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November 14, 2007

**TO:** Coastal Commissioners and Interested Parties

**FROM:** Alison Dettmer, Deputy Director
Tom Luster, Environmental Scientist

**SUBJECT:** Addendum to Staff Report for E-06-013 – Poseidon Resources (Channelside) LOC / Cabrillo Power II LLC

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This addendum includes several revisions to the November 2, 2007 staff report on Poseidon's proposal to construct and operate a desalination plant on the site of the Encina Power Plant. These revisions do not change staff's recommendation that the Commission deny the proposed project. *Ex parte* disclosures and other comments and correspondence received after publication of the November 2, 2007, staff report are provided under separate cover.

Staff recommends modifying the staff report as shown below in strikeout/underline:

**Page 7, Footnote 2, 3rd sentence:**

"To reduce the salinity concentrations of its discharge, Poseidon would pump an additional ~~250~~ 200 MGD into its intake…"

**Page 13, end of first partial paragraph:**

"As noted in Section 3.0 of these Findings, the Final EIR did not adequately identify the significant adverse impacts that would be caused by the facility's use of the estuarine intake. After the EIR was certified in June 2006, Poseidon provided Commission staff with results of its entrainment study showing impacts roughly equal to the loss of productivity from 37 acres of wetlands and open water in Agua Hedionda Lagoon. Poseidon also provided in December 2006 and March 2007 technical papers showing the amount of lagoon sedimentation caused by use of the intake."

**Page 16, second paragraph:**

"However, the project as currently proposed would allow for only limited exchanges, since it does not include several elements of public infrastructure needed to distribute the water. Poseidon's proposal includes pipelines and pumps necessary to transport its produced water to Carlsbad's Maerkle Reservoir, which serves parts of Carlsbad and neighboring Oceanside and Vista only, and its other pipelines would serve parts of some other neighboring communities. Getting water from this reservoir to the regional

distribution system where it would be usable or tradable by other water agencies would require an additional pump station and pipeline between the reservoir and elements of the regional system located further inland and several hundred feet higher in elevation. This new pump station and pipeline are not a part of the proposed project, but instead are included in the SDCWA's 2007 Draft Integrated Water Resource Management Plan, which has not yet been evaluated under CEQA or approved and funded by any agency. This Plan shows that the anticipated capital costs for these facilities are $80 million and ongoing operations and maintenance costs would be $2.5 million. These costs would need to be added to any costs charged by Poseidon and would represent a substantial additional cost to any purchaser needing to either obtain the desalinated water via the regional system or use that system to trade with other agencies. The Borego Water District, in its Board meeting minutes of September 26, 2007 describing its consideration of water purchases from the proposed desalination facility, identified the expected transmission costs as $140 per acre-foot. Cost issues are described in more detail later in this Section. Without the additional infrastructure, the actual usable water from Poseidon's proposed facility would be limited to water to those areas in and near Carlsbad."

**Page 16, last paragraph:**

"Further, Maerkle Reservoir is currently designated by Carlsbad as its required emergency storage reservoir – that is, water stored there is meant to provide the City with a 10-day emergency water supply – and, as noted in the City of Carlsbad Water Master Plan Update (March 2003), that designation would have to be changed to allow Poseidon to use the reservoir to store or transport water to the regional distribution system. That change would presumably have to identify an alternative 10-day emergency source for Carlsbad, and the necessary analysis for this change has not yet occurred."

**Page 19, last bullet:**

- "Additional costs to pump water into SDCWA distribution system: As noted above, Poseidon's current proposal includes installing the pipelines and pumps needed to deliver water only to Carlsbad's Maerkle Reservoir and parts of Vista and Oceanside. Transporting water to other entities would require an additional pipeline from the reservoir to the regional distribution system along with an additional pumping station and additional electricity costs. SDG&E's most recent cost estimates for these components are $80 million in capital costs and $2.5 million per year in operations and maintenance costs (which presumably include electricity costs), which would have to be reflected in the costs of water for any entity other than Carlsbad, Vista, or Oceanside. The additional operations and maintenance costs alone would add about $125 per acre-foot to the approximately 20,000 acre-feet that may need to reach the regional distribution system. As noted above, recent minutes of the Borrego Water District identify the Authority's expected distribution charge as $140 per acre-foot."

**Page 21, last paragraph:**

"Additionally, Poseidon's operations would cause additional sedimentation in Agua Hedionda, which is listed by the State and Regional Boards as an impaired water body due in part to high rates of sedimentation. The federal Clean Water Act requires that states develop a plan to restore waterbodies that are listed as impaired by removing or limiting the causes of impairment. The NPDES permitting program, at 40CFR22 prohibits issuance of a permit where a new source would contribute a pollutant to a waterbody already listed as impaired due to that pollutant, unless a plan is in place that demonstrates how the waterbody would be brought back in to compliance with the water quality standards (see also, for example, the U.S. Ninth Circuit Court's decision on *Friends of Pinto Creek vs. U.S. EPA*, October 4, 2007). The Board has not yet developed the required plan (known as a Total Maximum Daily Load, or TMDL) for Agua Hedionda. As noted in the Carlsbad Watershed Plan, developed pursuant to an NPDES Permit issued in 2001 by the State Water Quality Control Board, continued use of the power plant intake by either Poseidon or Cabrillo would contribute to the high sedimentation rate in the lagoon. As described later in these Findings, Poseidon's studies show that sedimentation at the mouth of the lagoon caused by use of the intake results in increased sedimentation within the area of the Inner Basin identified as impaired. For example, in describing sedimentation caused by the intake, Poseidon states that the build-up of sediment near the lagoon mouth restricts the tidal prism so that outflows from the Inner Basin are both reduced and slowed, resulting in the lagoon having insufficient transport capacity to reduce the sediment load in the Inner Basin. This issue will likely require further consideration by the Regional Board as part of its ongoing review of Poseidon's provisional NPDES permit, which was issued in June 2006 before these studies were provided.

**Page 30, second paragraph:**

"Poseidon has argued that this expected entrainment impact does not constitute a significant adverse impact. It states, for example, that because there are large numbers of planktonic organisms in estuarine water and because they experience a very high natural mortality rate, the effects of entrainment are generally similar to what these organisms already experience. Poseidon further states that the "cropping" of these organisms via entrainment is beneficial in that it allows remaining individuals to have less competition. These arguments, however, are not supported by findings from the past several years of entrainment studies conducted at power plants along the California coast and elsewhere in the U.S. In all entrainment studies done at California's coastal power plants, and per guidance from the U.S. EPA, entrainment mortality is assumed to be 100%. Although small numbers of live organisms may emerge from the discharge, they are expected to be injured and suffer mortality shortly after being discharged. Each of the studies done in California since 1998 concluded that the power plant intakes caused in significant adverse impacts to local or regional marine biota.[1] Some studies evaluated intake volumes in the same range as those proposed by Poseidon – for example, the entrainment study for the Huntington Beach power plant determined that its use of 253 MGD of ocean water resulted in Habitat Production Foregone of over 100 acres.

[1] Since 1998, entrainment studies completed at California coastal power plants include those done at Moss Landing, Morro Bay, Diablo Canyon, Huntington Beach, and South Bay.

Each of the three recent studies done for intakes within estuarine environments identified significant adverse entrainment impacts and substantial mitigation needs. For example, the Moss Landing study showed that its 1224 MGD estuarine intake resulted in Habitat Production Foregone of 1135 acres. If applied proportionally to Poseidon's 304 MGD intake, the HPF would be about 281 acres. Similarly, the study of Morro Bay's 668 MGD intake showed an HPF of from 230 to 759 acres, which is applied proportionally to Poseidon's expected flow would result in an HPF of from 104 to 345 acres. Finally, the South Bay power plant study of a 601 MGD intake resulted in an HPF of 1003 acres, which if applied to Poseidon's flow would require 507 acres of mitigation. Poseidon's contentions that its entrainment effects would be minimal or even beneficial are further refuted by both Coastal Act and Porter-Cologne Act requirements that call for entrainment to be minimized to protect marine biology and water quality. Having seen only the study results Poseidon provided, rather than the full study,[2] it is difficult to confirm these contentions, especially in comparison to these other recent entrainment studies, all of which found significant adverse impacts and resulted in HPF and mitigation needs well above Poseidon's proposal. The previous entrainment study done at the Encina power plant in 1979 found that there was an average of more than 1400 individuals of just the ten most abundant fish species in each 100 cubic meters of estuarine water.[3] The results Poseidon provided of its more recent study did not include this information, but if the current densities are similar, Poseidon's 304 MGD intake would cause entrainment to at least 16 million fish larvae per day (i.e., 304 MGD / 100 cubic meters (or 26,400 gallons) = 11,515 x 1400 = 16,121,000). That 1979 study also found that the power plant's 795 MGD intake would cause annual entrainment losses of identified zooplankton (including Crustacea, copepods, Mysidacea, Decapoda, etc.) of $30.9 \times 10^9$, or more than 30 billion organisms per year. When applied to Poseidon's 304 MGD flow volume, this would be about 11 billion of these identified organisms per year. "

**Page 31, first two paragraphs:**

"State law prohibits any commercial or recreational take of the garibaldi (*Hypsopops rubicundus*), which is also California's state marine fish. The project EIR stated that entrainment of garibaldi should be considered a *de minimus* impact; however, this does not mesh with California state law, which establishes a total prohibition on taking the species.[4] About 6% of the organisms identified in Poseidon's study were garibaldi. Using the entrainment figures from above, this would total about one million of the 16 million fish larvae entrained each day. (6% x 16,121,000 = 967,260).

[2] Commission staff several times requested Poseidon conduct an entrainment study and then provide the study for review. As part of its June 4, 2007 submittal, Poseidon provided a technical memorandum that summarized its study results. On July 3, 2007, Commission staff again requested the full entrainment analysis used to generate Poseidon's cited HPF of 36.8 acres, but has not yet received a copy of the full study.

[3] See Cabrillo Power I LLC, Proposal for Information Collection Clean Water Act Section 316(b) Encina Power Station, April 1, 2006.

[4] 14 CCR 28.05 states that Garibaldi may not be taken or possessed.

The California halibut (*Paralichthys californicus*) would also be subject to entrainment. The study showed that about ~~1.5~~0.15% of the entrained fish would be halibut; however, this may be considered a significant number, given the steep decline in California halibut populations over the past several decades. Using the entrainment figures from above, more than 24,000 halibut larvae per day would be lost to entrainment (i.e., 0.15% x 16,121,000 = 24,181.5). The California Department of Fish and Game associates this decline with the loss of nursery habitat in shallow bays such as Agua Hedionda and has established strict limits for commercial and recreational halibut fishing.[5] Similarly, the Northern anchovy (*Engraulis mordax*) is subject to state fishing regulations and additionally serves as an important forage fish for a number of species, including the California halibut."

**Page 38, add after first paragraph:**

"Other available mitigation options that would avoid or reduce entrainment impacts include the use of a zero-discharge system or routing more of Poseidon's discharge to the sanitary sewer system, as either of these options would reduce the amount of estuarine water needed for dilution. A zero-discharge system uses either mechanical means or evaporation to re-use and reduce discharge volumes. Some of these systems may also allow some cost savings through their recovery of salts or minerals from the seawater. Although the scale of the proposed project may prevent use of a zero-discharge system for the entire amount, it could possibly used for some of the discharge, perhaps in conjunction with routing additional volumes to the sanitary sewer system at the nearby Encina Wastewater Pollution Control Facilities. Although the sewer system has its own capacity limits, the City of Carlsbad is planning to route a new sewer line adjacent to the proposed facility and it may be possible to provide some capacity for additional desalination discharges.

Other than during Poseidon's start-up and cleaning operations, the vast majority of Poseidon's discharge would consist largely of seawater. That discharge would not require sanitary sewer treatment, so could be routed downstream of the treatment facility and directly into its outfall. This would create at least two substantial benefits. First, it would allow both discharges to combine for better mixing and fewer overall impacts to the marine environment. All or some of Poseidon's 50 MGD of high salinity discharge would mix with the approximately 36 MGD of freshwater effluent discharge from the treatment facility. This mixing would allow the combined waste stream to mix more readily in the receiving water, reducing the adverse effects of both types of discharges. This approach would also result in a significant decrease in entrainment, since Poseidon would need to pull in much less estuarine water for dilution. Poseidon has not shown these measures to be infeasible."

[5] See CDFG's information at: http://www.dfg.ca.gov/mlpa/response/halibut.pdf

**Page 38, add after the third paragraph:**

"As described above, Poseidon has not yet shown that the first two mitigation steps – avoidance and minimization – are infeasible; however, it has provided a description of potential compensatory mitigation measures. On October 10, 2007, Poseidon provided to Commission staff its proposed "Coastal Habitat Restoration and Enhancement Plan" that it intends to submit to the Regional Board. Although this compensatory mitigation plan is premature, Commission staff evaluated it to determine whether it would provide adequate mitigation for Poseidon's anticipated entrainment and impingement impacts. As discussed below, the Plan does not include the level of information or certainty to determine that any of the possible measures would be implemented, would provide adequate mitigation, or would conform to Coastal Act provisions.

Poseidon contends that the Commission has no authority to require mitigation for the anticipated entrainment impact since it expects the Regional Board to address any mitigation needs. The Commission disagrees.

Coastal Act Sections 30230 and 30231 confer on the Commission authority to regulate impingement and entrainment impacts of processes that involve the intake of seawater. This authority is not affected by the limitation of Section 30412(b) that prohibits the Commission from taking any action that is "in conflict with" any determination by the State Water Quality Control Board or a Regional Board "in matters relating to water quality…." The Commission's position is that adverse entrainment and impingement effects on marine organisms are not matters of "water quality." This interpretation of the "no conflict" language of Section 30412(b) is supported by the second paragraph of that provision which provides that nothing in Section 30412(b) "shall be interpreted *in any way*...as…limiting the Commission…from exercising" its authority under the Coastal Act "except as provided in this section." (Emphasis added.)

Past Commission decisions have included findings and conditions based in part on entrainment and impingement impacts to marine resources. Recently, for example, the Commission denied the proposed BHP Billiton Liquefied Natural Gas terminal (CC # 079-06) due in part to its inadequate entrainment mitigation. In several power plant siting cases during the past seven years, the Commission found that the predicted adverse entrainment effects would be significant and would require mitigation. As noted previously, these include Moss Landing, Morro Bay, and South Bay, which have intakes in estuaries.

We note, too, that one of Poseidon's possible mitigation sites is adjacent to the San Dieguito Wetlands Restoration Project. This restoration project results from Commission's Coastal Development Permit #6-81-330 that required Southern California Edison to mitigate for the marine resource impacts caused by the San Onofre Nuclear Power Station (SONGS), which include entrainment."

**Page 39, add paragraph to end of first bullet:**

"In recent weeks, the San Dieguito watershed experienced major fire damage, which has greatly affected the Lagoon. The San Dieguito River Valley Regional Open Space Park Joint Powers Authority estimates the recent fires burned over 60% (45,000 of 74,000 acres) of the land adjacent to the river and within the park planning area. These upstream conditions suggest that landslides, sedimentation, and other phenomena resulting from the fire will create substantial disturbances downstream in the area of both the existing San Dieguito restoration area and Poseidon's possible mitigation site. These will likely affect the performance and success of existing mitigation and will affect how future proposed mitigation is implemented."

**Page 44 & 45:**

"In addition to higher than natural levels of salinity, Poseidon's discharge would include some as-of-yet unknown amounts of other constituents that would enter the discharge from various materials or methods used in the proposed facility. As noted above, these include various chemicals and the dead organic matter from organisms entrained in the intake. ~~Additionally, Poseidon has not conducted tests to determine the chronic effects of its proposed discharge.[6] Its NPDES permit requires Poseidon conduct those test before beginning operations, but they have not yet been conducted.~~

Based on the above, Poseidon's proposed discharge would likely ~~cause adverse effects to organisms~~ result in salinity levels higher than the natural range in from about eight to 44 acres of nearshore benthic habitat. Although the extent of the areas would vary continually based on environmental conditions, some areas would be subject to nearly continual salinity concentrations higher than natural salinity variations.

There are a number of feasible mitigation measures available to reduce the ~~anticipated~~ extent of the discharge's ~~adverse~~ effects.[7] As noted previously, one of the difficult issues

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~~[6] The U.S. EPA Water Quality Standards Handbook defines "chronic" as "a stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. The measurement of a chronic effect can be reduced growth, reduced reproduction, etc., in addition to lethality."~~

~~[7] Note: Poseidon contends that Coastal Act Section 30412(b) prohibits the Commission from imposing requirements on Poseidon's proposed discharge or requiring additional mitigation for its impacts beyond those imposed by the Regional Board through issuance of an NPDES Permit.~~

~~Coastal Act Section 30412(b) states:~~

> ~~*"The State Water Resources Control Board and the California regional water quality control boards are the state agencies with primary responsibility for the coordination and control of water quality. The State Water Resources Control Board has primary responsibility for the administration of water rights pursuant to applicable law. The commission shall assure that proposed development and local coastal programs shall not frustrate this section. The commission shall not, except as provided in subdivision (c), modify, adopt conditions, or take any action in conflict with any determination by the State Water Resources Control Board or any California regional water quality control board in matters relating to water quality or the administration of water rights.*~~

with Poseidon's proposal to use the existing power plant cooling water system is that some options for reducing a discharge-related impact would cause increased impacts on the intake end of the pipe. In this case, Poseidon's proposal to reduce its salinity concentrations at the discharge by drawing in additional water means increasing its adverse entrainment effects at the intake. Using this dilution approach to further reduce discharge salinity levels would require pumping even more water from Agua Hedionda Lagoon, thereby increasing the already significant adverse entrainment impacts. Conversely, although allowing Poseidon to discharge at higher salinity levels would require less estuarine water and cause fewer entrainment impacts, it would increase the area and level of adverse effects in the nearshore ocean waters beyond the currently anticipated levels.

Other available mitigation options that would avoid or reduce discharge-related impacts are described previously in the discussion of entrainment impacts and mitigation. They include the use of a zero-discharge system or routing more of the discharge to the sanitary sewer system. A zero-discharge system uses either mechanical means or evaporation to re-use and reduce discharge volumes. Some of these systems may also allow some cost savings through their recovery of salts or minerals from the seawater. Although the scale of the proposed project may prevent use of a zero-discharge system for the entire amount, it could possibly used for some of the discharge, perhaps in conjunction with routing additional volumes to the sanitary sewer system. Although the sewer system has its own capacity limits, the City of Carlsbad is planning to route a new sewer line adjacent to the proposed facility and it may be possible to provide some capacity for additional desalination discharges. Additionally, if these systems were used to reduce either the overall amount of Poseidon's discharge or the concentration of salt and other minerals or contaminants in the discharge, they would also allow Poseidon to pull in less water from AHL, thus reducing the facility's entrainment impacts. Poseidon has not shown these measures to be infeasible.

~~Absent the use of these measures, Poseidon would need to provide compensatory mitigation for the adverse effects its discharge would cause to some area of the seafloor~~

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~~*Except as provided in this section, nothing herein shall be interpreted in any way either as prohibiting or limiting the commission, local government, or port governing body from exercising the regulatory controls over development pursuant to this division in a manner necessary to carry out this division."*~~

~~However, as noted previously in these Findings, the Commission shares jurisdiction with the State and Regional Boards for implementing Porter-Cologne Act Section 13142.5. The Regional Board has not yet determined whether Poseidon's proposed project would conform to Section 13142.5, and therefore the Commission's Findings are not in conflict with a determination by the Board. As stated in Poseidon's NPDES permit, the Board will review Poseidon's submitted Flow, Entrainment and Impingement Minimization Plan to determine whether it complies with Section 13142.5 and what measures may be needed for Poseidon to comply. The Board has not yet reviewed Poseidon's Plan and has not imposed conditions related to the Plan so there are no Board determinations with which the Commission could conflict. Additionally, the Commission's Findings include a number of feasible alternatives and mitigation measures that the Board will likely include in its review and may, in fact, use as the basis of conditions to impose as part of Poseidon's NPDES permit.~~

~~Because the Board has not yet adopted final conditions for the Permit, the Commission's findings specifying feasible alternatives and mitigation measures do not conflict with a Regional Board determination and therefore conform to provisions of Coastal Act Section 30412(b).~~

~~along the shoreline. Its proposed mitigation plan for its entrainment impacts did not acknowledge this area as part of the needed mitigation, so in addition to the plan's shortcomings identified above, Poseidon would have to add additional mitigation measures to reflect this additional area of impact.~~"

**Page 64, last paragraph:**

"Recent letters and memoranda from Poseidon (see October 21 and 22, 2007) provide a much lower estimate of its anticipated greenhouse gas emissions. Poseidon contends that its emission rate should be based on 546 pounds of carbon dioxide emissions per megawatt-hour, based on emissions expected from the energy sources in SDG&E's energy supply portfolio. This would result in about 84,000,000 pounds of carbon dioxide per year instead of 200,000,000 pounds. However, in comparing the SDG&E portfolio with the CCAR's average California portfolio, the SDG&E portfolio appears to result in an even higher emission figure than the California average.[8] For example, coal and natural gas, which have average emission rates much higher than 804.54 pounds per megawatt-hour,[9] make up a larger proportion of San Diego's portfolio than the state portfolio. Additionally, SDG&E testimony before the California Public Utilities Commission suggests its carbon dioxide emissions are in the range of 1100 pounds per megawatt-hour, based on an average of a range of natural gas technologies and heat rates.[10] Elsewhere, SDG&E's emissions are cited as 915 pounds per megawatt-hour for electricity it purchases.[11] It appears, therefore, that Poseidon's calculations are in error. The figure it uses is derived from SDG&E's 2005 self-reported Annual Entity Emissions report, which states that SDG&E expects emissions of 546 pounds per megawatt-hour from owned and purchased generation sources; however, that figure is not supported by other SDG&E sources or by other agencies, including the California Energy Commission and State Lands Commission, in their determations related to emissions from different

[8] Poseidon provided the following percentages of SDG&E's electricity sources, and the California averages are from the California Energy Commission's 2006 Gross System Power Report:

| Resource Type: | SDG&E Percent: | State Percent: |
|---|---|---|
| Coal | 18.0 | 15.7 |
| Natural Gas | 50.0 | 41.5 |
| Large Hydro | 10.0 | 19.0 |
| Nuclear | 15.0 | 12.9 |
| Biomass | 3.0 | 2.1 |
| Geothermal | 2.0 | 4.7 |
| Small Hydro | <1 | 2.1 |
| Solar | <1 | 0.2 |
| Wind | 3.0 | 1.8 |

[9] Natural gas emissions range from about 800-1200 lbs/megawatt-hour, and coal emissions are more than 2000 lbs/megawatt-hour.

[10] See page 12 of the Prepared Rebuttal Testimony of San Diego Gas & Electric Company – J. Strack, in the CPUC's Application No. 06-08-010 for the Sunrise Powerlink Transmission project, June 25, 2007.

[11] See Powers, Bill, Assessment of Energy Intensity and CO2 Emissions Associated with Water Supply Options for San Diego County, October 12, 2007.

types of electricity sources. For example, the State Lands Commission in its October 30, 2007 hearing used 815 pounds per megawatt-hour as the basis of its review, with a "best-case" low emission rate of 690 pounds and a high rate of 1100 pounds."

**Page 77, first paragraph:**

"Along with the direct effects of higher water costs, public entities that might initially become reliant on water from Poseidon would bear the burden if Poseidon were to experience financial difficulties. In a recent news article (November 11, 2007, in the North County Times), Poseidon stated that it will operate at a loss until the cost of imported water exceeds that of its desalinated water, which it now believes will cost up to $1050 per acre-foot. Given the cost trends and concerns identified previously in Section 2.2 of these Findings, it is not apparent that the cost of imported water and desalinated water will converge any time soon. It may need to sell its facility or raise its rates, either to make its reasonably expected profit or to avoid bankruptcy. If local agencies were unable to afford either the water costs or the costs of the facility, or if its ratepayers were unwilling to pay the necessary rate increases, the water may go to a higher bidder, perhaps at some distance from the area, while the burden of supporting the facility and its environmental impacts would remain locally. This scenario is practically built into the proposed project, since Poseidon's water purchase agreements both allow for a third-party purchase and are based on an unrealistically low expectation of the price for the water. As noted previously, this scenario could lead to fragmentation of essential public services, loss of local decision-making ability about how to use that water, and other losses that are not in the public interest."

**Page 79, Footnote 85:**

"[85] Relevant timeline: On June 13, 2006, the City certified the project EIR. That certified EIR described as "speculative" the possibility that the power plant would shut down, though it included information about the increased entrainment impacts that would occur if the desalination facility operated when the power plant was not operating. On August 28, 2006, Poseidon submitted its coastal development permit application and between that date and November 9, 2007, Poseidon submitted a number of additional documents regarding entrainment, mitigation, dredging, sedimentation, alternatives, and other issues that were not part of the CEQA review. On July 25, 2007, Coastal Commission staff determined that Poseidon's CDP application was complete. On September 14, 2007, Cabrillo Power II LLC filed with the California Energy Commission its application for a new power plant that would not use seawater."

**Add all of the documents below to Appendix A, Substantive File Documents:**

"Cabrillo Power I LLC. Proposal for Information Collection Clean Water Act Section 316(b) Encina Power Station, April 1, 2006."

"Clean Air, Cool Planet. A Consumer's Guide to Retail Carbon Offset Providers, December 2006."

"Collector Wells International, Inc. Collector Wells for Filtered Seawater, n.d.; and Filtered Seawater Supply for Desalination, 2001."

"Coast Law Group. June 4, 2007 letter to California State Water Resources Control Board re: Seawater Desalination Intakes and Once-Through Cooling Regulations."

"Hunt, Henry. Filtered Seawater Supplies – Naturally, in Desalination and Water Reuse, Volume 6, No. 2."

"Latham & Watkins. Letter to State Lands Commission Re: CEQA Issues Raised for Poseidon Project By Coastal Commission Staff, October 31, 2007."

"Miri, Rachid, and Abdelwahab Chouikhi. Ecotoxicological marine impacts from seawater desalination plants, in Desalination 182, 2005."

"Powers, Bill, P.E. Assessment of Energy Intensity and CO2 Emissions Associated with Water Supply Options for San Diego County, October 12, 2007."

"State Lands Commission staff report for Poseidon Resources Channelside LLC State Lands Lease Application, October 30, 2007."
"Poseidon Resources Corporation. Application for Coastal Development Permit, August 28, 2006, including (but not limited to) attachments:

- 11 - Final Environmental Impact Report
- 12 - Verification of All Other Permits or Approvals Applied for by Public Agencies
- City of Carlsbad Resolution No. 2006-156 - EIR 03-05
- City of Carlsbad Resolution No. 420 - RP 05-12
- City of Carlsbad Ordinance No. NS-805 - SP 144 (H)
- City of Carlsbad Ordinance No. NS-806 - PDP 00-02
- Planning Commission Resolution No. 6093 - SUP 05-04
- Planning Commission Resolution No. 6092 - CDP 04-41
- Planning Commission Resolution No. 6090 - DA 05-01 / Development Agreement, Finding of Fact
- CEQA Mitigation Monitoring and Reporting Program for the FEIR
- Planning Commission Resolution No. 6094 - HMPP 05-08
- Planning Commission Resolution No. 6088 - PDP 00-02
- Planning Commission Resolution No. 6091 - RP 05-12
- Planning Commission Resolution No. 6089 - SP 144 (H)"

"Poseidon Resources Corporation. Response to California Coastal Commission's September 28, 2006 Request for Additional Information, November 30, 2006, including (but not limited to) attachments:
• 1 - San Diego Regional Water Quality Control Board, Order No. R9-2006-0065 ("NPDES Permit")"

"Poseidon Resources Corporation. Response to California Coastal Commission's December 28, 2006 Request for Additional Information (including attachments), January 19, 2006."

"Poseidon Resources Corporation. Transmittal of Analysis of Alternative Subsurface Seawater Intake Structures, Proposed Desalination Plant, Carlsbad, CA, Wiedlin &

Associates (January 30, 2007), sent February 2, 2007."

"Poseidon Resources Corporation. Response to California Coastal Commission's February 20, 2007 Request for Additional Information (including attachments), June 1, 2007."

