California Regional Water Quality Control Board

Los Angeles Region

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

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COMMENTS TO PHASE II 316(B) PROPOSAL FOR INFORMATION COLLECTION AND IMPINGEMENT MORTALITY AND ENTRAINMENT CHARACTERIZATION STUDY SAMPLING PLAN FOR SCATTERGOOD GENERATING STATION, EL SEGUNDO, CA, NPDES PERMIT NO. CA0000370, CI-1886, HARBOR GENERATING STATION, WILMINGTON, CA, NPDES PERMIT NO. CA0000361, CI-2020, AND HAYNES GENERATING STATION, LONG BEACH, CA, NPDES PERMIT NO. CA0000353, CI-2769.

Dear Ms. Damron:

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 Scattergood Generating Station (SGS), NPDES Permit No. CA0000370, CI-1886, Harbor Generating Station (HGS), NPDES Permit No. CA0000361, CI-2020, and Haynes Generating Station (HnGS), NPDES Permit No. CA0000353, CI-2769, all dated Octboer 14, 2005. All three PICs were prepared by the Los Angeles Department of Water and Power (LADWP) and its contractors. Per the documents, the contributing contractors are URS Corp, EPRIsolutions, Inc., Tenera Environmental, Inc., and MBC Applied Environmental Sciences.

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 January 12, 2006, 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.

The Regional Board staff have completed our review for the PIC and IM&E Sampling Plan. We have consolidated our comments when addressing identical sections from the three PICs. A notation indicates whether the comment applies to one, two, or three facilities.

Section 1.0 Executive Summary (SGS, HGS, and HnGS)

In all three documents, LADWP states that the preferred method for meeting the Phase II rule's performance standards, whether for impingement mortality or entrainment, or both, is through the use of restoration. 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.*

LADWP 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 (CDS).

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.

Section 2.0 Introduction (SGS, HGS, and HnGS)

On Page 2-1, LADWP 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 with the intention of optimizing 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 performance standards.

Section 3.0 Description of Generating Station (SGS, HGS, and HnGS)

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

Section 4.0 Compliance Alternatives to be Evaluated

See below.

Section 5.0 Biological Studies

See comments for Appendix A.

Section 6.0 Summary of Past or Ongoing Consultation with Agencies (SGS, HGS, and HnGS)

On page C-2, LADWP states that, "While forage species…are the most commonly affected species at California Power Plants, stocking of these species to compensate for the losses would likely not be of interest to any of the federal and state fish and wildlife agencies". The basis for this statement is unclear as LADWP states in Chapter 6 that consultation with appropriate resource agencies has not occurred.

Section 7.0 Schedule for Information Collection

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

Section 4.0 Compliance Alternatives to be Evaluated (SGS)

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

Section 4.1.1 Impingement Mortality Credits (SGS)

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

Section 4.1.1 Entrainment Reduction Credits (SGS)

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

Section 4.2 Use of Restoration under Compliance Alternative 3 (SGS)

Please see comments for *Section 1.0 Executive Summary*, above.

On page 4-2 LADWP states "LADWP views restoration as a preferred method for meeting the entrainment reduction performance standard..." This statement again appears to reflect a pre-determination as to the compliance strategy ultimately adopted by SGS. The 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. Assumptions made by LADWP as to the relative environmental benefits of restoration compared to technological or operational measures are unsupported by information submitted in the PIC.

On page 4-3, LADWP states "the analysis of IM&E data described in Appendix A 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 LADWP, 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 2.0 Introduction,* above, regarding the topic of minimum levels in performance standard ranges.

Section 4.3 Use of Fish Protection Technologies and/or Operational Measures under Compliance Alternatives 3, 4, and 5 (SGS)

On page 4-5, LADWP states "In the event that use of restoration measures is not available to offset IM&E losses, the following technologies (including fine-mesh Ristroph traveling screens) 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. The Phase II rule requires that any restoration plan proposed as a component of a compliance strategy must contain "a demonstration to the Director that you have evaluated the use of design and construction technologies and/or operational measures for your facility and an explanation of how you determined that restoration would be more feasible, cost-effective, or environmental desirable…". The Regional Board staff believes all feasible technologies discussed in Section 4.3, as well as additional measures, should be evaluated without regard to the availability of restoration as a compliance option.

