

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

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**TENTATIVE ORDER NO. R9-2009-0038
AMENDING
ORDER NO. R9-2006-0065 (NPDES NO. CA0109223)
WASTE DISCHARGE REQUIREMENTS FOR
THE POSEIDON RESOURCES CORPORATION
CARLSBAD DESALINATION PROJECT
DISCHARGE TO THE PACIFIC OCEAN VIA
THE ENCINA POWER STATION DISCHARGE CHANNEL**

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On August 16, 2006, the Regional Board adopted Order No. R9-2006-0065 (NPDES No. CA0109223) (Order No. R9-2006-0065) establishing waste discharge requirements for Poseidon Resources Corporation (Discharger) to discharge up to 57 million gallons per day (MGD) of a combined waste stream comprised of concentrated saline waste seawater and filter backwash wastewater from the Carlsbad Desalination Project (CDP) into the Pacific Ocean via the Encina Power Station (EPS) cooling water discharge channel. Intake source water from Agua Hedionda Lagoon (AHL) is to be drawn in through the existing EPS intake structure. The total flow rate of source water needed to operate the CDP at full production was determined to be 304 MGD, in order to produce 50 MGD (MGD) of potable water. Of this source water, 107 MGD will be used for the production of 50 MGD of potable water (and 57 MGD of wastewater). The remaining 197 MGD of source water not used for production is needed as dilution water to comply with the salinity requirements of the NPDES Permit. This results in a total discharge flow rate of 254 MGD (57 MGD of wastewater and 197 MGD of dilution water).
2. Section 13142.5(b) of the California Water Code requires new or expanded coastal industrial facilities using seawater for cooling, heating, or industrial processing, to use the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life.
3. Section VI.C.2.e. of Order No. R9-2006-0065 requires Discharger to submit for Regional Board approval, within 180 days of adoption, a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan) that “shall assess the feasibility of site-specific plans, procedures, and practices to be implemented and/or mitigation measures to minimize the impacts to marine organisms when the CDP intake requirements exceed the volume of water being discharged by the EPS.” The Order requires an approved Minimization Plan to ensure that the CDP complies with Section 13142.5(b) of the Water Code when the CDP is co-located with EPS, but CDP’s intake requirements exceed the volume of water being discharged by EPS under power generation operations (“co-

location operation for CDP benefit”). Co-location operation for CDP benefit can occur under conditions: (1) when EPS is temporarily shut down or (2) when EPS is operating but its discharge volume is not sufficient to meet CDP’s intake requirements.

4. If EPS permanently ceases operations and the Discharger proposes to independently operate the existing EPS seawater intake and outfall for the benefit of the CDP (“stand-alone operation”), it will be necessary to evaluate whether, under those conditions, the CDP complies with the requirements of Water Code Section 13142.5(b). Additional review will be necessary in part because under stand-alone operations, the Discharger may have more flexibility in how it accesses the EPS intake structure and outfall, and additional and/or better design and technology features may become feasible. The Discharger will be required to submit a new Report of Waste Discharge to the Regional Board for authorization to operate in stand-alone mode, and shall seek review under Section 13142.5(b) for such stand-alone operation with permanent shutdown of the EPS facility, within 90 days after EPS provides written notice to the California Independent System Operator of its intent to shut down permanently all of its generating units.
5. It is possible that under prolonged, but not permanent, EPS shutdown, additional design or technology features to further reduce intake and mortality of marine life could become available and feasible. The Discharger will be required to submit a technical report to the Executive Officer evaluating the feasibility of any additional design or technology features within 45 days of being notified by EPS that all generating units will be non-operational for power production without seawater intake for these units and unavailable to be called upon by the California Independent System Operator to produce power for a period of 180 consecutive days or more. If the Discharger identifies additional measures that could be implemented under such conditions, the Discharger will be required to implement them as soon as reasonably practicable for the duration of the prolonged period of temporary shutdown.
6. On February 13, 2007, the Discharger submitted a draft Minimization Plan dated February 12, 2007, intended to comply with Order R9-2006-0065. On June 29, 2007, in response to Regional Board staff’s and interested persons’ comments, the Discharger submitted a revised Minimization Plan, dated June 1, 2007. Regional Board staff reviewed the revised Minimization Plan, and in a letter dated February 19, 2008, provided a detailed listing of items that needed to be addressed before the Regional Board could approve the revised Minimization Plan.
7. On March 7, 2008, the Discharger submitted an updated version of the revised Minimization Plan, dated March 6, 2008.
8. On April 9, 2008, in a public meeting, the Regional Board adopted Resolution No. R9-2008-0039, conditionally approving the revised Minimization Plan, subject to the conditions (1) that within six months, the Discharger submit an amended Minimization Plan that includes a specific proposal for mitigation of the impacts, by impingement and

entrainment upon marine organisms resulting from the intake of seawater from Agua Hedionda Lagoon and (2) that the amended Plan address the items outlined in the February 19, 2008 letter to Discharger and the following additional concerns:

- (1) Identification of impacts from impingement and entrainment;
- (2) Adequate monitoring data to determine the impacts from impingement and entrainment;
- (3) Coordination among participating agencies for the amendment of the Plan as required by Section 13225 of the California Water Code;
- (4) Adequacy of mitigation; and
- (5) Commitment to fully implement the amendment to the Plan.

9. On May 1, 2008, an interagency meeting was held to determine mitigation options for the CDP. In addition to Coastal Commission and Regional Board staff, attendees included staff representatives from:

- (a) California Department of Fish and Game
- (b) California State Lands Commission
- (c) California Department of Transportation
- (d) City of Carlsbad
- (e) City of Vista
- (f) U.S. Fish and Wildlife Service

During the subsequent weeks, the Discharger cooperated with the participating agencies to develop the Marine Life Mitigation Plan (MLMP) and, on July 3, 2008, the Discharger submitted the first draft of the MLMP to Coastal Commission staff. On July 7, 2008, Coastal Commission staff forwarded the draft MLMP to staff at the various participating agencies, including the Executive Officer of the Regional Board. On August 2, 2008, in response to Coastal Commission staff comment, the Discharger submitted a revised MLMP. On August 6, 2008, the Coastal Commission held a hearing to consider the MLMP. Regional Board staff attended this hearing. The Coastal Commission approved the MLMP and directed its staff to work with the Discharger to finalize the language of the plan. On or about September 17, 2008, the CDP's Project Manager, Peter MacLaggan, met with the Executive Officer and notified him that final language of the MLMP was unlikely to be available before October 8, 2008 because of the time required in the interagency process. On or about November 7, 2008, the Coastal Commission staff and the Discharger reached agreement on the final language of the MLMP.

10. On November 14, 2008, the Discharger submitted to the Regional Board the MLMP as the proposed amendment to the March 6, 2008 Minimization Plan to satisfy the conditions in Resolution No. R9-2008-0039.
11. On February 11, 2009, in a public meeting, the Regional Board was scheduled to consider whether the MLMP satisfied the conditions established in Resolution No. R9-2008-0039 or whether any failure to satisfy the conditions rendered the Resolution

inoperative by its own terms. At the commencement of the meeting, the Executive Officer identified a list of outstanding issues concerning the March 6, 2008 Minimization Plan, as supplemented by the MLMP. The outstanding issues were identified as follows: “(1) Placing Regional Water Board and its Executive Officer on equal footing, including funding, with Coastal Commission and its Executive Director, in the MLMP, while minimizing redundancies (e.g., only one Scientific Advisory Panel), with details of a dispute resolution process to be worked out; (2) Reducing the number of sites to five, in consultation with the Coastal Commission, with the existing proviso that other sites within the Regional Board boundaries could be added; (3) Poseidon to provide the flow-proportioned calculations for Poseidon’s impacts due to impingement, to help support the Board’s determination that these impacts are *de minimis*; and (4) Poseidon to provide a consolidated set of all requirements imposed to date by the various agencies.”

12. The Regional Board heard public comment at the February 11, 2009 hearing, but with the concurrence of the Discharger, continued the matter to its April 8, 2009 meeting. The Regional Board directed staff to work with the Discharger to expeditiously address the list of the outstanding issues identified by the Executive Officer and further directed staff to prepare for Regional Board consideration a resolution or order approving the Flow, Entrainment, and Impingement Minimization Plan required by Order No. R9-2006-0065.
13. Following the February 11, 2009 meeting, Regional Board staff and the Discharger met on numerous occasions to discuss the outstanding issues on numerous occasions. On March 9, 2009 the Discharger submitted a further revised Minimization Plan, including the MLMP, for the Regional Board’s consideration. On March 27, 2009, the Discharger submitted revisions to the March 9, 2009 Minimization Plan. The March 9, 2009 Minimization Plan, as revised on March 27, is hereinafter referred to as the March 27, 2009 Minimization Plan.
14. The Regional Board reviewed the March 27, 2009 Minimization Plan to determine whether its implementation will result in the “use [of] the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life” under co-location operation for CDP benefit.

SITE

15. Chapter 2 of the March 27, 2009 Minimization Plan addresses identification of the best available site feasible for the CDP to minimize the intake and mortality of marine life.
16. The CDP will be co-located with EPS and use EPS’s existing intake and discharge facilities, which draw cooling water from AHL and discharge into the Pacific Ocean.
17. The CDP has four fundamental project objectives: (1) to provide a local and reliable source of potable water not subject to variations of drought or political or legal constraints; (2) to reduce local dependence on imported water; (3) to provide water at or below the cost of imported water supplies; and (4) to meet the CDP’s planned

contribution of desalinated water as a component of satisfying regional water supply planning goals.

18. Co-locating the CDP with EPS allows the CDP to use the existing EPS intake and discharge facilities. Using EPS's existing intake and discharge facilities allows the CDP to minimize the intake and mortality of marine life by reducing the amount of source water required to be withdrawn directly from AHL for desalination purposes by the amount of water discharged by EPS.
19. By co-locating with the EPS, the CDP will use the wastewater stream discharged by the EPS as its first source of water. The discharge of the EPS wastewater to the Pacific Ocean is subject to R9-2006-0043, a NPDES permit issued to Cabrillo Power I LLC by the Regional Board. The Discharger's proposed beneficial reuse of EPS's discharge water is a form of conservation of water resources through water recycling expressly encouraged by the State of California (see, e.g., Water Code Section 461), and has the added benefit of reducing the amount of EPS wastewater discharged under R9-2006-0043.
20. Using the existing EPS intake and discharge facilities also eliminates the need for new construction of a major intake system and discharge facilities, with necessarily associated environmental and economic costs.
21. The Board, through its review and approval of the March 27, 2009 Minimization Plan, has evaluated three alternative sites in the City of Carlsbad that would accommodate the proposed desalination project. These sites include (1) other locations on the EPS property, (2) the Encina Water Pollution Control Facility, and (3) the Maerkle Reservoir.
22. These three alternatives have been found by the Regional Board to be infeasible for the following reasons:
 - (1) Other locations within the Encina Power Station property: Alternative sites within the EPS property are infeasible because the power plant owner has reserved the remaining portion of the site to accommodate future power plant modifications, upgrades, or construction of new power plant facilities.
 - (2) Encina Water Pollution Control Facility: This site could only accommodate a desalination plant with a 10 MGD production capacity, due to outfall constraints. Use of this site would also require the construction of an intake pipeline to convey source water from the power plant cooling canal.
 - (3) Maerkle Reservoir: The public rights-of-way between the reservoir and the Pacific Ocean do not have sufficient space to accommodate an intake pipeline and concentrate line. Use of this site would also require the pumping of over 100 MGD of seawater to an elevation of 531 feet (compared to 70 feet at the proposed site) for processing. This area has also been zoned as "Open Space."

23. The Project EIR, certified by the City of Carlsbad on June 13, 2006, evaluated only alternative 2 above, and concluded that the Encina Water Pollution Control Facility site would not be as effective as the proposed site in satisfying the objectives of the project. The EIR did not evaluate other locations within the EPS since other locations within the EPS were determined to be substantially the same as the proposed site.
24. The EPS site is the only site in reasonable proximity to the existing seawater intake and outfall, and to key delivery points of the water distribution system of the City of Carlsbad, the largest user of proposed desalinated water anticipated by the Discharger. The use of existing intake and discharge facilities at the EPS site avoids construction of a major new intake system and discharge facilities.
25. Further and more detailed findings of the Regional Board on site are in Attachment A to this Order, Supplemental Findings of Regional Board for Order No. R9-2009-0038.
26. The Regional Board finds that there are no better available, feasible and less environmentally damaging alternative sites to the proposed site for the CDP at the EPS (as previously approved by the Regional Board in NPDES Permit No. R9-2006-0065). Pursuant to Water Code Section 13142.5(b), the Board finds that the proposed site is the best available site feasible that can be used to minimize the intake and mortality of all forms of marine life.

DESIGN

27. Chapter 3 of the March 27, 2009 Minimization Plan addresses identification of the best available design feasible to minimize the intake and mortality of marine life under co-location operation for CDP benefit.
28. A key feature of the proposed design is the direct connection of the desalination plant intake and discharge facilities to the discharge canal of the power generation plant. This approach allows the CDP to use the power plant cooling water as both source water for the seawater desalination plant and as a blending water to reduce the salinity of the desalination plant concentrate prior to the discharge to the ocean. Under the conditions of co-location with the EPS, however, Discharger has little control over the intake structure.
29. When EPS is producing power and is discharging 304 MGD or more of seawater for once-through cooling, the proposed desalination plant operation would cause a *de minimis* increase in entrainment and impingement of marine organisms. Under conditions of co-location operation for CDP benefit, the Discharger must comply with Water Code Section 13142.5(b) and use best available design feasible to minimize incremental increases in intake and mortality of marine life for operation under these conditions. Based on flow data submitted by the Discharger, the EPS would have provided approximately 89% of the CDP's required flow in 2008, indicating that the CDP

would have been responsible for minimizing intake and mortality of the additional approximately 11% increment in impacts from EPS operations conducted for the benefit of the CDP. The March 27, 2009 Minimization Plan concludes that under this condition, direct use of the EPS discharge and variable frequency drives on the desalination plant intake pumps will result in a substantial reduction in intake and mortality of marine life.

