California Regional Water Quality Control Board
Los Angeles Region

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March 8, 2007

Mr. R.W. Lawhn
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COMMENTS ON REVISED POPOSAL FOR INFORMATION COLLECTION AND IMPINGEMENT MORTALITY AND ENTRAINMENT STUDY SAMPLING PLAN FOR RELIANT ENERGY MANDALAY GENERATING STATION, OXNARD, CA NPDES PERMIT NO. CA0000180, CI-2093

Dear Mr. Lawhn:

Reference is made to the Revised Phase II 316(b) Proposal for Information Collection (PIC) and Impingement Mortality and Entrainment (IM&E) Characterization Study Sampling Plan (Sampling Plan) submitted by Reliant Energy (Reliant) for its Mandalay Generating Station (Mandalay), dated November 2006, and prepared by ENSR International.

The California Water Quality Control Board, Los Angeles Region (Regional Board) staff reviewed your 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. We have the following comments:

GENERAL COMMENTS

1. The revised PIC and IM&E has been modified to incorporate many of the recommendations proposed by Regional Board staff. However, numerous comments made in the Regional Board's letter of March 3, 2006, have not been addressed – specifically those relating to baseline calculations and credits.
2. Satisfactory modifications have been made to the discussion of the zone of influence.
3. Reliant has expanded the discussion of historical studies to include information pertaining to the relevance and suitability of these studies to Mandalay.
4. The revised PIC is not well organized and occasionally lacks internal consistency. As was the case with the original 2005 PIC, the revised 2006 PIC contains numerous instances of unsupported claims (e.g., technology cost), specious calculations (e.g., IM/E

reduction credits), and premature discussions of compliance (e.g., baseline calculations). These issues cannot be addressed satisfactorily until the State Board and Regional Board have formulated policies with respect to once-through cooling and are better suited for discussion in the Comprehensive Demonstration Study (CDS), when a comprehensive set of monitoring data will be available for review. Some of the assumptions asserted by Reliant in the revised PIC might unreasonably narrow the focus of the compliance options to be evaluated as part of the CDS. Regional Board staff recommends that Reliant incorporate contingencies into the revised 2006 PIC that would allow it to address stricter requirements, if necessary.

SPECIFIC COMMENTS

Executive Summary

Our comments on issues raised in the Executive Summary are addressed below in their relevant sections.

1.0 - Introduction

Page 1-2 of the revised 2006 PIC states that the Phase II rule allows flexibility in assessing compliance by granting the Director "the ability to discount 'unavoidable, episodic impingement or entrainment events' in the assessment of performance." The Regional Board has not yet determined how it intends to address compliance when a facility experiences an unavoidable entrainment or impingement event. However, adequate assessment of normal impingement rates, including known episodic events, is an essential requirement of the CDS. Robust and accurate data will help support any future claim that such episodic events are "unusual" for the Mandalay facility.

Our comments on other issues raised in the Introduction are addressed below in their relevant sections.

2.0 – Cooling Water Intake Structure

The original 2005 PIC presented conflicting or contradictory information pertaining to the location and extent of the cooling water intake structure (CWIS). Reliant has added a section (Section 2.0) to the revised 2006 PIC in an attempt to define and describe the CWIS. The revised PIC states (page 2-1) that "Due to the location of Mandalay at the end of Channel Islands Harbor/Edison Canal complex, the definition of Mandalay's CWIS is ambiguous."

Regional Board staff acknowledges that the definition and delineation of the CWIS for Mandalay presents a challenge, given that the original constructed water body (Edison Canal) has been

altered substantially by the subsequent creation of Channel Islands Harbor. Our interpretation of the Phase II CWIS definition would appear to include the portion of Edison Canal that extends northward from Channel Islands Harbor to the Mandalay facility. However, this definition of the CWIS should be considered tentative pending final consultations with USEPA.