Section 4.3.1 Narrow Slot Cylindrical Wedgewire Screens (SGS)

The Regional Board staff supports the evaluation of newer technologies and existing technologies in non-traditional applications.

Section 4.3.2 Fine-Mesh Ristroph Traveling Water Screens (SGS)

The Regional Board staff agrees that fine-mesh Ristroph traveling screens should be evaluated for use at SGS. LADWP states on page 4-5, "However, due to their very high costs, LADWP does not plan to initiate such studies until it is determined that the restoration option is not available". Evaluations of technologies or operational measures (excluding restoration) must be conducted for feasibility as part of the overall compliance strategy whether or not restoration is available.

The Regional Board staff notes that the effectiveness of such systems has varied from facility to facility and can be dependent on adjustments that tailor the operation to the local conditions. Therefore, the Regional Board staff 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, etc.). In addition to the study elements presented by LADWP, the 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.

Section 4.3.3 Use of Pilot Studies (SGS)

The Regional Board staff is not certain of the role pilot studies are intended to play in an overall compliance strategy for SGS. Additional information is requested from LADWP to detail any potential pilot studies and the technologies and/or operational measures to be evaluated. It is unclear if "pilot studies" used in this context is meant to be synonymous with the Verification Monitoring Plan that is part of the CDS.

Section 4.3.3 Use of Operational Measures (SGS)

On page 4-8, LADWP states, "[i]f use of restoration measures is not available, LADWP will also consider reducing flow on a diel or seasonal basis." As noted above, measures other than restoration are the preferred method for complying for the Phase II rule. All technologies and operational measures must be evaluated for their feasibility in meeting the performance standards prior to the incorporation of restoration into the compliance strategy. Any flow reduction credits granted to SGS must be construed in such a way as to be sufficiently protective, in whole or in part, of the affected waterbody and perform as intended while recognizing the variability in generation needs of SGS.

Section 4.4 Use of an Approved Technology under Compliance Alternative 4 (SGS)

The 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. The Regional Board staff also supports cooperative efforts among dischargers subject to the Phase II rule in evaluating different technologies.

Technologies and/or Operational Measures Not Discussed

The 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 4.0 Compliance Alternatives to be Evaluated (HnGS)

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

Section 4.1.1 Taking Credit for Existing Restoration Measures (HnGS)
LADWP proposes to evaluate the benefit provided, if any, by aquatic life that has taken up residence in HnGS' 1.5 mile intake canal and is currently used as a sometime recreational fishery.

As discussed in the Phase II rule, benefits are directly attributable to reductions in impingement mortality and entrainment at the existing cooling water intake structure and do not account for improvements in the water body that may result from the operation of a cooling water system. In addition, the Regional Board staff does not believe these "benefits" can be considered because of the following:

1. The intake canal is not part of the source water body but rather is part of the cooling water intake structure. The intake canal does not exhibit bi-directional flow that might carry or allow organisms to return to Alamitos Bay; free-floating organisms are likely to interact with the intake screens and/or condenser at some point.
2. LADWP must demonstrate original intent behind the construction of the intake canal and any resulting "restoration" or "benefit". The Phase II Rule does not account for ancillary benefits that may result from the operation of the existing cooling water intake structure. Instead, LADWP must provide documentation outlining plans for restoration activities in the intake canal that occurred prior to the institution of the restoration measures.
3. In addition to documenting original intent, LADWP must provide information detailing ongoing maintenance, enhancement, and evaluation activities undertaken in support of the goals of the restoration project, preferably in consultation with the appropriate state resource agency.

