition, Regional Board staff requests the inclusion of a discussion of the

following technologies: closed-cycle cooling, either in whole or in part, and variable speed drives.

Section 3.2. Use of Fish Protection Technologies and/or Operational Measures under Compliance Alternatives 3 and 4 (ALAMITOS)

On page 20, AES notes "it will limit evaluation of entrainment reduction technologies only to Units 3&4 and Units 5&6 intakes. Please see comments in *Section 2.6. Applicable Performance Standards (ALAMITOS),* above, for a discussion of the definition of ALAMITOS CWIS and relevant performance standards.

Aquatic Filter Barriers and Fine Mesh Wedgewire Screens
Given the nature and topography of the source water body, Regional Board staff agrees that aquatic filter barriers (AFB) and fine mesh wedgewire screens are unlikely to be a viable alternative for ALAMITOS.

Fine-mesh Ristroph Traveling Water Screens
Regional Board staff agrees that fine-mesh Ristroph traveling screens should be evaluated for use at ALAMITOS. In addition to the study elements presented by AES, Regional Board staff requests additional discussion as to the viability standards used to determine an overall survival rate for entrainable organisms impinged on the screens. Regional Board staff also requests a discussion of any variations in the design and/or operation of the screens that will be evaluated (e.g., frequency of screen rotation, different spray wash pressures, number, spacing, and construction materials used for Ristroph buckets).

Use of a Barrier Net for Units 1&2
Barrier nets may be a viable option for reducing impingement at both CWIS. Regional Board staff requests that the scope of this analysis be expanded to address facility-wide impingement, not just impingement occurring on the screens at Units 1&2. In addition, Regional Board staff requests that seasonal use be evaluated along with multiple configurations and mesh sizes.

Use of Wide Slot (3/8 in. 0r 9.5 mm) Cylindrical Wedgewire Screens for Units 1&2
Please see comments in *Section 2.6. Applicable Performance Standards (ALAMITOS),* above, for a discussion of the definition of ALAMITOS CWIS and relevant performance standards.

On page 24 (ALAMITOS), AES refers to the use of wide slot wedgewire screens for the protection of entrainable organisms. Wide slot screens are not typically thought of as an entrainment reduction technology.

Use of an Approved Technology under Compliance Alternative 4
Regional Board staff supports the evaluation of newer technologies and existing technologies in non-traditional applications for possible inclusion as an approved technology that may be made available to other similar facilities. Regional Board staff also supports cooperative efforts among dischargers subject to the Phase II rule in evaluating different technologies.

Section 3.2 (ALAMITOS) notes the potential use of operational measures under Compliance Alternatives 3 and 4 yet no further discussion is offered in the subsequent section. Regional Board staff requests additional information about any operational measures, including flow reduction, seasonal operation adjustments to mitigate any losses that may occur during spawning or migration seasons, and alternative sources of cooling water that may be applicable at ALAMITOS. In addition, Regional Board staff requests the inclusion of a discussion of the following technologies: closed-cycle cooling, either in whole or in part, and variable speed drives.

Section 3.3. Use of Site Specific Standards under Compliance Alternative 5 (ALAMITOS)
Section 3.4. Use of Site Specific Standards under Compliance Alternative 5 (RBGS)

Regional Board staff continues to evaluate the methodologies used in the cost-cost and cost-benefit tests and is seeking additional guidance from USEPA. No comments are offered at this time.

Section 4. Biological Studies (ALAMITOS and RBGS)

Please see comments for Appendix B.

Section 5. Summary of Past or Ongoing Consultation with Agencies (ALAMITOS and RBGS)

Regional Board staff does not have any comment at this time.

Section 6. Schedule for Information Collection (ALAMITOS and RBGS)

Regional Board staff does not have any comment at this time.