In addition, the definition of the CWIS and its relationship to potential compliance is inconsistent throughout the revised 2006 PIC. Page 1-5 of the revised PIC states that the CWIS incorporates Edison Canal, which begins "approximately 2.3 miles from the mouth of Channel Islands Harbor and a small embayment at the end of the canal" up to and including the intake screens. However, the revised PIC also states that this configuration provides a substantial buffer from the habitat of the Pacific Ocean and likely results in lower IM/E rates than would occur if the CWIS withdrew directly from the shoreline of the ocean itself. Reliant appears to be referring to the Phase II rule definition of a baseline CWIS, which considers an intake structure that is located at the surface and flush with the shoreline of the source water to be "baseline" among other specifications. Any deviation from this configuration might provide IM/E reductions, but this would need to be demonstrated satisfactorily for the Mandalay facility. The revised PIC also claims that the baseline condition relevant to Mandalay is a shoreline structure on the Pacific Ocean near the mouth of Channel Islands Harbor. However, the definition presented above, and again in Section 2.0, does not allow for this baseline adjustment. If the CWIS is defined to begin at a point 2.3 miles from the mouth of Channel Islands Harbor, any baseline adjustment must consider Channel Islands Harbor to be the source water, rather than the Pacific Ocean.

Section 5.3.2 again presents conflicting CWIS definitions, first stating that "the beginning of the Edison Canal is considered the point at which water is withdrawn from the surface water source", but then stating in the next paragraph that "an intake at this location would withdraw water from the Pacific Ocean at a location along the shoreline." This discussion is inconsistent with the CWIS definition presented in Section 2.0, which equated the beginning of the Edison Canal with the beginning of the CWIS.

Section 4.3.1.1 of the revised PIC asserts that Channel Islands Harbor acts as a buffer between the CWIS and the Pacific Ocean without any justification as to why "isolation from the Pacific Ocean" is applicable. Reliant claims that this isolation will reduce IM/E impacts by 40% and 30%, respectively. This claim is not substantiated by any referenced data and cannot serve as the basis for any baseline assumptions until a robust analysis is conducted and accepted by the Regional Board. Further, as noted above, any inclusion of "isolation" from the Pacific Ocean would be dependent on the final definition of the CWIS. If the beginning of the CWIS is defined as the beginning of the Edison Canal at a point 2.3 miles north of Channel Islands Harbor entrance, such comparisons would be irrelevant.

3.0 – Source Water Body Information

In the original 2005 PIC, the zone of hydraulic influence was identified as the Edison Canal and Channel Islands Harbor; however, no documentation was provided nor were any assumptions discussed. Section 3.2 of the revised 2006 PIC presents three potential approaches for estimating the area of influence. Reliant has chosen to consider the "hydraulic behavior of the CWIS and define a location in the source water at which the CWIS-induced velocity becomes inconsequential." This approach is consistent with a theoretical basis for determining the area of influence as described in a letter from the Regional Board to AES Southland dated January 24, 2006.

Reliant calculated its area of influence estimates by using two different flow thresholds (page 3-3). When the Regional Board's "default" approach was applied, Reliant concluded "at a three mile radius, the velocity induced by the CWIS is less than 0.01% of the intake velocity." Using a second approach (i.e., assuming that the zone of hydraulic influence is the area in which the water velocity induced by the intake exceeds the ambient velocity), Reliant found that the zone of hydraulic influence includes all of Channel Islands Harbor and the area inshore of the breakwater (Figure 3-2). The revised PIC states (on page 3-3) that "Reliant has proposed to perform sampling for entrainment at various locations within the Harbor/Canal complex and this data will be evaluated relative to both calculated areas of influence." It is assumed that this is an incorrect statement and that entrainment sampling will be conducted in the CWIS (not at "various locations in the Harbor/Canal complex"). The sampling plan (Appendix D) appears to confirm that entrainment sampling will be conducted in the Edison Canal, immediately upstream of the removable screens.