Section 4.1.2 Existing Design Modifications Providing a Fish Protection Benefit (HnGS)

LADWP notes that HnGS replaced Units 3 and 4 with the new Unit 8 Heat Recovery Steam Generator and specifically states "the decision was made to reduce the overall cooling water flow." The Regional Board staff requests additional information regarding the planning and installation of the new system with specific regard to dates, stated intention regarding flow reduction, and primacy designations for all generating units.

As with the discussion in Section 4.1.1, above, USEPA has regarded documentation of "original intent" essential when evaluating credits for measures undertaken that may be applicable to the performance standards. USEPA has not formalized a cutoff date for when such modifications may be eligible but is considering adoption of such a standard. Additional implementation guidance about this topic is currently being deliberated by USEPA.

Section 4.2 Use of Restoration Under Compliance Alternative 3 (HnGS)

Please see comments for *Section 1.0 Executive Summary*, above.

On page 4-2 LADWP states "LADWP views restoration as a preferred method for meeting the entrainment reduction performance standard..." This statement again appears to reflect a pre-determination as to the compliance strategy ultimately adopted by SGS. The 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. Assumptions made by LADWP as to the

relative environmental benefits of restoration compared to technological or operational measures are unsupported by information submitted in the PIC.

On page 4-3, LADWP states "the analysis of IM&E data described in Appendix A 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 LADWP, 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 2.0 Introduction,* above, regarding the topic of minimum levels in performance standard ranges.

Section 4.3 Use of Fish Protection Technologies and/or Operational Measures under Compliance Alternatives 3, 4, and 5 (HnGS)

On page 4-4, LADWP states "In the event that use of restoration measures is not available to offset IM&E losses, the following technologies (including fine-mesh Ristroph traveling screens) 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. The Phase II rule requires that any restoration plan proposed as a component of a compliance strategy must contain "a demonstration to the Director that you have evaluated the use of design and construction technologies and/or operational measures for your facility and an explanation of how you determined that restoration would be more feasible, cost-effective, or environmental desirable…". The Regional Board staff believes all feasible technologies discussed in Section 4.3, as well as additional measures, should be evaluated without regard to the availability of restoration as a compliance option.

Section 4.3.1 Fine-Mesh Ristroph Traveling Water Screens (HnGS)

The Regional Board staff agrees that fine-mesh Ristroph traveling screens should be evaluated for use at HnGS. LADWP states on page 4-5, "However, due to their very high costs, LADWP does not plan to initiate such studies until it is determined that the restoration option is not available". Evaluations of technologies or operational measures (excluding restoration) must be conducted for feasibility as part of the overall compliance strategy whether or not restoration is available.

The Regional Board staff notes that the effectiveness of such systems has varied from facility to facility and can be dependent on adjustments that tailor the operation to the local conditions. Therefore, the Regional Board staff 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, etc.). In addition to the study elements presented by LADWP, the 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.

Section 4.3.2 Coarse Mesh Ristroph Traveling Screens (HnGS)

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

Section 4.3.3 Install Modular Inclined Screens (HnGS)

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

4.3.4 Use of Design Measures as a Part of a Repowering Project For Units 5 and 6 (HnGS)

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

4.3.5 Use of Pilot Studies (HnGS)

The Regional Board staff is not certain of the role pilot studies are intended to play in an overall compliance strategy for HnGS. Additional information is requested from LADWP to detail any potential pilot studies and the technologies and/or operational measures to be evaluated. It is unclear if "pilot studies" used in this context is meant to be synonymous with the Verification Monitoring Plan that is part of the CDS.

4.3.6 Use of Operational Measures (HnGS)

On page 4-10, LADWP states, "[i]f use of restoration measures is not available, LADWP will also consider reducing flow on a diel or seasonal basis." As noted above, measures other than restoration are the preferred method for complying for the Phase II rule. All technologies and operational measures must be evaluated for their feasibility in meeting the performance standards prior to the incorporation of restoration into the compliance strategy. Any flow reduction credits granted to HnGS must be construed in such a way as to be sufficiently protective, in whole or in part, of the affected waterbody and perform as intended while recognizing the variability in generation needs of HnGS.