"Poseidon Resources Corporation. Appeal of California Coastal Commission's July 3, 2007 Notice of Incomplete, July 6, 2007."

"Poseidon Resources Corporation. Response to California Coastal Commission's July 3, 2007 Request for Additional Information (including attachments), July 16, 2007."

"Poseidon Resources Corporation. Additional Analysis of Submerged Seabed Intake Gallery (including attachments), October 8, 2007."

"Poseidon Resources Corporation. Analysis of Offshore Intakes, October 8, 2007, including attachments:

- Scott A. Jenkins, Ph.D. and Joseph Wasyl. Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low-Flow vs No-Flow Alternatives, September 28, 2007.
- J.B. Graham, S. Le Page and D. Mayer. Issues Related to the Use of the Agua Hedionda Inlet Jetty Extension EIR to Recommend An Alternative Seawater Intake for the Carlsbad Desalination Project, October 8, 2007."

"Poseidon Resources Corporation. Coastal Habitat Restoration and Enhancement Plan (including attachments), October 9, 2007."

"Poseidon Resources Corporation. Updated Response to Coastal Commission's September 28, 2006 Request for Additional Information, Section 13, CDP Energy Use, GHG Production & Mitigation, October 9, 2007."

"Poseidon Resources Corporation. Transmittal of Intake Cost Estimates, October 17, 2007."

"Poseidon Resources Corporation. Climate Action Registry CO2 Conversion Calculation, October 18, 2007."

"Poseidon Resources Corporation. Updated Response to Coastal Commission's September 28, 2006 Request for Additional Information, Section 13, CDP Energy Use, GHG Production & Mitigation, October 21, 2007."

"Poseidon Resources Corporation. Transmittal of GHG Emission Baseline Protocol, October 22, 2007."

"Poseidon Resources Corporation. Transmittal of SDG&E GHG CCAR Report 2005, October 22, 2007."

"Poseidon Resources Corporation. Carlsbad Desalination Project Briefing Package, CDP Application No. E-06-013, November 2007."

"Poseidon Resources Corporation. Transmittal of Garibaldi Study and Coastal Development Permit for Southern California Edison and San Dieguito River Valley Joint Powers Authority's San Dieguito Wetland Restoration Plan, November 7, 2007."

"Poseidon Resources Corporation. Letter to Chairman Kruer and Honorable Commissioners Attaching Draft Proposed Conditions of Approval, November 7, 2007."

"Poseidon Resources Corporation. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use, November 8, 2007, including the following attachments:

- Carlsbad Municipal Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 7, 2007.
- Valley Center Municipal Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007.
- Rincon del Diablo Municipal Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007.
- Rainbow Municipal Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007.
- Sweetwater Authority. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007.
- Vallecitos Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007.
- Santa Fe Irrigation District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 7, 2007.
- Olivenhain Municipal Water District. Letter to State Lands Commission Executive Director Re: Desalination Project's Impact on Imported Water Use (including attachments), November 6, 2007."

"Poseidon Resources Corporation. Letter to T. Luster Transmitting State Lands Commission Hearing Presentation, November 8, 2007."

# Th7a

## Staff Proposed Conditions For Coastal Commission's Potential Approval of Poseidon Project

**STANDARD CONDITIONS:**

1) **Notice of Receipt and Acknowledgment:** This permit is not valid until a copy of the permit is signed by the Permittee or authorized agent, acknowledging receipt of the permit and the acceptance of the terms and conditions, and is returned to the Commission office.

2) **Expiration:** Construction activities for the proposed project must be initiated within two years of issuance of this permit. This permit will expire two years from the date on which the Commission approved the proposed project if development has not begun. Construction of the development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made at least six months prior to the expiration date.

3) **Interpretation:** Any questions of intent or interpretation of any condition will be resolved by the Executive Director of the Commission (hereinafter, "Executive Director") or the Commission.

4) **Assignment:** The permit may be assigned to any qualified person, provided the assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5) **Terms and Conditions Run with the Land:** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

**SPECIAL CONDITIONS:**

1) **Liability for Costs and Attorneys Fees:** The Permittee shall reimburse the Coastal Commission in full for all Coastal Commission costs and attorneys fees – including (1) those charged by the Office of the Attorney General, and (2) any court costs and attorneys fees that the Coastal Commission may be required by a court to pay -- that the Coastal Commission incurs in connection with the defense of any action brought against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission.

2) **Proof of Legal Interest:** PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall provide for Executive Director review and approval documentation of the Permittee's legal interest in all property needed to construct and operate the project, including:

   - Lease(s) from the California State Lands Commission for structures on state tidelands;
   - Lease(s) or other forms of approval from the power plant owner allowing the Permittee to use portions of the power plant site and Agua Hedionda Lagoon.
   - Lease(s) or other forms of approval from the City of Carlsbad and other local governments for the project's water delivery pipelines.
   - Lease(s) or other forms of approval from the City of Carlsbad and the San Diego County Water Authority for use of Maerkle Reservoir for water storage.

3) **Lease and Deed Restriction:** PRIOR TO ISSUANCE OF THE PERMIT, the applicant shall provide to the Executive Director for review and approval documentation demonstrating that the applicant and has executed and recorded against its leasehold interest(s) in the property governed by this permit a lease restriction (in which any private owner of the fee interest in such property shall join or to which it shall agree to be bound), in a form and content acceptable to the Executive Director (a) indicating that, pursuant to this permit, the California Coastal Commission has authorized development on the Property, subject to terms and conditions that restrict the use and enjoyment of the Property; and (b) imposing all of the Special Conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the Property. The restriction shall include a legal description of the Property. It shall also indicate that, in the event of an extinguishment or termination of the deed restriction for any reason, the Standard and Special Conditions of this permit shall continue to restrict the use and enjoyment of the Property so long as either this permit or the development it authorizes – or any part, modification, or amendment thereof – remains in existence on or with respect to the Property.

4) **Other Approvals:** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit to the Executive Director for review and approval documentation showing that the project has obtained final approvals for project construction and operation from the City of Carlsbad, the Regional Water Quality Control Board, the California Department of Health Services, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service, or documentation showing that these approvals are not needed.

5) **Assumption of Risk and Waiver of Liability:** The Permittee acknowledges and agrees, on behalf of itself and all successors and assigns: (i) that the may be subject to hazards from seismic events, liquefaction, storms, waves, floods and erosion; (ii) to assume the risks to the Permittee and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) that any adverse effects to property caused by the permitted project shall be fully the responsibility of the landowner.

6) **Limits of Development**: This permit authorizes the construction and operation of the Poseidon Carlsbad Desalination Project and associated infrastructure as described in the project description of this staff report, as clarified and modified by these conditions.

7) **Final Plans**: PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit to the Executive Director for review and approval final plans for the project components located in the coastal zone. The Permittee shall undertake development in accordance with the approved plans and any changes shall be reported to the Executive Director. No material changes within the coastal zone shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is necessary. Changes to the project requiring review for amendment would include changes in the physical, operational, or delivery capacity increases, or extension of water supply distribution pipelines beyond those shown on the final plans.

8) **Marine Life Mitigation Plan:** PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall submit to and obtain from the Commission approval of a Marine Life Mitigation Plan in the form of an amendment to this permit that includes the following:

   a) Documentation of the project's expected impacts to marine life due to entrainment and impingement caused by the facility's intake of water from Agua Hedionda Lagoon. This requirement can be satisfied by submitting a full copy of the Permittee's Entrainment Study conducted in 2004-2005 for this project.

   b) No less than 2:1 mitigation on an areal basis for the impacts identified above. To the maximum extent feasible, the mitigation shall take the form of creation, enhancement, or restoration of aquatic and wetland habitat within Agua Hedionda Lagoon. Remaining mitigation outside of Agua Hedionda Lagoon shall consist primarily of similar aquatic and wetland mitigation at other nearby coastal lagoons.

   c) Goals, objectives and performance criteria for each of the proposed mitigation sites. It shall identify specific creation, restoration, or enhancement measures that will be used at each site, including grading and planting plans, the timing of the mitigation measures, monitoring that will be implemented to establish baseline conditions and to determine whether the sites are meeting performance critieria. The Plan shall also identify contingency measures that will be implemented should any of the mitigation sites not meet performance criteria.

   d) "As-built" plans for each site and annual monitoring reports for no less than five years or until the sites meet performance criteria.

   e) Legal mechanism(s) proposed to ensure permanent protection of each site – e.g., conservation easements, deed restriction, or other methods.

9) **Change in Seawater Withdrawal:** If at any time during the life of the project Poseidon proposes or is required to withdraw more than an average flow of 304 MGD of seawater, it must obtain first an amendment to this permit.

10) **Energy Minimization and Greenhouse Gas Reduction Plan:** PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall submit to the Commission a Revised Energy Minimization and Greenhouse Gas Reduction Plan that addresses comments submitted by the staffs of the Coastal Commission, State Lands Commission and the California Air Resources Board. The permit shall not be issued until the Commission has approved a Revised Energy Minimization and Greenhouse Gas Reduction Plan after a public hearing.

11) **Public Access Enhancements:** PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall record one or more Public Access Easement Deed(s) in favor of one or more public agency(ies) or private association(s) acceptable to the Executive Director over four sites totaling approximately 19 acres as generally described below and as more specifically described in the coastal development permit application. The four sites are:

- Fishing Beach: approximately 3.5 to 4 acres of land along the west shore of Agua Hedionda Lagoon.
- Bluff Area: approximately 13 acres of land on the west side of Carlsbad Boulevard opposite the power plant.
- Hubbs Site: approximately 2 acres of land along the north shore of Agua Hedionda Lagoon to be used for a fish hatchery, aquatic research, and public access.
- South Power Plant Parking Area: land on the east side of Carlsbad Boulevard near the south entrance of the power plant to be used for public parking.

The Easement Deeds shall be of a form and content approved by the Executive Director, free of prior encumbrances, except for tax liens, that the Executive Director determines may affect the interest being conveyed. The Deed(s) shall provide that they shall not be used or construed to allow anyone to interfere with any rights of public access acquired through use which may exist on the property.

The Easement Deed(s) shall include stewardship plans for these easements that include the following:

- Descriptions of the allowable and prohibited uses of the easements. These descriptions shall identify the intended public uses of each easement area and the activities and structures that will be allowed or prohibited in order to support the intended uses.
- Descriptions of existing conditions within the easements, including any natural habitat areas, existing and proposed developments, and existing and proposed public accessways.
- Descriptions of how the easements will be managed to provide the allowable and existing uses described above.
- Descriptions of the funding needed to support stewardship of the easements. Based on the funding needs identified in the plan and upon approval of the plan by the Executive Director, the Permittee shall fund an endowment to provide for perennial stewardship costs.

12) **Dredging:** This permit does not authorize dredging that may be needed to maintain flows to the desalination facility's intake structure. The Permittee shall submit separate coastal development permit applications for proposed dredging operations. If dredge spoils are suitable for beach replenishment, the materials shall be placed at appropriate beach locations.

13) **Visual Resources:** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit to the Executive Director for review and approval a Screening Plan. Desalination plant exterior mechanical equipment and facilities, including tanks, heating, air conditioning, refrigeration equipment, plumbing lines, duct work and transformers, shall be screened from view on all sides visible to the public. The design and material used for screening shall be architecturally compatible with the building.

14) **Lighting Plan**: PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit a Lighting Plan to the Executive Director for review and approval. Exterior lighting for the desalination facilities shall serve the purpose of operations, security and safety only. The Lighting Plan shall demonstrate that project lighting is shielded from surrounding areas, and that only the minimum amount of lighting required for safety purposes is provided to avoid adverse effects on surrounding areas. In general, lighting fixtures shall be shielded downward and away from the ocean, lagoon and adjacent properties. Construction of the desalination plant and related facilities and improvements shall be in conformance with the approved plan.

15) **Construction Plan:** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit to the Executive Director for review and approval a Construction Plan. The Construction Plan shall identify the specific location of all construction areas, all staging areas, and all construction access corridors in site plan view in the coastal zone. The Plan shall identify any expected disruptions to public access to the shoreline and shall include measures to avoid, minimize, or mitigate for those disruptions.

    The Plan shall also identify the type and location of erosion control/water quality best management practices that will be implemented during construction to protect coastal water quality, including the following:

    - Silt fences, or equivalent apparatus, shall be installed at the perimeter of the construction areas to prevent construction-related runoff and/or sediment from entering the dunes and/or the Pacific Ocean.
    - Grading and alteration outside of the approved construction zone is prohibited.
    - Equipment washing, refueling, and/or servicing shall not take place on the beach or sandy dune area. All construction equipment shall be inspected and maintained at an off-site location to prevent leaks and spills of hazardous materials at the project site.
    - The construction site shall maintain good construction housekeeping controls and procedures (e.g., clean up all leaks, drips, and other spills immediately; keep materials covered and out of the rain (including covering exposed piles of soil and wastes); dispose of all wastes properly, place trash receptacles on site for that purpose, and cover open trash receptacles during wet weather; remove all construction debris from the beach).

- All erosion and sediment controls shall be in place prior to the commencement of construction as well as at the end of each workday. A copy of the approved Construction Plan shall be kept at the construction job site at all times and all persons involved with the construction shall be briefed on its content and meaning prior to commencement of construction. The Permittee shall notify the Executive Director at least three working days in advance of commencement of construction, and immediately upon completion of construction. The Permittee shall undertake construction in accordance with the approved Construction Plan. Any proposed changes to the approved Construction Plan shall be reported to the Executive Director. No material changes to the approved Construction Plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is necessary.

16) **Storm Water Pollution Prevention Plan:** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit for Executive Director review and approval a Storm Water Pollution Prevention Plan (SWPPP). At minimum the SWPPP shall include the following Best Management Practices (BMPs):

- Gravel bags, silt fences, etc. shall be placed along the edge of all work areas as determined appropriate by the City's construction inspector in order to contain particulates prior to contact with receiving waters.
- All concrete washing and spoils dumping will occur in a designated location.
- Construction stockpiles will be covered in order to prevent blow-off or runoff during weather events.
- A pollution control education plan developed by the General Contractor and implemented throughout all phases of development and construction.
- Severe weather event erosion control materials and devices shall be stored onsite for use as needed.

17) **Water Quality Technical Report:** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit for Executive Director review and approval a Water Quality Technical Report as specified in the City of Carlsbad Standard Urban Stormwater Mitigation Plan (April 2003) (Carlsbad SUSMP) for the post construction project site, prepared by a licensed Civil Engineer, which shall include plans, descriptions and supporting calculations. The Storm Water Management Plan shall incorporate all feasible Best Management Practices (BMPs) designed to reduce, to the maximum extent practicable, the volume, velocity and pollutant load of stormwater leaving the developed areas of the site. The plan shall include the following criteria:

- Post-Development peak runoff rates and average volumes shall not exceed pre-development conditions.
- Runoff from all parking areas, turnouts, driveways and other impermeable surfaces (e.g., roofs) shall be collected and directed through a system of structural BMPs including vegetated and/or gravel filter strips or other media filter devices. The filter elements shall be designed to 1) trap sediment, particulates and other solids and 2) remove or mitigate contaminants through infiltration and/or biological uptake. The drainage system shall also

be designed to convey runoff in excess of this standard from the developed site in a non-erosive manner.

- Provisions for maintaining the drainage and filtration systems so that they are functional throughout the life of the approved development. Such maintenance shall include the following: 1) the drainage and filtration system shall be inspected, cleaned and repaired prior to the onset of the storm season, no later than September 30th each year and 2) should any of the project's surface or subsurface drainage/filtration structures fail or result in increased erosion, the applicant/landowner or successor-in-interest shall be responsible for any necessary repairs to the drainage/filtration system and restoration of the eroded area.
- A drainage system approved by the City Engineer to ensure that runoff resulting from 10-year frequency storms of 6 hours and 24 hours duration under developed conditions, are equal to or less than the runoff from a storm of the same frequency and duration under existing developed conditions. Both 6-hour and 24-hour storm durations shall be analyzed to determine the detention basin capacities necessary to accomplish the desired results.

The Permittee shall implement and maintain the Plan for the life of the project.

CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
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| Date Filed: | July 25, 2007 |
| 49th Day: | Waived |
| 180th Day: | January 21, 2008 |
| Staff: | Tom Luster-SF |
| Staff Report: | November 2, 2007 |
| Hearing Date: | November 15, 2007 |

## STAFF REPORT
## COASTAL DEVELOPMENT PERMIT APPLICATION

| | |
|---|---|
| **APPLICATION FILE NO.:** | E-06-013 |
| **APPLICANT/ SITE OWNER:** | Poseidon Resource (Channelside) LLC / Cabrillo Power II LLC |
| **PROJECT LOCATION:** | On the Encina Power Plant site, adjacent to Agua Hedionda Lagoon, in the City of Carlsbad, San Diego County. |
| **PROJECT DESCRIPTION:** | Construction and operation of a 50 million gallon per day seawater desalination facility. |
| **SUBSTANTIVE FILE DOCUMENTS:** | See Appendix A |
| **STAFF RECOMMENDATION:** | Denial of coastal development permit application |
| **EXHIBIT 1:** | Location Map |
| **EXHIBIT 2:** | Site Layout |
| **EXHIBIT 3:** | Aerial View of Site |
| **EXHIBIT 4:** | Diagram of Subsurface Intakes |
| **ATTACHMENT 1:** | *Ex Parte* Forms |
| **ATTACHMENT 2:** | Correspondence Received: Government Officials, Organizations, and Individuals |

Click on the link at left to go to the attachments

Click on the links below to see correspondence and ex parte disclosures posted on Wednesday, November 14.

Additional Materials Part 1

Additional Materials Part 2

Additional Materials Part 3

# EXECUTIVE SUMMARY

**Project Description:** The proposed project is a seawater desalination facility to be constructed and operated at the site of the Encina Power Plant in Carlsbad, San Diego County. The facility would be owned and operated by Poseidon Resources (Channelside) LLC. It would withdraw about 304 million gallons per day (MGD) of water from Agua Hedionda, a coastal estuary, to produce about 50 MGD of potable water for sale and distribution.

The project was originally proposed to co-locate with the power plant in order to use some of the several hundred million gallons per day of water the power plant pumped from Agua Hedionda. However, the power plant owner announced earlier this year that it intends to shut down the existing plant and build a new one elsewhere on the site that would not use seawater for cooling. During the last few years, the power plant has operated at a substantially reduced level over its historical rate of use, and it is expected to operate only sporadically for a few more years once the new facility is built. As a result, the desalination facility would now operate as a "stand-alone" facility, and the analyses in these Recommended Findings are based on these "stand-alone" operations.

**Key Coastal Act Issues:**

- Protection of Marine Life and Water Quality: The project would cause significant adverse impacts to marine life and water quality in Agua Hedionda and in nearshore ocean waters. The entrainment caused by the project's use of an open-water intake within Agua Hedionda would result in a loss of productivity in the lagoon equal to that produced in no less than 37 acres of wetland and open water habitat. The project's discharge into coastal waters of its waste stream at levels of salinity higher than the natural variability of these waters would cause adverse effects to marine organisms in an area ranging from about eight to over 40 acres of benthic habitat. The Commission staff believes that either using a subsurface intake or re-locating the intake to offshore ocean waters are feasible, less environmentally damaging alternatives to using an intake located within the estuary. Either alternative would result in lessening significant adverse marine resource impacts. While Poseidon has submitted a conceptual plan to restore 37 acres of lost wetland and open water habitat, the plan lacks details necessary for the Commission to determine that significant adverse marine resource impacts will be mitigated fully. With respect to the project's discharges, Poseidon has not provided mitigation for those impacts. Accordingly, the Commission staff believes the project as currently proposed cannot be found consistent with Coastal Act Sections 30230 and 30231.

- Protection of Coastal Waters and Wetlands: The proposed project represents a non-allowable use of Agua Hedionda Lagoon, one of 19 coastal estuaries in which permitted uses are limited to very minor incidental public facilities, restorative measures, and nature study. Further, the project would require ongoing dredging of the lagoon, which would adversely affect water quality and habitat. As discussed above, using a different intake would eliminate or reduce project-related dredging within Aqua Hedionda. As currently proposed, the Commission staff believes the project cannot be found consistent with Coastal Act Section 30233.

- Energy Use and Greenhouse Gas Emissions: The project's electrical use would cause emissions of carbon dioxide of no less than 200 million pounds per year, which would result in adverse impacts to a wide range of coastal resources, as described in Section 2.5.5 of these Findings. Poseidon has stated it intends to "go carbon-neutral" – i.e., to reduce its emissions through various measures so that its facility would contribute net zero greenhouse gas emissions, but it has not demonstrated how it would implement this mitigation proposal. The Commission staff therefore believes that without Poseidon demonstrating how the project will be "carbon-neutral," the Commission cannot find the project consistent with Coastal Act Section 30253(4).

Because the proposed project is a coastal-dependent industrial facility, its inconsistencies with policies contained in Chapter 3 of the Coastal Act may be "overridden" pursuant to Coastal Act Section 30260. That policy allows the Commission to approve coastal-dependent industrial facilities that are not consistent with other Coastal Act policies contained in Chapter 3 if the proposal meets three tests. Those tests require: (1) that there be no feasible and less environmentally damaging locations for the proposed project; (2) that the project's impacts be mitigated to the maximum extent feasible; and, (3) that objection to the proposed project would adversely affect the public welfare. In applying these tests to the proposed project, the Commission staff believes, as discussed in detail in Section 2.5.6 of this report, the following:

- There are feasible and less environmentally damaging alternative locations to draw in the needed seawater (e.g., subsurface or offshore, as mentioned above).

- As described above, Poseidon has not yet demonstrated that the project's adverse marine resource effects will be mitigated to the maximum extent feasible.

- Objection to the proposed project would not adversely affect the public welfare for a number of reasons. First, the public welfare benefits of the proposed project are outweighed by the project's failure to conform to Coastal Act requirements. Staff believes that this or another desalination facility could provide part of the San Diego region's water supply and meet relevant Coastal Act requirements. Additional public welfare concerns include the project's adverse effects on ongoing publicly funded efforts to clean up and restore Agua Hedionda Lagoon and coastal waters, and the lack of public oversight and information about the project's growth implications, its stability as a water supply that public water districts would rely on, and its potential to reduce the benefits of other water supplies with lesser environmental impacts, such as conservation.

Staff therefore believes the project as currently proposed does not meet the three tests of Coastal Act Section 30260.

**Staff Recommendation:**

Staff therefore recommends the Commission **deny** coastal development permit application E-06-13.

## GLOSSARY

**Terms Used:**

- Acre-foot: An acre-foot is equal to about 326,000 gallons, which is enough to supply from one to four households for a year.

- Kilowatt-hour (kWh): As used in these findings, it refers to the amount of electricity needed to produce one kilowatt for one hour.

- Megawatt-hour (mWh): As used in these findings, it refers to the amount of electricity needed to produce one megawatt for one hour. A megawatt is 1,000 kilowatts.

- Million gallons per day (MGD): A million gallons is equal to about three acre-feet.

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# 1.0 RECOMMENDED MOTION AND RESOLUTION

## *Motion and Resolution for Coastal Development Permit Application No. E-06-013*

Staff recommends the Commission **deny** Coastal Development Permit Application No. E-06-013.

**Motion**

*I move that the Commission approve Coastal Development Permit No. E-06-013.*

Staff recommends a **NO** vote. Failure of this motion will result in denial of the permit application and adoption of the following resolution and findings as set forth in this staff report.

**Resolution**

*The Commission hereby denies a coastal development permit for the proposed development on the ground that the development will not conform to the applicable policies of the Coastal Act. Approval of the permit would not comply with the California Environmental Quality Act because there are feasible mitigation measures or alternatives that would substantially lessen the significant adverse impacts of the development on the environment.*

# 2.0 FINDINGS AND DECLARATIONS

***Note:*** Poseidon has not yet obtained landowner approval in the form of a lease from the State Lands Commission. Poseidon has therefore has not yet shown its ability to conform to Coastal Act requirements regarding a permittee's ability to comply with conditions of approval.[1] Coastal Act Section 30601.5 requires in part that an applicant demonstrate the authority to comply with all conditions of CDP approval prior to issuance of a permit. While this Coastal Act provision imposes a "prior to issuance" requirement rather than a "completeness" requirement, the Commission believes it is reasonable for Poseidon to demonstrate this ability as part of its CDP application review. It is more efficient to determine before, rather than after, whether a leasing obligation creates conflict with Commission findings or a permit condition. This is particularly important with this proposed project, where the Commission's findings must address several significant issues and potential impacts – e.g., estuarine water use, entrainment, discharge characteristics, energy use, etc. – that could vary greatly based on conditions that may be imposed on Poseidon through a State Lands lease.

Commission staff scheduled Poseidon's hearing for the November 2007 Commission meeting with the understanding that Poseidon's application for a State Lands lease would be heard in October 2007. On October 30, 2007, the State Lands Commission held a hearing on Poseidon's request for the necessary lease but declined to issue the lease and continued the hearing pending resolution of several issues that may change the project as currently proposed. Further, as described later in these Findings, Commission staff has determined that information in the project Environmental Impact Report (EIR) is not adequate for its review purposes. These issues are described in more detail below.

Nonetheless, the Commission has evaluated Poseidon's project as currently proposed. Based on information that is available, the Commission has determined that the proposed project would not conform to Coastal Act provisions.

## 2.1 PROJECT PURPOSE AND DESCRIPTION

The proposed project is a seawater desalination facility proposed by Poseidon Resources (Channelside) LLC (referred to herein as Poseidon). Poseidon's proposed facility would use about 304 million gallons per day (MGD) of water drawn from Agua Hedionda Lagoon in Carlsbad, San Diego County (see Exhibit 1), to produce 50 MGD of potable water for local and

[1] Coastal Act Section 30601.5 states:

> *Where the applicant for a coastal development permit is not the owner of a fee interest in the property on which a proposed development is to be located, but can demonstrate a legal right, interest, or other entitlement to use the property for the proposed development, the commission shall not require the holder or owner of any superior interest in the property to join the applicant as coapplicant. All holders or owners of any other interests of record in the affected property shall be notified in writing of the permit application and invited to join as coapplicant. In addition, prior to the issuance of a coastal development permit, the applicant shall demonstrate the authority to comply with all conditions of approval.* [emphasis added]

regional use.[2] At 50 MGD, Poseidon's proposed project would be the largest seawater desalination facility in the United States and in the Western Hemisphere. The proposed development also includes pipelines and pump stations necessary to deliver the produced water to a water reservoir in Carlsbad. The project's objectives include providing a local and reliable source of water, reducing local dependence of imported water, and providing water at or below the cost of imported water supplies. Poseidon has announced agreements to sell various amounts of its desalinated water to water districts in San Diego County for up to about 90 years.

**Project Setting:** The project would be located at the Encina power plant in Carlsbad on a site leased from the power plant owner, Cabrillo Power II, LLC (Cabrillo) (see Exhibit 2). During the past half-century, the power plant used water from Agua Hedionda Lagoon to cool its generating units. Poseidon's project as initially proposed in 1999 would have used some of the hundreds of millions of gallons of estuary water the power plant drew in from Agua Hedionda Lagoon to cool its generating units; however, Cabrillo recently proposed replacing the existing power plant with a new plant to be located elsewhere on the site, and which Cabrillo expects will be operating by 2010.[3] This new power plant would use dry cooling instead of using water from Agua Hedionda. Cabrillo proposes to keep two of the five units in the existing plant available for a few years beyond 2010 to provide additional grid reliability if needed, and Cabrillo anticipates that these two units would operate only a few weeks per year.

Cabrillo's announced change in the power plant's operations represents a significant change in how Poseidon's facility was originally proposed and how it was evaluated pursuant to the California Environmental Quality Act (CEQA). Poseidon's project would no longer function as a co-located desalination facility – that is, it would not re-use the estuarine water already used by the power plant – but instead would be a new "stand-alone" facility, drawing in water just for desalination. Poseidon's lease with the power plant owner would allow it to operate the power plant's pumps when the power plant is shut down and would allow the proposed desalination facility to operate for up to 90 years. These Findings evaluate Poseidon's proposal as a "stand-alone" facility and the analyses herein are based on the coastal resource impacts that would result from the "stand-alone" project.

A key environmental feature of the proposed project site is Agua Hedionda Lagoon. Several sections of these Findings address project-related impacts to the lagoon's water quality and habitat values. The description below provides a brief introduction to the lagoon and subsequent sections provide additional relevant details.