30. The March 27, 2009 Minimization Plan also concludes that additional design features will be employed to minimize intake and mortality of marine life when EPS is temporarily shut down. The CDP must comply with the best available design feasible requirement in Water Code Section 13142.5(b) when EPS is operating for the benefit of CDP (whether EPS is temporarily shut down or not otherwise discharging sufficient volume of water to meet CDP's operational needs). Features that will be incorporated in the desalination plant design to reduce impingement, entrainment, and flow collection when EPS is temporarily shut down include operation of a modified (EPS) pump configuration to reduce both inlet (bar racks) and fine screen velocity, and ambient temperature processing. While the percentage of time EPS is temporarily shut down has not been predicted and the Discharger has not quantified the expected reduction in impingement and entrainment during operation under these conditions, it is reasonable to conclude that reductions in impingement and entrainment will occur when CDP implements these features.
31. Available information shows that under the conditions of co-location operation for CDP's benefit, the Discharger has little control over the intake structure and the corresponding intake pumps. Under the conditions of co-location operation, the existing intake meets the best available design criteria feasible. The Regional Board finds that the proposed design for CDP operations is the best available design feasible under co-location operation for the benefit of CDP.
32. Further and more detailed findings on design are in Attachment A, Detailed Findings of Regional Board for Order No. R9-2009-0038.
33. The Discharger indicates that the design features it will use under limited co-location operations would also serve as best available design feasible under stand-alone conditions. As indicated above, the Regional Board is not considering the adequacy of design alternatives for stand-alone operating conditions at this time. Once EPS permanently shuts down and the CDP is operated on a stand-alone basis, the Discharger will have more flexibility in design implementation. It will be appropriate to undertake additional evaluation under Section 13142.5(b) at that time to determine whether any additional and/or superior design features are feasible for CDP stand-alone operations.
34. Pursuant to Water Code Section 13142.5(b), the Board finds that the proposed design is the best available design feasible under co-location operation for the benefit of CDP that can be used to minimize the intake and mortality of all forms of marine life

TECHNOLOGY

35. Chapter 4 of the March 27, 2009 Minimization Plan addresses identification of the best available technology feasible to minimize the intake and mortality of marine life under co-location operation for the CDP's benefit.
36. Because CDP will be co-located with the EPS, technological modifications to the existing intake channel to minimize the intake and mortality of marine life must be compatible with both EPS's and CDP's operations. In addition, the Amendment of Lease PRC 8727.1 [State Lands Commission lease with Cabrillo Power LLC I (EPS operator)] to authorize CDP's use of the intake and outfall recognized that entrainment and impingement minimization measures cannot interfere with or interrupt ongoing power plant operations.
37. The Board, through its review and approval of the March 27, 2009 Minimization Plan, has analyzed and investigated a number of alternative seawater intake, screening, and treatment technologies prior to selecting the desalination plant intake, intake screening, and seawater treatment technologies planned for the CDP. When economic, environmental and technological factors are taken into account, the power plant intake, screening, and treatment alternatives are not capable of being accomplished in a successful manner within a reasonable period of time.
38. The Board, through its review and approval of the March 27, 2009 Minimization Plan, has analyzed the following intake alternatives: (1) Subsurface intake (vertical and horizontal beach wells, slant wells, and infiltration galleries); (2) new open ocean intake; (3) Modifications to the existing power plant intake system; and (4) Installation of variable frequency drives (VFDs) on seawater intake pumps.
39. The Board, through its review and approval of the March 27, 2009 Minimization Plan, has compared screening technologies to identify the best available technology feasible including: (1) Fish net, acoustic and air bubble barriers upstream of the existing intake inlet mouth; (2) New screening technologies to replace the existing inlet screens (bar racks); and (3) fine vertical traveling screens.
40. Implementation of the alternatives associated with the modification of the existing power plant intake and intake screening facilities are infeasible because they would interfere with, or interrupt, power plant scheduled operations. Taking into account economic, environmental and technological factors, the power plant intake and intake screening alternatives are not capable of being accomplished in a successful manner within a reasonable period of time.
41. The Discharger identified intake technologies it will employ to reduce intake and mortality of marine organisms during temporary or permanent shutdown of the EPS. The CDP intake pump station design will incorporate variable frequency drives to reduce the total intake flow for the desalination facility to no more than that needed at any given time, thereby minimizing the entrainment of marine organisms.

42. Under the conditions of co-location operations for CDP's benefit when EPS maintains control of the intake and discharge facilities, the Discharger has little control over the intake structure and little flexibility in implementing different technologies. Under these circumstances, the Discharger has identified the best available technologies feasible to minimize the intake and mortality of marine life at this time. Because different and/or better technologies may become feasible under stand-alone operations, the Regional Board will require evaluation of CDP's compliance with Water Code Section 13142.5(b) under those conditions.
43. Further and more detailed findings on technology are in Attachment A, Detailed Findings of Regional Board for Order No. R9-2009-0038.
44. Pursuant to Water Code Section 13142.5(b), the Regional Board finds that the proposed technology is the best available technology feasible under co-location operation for the benefit of CDP that can be used to minimize the intake and mortality of all forms of marine life.

MITIGATION

45. Chapter 6 of the March 27, 2009 Minimization Plan describes mitigation measures associated with the CDP, incorporates the Marine Life Mitigation Plan previously submitted, and addresses identification of best mitigation feasible to minimize intake and mortality of marine life. By attachment, Discharger includes baseline studies of the existing marine system in the area that could be affected by the facility.
46. The MLMP sets forth a plan for mitigation and monitoring for impacts due to entrainment from the CDP as means of complying with Water Code Section 13142.5(b). It was developed by the Discharger in consultation with multiple resource agencies including the Regional Board, and was approved by the California Coastal Commission (Commission) on August 6, 2008. The MLMP was written for stand-alone operation, and proposes phased implementation of up to 55.4 acres of wetland mitigation within the Southern California Bight. Phase I requires the creation of 37 acres, and Phase II requires an additional 18.4 acres, which the Discharger may propose to eliminate or reduce if it proposes alternative mitigation, such as new entrainment reduction technology or mitigation credits for dredging.
47. The MLMP proposes mitigation that no more than two mitigation site(s) be selected from among 11 potential sites in southern California. These sites are: Tijuana Estuary, San Dieguito River Valley, Agua Hedionda Lagoon, San Elijo Lagoon, Buena Vista Lagoon, Huntington Beach Wetland, Anaheim Bay, Santa Ana River, Los Cerritos Wetland, Ballona Wetland, and Ormond Beach. Additional sites may be incorporated if appropriate. The Minimization Plan clarifies that preference will be given to mitigation in the San Diego Region, to the extent feasible.

48. Within 9 months of receiving its Coastal Development Permit from the Commission, the Discharger must submit to the Commission and the Regional Board, a list of the selected mitigation site or sites, and corresponding preliminary restoration plans, for review and agency approval. Six months following the Regional Board's and Commission's approval of the selected site(s) and proposed restoration plan(s), pending necessary permits, the Discharger must begin wetland construction. The Discharger must submit similar plans for Phase II implementation, if Phase II implementation is required, within 5 years of receiving the Coastal Development Permit for Phase I implementation.
49. The MLMP contains mitigation monitoring requirements, and criteria for performance standards modeled after those required of Southern California Edison's mitigation for San Onofre Nuclear Generating Station (SONGS) at San Dieguito lagoon. The MLMP also provides for the oversight of such monitoring by a scientific advisory panel, and commits to public availability of monitoring results.
50. The California Coastal Commission, through its expert, concluded that 55.4 acres of wetlands will assure the benefits needed to compensate for potential entrainment losses under stand-alone conditions (with an 80% confidence interval). The Commission on page 39 of 106 of its findings found that the CDP, "when operating stand-alone, is expected to impinge approximately 2.12 pounds of fish per day, which Poseidon provides is less than the average daily consumption of an adult pelican (more than 2.5 pounds per day), which for this project the Commission considers *de minimis* and insignificant." The March 27, 2009 Minimization Plan, Table 5-2, presents a range of projected impingement losses for the CDP when drawing 304 MGD from AHL, from 1.57 kilograms per day to 4.70 kilograms per day, which are higher than the level of 2.12 pounds per day (0.96 kilograms per day) considered by the Coastal Commission but still less than the average four pounds per day of fish an adult pelican consumes.
51. The Regional Board considered multiple approaches to estimating impingement associated with the CDP's projected operations as presented in the March 27, 2009 Minimization Plan. The estimates derived from the multiple approaches range from 1.56 kg/day to 7.2 kg/day of fish impinged. The Discharger presented evidence in April of 2008, January of 2009, and April of 2009 that the level of impingement is 1.56 kg/day, and the Discharger contends that the level of 4.7 kg/day overstates the CDP's projected impingement impacts. The Regional Board staff does not agree with the Discharger's position. The Discharger and the Board staff also disagree as to whether and to what extent certain dates, described by the Discharger's experts as "outliers", should be included in calculating the estimate of future impingement from the CDP. The Board finds it unnecessary to resolve these disputes and determine whether the Discharger's position or the staff's position concerning the estimation of impingement or the inclusion or exclusion of outliers is correct. Instead, based on the Discharger's voluntary agreement to meet a biological productivity standard of 1715 kg per year or 4.7 kg per day, the Board has determined that Proportional Approach 3-B, resulting in an estimate of 4.7 kg/day of impingement, the maximum reasonable estimate described in the Minimization Plan, should be used by the Regional Board as the appropriate standard to

use as the basis for setting the compensation for impingement to be provided by the mitigation site(s). Any impingement attributable to the CDP will be less than or equal to this level of 4.7 kg per day. The estimate of 4.7 includes the "outlier days" and in fact does not discount them due to reduced flow from the CDP. Based on this use of this standard as a regulatory measure, it is unnecessary to resolve the dispute between the staff and the Discharger as to the appropriate impingement estimate.

52. The biological performance standard of 1,715.5 kg/year agreed to by the Discharger is set forth in the Minimization Plan. This standard, as it may be adjusted under the terms of this Order, will be considered a biological performance measure under Section 5.4 of the MLMP.
53. To demonstrate that the mitigation wetlands required by the MLMP achieve the productivity standard of 1,715.5 kg/year of available fish biomass as described in Section 6.2.1 of the Minimization Plan, the Discharger will conduct productivity monitoring pursuant to a Productivity Monitoring Plan (PMP). The Discharger will be considered to be successful in meeting this performance standard when it has been met for a three-year period, in the same manner as the other performance standards described in Section 3.0 of the MLMP. The Executive Officer shall report to the Board upon determining that this performance standard has been met for three years and the CDP has been deemed successful in meeting this standard. If the Board determines that this performance standard has been met, the monitoring program will be scaled down as recommended by the Executive Officer and approved by the Board. A public review shall thereafter occur every five years, or sooner if called for by the Executive Officer. The work program shall reflect the lower level of monitoring required. If subsequent monitoring shows that the standard is no longer being met, monitoring may be increased to previous levels, if determined necessary by the Executive Officer.
54. The Discharger shall submit a proposed detailed PMP to the Executive Officer concurrently with the proposed Restoration Plan in Section 2.0 of the MLMP for review by the Executive Officer. In conducting the review and approval of the PMP, the Executive Officer may consult with the Scientific Advisory Panel (SAP) established in the MLMP, or other experts retained by the Executive Officer. The Discharger shall reimburse the Board for the costs of such review, in an amount not to exceed \$10,000, (such amount adjusted for changes in the consumer price index after 2009.) Any decision of the Executive Officer on the PMP may be appealed to the Regional Board.
55. At this time, there is no impingement data associated with the CDP because the CDP has not yet commenced operations. Once operations commence, it will be valuable to consider impingement over the course of a one-year period per permit cycle to evaluate impingement associated with the CDP's operations. The Regional Board will require the Discharger to sample and report on impingement during a one-year period per permit cycle according to an impingement sampling program (ISP) using the method set forth in

sections 9.3 and 10.2 of Attachment 4 to the March 27, 2009 Minimization Plan, with the exception of heat treatment events.

56. Based upon the results of the ISP, the Regional Board may determine that it is appropriate to adjust the biological productivity performance standard of 1,715.5 kg/year upward or downward for the next permit cycle.
57. Although the CDP will rely on EPS discharge water for its source water to the extent such water is available, the mitigation provided for under the Minimization Plan, incorporating the MLMP, and this Order fully offsets projected entrainment and impingement losses assuming up to an annual average flow rate of 304 MGD of source water withdrawn directly from AHL and none from EPS discharges.
58. Further and more detailed findings on mitigation are in Attachment A, Supplemental Findings of Regional Board for Order No. R9-2009-0038.
59. Pursuant to Water Code Section 13142.5(b), the Board finds that the proposed mitigation is the best available mitigation feasible that can be used to minimize the intake and mortality of all forms of marine life.

GENERAL

60. Implementation of the March 27, 2009 Minimization Plan will ensure that the CDP is in compliance with Water Code Section 13142.5(b) under co-location operations to benefit the CDP.
61. Implementation of the March 27, 2009 Minimization Plan is not required by the federal Clean Water Act and does not represent an effluent standard or limitation within the meaning of Section 1365 of the federal Clean Water Act [Title 33, Federal Water Pollution Control Act, Section 505]. Failure to implement and comply with the Minimization Plan is not a violation subject to mandatory minimum penalties under Section 13385, subdivision (h) or subdivision (i) of the Water Code, because it is not an "effluent limitation" as defined by Water Code Section 13385.1, subdivision (c).
62. EPS's operations are regulated in part by Regional Board Order No. R9-2006-0043 (NDPES No. CA0001350), issued to Cabrillo Power I, LLC, on August 16, 2006. The Discharger's and EPS' use of the intake structure in accordance with Order No. R9-2006-0065, and the March 27, 2009 Minimization Plan during co-location operations to benefit the CDP, does not constitute "cooling water flow" as that term is used in Section V.B. of Order No. R9-2006-0043. Therefore, EPS need not comply with Section V.B, but shall continue to comply with Sections V.A and V.C. of Order No. R9-2006-0043, when operating the intake structure during co-location operations to benefit the CDP.
63. According to Section 13263(e) of the California Water Code, the Regional Board may, upon application by any affected person, or on its own motion, review and revise waste

discharge requirements. Section 122.62(a) of title 40 of the Code of Federal Regulations authorizes the reopening and modification of an NPDES permit based upon new information.

64. This Order incorporates the March 27, 2009 Minimization Plan as amended by this Order, the supplemental findings, which are Attachment A to this Order, and the responses to public comments, which are Attachment B to this Order. The provision of the Minimization Plan and the Attachments to this Order are incorporated into this Order by reference, as if fully set forth herein, and shall be considered part of the Board's adopted findings for this Order.
65. This action is exempt from the requirement of preparation of environmental documents under the California Environmental Quality Act [Public Resources Code, Division 13, Chapter 3, Section 21000 et seq.] in accordance with Section 13389 of the California Water Code.
66. The Regional Board has notified all known interested parties of its intent to adopt Order No. R9-2009-0038.
67. In a public hearing on April 8, 2009, the Regional Board heard and considered all comments pertaining to the adoption of Order No. R9-2009-0038.

THEREFORE, IT IS HEREBY ORDERED:

1. The March 27, 2009 Minimization Plan, as amended hereunder, submitted pursuant to Provision VI.C.2.e. of Order No. R9-2006-0065, is hereby approved.
2. This Order amends Order No. R9-2006-0065 to require the Discharger to implement and comply with the March 27, 2009 Minimization Plan under co-location operations to benefit the CDP.
3. Order No. 2006-0065 is not being reopened for any other purpose than the revisions contained herein. Except as contradicted or superseded by the findings and directives set forth in this Order, all of the previous findings and directives of Order No. R9-2006-0065 remain in full force and effect.
4. This action supersedes in its entirety Resolution No. R9-2008-0039, which considered an earlier version of the March 27, 2009 Minimization Plan. Resolution No. R9-2008-0039 has no ongoing force or effect.
5. The March 27, 2009 Minimization Plan submitted pursuant to Provision VI.C.2.e. of Order No. R9-2006-0065 is hereby approved subject to the amendments described in this Order:
6. The Minimization Plan is amended to add a monitoring component that requires impingement monitoring at the intake once the desalination project is in operation.