4.0 – Technologies and Operational Measures

As was the case with our review of the original 2005 PIC, Regional Board staff did not evaluate in detail the claims made in the revised 2006 PIC with respect to the effectiveness of any particular technology or operational measure at the Mandalay facility. This analysis is more appropriate as a component of the CDS. The PIC should serve simply as a preliminary screening of technologies that might be feasible and appropriate, thus warranting the more detailed of the CDS.

Comments relating to baseline calculation and credits against this baseline, as well as the definition of the CWIS, are integral to Reliant's PIC in that the assumptions made therein influence the methods and technologies discussed as compliance options. Reliant acknowledges this by stating "at this point this assessment [of baseline conditions] can only be made based on professional judgment but this assessment is still valuable as a tool to focus the nature of the CDS investigation." Regional Board staff agrees that the assessments are preliminary, but we

disagree that they serve to focus the CDS investigation. In our opinion, these assessments may serve to narrow the scope of the CDS to an undesirable extent.

For example, Table 4-2 of the revised PIC incorporates the assumed 25% reduction associated with the operation of Unit 3 and the assumed benefit of Channel Islands Harbor as a buffer and asserts that impingement mortality and entrainment have been "significantly reduced" by 55% and 48%, respectively. If accepted, these reductions would indicate only incremental measures would be necessary to achieve regulatory compliance, and might not justify the higher cost of more complex compliance measures such as closed-cycle cooling. However, Regional Board staff has not evaluated these contentions and it would be premature and unwise to limit the analysis of compliance alternatives to exclude more complex measures.

As another example, Section 4.2.1.2 of the revised PIC states that Unit 3 does not use ocean water for cooling and that this can be considered a reduction in overall cooling water flow. Page 1-5 states that "Unit 3 is a combustion turbine that does not use sea water for cooling. This configuration results in a reduction in cooling water flow relative to open cycle cooling of approximately 25% from the total hypothetical cooling water flow. This reduction can be attributed directly to both of the performance goals." Reliant has calculated the 25% reduction in cooling water by estimating the cooling water used per megawatt generated at Units 1 and 2 and multiplying the generation of Unit 3 by this factor. The comparison of the combustion turbine to the steam-fired units disregards the substantially different mechanisms of generation used by each and is inappropriate to determine a reduced flow credit, in any is in fact warranted. USEPA has indicated that comparisons of flow reductions between different generating units are valid only when the operating mechanism is the same. At Mandalay, Units 1 and 2 are steam-fired turbines, while Unit 3 is a gas-fired combustion turbine, so the comparison is not valid. Furthermore, Reliant claims that the operation of Unit 3 represents a "reduction in cooling water flows" without offering supporting evidence that this is an actual reduction. There is no indication that Unit 3 replaced a once-through cooled unit or consistently supplants a portion of the overall generation at the facility to reduce the cooling water flow.

In general, where feasibility and potential effectiveness of different technologies and operational measures are discussed in the revised PIC, cost appears to be the primary basis for exclusion or inclusion in the CDS analysis. Table 4-3 evaluates each technology or operational measure in part by assessing whether costs are significantly greater than the USEPA estimate. Any discussion of estimated cost in the revised PIC is inappropriate; these evaluations should be conducted in the CDS and supported by detailed cost estimates, rather than simply by cost factors (e.g., as presented on page 4-9). Feasibility and effectiveness of a given technology or operational measure should serve as the primary basis for further study, rather than cost.

Evaporative cooling towers also were eliminated from further consideration because of expected costs and other environmental issues (e.g., consumptive use, salt drift, aesthetic impacts). As

with other technologies, feasibility and effectiveness should form the basis for evaluation in the revised PIC, not cost. Unreasonable or "significantly greater" cost may serve as a basis for excluding a particular technology in the CDS, but true costs cannot be known or evaluated until and detailed review is completed and supporting documentation is presented. Furthermore, it is possible that environmental issues can be addressed effectively through technology modifications.