Section 4.4 Use of an Approved Technology under Compliance Alternative 4 (HnGS)

The 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. The Regional Board staff also supports cooperative efforts among dischargers subject to the Phase II rule in evaluating different technologies.

Technologies and/or Operational Measures Not Discussed

The 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 4.0 Compliance Alternatives to be Evaluated (HGS)

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

Section 4.1 Taking Credit for Existing Use of Fish Protection Technologies and Operational Measures (HGS)

LADWP proposes to evaluate HGS existing configuration of offshore intakes with submerged screens to determine what, if any, reductions in impingement mortality and entrainment may be gained by the current configuration when compared to the baseline configuration discussed in the Phase II rule. In addition, LADWP proposes to evaluate potential credit achieved through the use of closed-cycle cooling for Units 10-14, which are simple cycle gas turbines.

The Regional Board staff notes the potential for impingement mortality and entrainment reduction credits through the use of flow reduction, but requests additional information regarding the operation of Units 10-14 to support any eventual determination of credit. Specifically, the Regional Board staff requests capacity utilization data for Units 10-14 as well as primacy designations for all generating units at HGS, i.e. which units are put into service first when demand warrants. Full credit may not be warranted when closed cycle systems are used infrequently. The Regional Board staff also requests information regarding the source of make-up water used in the closed cycle system. No details are provided by LADWP.

Section 4.2 Use of Restoration Under Compliance Alternative 3 (HGS)

Please see comments for *Section 1.0 Executive Summary*, above.

On page 4-2 LADWP states “LADWP views restoration as a preferred method for meeting the entrainment reduction performance standard...” This statement again appears to reflect a pre-determination as to the compliance strategy ultimately adopted by SGS. The 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. Assumptions made by LADWP as to the relative environmental benefits of restoration compared to technological or operational measures are unsupported by information submitted in the PIC.

On page 4-2, LADWP states “the analysis of IM&E data described in Appendix A 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 LADWP, 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 2.0 Introduction,* above, regarding the topic of minimum levels in performance standard ranges.

Section 4.3 Use of Fish Protection Technologies and/or Operational Measures under Compliance Alternatives 3, 4, and 5 (HGS)

On page 4-4, LADWP states "In the event that use of restoration measures is not available to offset IM&E losses, the following technologies (including fine-mesh Ristroph traveling screens) 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. The Phase II rule requires that any restoration plan proposed as a component of a compliance strategy must contain "a demonstration to the Director that you have evaluated the use of design and construction technologies and/or operational measures for your facility and an explanation of how you determined that restoration would be more feasible, cost-effective, or environmental desirable…". The Regional Board staff believes all feasible technologies discussed in Section 4.3, as well as additional measures, should be evaluated without regard to the availability of restoration as a compliance option.

Section 4.3.1 Reduce Maximum Through Screen Velocity to Less Than 0.5 fps (HGS)

LADWP notes that several screens at the intake structure are currently not operational. The use of these additional screens at the current intake flow volume may reduce the through screen velocity to 0.5 fps or less, thereby enabling impingement mortality compliance through Compliance Alternative 1. The Regional Board staff supports the evaluation of operational measures such as these. The Regional Board staff requests that if through screen velocities can be reduced, additional data be submitted documenting the range of through screen velocities observed under extreme conditions (e.g., low and high tides, high debris events) in order to ensure the desired velocities can be maintained.

Section 4.3.2 Fine-Mesh Ristroph Traveling Water Screens (HGS)

The Regional Board staff agrees that fine-mesh Ristroph traveling screens should be evaluated for use at HGS. LADWP states on page 4-5, "However, due to their very high costs, LADWP does not plan to initiate such studies until it is determined that the restoration option is not available". Evaluations of technologies or operational measures (excluding restoration) must be conducted for feasibility as part of the overall compliance strategy whether or not restoration is available. The Regional Board staff notes that the effectiveness of such systems has varied from facility to facility and can be dependent on adjustments that tailor the operation to the local conditions. Therefore, the Regional Board staff 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, etc.). In addition to the study elements presented by LADWP, the 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.