Agua Hedionda Lagoon is a coastal estuary that extends about 1.7 miles inland and is up to about one-half mile wide. It is at the downstream end of Agua Hedionda Creek, which has a watershed of about 29 square miles. The lagoon has been altered substantially over the past century or so.

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[2] The project would use about 100 MGD in the desalination process to create about 50 MGD of potable water and about 50 MGD of a high salinity discharge. The total amount would vary based on project operations – e.g., during maintenance, periods of start-up, etc. – and could be as high as 129 MGD. To reduce the salinity concentrations of its discharge, Poseidon would pump an additional 250 MGD into its intake and discharge system for dilution. This is discussed in more detail in Section 2.5.1 of these Findings.

[3] On September 14, 2007, Cabrillo submitted to the California Energy Commission its Application For Certification to start the review process needed to replace the existing power plant (Application #07-AFC-06).

It has been bridged several times – in the late 1800s for a railroad, in 1919 for the Pacific Coast Highway, and in 1967 for Interstate 5. It now consists of three main "lobes" – an Outer Basin of about 66 acres, a Middle Basin of about 23 acres, and an Inner Basin of about 167 acres. The lagoon's mouth is about 3,000 feet north of the power plant, and is maintained by two jetties extending a few hundred feet into the ocean. The jetties are on State tidelands and are leased by the State Lands Commission to Cabrillo. The power plant also has a State Lands lease for use of its discharge structure, which crosses a state beach and state tidelands to the south of the lagoon mouth (see Exhibit 3).

Before the mid-1950s, Agua Hedionda Lagoon was a shallow coastal wetland that was periodically shut off from tidal flows (the name is Spanish for "stinky water"). In the mid-1950s, Southern California Edison purchased much of the lagoon and dredged about four million cubic yards of material to create an intake channel for the power plant's cooling water system.[4] Edison sold the power plant in 1999. The power plant has operated since the mid 1950s using up to about 850 million gallons per day of water from the estuary, although its water use has declined significantly in recent years. It has required regular dredging during that time to maintain the power plant's intake channel, with at least 25 separate dredging events occurring during the power plant's history. The estuary is also used for other purposes, including aquaculture (sea bass net pens, and a mussel farm), recreation (primarily boating and beach use), and ocean research (Hubbs-Seaworld Research Institute). Cabrillo, the current owner, also allows use of the lagoon for various scientific research and monitoring activities.

The state's water quality standards identify Agua Hedionda Lagoon's listed beneficial uses as the power plant's industrial use, recreational uses, aquaculture, and habitat. The estuary is also listed as impaired, pursuant to Section 303(d) of the federal Clean Water Act, due to excess sedimentation and coliform bacteria. Additionally, the Carlsbad Watershed Management Plan[5] identifies the lagoon as being further impaired due to habitat fragmentation and the presence of invasive species. During the past several years, the lagoon experienced an outbreak of the highly invasive *Caulerpa taxifolia*, but in 2006 local and state efforts to eradicate *Caulerpa* from the lagoon were deemed successful. Monitoring for *Caulerpa* continues, however.

Despite these impacts and the degraded water quality, Agua Hedionda continues to provide significant habitat values. The California Department of Fish and Game (DFG) includes it in a list of 19 "high-priority" coastal wetlands and DFG manages a Marine Ecological Reserve within the lagoon that provides habitat for a number of listed sensitive species. These features are described in more detail in Section 2.5.1 of these Findings.

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[4] In 1999, Southern California Edison sold most of the power plant property and Agua Hedionda Lagoon to Cabrillo, although it continues to own land along the lagoon's shoreline.

[5] The Carlsbad Watershed Plan was published in 2002 pursuant to an NPDES permit issued in 2001 by the State Water Resources Control Board to the cities of San Diego County. The permit requires participating cities to develop a cooperative and coordinated watershed approach to address water quality issues. The Plan's goals include the following: "Protect coastal and wetland resources: Extra credit should be given to "Action Items" that serve to protect the wetland resources, sensitive species and fragile ecosystems associated with coastal lagoons and riverine resources. These resources are not only sensitive and highly valued, but they support a great diversity of species and tend to be "sink holes" where water quality problems become much greater."

## 2.2 BACKGROUND

### *Seawater Desalination's Role in California's Water Portfolio*

Both California and the Coastal Commission have recognized that environmentally and economically appropriate seawater desalination is an acceptable method for providing part of the state's water supply. There are currently about a dozen facilities operating along the California coast, mostly providing relatively small amounts of water to local users or to certain industrial facilities. During the past few years there has been increased interest in seawater desalination, due largely to recent advances in desalination technology, concerns about increasing the reliability over local water supplies, and reducing dependence on imported supplies. There are now about twenty proposals for new facilities to be built along the coast to serve both local and regional water needs.

The 2005 Update of California's State Water Plan expects seawater desalination to provide about 200,000 acre-feet of water by 2030. Both the Metropolitan Water District of Southern California (MWD) and the San Diego County Water Authority (SDCWA, or Authority) have included seawater desalination as part of their long-term water supply portfolio. The Authority has established a goal that seawater desalination provide 89,600 acre-feet of its water supply by 2030. Even the Southern Nevada Water Authority has identified seawater desalination as part of its long-term water supply, with its idea being that water from the Colorado River would be used in Nevada in exchange for the Nevada water users paying for desalinated water to be produced along the California coast.

Several recent initiatives in California illustrate this increased interest:

- **State Desalination Task Force:** In 2003, pursuant to AB 2717, the California Department of Water Resources convened an interagency task force[6] to report to the Legislature on potential opportunities and impediments for using seawater and brackish water desalination, and to examine what role, if any, the state should play in furthering the use of desalination technology. Based on information provided during a series of workshops around the state, the task force developed recommendations and guidelines for desalination projects proposed in California. Some key task force findings applicable to this proposed project include:

    - *Desalination can provide a reliable supply during California's periodic droughts.*
    - *Many communities and water districts are interested in developing desalination facilities as a local, reliable source of water to reduce their dependence on imported water and/or*

[6] Task Force members included representatives from: State agencies – California Department of Water Resources, Coastal Commission, State Water Resources Control Board, Central Coastal Regional Water Quality Control Board, Energy Commission, Department of Health Services, Resources Agency, California Environmental Protection Agency, Department of Food and Agriculture, CALFED, Bay Conservation and Development Commission, Department of Fish and Game, University of California; federal agencies – Bureau of Reclamation, Monterey National Marine Sanctuary; local governments and water agencies – Monterey County Health Department, City of Long Beach Water Department, League of Cities, County Supervisor Association of California, Central Basin and West Basin Municipal Water Districts, Marin Municipal Water District, Inland Empire Utilities Agency; and interest groups – California Building Industry Association, Surfrider, American Membrane Technology Association, National Water Research Institute, Clean Water Action and Clean Water Fund.

*to meet existing or projected demand. Some communities see desalination as a way to reduce their diversions from rivers and streams, thus contributing to ecosystem restoration.*

- *Technologically, desalination is a proven, effective mechanism for providing a new source of water. A variety of desalination technologies have been applied in many locations throughout the world.*
- *Economically and environmentally acceptable desalination should be considered as part of a balanced water portfolio to help meet California's existing and future water supply and environmental needs.*
- *While they vary on a site-specific level, potential impediments to seawater desalination include the environmental impacts associated with the feedwater intake and brine/concentrate disposal. As is the case with many other water management strategies, other potential issues include cost, siting and growth-inducement.*
- *With proper design and location of outfalls, brine/concentrate disposal may not be a major impediment to desalination.*
- *Seawater desalination is more energy intensive, per acre-foot, than brackish water desalination or water recycling. For energy comparison purposes, current desalination systems using reverse osmosis technology require about 30 percent more energy than existing interbasin supply systems currently delivering water to parts of Southern California. Efforts including those supported by the Bureau of Reclamation, U.S Desalination Coalition, and the National Water Research Institute are underway to increase the energy efficiency of desalination through improved membranes, dual pass processes, and additional energy recovery systems.*
- *Advantages to co-locating desalination facilities with coastal power plants using once-through cooling may include: compatible land use, use of the existing infrastructure for feedwater intake and brine discharge, location security, use of the warmed power plant cooling water as the feedwater for the desalination facility, reduction of the power plant discharge thermal plume and the potential to purchase power from the host power plant at prices below retail rates.*
- *Co-locating a desalination facility with a coastal power plant may provide a justification for the continued use of once-through cooling technology. Once through cooling technology has well-documented environmental impacts, including impacts on marine organisms.*
- *The appropriate State regulatory agencies have indicated that the siting of a new desalination facility, which utilizes any new or existing open water feedwater intakes, will require a current assessment of entrainment and impingement impacts as part of the environmental review and permitting process.*
- *Various technologies exist that may avoid, reduce or minimize the impacts of feedwater intake.*
    - *Drawing feedwater from beach wells is one way to avoid the ecological impacts of entrainment and impingement associated with open water intakes; however, the capacity of each well is limited and is subject to local hydrogeologic conditions.*
    - *Low velocity intake systems, marine fish screens, sub-floor intakes and appropriate intake pipe design and location are methods that may reduce or minimize impacts of entrainment and impingement associated with open water intakes.*
- *Water, including ocean and estuarine water, is a public resource, subject to the public trust doctrine, and should be protected and managed for the public good.*

- *The extent to which private companies are involved in the ownership and operation of proposed desalination plants varies widely, from completely private projects that may be regulated by the State Public Utilities Commission, to public-private partnerships, to projects that would be wholly owned, operated and controlled by public entities. The involvement of private companies in the ownership and/or operation of a desalination plant raises unique issues.*
- *There are implications associated with the range of public-private possibilities for ownership and operation of desalination facilities. Local government has the responsibility to make the details of these arrangements available to the public.*
- *Recently adopted international trade agreements and international trade agreements currently being negotiated may affect how federal, State and local agencies adopt or apply regulations concerning activities of public agencies or private entities with multinational ties.*
- *Desalination proposals are subject to existing regulatory and permitting processes to ensure environmental protection and public health.*
- *Environmental justice considerations include the siting of desalination facilities, determining who accrues the costs and benefits of desalination and who has the opportunity to use higher quality (desalinated) water, and the possible impacts of replacing low-cost with high-cost water.*
- *Growth inducing impacts of any new water supply project, including desalination, must be evaluated on a case-by-case basis through existing environmental review and regulatory processes.*
- *Each desalination project involves different environmental characteristics, other water supply alternatives, proposed plant ownership/operation arrangements, demographics, economics, community values and planning guidelines.*

- **Coastal Commission Report – Seawater Desalination and the California Coastal Act:** In 2004, Commission staff published a report describing many of the issues associated with seawater desalination along the California coast and discussing how proposed desalination facilities could conform to Coastal Act provisions. The report provides general information about desalination, describes the status of desalination in California, identifies key Coastal Act policies most likely to apply to proposed desalination facilities, and identifies much of the information likely to be required during review of a coastal development permit application for those facilities.

  Its key conclusions recognize that each facility will require case-by-case review due to the unique operating characteristics and environmental settings, that Coastal Act policies do not suggest overall support of, or opposition to, desalination, that there may be differences in applying those policies to public or private proposals, that the most significant potential impacts to address are likely entrainment of marine organisms and growth-inducement, and that proposed co-located facilities raise unique issues regarding Coastal Act conformity.

- **Proposition 50 Grants:** As part of Proposition 50, which Californians approved in 2002 to provide funding for a number of water-related projects around the state, the state Department of Water Resources distributed about $50 million to public agencies for various types of desalination research projects. Several of the Commission's past decisions have been in support of these projects – for example, the Commission has approved projects conducted by

the City of Long Beach Water Department to conduct pilot tests and subsurface intake methods and projects by the Metropolitan Water District of Orange County for its innovative and successful research on using slant-drilled wells for subsurface desalination intakes.

There are also a number of initiatives at local or regional levels to support or research the potential for seawater desalination to provide part of an area's water supply. For example, Southern California's Metropolitan Water District (MWD), which represents most water agencies in coastal Southern California, established a program offering to its member agencies subsidies of up to $250 for each acre-foot of desalinated seawater produced. The agencies eligible for this subsidy include the San Diego County Water Authority, Long Beach Water Department, Los Angeles Department of Water and Power, West Basin Municipal Water District, and the Municipal Water District of Orange County. The MWD has also provided about $250,000 to its member agencies for desalination research

## *Association with a power plant once-through cooling water intake system*

One of the most significant elements of Poseidon's project affecting its ability to conform to Coastal Act provisions is its proposed use of a power plant once-through cooling system. Power plants along California's coast have used these systems for the past half-century or so, but many of them are being phased-out due to increased awareness of the adverse environmental effects they cause, regulatory and policy changes, or retirement of aging power plants. These systems can pump in and discharge hundreds of millions gallons per day of seawater and estuarine water and cause significant adverse impacts to marine life and to other coastal resources. These environmental effects are described in more detail in Section 2.5.1 of these Findings.

Poseidon's proposed use of the Encina power plant intake and discharge creates significant concerns about its ability to conform not only to Coastal Act requirements but to other regulations and policies associated with such facilities. Although co-locating a desalination facility with an operating power plant cooling system can offer a number of advantages – such as re-using water already used by the power plant, using the power plant's heated discharge to allow more efficient desalination membrane performance,[7] using existing intake and discharge structures rather than having to build new ones, etc. – a number of changes in the past few years have substantially diminished the advantages of co-location. These changes, described below, have already resulted in five of California's coastal power plants announcing their intention to switch from once-through cooling to other less environmentally harmful alternatives for cooling.

These include the Encina facility. In September 2007, Cabrillo applied to the California Energy Commission to build by 2010 a new, smaller, dry-cooled power plant on site that would not use water from Agua Hedionda. Cabrillo's proposal includes removing three of the existing plant's five generating units and operating the remaining two units only part time (expected to be up to a few weeks per year) for several more years until replacement power becomes available.[8] With

[7] Poseidon obtained a patent for the process of combining ambient temperature seawater with a power plant's heated seawater discharge, which helps optimize a desalination facility's membrane performance. See U.S. Patent Number 6,946,081 awarded September 20, 2005; applied for December 30, 2002.

[8] Although the power plant has been permitted in the past to use up to about 857 MGD of estuarine water, its recent average use has been well below that amount. In the first half of 2007, for example, its average use was 120 MGD, and it had more than sixty days with no operations.

that change, Poseidon's facility would no longer be able to use water from an already operating intake system and the resulting adverse environmental impacts would be due solely to Poseidon's use of the system. Poseidon's main remaining advantage – using an existing intake and discharge structure rather than having to build a new one – becomes a disadvantage because of all the adverse environmental damages and costs associated with use of that structure. These issues and feasible alternatives are described in more detail later in these Findings.

Poseidon's switch from a proposal to use an already operating power plant intake to being a stand-alone facility would result in a highly inefficient desalination facility. At this particular site, for example, the desalination facility will require more than 300 MGD of estuarine water to create 50 MGD of potable water. Most reverse osmosis desalination facilities can produce a particular amount of potable water by using about twice that amount of seawater (i.e., a 2:1 ratio), but because of the approach used in this project to dilute Poseidon's discharge, this project would require a 6:1 ratio. This is discussed in more detail in Section 2.5.1 of these Findings.

Poseidon's proposal would also require substantially more electricity than it might otherwise use, since it would pull in far more water than is actually needed for the desalination process (304 million gallons of water instead of 104 million). Further, Poseidon is proposing to use the older and relatively inefficient existing power plant pumps rather than install newer and more efficient pumps,[9] which represents a significant inefficiency, since its 304 MGD flow requires pumping 2.5 billion pounds of water per day.

Along with these issues are a number of regulatory, policy, and legal changes that eliminate or further diminish the potential advantages of co-location:

- Entrainment/impingement studies along California's coast: California's coastal power plants have been the subject study over the past few years to determine what effects their use of seawater for cooling has on the marine environment.[10] These power plants can use from several hundred million gallons per day to over two billion gallons per day of water from the nearshore ocean, open embayments, and enclosed estuaries. Each of the studies showed these cooling water intakes cause significant adverse effects to the marine environment that in some cases extended up to dozens of miles along the coast or covered up to hundreds of acres of nearshore waters.

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[9] The power plant has five separate generating units, each with two cooling water pumps and one or two service pumps. Each unit's pumps have a different capacity, from about 73 MGD to 326 MGD. Poseidon's preferred scenario would be to operate the Unit 4 pumps, which would provide the required 304 MGD rate. The Regional Board determined that 304 MGD would be necessary to adequately dilute Poseidon's 50 MGD high salinity discharge. On June 1, 2007, Poseidon submitted to the Board a Revised Flow, Entrainment and Impingement Minimization Plan that the Board is currently reviewing. The draft Plan states that operating the Unit 4 pumps would result in a discharge of 304 MGD with a salinity level of 40.1 parts per thousand, which is the limit established in the facility's conditional NPDES permit. This operating scenario serves as the basis of the various analyses in these Findings related to entrainment, impingement, greenhouse gas emissions, and others.

[10] Since 1998, power plant entrainment/impingement studies done in California include South Bay (in San Diego), Huntington Beach (Orange County), Diablo Canyon and Morro Bay (San Luis Obispo County), and Moss Landing (Monterey County).

- California Ocean Protection Council's Once-Through Cooling Policy: In response to these studies and in recognition of the degraded quality of California's ocean environment, the California Ocean Protection Council last year adopted a policy to reduce the adverse effects of once-through cooling systems.[11] The resolution recognizes that such systems cause significant adverse impacts to the marine ecosystem. The Commission further directed its staff to complete by December 2007 a study of alternative cooling methods that would reduce impacts, urged the State Water Resources Control Board to implement the most protective controls to reduce entrainment and impingement impacts by 90-95%, and established an interagency coordinating effort to address once-through cooling issues.[12]

- Changes in regulatory / legal status of seawater intake systems: In January 2007, the 2nd Circuit Court of Appeals determined that U.S. EPA rules for regulating existing power plant cooling water intakes did not conform to Clean Water Act requirements (*Riverkeeper, Inc., v. United States EPA*, 475 F.3d 83, 97 (2d Cir. 2007). The court's decision, known as *Riverkeeper II* and which applies nationwide, found that cooling water intakes had to reduce entrainment impacts through technological measures and could not use compensatory mitigation as a means of compliance. For most power plants, this decision means that continued use of their existing cooling water systems would not comply with the Act's requirements. As noted previously, five of California's coastal power plants have since announced that they will switch to a less environmentally damaging cooling method.

  Poseidon contends that this decision has no effect on its ability to use the intake when the power plant shuts down because it would not use the intake for cooling water. However, in conjunction with that ruling, the State Water Resources Control Board is developing a Statewide Policy for Once-Through Cooling[13] that will incorporate the *Riverkeeper II* decision, which was a decision involving the federal Clean Water Act, but will also be based primarily on a state requirement that regulates more than just cooling water structures. Porter-Cologne Act Section 13142.5(b)[14] states:

  > *"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."*

  Although Poseidon's use of the power plant intake structure would not be for cooling purposes, it would be subject to this Porter-Cologne Act provision and would cause the same type of entrainment and impingement impacts both the Clean Water Act and the Porter-

[11] See Resolution of the California Ocean Protection Council Regarding the Use of Once-through Cooling Technologies in Coastal Waters, April 20, 2006.

[12] Coastal Commission staff is active in the interagency coordinating group.

[13] In July 2006, the Board initiated CEQA review for the proposed policy and is expected to issue a draft policy sometime in early 2008, with a final policy later in 2008.

[14] Pursuant to Coastal Act Section 30412(a), the Commission shares responsibilities with the State Board in implementing this section of the Porter-Cologne Act.

Cologne-Act require be avoided and minimized. This issue may be clarified sooner than the State Board's expected policy adoption date, as another case at the state level is expected to be decided in December 2007. The state Court of Appeals is expected to rule on *Voices of the Wetlands v. Calif. State Water Resources Control et al. and Duke Energy Moss Landing et al.* (a case similar to *Riverkeeper II*) about whether the adverse entrainment and impingement effects of a power plant's intake structure can be mitigated using restoration or whether it requires a technological approach to avoid or reduce the impacts.

The issues described above raise fundamental concerns about how Poseidon's proposed use of the power plant once-through cooling system would affect its ability to conform to Coastal Act provisions as well as requirements of other policy, regulatory, and legal obligations associated with its proposed use of the power plant cooling water intake structure. The Findings herein show that the proposed use of this structure would cause significant adverse impacts that would otherwise not occur. They also suggest that approval of the project as proposed could serve as a precedent for other similarly harmful uses of these environmentally destructive intake systems. Commission review of the proposal requires substantial consideration of alternatives to both the overall project and to specific project components. Other issues and changed circumstances described below – including the project's inability to distribute water without additional public infrastructure, faulty cost assumptions, and its lack of necessary regulatory approvals – contribute to additional Coastal Act nonconformity.

## *Need for additional public infrastructure*

Poseidon's proposed facility would rely on several public infrastructure components that have not yet gone through CEQA review and have not yet been approved or funded, as described below. Without these components, the project would not meet its objective of providing water to the regional distribution system and cannot provide water for use by most of Poseidon's expected water purchasers.

Poseidon has announced purchase agreements totaling 57,900 acre-feet of water per year with the following water agencies:

- Carlsbad Municipal Water Department: 22,000 acre-feet per year, or about 20 MGD
- Olivenhain Municipal Water District: 5,000 acre-feet per year, or about 4.5 MGD
- Rainbow Municipal Water District: 7500 acre-feet per year, or about 6.5 MGD
- Rincon Del Diablo Municipal Water District: 4,000 acre-feet per year, or about 3.5 MGD
- Sante Fe Irrigation District: 2000 acre-feet per year, or about 1.8 MGD
- Sweetwater Authority: 2400 acre-feet per year, or about 2 MGD
- Vallecitos Water District: 7500 acre-feet per year, or about 6.5 MGD
- Valley Center Municipal Water District: 7,500 acre-feet per year, or about 6.5 MGD

Poseidon's stated objective is to provide water to purchasers at or below the price they would pay for imported water, and its purchase agreements with these agencies are based on that objective. These agencies, all of which are members of the San Diego County Water Authority, currently purchase imported water from the Authority at rates ranging from about $250 to $700 per acre-foot, which are well below the costs anticipated for water from the Poseidon project. Cost considerations are described in more detail later in this section.

Of the purchasers above, several would not be able to receive water directly from Poseidon's facility, as they are some distance from Carlsbad – for example, the Sweetwater Authority is about twenty miles away at the southern end of San Diego Bay and both Rincon and Valley Center are several miles inland.[15] Instead, Poseidon's intent is to allow some of the agencies to trade water it has purchased from Poseidon to agencies closer to the facility in exchange for those nearby agencies' rights to imported water.

However, the project as currently proposed would allow for only limited exchanges, since it does not include several elements of public infrastructure needed to distribute the water. Poseidon's proposal includes pipelines and pumps necessary to transport its produced water to Carlsbad's Maerkle Reservoir, which serves parts of Carlsbad and neighboring Oceanside and Vista only, and its other pipelines would serve parts of some other neighboring communities. Getting water from this reservoir to the regional distribution system where it would be usable or tradable by other water agencies would require an additional pump station and pipeline between the reservoir and elements of the regional system located further inland and several hundred feet higher in elevation. This new pump station and pipeline are not a part of the proposed project, but instead are included in the SDCWA's 2007 Draft Integrated Water Resource Management Plan, which has not yet been evaluated under CEQA or approved and funded by any agency. This Plan shows that the anticipated capital costs for these facilities are $80 million and ongoing operations and maintenance costs would be $2.5 million. These costs would need to be added to any costs charged by Poseidon and would represent a substantial additional cost to any purchaser needing to either obtain the desalinated water via the regional system or use that system to trade with other agencies. Cost issues are described in more detail later in this Section. Without the additional infrastructure, the actual usable water from Poseidon's proposed facility would be limited to water to those areas in and near Carlsbad.

Further, Maerkle Reservoir is currently designated by Carlsbad as its required emergency storage reservoir – that is, water stored there is meant to provide the City with a 10-day emergency water supply – and that designation would have to be changed to allow Poseidon to use the reservoir to store or transport water to the regional distribution system. That change would presumably have to identify an alternative 10-day emergency source for Carlsbad, and the necessary analysis for this change has not yet occurred.

[15] Poseidon's proposal includes several pipeline route alternatives, for the most part outside the coastal zone, that would allow it to serve portions of the cities of Carlsbad, Oceanside, Vista, San Marcos, Escondido, Encinitas, and Solana Beach.

## *Expected Project Costs*

One of Poseidon's objectives and the basis of its purchase agreements is to provide water to water districts at or below the costs of imported water.[16] Those costs now range from about $300 to $700 per acre-foot for water districts in the San Diego area.[17] It appears, however, that, Poseidon's actual costs would be substantially higher than what local water districts are paying for imported water and its proposed project would therefore not meet this stated objective.[18]

In July 2007, Poseidon provided the following figures for its expected project costs:

| | | |
|---|---|---|
| **Total capital costs:** | $300 million | |
| **Annual gross revenues:** (based on 56,000 acre-feet per year X ~$950 per acre-foot) | $53 million | |
| **Annual operations and maintenance costs:** | $30 million | $535 per acre-foot |
| **Debt service and taxes:** | $21 million | $375 per acre-foot |
| **Anticipated net annual revenues:** | $2 million | $ 36 per acre-foot |
| **Total:** | | $946 per acre-foot |

[16] More precisely, Poseidon's Water Purchase Agreements describe the price as: "The lower of (i) the sum of (A) $861/acre-foot [$0.70/$m^3$] (the "Base Price" in 2004 dollars) and (B) a delivery charge for transportation of the desalinated water to the Exchange Partner; and (ii) the sum (the "Avoided Cost") of (A) Buyer's cost of water supplied by the SDCWA and (B) any subsidy received by Buyer from MWD or any other third party for the purchase of water from the Project. To the extent the Base Price plus the delivery charge is less than the Avoided Cost, the savings shall be shared equally between the Parties."

The "Avoided Cost" method is equal to the sum of costs charged by the San Diego County Water Authority xx The "Base Price" method is tied to the Consumer Price Index and is based on the following formula:

$$\text{Current Base Price} = (\text{Base Price}_{initial}) \cdot (70\%(CPI_i / CPI_{initial}) + (30\%(EC_i / Ec_{initial})))$$

[17] The MWD, from whom SDCWA purchases most of its imported water, expects its imported water price to go up from 4-6% per year for the next ten years. In the shorter term, SDCWA expects its costs to increase next year by about 10%.

[18] The Coastal Act includes consideration of project costs in an indirect but important way. Some Coastal Act provisions require the Commission to determine whether certain adverse impacts of the proposed project are mitigated to the maximum extent feasible and whether there are feasible and less environmentally damaging alternatives to aspects of a proposed project. Coastal Act Section 30108 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." Therefore, information about proposed project costs may sometimes be necessary to fully evaluate what project changes or mitigation measures may be economically feasible.

Commission staff could not verify several of Poseidon's estimated costs and, in fact, for some components of the proposed project could only verify higher costs. These higher costs would make Poseidon's water cost substantially more than the expected $950 per acre-foot and even higher than current or expected costs for imported water. The Commission believes the costs to provide this water will be higher than Poseidon currently estimates, for the following reasons:

- Overall trend of desalination costs: Over the past couple of decades, desalination costs have declined significantly, due largely to advances in technology such as increased energy efficiency, extended membrane and filter operating life, and other improvements. More recently, however, the trend appears to have reversed. Despite continued advances in some areas of desalination technology and energy efficiency, overall costs of desalinated water have increased during the past few years largely due to increased cost for energy and materials. Of all significant sources of water, seawater desalination is the most energy intensive and the most cost-sensitive to energy prices. Poseidon's expected costs in Carlsbad have gone up, not down, over the past several years. In 2004, Poseidon estimated its water would cost $800 per acre-foot; its most recent estimate is $950 per acre-foot. Its overall capital costs have gone from $270 million to about $300 million during the same period.