5.0 – Historical Study Review

The original 2005 PIC did not provide sufficient information to evaluate the suitability of historic studies and/or the proposed new studies to satisfy the requirements of the CDS. The revised 2006 PIC includes a discussion of data sufficiency (Section 5.3), and proposes to supplement historic IM&E data with new, site-specific data. All data submitted as part of the CDS should include a detailed discussion of the relevance of historical analyses to the present operations of the Mandalay CWIS, as well as detailed information on the specific sample methods and quality assurance/quality control (QA/QC) protocols applied to both new and historic studies.

Section 5.2 of the revised PIC contains a discussion of historic impingement and entrainment rates at Mandalay. The third paragraph of this discussion indicates that the historic studies used "standard sampling and analysis techniques that are appropriate for quantifying impingement and entrainment under the Rule." Additionally, this paragraph states that "these data are expected to be useful within the context of the Rule ..." For Regional Board staff to substantiate these statements, complete information on sampling methods, data analysis techniques (where appropriate), QA/QC procedures, and a discussion of relevance to the area under the influence of the Mandalay CWIS should be included in the CDS.

Section 5.2 of the revised PIC presents a bulleted list of assertions regarding IM/E rates, as well as fish and shellfish communities that Reliant believes are subject to impingement or entrainment by Mandalay. Reliant indicates that "original demonstrations in 1983 concluded that the operation of the CWIS did not result in an Adverse Environmental Impact (AEI) on the fisheries in the vicinity." However, Regional Board staff does not believe that conclusions with respect to AEI made in 1983 will be relevant in the context of current Phase II implementation and compliance.

Page 5-10 of the revised PIC states that "it is likely that the rate of impingement of shoreline species is reduced by the CWIS location relative to the calculation of baseline condition. Similarly, more harbor-dwelling organisms might be expected to be impinged." As discussed above, it is assumed that the data collected as part of the proposed new sampling (PIC Section 8) will be used to support or refute these expectations or assumptions. Of course, the relevance of the comparison will be dependent on the final definition of the CWIS.

The original 2005 PIC concluded that "[the] collection of ambient data in order to define the differences between the current CWIS and the calculation baseline is not likely to be productive." However, in the revised 2006 PIC, Reliant proposes to collect monthly ambient ichthyoplankton samples for six months to define the differences between the current CWIS and the Calculation Baseline more clearly. Regional Board staff agrees that the collection of new data is warranted.

The original 2005 PIC stated (on page 4-10) that "Reliant has not collected a substantial amount of physical or water quality data and does not anticipate that these data will be critical to the execution of the CDS." Sufficient detail was not provided in the 2005 PIC to allow us to determine whether the existing data serve to adequately characterize the source water body, zone of hydraulic influence or the CWIS. The revised 2006 PIC includes a more detailed description of the CWIS and zone of hydraulic influence, and proposes (on page 5-11) to collect some additional water quality data (i.e., dissolved oxygen, temperature, salinity and pH) as part of the ichthyoplankton sampling program (presumably during impingement, entrainment and ambient sampling events).

6.0 – Agency Consultations

Section 6.1 of the revised PIC states that "we [Reliant] believe that the NPDES agency generally concurred with the conclusion that no Adverse Environmental Impacts were being caused by the CWIS at the plant." As noted above, Regional Board staff does not believe that previous assessments of AEI made prior to the adoption of the Phase II rule will be relevant, unless documentation of the previous assessment conforms to the requirements of the Phase II rule and the data is presented for review. The revised PIC also states that communications with various agencies "have indicated that there are no state or federally listed species in the vicinity of the CWIS and therefore no potential impacts to protected species." Records of such communications should be supported by documentation (e.g., agency contacts and dates of consultations, written responses).

7.0 – Proposed Compliance Approach

No comments.

8.0 – Proposed Sampling Plan

The original 2005 PIC indicated that no data are available for use in characterizing the fish and shellfish in the vicinity of the CWIS, and Reliant proposed "not to perform sampling of ambient populations of ichthyoplankton or adults." In the revised 2006 PIC, Reliant has proposed to collect monthly ambient ichthyoplankton samples for six months (refer to section 9.3 – Ambient Sampling Plan). Text in Section 8.3 indicates that samples will be collected from two locations, and references Figure D-1; however, it appears that the figure was omitted from Appendix D.