Section 4.3.2 Use of Pilot Studies (HGS)

The Regional Board staff is not certain of the role pilot studies are intended to play in an overall compliance strategy for HGS. Additional information is requested from LADWP to detail any potential pilot studies and the technologies and/or operational measures to be evaluated. It is unclear if "pilot studies" used in this context is meant to be synonymous with the Verification Monitoring Plan that is part of the CDS.

Section 4.3.3 Use of Operational Measures (HGS)

On page 4-8, LADWP states, "[i]f use of restoration measures is not available, LADWP will also consider reducing flow on a diel or seasonal basis." As noted above, measures other than restoration are the preferred method for complying for the Phase II rule. All technologies and operational measures must be evaluated for their feasibility in meeting the performance standards prior to the incorporation of restoration into the compliance strategy. Any flow reduction credits granted to HGS must be construed in such a way as to be sufficiently protective, in whole or in part, of the affected waterbody and perform as intended while recognizing the variability in generation needs of HGS.

Section 4.4 Use of an Approved Technology under Compliance Alternative 4 (HGS)

The 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. The Regional Board staff also supports cooperative efforts among dischargers subject to the Phase II rule in evaluating different technologies.

Technologies and/or Operational Measures Not Discussed

The 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.

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

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

Appendix A Section 2.0 Historical Physical and Biological Studies (SGS)

Impingement Mortality and Entrainment (IM&E) studies were conducted between October 1978 and November 1979 at SGS. This study included only limited impingement sampling and collected both fish larvae and eggs in source water population sampling. The calculations of adult equivalent loss estimates presented in Table 2-1 indicate that calculations made based on fish eggs and fish larvae yield substantially different numbers. The use of (and different results obtained from) collection and processing of fish eggs in this study conflicts with LADWP's

current sampling plan that excludes the consideration of fish eggs. Relatively high impingement numbers are listed in Table 2-2 for three of four designated critical taxa (no abundance value was available for the fourth species).

Additional heat-treatment impingement studies were conducted between 1989 and 1995. The average annual impingement of the ten most abundant fish during this period cited in Table 2-3 ranged from 569 to 11,862. The total average annual abundance of the ten most abundant fish during this period was 34,149. These values appear to have increased between the period of 1999 to 2004, as the total abundance of impinged fish ranges from 29,711 to 369,577 during this period.

No quality assurance/quality control (QA/QC) data were provided with either of these two studies. Additionally, given the apparent increases in impingement abundances, it is unclear how the historic data may be representative of current conditions. Both QA/QC information and an indication of the relevance of historic data to current conditions should be included in the CDS if these data are to be used.

Appendix A Section 3.0 Proposed New Biological Studies (SGS)

The sampling program proposed for the new impingement and entrainment monitoring studies described in Section 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. For the purposes of this study, LADWP defines shellfish as “commercially and recreationally important species of crustaceans (crabs, lobsters, shrimp, etc.) and mollusks (clams, squid, and octopus) that are currently being harvested on a regular basis from the coastal areas surrounding the SGS. This would not include organisms such as clams, mussels, and other crustaceans and mollusks that may only be harvested occasionally for recreational purposes”. The 316(b) Phase II Rule specifically requires that the “Impingement Mortality and Entrainment characterization must include the following (1) Taxonomic identification 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 cooling water intake structures(s) and are susceptible to impingement and entrainment…” It is not clear how LADWP’s definition of shellfish will satisfy the requirements of the rule.

   The proposed study plan states that “shellfishes and other macroinvertebrates will be identified to species and their presence recorded, but they are not measured or weighed”. If all shellfish and other macroinvertebrates are to be identified and their

presence recorded, simply counting the number of each individual in each sample constitutes very little additional work. As written, it is unclear whether or not the study plan satisfies the requirements set forth by the 316(b) Phase II Rule for information required in the CDS.

3. The impingement sampling plan states that if an "extreme event" occurs (defined as greater than 200 fish and/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, a longer sample period should be used to adequately characterize actual impingement rates.