  Further, although it is difficult to compare the cost of water from different desalination facilities, Poseidon's purported costs are much lower than estimates at other seawater desalination facilities now operating or being developed. For example, testimony by the California-American Water Company before the state Public Utilities Commission shows that it expects water from a similar proposed seawater desalination facility at the Moss Landing Power Plant to cost from $1600-1800 per acre-foot. This proposed facility would be somewhat smaller than Poseidon's (between 10 and 20 MGD), but even allowing Poseidon a 10% "economy of scale" benefit would result in its costs being closer to $1500 per acre-foot.

- Additional mitigation costs: As noted later in these Findings, several mitigation measures are needed for the proposed project to conform to various Coastal Act provisions, and these costs are not yet included in Poseidon's estimates. For example, Poseidon stated it is considering purchasing "carbon offset" credits for its greenhouse gas emissions. At a current average cost of $20 per megawatt-hour, these credits, would cost Poseidon over $5 million per year to fully offset its emissions, which would add about $95 to the cost of each acre-foot produced.

- Poseidon's reliance on a not-yet-available subsidy: Poseidon's anticipated costs are also based in part on it being eligible to receive the $250 per acre-foot subsidy available from the MWD. As described previously, the MWD several years ago adopted a policy to provide up to $250 per acre-foot to selected water agencies. However, Poseidon is not at this time eligible for the subsidy. It would have to enter an agreement with one of the five eligible entities (presumably, the San Diego County Water Authority) to transfer its subsidy rights. This may be difficult if the Authority or the other eligible entities plan to use the subsidy for their own desalination projects. The Authority, for example, states in its most recent Annual Report that it is planning on using seawater desalination to provide 89,600 acre-feet of the region's water supply by 2020 and it is also continuing to evaluate potential desalination

projects of its own. Without this subsidy, Poseidon's stated costs would be $250 per acre-foot higher.[19]

- Present and future costs for electricity: Poseidon estimates its average cost for electricity will be $0.0749 per kWh. It bases this estimate on the rates available from the San Diego Gas & Electric Company (SDG&E) for large industrial customers (SDG&E Tariff Sheet #AL-TOU), which provides a range of energy prices based on the time-of-use (e.g., higher costs at peak afternoon hours, lower costs at night; generally higher costs in summer than in winter). Poseidon states that it determined its expected $950 per acre-foot water cost in part by applying expected rates from that Tariff Sheet.

  However, it appears that applying the rates from that Tariff Sheet would result in an actual annual average rate of no less than $0.10 per kWh. The cost of desalinated water is highly sensitive to energy costs, with each penny increase in the rate per kilowatt-hour resulting in about a $50 per acre-foot increase in the end cost, so this average $0.10 rate would increase Poseidon's expected costs per acre-foot by about $125.[20]

  Additionally, Poseidon's anticipated costs do not recognize likely future rate increases for electricity, which are likely to help maintain the gap between Poseidon's production costs and the costs of imported water. For 2008, SDG&E has already proposed an increase of about 5% increase for its industrial users. Even though imported water sources would also be subject to future rate increases, at least two characteristics suggest that Poseidon would have disproportionally higher increases compared to imports. First, as noted above, seawater desalination is more sensitive to energy costs than are other sources; and second, Poseidon would obtain its electricity from the SDG&E service area, whereas much of the water imported to San Diego County is subject to the lower rates available to the state's water transport systems. Although Poseidon may be able to "hedge" all or part of its electricity costs through the purchase of natural gas futures, such hedges are relatively short-term, so Poseidon's costs would eventually be subject to rate increases similar to those experienced by other electricity users in the region. At this point, the expected 5% increase next year by SDG&E would add about $25 per acre-foot to Poseidon's costs.

- Additional costs to pump water into SDCWA distribution system: As noted above, Poseidon's current proposal includes installing the pipelines and pumps needed to deliver water only to Carlsbad's Maerkle Reservoir and parts of Vista and Oceanside. Transporting water to other entities would require an additional pipeline from the reservoir to the regional

[19] Further, the MWD established the subsidy for use by its member agencies, all of which are public water districts, and selected just five of those public districts as being eligible for the subsidy. It has not yet been established that Poseidon may use these funds, either directly or indirectly, and such use may not represent a valid expenditure of public funds for a private entity.

[20] Poseidon stated that it could take advantage of lower off-peak electricity rates by reducing its production during peak hours and increasing it during non-peak hours – it proposed, for example, that it could operate at 80% capacity (40 MGD) during the highest rate periods and at 108% capacity (54 MGD) during lower rate periods. However, it appears this scenario would have little effect on average electrical costs, since Poseidon would use even more electricity during the longer low-rate periods and less during the much shorter high-rate periods. Further, this "start/stop" operating scenario would likely increase Poseidon's operations and maintenance costs due to shortening the operating life of the various membranes, filters, and other facility components.

distribution system along with an additional pumping station and additional electricity costs. SDG&E's most recent cost estimates for these components are $80 million in capital costs and $2.5 million per year in operations and maintenance costs (which presumably include electricity costs), which would have to be reflected in the costs of water for any entity other than Carlsbad, Vista, or Oceanside. The additional operations and maintenance costs alone would add about $125 per acre-foot to the approximately 20,000 acre-feet that may need to reach the regional distribution system.

- Additional costs for dredging Aqua Hedionda Lagoon: With the planned power plant shutdown, Poseidon would have to take on responsibilities for dredging the lagoon. Poseidon would not need to dredge as large an area, since it would use less water than past power plant operations; even so, Poseidon's costs could be higher. The power plant has in the past dredged about every other year, with its most recent operations costing about two million dollars (or an average of one million dollars per year); however, it owns the barge and sand delivery pipelines it uses for dredging operations. A similar one million dollar per year average would add about $20 per acre-foot to Poseidon's water costs, which has not yet been included in its estimates.

  In sum, the additional costs described above would add about $450 to Poseidon's stated $950 per acre-foot costs. This approximate cost of $1400 per acre-foot is more in line with credible cost estimates available from other seawater desalination facilities operating or being developed in California.

## 2.3 COASTAL COMMISSION JURISDICTION AND STANDARD OF REVIEW

The proposed desalination facility and portions of its associated pipelines would be located in the coastal zone within the City of Carlsbad. Carlsbad has a certified Local Coastal Program (LCP), and the Agua Hedionda area is one of six segments of that LCP. Although most of the city's coastal zone is fully certified, the Agua Hedionda segment has only a certified Land Use Program (LUP), not a certified implementation program. Therefore, review and permitting authority within this segment remain with the Commission, with the standard of review being Chapter 3 of the Coastal Act. The Commission may also use provisions of the certified LUP as guidance.

## 2.4 OTHER PERMITS AND APPROVALS

**City of Carlsbad:**

- **Precise Development Plan:** As part of its project review and approval, the City of Carlsbad approved a Precise Development Plan for the project site, which modified the allowable uses on the site to include the proposed desalination facility.

**State:**

- **Lease of state tidelands from the State Lands Commission:** The proposed project would require a lease from the State Lands Commission due to its use of two sets of structures built on state tidelands – the jetties at the mouth of Agua Hedionda and the discharge structure built across a state beach about 3000 feet south of the lagoon mouth.

  The power plant currently has a lease from the State Lands Commission allowing it to use those structures until 2026; however, that lease allows use of those structures only for power plant cooling operations and for minor use by Poseidon's test desalination facility (up to 200 gallons per minute) only when the power plant is operating. The power plant's lease also states that the "Commission has expressed concerns regarding Once-Through Cooling (OTC) of power plants and the environmental impacts to the waters of California that may be caused by OTC systems", and further states that the lease includes provisions that authorize the State Lands Commission to amend the lease if the State or Regional Water Boards modify Cabrillo's NPDES permit. This lease specifically prohibits use of the intake or discharge structures by a future desalination project without additional written approval from the State Lands Commission. Poseidon submitted its lease application in February 2007. On October 30, 2007, the State Lands Commission held a hearing on Poseidon's lease application, but took no action and continued the hearing.

- **National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board:** Poseidon's proposed project would be subject to a provisional NPDES permit issued by the San Diego Regional Board in August 2006. The permit requires Poseidon submit additional documentation for Board approval before starting operations and is based on Poseidon operating with or without concurrent power plant operations, as long as either entity ensures a discharge of at least 304 MGD to provide adequate dilution of the desalination facility's high salinity discharge.[21]

  One of the required documents is a Flow, Entrainment and Impingement Minimization Plan, which Poseidon submitted in June 2007 and which the Board is still reviewing. This plan is described in more detail in Section 2.5.1 of these Findings. The NPDES Permit states that the Board will determine through its review of this Plan whether the proposed project conforms to Porter-Cologne Act Section 13142.5.

  Additionally, Poseidon's operations would cause additional sedimentation in Agua Hedionda, which is listed by the State and Regional Boards as an impaired water body due in part to high rates of sedimentation. The federal Clean Water Act requires that states develop a plan to restore waterbodies that are listed as impaired by removing or limiting the causes of impairment. The NPDES permitting program, at 40CFR22 prohibits issuance of a permit where a new source would contribute a pollutant to a waterbody already listed as impaired

[21] **Note:** The Santa Ana Regional Board took an entirely different approach with its issuance of an NPDES permit for Poseidon's similar proposed desalination facility at the Huntington Beach Generating Station. In that permit, the Board required that if water used by the power plant cooling system was not available, Poseidon would have to find another water source or apply for a new permit. These two different approaches illustrate the value of the statewide policy described above that is being developed by the State Water Resources Control Board. The policy may provide consistency in the application of state water quality requirements.

due to that pollutant, unless a plan is in place that demonstrates how the waterbody would be brought back in to compliance with the water quality standards (see also, for example, the U.S. Ninth Circuit Court's decision on *Friends of Pinto Creek vs. U.S. EPA*, October 4, 2007). The Board has not yet developed the required plan (known as a Total Maximum Daily Load, or TMDL) for Agua Hedionda. As noted in the Carlsbad Watershed Plan, developed pursuant to an NPDES Permit issued in 2001 by the State Water Quality Control Board, continued use of the power plant intake by either Poseidon or Cabrillo would contribute to the high sedimentation rate in the lagoon. This issue will likely require further consideration by the Regional Board as part of its ongoing review of Poseidon's provisional NPDES permit.

**Federal:**

- **Federal "incidental take" permits:** Poseidon's proposed project would be expected to result in the "take" of species protected under the Marine Mammal Protection Act through entrapment of seals or other marine mammals in the power plant intake. In a June 4, 2007 letter to Commission staff, Poseidon indicated it would apply for the necessary "incidental take" permit. It states that the National Marine Fisheries Service would also incorporate into its review of its permit application any measures needed to protect species listed under the federal Endangered Species Act. Past power plant operations have caused documented entrapment of species protected under the federal Endangered Species Act, including the endangered East Pacific green turtle *(Chelonia mydas*). For both types of "take," the permit application requires an applicant to describe alternatives available to avoid "take" and provide the reasons those alternatives were not implemented. Poseidon has not yet indicated how the proposed project would conform to those requirements.

  In addition, Agua Hedionda has historically provided habitat for the tidewater goby (*Eucyclogobius newberryi*) a species listed as endangered by the U.S. Fish and Wildlife Service in 1999. The goby is also listed as a Special Status Species by the California Department of Fish and Game. The Service is currently developing a critical habitat designation for the species, with a decision due by November 1, 2007, about the same time as publication of Commission staff's recommended Findings to the Commission.[22] This designation could affect whether Poseidon is able to operate its proposed intake system in conformity to federal Endangered Species Act requirements. Poseidon has stated its intent to apply for an incidental "take" permit to address possible entrapment of marine mammals and sea turtles, but has not addressed its potential effect on goby habitat. This issue is discussed later in these Findings.

[22] In 1994, the U.S. Fish and Wildlife Service listed the goby as endangered. In 1999, the Service published in the Federal Register a proposed rule to retain the goby as a listed endangered species in Orange and San Diego County coastal waters and to establish Agua Hedionda as part of the critical habitat for the goby. The goby had been listed as endangered in February 1994. In November 2000, the Service published its final rule, which designated Agua Hedionda as critical habitat for the goby. In August 2001, Cabrillo Power L.L.C., owner of the Encina power plant, filed a lawsuit challenging that designation. The Service later filed a consent decree with U.S. District Court in which it agreed to vacate that designation and reconsider the entire critical habitat designation in the rule. That consent decree also established that the Service would publish a revised proposal for critical habitat by November 15, 2006 and a new final rule by November 1, 2007.

## 2.5 CONFORMITY TO APPLICABLE COASTAL ACT POLICIES

### 2.5.1 Protection of Marine Life (Coastal Act Sections 30230 & 30231)

Coastal Act Section 30230 states:

> *Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Coastal Act Section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

These Coastal Act provisions require generally that marine resources be maintained, enhanced, and where feasible, restored. They also require that the marine environment be used in a manner that sustains biological productivity and maintains healthy populations of all marine species. Coastal Act Section 30231 requires that biological productivity be maintained, and where feasible, restored, including by minimizing the adverse effects of entrainment.[23]

#### *Other policies as guidance*

In applying the above-quoted Chapter 3 policies, the Commission may be guided by Coastal Act Section 30412(a),[24] which designates the Commission, along with the State and Regional Water Boards, as responsible for implementing Porter-Cologne Act Section 13142.5. Subsection (b) of that section states:

> *For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design,*

[23] "Minimize", as used in these Findings, means "to reduce to the smallest possible amount, extent, size, or degree" as defined in the American Heritage® Dictionary of the English Language: Fourth Edition (2000).

[24] Coastal Act Section 30412(a) states: "In addition to Section 13142.5 of the Water Code, this section shall apply to the commission and the State Water Resources Control Board and the California regional water quality control boards."

> *technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life.*

Certified Agua Hedionda Land Use Plan: Because the proposed project is within the Commission's retained jurisdiction, the standard of review is Chapter 3 of the Coastal Act. However, in such instances, the Commission may use as guidance adjacent certified Local Coastal Programs (LCPs). The proposed project would be in the coastal zone within the City of Carlsbad. Although the City has a certified LCP, the Commission has not yet certified the LCP for the portion of the City, known as the Agua Hedionda segment, where the project would be.

The Commission, however, has certified the Land Use Plan (LUP) for the Agua Hedionda segment. The certified Land Use Plan recognizes the lagoon's unique environmental status and designates the entire lagoon as a "special treatment area". The Plan's goals for the lagoon include the following:

- *Protect and conserve natural resources, fragile ecological areas, unique natural assets, and historically significant features of the community.*

- *Preserve natural resources by protecting fish, wildlife, and vegetation habitats; retain the natural character of waterways, shoreline features, hillsides, and scenic areas; safeguard areas for scientific and educational research; respect the limitations of our air and water resources to absorb pollution; and encourage legislation that will assist in preserving these resources.*

Agua Hedionda is also one of 19 coastal wetlands identified in the California Department of Fish and Game report, Acquisition Priorities for the Coastal Wetlands of California. This report identifies high priority wetlands for acquisition, based primarily on their values for fish and wildlife habitat and threats to their continued existence as a natural resource.[25] Coastal wetlands identified in this report are subject to the additional protections of Coastal Act Section 30233(c), which are described in Section 2.5.2 of these Findings.

## *Other policies and requirements applicable to the proposed project*

Marine Reserve Designation: Additionally, part of Agua Hedionda has been designated by the California Department of Fish and Game as the Agua Hedionda Lagoon State Marine Reserve. Pursuant to Section 1580 of the state Fish and Game Code, the Reserve is to be managed to:

> *"…protect threatened or endangered native plants, wildlife, or aquatic organisms or specialized habitat types, both terrestrial and nonmarine aquatic, or large heterogeneous natural gene pools for the future use of mankind through the establishment of ecological reserves."*

[25] See also the California Coastal Plan, December 1975.

NPDES permit: Activities within the City of Carlsbad affecting Agua Hedionda Lagoon are in part subject to an NPDES permit issued in 2001 by the State Water Resources Control Board to several San Diego County cities to address significant water quality impacts in several coastal watersheds. The permit in part requires the cities to develop a comprehensive plan to manage the region's watersheds and to avoid and solve surface water quality problems. The Carlsbad Watershed Management Plan, published in 2002 pursuant to these NPDES requirements, includes a number of goals and objectives to implement the NPDES permit requirements. Its goals include, for example:

> *Protect Beneficial Water Uses: To be considered supportable by this plan, all "Action Items" must protect, restore, or enhance beneficial water uses within the watershed. The action should focus on the protection of human public health first and then on the health of wildlife and natural ecosystems. The action item should recognize that public health includes flood protection and should strive to balance natural restoration with water quality improvements and flood control.*
>
> *Protect Coastal and Wetland Resources: Extra credit should be given to "Action Items" that serve to protect the wetland resources, sensitive species and fragile ecosystems associated with coastal lagoons and riverine resources. These resources are not only sensitive and highly valued, but they support a great diversity of species and tend to be "sink holes" where water quality problems become much greater.*

Multiple Habitat Conservation Program: The Multiple Habitat Conservation Program (MHCP) is a comprehensive habitat conservation planning process that addresses multiple species needs and the preservation of native vegetation communities for the cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista, California. The MHCP is established in part to develop coordinated habitat preserve system. In Carlsbad, the MHCP is focused on preserving eight vegetation types, including marsh and estuarine wetlands. The covered species for this plan include invertebrates, birds, and plants found in and near Agua Hedionda and use the lagoon as habitat.

Marine Life Management Act: The California Marine Life Management Act (MLMA) was established to ensure the conservation, sustainable use, and restoration of California's marine life. This includes the conservation of healthy and diverse marine ecosystems and marine living resources. To achieve this goal, the MLMA calls for allowing and encouraging only those activities and uses that are sustainable. Although most of the MLMA is devoted to fisheries management, it also recognizes that non-consumptive values such as aesthetic, educational, and recreational are equally important. Unlike previous law, which focused on individual species, the MLMA recognizes that maintaining the health of marine ecosystems is important in and of itself. The MLMA also holds that maintaining the health of marine ecosystems is key to productive fisheries and non-consumptive uses of marine living resources.

One of the MLMA's primary goals is to provide for sustainable fisheries. A sustainable fishery is defined in the MLMA as one in which fish populations are able to replace themselves. The MLMA recognizes that populations of marine wildlife may fluctuate from year to year in response to external environmental factors, such as climate and oceanic conditions. Unlike traditional definitions of sustainability in fisheries, a key feature of the MLMA definition calls for maintaining biological diversity

"Essential Fish Habitat": Agua Hedionda Lagoon is also considered "Essential Fish Habitat" (EFH), pursuant to provisions of the federal Magnuson-Stevens Fishery Conservation and Management Act. The Act defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and establishes that activities that would affect this habitat require consultation with the National Marine Fisheries Service pursuant to Section 305(b) of the Act.

## *Proposed Project Location and Site Conditions*

Poseidon's proposed facility would be located on the site of the Encina power plant adjacent to Agua Hedionda. The facility would pump no less than 304 million gallons per day (MGD) of estuarine water from the lagoon.[26] Although Poseidon's proposal is to use 100 MGD of seawater to produce 50 MGD of potable water, the Regional Water Quality Control Board has required through its issuance of an NPDES permit that Poseidon discharge no less than 304 MGD to dilute its high salinity discharge.[27] These proposed project characteristics and issues associated with this discharge are discussed in Section 2.5.1 later in these Findings.

**Characteristics of Agua Hedionda Lagoon:** Agua Hedionda Lagoon is located within the City of Carlsbad and is used for a wide variety of activities. It is used recreationally, it includes extensive aquaculture operations, and it has served as the location for the power plant's cooling water intake structure since the mid-1950s.

The vast majority of the water in the estuary is from tidal sources. Each semi-diurnal tide brings in or discharges about 500 million gallons of seawater, so Poseidon's water withdrawals would represent about 30% of the estuary's daily water influx.[28] The lagoon receives a relatively small amount of freshwater from Agua Hedionda Creek, from twenty-three storm drains, and from urban and agricultural runoff. The lagoon's three basins have very different habitat characteristics, based largely on the hydrodynamics of the tidal flow and the resulting different substrates – finer materials in the Inner Basin grading to coarser materials in the Outer Basin.

Agua Hedionda Lagoon is listed by the Regional Board has having impaired water quality due to the presence of indicator bacteria and because of siltation and sedimentation.[29] As noted in the

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[26] To provide a sense of scale, the 304 million gallons of estuarine water Poseidon would use each day equals about 932 acre-feet, or the amount of water that would cover 932 acres (about 1.5 square miles) with a foot of water. Over the course of a year, Poseidon would use more than 100 billion gallons of water from the estuary, or about 340,000 acre-feet, which would cover over 500 square miles up to a foot deep.

[27] 304 MGD is an average volume. Poseidon's NPDES Permit limits the facility's salinity discharge to no more than about 40 parts per thousand, which requires Poseidon to pump from up to about 320 MGD at various times.

[28] Poseidon's Flow Plan states that the tidal cycle brings in about 475 million gallons. The San Diego County Water Authority estimated in its recent Draft EIR for a similar proposed desalination facility that tidal inputs were about 528 million gallons. The average of these two estimates would result in a twice-per-day influx of about 1003 MGD, so Poseidon's 304 MGD withdrawal would represent about 30% of the average tidal inputs.

[29] As noted in Section xx of these Findings, pursuant to provisions of the federal Clean Water Act, states are required to identify polluted surface water bodies that do not meet water quality standards. States are to then prioritize those waterbodies for cleanup activities through developing a "Total Maximum Daily Load" (TMDL) for those waterbodies that identifies the cleanup steps needed to allow the waterbodies to meet the standards. California has not yet developed a TMDL for Agua Hedionda Lagoon.

Carlsbad Watershed Plan, part of the excess sedimentation within the estuary has been due to the power plant's water intake causing an imbalance between sediment inflow and outflow, and Poseidon's proposed project would cause similar sedimentation problems. This issue is described in more detail in Section 2.5.2 of these Findings.

Despite these water quality concerns, Agua Hedionda provides extensive habitat values for a wide variety of marine biological resources and other wildlife. Surveys from 1994-95 found that the lagoon and nearby wetlands supported 29 fish species and 143 species of benthic invertebrates.[30] Agua Hedionda provides habitat for important commercial and recreational fish species, special listed species, and forage fish used by these other species. Fish in the lagoon include California halibut, which use the lagoon as an important nursery area, garibaldi, Northern anchovy, and various gobies, blennies, and others. The lagoon formerly provided habitat for the endangered tidewater goby (*Eucyclogobius newberryi*). The U.S. Fish and Wildlife Service determined in 2006 that the goby's absence from the lagoon is due to habitat loss and other anthropogenic factors.[31] The lagoon is also identified as Essential Fish Habitat (EFH), pursuant to the Magnuson-Stevens Act described above.

The surveys also identified 81 different bird species in these areas, including 12 listed as sensitive: Belding's Savanna sparrow, California least tern, Western snowy plover, Brown pelican, White-faced ibis, California gull, Osprey, Cooper's hawk, Long-billed curlew, Loggerhead shrike, Northern harrier, and Black skimmer. In the coastal scrub sage habitat adjacent to many of its wetlands, the surveys found additional sensitive bird species, including the California gnatcatcher, the least Bell's vireo, and the light-footed Clapper rail. Many of these species rely on marine life within the lagoon and adjoining wetlands.

## *Anticipated Project Impacts and Coastal Act Conformity – Intake-Related*

Findings in this section evaluate the proposed project's impacts on marine biological resources associated with its intake of estuarine water. Findings in subsequent sections describe discharge-related impacts caused by the proposed facility's discharge of highly saline wastewater into nearshore ocean waters and its cumulative impacts. All analyses are based on Poseidon's proposed use and discharge of an average of 304 MGD of estuarine water, and on Poseidon's use of the existing power plant pumps as a stand-alone desalination facility.

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[30] From California Wetlands Information System database at: http://ceres.ca.gov/wetlands/geo_info/so_cal/agua_hedionda.html.

[31] From Federal Register, November 28, 2006, proposed rule pursuant to 50 CFR 17 (see: http://www.epa.gov/fedrgstr/EPA-SPECIES/2006/November/Day-28/e9291.htm). Additionally, as noted in Section xx of these findings, although Agua Hedionda Lagoon is not currently listed as critical habitat for the species, the U.S. Fish and Wildlife Service is subject to a consent decree requiring it to publish by November 1, 2007 a final rule to establish listed critical habitat for the goby, which may include Agua Hedionda.

**Adverse Impacts Caused by Poseidon's Intake:** The project's proposed withdrawal of 304 MGD of estuarine water through the power plant intake structure would cause several types of impacts to marine biological resources, including impingement, entrainment, and "take" of protected species:

- **Impingement:** Impingement occurs when fish or other organisms are caught on an intake's screening system and are either killed or injured. The impingement rate for an intake is primarily a function of water velocity. The current Clean Water Act regulations (at 40 CFR 125) applicable to cooling water systems establishes a maximum velocity of 0.5 feet per second as the required Best Available Technology. When velocities are below that level, fish are usually able to swim away from the pull of the intake. Impingement rates may also vary seasonally or when schools of fish get close to the intake.

  Regarding Poseidon's expected impingement impacts, its 2004-05 study described below showed 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. Therefore, Poseidon's impingement rate would be much less, averaging less than 2.5 pounds per day. This is a relatively insignificant impact when compared to the proposed project's entrainment effects; however, there are feasible alternatives and mitigation measures available that would eliminate or reduce this impact, as described later in this section. Additionally, as noted below, past impingement at the power plant has included entrapment and "take" of the endangered Eastern Pacific green turtle a protected species, which constitutes a significant impact.

- **Entrainment:** Entrainment occurs when small organisms, such as plankton, fish eggs, larvae, etc., are pulled into an open-water intake. Once-through cooling systems like the one at Encina are considered to cause essentially 100% mortality due to the organisms being subjected to high temperatures or high pressures within the system. Entrainment causes direct impacts by killing the small organisms that are pulled through the cooling system and causes indirect impacts to the larger marine community by altering the food web and removing part of the community's productivity. Seawater is not just water, but is habitat, and along the California coast an acre-foot of seawater (about 326,000 gallons) can contain an average of about 500 different species of fish, invertebrates, plankton, and other marine life. Large intake systems such as the one Poseidon proposes to use can kill millions of organisms each day and cause a loss or change in ecosystem resources and alterations in community structure. While impingement rates are largely a function of water velocity and can be reduced when velocities are reduced, the amount of entrainment is primarily associated with the amount of water used, so the main way to reduce entrainment impacts is to reduce water volumes pulled into an intake system.

  Background – How to Determine Entrainment Effects: Determining the scale and the extent of entrainment impacts generally requires a study that includes obtaining at least one year's worth of regular sampling data and application of any of several modeling approaches. The samples are taken from waters near the intake and from nearby source waters. Organisms captured are identified to the lowest possible taxon. In most cases, all organisms cannot be identified, so the known taxa serve as indicators or surrogates for the full set of affected

species. Of the various models available, the most acceptable is known as the Empirical Transport Model (ETM). It is used to provide an estimate of the proportion of organisms lost due to entrainment compared to the overall number of organisms in a source water body. The ETM approach allows estimates of loss for each identified species, in part by recognizing that each species is subject to entrainment during particular life stages. Once the species subject to entrainment are identified, the ETM approach then determines what period of time each of the species are subject to entrainment – that is, based on local currents, it determines how many days an egg stage or larval stage of a particular species is subject to being pulled into the cooling system rather than be able to move away and escape from it. This period varies by species, ranging from just a few days to several weeks. It will also vary by whether it is calculated using the maximum or mean duration of larvae in the source water. As a very simple example, if individuals of a species are "entrainable" for the first five days of their lives and the average currents in the area move past the cooling system intake at half a mile per hour, that species has a source water area of sixty miles (5 days x 24 hours x 0.5 mph = 60 miles). Determining source water areas may be complicated by seasonal changes in current speed or direction and whether the species are from nearshore or offshore areas, and for intakes proposed in enclosed estuaries, the calculations must incorporate the hydrologic pattern of the estuary.

The proportion of larvae lost to larvae in the source water (known as "proportional mortality") is then multiplied by the source water area to provide an estimate of how much overall production of the species in this area is lost due to entrainment. This result of this calculation, known as "habitat production foregone" (HPF) can be expressed in acres or in miles of shoreline. Even a low "proportional mortality" figure can result in a large impact if the loss occurs over a large stretch of shoreline. Using the example above, if 5% of the larval stage of that species is lost due to entrainment, that represents that species' production along about three miles of shoreline (0.05 x 60 miles = 3 miles). The HPF for the various species can be kept separate or can be combined as an overall average figure.