- a. Intake Monitoring Schedule. Discharger shall commence monitoring for impingement in 2012, following permit reissuance. Monitoring shall be conducted for 52 continuous 24-hour periods during the first 12 months after project operation.
 - b. Selection of Sampling Dates. Preference will be given to days in which the EPS flow is expected to be at or about 304 MGD.
 - c. Impingement Sampling. Discharger shall monitor for impingement in accordance with the methodology and the impingement mortality sampling plan, described in Sections 9.3 and 10.2 of Attachment 4 to the Minimization Plan, excluding the requirement for impingement sampling during heat treatment.
 - d. Reporting. A report containing detailed analysis of the fish impingement monitoring data shall be submitted within 6 months after the field program is complete. The Discharger shall report impingement data as follows:
 - i. Impingement shall be adjusted to reflect the flow proportional approach as described in and consistent with Approach 3-B of the Minimization Plan, Attachment 5.
 - ii. Notwithstanding subparagraph 6.d.i., impingement data shall not be proportionally adjusted, in accordance with Approach 3-B, when impingement sampling indicates that impingement on a particular sampling day is the result of a non-flow related event.
7. The Minimization Plan is amended to add a productivity monitoring component that requires monitoring of available fish biomass at the mitigation site(s):
- a. Available Fish Biomass. Within 4 years upon completed construction of the mitigation wetlands and prior to the end of the 2011-2016 permit cycle, Discharger shall demonstrate that the wetlands produce at least 1715 kilograms (kg) of available fish biomass per year. At the end of the 2011-2016 permit cycle, Discharger shall provide a comparison of the impingement monitoring data and available fish biomass data obtained during the 2011-2016 permit cycle. This comparison will be used to support the determination whether to increase or decrease the 1,715 kg/year performance standard to reflect actual impingement resulting from CDP operations.
 - b. Accounting.
 - i. Available fish biomass shall be based on the following three categories of fish species:
 1. Most Commonly Entrained Lagoon Species ("Lagoon Biomass")

- a. Goby
 - b. Blenny
 - c. Garibaldi
 2. Most Commonly Entrained Ocean Species ("Ocean Biomass")
 - a. White croaker
 - b. Spotfin croaker
 - c. Queenfish
 - d. Northern anchovy
 - e. California halibut
 3. All Other Species ("Other Biomass")
 - ii. The biomass from Lagoon, Ocean and Other Species shall be deemed available in the following proportions:
 - 0% of Lagoon Biomass is available
 - 88% of Ocean Biomass is available
 - 100% of Other Biomass is available
 - iii. Available fish biomass shall be calculated as follows: Available Fish Biomass = (88% x Ocean Biomass) + (100% x Other Biomass)
 - iv. For mitigation sites that involve restoration of existing wetlands, a baseline of the estimated biological productivity of fish biomass of the wetlands prior to restoration shall be used to measure increases in fish biomass required by this productivity standard.
 - v. The term "available fish biomass" shall be defined and calculated consistent with the methodology set forth in Attachment 7 to the Minimization Plan and the April 2, 2009 submittal to the Regional Board by Dr. David Mayer and Mr. Chris Nordby entitled "Wetlands Mitigation Credit for Potential Impingement, As Well As For Potential Entrainment.
 - vi. The sampling for the productivity monitoring shall be done principally or wholly within the boundaries of the mitigation site(s).
- c. Monitoring Plan. The Discharger shall submit a proposed Productivity Monitoring Plan ("PMP") to measure the fish biomass as described in this Order concurrently with the proposed Restoration Plan in section 2.0 of the MLMP for review and approval by the Executive Officer. In conducting the review and approval of the PMP, the Executive Officer may consult with the Scientific Advisory Panel (SAP) established in the MLMP, or other experts

retained by the Executive Officer. The Discharger shall reimburse the Board for the costs of such review, in an amount not to exceed \$10,000, (such amount adjusted for changes in the consumer price index after 2009.) Any decision of the Executive Officer on the PMP may be appealed to the Board. The PMP is subject to framework established in Conditions B and C of the MLMP and to the Regional Board's corresponding authorities under Condition B for purposes of administration.

Monitoring. Discharger shall conduct monitoring of available fish biomass using the protocol and methodologies specified in the approved monitoring plan.

- d. The Discharger will be considered to be successful in meeting this performance standard when it has been met for a three-year period, in the same manner as the other performance standards described in Section 5.4 of the Minimization Plan. The Executive Officer shall report to the Board upon determining that this performance standard has been met for three years and the CDP has been deemed successful in meeting this standard. If the Regional Board determines that this performance standard has been met and the project has been successful, the monitoring program will be scaled down as recommended by the Executive Officer and approved by the Board. A public review shall thereafter occur every five years, or sooner if called for by the Executive Officer. The work program shall reflect the lower level of monitoring required. If subsequent monitoring shows that the standard is no longer being met, monitoring may be increased to previous levels, if determined necessary by the Executive Officer.
8. Within 90 days after the EPS provides written notice to the California Independent System Operator of its intent to shutdown permanently all of its generating units, the Discharger shall submit a Report of Waste Discharge to the Regional Board for authorization to operate in stand-alone mode with permanent shutdown of the EPS facility, and shall seek review under California Water Code Section 13142.5(b) for such stand-alone operation.
 - a. The conditions of Order No. R9-2006-0065, as amended by this order, or as replaced by subsequent orders, shall remain in force until the Regional Board takes final action on the Discharger's Report of Waste Discharge to operate in stand-alone mode.

Section VI.C.2.e. in Order No. R9-2006-0065 is amended as follows:

On March 27, 2009, the Discharger submitted a Flow, Entrainment and Impingement Minimization Plan (March 27, 2009 Minimization Plan) which was approved with amendments by the Regional Board on May 13, 2009. The approved Plan identifies the best available site,

design, technology, and mitigation feasible to be used by the Discharger to minimize the intake and mortality of all forms of marine life during CDP operations when CDP is co-located with EPS, but CDP intake requirements exceed the volume of water being discharged by the EPS and EPS operates its seawater intake and outfall for the benefit of CDP. The Discharger shall implement and comply with the terms of the Minimization Plan as approved by the Regional Board. In the event that the EPS permanently ceases operations, and the Discharger proposes to operate the seawater intake and outfall independently for the benefit of CDP as a stand-alone facility, additional review to determine whether CDP complies with Section 13142.5 (b) of the Water Code will be required. In addition, the Discharger shall submit a technical report to the Executive Officer evaluating the feasibility of any additional design or technology features within 45 days of being notified by EPS that all generating units will be non-operational for power production without seawater intake for these units and unavailable to be called upon by the California Independent System Operator to produce power for a period of 180 consecutive days or more. If the Discharger identifies additional measures that could be implemented under such conditions, the Discharger will be required to implement them as soon as reasonably practicable for the duration of the prolonged period of temporary shutdown. Discharger shall not conduct "heat treatment" of the seawater intake system in the operations of the CDP, and any "heat treatment" shall be conducted by EPS solely for the benefit of its operations.

Table 12 in the Fact Sheet will be modified as follows:

Potential Issue	EIR Finding	EIR-Required Mitigation	Regional Board Analysis
Entrainment & Impingement	No Significant Impact. When operating in conjunction with EPS, the operation of CDP will not change EPS flows and flow velocities, nor cause additional impingement losses. Additional entrainment loss is ~ 0.01% to 0.28%. When operating independent of EPS, flow volume and velocity would be substantially reduced, meeting federal performance standards for impingement. Entrainment loss would range from 2% to 34%	In the event the EPS were to permanently cease operations, and the Developer were to independently operate the existing EPS seawater intake and outfall for the benefit of the project, such independent operation will require CEQA compliance and permits to operate as required by then-applicable rules and regulations for the City and other relevant agencies.	The CDP is not subject to 316(b) regulations. To ensure compliance with California Water Code Section 13142.5(b) requirements when the CDP is co-located with the EPS but the CDP intake requirements exceed the volume of water being discharged by the EPS and EPS operates for the benefit of the CDP, the discharger must implement and comply with the

	of that of EPS.		<p>March 27, 2009 Flow, Entrainment and Impingement Minimization Plan as approved by the Regional Board on May 13, 2009. If EPS ceases operations and the Discharger proposes to operate the seawater intake structure and outfall independently for the benefit of CDP as a stand-alone facility, the Regional Board will reevaluate whether the CDP meets the requirements of Water Code Section 13142.5(b).</p>
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Section VII.B.2.e. in the Fact Sheet will be modified as follows:

e. Flow, Entrainment and Impingement Minimization Plan

The Discharger’s Report of Waste Discharge assessed EPS cooling water flows over a 20.5-year period and concluded that historical EPS flows were sufficient to supply CDP intake flows and provide sufficient dilution water to insure that receiving water salinity is not adversely impacted. The Discharger also concluded that during temporary periods when power generation is suspended for maintenance, unheated EPS thru-flows would be adequate to supply CDP and provide sufficient dilution water to protect receiving water salinity. The Regional Water Board recognizes that future EPS flows may not follow historical trends. For this reason, the Regional Board requires the Discharger to implement and comply with the approved Flow, Entrainment and Impingement Minimization Plan to ensure that the requirements of Section 13142.5(b) of the Water Code are complied with when CDP’s intake requirements exceed the volume of water being discharged by the EPS and EPS operates partially for the benefit of CDP.

Section VII.B.4.b. in the Fact Sheet will be modified as follows:

- b. California Water Code Section 13142.5(b) Applicability. Water Code Section 13142.5(b) requires industrial facilities using seawater for processing to use the best available site, design, technology, and mitigation feasible to minimize the intake and mortality of all forms of marine life. The CDP is planned to operate in conjunction with the EPS by using the EPS cooling water discharge as its source water. When operating in conjunction with the power plant, the desalination plant feedwater intake would not increase the volume or the velocity of the power station cooling water intake nor would it increase the number of organisms impinged and entrained by the Encina Power Station cooling water intake structure. Recent studies have shown that nearly 98 percent of the larvae entrained by the EPS are dead at the point of the desalination plant intake. As a result, a *de minimis* of organisms remain viable which potentially would be lost due to the incremental entrainment effect of the CDP operation. Due to the fact that the most frequently entrained species are very abundant in the area of the EPS intake, Agua Hedionda Lagoon and the Southern California Bight, species of direct recreational and commercial value would constitute less than 1 percent of all the organisms entrained by the EPS. As a result, the incremental entrainment effects of the CDP operation in conjunction with the EPS would not trigger the need for additional technology or mitigation to minimize impacts to marine life.

In instances when the CDP's intake requirements exceed the volume of water being discharged by EPS, the CDP will implement the approved Flow, Entrainment and Impingement Minimization Plan to comply with the requirements of Water Code Section 13142.5(b) to use the best available site, design, technology and mitigation feasible to minimize the intake and mortality of marine life. In the event that the EPS were to cease operations, and the discharger were to independently operate the seawater intake and outfall for the benefit of the CDP, such independent or stand-alone operation will require additional Regional Board review to ensure that CDP operations comply with the requirements of Water Code Section 13142.5(b) by employing any additional and/or better design or technology features that were not feasible when EPS was in operation.

Section VI.C. of Attachment F Fact Sheet will be modified as follows:

C. Fish Impingement Monitoring

As issued on August 16, 2006, the NPDES permit did not require Discharger to monitor for fish impingement. In conjunction with the approval of the Minimization Plan, the Regional Board determined that monitoring for fish impingement is necessary. The permit is being amended to reflect such requirement.

The desalination plant will not begin operations until the fourth quarter of 2011, at the very earliest. The permit expires on October 1, 2011. Therefore, the impingement monitoring requirement will not take effect until the next permit cycle.

The current amendment establishes the impingement monitoring requirements. For the next permit cycle, Discharger is required to monitor for 52 continuous 24-hour periods during the first 12 months after the CDP commences operations, giving preference to

those days on which the EPS flow is expected to be at or about 304 MGD. Monitoring must be conducted in accordance with the impingement sampling methods described in Sections 9.3 and 10.2 of Attachment 4 to the Minimization Plan, respectively. No impingement monitoring will be conducted during heat treatments.

Discharger is required to prepare a report containing detailed analysis of the fish impingement monitoring data, which must be submitted to the Regional Board within 6 months after completion of the field program. In the report, the impingement must be adjusted to reflect the CDP's proportional flow, as described in Approach 3-B of the Minimization Plan, Attachment 5, unless the impingement results from a non-flow related event.

D. Productivity Monitoring

Productivity Monitoring Requirements have been added to the permit in Attachment E—the Monitoring and Reporting Program. The purpose of this standard is to ensure that the Discharger satisfies Section 1.1 of the Minimization Plan, which states in pertinent part: “[T]he purpose of the Plan is to minimize the impingement and entrainment of marine life associated with the intake of seawater for desalination because mortality can result from such impingement and entrainment.”

Within 4 years upon completed construction of the mitigation wetlands prior to the end of the 2011-2016 permit cycle, 1,715.5 kg per year will be the required performance standard. At the end of the 2011-2016 permit cycle, Discharger will evaluate the impingement monitoring data to determine whether 1,715.5 kg per year actually reflects CDP-related impingement or if this value requires an increase or decrease in order to properly account for CDP's operations.

In order to calculate the amount of fish biomass that is “available” as impingement mitigation credit in the mitigation wetlands, it is necessary to distinguish between three fish categories: (1) the three most commonly entrained lagoon species—i.e., gobies, blennies, garibaldi (“Lagoon”); (2) the five most commonly entrained ocean species—i.e., white croaker, northern anchovy, California halibut, queenfish, spotfin croaker (“Ocean”); and (3) all other species (“Other”).

- a. Lagoon. Of the up to 55.4 acres of mitigation wetlands that the Discharger has agreed to create or restore to offset potential stand-alone entrainment, 49 acres are designed to mitigate for the entrainment of the most commonly entrained lagoon species (i.e., gobies, blennies and garibaldi). Therefore, to the extent that the mitigation wetlands produce gobies, blennies, and/or garibaldi, 12% of their biomass should be available as impingement mitigation credit ($6.4/55.4 = 12\%$). As a means of streamlining the monitoring and accounting, the Discharger has elected to forego any claim to this credit.

- b. Ocean. Of the up to 55.4 acres of mitigation wetlands that the Discharger has agreed to create or restore to offset potential stand-alone entrainment, 6.4 acres are designed to mitigate for the entrainment of the most commonly entrained ocean species (i.e., white croaker, northern anchovy, California halibut, queenfish, spotfin croaker). Therefore, to the extent that the mitigation wetlands produce these ocean species, 88% of their biomass is available as impingement mitigation credit ($49/55.4 = 88\%$).
- c. Other. Of the up to 55.4 acres of mitigation wetlands that the Discharger has agreed to create or restore to offset potential stand-alone entrainment, no acres are designed to mitigate for the entrainment of "other species." Therefore, to the extent that the mitigation wetlands produce other species, 100% of their biomass is available as impingement mitigation credit ($55.4/55.4 = 100\%$).