4. 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.

5. 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.

6. 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.

7. 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.

8. The impingement study plans to identify all macroinvertebrates but not count them. If organisms are individually identified, then enumerating them is not difficult and the sampling plan should be modified to include identification and enumeration of all organisms.

9. Larvae of shellfish are not proposed to be sampled under this entrainment and source water sampling plan. There is no discussion of why the techniques and methods planned will not sample larval shellfish. Sampling of all life stages is required under the Rule.

10. 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.

11. Entrainment sampling is planned in the proximity of the intake canal. More information on why sampling can not be conducted inside the unit should be provided.

12. Impingement and entrainment studies should include enumeration and identification of all collected fish 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 cooling water intake structures(s) and are susceptible to impingement and entrainment".

Appendix A Section 4.0 Analytical Methods (SGS)

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 of 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 the 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 A. Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Plan (HnGS)

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

Appendix A Section 2.0 Historical Physical and Biological Studies (HnGS)

An impingement mortality and entrainment (IM&E) study was conducted at HnGS from October 1978 through November 1979. Additionally, twice yearly impingement sampling was conducted between 2000 and 2004, and ichthyoplankton sampling was conducted during April and May 2004, in the vicinity of the intake. The results of these studies are discussed in Appendix A.

The IM&E study conducted in 1978-1979 included consideration of fish eggs. Table 2-1 from Appendix A indicates that some fish collected as eggs were not collected as larvae (e.g., *Anchoa sp.*), which seems to conflict with LADWP's current sampling plan that excludes the consideration of fish eggs. Also, the most abundant macroinvertebrates collected and identified in the 2000-2004 impingement monitoring studies (e.g., *Pyromaia tuberculata* and *Crucibulum spinosum*) are not proposed to be included in the current study. It is unclear why these species (that were collected previously and found to be abundant) are not included in the proposed new study plans.

For both the 1978-1979 and 2000-2004 impingement monitoring, no quality assurance/quality control (QA/QC) information is included with these data and no indication is given as to whether or not the presented data are representative of current conditions. Such information must be included if these data are to be used in the CDS. LADWP states that appropriate QA/QC measures were taken in taxonomic identification of collected individuals collected during the 2004 larval characterization study. Supporting documentation should be included if such data are to be included in the CDS.

Appendix A Section 3.0 Proposed New Biological Studies (HnGS)

The sampling program proposed for the new impingement and entrainment monitoring studies described in Section 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. For the purposes of this study, LADWP defines shellfish as "commercially and recreationally important species of crustaceans (crabs, lobsters, shrimp, etc.) and mollusks (clams, squid, and octopus) that are currently being harvested on a regular basis from the coastal areas surrounding the HnGS. This would not include organisms such as clams, mussels, and other crustaceans and mollusks that may only be harvested occasionally for recreational purposes". The 316(b) Phase II Rule specifically requires that the "Impingement Mortality and Entrainment characterization must include the following (1) Taxonomic identification 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 cooling water intake structures(s) and are susceptible to impingement and entrainment…" It is not clear how LADWP's definition of shellfish will satisfy the requirements of the rule.

The proposed study plan states that "shellfishes and other macroinvertebrates will be identified to species and their presence recorded, but they are not measured or enumerated". If all shellfish and other macroinvertebrates are to be identified and their presence recorded, counting the number of each individual in each sample constitutes very little additional work. As written, it is unclear whether or not the study plan satisfies the requirements set forth by the 316(b) Phase II Rule for information required in the CDS.

3. The impingement sampling plan states that if an "extreme event" occurs (defined as 100 fish or 200 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, a longer sample period should be used to adequately characterize actual impingement rates.

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

5. 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.

6. The QC program for the field sampling is only proposed to be applied quarterly. We believe QC checks should occur at program commencement and then, (as with the processing and analysis protocols) if the procedures and samples regularly pass inspections, QC monitoring can decline incrementally to the minimum frequency of quarterly.