Results of entrainment studies such as this do not reflect all the variables that may affect populations within a given area – for example, populations may decrease or increase due to seasonal or long-term changes, the habitat within the source water areas is likely to include characteristics that affect particular species and may be of variable quality within the same source water area, etc. These methods do, however, provide a good sense of scale of the overall impacts of a given intake system during the period sampled.

Poseidon's anticipated entrainment effects: In 2004-05, Poseidon conducted a study to determine the entrainment impacts that would be caused by continuous 304 MGD water use. In May 2007, Poseidon provided results of that study showing that the desalination facility's water withdrawals would kill about 12% of three types of fish larvae in Agua Hedionda subject to entrainment – gobies, blennies, and garibaldi – in addition to smaller percentages of other species, including white croaker, Northern anchovy, California halibut, and queenfish. Poseidon identified these species as coming from about 302 acres of Agua Hedionda's open water habitat (253 acres) and its mudflat/tidal channel habitat (49 acres). Applying the ETM and HPF methods described above suggests that Poseidon's entrainment would cause a loss of productivity about equal to that created by 36 acres of Agua Hedionda's open water and mudflat/tidal channel habitat (i.e., 12% of 302 acres = ~36 acres).

Commission staff requested a copy of Poseidon's entrainment study but received only a summary of the study results. The Commission was therefore unable to fully evaluate the accuracy of the results or determine how those results were derived. For example, the study was apparently based on protocols Cabrillo proposed for a similar study, which recognized that the study may need various types of stratified sampling to address differences in habitat types, but the Commission is unaware whether this potential study protocol was included in Poseidon's study. The study results did not distinguish between the different types and rates of productivity in these habitat types. The results also provide only a surrogate for the full range of impacts, since they do not identify smaller but numerous and important planktonic species that serve as the basis for much of the estuary's productivity. Therefore, the full range of impacts caused by entrainment are likely much broader than expressed in these study results. Additionally, Poseidon's study does not appear to incorporate the hydrologic dynamics of Agua Hedionda lagoon that result in some parts of the lagoon habitat likely contributing more organisms to entrainment than other. Based on the tidal flows described previously – i.e., that Poseidon's 304 MGD flows would represent about 30% of the daily tidal flux from Agua Hedionda – the project's entrainment impacts could be substantially higher or different than those described by Poseidon. However, absent the information that would be provided from the full study, the Commission is basing the impact assessment in these Findings on the limited information Poseidon provided.

Poseidon has argued that this expected entrainment impact does not constitute a significant adverse impact. It states, for example, that because there are large numbers of planktonic organisms in estuarine water and because they experience a very high natural mortality rate, the effects of entrainment are generally similar to what these organisms already experience. Poseidon further states that the "cropping" of these organisms via entrainment is beneficial in that it allows remaining individuals to have less competition. These arguments, however, are not supported by findings from the past several years of entrainment studies conducted at power plants along the California coast and elsewhere in the U.S. Each of the studies done in California since 1998 concluded that the power plant intakes caused in significant adverse impacts to local or regional marine biota.[32] Some studies evaluated intake volumes in the same range as those proposed by Poseidon – for example, the entrainment study for the Huntington Beach power plant determined that its use of 253 MGD of ocean water resulted in Habitat Production Foregone of over 100 acres. Poseidon's contentions that its entrainment effects would be minimal or even beneficial are further refuted by both Coastal Act and Porter-Cologne Act requirements that call for entrainment to be minimized to protect marine biology and water quality.

Along with the lost productivity that would result from Poseidon's estuarine water use, the water use would also cause significant adverse effects to specific species. The species identified in the study as subject to entrainment include several subject to "take" prohibition or fishing limits and others that provide important functions in the estuarine food web. Of the species that would be entrained, most have a role in the estuary's food web as prey

[32] Since 1998, entrainment studies completed at California coastal power plants include those done at Moss Landing, Morro Bay, Diablo Canyon, Huntington Beach, and South Bay.

species for higher trophic level species, including many that are important for commercial or recreational fishing.[33]

State law prohibits any commercial or recreational take of the garibaldi (*Hypsopops rubicundus*), which is also California's state marine fish. The project EIR stated that entrainment of garibaldi should be considered a *de minimus* impact; however, this does not mesh with California state law, which establishes a total prohibition on taking the species.[34] About 6% of the organisms identified in Poseidon's study were garibaldi.

The California halibut (*Paralichthys californicus*) would also be subject to entrainment. The study showed that about 1.5% of the entrained fish would be halibut; however, this may be considered a significant number, given the steep decline in California halibut populations over the past several decades. The California Department of Fish and Game associates this decline with the loss of nursery habitat in shallow bays such as Agua Hedionda and has established strict limits for commercial and recreational halibut fishing.[35] Similarly, the Northern anchovy (*Engraulis mordax*) is subject to state fishing regulations and additionally serves as an important forage fish for a number of species, including the California halibut.

These three important species – the garibaldi, California halibut, and Northern anchovy – make up about 6.5% of the identified organisms collected during entrainment sampling. They would constitute a similar percentage of the millions of organisms that Poseidon's project would entrain, and therefore represent a significant adverse project impact.

Overall, Poseidon's entrainment study results show that its proposed use of an estuarine intake would causes a substantial loss of important individual species and substantial loss of production within Agua Hedionda. It may also cause losses in nearby nearshore waters due to the intake entraining organisms that would otherwise enter nearshore areas due to tidal discharges; however, the study results did not identify whether that hydrodynamic-related effect was included.

The proposed project is also likely to result in the "take" of protected marine mammals and sea turtles due to those animals being drawn in to the intake. As noted previously, past power plant operations have resulted in entrapment of the endangered East Pacific green turtle (*Chelonia mydas*) and Poseidon's proposed operations would be similar. In July 2007, Poseidon stated it would apply to the National Marine Fisheries Service for the necessary "incidental take" permit. It is not yet known whether Poseidon could obtain the necessary permit, as applications for those permits require an applicant to identify methods to avoid taking listed species, and the Findings herein identify feasible alternatives that would allow Poseidon to entirely avoid take due to entrainment or impingement.

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[33] The recently published report by the Environment California Research and Policy Center, Net Loss: Overfishing Off the Pacific Coast (October 2007) identifies significant overfishing along the coast of California and other states. Among the populations identified as overfished (i.e., reduced to below 20-25% of its original population) are several that rely on fish that would be entrained by Poseidon's project.

[34] 14 CCR 28.05 states that Garibaldi may not be taken or possessed.

[35] See CDFG's information at: http://www.dfg.ca.gov/mlpa/response/halibut.pdf

**Mitigating the Impacts Caused by the Poseidon's Use of an Estuarine Open Water Intake:**

Mitigation Background: The standard approach for identifying, selecting, and implementing appropriate mitigation for project impacts is to first avoid the impacts, to then minimize the impacts, and to finally compensate for the impacts that remain.[36] Mitigation sequencing, as it is known, requires that mitigation measures to achieve the first step be considered and selected (or be determined infeasible) before moving to the next step. If the third step, compensatory mitigation, is necessary to address remaining impacts, it also includes a preferred sequence – to first create environmental conditions similar to those being lost; to next restore or enhance conditions similar to those being lost; and to finally preserve or protect an area that provides habitat value. It is generally preferable to select "in-kind" mitigation; that is, to develop mitigation sites with habitat similar to that being adversely affected, rather than to develop "out-of-kind" mitigation. Similarly, it is generally considered better to develop mitigation on-site rather than off-site.

Avoiding and Minimizing Impingement Impacts: As noted above, Poseidon's study showed that its use of the power plant intake would impinge about 2.5 pounds of fish per day. While this is a relatively minor impact, past power plant operations have also included impingement of an endangered species, which constitutes a significant adverse impact.

The primary method of avoiding and minimizing impingement is to maintain intake water velocities below 0.5 feet per second (fps), a rate that the U.S. EPA considers to be "best available technology" for cooling water intakes. This velocity represents the rate from which most fish species are able to swim away from intake screens and avoid being impinged. Poseidon showed, in its draft Revised Flow, Entrainment, and Impingement Minimization Plan that its use of the power plant pumps would create intake velocities higher than 0.5 fps and that its preferred operating scenario – using the power plant's Unit 4 pumps—would result in rates between 1.8 and 2.8 fps, or from more than three to five times the acceptable rate. Along with velocity reductions, other methods to reduce impingement include using moving screens, fish return systems, velocity caps, or other technological or structural measures. Poseidon has not proposed the use of any of these measures to further reduce its impacts and has not shown that their use would be infeasible.

Avoiding Entrainment Impacts: The most direct way to avoid Poseidon's expected adverse entrainment effects would be to use an alternative intake structure that eliminates those effects. The alternatives available to accomplish this include different types of subsurface intakes, all of which would draw in water through an overlying layer of sand. These types of intakes would completely eliminate both entrainment and impingement.

The four main types of intakes are vertical beach wells, Raney-type wells, slant-drilled wells, and infiltration galleries (see Exhibit 4). Vertical beach wells are essentially the same as wells located at inland locations, drilled to a depth where they intercept an underlying aquifer, or for beach wells, where they intercept the seawater "wedge" underlying the beach. Raney-type wells are vertical wells with an additional series of horizontal collector wells extending out from the bottom of the vertical well shaft. This type of well can significantly add to the yield obtained

[36] See, for example, the CEQA Guidelines at Section 15370.

from a vertical well shaft. 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. 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. Although subsurface intakes can, like open water intakes, cause adverse environmental effects, they are generally less severe and temporary, and a properly designed subsurface system can be environmentally benign.[37] At least four desalination facilities along the California coast use beach wells as their feedwater system, and the Commission recently approved two pilot studies to determine the applicability of both a slant-drilled intake and an infiltration gallery for desalination.

The amount of water subsurface intakes can take in depends on the permeability of the overlying substrate and other geotechnical characteristics. With an infiltration gallery, the substrate can be engineered to allow much higher permeability than would occur with the natural substrate. Subsurface intakes also offer additional operational advantages, such as reduced chemical use and reduced operating costs. Water from subsurface intakes generally has lower concentrations of solids, organic material, oil and grease, and other constituents that would have to be removed before the water contacts a desalination facility's reverse osmosis membranes. The natural filtering effect of the overlying substrate can buffer changes in the open water column caused by storms, runoff, or spills, and they may be able to operate during times when facilities with open water intakes would have to shut down. Subsurface intakes also provide some of the pre-treatment needed before seawater goes through desalination filters or membranes, thus eliminating part of the chemical or physical treatment that would otherwise be required at the desalination facility. While subsurface intakes may have higher initial construction costs, they can result in long-term operational savings due to their lower pre-treatment and chemical costs, and because water quality from those intakes is generally less variable, which allows for more efficient desalination operations. These characteristics are likely more evident from intakes that extend under the nearshore ocean water column than those that intercept aquifers that may be affected by surface infiltration from inland areas or have high mineral content.

Of the various types of subsurface intakes, at least two are feasible for Poseidon's proposed project. Both the slant-drilled wells and infiltration galleries could be used – together or individually – to provide the amount of water Poseidon would use. Further, if Poseidon were to use various techniques to reduce its discharge effects, as described later in these Findings, or if it is unable to convey the full 50 MGD its expect to due to reasons described in Section 2.2 of these Findings, either of the subsurface systems could be built for smaller capacities, further reducing potential construction impacts.

Poseidon contends that subsurface intakes would cause more significant impacts than those caused by the existing power plant intake and that they would be economically infeasible. In support of this contention, it has submitted several documents and cost estimates described below. Regarding economic infeasibility, Poseidon believes that subsurface intake options would be infeasible in part because they would raise the anticipated cost of desalinated water from Poseidon's current estimate of $950 per acre-foot to about $1300 per acre-foot. However,

[37] The most common adverse effects would be caused during construction or would be related to groundwater quality or quantity. For example, an improperly located subsurface intake could draw down aquifers or could intercept areas of contaminated groundwater or water with naturally high mineral content that is difficult to treat.

as described above, Poseidon's estimated $950 cost does not reflect what are likely the full costs of producing and delivering its water. Further, the alternative intake structures are likely to result in cost savings due to lower pre-treatment costs and lower mitigation costs, which are not included in Poseidon's estimates for those structures.

Regarding slant-drilled wells, a recent study conducted by the Municipal Water District of Orange County (MWDOC) showed that that type of intake could be used to draw in 30 MGD of seawater for its proposed desalination facility near Dana Point.[38] The facility would draw 30 MGD from nine 500-foot long wells extending under the seafloor at about a $20^{o}$ angle. Poseidon has characterized slant wells as infeasible due to their presence on the beach and disruption of public access and recreation. However, these wells can be built so that their only surface presence is a vault cover or similar at-grade cover. Additionally, the well entry point can be set back from the beach to completely avoid potential effects to public access and recreation.

Poseidon's estimates[39] showed that using slant wells for its project would cost $418 million for the well design and construction, which would be much more than its expected $300 million in capital costs for its full desalination facility. However, Poseidon's estimate appears substantially inflated compared to MWDOC's estimated costs, and Poseidon does not provide the basis for its figures. As a comparison, MWDOC's engineering feasibility study estimates the cost for the entire 15 MGD desalination with slant-drilled wells at $136 million. Those costs include MWDOC's recognized $30 million savings in capital costs due to the water from the subsurface intakes not requiring as much pre-treatment. Another difference appears to be Poseidon's inclusion of land acquisition costs ($8.7 million) instead of the presumably lower lease payments that would be needed to site slant-drilled wells on state tidelands. Poseidon's estimate does not appear to include cost savings that would result from lower dredging costs. An even more substantial overestimate on Poseidon's part is its inclusion of $38 million for environmental mitigation costs. Poseidon does not provide any basis for this cost, which is more than ten times the amount it has offered for mitigation needed for its more environmentally harmful proposed use of the existing power plant intake (as described in the Findings below), and which would likely be unnecessary for a properly designed slant-drill well system. Additionally, MWDOC used an even higher contingency rate than did Poseidon (25% versus 20%), so Poseidon's cost savings in comparison to MWDOC's figures would likely be even greater. Finally, MWDOC estimates the entire cost of its wells providing 30 MGD at $24 million, and scaling that rate up to Poseidon's expected 304 MGD water use would be much lower than Poseidon's suggested $418 million cost. In essence, Poseidon's figures do not mesh with the more credible figures provided in the MWDOC engineering study and they do not serve as an adequate basis for infeasibility.

An infiltration gallery is likely even more suitable for a facility the size of Poseidon's proposed project, since galleries would likely be able to draw in more water from a given area and can be installed with some of its overlying material being of a selected permeability. These systems are in place at a number of locations around the world, including one that provides water for a 45 MGD desalination facility, with plans for other galleries that would provide up to several hundred million gallons per day for power plant cooling water use. While these systems would

[38] See Boyle Engineering's Dana Point Ocean Desalination Project – Engineering Feasibility Report (March 2007), prepared for the Municipal Water District of Orange County.

[39] See Poseidon's October 18, 2007 letter to Commission staff.

result in seafloor disturbance during construction, they would cause few, if any, impacts to marine life once in operation. When installed in an area of open sandy seafloor as is available just offshore of Agua Hedionda, the post-construction benthic habitat conditions would be essentially the same as pre-construction conditions. The initial construction impacts to the offshore sandy bottom habitat would be similar to the continual offshore sand deposition and movement already experienced by that type of habitat and would be far less severe than the ongoing entrainment losses that Poseidon's estuarine intake would cause.

Poseidon's concerns about infiltration galleries are similar to those it expressed about slant-drilled wells – that galleries would be environmentally and economically infeasible. Poseidon contends that a gallery needed for its facility would irreversibly destroy about 46 acres of seafloor and it describes this impact as significantly greater than that caused by its anticipated estuarine entrainment. Poseidon also contends that constructing the system would require that a 15-foot thick layer of sand be removed from this 46-acre area and loaded on trucks to be taken to a landfill, and that operating the system would trap marine organisms on the seafloor due to the pull of the intake pumps.[40] However, none of these contentions are valid. As noted above, once a gallery is installed, it is essentially invisible from the surface of the seafloor, both in terms of its structure and any effects on marine life. The systems are designed so that the pull of the pumps are undetectable at the seafloor, thus making it highly unlikely that organisms would be "trapped". Poseidon's geophysical surveys of an area offshore of Agua Hedionda show an area of over 200 acres of featureless bottom with fine-grained sand, which may be suitable for such a system. We note, too, that conditions at that site may improve as a gallery site when the sediment loss caused by the existing estuarine intake ends and allows more coarse grain sand to stay in the longshore transport system. During construction, not all the seafloor material within the gallery area would need to be removed, and it certainly would not require being transported to a landfill. Most material would likely be suitable for the ongoing longshore sand movement in this area of the coast. Poseidon's contentions also fail to recognize that the largest infiltration gallery used for desalination, at San Pedro del Pinatar in Spain, was selected in recognition of its location next to the highly sensitive marine environment of a regional nature reserve. That installation was also able to use horizontal directional drilling, which significantly reduced its installation impacts.

Poseidon also contends such a system would be economically infeasible. Its October 2007 cost estimates show that an infiltration gallery for its Carlsbad facility would cost $646 million. However, similar to the costs described above, Poseidon provided no justification for these costs and several appear to be significantly inflated. For example, Poseidon cites a land cost of over eight million dollars,[41] and electricity costs of $18 million; but again, actual land costs would likely be for a lease on state tidelands rather than a land purchase, and its electrical costs would likely be similar to its proposed project's operation of the power plant's cooling water pumps. Poseidon also includes expected costs of $59 million for environmental mitigation, although it is unclear why this was included, given that the gallery itself would serve as mitigation for the impacts caused by the estuarine intake and would not be expected to cause any significant impacts. Finally, the Commission notes that the entire cost of the facility in Spain using an

[40] See Poseidon's July 16, 2007 letter to Commission staff.

[41] For comparison, the proposed fee for Poseidon's State Lands lease for the Agua Hedionda Lagoon jetties and its discharge structure is $123,000 per year.

intake gallery was about $200 million, so it is likely Poseidon's costs would be far lower than those it cites.

In comparing Poseidon's contentions about potential environmental impacts and costs of subsurface intakes with information about other proposed or operating facilities, the Commission finds that subsurface intakes appear to be a feasible and less environmentally damaging alternative and that Poseidon has not provided the level of detailed or credible information to show otherwise. Subsurface intakes would provide a feasible alternative that would result in substantially fewer adverse impacts, including complete avoidance of entrainment and impingement, and significantly reduced dredging-related impacts.

Minimize or reduce entrainment impacts: Another feasible alternative that would reduce but not eliminate adverse entrainment and impingement impacts would be to move the intake offshore into open coastal waters. Although this alternative would still cause adverse entrainment and impingement effects, it would move those effects from the highly sensitive estuarine environment of Agua Hedionda to the somewhat less sensitive open ocean waters in which the adverse effects would be more diffuse.

This alternative – moving the existing power plant intake to an offshore location – has already been determined in a recent State Lands Commission Draft EIR review of power plant operations to be the least environmentally damaging feasible alternative to operating the existing intake. From 2001 through 2005, the State Lands Commission conducted environmental review of a request from Cabrillo to modify one of the two jetties at the mouth of Agua Hedionda.[42] Southern California Edison, the original power plant owner, constructed the two jetties on state tidelands in the mid-1950s to maintain the mouth of the lagoon for the power plant's cooling water channel. Power plant operations over the past half century had created a lagoon with a high rate of sedimentation due to the power plant's nearly continual intake of cooling water. Unlike other nearby lagoons subject to a natural tidal cycle, with incoming and outgoing tides bringing in and removing roughly equal amounts of water and sediment, the power plant's cooling water use caused an imbalance in the amount of water and sediment entering the lagoon. During peak power plant operations, the power plant was able to pull in more than 800 MGD, which is more than half the daily tidal influx in the lagoon. Pulling water into the intake reduced Agua Hedionda's flushing capacity and the lagoon became a sediment sink. During the past fifty years or so, the various power plant owners have dredged the lagoon at least twenty-five times to maintain power plant operations.

Cabrillo's request, to make the north jetty two hundred feet longer, was meant to reduce the amount of sand entering the lagoon in the first place, thus reducing dredging needs and allowing the sand to stay in the active littoral transport zone and thereby continue to be available for natural beach nourishment. This EIR evaluated this proposed project as part of the long-term and comprehensive management strategy for the lagoon, with key goals and objectives being to reduce sand accumulation in Agua Hedionda, maintain the existing longshore transport system along the nearshore coastline, minimize potential effects on biological resources, and increase

[42] In March 2001, the State Lands Commission issued a Notice of Preparation for the proposed project's EIR. It published the Draft EIR in January 2005. In February 2005, Cabrillo withdrew its request for the proposed project, which terminated the CEQA environmental review process.

sand volumes available to downcoast beaches between dredging events. The EIR identified several potential significant adverse effects of the proposed jetty extension. The proposed extension would have resulted in continued dredging operations within the lagoon, though less extensive than caused by the existing jetty, and would have continued to cause the full suite of impacts associated with such operations – e.g., disturbance of marine life, habitat disruption to eelgrass beds, loss of surfgrass due to sand deposition on nearby beaches, etc. The EIR also showed that an extended jetty would likely reduce beach width at Carlsbad's Middle Beach and South Beach. The change in beach dynamics was also expected to cause impacts to beach and nearshore recreation, such as loss of beach recreation opportunities, changes in surfing conditions, etc.

The EIR evaluated several alternatives to determine whether they would be feasible, would meet Cabrillo's objectives, and would eliminate or reduce environmental impacts. Its conclusion was that the environmentally superior alternative would be for Cabrillo to move its intake offshore.

This alternative would avoid or reduce the identified significant impacts and would significantly reduce the need for dredging in Agua Hedionda. The EIR estimated that instead of dredging more than 100,000 cubic yards of sediment from within the lagoon every year or two, the preferred alternative would require dredging a much smaller amount – about 20,000 cubic yards per year – from the lagoon mouth to maintain adequate tidal flow to support the lagoon's other existing beneficial uses. It acknowledged that constructing an offshore intake would cause short-term construction effects, but found that these would cause fewer impacts overall than the need for ongoing dredging within the lagoon. The offshore intake could be located in an area of sandy bottom habitat that is used to disturbance due to ongoing sand movement, and where construction impacts would likely be short-term.

Poseidon's proposed use of the existing intake would cause the same types of significant adverse impacts identified in that EIR, albeit at a somewhat smaller scale due to its proposed intake of 304 MGD instead of the power plant's maximum of more than 800 MGD. Poseidon's use of the power plant intake for desalination would also extend up to 90 years the need to dredge a channel within the lagoon. However, similar to its views on subsurface intakes, Poseidon contends that this alternative would cause even more significant impacts than its proposed use of the existing power plant intake, and that it is economically infeasible. It characterizes the impacts caused by an offshore intake as "significant and irreversible." Clearly, though, while an offshore open water intake would cause greater impacts than a subsurface intake, the impacts of a properly designed and sited open water intake would be substantially less than those caused by the existing estuarine intake. There are areas offshore where the intake would not affect valuable hard bottom habitat, kelp beds, or other high value habitats, it could be built with a velocity cap to maintain very low levels of impingement, and its entrainment effects would likely be far less severe than those that occur within the highly productive Agua Hedionda estuarine environment.

Poseidon also contends such an intake would be economically infeasible. On October 18, 2007, Poseidon provided cost estimates showing that a 1000-foot long offshore intake would cost about $150 million; however, similar to its estimates for the other alternatives described above, the costs do not appear credible. Included with Poseidon's estimates, for example, are land acquisition costs, instead of lease costs. The estimate also includes environmental mitigation costs of about $14 million, again for an intake meant to be less environmentally harmful than the intake Poseidon proposes to mitigate for $2.79 million. Further, Poseidon's cost estimates do not

reflect savings such an intake could provide. For example, Poseidon would not have to dredge the lagoon (a savings of at least $1 million per year) and may have much less required compensatory mitigation (see below).

One measure Poseidon offered to include in its facility to reduce entrainment would be to install variable speed pumps (see Poseidon's June 2007 Flow, Entrainment and Impingement Minimization Plan); however, since the entrainment rate is primarily a function of the amount of water used, this measure would not likely reduce entrainment as long as Poseidon continued to pump the anticipated 304 MGD into the desalination facility.

Compensatory mitigation: The third main step in mitigation sequencing is to provide compensatory mitigation – that is, creating, restoring, or enhancing the same or similar types of habitats as those a project would adversely affect. This mitigation step has its own sequence – it should first be "in-kind", if possible – that is, it should result in the same type of habitat as that being lost; it should be "on-site" – that is, it should be at or near the site of the affected habitat; and it should be "in time" – that is, the mitigation site should provide habitat functions at the same time the affected habitat is losing its habitat value. As mitigation options move away from any of these three characteristics, the amount of mitigation needs to increase to reflect that the mitigation is not fully providing the habitat functions and values being lost. For example, if a mitigation site is not expected to provide its expected habitat functions for several years – due to the need to construct it, plant the necessary vegetation, let the vegetation take hold, etc. – that time lag is addressed by requiring mitigation at greater than a 1:1 ratio to make up for the time period between when the habitat impact starts and when the mitigation site begins providing the anticipated habitat function. Similarly, when mitigation is intended to replace lost high-quality habitat, a restoration or enhancement mitigation site will often be larger than the project site to reflect the overall lower quality of the habitat that comes about through mitigation. Mitigation ratios can range from as low as 1:1 when mitigation is certain, immediate, and of equivalent value as the lost habitat, to 30:1 or higher for lower quality or delayed mitigation to make up for the loss of high-quality habitat.

As described above, Poseidon has not yet shown that the first two mitigation steps – avoidance and minimization – are infeasible; however, it has provided a description of potential compensatory mitigation measures. On October 10, 2007, Poseidon provided to Commission staff its proposed "Coastal Habitat Restoration and Enhancement Plan". Although this compensatory mitigation plan is premature, Commission staff evaluated it to determine whether it would provide adequate mitigation for Poseidon's anticipated entrainment and impingement impacts. As discussed below, the Plan does not include the level of information or certainty to determine that any of the possible measures would be implemented, would provide adequate mitigation, or would conform to Coastal Act provisions.

Poseidon states in the Plan that it would provide up to $2.79 million for various potential mitigation projects in northern San Diego County. The Plan identified those potential projects based on responses to Poseidon's distribution in August 2007 of a "Request For Expressions of Interest" (REI). The REI asked interested parties to submit mitigation proposals that would "preserve, restore or enhance existing wetlands, lagoons, or other high-productivity near-shore coastal areas" in San Diego County. The proposals were also to be consistent with requirements of the Coastal Commission, Regional Board, National Marine Fisheries Service, and other

federal, state, and local agencies. Poseidon asked that the proposals cover areas of from five to 37 acres, that they hold promise for long-term benefits, and that they be technically feasible.

Poseidon's Plan presents seven proposals from the responses received. They are briefly described and evaluated below:

- San Dieguito Coastal Habitat Restoration: This proposal describes possible mitigation measures at San Dieguito Lagoon, about 12 miles south of Agua Hedionda. This mitigation site would be adjacent to a 115-acre mitigation site being developed by Southern California Edison pursuant to Coastal Development Permit #6-81-330. The proposal describes two options, each of which would create about 37 acres of various wetland and upland habitat types – e.g., high salt marsh, seasonal salt marsh, native grasslands, etc. – for about $2.4 million to $2.79 million. Both options would rely in part on water quality treatment ponds that have been funded but not yet constructed. It is unclear from the description how either option would be selected or implemented.

- Loma Alta Lagoon Restoration: This proposal describes acquiring two privately-owned parcels that total 0.89 acres and restoring those and three other publicly-owned adjacent parcels to add 3.01 acres of wetlands to an already restored 2.0 acre lagoon in Oceanside. The overall project, proposed by the City of Oceanside, would cost about $5.6 million. It is not clear from the proposal whether other funds have been provided or what amount is being requested from Poseidon. The proposal does not provide specific descriptions of the expected habitat types.

- Agua Hedionda Lagoon Ecological Reserve Expansion: This proposal describes acquiring and preserving a parcel of land near the existing Ecological Reserve on the north shore of Agua Hedionda's Inner Basin. The subject parcel is apparently being considered for a housing development, but provides wildlife habitat adjacent to the lagoon's wetlands. However, the proposal does not identify details about expected mitigation benefits or project costs. Additionally, it is apparently contingent on first determining whether the current owner is interested in selling and then raising other needed funds for the purchase. It describes Poseidon's potential contributions as helping with a down payment or helping to secure a loan for the property.