When calculating the available fish biomass, the following expression shall be used:

$$\text{Available Fish Biomass} = (88\% \times \text{Ocean Biomass}) + (100\% \times \text{Other Biomass})$$

Discharger will submit a detailed monitoring plan to the Executive Officer for review and approval concurrent with the submittal of the proposed wetlands Restoration Plan under the MLMP. The methodologies and procedures described therein will be based on the sampling of representative species, potentially including invertebrates, in addition to fish species.

Productivity sampling must be conducted so as to avoid materially disturbing the functioning and viability of the wetlands.

Discharger must conduct monitoring of available fish biomass using the protocol and methodologies specified in the approved monitoring plan.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, on May 13, 2009.

TENTATIVE

JOHN H. ROBERTUS
Executive Officer

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

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**ATTACHMENT A TO TENTATIVE ORDER R9-2009-0038
SUPPLEMENTAL FINDINGS REGARDING
TENTATIVE ORDER NO. R9-2009-0038
AMENDING
ORDER NO. R9-2006-0065 (NPDES NO. CA0109223)
WASTE DISCHARGE REQUIREMENTS FOR
THE POSEIDON RESOURCES CORPORATION
CARLSBAD DESALINATION PROJECT
DISCHARGE TO THE PACIFIC OCEAN VIA
THE ENCINA POWER STATION DISCHARGE CHANNEL**

1. The Carlsbad Desalination Project (CDP) has been subject to extensive regulatory process before this agency and other resource agencies, including some six meetings before the Regional Board, with substantial public comment. Substantial additional comments regarding the details of the Regional Board's proposed decision were received in February, March and April of 2009, including at the public hearing held on April 8, 2009. To fully respond to this additional public comment, to provide a detailed explanation for the bases for the Board's decision on this matter, and to provide citations to the evidence upon which the Board has based its decision, the California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), makes the following additional supplemental findings on detailed issues as part of its decision on Tentative Order No. R9-2009-0039:

Approval of NPDES Permit in 2006

2. On August 16, 2006, the Regional Board adopted Order No. R9-2006-0065 (NPDES No. CA0109223) (Order No. R9-2006-0065) establishing waste discharge requirements for Poseidon Resources Corporation's (Discharger) Carlsbad Desalination Project (CDP).

Description of the CDP

3. The CDP will convert approximately 107 million gallons per day (MGD) of source water into approximately 50 MGD of potable water. The other 57 MGD will be discharged as a combined waste stream comprised of concentrated saline wastewater and filter backwash wastewater. Approximately 197 MGD of additional source water will be used to dilute the 57 MGD wastewater stream, for a total discharge flow rate of approximately 254 MGD. The 197 MGD of additional source water not used for production is needed as dilution water to allow the CDP to comply

with the salinity requirements of the NPDES permit. The total source water needed for conversion to potable water and dilution of the waste stream will be approximately 304 MGD.

4. The CDP will be located adjacent to an existing power plant referred to as the Encina Power Station (EPS). The EPS includes an intake structure that draws water from Agua Hedionda Lagoon (AHL) to supply cooling water for its electricity generation operations. After use, the cooling water the EPS withdraws from AHL is discharged to the Pacific Ocean.
5. The CDP will use the existing intake and discharge system of the EPS to supply its source water, and discharge its wastewater stream. The CDP will use the water the EPS discharges after it has been used for cooling purposes (shown on CDP Flow Schematic – April 9, 2009 Regional Board Agenda Item No. 7, Attachment 1b). On some days, it is expected that the EPS will not discharge enough water to supply the 304 MGD needed for its desalination operations. On those days, the intake system will withdraw from AHL additional water above and beyond what the EPS is using in order to supply the CDP. Although the cooling water withdrawals of the EPS vary from year to year, information available from 2008 indicates that the EPS would have met approximately 89% percent of the CDP's water needs (i.e., 304 MGD), had the CDP been in operation in calendar year 2008 (March 27, 2009 Flow, Entrainment and Impingement Minimization Plan, Attachment 1 - EPS 2008 Daily Flow Data). Since the fifth EPS generating unit (Unit 5) was put into service in 1976, annual water use at the EPS for cooling water purposes has never dropped below 61% of the water that would be needed on a daily basis by the CDP. (Minimization Plan, 6-4, footnote 5.)

Project Benefits and Objectives

6. To properly evaluate the proposed alternative sites, design, and technologies that were the subject of substantial public comment, the proposed project's benefits and basic project objectives must be identified and determined by the Board. An alternative is not a feasible alternative if it fails to meet any of these basic project objectives.
7. The approximately 50 MGD (or 56,000 acre feet per year (af/yr)) of potable water that the CDP will produce will be enough water to supply approximately 300,000 San Diego County residents, or approximately 112,000 households. The Discharger is under contract to provide the water from the CDP to various water agencies in the San Diego region. The City of Carlsbad has contracted with the Discharger to allow the City to take up to 100 percent of its water needs from the desalination plant, approximately 25 MGD or 27,990 af/yr. Carlsbad has contract rights to 25 MGD and will take water based on daily demand projected at between 10 MGD and 25 MGD. The following additional cities and water districts have contracts with the Discharger to provide desalinated water to the customers in their service territories: City of Oceanside for up to 5,000 af/yr; Olivenhain Water District for up to 5,000 af/yr;

Rainbow Municipal Water District for up to 7,500 af/yr; Rincon Del Diablo Municipal Water District for up to 4,000 af/yr; Santa Fe Irrigation District for up to 2,000 af/yr; Sweetwater Authority for up to 2,400 af/yr; Vallecitos Water District for up to 7,500 af/yr; Valley Center Municipal Water District for up to 7,500 af/yr. (Latham & Watkins comment letter dated April 2, 2009, Appendix C, Tab 31.)

8. The CDP's fundamental project objectives are: (1) allowing Carlsbad to purchase 100 percent of its potable water supply needs from the desalination plant, thus providing a secure, local water supply that is not subject to the variations of drought or political or legal constraints; (2) reducing local dependence on water imported from outside the San Diego County area and from outside of Carlsbad and surrounding areas; (3) providing water at or below the cost of imported water supplies; and (4) meeting the CDP's planned contribution of desalinated water as a component of regional water supply planning goals. The CDP's expected output of 50 MGD will supply about 10% of the desalinated water needed in California by 2030, according to the Department of Water Resources, and 56,000 af/yr out of the 150,000 af/yr of desalinated water that is needed to ensure regional reliability, according to the Metropolitan Water District of Southern California. The objectives are summarized in the Environmental Impact Report certified by the City of Carlsbad for the CDP and related findings adopted by the City, and on page 14 of 106 of the findings adopted on August 6, 2008 by the California Coastal Commission for the Coastal Development Permit adopted for the project.
9. Potable water is an acute need in this State generally, and in the San Diego region in particular. On June 4, 2008, Governor Schwarzenegger issued Executive Order S-06-08 in which he noted that California's water supply crisis has been caused by prolonged drought, extreme fire conditions, the long-term threat of climate change, and judicially-imposed restrictions on diversions from the Sacramento-San Joaquin River Delta for the State Water Project and the federal Central Valley Project aimed at protection of federally listed endangered fish species. Executive Order S-06-08 emphasizes the State's commitment to enhancing drought response and preparedness to protect California's economy and its environment. (Latham & Watkins comment letter dated April 2, 2009, Appendix C, Tab 34.)
10. On February 27, 2009, Governor Schwarzenegger proclaimed a State of Emergency under the California Emergency Services Act because of the drought. The proclamation noted that since California's last major drought in 1991, the State has added nine million new residents, experienced a significant increase in the planting of permanent crops not subject to fallowing, and witnessed new biological opinions for threatened species that have reduced the flexibility of water planning and operations throughout the year. The Governor found that severe water shortages were causing widespread harm throughout California to people, businesses, property, communities, wildlife and recreational resources. To help address this growing problem, the Governor directed state agencies to "prioritize and streamline permitting and regulatory compliance actions for desalination[.]" (Latham & Watkins comment letter dated April 2, 2009, Appendix C, Tab 35.)

11. In contrast to traditional freshwater sources, ocean-water desalination does not suffer from the problems described in Executive Order S-06-08. Ocean-water desalination provides a drought-proof source of potable water without any impacts to endangered or threatened species. A stable source of potable water derived from ocean-water desalination is an element of drought response and preparedness, and helps to address the growing pressures on the State's traditional water supplies. (Latham & Watkins comment letter dated April 2, 2009, Appendix C, Tabs 6, 23-30.)
12. Governor Schwarzenegger has directed the State Water Resources Control Board and other state agencies to take prompt action to reduce and mitigate the effects of the drought. By this action, the Board is taking an important step in helping to alleviate these conditions and is doing so at a time when there are numerous pressures on California's traditional freshwater supplies. (Latham & Watkins comment letter dated April 2, 2009, Appendix C, Tab 35.)

Relationship of Board Action to Prior Board Actions

13. In issuing Order No. R9-2006-0065, the Regional Board previously determined the Discharger's obligations under the federal Clean Water Act, 33 U.S.C. § 1251 et seq., and the National Pollutant Discharge Elimination System (NPDES), 33 U.S.C. § 1342. This Order pertains exclusively to the Discharger's obligations under a provision of state law applicable to seawater intakes, specifically California Water Code (CWC) Section 13142.5(b). CWC Section 13142.5(b) provides that: "For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."
14. When the Regional Board reviewed the CDP in 2006 and issued Order No. R9-2006-0065, the Board determined that when the EPS is discharging sufficient water to meet the source water needs of the CDP (304 MGD), the potential for the CDP to cause intake and mortality of marine life, i.e., impingement and entrainment, is *de minimis*. (Order No. R9-2006-0065, Attachment F – Fact Sheet, Section VII.B.4.b.) This Order concerns, therefore, the situation in which the EPS is *not* generating sufficient discharge to meet the source water intake needs of the CDP ("co-location operation for CDP benefit"). Co-location operation for CDP benefit can occur under two conditions: (1) when some or all of the generating units at the EPS are temporarily shut down, or (2) when some or all of the generating units at the EPS are operating but its discharge volume is not sufficient to meet the CDP's intake requirements.

Further Review When/If the EPS Permanently Ceases Operation

15. This Order does not concern the circumstance in which the CDP is operating in complete stand-alone mode and the EPS has permanently ceased operations as described in this Order. If such a circumstance occurs, the CDP will need to be re-

reviewed by the Regional Board in order to ensure continued compliance with CWC Section 13142.5(b). Additional review will be necessary in part because, under stand-alone mode when the EPS has permanently ceased operations, the Discharger likely will have more flexibility in how it accesses the EPS's seawater intake structure, making consideration of additional design or technology features to minimize entrainment and impingement impacts associated with the operation of the seawater intake structure appropriate.

16. The CDP will not operate under complete stand-alone conditions until the EPS permanently ceases operations by permanently shutting down Units 1, 2, 3, 4 and 5.
17. The EPS cannot permanently cease operations unless it satisfies certain notice requirements of the California Independent Systems Operator (Cal-ISO) regarding the EPS's existing Participating Generator Agreement (PGA) and the Meter Service Agreement (MSA). Under the terms of these Agreements, to terminate the PGA, and MSA of any EPS Generating Unit, the EPS must provide written notice to Cal-ISO at least ninety (90) days before the permanent shutdown date of that generating unit. This Order requires, within 90 days of the date of the EPS notice to Cal-ISO for permanent shutdown, the Discharger to submit a Report of Waste Discharge to the Regional Board to operate in stand-alone mode and to seek review under Section 13142.5(b) for stand-alone operation.
18. The operator of the EPS has applied to the California Energy Commission for permission to construct the Carlsbad Energy Center, which is a proposed natural gas-fired power plant that, if constructed, may replace the generating capacity of the EPS. If approved and constructed, the Carlsbad Energy Project will be a 558 megawatt (MW) combined-cycle generating facility. Units 1, 2, and 3 of the existing EPS are proposed to be shut down should the Center be approved and constructed. Units 4 and 5, however, would continue to operate. (See California Energy Commission Application for Certification No. 07-AFC-06, dated October 31, 2007.)
19. The Carlsbad Energy Center has not been certified by the California Energy Commission, and it is too speculative at this time to determine whether the project will either be approved by the California Energy Commission, or constructed by the applicant. It therefore cannot be determined at this time when, if ever, the proposed Carlsbad Energy Center will result in the shutdown of Units 1, 2 and 3. The potential permanent shutdown of Units 1, 2, and 3 as part of the proposed Carlsbad Energy Center, or otherwise, would not, however, cause CDP to operate under stand-alone conditions because the combined intake capacity of Units 4 and 5 (633 MGD) exceeds the intake requirements of CDP. Should the Carlsbad Energy Center, or similar power plant, be constructed, and the EPS's generating capability for certain units be phased out, this Order will continue to authorize co-location operations of the CDP as long as there are remaining EPS units in service for purposes of power generation at the existing EPS facility.

Minimization Plan Provisions and Proceedings

20. To ensure compliance with CWC Section 13142.5(b) when the CDP is operating in co-location mode (versus complete stand-alone mode when the EPS has permanently ceased operations), Section VI.C.2.e of Order No. R9-2006-0065 required the Discharger to submit for Regional Board approval a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan) that “shall assess the feasibility of site-specific plans, procedures, and practices to be implemented and/or mitigation measures to minimize the impacts to marine organisms when CDP intake requirements exceed the volume of water being discharged by the EPS” within 180 days of adoption of the Order No. R9-2006-0065.
21. To satisfy Section VI.C.2.e. of Order No. R9-2006-0065, the Discharger relied upon data collected in AHL pursuant to a field study, the work plan for which was approved by the Regional Board. These data were collected for the purpose of characterizing entrainment and impingement at the EPS’s intake structure. The EPS is subject to federal Clean Water Act Section 316(b), 33 U.S.C. § 1326(b), which requires “that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.” The work plan, entitled, “Cabrillo Power I LLC, Encina Power Station, 316(b) Cooling Water Intake Effects Entrainment and Impingement Sampling Plan,” was reviewed and approved by the Regional Board, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and other agencies. (March 27, 2009 Flow, Entrainment and Impingement Minimization Plan, Attachment 4). The results of the field program, conducted in 2004-2005, are provided in the report entitled, “IMPINGEMENT MORTALITY AND ENTRAINMENT CHARACTERIZATION STUDY, Effects on the Biological Resources of Agua Hedionda Lagoon and the Nearshore Ocean Environment, January 2008” (“E & I Study”). (Latham & Watkins comment letter dated January 26, 2009, Appendix A, Tab 3.)
22. On February 13, 2007, the Discharger submitted a draft Minimization Plan dated February 12, 2007 in order to comply with Section VI.C.2.e. of Order No. R9-2006-0065.
23. On June 29, 2007, in response to Regional Board staff and interested persons’ comments, the Discharger submitted a revised Minimization Plan, dated June 1, 2007. This version of the plan included projections of CDP’s potential impingement and entrainment. Impingement data for the EPS intake system from the E & I Study were included to support the Minimization Plan (Table 3-2). Potential impingement at the CDP was calculated using these data as a basis. The Minimization Plan was divided into chapters addressing the four principal factors of CWC Section 13142.5(b) – site, design, technology, and mitigation – to be used to minimize the intake and mortality of marine life.
24. Regional Board staff reviewed the revised Minimization Plan over the next several months. In a letter to the Discharger dated February 19, 2008, Regional Board staff

identified several issues to be addressed before the Minimization Plan would be ready for Regional Board approval.