7. The impingement study plans to identify all macroinvertebrates but not count them. If organisms are individually identified, then enumerating them is not difficult and the sampling plan should be modified to include identification and enumeration off all organisms.

8. Larvae of shellfish are not be sampled under this entrainment and source water sampling plan. There is no discussion of why the techniques and methods planned will not sample larval shellfish. Sampling of all life stages is required under the Rule.

9. 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.

10. Entrainment sampling is planned in the proximity of the intake canal. More information on why sampling can not be conducted inside the unit should be provided.

11. Impingement and entrainment studies should include enumeration and identification of all collected fish 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 cooling water intake structures(s) and are susceptible to impingement and entrainment".

Appendix A Section 4.0 Analytical Methods (HnGS)

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 of 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 the 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 A. Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Plan

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

Section 2.0 Historical Physical and Biological Studies

The summary of historical studies documents frequent impingement and entrainment of fishes from Inner Los Angeles HGS during the 1978-1979 study. This study, however, was not conducted under current flow conditions and focused on only pre-selected targeted (or "critical") species, rather than all species of fish and shellfishes impinged or entrained. The entrainment study conducted in 1978-1979 included consideration of fish eggs. Table 2-1 from Appendix A indicates that some fish collected as eggs were not collected as larvae (e.g., *Engraulis mordax*.), which seems to conflict with LADWP's current sampling plan that excludes the consideration of fish eggs. Also, there is no description of QA/QC protocols employed in these studies. An updated study conducted in 1997 (Section 2.2) did not involve the collection of additional biological data. All of these issues would preclude the use of these data for setting any current reduction standards or performance criteria.

Sections 3.0 Proposed New Biological Studies

The sampling program proposed for the new impingement and entrainment monitoring studies described in Section 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. For the purposes of this study, LADWP defines shellfish as "commercially and recreationally important species of crustaceans (crabs, lobsters, shrimp, etc.) and mollusks (clams, squid, and octopus) that are currently being harvested on a regular basis from the coastal areas surrounding the HGS. This would not include organisms such as clams, mussels, and other crustaceans and mollusks that may only be harvested occasionally for recreational purposes". The 316(b) Phase II Rule specifically requires that the "Impingement Mortality and Entrainment characterization must include the following (1) Taxonomic identification 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 cooling water intake structures(s) and are susceptible to impingement and entrainment…" It is not clear how LADWP's definition of shellfish will satisfy the requirements of the rule.

   The proposed study plan states that "shellfishes and other macroinvertebrates will be identified to species and their presence recorded, but they are not measured or weighed". If all shellfish and other macroinvertebrates are to be identified and their presence recorded, simply counting the number of each individual in each sample constitutes very little additional work. As written, it is unclear whether or not the study

plan satisfies the requirements set forth by the 316(b) Phase II Rule for information required in the CDS.

3. The impingement sampling plan states that if an "extreme event" occurs (defined as 100 fish or 200 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, a longer sample period should be used to adequately characterize actual impingement rates.

4. 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.

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

6. The impingement study plans to identify all macroinvertebrates but not count them. If organisms are individually identified, then enumerating them is not difficult and the sampling plan should be modified to include identification and enumeration off all organisms.

7. Larvae of shellfish are not be sampled under this entrainment and source water sampling plan. There is no discussion of why the techniques and methods planned will not sample larval shellfish. Sampling of all life stages is required under the Rule.

8. 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. Entrainment sampling is planned in the proximity of the intake canal. More information on why sampling can not be conducted inside the unit should be provided.

10. Impingement and entrainment studies should include enumeration and identification of all collected fish 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 cooling water intake structures(s) and are susceptible to impingement and entrainment".

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 of all collected organisms. Where appropriate and as indicated in the sampling design, collections 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 the 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. Finally, any estimates of entrained organisms should include measures of variability around that estimate. Such measures should take into account not only confidence intervals associated with the models used, but also that associated with the collection methods.

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

Sincerely,

ORIGINAL SIGNED BY

Jonathan S. Bishop
Executive Officer

Cc: Mailing List

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