- Agua Hedionda Lagoon Invasive Plant Eradication and Native Plant Restoration: This proposal would involve removing invasive, exotic species from the Agua Hedionda watershed and planting native species. It proposes a one-year, $1 million project that would locate and map non-native, invasive plants, removal some number of those plants, revegetate those areas with native plants, measure water quality and habitat parameters before and after site treatments to determine ecosystem improvements, and provide public education and outreach. However, the proposal does not specify how many acres of invasive plants would be removed or how many acres of native plants would be planted, and does not include any monitoring or contingency plans to ensure the areas are maintained.

- Agua Hedionda Lagoon Abalone Stock Enhancement: This proposal by the Carlsbad Aquafarm would involve growing and planting about 100,000 abalone at unspecified sites in Agua Hedionda and other nearby waters. It would require $910,000 and is expected to take from three to five years.

- Buena Vista Lagoon Environmental Analysis: This proposal consists of a request that Poseidon fund the completion of a Restoration Plan and Environmental Impact Report for the Buena Vista Lagoon Foundation.

- Frazee State Beach Coastal Bluff Habitat Restoration: This proposal, from the California Department of Parks and Recreation, would restore about 5.8 acres of coastal bluff habitat near Agua Hedionda. The project would cost $508,330 and would involve removing non-native vegetation, performing unspecified habitat restoration, and providing public interpretation.

Overall, although some of these proposals have the potential to partially mitigate for Poseidon's anticipated entrainment impacts, the Plan does not provide enough information or certainty about any of them to determine what mitigation would actually occur. Its shortcomings include the following:

- The Plan provides no certainty that any of these potential projects would occur. Poseidon has not offered these projects as mitigation; its Plan states only that these are possible mitigation efforts. Further, included in the Plan is Poseidon's Request for Expressions of Interest, which states that Poseidon reserves the right to reject any of the submitted proposals.

  None of the proposals include the type or level of information needed to determine what mitigation benefits would accrue, what performance standards or contingency measures would be used to ensure mitigation success, or other similar descriptions generally required for determining the adequacy of a mitigation proposal. At best, the proposals describe projects that have the potential to partially mitigate for entrainment impacts, but the Commission would need a substantially more detailed proposal to determine whether any of the proposals would meet Coastal Act mitigation standards.

- The Plan does not recognize that Agua Hedionda is already the subject of extensive mitigation work. There are a number of initiatives already occurring or planned that involve enhancing or restoring water quality or habitat in Agua Hedionda, many being implemented with substantial amounts of public funding. Poseidon's planned use of the estuarine intake and its proposed compensatory mitigation approach away from Agua Hedionda would diminish many of the water quality benefits and habitat values that these other mitigation efforts are expected to provide.

  As noted previously, for example, Carlsbad and other nearby cities are subject to requirements of an NPDES permit issued by the Regional Board to improve stormwater management practices affecting Agua Hedionda. Also, the State Water Resources Control Board is funding development of an Agua Hedionda Watershed Management Plan by the Carlsbad Watershed Network. That plan calls for coordinated and integrated planning for

watershed management initiatives.[43] As part of this plan, the Network is establishing a comprehensive and prioritized list of mitigation opportunities in the watershed, which it expects to complete in August 2008. The Network recently completed research identifying shortcomings in the mitigation approach used thus far in the lagoon that has resulted in low success rates and recommending steps to improve mitigation success.[44] The Network requested that any mitigation the Commission may require of Poseidon be integrated with this existing state-funded effort.[45] Thus far, however, Poseidon's possible mitigation projects do not show the necessary level of coordination with these other ongoing efforts.

- Poseidon states that the Plan is based on providing 1:1 mitigation for the loss of about 37 acres of habitat within Agua Hedionda. However, none of the potential projects offered would provide "in-kind", on-site mitigation – that is, none would replace the habitat or organisms lost in Agua Hedionda due to entrainment – and so the individual projects or any combination of projects would have to provide mitigation at more than a 1:1 ratio.

- The Plan appears to be based more on cost than mitigation needs. Poseidon has established an upper limit of $2.79 million for mitigation costs, but that does not appear to reflect the cost to provide adequate mitigation for its expected impacts. For example, the Plan assumes wetland restoration in Southern California would cost about $75,000 per acre, but it includes several proposals where the costs are unspecified or are well above that figure. The San Dieguito proposal comes closest to Poseidon's assumed cost figure, but about a quarter of the mitigation at that site would be uplands. The Oceanside proposal, to restore about three wetland acres for about $2.5 million is well beyond Poseidon's expected costs. Even the completely out-of-kind mitigation that could result from the Frazee coastal bluff restoration would cost about $100,000 per acre.

In sum, Poseidon has described several mitigation options, but has not committed to provide the level or type of mitigation that would be needed to address impacts caused by its use of the estuarine intake. Additionally, as noted above, the previous mitigation sequencing steps – avoidance and minimization – provide feasible mitigation measures that would result in application of this third step not being needed.

Further, and importantly, other regulatory requirements are likely to result in Poseidon needing to use an alternative to the proposed estuarine intake. As noted previously, Section 13142.5 of the Porter-Cologne Act requires that "…the best available site, design, technology, and mitigation

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[43] For example, the Carlsbad Watershed Management Plan includes the following objectives:

- "Coordinate watershed efforts: "Action Items" should facilitate coordinated efforts between municipalities, regulatory agencies, and environmental organizations to implement watershed management policies and physical improvements at the most functional locations and in the most effective manner, without the restriction of political boundaries.
- Integrate various planning efforts: Planning for land use, transportation, watershed protection and habitat conservation need to be integrated and coordinated. "Action Items" related to planning must look for as many overlapping benefits between these planning topic areas as possible."

[44] Case Study: Systemic Evaluation of Compensatory Mitigation Sites Within the Carlsbad Hydrologic Unit" by Nicholas R. Magliocca, UCSD

[45] See September 24, 2007 letter from Carlsbad Watershed Network to Commission staff.

measures feasible shall be used to minimize the intake and mortality of all forms of marine life." For this proposed project, the best available site is clearly not one within a highly productive estuarine environment; the best available design and technology are not those represented by a 53-year old existing intake that is being shut down due in part to its significant entrainment impacts; and the best mitigation measures feasible are not the assortment of possible projects Poseidon has proposed. Use of that intake would also be subject to Clean Water Act requirements that limit activities that would cause further impairment to a listed impaired waterbody. As noted previously, Agua Hedionda is impaired due to excess sedimentation caused in part by use of the intake and permitting Poseidon's proposed new use is not likely to occur until the Regional Board develops the required TMDL for Agua Hedionda.

## *Anticipated Project Impacts and Coastal Act Conformity – Discharge-Related*

**Description of Impacts:** The proposed project would result in a discharge of about 250 MGD from the desalination facility to the outfall currently used by the power plant, which is located on state tidelands and on Carlsbad State Beach. The discharge would contain at least 50 MGD of high salinity water from the facility along with at least about 200 MGD of estuarine water pumped into the intake system to provide dilution for the high salinity discharge. The expected "end of pipe" salinity of the blended discharges is expected to be about 40 parts per thousand (ppt) of salinity. This would be about twenty percent higher than the naturally occurring average salinity of about 33.5 ppt in these nearshore waters. Because the discharge would be immediately adjacent to the shoreline, the plume of higher salinity water would extend along the beach and nearshore waters. Poseidon's discharge would be subject to conditions of an NPDES permit that allows discharges at an average daily concentration of up to 40 ppt and an average hourly concentration of up to 44 ppt.

Poseidon's desalination process would also include adding a number of chemicals to the water during desalination. The chemicals used would be those commonly used in water treatment plants, such as coagulants (e.g., ferric sulfate) alkalinity adjusters (e.g., sulfuric acid), and various membrane cleaning chemicals such as hydrochloric acid, detergents, or caustic soda. Many of the chemicals would be used during start up and membrane cleaning and after those processes would be neutralized or sent to the sanitary sewer system instead of the seawater discharge. However, the discharge into ocean waters is expected to include some relatively low concentrations of some those chemicals. The discharge would also include biological matter – i.e., the entrained organisms from the intake.

Poseidon's project as originally proposed – that is, co-located with an operating power plant cooling water system – would have withdrawn 100 MGD of the several hundred million gallons used by the power plant, processed that water to produce 50 MGD of potable water, and discharged about 50 MGD of its high salinity waste stream back into the up to eight hundred million gallons of seawater being discharged by the power plant. Blending the desalination discharge with the much larger power plant discharge would have resulted in an overall discharge with salinity levels very close to the natural background levels in the nearshore ocean waters. Without the power plant discharge, however, Poseidon's discharge would cause salinity levels twice that of seawater and caused significant adverse impacts to marine life in the nearshore waters and on the seafloor.

**Mitigation measures:** To address this issue, Poseidon proposes to maintain a discharge of at least 304 MGD when the power plant is not operating or is discharging less than that amount. Poseidon determined that an overall 304 MGD discharge would dilute its desalination discharge so that salinity levels near the outfall would be about 40 ppt instead of 67 ppt. This 40 ppt level is about 20 percent higher than the average receiving water salinity and about 15 percent higher than the level of natural variation in local seawater salinity. Local seawater averages about 33.5 ppt and varies naturally up to about 34.4 ppt, due to phenomena such as upwellings, changes in freshwater inputs, and others. The project EIR identified the 40 ppt at the level above which discharges would cause significant adverse impacts.[46] Guidance from the U.S. EPA recommends that salinity levels from a discharge should not vary more than 4 ppt from the range of natural variation in areas permanently occupied by food and habitat forming plants. Using the EPA guidance would result in a maximum allowable discharge level of about 38.4 ppt. Poseidon's NPDES permit allows an average daily concentration of 40 ppt and an average hourly concentration of up to 44 ppt.

Poseidon also submitted modeling results showing the expected extent of the salinity plume based on local historical data for characteristics such as ocean temperatures, currents, and salinity levels. The extent of the high salinity in the discharge would vary based on how these characteristics interact at any given time. Poseidon's models show that salinity concentrations above the level of natural variation would cover about 8.3 acres of the nearshore seafloor during average conditions (i.e., a frequency of 50%) and would cover up to about 44 acres during extreme conditions (i.e., a frequency of less than 0.1%).

Under either condition, the discharge would create conditions beyond the range experienced by the local biota and would cause some level of adverse impacts. Poseidon has provided test results showing that a 40 ppt salinity level would cause minimal acute effects to several test organisms; however, these organisms are not representative of the full suite of marine life living in these nearshore waters and benthic habitat that would experience this level of salinity. Further, several species used in these tests are generally considered more salinity tolerant than others, so the test results likely do not reflect actual effects that would occur to species exposed to these high salinity levels in the natural environment. For example, a State Board proposal to establish a salinity limit in the state's Ocean Plan includes a proposed limit of 36.5 ppt based on study results showing that level caused adverse effects to sea urchin embryos, which is one of standard test species more sensitive to salinity differences.[47] Other studies show that slight

[46] The EIR stated that elevated salinity levels would cause significant impacts if they had a substantial adverse effect on marine biota, included extended exposure to salinity levels above 40 ppt or permanent elevation of salinity levels above 38.4 ppt on hard bottom habitat.

[47] The State Board is considering an amendment to the state's Ocean Plan that would establish an upper salinity limit for discharges into California's coastal waters. The Ocean Plan at this time does not have a specific salinity limit, but requires in general protection of beneficial uses and water quality objectives for other contaminants and physical water quality characteristics. In June 2007, the State Board issued a Scoping Document for its proposed policy that included three proposed alternatives: "No Action" – that is, do not add a salinity limit to the Plan; "No discharges above natural variation" – that is, limit salinity in discharges to the range of natural variation which is about 10% above average; or, "Numeric water quality objective of 36.5 ppt", based on study results showing that salinity levels above than 36.5 ppt caused adverse effects to sea urchin embryos.

differences in salinity levels can affect the population density of various species, their ability to tolerate various environmental stressors, reproductive rates, and other effects.[48]
In addition to higher than natural levels of salinity, Poseidon's discharge would include some as-of-yet unknown amounts of other constituents that would enter the discharge from various materials or methods used in the proposed facility. As noted above, these include various chemicals and the dead organic matter from organisms entrained in the intake. Additionally, Poseidon has not conducted tests to determine the chronic effects of its proposed discharge.[49] Its NPDES permit requires Poseidon conduct those test before beginning operations, but they have not yet been conducted.

Based on the above, Poseidon's proposed discharge would likely cause adverse effects to organisms in from about eight to 44 acres of nearshore benthic habitat. Although the extent of the areas would vary continually based on environmental conditions, some areas would be subject to nearly continual salinity concentrations higher than natural salinity variations.

There are a number of feasible mitigation measures available to reduce the anticipated discharge's adverse effects.[50] As noted previously, one of the difficult issues with Poseidon's

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[48] See, for example, Technical Report 39: San Francisco Estuary Regional Monitoring Program for Trace Substances, Result of the Benthic Pilot Study, August 2000; and Voyer, R.A., and Glen Modica, Influence of salinity and temperature on acute toxicity of cadmium on *Mysidopsis bahia*, in Environmental Contamination and Toxicology, Vol. 19:1, January 1990.

[49] The U.S. EPA Water Quality Standards Handbook defines "chronic" as "a stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. The measurement of a chronic effect can be reduced growth, reduced reproduction, etc., in addition to lethality."

[50] Note: Poseidon contends that Coastal Act Section 30412(b) prohibits the Commission from imposing requirements on Poseidon's proposed discharge or requiring additional mitigation for its impacts beyond those imposed by the Regional Board through issuance of an NPDES Permit.

Coastal Act Section 30412(b) states:

> "*The State Water Resources Control Board and the California regional water quality control boards are the state agencies with primary responsibility for the coordination and control of water quality. The State Water Resources Control Board has primary responsibility for the administration of water rights pursuant to applicable law. The commission shall assure that proposed development and local coastal programs shall not frustrate this section. The commission shall not, except as provided in subdivision (c), modify, adopt conditions, or take any action in conflict with any determination by the State Water Resources Control Board or any California regional water quality control board in matters relating to water quality or the administration of water rights.*
>
> *Except as provided in this section, nothing herein shall be interpreted in any way either as prohibiting or limiting the commission, local government, or port governing body from exercising the regulatory controls over development pursuant to this division in a manner necessary to carry out this division.*"

However, as noted previously in these Findings, the Commission shares jurisdiction with the State and Regional Boards for implementing Porter-Cologne Act Section 13142.5. The Regional Board has not yet determined whether Poseidon's proposed project would conform to Section 13142.5, and therefore the Commission's Findings are not in conflict with a determination by the Board. As stated in Poseidon's NPDES permit, the Board will review Poseidon's submitted Flow, Entrainment and Impingement Minimization Plan to determine whether it complies with Section 13142.5 and what measures may be needed for Poseidon to comply. The Board has not yet reviewed Poseidon's Plan and has not imposed conditions related to the Plan so there are no Board determinations with which

proposal to use the existing power plant cooling water system is that some options for reducing a discharge-related impact would cause increased impacts on the intake end of the pipe. In this case, Poseidon's proposal to reduce its salinity concentrations at the discharge by drawing in additional water means increasing its adverse entrainment effects at the intake. Using this dilution approach to further reduce discharge salinity levels would require pumping even more water from Agua Hedionda Lagoon, thereby increasing the already significant adverse entrainment impacts. Conversely, although allowing Poseidon to discharge at higher salinity levels would require less estuarine water and cause fewer entrainment impacts, it would increase the area and level of adverse effects in the nearshore ocean waters beyond the currently anticipated levels.

Other available mitigation options that would avoid or reduce discharge-related impacts include the use of a zero-discharge system or routing more of the discharge to the sanitary sewer system. A zero-discharge system uses either mechanical means or evaporation to re-use and reduce discharge volumes. Some of these systems may also allow some cost savings through their recovery of salts or minerals from the seawater. Although the scale of the proposed project may prevent use of a zero-discharge system for the entire amount, it could possibly used for some of the discharge, perhaps in conjunction with routing additional volumes to the sanitary sewer system. Although the sewer system has its own capacity limits, the City of Carlsbad is planning to route a new sewer line adjacent to the proposed facility and it may be possible to provide some capacity for additional desalination discharges. Additionally, if these systems were used to reduce either the overall amount of Poseidon's discharge or the concentration of salt and other minerals or contaminants in the discharge, they would also allow Poseidon to pull in less water from AHL, thus reducing the facility's entrainment impacts. Poseidon has not shown these measures to be infeasible.

Absent the use of these measures, Poseidon would need to provide compensatory mitigation for the adverse effects its discharge would cause to some area of the seafloor along the shoreline. Its proposed mitigation plan for its entrainment impacts did not acknowledge this area as part of the needed mitigation, so in addition to the plan's shortcomings identified above, Poseidon would have to add additional mitigation measures to reflect this additional area of impact.

## *Anticipated Project Impacts and Coastal Act Conformity – Cumulative Impacts*

In addition to the adverse marine biological effects the proposed project would cause to Agua Hedionda Lagoon and the nearshore waters off of Carlsbad, the project would contribute to cumulative impacts already occurring in those waters. As noted above, Agua Hedionda Lagoon is listed as an impaired waterbody due in part to excess sedimentation. The impairment affects a number of beneficial uses of the waterbody and requires the ongoing dredging described in the

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the Commission could conflict. Additionally, the Commission's Findings include a number of feasible alternatives and mitigation measures that the Board will likely include in its review and may, in fact, use as the basis of conditions to impose as part of Poseidon's NPDES permit.

Because the Board has not yet adopted final conditions for the Permit, the Commission's findings specifying feasible alternatives and mitigation measures do not conflict with a Regional Board determination and therefore conform to provisions of Coastal Act Section 30412(b).

next section of these Findings. The sedimentation is due largely to the intake drawing in water from the lagoon that would otherwise exit through the lagoon mouth and take much of the sediment with it. The source of this sediment is the longshore sand movement off the coast of Carlsbad, and as a result of the jetties and the intake, sediment pulled into the lagoon is removed from that longshore process, resulting in the need for beach nourishment that causes effects to coastal resources in the form of ongoing dredging every few years and the accompanying disruption of public access to areas of the nearby beaches.

## *Conclusion*

Regarding entrainment and impingement, Poseidon's proposed project would use 304 MGD of estuarine waters (equal to about 932 acre-feet of water per day, which over a year would cover more than 500 square miles up to one foot deep in water). This water use would kill all the organisms in that water, which Poseidon estimates represent about 37 acres worth of wetland and open water productivity in Agua Hedionda. This impact is avoidable through use of subsurface intakes or could be reduced through use of an offshore intake. Either type of intake is a feasible and less environmentally damaging alternative to Poseidon's proposed use of an estuarine open water intake. Poseidon has instead proposed a compensatory mitigation approach that is inadequate to mitigate for these impacts. Regarding the project's planned discharges, there are feasible mitigation measures available that would reduce the impacts associated with high salinity levels in the nearshore benthic environment, some of which would also reduce Poseidon's entrainment-related impacts. Further, Poseidon has not proposed compensatory mitigation for affected areas that would remain after implementing the avoidance and reduction mitigation measures.

Therefore, based on the studies cited and the information provided above, the Commission finds that the project as proposed does not conform to Coastal Act Sections 30230 and 30231. However, because the proposed project would be considered a "coastal-dependent" industrial facility, the Commission may therefore evaluate it under Coastal Act Section 30260, which allows such projects to be approved in some instances even when they are found to be inconsistent with other Coastal Act provisions. The analysis and findings related to Section 30260 are in Section 2.5.6 of this report, below.

## 2.5.2 Use of Wetlands and Coastal Waters (Coastal Act Section 30233)

Coastal Act Section 30233(a) states, in relevant part:

> *The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects...*

Coastal Act Section 30233(b) states:

> *Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable longshore current systems.*

Coastal Act Section 30233(c) states:

> *"In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to, the 19 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division.…*

Coastal Act Section 30233 requires in general that dredging in coastal wetlands and estuaries be limited to certain types of uses, that it be allowed only where there are no feasible less environmentally harmful alternatives, and that it be mitigated to the extent feasible. It also requires that dredging be implemented in a manner that avoids significant disruption to marine and wildlife habitats and to water circulation. Section 30233(c) further imposes a more limited set of allowable uses in some wetlands, including Agua Hedionda Lagoon. Because Agua Hedionda Lagoon is one of the coastal wetlands subject to the use limitations in Coastal Act Section 30233(c), that subsection serves for this proposed project as the standard of review for allowable uses.

### *Description of the project's alteration of, and its effects on, Agua Hedionda Lagoon*

Agua Hedionda Lagoon is one of 19 coastal wetlands identified in the California Department of Fish and Game report, Acquisition Priorities for the Coastal Wetlands of California. This report identifies high priority wetlands for acquisition, based primarily on their values for fish and wildlife habitat and threats to their continued existence as a natural resource. Areas of the lagoon where the plant and animal life is especially valuable due to its special nature in the ecosystem include the Agua Hedionda Lagoon State Marine Reserve and Ecological Reserve,

which cover about 180 acres extending along about a half-mile of the lagoon's Inner Basin. The lagoon includes extensive areas of open water habitat, eelgrass beds, and various types of wetlands, and provides significant habitat benefits to a number of species, as described in previous section of these Findings. Those Findings also show that Poseidon's proposed use of estuary water would create adverse entrainment effects equal to the loss of no less than about 37 acres of Agua Hedionda's wetland and open water areas.

Agua Hedionda Lagoon as it currently exists is a highly engineered coastal lagoon. During the past half-century of power plant operations, the power plant's cooling water intake created an imbalance between tidal inflow and outflow, resulting in more sediment entering the estuary than leaving. Agua Hedionda Lagoon is on the state's list of impaired waterbodies due to high rates of sedimentation, which are caused in part by the power plant's intake and would continue due to Poseidon's proposed use of the intake. As an existing coastal-dependent industrial facility operating in the lagoon since the mid 1950s, the power plant has dredged its cooling water intake channel at least 25 times over the last half-century.[51] Since 1954, dredging is estimated to have removed about eleven million cubic yards of material from the lagoon.

Starting in 1977, the Commission issued a number of coastal development permits to allow various amounts of dredging for one-year or multiple-year periods. During Commission review of the last several permits, there was considerable debate about where to deposit the dredged spoils. Much of the material was sand suitable for being placed on beaches and used for recreation; however, it was believed that material placed on some of the nearby beaches, particularly those to the north of the lagoon mouth where recreational benefits were higher, would be quickly transported by tide and currents back into the lagoon where it would need to be dredged again.

The Commission required that some material be placed at various beaches in and near the lagoon where it would serve a recreational purpose; however, the Commission also required the power plant owner to pay for an independent study to assess sediment transport conditions along the ocean shoreline in and near Agua Hedionda.[52] That 1999 study found that, on average, about 80% of the sand trapped within the lagoon comes from longshore transport from north and the rest comes from the south. It recommended that most of the dredged spoils be placed to the south of the lagoon to reduce the need for "re-dredging" the same material. At about the same time, the San Diego Association of Governments (SANDAG) was implementing another program to increase the amount of sand on nearby beaches with a focus on providing sand to enhance recreational uses of beaches to the north (See CDP 6-06-061).

Based in part on the results of the 1999 study, and in an effort to reduce the need for dredging within the lagoon, the power plant owner in 2001 requested that the State Lands Commission allow a 200-foot extension of the north inlet jetty to reduce the amount of sand entering the lagoon. The State Lands Commission conducted environmental review of the proposal and published in January 2005 a Draft EIR that provided a comprehensive and independent

[51] Poseidon's proposed project would be a new, rather than an existing, facility, and with the pending power plant shutdown, would result in new dredging-related impacts not necessary to maintain operations of an existing facility.

[52] Elwany, Dr. Hany. Study of Sediment Transport Conditions in the Vicinity of the Agua Hedionda Lagoon, 1999.

assessment of the effects caused by dredging in Agua Hedionda.[53] It evaluated not only the proposed jetty extension and associated dredging, but also assessed how best to meet related objectives, including:

- Mitigating the expected cumulative sedimentation impacts to the lagoon that would result from implementing the SANDAG Regional Beach Sand Project;
- Maintaining the longshore sediment transport process and increasing the amount of sand that bypasses the lagoon and is made available to downcoast beaches;
- Minimizing potential adverse effects on biological resources; and,
- Limiting the frequency of needed maintenance dredging in the lagoon.

The EIR evaluated five alternatives and concluded that the environmentally superior alternative would be to significantly reduce the need for dredging within the lagoon by moving the power plant's intake offshore. The EIR found that by ending the power plant's estuarine water withdrawals, this alternative would avoid the significant adverse impacts identified for the proposed project related to aesthetic resources, recreation, hydrology, water quality, and biological resources. It also found that maintenance dredging of about 20,000 cubic yards per year from near the lagoon's mouth would be adequate to maintain tidal flows in the lagoon, which would help continue the lagoon's other existing beneficial uses. This alternative would also allow for at least partial removal of the jetties to re-establish a more natural longshore transport system.

In 2006, Poseidon provided a technical paper that modeled expected differences in sand influx into Agua Hedionda under two scenarios – with the power plant operating at 530 MGD (the average from 1981 until 2000), and with the desalination facility operating at 304 MGD.[54] It found that stand-alone desalination operations at 304 MGD would reduce sand influx by 42.5% compared to the influx caused by the power plant during those years. The paper found that during those years, power plant operations resulted in a cumulative total of about three million cubic yards of sediment staying in the lagoon (an average of about 159,000 cubic yards per year). Had the desalination facility been operating during those years at 304 MGD, the paper estimated sand influx would have been just over two million cubic yards (or about 106,000 cubic yards annually).[55]

More recently, Poseidon provided another technical paper[56] that modeled another two scenarios – the expected difference in sand influx into the lagoon with a stand-alone desalination plant using 304 MGD versus complete cessation of the intake use. Using similar assumptions as the

[53] The State Lands Commission conducted CEQA review from 2001 to 2005. It published the Draft EIR in January 2005, but did not complete the review because the power plant owner withdrew its application request shortly thereafter in February 2005.

[54] Jenkins, Dr. Scott, and Joseph Wasyl. Coastal Processes Effects of Reduced Intake Flows at Agua Hedionda Lagoon, December 2006.

[55] These figures assume a 14.7% "backpassing" rate to reflect sand dredged from the lagoon and deposited on nearby beaches so that it returns to the lagoon.

[56] Jenkins, Dr. Scott, and Joseph Wasyl. Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low-Flow vs No-Flow Alternatives, September 28, 2007.

previous paper, this paper concluded that had there been no flow of water from the lagoon to the power plant during the same 1981-2000 period, the net sand influx would have been about 1.7 million cubic yards, or about 316,000 cubic yards less than that that would have been caused by a stand-alone 304 MGD desalination facility. The paper also concluded that the difference between sand influx caused by historic power plant operations and influx that would have been caused solely by desalination operations would have reduced the need to dredge from an average of every two years (which had been the pattern for the power plant during that time period) to every three years. The paper also concluded that the difference in sand influx between stand-alone desalination operations and "no flow" – i.e., about 316,000 cubic yards total, or about 16,000 cubic yards per year – would have resulted in no discernable difference between having a desalination facility use water from the lagoon and not having this water use.

However, neither of Poseidon's submittals appeared to consider the conclusions reached in the EIR discussed above. The EIR, for example, identified a number of adverse impacts caused by the power plant dredging, and it is likely that Poseidon's proposed dredging would cause these same adverse effects, albeit at a somewhat smaller scale. Additionally, the EIR's identification of those significant impacts led to its selection of an environmentally preferred alternative that would require dredging only about 20,000 cubic yards per year from the lagoon mouth rather than Poseidon's identified dredging of over 100,000 cubic yards per year average within the lagoon's West Basin. The EIR's independent and more comprehensive analysis provides a credible assessment of the type and degree of impacts that would be associated with Poseidon's proposed dredging. Additionally, the EIR's feasible least damaging environmental alternative – that is, ending the use of the intake in the lagoon and instead using an offshore intake – would result in substantially reduced impacts, would restore a more natural longshore sand transport system, and would substantially decrease the amount of sand influx into the lagoon.