25. In response to staff's February 19, 2008 letter, on March 7, 2008, the Discharger submitted an updated version of the Minimization Plan, dated March 6, 2008.
26. The March 6, 2008 version of the Minimization Plan, which was conditionally approved by the Regional Board on April 9, 2008, has been substantially revised and has been replaced by the March 27, 2009 version of the Minimization Plan, including the Marine Life Mitigation Plan (MLMP).
27. On April 17, 2008, Regional Board staff informed the Discharger that the value calculated for potential impingement in the March 6, 2008 version of the Minimization Plan (0.96 kilograms per day, or kg/day) was in error. Staff indicated that the Discharger could provide clarification via email rather than in person.
28. On April 30, 2008, the Discharger submitted a revised calculation of potential impingement, based on linear regression of the 2004-2005 EPS data. In this submission, the Discharger used the linear regression method in order to adjust the EPS data to account for CDP's relatively lower flows. According to the Discharger, linear regression had not been used in the earlier calculation of 0.96 kg/day because the value was so low that it did not warrant adjustment to reflect the relatively lower flow rates of the CDP compared to the EPS.) Two values considered outliers by the Discharger's expert were not included in the regression analysis submitted on April 30, 2008.
29. The revised calculation produced a value of 1.56 kg/day. The Discharger contends that this estimate corresponds to potential impingement for 304 MGD of seawater intake exclusively for CDP operations. Unless the EPS is not generating any discharge for CDP use, some portion of this impingement is attributable to the EPS operations – not CDP operations. An assumption that all of this potential impingement is attributable to the CDP is conservative, and is tantamount to assuming that the CDP is operating in stand-alone mode.
30. The California Coastal Commission also was evaluating the potential for entrainment and impingement at the CDP, as part of the proceedings related to the Coastal Development Permit for the CDP. The Discharger prepared the MLMP both to satisfy conditions imposed by the Coastal Commission and to satisfy the requirements of Resolution No. R9-2008-0039 to evaluate mitigation options for the CDP).
31. During the November 12, 2008 Regional Board meeting, in response to public questions regarding the status of the MLMP, the Executive Officer advised the Regional Board that flexibility in the October 8, 2008 deadline of Resolution No. R9-2008-0039 was being allowed to accommodate the involvement of the other agencies participating in the interagency process.

32. On November 14, 2008, the Discharger submitted the final MLMP to the Regional Board as an amendment to the March 6, 2008 Minimization Plan to satisfy the conditions of Resolution No. R9-2008-0039.
33. On February 11, 2009, the Regional Board held a hearing to consider whether the MLMP satisfied the conditions established in Resolution No. R9-2008-0039, and, if not, whether the Resolution was thereby inoperative by its own terms.
34. At the commencement of the meeting, the Executive Officer identified a narrowed list of staff's outstanding issues concerning the March 6, 2008 Minimization Plan, as supplemented by the MLMP. The outstanding issues were identified as follows:
 - a. "(1) Placing Regional Water Board and its Executive Officer on equal footing, including funding, with Coastal Commission and its Executive Director, in the MLMP, while minimizing redundancies (e.g., only one Scientific Advisory Panel), with the details of dispute resolution process to be worked out;
 - b. "(2) Reducing the number of sites to five, in consultation with the Coastal Commission, with the proviso that other sites within the Regional Board boundaries could be added;
 - c. "(3) Poseidon to provide the flow-proportioned calculations for Poseidon's impacts due to impingement, to help support the Board's determination that these impacts are *de minimis*; and,
 - d. "(4) Poseidon to provide a consolidated set of all requirements imposed to date by the various agencies."
35. On February 26, 2009, the Discharger submitted a consolidated set of all requirements imposed to date by the various agencies to resolve outstanding issue no. 4.
36. Regional Board staff and the Discharger discussed the outstanding issue no. 3 on numerous occasions. During these discussions, staff expressed a preference for a flow-proportioned calculation rather than the linear regression methodology used by the Discharger's expert consultants to calculate the CDP's potential impingement, which resulted in 1.56 kg/day.
37. On February 26 and 27, 2009, the Discharger submitted calculations intended to satisfy the Executive Officer's request for "flow-proportioned calculations," outstanding issue no. 3. "Flow-proportioned calculations" refers to a methodology for estimating CDP's impingement based on the EPS's impingement data that is different than the linear regression methodology used by Discharger's expert consultants. Like the calculation provided by the Discharger's expert, the flow-proportioned calculations correspond to potential impingement for 304 MGD. Unless

the EPS is not generating any discharge for CDP use, some portion of this impingement is attributable to the EPS's operations – not the CDP's operations. An assumption that all of this potential impingement is attributable to the CDP is conservative, and is tantamount to assuming that the CDP is operating in stand-alone mode.

38. The “flow-proportioned calculations” resulted in an estimated projected impingement of 3.74 kg/day. This calculation includes the two events that the Discharger’s experts consider outliers. When the outliers are excluded, the “flow-proportioned calculations” result in an estimated projected impingement of 2.11 kg/day.
39. On March 9, 2009, the Discharger submitted a revised Minimization Plan, including the MLMP, for Regional Board consideration. The March 9, 2009 Minimization Plan included revisions to Chapter 6 regarding mitigation, including the incorporation of the MLMP, additional provisions placing the Regional Board on equal footing with the Coastal Commission to address outstanding issue no. 1, and provisions identifying the five sites within the Regional Board boundaries as priority mitigation sites to address outstanding issue no. 2.
40. In response to comments from staff regarding the projected impingement value, the March 9, 2009 Minimization Plan also included Attachment 5, which explained and identified several possible approaches for estimating CDP’s potential stand-alone impingement, including the linear regression approach supported by the Discharger’s experts, “flow-proportioned calculations” as requested by staff at the February 11, 2009 hearing, and three variations of the other two approaches.
41. In response to additional staff comment, on March 27, 2009 the Discharger submitted a revised Minimization Plan. The March 27, 2009 Minimization Plan includes Attachment 9, which complements the impingement analysis provided in Attachment 5 with additional scientific analysis of the two outlier events observed in the EPS dataset, tending to validate the lower values for potential impingement.
42. After receiving extensive public comment at its April 8, 2009 hearing regarding the Minimization Plan, the Regional Board closed the record and continued the matter for final decision at its May 13, 2009 meeting.

SITE

43. Chapter 2 of the Minimization Plan addresses the “site” factor of CWC Section 13142.5(b).
44. The CDP will be co-located with the EPS and use the EPS’s existing intake and discharge facilities, which draw cooling water from AHL and discharge into the Pacific Ocean.

45. AHL is a largely man-made lagoon that, without regular maintenance dredging, would likely return to a natural “mud-flat” state in which the mouth of the lagoon would be closed to the Pacific Ocean. (“Beach Receives Bounty of Dredging,” San Diego Union Tribune, March 7, 2009.)
46. In 1954, the EPS was commissioned by San Diego Gas & Electric. (Agua Hedionda Land Use Plan, City of Carlsbad Local Coastal Program.) To obtain a sufficient cooling water source for the new power plant, San Diego Gas & Electric dredged more than 310,000 cubic yards of sediment from the Lagoon. This dredging created an open channel that enabled tidal flushing from the Pacific Ocean. (Precise Development Plan and Desalination Plant Project (FEIR 03-05) (SCH#2004041081) Appendix E - Intakes Effects Assessment.) Although natural storms and wave action constantly deposit sediment that could close the Lagoon’s mouth, the EPS’s operators have regularly maintained and dredged the Lagoon to maintain the power plant’s cooling water source, thereby keeping the mouth open and preserving the cooling water source. In 1998-99, the entire Lagoon was re-dredged to an average depth of 8 to 11 feet, significantly increasing tidal flushing. (SeaWorld/Busch Gardens Animal Information Database, San Diego Wetlands - Agua Hedionda Lagoon.) In sum, the EPS relies on AHL for cooling water, while AHL relies on the power plant’s operators to conduct maintenance dredging that is necessary to maintain its present ecological productivity.
47. A number of commenters requested that the Regional Board consider alternative sites for the CDP outside of the Carlsbad area, including areas elsewhere in San Diego County and elsewhere in California. To determine whether these alternative sites are feasible, the Board has examined the fundamental project objectives of the CDP, based on the evidence before it, including the objectives as described by the Discharger and the City of Carlsbad in its comments, the objectives as described in the EIR certified by the City of Carlsbad, and the project objectives as described in the August 6, 2008 findings of the Coastal Commission.
48. A fundamental project objective of the CDP is to provide a local and reliable water source. The City of Carlsbad will be able to meet 100 percent of its potable water supply needs from the desalination plant, a secure, local water supply not subject to the variations of drought or political or legal constraints. Any site for the project outside the City of Carlsbad would subject the project to the control of other water agencies or governmental jurisdictions. For example, if the project were to be sited in another city, that city might exercise its police powers to utilize the water within its own jurisdiction, or to regulate or prohibit the transmission of water outside of its municipal boundaries. Thus, sites outside of Carlsbad would conflict with this fundamental project objective, and therefore any such site is neither available nor feasible for use by the CDP. As a result, the proposed site is the best available site feasible to minimize the intake and mortality of all forms of marine life, pursuant to CWC Section 13142.5(b), and sites outside of the City of Carlsbad are not available or feasible within the meaning of Section 13142.5(b). The facts set forth in this Section 48, standing alone, constitute a separate and independent basis for the

Regional Board's determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).

49. A second fundamental project objective of the CDP is reducing local dependence on water imported from outside the San Diego County area and from outside of Carlsbad and surrounding areas. Importation of water over substantial distances increases the cost of the water, increases the energy necessary to deliver the water, and makes the supply of water less secure and more vulnerable to disruption from broken or inoperable pipelines due to earthquakes or other natural disasters. Also, as noted on page 2-6 of the Minimization Plan, long-distance transportation of water from the CDP to its intended users would cause an increase in carbon emissions because significant additional energy would be required to accomplish it, thereby increasing greenhouse gas emissions associated with the Project, another potential adverse environmental impact. Any site outside of San Diego County or remote from Carlsbad and surrounding areas would simply be another form of "imported water" that would have to be transported to the location of the agencies that are purchasing the water. While one of the agencies purchasing the water from the CDP is located in southern San Diego County, the remaining agencies provide water service within Northern San Diego County and the vicinity of Carlsbad. Thus, alternative sites for the CDP outside of San Diego County or the vicinity of Carlsbad would not meet this fundamental project objective and would not be either feasible or available to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b). The facts set forth in this Section 49, standing alone, constitute a separate and independent basis for the Board's determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).
50. A third fundamental project objective of the CDP is providing water at or below the cost of imported water supplies. Alternative sites would each require the construction of a new form of seawater intake system. The construction of a new seawater intake system of any type, such as a new seawater intake at the Encina Water Pollution Control Facility (see, e.g., Minimization Plan at 2-5) or the construction of a new seawater intake infiltration gallery, (see e.g., Coastal Commission August 6, 2008 findings at Page 51 of 106), would be very costly or "cost prohibitive" and increase the cost of production of the water well above the cost of imported water supplies. Thus, alternative sites requiring the construction of a new seawater intake system are not feasible or available to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b). The facts set forth in this Section 50, standing alone, constitute a separate and independent basis for the Board's determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).
51. Another important objective of the CDP is its planned contribution of desalinated water as a component of meeting regional water supply planning goals. The CDP's

expected output of 50 MGD will supply about 10 percent of the desalinated water needed in California by 2030, according to the Department of Water Resources, and 56,000 af/yr out of the 150,000 af/yr of desalinated water that is needed to ensure regional reliability, according to the Metropolitan Water District of Southern California. In order to satisfy this objective, the CDP must be constructed at a site that can accommodate a 50 MGD facility, so that the CDP's output will be sufficient to satisfy Carlsbad's demand, the demand of other local agencies, and the CDP's planned contribution of desalinated water as a component of regional water supplies. Sites that cannot accommodate a 50 MGD facility would conflict with an important project objective and are neither available nor feasible for use by the CDP. The Project Environmental Impact Report (EIR), certified by Carlsbad on June 13, 2006, analyzed a reduced output (25 MGD) alternative but found that the alternative would be insufficient to satisfy the CDP's planned contribution to regional water supplies or the demand of local agencies other than Carlsbad. The facts set forth in this Section 51, standing alone, constitute a separate and independent basis for the Board's determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).

52. As described on Page 2-4 of the Minimization Plan, the EIR, certified by the City of Carlsbad on June 13, 2006, analyzed a number of alternative sites within the boundaries of the EPS and alternative sites within the boundaries of the Encina Water Pollution Control Facility. The Coastal Commission staff requested an evaluation of other potential locations for the desalination facility and its associated infrastructure. As a result, the Discharger added the Maerkle Reservoir site to the list of alternative sites considered. These sites are the only parcels in the entire City of Carlsbad with compatible land use designations and sufficient space available to accommodate the desalination facility. Each of these sites is neither available nor feasible for the reasons set forth in the Minimization Plan Sections 2.2.1, 2.2.2 and 2.2.3, and the findings adopted by the City of Carlsbad on June 13, 2006 and the California Coastal Commission on August 8, 2008. The facts set forth in this Section 52, standing alone, constitute a separate and independent basis for the Board's determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).
53. In its findings adopted on August 6, 2008, the Coastal Commission found that "[t]here are no feasible and less environmentally damaging alternative locations to draw in the needed seawater (e.g. subsurface or offshore)." (Page 28 of 106.) The Coastal Commission further noted on page 48 of 106 of its findings, based on evidence presented in the City of Carlsbad Environmental Impact Report, that alternative intake systems at other sites, such as horizontal wells, vertical beach wells or infiltration galleries in lieu of the CDP's use of the EPS power plant intake system at the proposed EPS site "would cause more significant impacts than those caused by the existing [EPS site] power plant intake and that they would be economically infeasible." On page 51 of 106, the Coastal Commission found that

alternative sites using proposed or potential (but unbuilt) alternative seawater intake systems, such as slant wells at Dana Point or elsewhere, infiltration galleries, horizontal wells, vertical beach wells or other types of subsurface intakes would be infeasible alternative sites for the CDP project: “[T]he proposed alternatives would result in greater environmental impacts than the proposed project due to the destruction of coastal habitat from construction of intake systems, the loss of public use of coastal land due to numerous intake collector wells that would be located on the beach, and the adverse environmental impacts to coastal resources during construction, including but not limited to the creation of negative traffic, noise, and air pollution impacts.” The Regional Board incorporates these findings by the Coastal Commission in full, by reference. The Coastal Commission’s finding that there are no feasible and less environmentally damaging alternative locations available to the Project is noted and cited on page 2-8 and note 6 of the Minimization Plan. The facts set forth in this Section 53, standing alone, constitute a separate and independent basis for the Board’s determination that the site proposed by the Discharger is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).