In the original 2005 PIC, Reliant proposed to collect monthly entrainment samples. The sampling frequency has been changed in the revised 2006 PIC to "twice monthly". Because the available entrainment data is limited, and since the populations of ichthyoplankton vary greatly both spatially and temporally, Regional Board staff believes that weekly or bi-weekly (when the plant is in operation) sampling would be more appropriate. The revised PIC has increased the diurnal frequency of sample collection (to four 6-hour samples over the 24-hour sampling period), and has improved the completeness of sampling and subsampling procedure descriptions.

Appendix A – Technology Review

Regional Board staff has not reviewed the claims made in this appendix in detail. We will reserve our analysis for the CDS.

Appendix B – Review of Pacific Ocean Fisheries

This appendix includes the same bulleted list presented in Section 5.2. The comments provided above for Section 5.2 also apply here.

Page B-8 (Section 3.0) of the revised 2006 PIC indicates that identification of fish and shellfish potentially affected by impingement and entrainment will focus on those species that are "likely to dominate impingement and entrainment" and will provide special focus on those of commercial or recreational importance. The Phase II rule does not allow for a limited focus with respect to the fish and shellfish subject to impingement and entrainment, but rather requires that all fish and shellfish be included, unless specified by the Director.

The revised PIC indicates (in Section 5.3.1) that "good Quality Assurance/Quality Control Practices" are provided in Appendix B. Appendix B implies (on page B-47) that data quality is ensured by adherence to Standard Operating Practices and maintaining consistency in the contractors used to collect the IM&E data. Adherence to approved SOPs is extremely important, but it does not constitute a complete QA/QC program. The complete QA/QC Plan (and any additions or revisions to the QA/QC summary in Appendix D) should be included in the CDS.

Page B-45 (Section 5.2.3.2) of the revised PIC suggests that the location of the CWIS is a protective measure and a deviation from the baseline. Reliant also states that "the species composition of impinged fishes at Mandalay differs greatly from the fish species composition found in the nearshore habitat offshore of Mandalay", and that "the ichthyoplankton species entrained at Mandalay would be different from those seen offshore of the facility." The revised PIC includes an additional statement that notes that Reliant acknowledges that these are suppositions, and that they will be "re-evaluated" using data collected during the new, proposed

sampling events (described in Appendix D). Regional Board staff will rely upon data, rather than suppositions, during review of the CDS.

Appendix D – Sampling Plan

Page D-13 of the revised 2006 PIC states that "All biological sampling will be conducted in accordance with the QA/QC Plan" and it appears that QA/QC procedures are outlined in Appendix D (Section D.3). The complete QA/QC Plan (and any additions or revisions to the QA/QC summary in Appendix D) should be included in the CDS.

Elements of the proposed sampling plan are somewhat inconsistent with those proposed by similar coastal generating facilities elsewhere in the Southern California Bight. As required by the Phase II Rule, the methods proposed in the PIC are to "take into account the methods used in other studies performed in the source water body. Also, the methods must be consistent with any methods required by the Director." The original PIC proposed an IM/E sampling frequency of "approximately monthly". The revised 2006 PIC has proposed adjusting the sample frequency to "twice monthly" for entrainment sampling and "twice monthly, as plant operations allow, during normal operation" for impingement sampling. The revised PIC (page B-43) notes that "impingement at Mandalay is highly episodic." Regional Board staff believes it would be advisable to change the proposed impingement sampling frequency to weekly to more adequately characterize episodic impingement events, as well as to be consistent with sampling programs at other facilities in the area. Failure to adjust the sampling program in this manner may result in the need for additional data collection in the future.

If you have any questions, please contact David Hung at (213) 576-6616 or Michael Lyons at (213) 576-6718.

Sincerely,

Jonathan S. Bishop
Executive Officer

Cc: Mailing List

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