Appendix A. Restoration Measures (ALAMITOS and RBGS)

AES's preferred compliance alternative to meet the entrainment reduction standard is restoration, if this option remains available pending ongoing litigation. This PIC does not provide information on the type of restoration that would be planned, but summarizes the types of environmental augmentation applied at other facilities, i.e., options AES plans to consider. The Phase II Rule does not specify the types of restoration measures that can be used, which does allow some flexibility. However, the Phase II Rule does require that the impacted watershed benefit from the restoration measures. The examples provided or discussed do not constitute a restoration activity in that the goals are not to reverse the environmental damage caused by the CWIS on the most impacted populations of organisms. AES lists only mitigative actions that will augment an environmental resource and plans to demonstrate an economic equivalence between the impacted resource and the resource augment through restoration activities. This is not consistent with the definition of restoration and could lead to a precedent by which local communities are left unprotected by the rule until impacts become severe enough to harm an economically important species. Once food webs are altered to such a degree that forage-

based species as well as the more publicly prized predatory or endangered species are impacted, the cost of restoration will be even greater and likelihood of success potentially lower.

On page A-2, AES states that "While forage fish are the most common species impacted at Redondo Beach [and Alamitos], stocking of these species to compensate for the losses would not be of interest to any of the federal and state fish and wildlife agencies". AES does not provide a basis for this statement, nor can one be inferred given that AES states in Section 5 that "[t]here have been no consultations with federal or state fish and wildlife agencies regarding RBGS [and ALAMITOS] relative to 316(b)."

The rule intends, by use of the word "restoration", that facilities restore the communities they directly impact. Specifically, "the final rule authorizes the use of restoration measures that produce and result in increases of fish and shellfish in the facility's watershed". Examples provided in the Rule include direct stocking, improved habitat or stocking of a functionally similar species, which clearly are intended to protect the watershed's structural and functional integrity. The interpretation of restoration as a compliance alternative in the PIC should be re-evaluated before an actual restoration plan is developed.

Appendix B. Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Plan (ALAMITOS)

Section 2.0 Historical Impingement and Entrainment Studies (ALAMITOS)

The summary of historical studies documents frequent entrainment of larval fishes from Alamitos Bay during the 1978-1980 study. This entrainment study, however, was conducted at Haynes Generating Station intake structure; it does not appear than an entrainment study has ever been performed at Alamitos's intake canals. Impingement studies were conducted at Alamitos station from 1978 – 1980 and from 1992 – 1993 and "periodically" from 2002 – 2004. These studies demonstrate a shift in the populations of fish impinged between study years.

The methods for the impingement sampling required that the screens be held stable for 24 hours and then washed. A discussion of why this method is used rather than sampling under normal operating conditions is not provided. There also is no discussion of QA/QC protocols employed in these studies.

Appendix B. Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Plan (RBGS)

Section 2.0 Historical Impingement and Entrainment Studies (RBGS)

The summary of historical studies documents frequent entrainment of larval fishes in the 1979-1980 study. Additionally, impingement studies were conducted from 1978 – 1980 and from 1999 –2004. These summaries included a brief discussion of methods and QA/QC practices used in the collection of the historic data. However, neither the discussion of methods or results indicated how these studies were adequate for use in setting current conditions or establishing

baseline. Because AES plans to use these data to establish impingement over "current long-term conditions", the QA/QC procedures and relevance of methods and results to current conditions must be described in more detail so that they can be fully evaluated.

Sections 3.0 Proposed New Biological Studies (ALAMITOS)

The sampling program proposed for the new impingement and entrainment monitoring studies described in Chapter 3 appears to be adequate to meet the temporal (seasonal and diel) characterization requirements of the rule, with the following comments:

1. The study design proposes to hold the traveling screen stationary for 5.5 hours and allowing them to collect fish before rotating them and collecting the impingement sample. No rationale is provided for conducting impingement sampling under such conditions and it is unclear why collections are not to be performed under normal operating conditions.