54. When the Board adopted Order No. R9-2006-0065 in 2006 granting approval of the CDP, it determined that the EPS site was appropriate for the project under Section 13142.5(b), despite the possibility of impacts to marine life for operations when the EPS was *not* generating sufficient discharge to meet the source water intake needs of the CDP. The Board required that a Minimization Plan be prepared to assess the feasibility of “site-specific” plans, procedures, practices and mitigation measures to minimize impacts and address any “additional review” required by Section 13142.5(b). Thus the Board determined in 2006 that the EPS site was the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b). The Discharger has spent substantial time and money in reliance on the Board’s 2006 determination, which was not subsequently challenged and is no longer subject to superior court review, and the Board believes such determination should not be disturbed. Such 2006 determination constitutes a separate and independent basis for a determination that the CDP has complied with 13142.5(b). However, because of the possibility that such 2006 determination might be challenged indirectly through an attack on the Board’s approval of the Minimization Plan, as a separate and alternative ground, the Board (at the Discharger’s request) has reexamined anew without regard to its 2006 determination, the question of the appropriate site for the CDP and has made the determination in this Order, including the findings above in Sections 43-53, that the EPS site is the best available site feasible to minimize the intake and mortality of all forms of marine life pursuant to Section 13142.5(b).
55. One commenter at the April 8, 2009 hearing suggested that a feasible alternative site for the CDP would be to locate the CDP somewhere else in San Diego County, and then use the San Diego County Water Authority Pipeline to transfer the water or use “paper water credits” to allow project users to get the benefit of water production. Such an alternative site would neither be available nor feasible within

the meaning of Section 13142.5(b) for the following separate and independent reasons:

- a. First, no alternative location with access to seawater was described by the commenter. Locations remote from the ocean would be infeasible due to the lack of access to seawater, or the extremely high costs and logistical problems of pumping seawater and brine to and from the desalination facility remote from the ocean.
- b. Additionally, another location in San Diego County would require the construction of a new seawater intake system. The construction of new seawater intake systems at sites other than the EPS is fully addressed in Section 45, and was found to be infeasible due to the costs of constructing a completely new intake system and the conflict with the third fundamental project objective.
- c. Any location outside the City of Carlsbad would conflict with the first fundamental project objective as described in Section 6 because it would not provide a reliable source of potable water under the control of the City of Carlsbad.
- d. Any location outside the City of Carlsbad or its vicinity would conflict with the second project objective as described in Section 6 because it would be an imported source of water requiring the import of water into Northern San Diego County through pipelines that would be subject to disruption. Paper water transfers would not protect Carlsbad from insufficient water supplies if imported water supplies were to be disrupted by earthquakes or other natural disasters.

DESIGN

56. Chapter 3 of the March 27, 2009 Minimization Plan addresses identification of the best available design feasible to minimize the intake and mortality of marine life under co-location operation for CDP's benefit.
57. The primary design feature of the CDP is the direct connection of the desalination plant to the EPS intake and discharge facilities. This design feature allows the CDP to use the power plant cooling water as both source water for the seawater desalination plant and as blending water to reduce the salinity of the desalination plant concentrate prior to the discharge to the ocean. In 2008, the EPS discharges would have met approximately 89% of the CDP's water supply needs. The annual discharges at the EPS have never dropped below 61% of the annual water supply requirement for the CDP.
58. An additional design feature that will be incorporated in the desalination plant design to reduce impingement, entrainment, and flow when the EPS is temporarily shut down is operation of a modified the EPS pump configuration to reduce both inlet (bar

racks) and fine-screen velocity, and ambient temperature processing. Included in the design features proposed by the Discharger is a design that would maintain the Project's intake water flows at 0.5 feet per second ("fps") or less at the intake bar racks. (See Minimization Plan, p. 3-5.)

59. The Regional Board finds that these design features will minimize the impingement of marine life on through screens and vertical screens.
60. While the percentage of time the EPS will be temporarily shut down in the future has not been predicted and the Discharger has not quantified the expected reduction in impingement and entrainment during operation under these conditions, it is reasonable to conclude that reductions in impingement and entrainment will occur when the CDP implements the design features.

TECHNOLOGY

61. Chapter 4 of the March 27, 2009 Minimization Plan addresses identification of the best available technology feasible to minimize the intake and mortality of marine life under co-location operation for CDP's benefit.
62. The Lease Amendment approved by the State Lands Commission to authorize the use of the EPS facilities by the Project specifically prohibits the implementation of minimization measures that would interfere with or interrupt ongoing power plant operations. (See State Lands Commission, Final Amendment of Lease PRC 8727.1, November 24, 2008 at Section 2, Previously submitted January 26, 2009, Latham & Watkins LLP Comments, Appendix A.) Specifically, the Lease Amendment requires the following: "Poseidon, without interference with, or interruption of, powerplant scheduled operations and at its sole cost and expense, shall use the best available design, technology, and mitigation measures at all times during which this Lease is in effect to minimize the intake (impingement and entrainment) and mortality of all forms of marine life associated with the operation of the desalination facility as determined by the San Diego Regional Water Quality Control Board or any other federal, state, or local entity having applicable jurisdiction." In light of this requirement, the Regional Board recognizes that any technological modifications to the existing EPS intake channel to minimize the intake and mortality of marine life must be compatible with the operations of the EPS.
63. A number of alternative seawater intake, screening, and treatment technologies were analyzed and investigated prior to selection of the desalination plant intake, screening, and seawater treatment technologies planned for the CDP. This analysis included the following intake alternatives: (1) subsurface intake (vertical and horizontal beach wells, slant wells, and infiltration galleries); (2) new open ocean intake; (3) modifications to the existing power plant intake system; and (4) installation of variable frequency drives (VFDs) on seawater intake pumps.

Subsurface Intake Alternatives

64. The Minimization Plan includes an analysis of the feasibility of the use of alternative subsurface intakes for the CDP, and based on this analysis, the Regional Board has determined that the alternative intakes that were evaluated are incapable of providing sufficient seawater to support the CDP.
- a. None of the subsurface intake systems considered (vertical wells, slant wells, or horizontal wells) can deliver the 304 MGD of seawater needed for environmentally safe operation of the CDP. The maximum capacity that could be delivered using subsurface intakes is 28,000 gpm (40 MGD), which is substantially below the needed intake flow.
 - b. The quality of the water available from the subsurface intake (salinity twice that of seawater, excessive iron and high suspended solids) would be untreatable.
 - c. The alternative subsurface intake systems were determined not to be the environmentally preferred alternative. Taking into account economic, environmental and technological factors, the alternative subsurface intakes are not capable of being accomplished in a successful manner within a reasonable period of time, and are infeasible.
 - d. The Coastal Commission Findings approving the CDP's coastal development permit concur with this conclusion: "[T]he Commission finds that the substantial weight of the evidence is that subsurface intakes are an infeasible alternative." (See Coastal Commission Recommended Revised Findings Coastal Development Permit for Poseidon Carlsbad Desalination Project, page 62 of 133.)
 - e. The Regional Board finds that each of these subsurface intake alternatives is infeasible based on each of these separate and independent reasons.
65. Vertical beach intake wells are water collection systems drilled vertically to intercept a coastal aquifer.
- a. To meet the 304 MGD seawater demand of the project, 253 wells of a 1.5 MGD intake capacity each would have to be constructed along 7.2 miles of coastline to collect and transport the water to the proposed desalination facility. Irrespective of the specific location of these vertical wells, the siting, construction and continued operation of 253 wells along 7.2 miles of coastline would result in significantly more environmental impacts, including, but not limited to, negative traffic, noise, and air pollution impacts for a period of two years during construction, and long-term disturbance of, and loss of public access to, the area occupied by the wells.
 - b. The total cost of the implementation of a vertical well intake would be approximately \$650 million. (See Minimization Plan, Attachment 2.)

- c. The Regional Board finds that the installation of vertical beach wells is infeasible, and that such installation would also be infeasible even if the project were located at another site in coastal California.
66. Separately, the site-specific conditions of the Project prevent the use of vertical beach intake wells, as the EPS site does not contain over seven miles of coastline to place the necessary number of wells to meet Project capacity.
67. Horizontal wells are vertical wells that incorporate an additional series of horizontal collection arms extending into the coastal aquifer from a central collection caisson in which the source water is collected.
 - a. Due to the limited diameter of the collection arms of the horizontal wells, the production rate is limited to 1,760 gpm (2.5 MGD) per well. The Dana Point Ocean Desalination Project test well confirmed this limited production rate by documenting a yield of 1,660 gpm (2.4 MGD) from a 12-inch diameter well in that location.
 - b. Even assuming ideal conditions for this type of wells can exist elsewhere (i.e., each well could collect 5 MGD rather than the 2.5 MGD determined based on actual hydrogeological data), horizontal well intake construction would require the siting, installation and continued operation of a total of 76 horizontal wells, impacting a total length of coastal seashore of 4.3 miles and resulting in greater environmental impacts similar to those associated with the installation of vertical beach wells.
 - c. The cost for construction of a horizontal well intake system for collection of 304 MGD of seawater needed for the desalination plant operation is estimated at \$438 million. (See Minimization Plan, Attachment 2.)
 - d. The Regional Board finds that the horizontal intake system is infeasible and that such installation would also be infeasible even if the project were located at another site in coastal California.
68. Additionally, specifically within AHL, the limited width of the alluvial channel permits placement of approximately only 14 horizontal wells, for a total production rate of 28,000 gpm (40 MGD), significantly below the Project's required production of 304 MGD. The horizontal intake system would require installation of nine large pump stations located on Tamarack State Beach, disrupting public access to marine and beach resources. A horizontal intake system is infeasible due to site-specific conditions as well.
69. Slant-drilled wells are drilled at an angle from the beach or from further inland, with a perforated well casing that extends below the seafloor to intercept water from below the substrate.

- a. The use of slant wells is infeasible because pilot testing indicates that the quality of the water available from subsurface intakes would be so low as to be difficult, if not impossible, to treat due to salinity concentrations twice that of seawater, excessive iron, and high levels of suspended solids.
 - b. Studies performed by the Discharger confirm that, at best, one slant well could provide only 5 percent of the water required by the Project. (See Poseidon Resources Corporation Transmittal of Analysis of Alternative Subsurface Seawater Intake Structures, Proposed Desalination Plant, Carlsbad, CA, Wiedlin & Associates (January 30, 2007), sent to California Coastal Commission February 2, 2007; Coastal Commission Findings adopted August 6, 2008, page 49 of 106, and note 71.)
 - c. A recent study conducted by the Municipal Water District of Orange County (MWDOC) showed that slant-drilled wells could be used to draw in 30 MGD of seawater for a proposed desalination facility near Dana Point through the use of nine, 500-foot wells extending under the seafloor, each with buried submersible electric pumps. Relying on the results of this study, the Board finds that approximately ninety, 500-foot wells would be required to be installed along the coastline to supply 304 MGD. Regardless of Project location, many multiple slant wells would be needed to meet Project objectives.
 - d. The Regional Board finds that this option is infeasible at any location in coastal California because it would disrupt public beach access and recreation and create greater environmental impacts and costs.
 - e. The total construction costs for implementation of slant wells would exceed \$410 million. This represents a significant 139 percent increase in construction costs for the Project, which not only would defeat the Project objective of providing affordable water supply to the San Diego Region, but would render the Project infeasible. (See Minimization Plan, Attachment 2.)
70. An infiltration gallery consists of a series of perforated pipes that are placed in a trench dug on the seafloor, which is then backfilled with sand.
- a. To meet the source water intake feed rate of 304 MGD needed for the Project, 146 acres of ocean floor would need to be excavated to build a seabed intake system of adequate size, impacting three linear miles of sensitive nearshore hard bottom kelp forest habitat.
 - b. The excavation of a 146-acre/3-mile-long strip of the ocean floor at depth of 15 feet in the surf zone to install a seabed filter system of adequate size to supply the CDP would result in a very significant impact on the benthic marine organisms in the excavated area. (See Poseidon Resources Corporation,

Additional Analysis of Submerged Seabed Intake Gallery, October 8, 2007; Coastal Commission Findings Adopted August 6, 2008, pages 49 and 50 of 106, and note 73.)

- c. The Board finds that an infiltration gallery is infeasible and that such seawater intake system would also be infeasible even if the project were located at another site in coastal California.
 - d. The cost for construction of subsurface seabed intake system for collection of the 304 MGD of seawater needed for the desalination plant operation is estimated at \$647 million, 215 percent higher than the cost of the entire proposed Project. Such an increase in costs would render the Project infeasible. (See Minimization Plan, Attachment 2.)
71. In addition, the subsurface seabed intake system would be infeasible due to site-specific geologic conditions at the City of Carlsbad.
- a. To collect the seawater from the filter bed and transfer it to the CDP, the intake system would require 76 collector pipelines on the ocean floor connected to pump stations that would be installed on Tamarack State Beach, which would limit public access to the beach for a period of 2 to 4 years, result in significant loss of recreational activities for the City of Carlsbad, and result in a permanent loss in public access and visual resources impacts where the collection wells are located. (See Poseidon Resources Corporation, Additional Analysis of Submerged Seabed Intake Gallery, October 8, 2007; Coastal Commission Findings adopted on August 6, 2008, page 50 of 106.)
 - b. Excavation of a three-mile-long-by-400-feet-wide strip of seafloor will make this area of the ocean unavailable for recreational activities such as fishing and diving and will result in additional NOx and carbon dioxide gas emissions associated with operation of barges and platforms and equipment needed to excavate and remove the ocean shelf material over this vast area. (*Id.*)
 - c. In order to secure consistent operation of the filter bed, this bed would need to be dredged every one to three years to remove the sediment and entrained marine life that would accumulate in the intake filter bed and over time will plug the bed. The dredged material would need to be disposed away from the one-mile strip of the intake filter bed in order prevent the removed solids from returning to the area of the bed. This will not only result in frequent adverse impacts of the marine flora and fauna in the area but will also render the area unavailable for recreational activities during maintenance activities. (*Id.*)