## *Analysis of Conformity to Coastal Act Section 30233(c)*

Coastal Act Section 30233(c) establishes that alterations to certain wetlands included in the report, Acquisition Priorities for the Coastal Wetlands of California, must be limited to "…very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of south San Diego Bay…". The report lists 19 of California's most productive coastal wetlands, which include Agua Hedionda.

The proposed project would alter these wetlands in a manner not allowed by Section 30233(c). As stated in Section 30233(c), the allowable activities in Agua Hedionda are "very minor incidental public facilities, restorative measures, [and] nature study…". The project's proposed development activities – i.e., water removal and dredging – are not for a "very minor incidental public facility," and are not restorative measures or nature study. Therefore, the project's proposed use of these wetlands does not conform to this section of the Coastal Act.[57] The

[57] Past Commission decisions have interpreted "minor" and "incidental" activities as those that are temporary in nature and for which no alternatives exist. For example, in a recent decision approving the placement of pilings within Agua Hedionda Lagoon to support an existing rail line (Consistency Certification #CC-52-05), the Commission found that determining whether to allow an "incidental" public use under Section 30233(c) should also consider whether there are feasible alternatives to the proposed wetland use. The Commission approved the project in part because there were no alternatives, because the project would not affect the functional capacity of the lagoon, and because it did not increase the capacity of the rail line.

Commission further notes that Section 30233(c) does not allow other uses in exchange for offsetting mitigation; therefore, the mitigation Poseidon has offered for its entrainment impacts does not provide the needed conformity to this section.

## *Additional evaluation of the proposed project's dredging component*

Coastal Act Section 30233 also includes provisions applicable to proposed dredging projects. As shown below, the project's proposed dredging does not conform to those provisions.

**Analysis of Conformity to Coastal Act Section 30233(a):** Section 30233(a) imposes a three-part "test" for proposed dredging activities:

1) Is the activity an allowable use?: As noted above, the standard of review for whether this proposed project is an allowable use in Agua Hedionda is Section 30233(c). The Findings above show that the project is not an allowable use in Agua Hedionda; therefore, the project does not meet the first test of Section 30233(a).[58]

2) Are there no feasible, less environmentally damaging alternatives?: As described in Section 2.5.1 of these Findings, there are feasible and less environmentally damaging alternatives to Poseidon's proposed use of a soon-to-be-retired cooling water intake structure. These alternatives include constructing a subterranean intake system or an offshore intake, either of which would eliminate or reduce the need for dredging within Agua Hedionda. Use of either type of alternative intake structure would reduce the amount of net sediment transport into the lagoon, which would create a more balanced sediment transport system within Agua Hedionda and along the nearby ocean beaches. As noted in the State Lands Commission study cited above, use of these alternative structures would reduce the amount of dredging needed to allow the lagoon to stay open to the sea, to maintain its existing beneficial uses, and would do so with far fewer environmental impacts than those associated with either the power plant's recent current dredging regime or the dredging regime proposed by Poseidon. Therefore, the project as proposed would not meet the second of the three Section 30233(a) tests.

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In another example, the Court of Appeal recognized the Commission's approach as a permissible interpretation of the Coastal Act and supported the Commission's interpretation of "incidental" public service. In the case of *Bolsa Chica Land Trust et al., v. The Superior Court of San Diego County* (1999) 71 Cal.App.4th 493, 517, the court found that:

> *… we accept Commission's interpretation of sections 30233 and 30240… In particular we note that under Commission's interpretation, incidental public services are limited to temporary disruptions and do not usually include permanent roadway expansions. Roadway expansions are permitted only when no other alternative exists and the expansion is necessary to maintain existing traffic capacity.*

As noted above, Poseidon's proposed dredging would not be temporary, as it would occur every three or four years for 30 to 90 years. Also as noted above, there are alternatives available to this proposed dredging.

[58] While Coastal Act Section 30233(a) identifies a number of allowable uses for which dredging may be done – e.g., for coastal-dependent industrial uses, for maintaining existing navigation channels, for incidental public services, etc. – for this proposed project, the standard of review to determine allowable uses is Section 30233(c), as described in these Findings.

3) Have feasible mitigation measures been provided to minimize adverse environmental effects?: In addition to the feasible mitigation measures described above – that is, the use of a subterranean or offshore intake – there are a number of additional measures available that would minimize adverse environmental effects. The Commission's approvals of past dredging projects within Agua Hedionda have required measures such as extensive eelgrass monitoring and mitigation, monitoring and removal of *Caulerpa*, deposition of sand at specific locations to provide beach nourishment, and other similar measures. While Poseidon has stated it intends to take over from the power plant the responsibilities for dredging the intake channel, it has not provided information about the extent to which it would take on those responsibilities or committed to the types of mitigation measures Cabrillo has included in its recent dredging projects. It has also not provided information about how it would implement these responsibilities – for example, the lagoon area subject to dredging is owned by Cabrillo and there is no lease arrangement between Cabrillo and Poseidon for its use or maintenance of that area. Additionally, as noted in Section 2.5.1 of these Findings, Poseidon's expected entrainment impacts would vary greatly depending on the hydrodynamics of Agua Hedionda. While Poseidon's submittals about various dredging scenarios describe some of the likely dredging amounts or dredging intervals, they do not describe the entrainment effects that would result from its intake channel being maintained at different capacities or configurations, any of which could increase (or decrease) the amount of estuarine water directed into or away from the intake. Therefore, the project as proposed would not include feasible mitigation measures to minimize adverse environmental impacts and does not meet the third of the three tests of Section 30233(a).

**Analysis of Conformity to Coastal Act Section 30233(b):** Coastal Act Section 30233(b) requires that dredging and spoils disposal be done in a manner that avoids significant disruption to marine and wildlife habitats and to water circulation. It also provides that, when suitable, dredge spoils should be used for beach replenishment.

As noted above, the findings in the State Lands Commission's EIR showed that use of the power plant's intake structure created a significant disruption to marine and wildlife habitats and to water circulation. The power plant's use of that intake has required it to dredge Agua Hedionda every one or two years, which has been disruptive to eelgrass beds and other habitats. Use of that structure has also required the continued presence of the two jetties at the mouth of the lagoon, which disrupt water circulation and the natural nearshore sand transport needed to maintain beaches in the area. Although Poseidon's proposed use of the intake would likely require less dredging than the power plant has required, it would still disrupt habitat and natural circulation patterns, albeit on a slightly smaller scale. Additionally, Poseidon has available to it feasible alternatives that would substantially diminish dredging-related adverse impacts to the lagoon. Using a subsurface intake or moving the intake offshore would reduce the need to dredge the lagoon from about 100,000 cubic yards annually to about 20,000. Further, the smaller amount of dredging needed for either of these alternatives would be primarily at the mouth of Agua Hedionda rather than in eelgrass beds within the lagoon. These alternatives would also have the benefit of keeping more sand in the longshore transport system, which would reduce the need for, and avoid the impacts associated with, placing dredged spoils on local beaches.

Based on the above, the project as proposed would not be implemented in a manner that avoids significant disruption to marine and wildlife habitat and to water circulations, and it therefore would not conform to Coastal Act Section 30233(b).

**Analysis of conformity to Coastal Act Section 30233(c):** In addition to its use limitations noted above, Section 30233(c) requires that dredging "in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary." The dredging needed as part of the proposed project would allow Poseidon to withdraw at least 304 MGD of estuarine water from Agua Hedionda. This proposed water use does not "maintain or enhance" the lagoon's productivity – instead, as described in Section 2.5.1 of these Findings, it eliminates the equivalent of about 37 acres of productivity from this estuarine wetland system and represents a decrease in its habitat functions. The project therefore does not conform to this provision of Section 30233(c).

## *Conclusion*

The proposed project would represent a use of the Agua Hedionda wetlands not permitted by this Coastal Act Section 30233(c); therefore, based on the studies cited and the information provided above, the Commission finds that the project as proposed does not conform to this Coastal Act provision. Additionally, the proposed project does not conform to those provisions of Section 30233(a), (b), and (c) that apply to the proposed project's dredging activities. However, because the proposed project would be considered a "coastal-dependent" industrial facility, the Commission may therefore evaluate it under Coastal Act Section 30260, which allows such projects to be approved in some instances even when they are found to be inconsistent with other Coastal Act provisions. The analysis and findings related to Section 30260 are in Section 2.5.6 of these Findings.

### 2.5.3 Public Access

Coastal Act Section 30210 states:

> *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Coastal Act Section 30211 states:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

Coastal Act Section 30212(a) states:

> *Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby, or (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.*

Coastal Act Section 30212.5 states:

> *Wherever appropriate and feasible, public facilities, including parking areas or facilities, shall be distributed throughout an area so as to mitigate against the impacts, social and otherwise, of overcrowding or overuse by the public of any single area.*

Coastal Act Section 30213 states, in relevant part:

> *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred...*

The proposed project would be built largely on a site already occupied by industrial uses and would not at that location affect public access to the shoreline. The project also includes pipelines that would be built under roads within the coastal zone, although the pipeline construction would be similar to other road construction projects and would likely not result in adverse effects on public access to the shoreline.

The project's proposed use of estuarine water from Agua Hedionda Lagoon, and its reliance of intake jetties and a discharge structure on State tidelands would affect public access by limiting accessibility to those areas. As noted previously in these Findings, other feasible alternatives

would allow cessation of use of these structures. Further, the project would require ongoing dredging within the lagoon and deposition of the dredged spoils for beach nourishment along nearby beaches, and these activities would each cause temporary disruptions to public access. The feasible alternatives identified previously would reduce the need for dredging and beach nourishment. If Poseidon were to use the available feasible alternatives for its intake and outfall, it would cause as-of-yet unknown effects to public access during construction and possibly during operations.

To address the public access impacts of its project as proposed, Poseidon has offered to dedicate to the City the following sites to be used for public access:

- A site of about two acres, known as the Hubbs Site, on the north side of the lagoon's Outer Basin that would include a trail system and expansion of the existing fish hatchery and aquatic research uses;
- A site of about 3.5 to 4 acres on the west shore of the lagoon's Outer Basin to be used as a fishing beach;
- A site of about 13 acres of bluffs west of the power plant site and adjacent to the shoreline to be used for recreation and coastal access; and,
- A parking area at the south end of the power plant for public parking.

These sites total about 19 acres, and are described in more detail in the City's precise development permit for the project, and Poseidon's coastal development permit application submittals. These public access dedications provide adequate conformity to the Coastal Act's public access provisions.

## *Conclusion*

Based on the above, the Commission finds that the project as proposed conforms to the Coastal Act's public access provisions.

## 2.5.4 Energy Use and Greenhouse Gas Emissions (Coastal Act Section 30253(4))

Coastal Act Section 30253(4) states:

> *New development shall: … (4) Minimize energy consumption and vehicle miles traveled.*

Section 30253(4)'s requirement to minimize energy consumption reduces impacts to coastal resources caused by greenhouse gas emissions. Most of the electricity Poseidon would use would be produced by natural gas-fired power plants, with some produced by coal, hydroelectric, or renewable sources. According to methods developed by the California Climate Action Registry (CCAR), Poseidon's proposed electrical use would result in no less than 200,000,000 pounds of carbon dioxide emissions per year.[59]

> **Note:** The anticipated emissions described herein likely represent the very low end of the range of actual greenhouse gas contributions Poseidon would generate. These analyses evaluate only those carbon emissions that would be generated by Poseidon's electrical use for pumping and desalinating water and transporting it to Maerkle Reservoir. It does not include emissions that would result from project construction, manufacture of reverse osmosis membranes, dredging needed to maintain the intake channel, etc. It also does not include emissions from the pumping needed to move part of Poseidon's produced water to the regional distribution system. Also, it includes only carbon dioxide emissions, not emissions of other greenhouse gases generated by power plants. The analyses also credit Poseidon with emission reductions that may occur through its potential use of a high-efficiency energy recovery device that is still being tested and that Poseidon has not yet committed to use.

Emissions from this facility's electrical use would be substantially greater than those created by other water sources and would represent a significant contribution to California's greenhouse gas emissions. They would also cause significant adverse effects to many coastal resources the Coastal Act is meant to protect. The global heating, sea level rise, and ocean acidification resulting from greenhouse gas emissions affects public access (Coastal Act Sections 30210-30214), recreation (Sections 30212.5, 30213, 30220-30222), marine resources (Sections 30230-30231), wetlands (Sections 30231, 30233), ESHA (Section 30240), agriculture (Sections 30241-30242), natural land forms (30251), and existing development (Sections 30235, 30253). As described below, Poseidon has not demonstrated that its proposed project will conform to the Section 30253(4) requirement to minimize energy consumption to avoid or mitigate adverse effects to coastal resources caused by energy-related greenhouse gas emissions and therefore fails to meet this Coastal Act provision.

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[59] Protocols developed by the California Climate Action Registry estimate carbon dioxide emissions from California's electricity sources total 804.54 pounds per megawatt-hour. Poseidon's expected electrical use of about 250,000 megawatt-hours per year would therefore total just over 200,000,000 pounds of carbon dioxide. These calculations are described in more detail below.

For comparison, 200,000,000 pounds of carbon dioxide is about the same amount produced during 235 million vehicle miles traveled or is the amount of carbon stored each year in 75,000 acres of growing forest (see the U.S. EPA and U.S. Agency for International Development Climate Technology Gateway at www.usctcgateway.net).

## *Issue Background*

One of California's biggest overall energy uses, and one of its most intensive energy uses, is moving water around the state. With most of its water in the north and most of its population in the south, California has established conveyance systems to move water hundreds of miles and over hundreds of feet of elevation gain. Because water is relatively heavy, it requires significant amounts of electricity to transport – for example, the State Water Project uses up to about 5 billion kilowatt-hours each year to move millions of acre-feet of water from Northern to Southern California. Its average demand per acre-foot is about 3,200 kilowatt-hours, which is about the same as the annual residential use for each person in the U.S.

Compared to California's existing water supply systems, seawater desalination is an even more energy intensive source of water. Although desalination's energy needs have decreased significantly in the past several years, reverse osmosis facilities such as Poseidon's proposed project still require much more electricity than is needed for other water sources. For example, Poseidon's proposal is expected to require no less than about 4,400 kilowatt-hours per acre-foot, about 40% more than the State Water Project. Further, in addition to the electricity needed to operate a seawater desalination facility, Poseidon's proposal would require additional electricity to move the desalinated water from sea level to higher elevations where it can be distributed to end users.

In many parts of the state, the electrical grid needed to provide water is under a great deal of strain. Southern California, in particular, will be challenged to meet its energy needs due to its need to reduce its reliance on aging power plants and to develop new energy sources, developing updated transmission infrastructure, and other similar difficulties.[60] Poseidon's proposal would rely on the local and regional electrical grid, which generates most of its electricity from fossil fuel-fired power plants. The proposed facility's electrical use would therefore result in substantial greenhouse gas emissions due to its use of this type of electricity.

**Background of Greenhouse Gas-related Issues and Impacts:** The Fourth Assessment Report of Working Group I of the Intergovernmental Panel on Climate Change (IPCC) (2007) represents the consensus of fifty top international scientists working in fields related to climate change. More than one hundred national governments, including the United States, have approved the report. The report concludes that the evidence of global climate system warming is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level (IPCC, 2007). Further, the report concludes that "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely [greater than 90% probable] due to the observed increase in anthropogenic greenhouse gas concentrations." The report cites numerous long-term changes in climate, including changes in Arctic air temperatures, decreases in the amount of Arctic sea ice, widespread changes in precipitation amounts, increase in ocean salinity, changes in wind patterns and increased incidences of extreme weather including droughts, heavy precipitation, heat waves and tropical storms.

Many studies consider a climate heating of more than 2 degrees Celsius above pre-industrial temperatures as representing "dangerous" level of climate disruptions. Based on six emissions scenarios ranging from "business as usual" to aggressive shifts to cleaner technologies, the best

[60] See, for example, the California Energy Commission's 2007 Draft Integrated Energy Policy Report.

estimates of global average temperature increase are between 1.8 and 4.0 degrees Celsius by 2099. A more recent study has found that comparing actual "on the ground" data compiled during the last ten years shows that the model used to develop these scenarios has vastly underestimated the rate and degree of global warming effects. It suggests that limiting global heating to no more than 2 degrees Celsius will require measures that result in the equivalent of complete elimination of industrial emissions (see Weaver et. al. Long term climate implications of 2050 emission reduction targets, in Geophysical Research Letters, October 6, 2007).

These six emission scenarios also estimate that sea level will rise between 0.18 and 0.59 m. This amount of sea level rise does not include contributions from rapid melting of either the Greenland or Antarctic ice caps. (Bindschadler, 2006; Ekström et al., 2006; Joughin, 2006; Kerr, 2006). In addition, the ocean's absorption of carbon dioxide leads to a reduction in ocean pH with concomitant consumption of dissolved carbonate ions, which adversely affects calcite-secreting marine organisms, marine water quality and the abundance and distribution of marine species (The Royal Society, 2005).

**Impacts to the California Coastal Zone**: In July 2006, the California Climate Change Center released a series of reports describing ongoing and future effects of global warming on the California environment (Baldocchi and Wong, 2006; Battles et al., 2006; Cavagnaro et al., 2006; Cayan et al., 2006a; Cayan et al., 2006b; Cayan et al., 2006c; Drechsler et al., 2006; Franco and Sanstad, 2006; Fried et al., 2006; Gutierrez et al., 2006; Joyce et al., 2006; Lenihan et al., 2006; Luers et al., 2006; Luers and Moser, 2006; Medellin et al., 2006; Miller and Schlegel, 2006; Moritz and Stephens, 2006; Vicuña, 2006; Vicuña et al., 2006; Westerling and Bryant, 2006). Drawing on three projected warming scenarios (low, medium, and high), the reports projected severe impacts by the end of the century in the areas of public health, water resources, agriculture, forests and landscapes, and sea level. Many of these effects will adversely impact resources of the coastal zone. The adverse effects include worsened air quality, changes in species distribution, significant reductions in plant and animal diversity, loss of various kinds of agriculture (such as fruit trees), expansion of invasive plant and animal species, increase in plant pathogens, increase in number and severity of wildfires, rising sea level, coastal flooding, and increased coastal erosion. In addition, absorption of carbon dioxide by the ocean is causing a reduction in ocean pH with concomitant consumption of dissolved carbonate ions, which is adversely impacting calcite-secreting marine organisms. The warming of ocean waters is also adversely affecting marine resources.

As identified in the 2006 Climate Change Center reports, air quality will be compromised by soot from wildfires, which the report predicts will increase. Coastal agriculture, already threatened by land development and habitat fragmentation, will be subject to further impacts from climate change. Impacts to coastal agricultural will include impacts to wine grapes, which will be subject to premature ripening and decreased fruit quality; adverse impacts to fruit and nut trees, many of which will no longer be able to produce once the number of "chill hours" per day drops below that necessary for proper ripening; and adverse impacts to milk production. Other threats to coastal agriculture identified by the Climate Change Center reports include the expansion of the ranges of agricultural weeds and an increase in plant pests and pathogens. Coastal forests and scrublands will be increasingly susceptible to wildfires due to longer and warmer periods of summer drying. This, together with the warmer climate itself, will lead to shifts in vegetation type, probably resulting in the loss of coastal scrub as it is converted to grasslands. Inasmuch as suitable habitat exists, species requiring cooler climates can migrate northward or to higher elevations. Their ability to do this, however, will be limited by the speed

with which they are able to disperse, the suitability and interconnectivity of available habitat, and their ability to compete with non-native invasive species which, by definition, are able to disperse and exploit habitat efficiently. All of these effects will lead to a decline in forest productivity, with a concomitant loss in habitat.

The most direct impacts of global warming focused on the coastal zone are sea level rise and its associated impacts, ocean warming, and ocean acidification:

- **Sea Level Rise:** According to tide gage data, global mean sea level has been rising at the rate of approximately 1.8 mm/yr for the past century (IPCC, 2001). Although no acceleration of this rate is apparent from the tide gage data (IPCC, 2001), satellite measurements starting in the early 1990s indicate an annual rate of approximately 2.8 mm/yr (Church and White, 2006). Sea level is clearly rising, and the rate of increase may in fact be accelerating. Since land can also change elevation due to either uplift or subsidence, global sea level change affects various coastal areas differently. Much of the California coast is rising; however the rate of uplift is, everywhere except northernmost California, lower than the rate of sea level rise. The *relative* historic rate of sea level rise (relative sea level rise is global sea level minus local land uplift or plus local land subsidence) has been calculated by Commission staff to range from a high of 2.16 ± 0.11 mm/yr in San Diego to a low of 0.92 ± 0.17 mm/yr in Los Angeles. Relative sea level is actually falling at Crescent City due to the high rates of tectonic uplift at that locality. (California Coastal Commission, 2001).

  Even the 0.18 to 0.59 meter rise in sea level by 2100 predicted by the IPCC will have a large impact on the California coast. The effects of a much larger increase in sea level due to large contributions from the Greenland and/or Antarctic ice sheet would be truly catastrophic. The 2001 Coastal Commission report concluded:

  > *The most obvious consequence of a large rise in sea level will be changes in areas that are submerged. Lands that now are only wet at high tide could be wet most of the day. Structures that are built above the water, like docks and piers, will be closer to the water, or eventually submerged. A second consequence will be an increase in wave energy. Wave energy is a factor of wave height. Wave heights along the California coast are influenced greatly by bottom depths and for most locations along the coast, the heights of nearshore waves are "depth limited". When the water depth increases, the wave height can be higher. Thus, higher waves impact the coast during high tide than during low tide. Wave energy increases with the square of the wave height. Thus, a 2-foot (0.6-meter) wave would have 4 times the energy of a 1-foot (0.3-meter) wave. Small changes in water level can cause significant changes in wave energy and the potential for shoreline damage from wave forces. A 1-foot to 3-foot (0.3 to 0.9 meter) rise in sea level, such as projected to occur over the next 100 years, would cause enormous changes in nearshore wave energy. The consequences of a 1-foot to 3-foot (0.3 to 0.9 meter) rise in sea level are far reaching. Along the California coast, the best analogy for sea level rise is thought to be El Niño, where a significant rise in sea level will be like El Niño on steroids. One of the factors that contributed to the amount of damage caused by the 1982/83 El Niño was that several storms coincided with high tide events and the elevated water levels (from tides and low pressure system combined) brought waves further inland than would have occurred otherwise…*

> *Beaches and Coastal Bluffs: Open coastal landforms like beaches and bluffs will be exposed to greater and more frequent wave attack. There will more potential for erosion and shoreline retreat. For gently sloping beaches, the general rule of thumb is that 50 to 100 feet of beach width will be lost from use for every foot of sea level rise… Some global circulation models predict significant increases in run-off from coastal watersheds in California (Wolock and McCabe, 1999) …*

In general, erosion of the landward edge of a beach, dune, or coastal bluff creates additional beach area, and so even in a period of sea level rise such as the present, in which the seaward extent of the beach is reduced by flooding and erosion, new beach creation can result in a relatively constant beach width. However, when threats to existing development from erosion lead to the construction of shoreline protective devices that halt the landward migration of the back beach, continued flooding of the seaward beach results in a reduction in beach width. Thus, on beaches experiencing erosion due to rising sea level, the protection of threatened structures will result in the loss of beaches wherever property owners choose to harden the coast to prevent coastal erosion. This loss of beach has immense negative impacts, including loss of recreational value, tourism, marine mammal haul-out area, sandy beach habitat, and buffering capacity against future bluff erosion.

The 2001 Coastal Commission report goes on to indicate other potential impacts of sea level rise on the California coast:

> *Wetland changes also will be affected by inland development. Historically, wetland areas migrated both upward and landward as they were inundated. If the inland area has a slope and soil composition that can support a wetland and is not already developed, then inland migration may be possible. If there is a steep bluff or some type of fixed development, such as a highway or bulkhead, inland of a wetland, inland migration will not be possible and the wetland area will diminish over time.*
> *Another physical change to wetland in response to a rise in sea level is an increase in the tidal currents, with the potential for increased scour. Also, for estuarine systems there will be a shift in the location of the salt water-freshwater interface, and an inland movement of the zone of brackish water…*
> *Ports, Harbors and Marine Facilities: Much of the infrastructure of a port or harbor will be affected by a change in sea level. So too will marine terminals and offshore structures. All of the horizontal elements, such as the decking of wharves and piers, will be exposed more frequently to uplift forces larger than those occurring now. Compared to current conditions, ships will ride higher at the dock and cargo-handling facilities will have less access to all parts of the ship. Loading and unloading may have to be scheduled for low tide periods to allow greatest access into the ship, or else mooring and cargo handling facilities will need to be elevated.*
> *If breakwaters or jetties protect the harbor, these structures will become less efficient as water levels increase. The breakwaters and jetties will need to be enlarged and heightened to keep up with the rise in sea level, or the harbor will have to accept a higher level of overtopping and storm surge, and a higher probability of storm damage. The increase in water level could also increase the tidal prism of the harbor, resulting in increased scour at the foundations of any structures in the harbor. So, it may also be necessary to reinforce the base of the breakwater or jetty to insure stability. Benefits that could occur from a rise in sea level would be the*

*opportunity for harbors to accommodate deeper draught ships and a decrease in dredging to maintain necessary channel depths.*
*Seawalls and other engineered shoreline protection: [Seawall] foundations would be exposed to greater scour and the main structure would be exposed to greater and more frequent wave forces. As with breakwaters and jetties, these structures will need to be reinforced to withstand these greater forces, or a lower level of protection will have to be accepted for the backshore property.*

- **Ocean Warming:** In December 2006, the Commission held the first in a series of workshops on global warming. One of the well-recognized connections between the atmosphere and the ocean is heat exchange. Global warming of the atmosphere is expected to cause an increase in ocean warming as the ocean absorbs greater amounts of thermal energy from the atmosphere. At the workshop, Dr. James Barry (Associate Scientist, Monterey Bay Aquarium Research Institute) presented a summary of observed and predicted effects of ocean warming on California coastal ecosystems. Dr. Barry inventoried intertidal animals along the Monterey coast, and compared his results to a 1932 baseline inventory. He found that species that increased in abundance in southern California had increased markedly since the baseline study. Over the same time, there was a dramatic decline in species more associated with northern California. This demonstrates that the observed warming of the ocean over the past 60 years has resulted in a shift in the geographic ranges of species. With continued warming, species can be expected to continue to migrate northward as long as suitable habitat is available.

  Some instances of remarkable biodiversity are due to the fortuitous combination of suitable ocean temperature and suitable geomorphic conditions. For example, one of the most diverse shallow water habitats in California is found in the rocky-bottom waters around the northern Channel Islands. This is a zone of mixing of species characteristic of a "southern California realm" and a "northern California realm." The abundant rocky bottom habitat in the shallow waters ringing the islands provides a niche in which this diversity is expressed. If, because of global warming, the suitable temperature zone migrates northward, it will be moved off of the abundant rocky bottom habitat and the diversity and ocean productivity might decrease significantly.

  Declines in ocean productivity due to habitat shifts are an indirect consequence of ocean warming. Ocean warming can cause a direct loss of primary productivity as well. Warming of the surface of the ocean results in increased ocean stratification, limiting the upwelling of deep, nutrient-rich waters that are responsible for California's rich coastal productivity. Roemmich and McGowan (1995) report a 1.2 to 1.4 degree centigrade increase in ocean temperature between 1950 and 1994. This was accompanied by a 75% reduction in zooplankton biomass. Reductions in phytoplankton and zooplankton biomass have profound cascading effects throughout the food chain. Short term warming events, such as El Niño events, have resulted in abrupt decline in commercial fish species, marine mammals, and birds (Laws, 1997; Nezlin et al., 2005). Similar effects might accompany global warming on a longer time scale, vastly affecting California's coastal resources.

  Ocean warming could also create a disconnect between historic feeding and breeding grounds for many species. Welch and others (1998) reported on potential changes in sockeye salmon distribution due to future global warming. Sockeye salmon, which spend 2-3 years in

waters of the northern Pacific, migrate northwards to areas of high productivity, such as the Bering Sea, in the summer. Productivity decreases with temperature increase, however, and as the Bering Sea warms, migration routes would have to be longer. Eventually, the metabolic cost of migrating further northwards to feeding grounds could make the migration infeasible. When summer feeding grounds are disconnected from winter breeding grounds, a population crash may be anticipated. A population crash in such species would not only impact commercial fishing in California, but would ripple up through the food chain, impacting protected coastal resources such as marine mammals and birds.