2. The impingement sampling plan states that if an "extreme event" occurs (defined as 100 – 500 fish or shellfish collected within a 24 hour period) during sampling, the 24 hour sampling will be extended for additional days. Given the variability in both the spatial and temporal distribution of fish and shellfish, the occurrence of a large number of individuals in a sample is probably not an extreme event, but rather atypical of previous samples. However, it is appropriate to include these samples as single 24-hour samples as they account for periodic short-term increases in impingement abundance that almost certainly occur under normal circumstances. If the collection of atypically large numbers of individuals in a single 24 hour sample is a realistic concern for this sampling program, longer sample period should be used to adequately characterize actual impingement rates.

3. More detail is required on the methods to be used to quantify impingement during and following a heat treatment. The plan states that such sampling will take place, but it is unclear how such sampling will be accomplished.

4. All fish and shellfish collected in impingement samples must be identified to species counted. The sampling plan states that impingement samples are to be subsampled when the number of collected fish and shellfish of any particular species exceeds 30. This number should be higher, particularly given the expected low rate of impingement at this facility. Ideally, this number would be 100 – 200 fish or shellfish.

5. The QC program for the field sampling is only planned to be done quarterly. We believe QC should be conducted each time sampling occurs at program commencement and then, (as with the processing and analysis protocols) if the procedures and samples pass inspections regularly, QC monitoring can decline incrementally to the minimum frequency of quarterly.

6. Identification of shellfish larvae is proposed to be limited to *Cancer* crabs, lobster and squid larve. Larvae of other types of organisms, such as non-*Cancer* crabs,

shrimp, sand crabs, bivalves, etc., may be abundant in the plankton. Sampling of all life stages is required under the Rule and consideration should be given to expanding the list of target organisms for identification and enumeration.

7. Section 3.2 of the study plan indicates that "…the commercial and recreational values of adult fish losses…" would be used in the cost-benefit analyses. Ecological losses and benefits also must be evaluated.

8. Entrainment studies should include not only enumeration of collected fish eggs, but also identification of collected eggs to the lowest practical taxonomic level. It is understood that in some cases taxonomic identification of eggs may not be possible, but even an enumeration of unidentifiable eggs would be informative. The egg represents a critical life stage, the presence and abundance of which may not be accurately represented based on larval, juvenile, and adult presence. Fish eggs should be included in these studies not only to allow for a more accurate estimate of entrainment and impingement effects, but also because the Phase II regulations mandate their inclusion. Specifically, 40 CFR 125.95(b)(3) states that the impingement mortality and/or entrainment characterization study must include "taxonomic identifications of all life stages of fish, shellfish, and any species protected under Federal, State or Tribal Law (including threatened or endangered species) that are in the vicinity of the CWIS(s) and are susceptible to impingement and entrainment".

Sections 3.0 Proposed New Biological Studies (RBGS)

The sampling program proposed for the new impingement and entrainment monitoring studies described in Chapter 3 appears to be adequate to meet the temporal (seasonal and diel) characterization requirements of the rule, with the following comments:

1. The impingement assessment discussed on Page 26 of the sampling plan mentions that fish survival will be evaluated at 7-days post-impingement. Any fish surviving at 7-days following impingement will be assumed to survive return to the source waters and will be subtracted from the impingement totals. More detail is required as to how those fish will be held (e.g., temperature, water source, feeding, etc.) and what criteria are to be used for determining survival. It is also appropriate for this type of study to include measures of not only survival, but also damage, and immediate reaction to reintroduction to water.

2. The study design proposes to hold the traveling screen stationary for 5.5 hours and allowing them to collect fish before rotating and collecting the impingement sample. No rational is provided for conducting impingement sampling under such conditions and it is unclear why collections are not to be performed under normal operating conditions.

3. The impingement sampling plan states that if an "extreme event" occurs (defined as 100 – 500 fish or shellfish collected within a 24 hour period) during sampling, the 24 hour sampling will be extended for additional days. Given the variability in both the spatial and temporal distribution of fish and shellfish, the occurrence of a large number of individuals in a sample is probably not an extreme event, but rather simply atypical of previous samples. However, it is appropriate to include these samples as single 24-hour samples as they account for periodic, although potentially short-term increases in impingement abundance that almost certainly occur under normal circumstances. If the collection of atypically large numbers of individuals in a single 24 hour sample is a realistic concern for this sampling program, longer sample period should be used to adequately characterize actual impingement rates.