New Open-Ocean Intake

72. The Minimization Plan includes an analysis of whether the construction and operation of a new offshore intake to serve the seawater supply needs of the CDP would be a feasible alternative to the use of the existing EPS intake system. Based upon this evaluation, the Regional Board concludes that the construction and use of an offshore intake system would not reduce the frequency of dredging in AHL, would cause permanent construction-related impacts to the marine environment and would shift entrainment to a more sensitive area of the marine environment, which would affect a greater diversity of species. Use of an offshore intake system is infeasible and not the environmentally preferred alternative. Construction of an offshore intake system would render the Project infeasible due to a significant increase in project costs. (See Poseidon Resources Corporation, Analysis of Offshore Intakes, October 8, 2007 (including attachments); Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low-Flow vs. No-Flow Alternatives, Jenkins and Wysal, September 28, 2007; Coastal Commission Findings adopted August 6, 2008, page 51 of 106.)
73. In addition, the Discharger evaluated a draft EIR commissioned by the State Lands Commission related to an AHL jetty extension project (Jetty EIR). Based on this evaluation, the Regional Board concludes that the Jetty EIR does not analyze the full extent of the biological impacts of installing a large diameter pipe 1000 feet offshore, which, depending on placement, would potentially destroy existing rocky reef outcroppings occurring offshore. (See Issues Related to the Use of the Agua Hedionda Inlet Jetty Extension EIR to Recommend An Alternative Seawater Intake for the Carlsbad Desalination Project, Graham, Le Page and Mayer, October 8, 2007.) In addition, the Jetty EIR did not evaluate the down-coast effects of an intake structure on habitat, sand flow, or sedimentation. (See *id.*) Further, the Jetty EIR did not adequately evaluate entrainment and impingement impacts of an offshore intake. The Regional Board concludes that an offshore intake has the potential to affect a greater diversity of adult and juvenile organisms, as well as both phyto and zooplankton species, than the species currently impacted by the EPS's existing intake. (*Id.*) The biofouling community of organisms that will take up residence in the intake pipe will consume virtually all of the entrained plankton. This has implications for the survival potential of organisms that can survive passage through the EPS. (*Id.*)

Modifications to Existing Power Plant Intake System

74. The Minimization Plan includes an analysis of the implementation of alternatives associated with the modification of the existing the EPS intake and screening facilities, including: (a) modified traveling screens with fish return; (b) replacement of existing traveling screens with fine mesh screens; (c) new fine mesh screening structure; (d) cylindrical wedge-wire screen; (e) fish barrier net; (f) aquatic filter barrier; (g) fine mesh dual flow screens; (h) modular inclined screens; (i) angled screen systems; (j) behavior barriers; and (k) installation of variable frequency drives on existing EPS intake pumps. These alternative modifications to the existing EPS intake system are infeasible for the following reasons:

- a. Implementation of the alternatives associated with the modification of the existing power plant intake and screening facilities were infeasible because they would interfere with, or interrupt, power plant scheduled operations, in violation of Lease Amendment Public Resources Code Section 8727.1.
- b. The complex and costly modifications to the existing intake, along with prolonged periods of power plant downtime, are not prudent in light of the limited environmental benefits of these modifications.
- c. Taking into account economic, environmental and technological factors, the power plant intake screening alternatives are not capable of being accomplished in a successful manner within a reasonable period of time.

Installation of Variable Frequency Drives (VFDs) on Seawater Intake Pumps

75. The Minimization Plan identified intake technologies the Discharger will employ to reduce intake and mortality of marine organisms during temporary or permanent shutdown of the EPS. The Regional Board finds that the installation of VFDs on CDP intake pumps is a feasible impingement, entrainment and flow reduction technology measure for the site-specific conditions of the CDP. The desalination plant intake pump station will be equipped with a VFD system to closely control the volume of the collected seawater. As water demand decreases during certain periods of the day and the year, the VFD system will automatically reduce the intake pump motor speed and decrease intake pump flow to the minimum level needed for water production. If a VFD system is not available, the CDP intake pumps would collect a constant flow corresponding to the highest flow requirements of the CDP. The installation of a VFD system at the intake pump station would reduce the total intake flow of the desalination plant compared to constant speed design, resulting in the proportional decrease in entrainment associated with desalination plant operations. In addition, by reducing the intake flow and velocity, the CDP will further minimize impingement.
76. Under the conditions of co-location operations for the CDP's benefit, the Discharger has little control over the intake structure and little flexibility to implement different technologies. Under these circumstances, the Discharger has identified the best available technologies feasible to minimize the intake and mortality of marine life at this time. Because different or additional technologies related to the existing seawater intake may be feasible under stand-alone operations with a permanent shutdown of the EPS, the Regional Board will require a re-evaluation of the CDP's compliance with Water Code Section 13142.5(b) under those conditions.

MITIGATION

77. Chapter 6 of the March 27, 2009 Minimization Plan addresses the best available mitigation feasible to minimize the intake and mortality of marine life pursuant to CWC Section 13142.5(b).

78. The Minimization Plan provides for the implementation of mitigation in addition to, as opposed to in lieu of, site, design, and technology measures to minimize the intake and mortality of marine life.
79. Chapter 5 of the Minimization Plan estimates potential entrainment and impingement that may be associated with the CDP under conditions tantamount to stand-alone operations with a permanent shutdown of the EPS. That is, these estimates assume that the CDP receives all 304 MGD of its source water from AHL and no water from the EPS's discharges. These estimates are not reduced to account for co-located operations.
80. Chapters 3 and 4 of the Minimization Plan describe design and technology measures that the Discharger will implement to reduce the intake and mortality of marine life. The Minimization Plan does not quantify or account for the entrainment and impingement reductions that will result from the implementation of these design and technology measures.
81. Because the impingement and entrainment estimates provided in the Minimization Plan are not reduced to account for co-located operations, i.e., the amount of impingement and entrainment that will be avoided by the CDP's re-use of the EPS's discharge water, and are not adjusted for design and technology features expected to reduce impingement and entrainment, the impingement and entrainment estimates are conservative.
82. Chapter 6 of the Minimization Plan prescribes mitigation requirements, the implementation of which will fully offset the potential entrainment and impingement identified in Chapter 5. It is described in Section C, below.

A. Entrainment

83. The CDP's entrainment was projected using the Empirical Transport Model ("ETM"), which is a widely used model to estimate mortality rates resulting from water intake systems. The ETM calculates what is known as the Area of Production Foregone (APF)—a value that represents the number of acres of habitat that will provide wetlands benefits sufficient to mitigate for the fish larvae that pass through the intake screens and become entrained in a water intake system.
84. The ETM is an algebraic model that incorporates two basic variables: Source Water Body (SWB) and Proportional Mortality (Pm).
85. The Source Water Body (SWB) represents the number of acres in which larvae populations are subject to entrainment. The SWB value is limited to the area in which mature fish produce eggs and larvae. If mature fish do not spawn in a given area, that area will contain no entrainable organisms—i.e., no larvae to be drawn into and entrained by the intake system. The SWB for the CDP is primarily AHL.
86. Proportional Mortality (Pm) represents the percentage of the population of a marine species in a given water body that will be drawn in and entrained by a water intake

system. The Pm ratio is calculated by dividing (a) the number of larvae that are entrained in a water intake system by (b) the number of larvae in the same water body that are subject to entrainment (i.e., entrainable).

87. Tenera Environmental (“Tenera”) collected entrainment samples in AHL as part of its entrainment and impingement study. Because of natural variation in the sampling data, each sample collected by Tenera represents an estimate of the actual Pm—i.e., the actual percentage of the population that becomes entrained through the intake system.
88. Because entrainment sampling does not enable direct counting of entrained larvae, scientists apply standard error estimates to the SWB and Pm values and, using principles of statistics, calculate confidence intervals to indicate the reliability of the APF estimates.
89. Based on the entrainment data derived from sampling at the EPS intake, Tenera estimated the proportional entrainment mortality (Pm) of the most commonly entrained larval fish living in AHL by applying the ETM to the complete data. To estimate the CDP’s potential entrainment, Tenera computed the values based on a total flow rate of 304 MGD. Tenera concluded that the entrainment effect of the Project’s stand-alone operation would influence 36.8 acres of Agua Hedionda Lagoon (i.e., APF = 36.8 acres).
90. The ETM results presented in the Minimization Plan incorporated the following assumptions:
 - a. Assumes 100% mortality of all marine organisms entering the intake. The ETM does not take into consideration any of the design and technology features that would be incorporated in the project to avoid effects to marine life (e.g., beneficial reuse of the EPS discharge, variable frequency drives, etc.). The actual effects to marine life are expected to be lower given these features.
 - b. Assumes species are evenly distributed throughout the entire depth and volume of the water body. This assumption is conservative for AHL because some affected species (e.g., garibaldi) mainly inhabit the rocky area in immediate proximity to the entrance to the power plant intake, while source water is drawn from a broader area. The assumption that the species are evenly distributed results in a higher SWB value, which, in turn, results in a conservative estimate of the APF.
91. In March 2008, the Discharger provided a copy of its entrainment study to the Coastal Commission as required by Special Condition 8 of the CDP’s Coastal Development Permit. Coastal Commission staff forwarded the study to Dr. Pete Raimondi for his review and recommendations. Dr. Raimondi provided the initial results of his review and recommendations to the Coastal Commission in April 2008.

92. During the course of his review of Tenera's entrainment study, Dr. Raimondi revised the APF from 36.8 to 55.4. The bases of this upward revision to the APF were two additional assumptions.
- a. First, Dr. Raimondi added open ocean water species (e.g., the northern anchovy) to the entrainment model, even though he recognized that the water intake system's entrainment effect on ocean species is very small. (Dr. Raimondi's PowerPoint Presentation Presented to Coastal Commission Staff and Poseidon on April 25, 2008 in San Francisco; Expert Opinion On Poseidon's Marine Life Mitigation Plan, submitted by Dr. David Mayer, Ph.D. on January 26, 2009, Attachment C.) By adding ocean species, Dr. Raimondi's approach requires mitigation for a number of species that will be affected minimally by the Project's operations. The addition of ocean species to the entrainment model adds an extra layer of resource protection to the Project's mitigation obligation.
 - b. Second, Dr. Raimondi used a statistical approach of applying an 80% confidence interval to the APF, rather than the 50% confidence interval employed by Tenera. Thus, to an 80% degree of confidence, the mitigation plan identifies and accounts for any potential entrainment. This 80% confidence interval approach represents a significant departure from the way that entrainment studies have been conducted in the past, since scientists customarily apply a 50% confidence interval. (Expert Opinion On Poseidon's Marine Life Mitigation Plan, submitted by Dr. David Mayer, Ph.D. on January 26, 2009, p. 10.)
93. Statistical confidence intervals are employed when projecting entrainment impacts because entrainment sampling at the intake, which relies on the collection of very small larvae, is difficult, and similarly, determining whether the mitigation acreage will produce sufficient entrained larvae to offset such losses is difficult.
94. After reviewing Tenera and Dr. Raimondi's work, the Coastal Commission concluded that by creating or restoring up to 55.4 acres of estuarine wetlands, the Discharger "will ensure the project's entrainment-related impacts will be fully mitigated and will enhance and restore the marine resources and biological productivity of coastal waters..." (Condition Compliance Findings for Special Condition 8, Marine Life Mitigation Plan, November 21, 2008, (approved December 10, 2008), p. 19 of 19.)
95. The ETM is a species-specific model, based on the notion that entrainment is a particularized effect on an ecosystem, and does not wholly eliminate its value. The modeling focuses on the main species subject to entrainment, based on their absolute numbers and also their relative proportional mortality. The Regional Board concurs with the Coastal Commission and the Scientific Advisory Panel's (SAP) conclusion that "the APF is used to determine impacts to only those species affected by entrainment, and the mitigation resulting from the APF is meant to account only for those effects." (Condition Compliance Findings for Special Condition 8, Marine

Life Mitigation Plan, November 21, 2008, (approved December 10, 2008) p. 12 of 19.)

96. The Regional Board also agrees with the SAP's finding that "entrainment studies do not assume the complete loss of ecosystem function within an area of APF; instead they identify only the area that would be needed to replace the numbers and types of species identified in the study as subject to entrainment." (*Id.* at 12.) The mitigation wetlands will provide entrainment mitigation by replacing "the numbers and types of species identified in the study as subject to entrainment." (Condition Compliance Findings for Special Condition 8, Marine Life Mitigation Plan, November 21, 2008, (approved December 10, 2008) p. 12 of 19.)
97. The main species subject to entrainment, and thus modeled, consist of the most commonly entrained lagoon species (i.e., gobies, blennies, garibaldi) and the most commonly entrained ocean species (i.e., white croaker, northern anchovy, California halibut, queenfish, spotfin croaker).
98. Of the acres that Discharger has agreed to create or restore under the MLMP:
 - a. 88% are designed to provide mitigation for the potential entrainment of the most commonly entrained lagoon species—gobies, blennies and garibaldi. These three lagoon species account for approximately 95 percent of the larvae entrained at the EPS intake. (Impingement Mortality and Entrainment Characterization Study, "Effects on the Biological Resources of Agua Hedionda Lagoon and the Nearshore Environment" (Tenera Environmental, 2008), Table S-1 at page S-6.)
 - b. 12% are designed to provide mitigation for the potential entrainment of the most commonly entrained ocean species—white croaker, northern anchovy, California halibut, queenfish, spotfin croaker. These five ocean species account for less than 5 percent of the larvae entrained at the EPS intake. (*Id.*)
 - c. 0% are designed to provide mitigation for the entrainment of any other species.

B. Impingement

99. Like the entrainment projection, the CDP's impingement projection was calculated using data collected pursuant to the EPS's Regional Board-approved 316(b) Impingement Mortality and Entrainment Characterization Study plan. Tenera collected 52 impingement samples on a weekly basis during the period from June 1, 2004 to May 31, 2005. Unlike entrainment sampling, impingement sampling is relatively straightforward and does not require statistical interpretation such as confidence intervals. Surveyors can simply count and record the number and weights of impinged fish found at the intake on the sample days.

100. The California Coastal Commission found that when operating under stand-alone conditions, the Discharger is expected to impinge a “*de minimis* and insignificant” quantity of fish biomass. (Adopted Findings—Coastal Development Permit Application E-06-013, Approved August 6, 2008, page 39 of 106.) The Coastal Commission’s determination as set forth in its findings was based on several facts.
- a. First, the Commission noted that “the project EIR at Section 4.3 and Poseidon’s 2004-2005 study described below showed that it would not cause impingement at levels beyond those caused by the power plant and that its use of the power plant intake would impinge about 20,000 fish per year (or about 55 per day) weighing a total of about 4500 pounds (or about 12 pounds per day). During the study period, however, most of this impingement – about 80% – was caused by power plant heat treatments, which Poseidon would not have to do as a stand-alone desalination facility.”
 - b. Second, the Commission noted that the City of Carlsbad EIR determined that under stand-alone “No Power Plant Operation” scenario, “the project would have an intake flow velocity that would not exceed 0.5 feet per second, which is consistent with the U.S. EPA guidance for ‘best available technology’ for cooling water intakes, and that under these operating conditions the project ‘would not result in significant impingement effects.’ See project EIR Section 4.3.”
 - c. Third, the Commission noted that, with regard to endangered Eastern Pacific green turtle, the existing power plant conditions, including slow moving water through the intake trash racks, minimize the possibility of impingement of sea turtles. The CDP would not change these features, and would substantially reduce the seawater pumping rate when operating in stand-alone mode.
 - d. Fourth, the Commission also relied upon the proposed June 2007 version of the Flow, Entrainment and Impingement Minimization Plan prepared by Poseidon, which estimated that the stand-alone impingement of the CDP would be “2.12 pounds of fish per day.” The Commission noted that the 2.12 pounds of fish per day estimate was “less than the average daily consumption of an adult pelican (more than 2.5 pounds per day), which for this project the Commission considers *de minimis* and insignificant.”
101. Although the Commission had several bases, as described above, for its conclusion that the impingement associated with CDP in stand-alone mode will be *de minimis*, its conclusion was premised in part on a miscalculation by Discharger in the June 2007 version of the Flow, Entrainment and Impingement Minimization Plan that resulted in an underestimation of the Discharger’s estimated daily impingement (i.e., 0.96 kg/day or 2.12 pounds of fish per day was an incorrect estimate). Discharger’s corrected impingement calculation is 1.56 kg/day.

102. On April 17, 2008, the Regional Board Staff notified the Discharger of an impingement miscalculation in the Flow, Entrainment and Impingement Minimization Plan that the Discharger submitted in March 2008. Staff discovered this calculation error after reviewing the publicly available impingement data that the Discharger had disclosed in several previous submittals. (See, e.g., June 2007 Minimization Plan Table 3-2 and March 2008 Minimization Plan Table 5-1.)
103. On April 30, 2008, the Discharger acknowledged and corrected the impingement calculation error. The Discharger corrected the impingement miscalculation by making three changes. First the Discharger no longer divided by 365 days (instead of 52) to calculate the average daily impingement. Second, the Discharger applied a linear regression to adjust the EPS's average daily impingement to account for the CDP's relatively lower flows. Third, the Discharger's revised calculation excluded two outlier days from the EPS dataset of relatively higher impingement (January 12 and February 23, 2005), which Discharger's expert Dr. David Mayer determined were the result of events unlikely to occur under a typical operating scenario.
104. The net result of the recalculation was to correct the impingement value from approximately 0.96 kg/day to 1.56 kilograms per day, still a *de minimis* amount according to the expert opinion of Dr. David Mayer. (See April 30 email from Mr. Peter MacLaggan to Ms. Chiara Clemente; Expert Opinion On Poseidon's Marine Life Mitigation Plan, submitted by Dr. David Mayer, Ph.D. on January 26, 2009).
105. Thus, in its April 30, 2008 memorandum to Regional Board Staff, the Discharger provided a revised estimate of 1.56 kg/day by applying a regression analysis that accounts for the generally accepted relationship between flow and impingement.
106. The relationship between flow and impingement is generally accepted as an established scientific principle. (See Minimization Plan Attachment 5). This relationship was observed during the two most recent sampling surveys (1979-1980 and 2004-2005). The 1979-1980 data indicated that "in general, levels of impingement increased in relation to increasing flow rates of the cooling water" (Encina Power Plant Cooling Water Intake System Demonstration (1980), San Diego Gas & Electric, at p. 7-76), while the 2004-2005 data reflected a relationship between flow and impingement when the two outlier days of relatively higher impingement (January 12 and February 23, 2005) were excluded.
107. On January 26, 2009, Dr. David Mayer of Tenera Environmental submitted to the Board additional detail about the regression analysis and estimation of an impingement impact of 1.56 kg (3.45 pounds) per day previously submitted to the Board staff on April 30, 2008.
108. At the February 11, 2009 Regional Board meeting, the Regional Board Staff requested that the Discharger provide a flow-proportioned impingement calculation as an alternative to the regression analysis that the Discharger had submitted ten months prior. The Regional Board identified this request as outstanding issue

number three (3)—i.e., “Poseidon to provide the flow-proportioned calculations for Poseidon’s impacts due to impingement, to help support the Board’s determination that these impacts are *de minimis*”—and directed staff to work with the Discharger to expeditiously address this issue.

109. Following the February 11, 2009 Regional Board meeting, Discharger met with Regional Board Staff by teleconference on several occasions. During these teleconferences, Staff asked Discharger to adjust the 2004-2005 EPS impingement data in a number of ways so as to produce a variety of different flow-proportioned calculations. Discharger complied with these requests by submitting the calculations to Regional Board Staff on February 26, 2009. (Letter from Ms. Amanda Halter, Esq. to Dr. Deborah Woodward, February 26, 2009.) According to these flow-proportioned calculations, which included the outlier data, the CDP’s potential impingement was estimated to be 3.74 kg/day.
110. After receiving the flow-proportioned calculations from the Discharger, Staff continued to express concerns with respect to the methodologies for projecting impingement. Discharger responded on March 9, 2009 by submitting a memorandum describing five (5) additional approaches that could be used to estimate the potential for impingement when the CDP operates in stand-alone mode. (See Minimization Plan Attachment 5.) Depending on their treatment of the outlier sampling events and the extent to which they account for the relationship between flow and impingement, these various approaches produce a projected impingement estimation in a range between 1.56 – the Discharger’s regression analysis – and 7.16 kg/day – an estimation that assumes that the CDP’s impingement will be equivalent to the EPS’s despite the CDP’s lower flows.
111. On March 27, 2009, Discharger submitted a memorandum (see Minimization Plan Attachment 9), which refined the impingement analysis by providing additional analysis of the outlier events. Attachment 9 concludes that the lower end of the impingement estimation range most likely reflects the impingement that may potentially be associated with the CDP’s stand-alone operations. This conclusion was based on the hydrological analyses of Drs. Jenkins and Chang. These experts employed two different methodologies to conclude that the relatively higher impingement observed on the two outlier days was preceded by record storms that have a low probability of recurrence (35-year and 25-year storms).
112. This analysis accords with additional impingement data from 1979-1980. San Diego Gas & Electric (“SDG&E”) conducted a 336 consecutive day impingement survey in 1979-1980 pursuant to Clean Water Act Section 316(b). During this period, the EPS withdrew, on average, 619 MGD of seawater through the cooling water intake system. These flows resulted in the daily impingement of 255 fish weighing approximately 2.46 kg. When these data are proportionally adjusted to account for the CDP’s relatively lower anticipated flows, the average daily impingement at 304 MGD is 1.21 kg/day (2.46 kg x 304/619).

113. The average daily consumption of one adult pelican is 4 pounds or 1.8 kilograms per day. The amount of impingement presented by the Discharger to the Board is 3.4 pounds (i.e., 1.56 kg) per day is higher than the 2.12 pounds per day considered by the Coastal Commission, but still less than the average daily consumption of one adult pelican.
114. While the Discharger contends that the amount of impingement from the CDP under standalone operations will be no greater than 1.56 kg per day (3.4 pounds per day), Regional Board staff disagrees. The Board need not resolve this dispute, because the Discharger has agreed to provide compensation for impingement at an amount equal to 4.7 kg/day – not 1.56 kg/day. 4.7 kg/day is an amount derived from an estimation approach that conservatively applies a flow-proportional approach (rather than the regression approach) and assumes 100 percent probability of the outlier events, with no discounting for expected reduced flow for these outlier events. (See Proportional Approach 3-B in Attachment 5 of the Minimization Plan.)
115. The Discharger has committed to produce up to 4.7 kg/day (1715 kg/year) of “available” fish biomass in the mitigation wetlands.
116. The mitigation wetlands are expected to produce fish biomass in excess of that which is earmarked for entrainment mitigation as described in Attachment 7 to the Minimization Plan. To the extent that the mitigation wetlands produce:
 - a. The three (3) most commonly entrained lagoon species, 12% of their biomass is available as impingement mitigation credit;
 - b. The five (5) most commonly entrained ocean species, 88% of their biomass is available as impingement mitigation credit;
 - c. All other fish, 100% of their biomass is available as impingement mitigation credit.
117. Although 12% of the biomass of the three (3) most commonly entrained lagoon species is not reserved for entrainment mitigation and, as a logical matter, may be used to offset potential impingement, Discharger has agreed to exclude this biomass from the impingement mitigation accounting. For present purposes, therefore, the biomass of these three identified most commonly entrained lagoon species is never available as impingement mitigation credit.
118. Fish productivity studies indicate that the mitigation wetlands will produce approximately 150 kg/acre/year of available fish biomass. Larry G. Allen, Seasonal Abundance, Composition, and Productivity of the Littoral Fish Assemblage in Upper Newport Bay, California, 80 Fishery Bull. 769 (1982), referenced in Attachment 7 to the Minimization Plan.
119. By committing to creating or restoring up to 55.4 acres of estuarine wetlands, Discharger provides a reasonable basis for concluding that the mitigation wetlands

will produce more than 1715 kg/year of available fish biomass, which will more than fully offset potential stand-alone impingement. The Discharger has provided expert opinion that the mitigation site(s) provided for under the MLMP assures that the Project will result in a net productivity of fish biomass and provide mitigation for both entrainment and impingement. Specifically, the Discharger concludes that every acre of subtidal mudflats and/or intertidal habitat will produce approximately 150 kg/year of available fish biomass. The MLMP's minimum standards provide that the mitigation site(s) must have potential for extensive intertidal and subtidal areas. Assuming 60% of the restored habitat consists of new subtidal and intertidal wetlands, the 37 acres to be constructed in Phase I will yield approximately 3,330 wet weight (ww)/year of available fish biomass, and the mitigation of 55.4 acres of such habitat will yield approximately 4,986 kg ww/yr of available fish biomass.

120. To demonstrate that the mitigation wetlands produce at least 1715 kg/year of available fish biomass as described in the Minimization Plan, the Discharger must conduct productivity monitoring in accordance with a plan approved by the Executive Officer pursuant to this Order. This monitoring will be for purposes of calculating available fish biomass according to the methodology presented in Attachment 7 to the Minimization Plan.
121. Thus, in addition to the use of the proposed impingement minimization design and technology described above, the Discharger has established that the mitigation site(s) provided for in the MLMP will fully compensate for both any entrainment and any impingement that may eventually be associated with the CDP's stand-alone operations.
122. Because the monitoring program provides for empirical verification of both the CDP's impingement and the effective offset of such impingement in the mitigation site(s), the Regional Board need not adopt Dr. Raimondi's statistical approach of applying confidence intervals. While such a statistical approach is appropriate for entrainment modeling because it is encumbered by monitoring difficulties, such an approach is not necessary with impingement related to this project, where subsequent empirical verification and adjustment of the biological productivity standard is possible, and required by the terms of this Order.

Board Interpretation And Application Of Section 13142.5(b)

123. Under Section VI.C.2.e. of Order No. R9-2006-0065, the Regional Board reviews the Minimization Plan to assure that the Project will be in compliance with CWC Section 13142.5(b), which provides that: "For each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating or industrial processing, the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."
124. Order No. R9-2006-0065 requires an approved Minimization Plan to ensure that the CDP complies with CWC Section 13142.5(b) when under conditions of co-location

operation for CDP benefit. To approve the Minimization Plan, the Regional Board must determine that it provides for the use of the best available site, design, technology, and mitigation feasible to minimize intake and mortality of all forms of marine life under these operating conditions.

125. Counsel for Surfrider and Coastkeeper have argued in numerous public comments and pending litigation that the Regional Board's interpretation of CWC Section 13142.5(b) must be harmonized with judicial interpretation of Section 316(b) of the federal Clean Water Act, specifically *Riverkeeper, Inc. v. U.S. E.P.A.*, 475 F.3d 83 (2007), *rev'd, remanded sub nom. Entergy Corp. v. Riverkeeper, Inc.*, No. 07-588, 2009 U.S. LEXIS 2498 (U.S. Apr. 1, 2009). To clarify, the Regional Board finds that the Project is not subject to Clean Water Act Section 316(b), and further finds that it is unnecessary to determine whether CWC Section 13142.5(b) should be interpreted in accordance with Clean Water Act Section 316(b). The Regional Board has analyzed the Minimization Plan to ensure that it provides for the use of the best available site, design, technology, and mitigation feasible to minimize intake and mortality of all forms of marine life, as is required to satisfy CWC Section 13142.5(b).
126. Counsel for Surfrider and Coastkeeper have also argued in numerous public comments that CWC Section 13142.5(b) must be interpreted to require avoidance of intake and mortality first, and then mitigation of any residual intake and mortality that cannot be avoided. In accordance with this theory, they argue that CWC Section 13142.5(b) creates a hierarchy for minimization, pursuant to which site, design, and technology approaches must be selected first, with resort to mitigation only if those three approaches do not minimize intake and mortality. In this instance, this theory is irrelevant as those mitigation measures set forth under the Minimization Plan and, correspondingly the MLMP, are being made in addition to, and not in place of, measures taken under the site, design and technology elements of CWC Section 13142.5(b) to minimize intake and mortality of marine organisms by impingement and entrainment.
127. The theory put forth by counsel for Surfrider and Coastkeeper that CWC Section 13142.5(b) creates a hierarchy of actions also is incorrect. CWC Section 13142.5(b) does not express any preference for site, design and technology, over mitigation. It does not characterize the former three approaches as avoidance approaches, to be distinguished from mitigation. It does not reserve mitigation only for those situations where intake and mortality cannot be avoided. Rather, CWC Section 13142.5(b) provides discretion to the Regional Board to strike an appropriate balance among these various factors, as may be achieved through a variety of approaches relying to greater and lesser degrees on the four approaches authorized by the California Legislature to minimize intake and mortality.
128. While unnecessary, the Regional Board has determined that its interpretation of CWC Section 13142.5(b) corresponds with the interpretation set forth by the California Court of Appeal, Sixth District in *Voices of the Wetlands v. California State Water Resources Control Board*, 157 Cal. App. 4th 1268, 1351 (2007), *modified*,

reh'g granted, No. H028021, 2008 Cal. App. LEXIS 28 (Cal. Ct. App. Jan. 10, 2008), *review granted, depublished by*, 74 Cal. Rptr. 3d 453 (2008), *reserved by*, No. S160211, 2009 Cal. LEXIS 450 (Cal. Jan. 14, 2009), which states: "California law makes mitigation a legitimate factor in certain circumstances. For example, a provision of state water law contained in the Porter-Cologne Act, which governs 'each new or expanded coastal power plant,' expressly recognizes the availability of 'mitigation measures' as one way 'to minimize the intake and mortality of all forms of marine life.' (Wat. Code, § 13142.5, subd. (b).)"

GENERAL

129. Implementation of the Minimization Plan, including its provisions related to impingement and entrainment, is not required by the federal Clean Water Act and does not represent an effluent standard or limitation within the meaning of Section 1365 of the federal Clean Water Act, 33 U.S.C.S. § 1365. By requiring implementation of the Minimization Plan, the Regional Board is requiring compliance with California Water Code Section 13142.5(b) and is mandating through this permit amendment a greater scope of coverage than that required by the federal Clean Water Act and its implementing regulations. These requirements are imposed solely as a function of state law for which there is no federal corollary, do not relate to state water quality standards, and do not relate to the planning, monitoring, and reporting requirements of the receiving waters limitations and/or effluent limitations of the CDP's NPDES permit, or any other element of the Clean Water Act's enforcement procedures.