4. More detail is required on the methods to be used to quantify impingement during and following a heat treatment. The plan states that such sampling will take place, but not how it will be accomplished.

5. All fish and shellfisjh collected in impingement samples must be identified to species and counted. The sampling plan states that impingement samples are to be subsampled when the number of collected fish and shellfish of any particular species exceeds 30. Given the expectedly low rate of impingement at this facility this subsampling number should be higher (e.g., 100 – 200 fish or shellfish).

6. The QC program for the field sampling is only planned to be done quarterly. We believe QC should be conducted each time sampling occurs at program commencement and then, (as with the processing and analysis protocols) if the procedures and samples pass inspections regularly, QA/QC monitoring can decline incrementally to the minimum frequency of quarterly.

7. Identification of shellfish larvae is proposed to be limited to *Cancer* crabs, lobster and squid larve. Larvae of other types of organisms, such as non-*Cancer* crabs, shrimp, sand crabs, bivalves, etc., may be abundant in the plankton. Sampling of all life stages is required under the Rule and consideration should be given to expanding the list of target organisms for identification and enumeration.

8. Section 3.2 of the study plan indicates that "…the commercial and recreational values of adult fish losses…" would be used in the cost-benefit analyses. Ecological losses and benefits should also be evaluated.

9. Impingement and entrainment studies should include not only enumeration of collected fish eggs, but also identification of collected eggs to the lowest practical taxonomic level. It is understood that in some cases taxonomic identification of eggs may not be possible, but even an enumeration of unidentifiable eggs would be informative. The egg represents a critical life stage, the presence and abundance of which may not be accurately represented based on larval, juvenile, and adult presence. Fish eggs should be included in these studies not only to allow for a more accurate estimate of entrainment and impingement effects, but also because the

Phase II regulations mandate their inclusion. Specifically, 40 CFR 125.95(b)(3) states that the impingement mortality and/or entrainment characterization study must include "taxonomic identifications of all life stages of fish, shellfish, and any species protected under Federal, State or Tribal Law (including threatened or endangered species) that are in the vicinity of the CWIS(s) and are susceptible to impingement and entrainment".

10. Figure 3.1 indicates the locations of the proposed sampling stations for entrainment and source water studies. The two most seaward stations for the RSBS are located closer to shore than is the case for the El Segundo Generating Station/Scattergood Generating Station source water stations, since the 20-meter isobath is located closer to shore south of Redondo Beach. We would suggest locating an additional sampling station offshore of each of the 20-meter depth stations to fully characterize the abundance of larval fishes and invertebrates in the adjacent waters.

Section 4.0. Analytical Methods

The analysis section (Section 4.1) describes a focus on the most abundant or commercially valuable taxa for impingement analyses and identification of fish taxa only beyond the egg stage for entrainment. It is appropriate and required that the facility characterize impingement and entrainment mortality via counts and identification all collected organisms. Where appropriate and as indicated in the sampling design, collected samples may be sub-sampled, but enumeration and identification of all collected taxa is essential. Specific data analysis or modeling techniques may be used for selected taxa (pending approval of those "target taxa" following consultation with Regional Board staff and other agencies); but all taxa, regardless of abundance or commercial/recreational importance, should be counted and identified in samples from the impingement, entrainment and source waterbody studies.

Appendix C. Proposed Method for Evaluation of Environmental Benefits

Regional Board staff did not review this section of the PIC pending additional guidance from USEPA.

If you have any questions, please contact David Hung at 213/576-6664 or Dr. Tony Rizk at 213/576-6756.

Sincerely,

Jonathan S. Bishop
Executive Officer

Cc: Mailing List

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