- **Ocean Acidification**[61]**:** Just as there is an exchange of thermal energy between the atmosphere and the oceans, there is an ongoing exchange of gases between the atmosphere and the ocean. Each year some 92 billion metric tonnes of CO2 annually are directly absorbed by the ocean from the atmosphere. At the same time, approximately 90 billion metric tonnes are released back to the atmosphere (Schlesinger, 1997). The net increase in dissolved CO2 in the ocean is a direct result of increases in the atmosphere related to changes humans are making to the carbon cycle—most notably fossil fuel burning and land use changes (deforestation, mostly in the tropics). The ocean is an enormous reservoir that can absorb a vast amount of $CO_2$, although the rate of ocean mixing is too slow to prevent the current buildup in the atmosphere. Without this net absorption of $CO_2$ by the oceans, the atmospheric buildup—and global warming—would be far greater than it is now.

  Over the past 200 years, the oceans have taken up approximately half of the industrial age $CO_2$ emissions, substantially reducing the net atmospheric concentrations of $CO_2$. This effect does not come without a cost, however. When $CO_2$ is absorbed by the ocean, some of it combines with water to form carbonic acid ($H_2CO_3$). This results in only a modest decrease in ocean pH, however, because most of the carbolic acid recombines to form bicarbonate ions ($HCO_3$). In the process, carbonate ions ($CO_3^{-2}$) are consumed, with the net result being that absorption of $CO_2$ by the ocean consumes carbonate ions and reduces the pH of the ocean. The decrease in pH is minor because of the "buffering capacity" of these carbonate reactions, but appears to have decreased mean average surface water pH by 0.1 pH units over the past 200 years (Caldeira and Wickett, 2003). Because the pH scale is logarithmic, this decrease in ocean pH (commonly called "ocean acidification," but more properly referred to as a decrease in alkalinity) means that hydrogen ion activity (which defines acidity) has increased by some 30% in this time frame (The Royal Society, 2005).

  The effects of decreasing ocean alkalinity and carbonate ion concentration are twofold. First, many species are directly affected by the reduction in pH. In his presentation before the Commission in December 2006, Dr. Barry identified several physiologic stresses to which some species are susceptible. These stresses include respiratory stress (reduced pH limits oxygen binding and transport by respiratory proteins, such as hemoglobin, leading to reduced aerobic capacity), acidosis (disruption of acid/base balance which impairs function and requires energy to restore or maintain optimal pH balance), and metabolic depression

[61] Note: Along with the acidification that would result from the proposed project's energy use, Poseidon's discharge to ocean waters would cause additional local acidification, as its discharge is expected to have a pH of about 7.5, which is more acidic than seawater's average pH of around 8. The discharge would therefore represent an additional and cumulative adverse impact to coastal resources.

(reduced pH associated with increased environmental $CO_2$ can cause some animals to enter a state of torpor or semi-hibernation). In addition to these physiologic effects, calcite-secreting organisms (including many phytoplankton, zooplankton, clams, snails, sea stars, sea urchins, crabs, shrimp, and many others) have more difficulty secreting their shells or tests under reduced carbonate ion concentrations. Deep-sea species will be particularly affected because increasing $CO_2$ levels in seawater decreases the saturation state of seawater with respect to calcium carbonate ($CaCO_3$) and raises the saturation horizon closer to the surface. The $CaCO_3$ saturation horizon is a depth in the ocean above which $CaCO_3$ can form, but below which $CaCO_3$ dissolves. Increasing surface $CO_2$ levels could have serious consequences for organisms that make external $CaCO_3$ shells and plates (The Royal Society, 2005). The consequences of reduced calcification are not fully known, but are likely to include changes to plankton communities, higher metabolic costs for water-breathing species, resulting in lower growth, survival and reproduction, and higher metabolic costs for calcite secreting organisms. The effect on food webs is unclear, but it is very likely that these effects will result in a loss of biodiversity and complexity in California's coastal marine ecosystems.

## *Analysis of Poseidon's Anticipated Greenhouse Gas Emissions and Poseidon's Response*

As noted above, Commission staff estimates that Poseidon's electricity use would generate no less than 200,000,000 pounds of carbon dioxide emissions each year, based on Poseidon's use of approximately 250,000 megawatt-hours per year from the San Diego Gas & Electric Company energy portfolio. In October 2007, Poseidon submitted several letters and memoranda to Commission staff describing the proposed facility's expected electricity use, some possible measures that would reduce its expected use, and measures that Poseidon may use to address its greenhouse gas emissions. These are described in more detail below.

Poseidon's most recent estimates show that it expects the project would use 4,833 kilowatt-hours to produce each acre-foot of potable water. This includes using the power plant's Unit 4 pumps to bring water into the intake channel, pumping that water into the proposed facility, pre-treating the water, producing desalinated water using reverse osmosis membranes, and pumping the water from the water from the facility to the Maerkle Reservoir in Carlsbad. At 4,833 kilowatt-hours per acre-foot, Poseidon's electrical use would total 270,648 megawatt-hours per year.[62] Poseidon's estimates also show that its expected continual electrical demand would be between 28.1 and 33.8 megawatts, with an average demand of about 30 megawatts. Using these figures, Poseidon's electrical use would range from 246,156 to 296,088 megawatt-hours per year, with an average annual use of 262,800 megawatt-hours.[63] Along with this energy demand, Poseidon's project would require a pump station in Oceanside that would use about 0.5 megawatt, or approximately 4,380 megawatt-hours per year.

Poseidon also described several measures that it may use to reduce its electrical use. Those measures include a high-efficiency energy recovery device that Poseidon is still testing, but which could reduce its electrical use by about 10%, to about 4400 megawatt-hours per acre-foot of production. Although

[62] 4,833 X 56,000 acre-feet per year / 1,000 kilowatts per megawatt = 270,648.

[63] 30 megawatts X 24 hours per day X 365 days per year = 262,800.

Poseidon has not yet committed to using this device, the emissions analysis in these Findings credits Poseidon with the emission reductions that would occur due to its use. Using the 4400 megawatt-hour per acre-foot figure would result in Poseidon's electrical use being 246,400 megawatt-hours per year. Along with the energy demand of the Oceanside pump station, Poseidon's electrical use would be no less than about 250,000 megawatt-hours per year, which is used as the basis for the analyses in these findings. This would result in carbon dioxide emissions of about 200,000,000 pounds per year.[64]

As noted above, the analyses in these Findings do not include several emission sources that could add significantly to Poseidon's total. The analyses do not include emissions resulting from project construction, manufacture of materials used, ongoing dredging requirements, and electricity needed to move water from Maerkle Reservoir 350 feet higher into the regional water distribution system, even though they could add substantially to the project's greenhouse gas contributions.

Recent letters and memoranda from Poseidon (see October 21 and 22, 2007) provide a much lower estimate of its anticipated greenhouse gas emissions. Poseidon contends that its emission rate should be based on 546 pounds of carbon dioxide emissions per megawatt-hour, based on emissions expected from the energy sources in SDG&E's energy supply portfolio. This would result in about 84,000,000 pounds of carbon dioxide per year instead of 200,000,000 pounds. However, in comparing the SDG&E portfolio with the CCAR's average California portfolio, the SDG&E portfolio appears to result in an even higher emission figure than the California average.[65] For example, coal and natural gas, which have average emission rates much higher than 804.54 pounds per megawatt-hour,[66] make up a larger proportion of San Diego's portfolio than the state portfolio. Additionally, SDG&E testimony before the California Public Utilities Commission suggests its carbon dioxide emissions are in the range of 1100 pounds per megawatt-hour, based on an average of a range of natural gas technologies and heat rates.[67] It appears, therefore, that Poseidon's calculations are in error.

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[64] Based on the CCAR average rate of 804.54 pounds per megawatt-hour of carbon dioxide emissions from California's electrical sources.

[65] Poseidon provided the following percentages of SDG&E's electricity sources, and the California averages are from the California Energy Commission's 2006 Gross System Power Report:

| **Resource Type:** | **SDG&E Percent:** | **State Percent:** |
|---|---|---|
| Coal | 18.0 | 15.7 |
| Natural Gas | 50.0 | 41.5 |
| Large Hydro | 10.0 | 19.0 |
| Nuclear | 15.0 | 12.9 |
| Biomass | 3.0 | 2.1 |
| Geothermal | 2.0 | 4.7 |
| Small Hydro | <1 | 2.1 |
| Solar | <1 | 0.2 |
| Wind | 3.0 | 1.8 |

[66] Natural gas emissions range from about 800-1200 lbs/megawatt-hour, and coal emissions are more than 2000 lbs/megawatt-hour.

[67] See page 12 of the Prepared Rebuttal Testimony of San Diego Gas & Electric Company – J. Strack, in the CPUC's Application No. 06-08-010 for the Sunrise Powerlink Transmission project, June 25, 2007.

In selecting an appropriate rate to use for these analyses, Commission staff used the standard figure from the Climate Action Registry, which is the lowest of these credible emission rates, to establish Poseidon's 200 million pound contribution to greenhouse gas emissions.[68] Based on the above, the Commission believes the basis of Commission staff's calculations are an appropriate, if not a low, estimate of carbon dioxide emissions resulting from Poseidon's proposed electricity use.

In its October 21, 2007 memorandum, Poseidon presented its proposal to offset or reduce the proposed project's energy use and greenhouse gas production. In the letter, Poseidon states that it will develop a Climate Action Plan that may include the following, which are described in more detail below:

- Installing a state-of-the-art high efficiency energy recovery system, including improved energy efficiency for the proposed project, evaluating the proposed project through a LEED-type process, and implementing as many of the LEED Checklist items as feasible ("LEED" is the "Leadership in Energy and Environmental Design" program).
- Acquiring Renewable Energy Credits (RECs) or purchasing carbon offset projects.
- Restoring and preserving coastal wetlands for carbon sequestration.

As noted previously, Poseidon estimates that its facility will require 4,833 kilowatt-hours of electricity to produce each acre-foot of potable water (kWh/AF) and transport that water to the Carlsbad reservoir. This figure would otherwise be somewhat higher – about 5,990 kWh/AF – however, Poseidon plans to use an energy recovery turbine to reduce electricity demand by about 1,103 kWh/AF. Poseidon is also exploring the use of a relatively new energy recovery device known as a pressure exchanger, which it expects could reduce electrical use by an additional 10%. This would result in electrical usage of about 4,400 kWh/AF and would reduce Poseidon's expected carbon dioxide emissions to somewhat greater than 200 million pounds per year. It would clearly be to Poseidon's advantage to use any cost-effective energy efficiency devices available to reduce its operating costs, and although Poseidon has not yet committed to use this device, the emission estimates in these Findings already credit Poseidon with the emission reductions that would result from its use.

Poseidon is also exploring a number of other energy efficiency measures, including installing variable speed pumps, installing high efficiency lighting and motors throughout the facility, and using low-friction piping material and installing larger diameter piping where possible. It is proposing to implement as many LEED items as feasible, including providing bicycle storage, using water efficient landscaping, providing recycling capability, using low-emission adhesives and sealants, etc. It is also considering installing a rooftop solar energy system. The Commission supports Poseidon's proposed use of the LEED guidelines, as implementing LEED-related measures would likely provide numerous benefits; however, those guidelines would not result in lower emissions from Poseidon's anticipated electrical use. Further, Poseidon has not yet committed to these measures.

[68] Using the next higher credible estimate (1100 pounds per megawatt-hour) would result in Poseidon's emissions being closer to 300,000,000 pounds per year.

Poseidon also states that it could further reduce its energy use by operating at 80% capacity during the eight hours per day of peak electricity demand and then operate at 108% of its average capacity during the remaining hours each day.[69] This proposed operating scenario, however, would not necessarily reduce energy use or emissions; it would instead shift energy use from one time of day to another. This would be beneficial in that it would lower Poseidon's electricity costs and reduce demand on the electricity grid during those peak hours, but Poseidon would still produce about the same amount of water each day requiring the same amount of electricity for each acre-foot.

Poseidon further contends it should be credited with emission reductions because its project would result in less water being transported to the San Diego region from the State Water Project. Although the State Water Project emits fewer emissions per acre-foot than Poseidon's project would, applying a credit for this foregone use would lower Poseidon's overall greenhouse gas contributions by about 40% (i.e., the difference between Poseidon's 4400 kilowatt-hour per acre-foot energy use and the State Water Project's 3200 kilowatt-hour per acre-foot). For several reasons, however, the Commission finds this "crediting" approach is not warranted. First, Poseidon's proposed project does not ensure a decrease in imported water supplies to the San Diego Region.[70] Other factors may contribute to such a decrease – e.g., supply cutbacks imposed by court order, a shift in water prices, etc. – but Poseidon's project itself does not include measures that would implement such a decrease, such as retiring distant water rights or assigning water rights to instream uses. Poseidon acknowledges that the State Water Project would continue to pump available water to Southern California users, but then argues that it should still be credited for what would then be a non-existent reduction in emissions. Additionally, because Poseidon's water would be more expensive than imported sources, available imported water would likely remain the water of choice for most users, and so Poseidon's project would not likely affect the cost preference for imported water (e.g., the San Diego County Water Authority has contracted with the Imperial Irrigation District for up to 200,000 acre-feet per year – about 175 MGD – at less than $300 per acre-foot). Further, much of the water imported to San Diego comes from the Colorado River, which requires about a third less electricity than water imported from the State Water Project (approximately 2,000 kilowatt-hours per acre-foot versus 3,100 kilowatt-hours per acre-foot), so even if "crediting" was appropriate, it would be at a much lower level than Poseidon proposes.

Poseidon further contends that its project should be seen as part of a proposed regional water supply portfolio that would result in an overall reduction of electrical use and greenhouse gas emissions from the area's water use. Poseidon states that the planned shift in the San Diego region's water portfolio – using less imported water, gaining water through conservation, recycling, and canal lining projects, using seawater desalination, etc. – will result in an overall 19% reduction in the energy use per acre-foot now used for the region's water supply. While such a shift would likely reduce overall electrical use and emissions, those measures are not a part of Poseidon's proposal and those components of the proposed future portfolio would not reduce Poseidon's 200 million pounds of carbon dioxide emissions.

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[69] An annual daily average of 50 MGD equals 2,083,333 million gallons per hour. Operating at 80% capacity for eight hours would produce about 16.6 million gallons, and operating at 108% capacity for sixteen hours would produce about 33.3 million gallons, for an overall total of about 49.9 MGD. Since the energy required to produce each acre-foot is about 4400 kilowatt-hours, the overall energy difference between continual production of 50 MGD (153.4 AF) and variable production of 49.9 MGD (153.1 AF) would be minimal.

[70] We note that the San Diego County Water Authority continues to seek out additional imported water sources that would be used regardless of Poseidon's project.

In sum, the electrical demand of Poseidon's proposed project would contribute no less than 200 million pounds of carbon dioxide annually. The project is meant in part to respond to the threat of drought and dwindling water supplies brought about in part by global warming; however, its significant and unmitigated emissions would exacerbate the very problem it is supposed to address. Its emission levels would not be further reduced through the measures described above. However, Poseidon states that it will develop a plan that may include three additional types of "offsets":[71]

- Acquiring Renewable Energy Credits (RECs)
- Purchasing carbon offset projects
- Restoring and preserving coastal wetlands for carbon sequestration

Poseidon states that it would consider purchasing RECs, which are credits bought and sold in an open market and used to fund renewable energy sources. For example, a renewable energy provider can be credited with one REC for every megawatt it produces, and can sell its RECs to make up some of the difference between the generally higher-cost energy produced from the renewable source and the generally lower-cost energy produced by a conventional fossil fuel source.[72] Carbon offsets are similar, in that they can be purchased through various market systems – non-profit or for-profit organizations, formal trading systems, etc. – and used for projects that reduce atmospheric carbon, such as energy conservation projects, methane capture, reforestation, etc. One method of offsetting carbon emissions involves sequestering carbon in growing plants, either through reforestation, or as Poseidon describes, through restoring and preserving coastal wetlands.[73] However, Poseidon has not provided further details about the type or amount of emission credits it would purchase or what kinds of emission reduction projects it would undertake. An additional concern is that there are only limited methods currently available for offsetting emissions, and it may be necessary to commit those offsetting measures to existing and critically needed facilities rather than a proposed and highly energy-intensive use such as this desalination facility. Further, rather than use offsets, Poseidon would be better able to conform to the Coastal Act Section 30253(4) requirement by including with its proposed project an energy conservation plan that commits to specific measures it will take to minimize energy use and its associated greenhouse gas emissions. A plan focusing on onsite and offsite energy conservation measures that result in an annual 200 million pound decrease in carbon dioxide emissions would be most closely related to Section 30253(4)'s mandate to minimize energy use. If those measures are inadequate, the plan could then provide offsets for the remaining emissions.

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[71] We note that Poseidon has not proposed at least one additional option that would substantially minimize its greenhouse gas emissions – that of using renewable energy to directly supply its electrical needs. This approach has been determined feasible for at least two large desalination facilities in Sydney and Perth, Australia. The facility in Sydney would produce 33 million gallons per day and the Perth facility would initially produce 37 million gallons per day with a planned expansion to 66 million gallons per day, all from wind power.

[72] Recent REC prices have ranged from about $5 to $90 per megawatt-hour, with an average cost in 2006 of about $20 (see U.S. Department of Energy, Energy Efficiency and Renewable Energy website at: http://www.eere.energy.gov/greenpower/markets/certificates.shtml?page=1). Based on the average 2006 cost, offsetting Poseidon's anticipated use of 250,000 megawatt-hours per year would require it to purchase $5 million worth of RECs, equal to about $90 for each acre-foot of water it produced.

[73] To provide a comparison, the U.S. EPA and U.S. Agency for International Development Climate Technology website calculates that sequestering 200,000,000 pounds of annual carbon emissions each year requires about 75,000 acres of growing forest (see www.usctcgateway.net).

## *Conclusion*

Therefore, even with the analyses above based on what is likely the very low end of the range of Poseidon's expected greenhouse gas emissions,[74] the Commission cannot find that Poseidon has mitigated the effects of those emissions on coastal resources, or that the project is consistent with the requirement of Section 30253 that it minimize energy consumption. The proposed project is meant in part to respond to the threat of drought and dwindling water supplies, but without adequate minimization or compensatory mitigation measures, the proposed project's emissions would worsen the very problems it sets out to resolve. Poseidon has failed to establish that the project will avoid, minimize, or mitigate adverse impacts to a wide range of coastal resources, including public access, recreation, marine resources, wetlands, ESHA, agriculture, natural land forms, and existing development associated with its as-of-yet non-minimized energy consumption.

However, because the proposed project would be considered a "coastal-dependent" industrial facility[75], the Commission may therefore evaluate it under Coastal Act Section 30260, which allows such projects to be approved in some instances even when they are found to be inconsistent with other Coastal Act provisions. The analysis and findings related to Section 30260 are in Section 2.5.6 of this report, below.

[74] As noted above, the Commission's analysis herein evaluates only those greenhouse gas emissions associated with part of the proposed project's electrical use and only the carbon dioxide emissions generated by that use. It does not include pumping its water to the regional distribution system, project construction, production of materials used in the project (e.g., the manufacture of both concrete and reverse osmosis membranes generates a number of greenhouse gas and toxic emissions).

[75] This proposed seawater desalination facility has been determined to be "coastal-dependent" pursuant to Coastal Act Section 30101, which defines a coastal-dependent development or use as that which "requires a site on or adjacent to the sea to be able to function at all."

### 2.5.5 Development and Public Services (Coastal Act Sections 30250 and 30254)

Coastal Act Section 30250(a) states:

> *New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller than the average size of surrounding parcels.*

Coastal Act Section 30254 states:

> *New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.*

Coastal Act Section 30250(a) generally requires that new industrial development, such as the proposed project, be sited in developed areas able to accommodate it or in areas with adequate public services and where it will not result in significant adverse effects to coastal resources. Coastal Act Section 30254 requires in part that development not preclude public works facilities able to accommodate only limited new development from providing essential public services. ,Taken together, these policies are meant to ensure, in part, that new development not outpace the ability of communities to provide necessary public services and that development be supportive of other coastal resources.

The proposed project would not conform to Sections 30250(a) and 30254 because it would result in significant adverse effects to coastal resources as described in other sections of these Findings. These effects include the project's adverse entrainment and impingement impacts, its "take" of marine life, its discharge-related effects to coastal water quality, and the effects of its greenhouse gas emissions on coastal resources. Additionally, the proposed project does not include the information needed to determine if its growth implications would result in individual or cumulative adverse impacts to coastal resources.

## *Conclusion*

Based on the above, the Commission finds that the project as proposed does not conform to Coastal Act Sections 30250 and 30254. However, because the proposed project would be considered a "coastal-dependent" industrial facility,[76] the Commission may therefore evaluate it under Coastal Act Section 30260, which allows such projects to be approved in some instances even when they are found to be inconsistent with other Coastal Act provisions. The analysis and findings related to Section 30260 are in Section 2.5.6 of this report, below.

[76] This proposed seawater desalination facility has been determined to be "coastal-dependent" pursuant to Coastal Act Section 30101, which defines a coastal-dependent development or use as that which "requires a site on or adjacent to the sea to be able to function at all."

## 2.5.6 Coastal-Dependent "Override" (Coastal Act Section 30260)

Coastal Act Section 30101 states:

> *"Coastal-dependent development or use" means any development or use which requires a site on, or adjacent to, the sea to be able to function at all.*

Coastal Act Section 30260 states:

> *Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 30262 if (1) alternative locations are infeasible or more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental effects are mitigated to the maximum extent feasible.*

Coastal Act Section 30260 provides for special consideration of coastal-dependent industrial facilities that may otherwise be found inconsistent with the Coastal Act's Chapter 3 policies. Such coastal-dependent proposals must first be evaluated for consistency to all other applicable policies and standards contained in Chapter 3. If a proposal is found to be inconsistent with any Chapter 3 policy, Section 30260 provides that it may be approved, notwithstanding its inconsistencies with those other policies, but only upon application of a three-part test – (1) that alternative locations are infeasible or more environmentally damaging; (2) that adverse environmental effects are mitigated to the maximum extent feasible; and (3) that to do otherwise (i.e., to deny the project) would adversely affect the public welfare.

Poseidon's proposed seawater desalination facility would be a coastal-dependent industrial facility, as it would need to be sited on or adjacent to the sea in order to function at all. Additionally, as determined previously in these findings, the Commission has found that the proposed project would not conform to Coastal Act policies related to marine biological resources and water quality (Sections 30230 and 30231), dredging in coastal waters (Section 30233), development and public services (Sections 30250 and 30254), and Energy Use (Section 30253(4). Because the proposal would be a coastal-dependent industrial facility, the Commission may apply Section 30260 to "override" those inconsistencies and nonetheless approve the project if the three tests of Section 30260 can be met. However, many of the same project characteristics that prevent it from conforming to those other Chapter 3 policies prevent it from meeting the three tests of this policy. Therefore, in applying Section 30260, the Commission finds that the project meets none of the three tests and must be denied. Each of the three tests is applied below.

### *Test 1 – Alternative Locations are Infeasible or More Environmentally Damaging*

Under Section 30260, the project can be approved if the Commission finds there are no alternative locations that would lessen the project's environmental impacts. Previously in these Findings, the Commission found that there are feasible alternative locations that would significantly reduce impacts of the proposed intake and the outfall. There are at least two feasible and less environmentally damaging alternatives locations for Poseidon's seawater intake – placing it subsurface or offshore. Similarly, Poseidon has alternative locations available to it that may not require it to use the existing outfall, which discharges to the nearshore and beach environment and is located across a public beach, interfering with public access to the shoreline. Those options include using a zero-discharge system and a nearby existing or planned sewer line for all or part of its discharge.

The Commission thus finds that there are feasible and less environmentally damaging alternative locations available for the project's seawater intake and discharge components and that the proposed project does not meet the first test of Section 30260.

### *Test 2 – Adverse environmental effects are minimized to the maximum extent feasible*

Section 30260's second test requires that a proposed project include maximum feasible mitigation measures to address project impacts. Poseidon's proposal does not meet this test of Section 30260 for many of the same reasons it does not meet the requirements of other Chapter 3 provisions. Section 2.5.1 of these Findings shows that the proposed project would not conform to the Coastal Act's marine life protection provisions in part because the project does not include all feasible mitigation measures, including the feasible and less environmentally damaging alternatives noted above that would avoid, minimize, or compensate for the impacts caused by Poseidon's proposed estuarine intake system. Poseidon's proposed compensatory mitigation plan also falls far short of meeting this standard. Section 2.5.2 of these Findings shows that the project would not conform to the Coastal Act policies protecting coastal waters and wetlands in part because of these same insufficient mitigation measures. As described in Section 2.5.5, the project would not conform to Coastal Act Section 30253(4) because it provides no mitigation for its expected annual emissions of 200 million pounds of carbon dioxide that would adversely affect numerous coastal resources.

For all of the Coastal Act provisions above, there are feasible mitigation measures that would eliminate or reduce adverse environmental effects; however, Poseidon has not included them with the project and has not shown them to be infeasible. For the project to meet this test of Section 30260, substantial additional mitigation would be required. For example, regarding the adverse effects to marine life, habitat, and coastal waters, mitigation to the maximum extent feasible would require Poseidon to use a subsurface or offshore intake. Even if Poseidon was able to use the existing intake, it would have to provide compensatory mitigation that fully addressed the expected impacts, included standard mitigation plan components such as performance standards, monitoring protocols, contingency plans, and provided certainty that the mitigation would be carried out. Regarding its greenhouse gas emissions, Poseidon would have to provide evidence of proven reductions and offsets of its expected annual 200 million pound contribution.

Based on the above and on the previous Findings herein, the Commission finds that the proposed project does not mitigate its impacts to the maximum extent feasible and that it does not meet the second test of Section 30260.

## *Test 3 – To not permit the development would adversely affect public welfare*

Section 30260's final test provides that coastal-dependent industrial development may be permitted if to do otherwise would adversely affect the public welfare. This test requires more than a finding that, on balance, a project as proposed is in the interest of the public. It requires that the Commission find that there would be a detriment to the public welfare were the Commission to deny the project. The Commission recognizes that it is clearly in the interest of the San Diego region to develop local and reliable water sources and that seawater desalination may be a part of this portfolio. However, the Commission believes that the public welfare benefits of the proposed project are outweighed by the failure of the project to conform to Coastal Act requirements and thus, that the Commission's denial of the project would not, on balance, adversely affect the public welfare. The Commission believes that this, or another desalination facility, could serve as part of the San Diego region's water supply portfolio and meet relevant Coastal Act requirements.[77] For example, as described in the Findings above, there are alternative locations for the intake that would greatly reduce the facility's adverse marine resource effects – i.e., subsurface or offshore locations. Further, the Commission believes that the public benefits of the project are outweighed by the project's failure to mitigate to the maximum extent feasible its entrainment effects, as well as the effects of its discharge to coastal waters, the effects of its greenhouse gas emissions on coastal resources, and the other mitigation needs identified previously.

For these reasons and the additional reasons below, the Commission finds that approval of the proposed project is not in the public interest.

Additional public welfare concerns:

- **Effects of environmental impacts on public welfare:** As shown previously, use of the intake would cause further impairment to Agua Hedionda Lagoon. But for this proposed project, use of the intake by the power plant is expected to diminish and then completely end over the next few years. Its use thus far has caused more than fifty years of entrainment, sedimentation, loss of wetland production, loss of eelgrass, removal of sand from the nearshore transport system, and other significant adverse environmental effects. Poseidon's proposed use of the intake would result in these impacts continuing for up to ninety more years.

  A number of publicly-funded initiatives are working to reverse these adverse effects and restore the lagoon's water quality and habitat values. Local governments are subject to NPDES permit requirements and are using state funds to develop and implement a watershed plan to improve conditions in Agua Hedionda. Allowing Poseidon to use the existing estuarine intake would result in continued removal of much of the lagoon's productivity and would run counter to the effect these initiatives are intended to have on improving the lagoon. The lagoon also provides

[77] For example, the Commission recently found several desalination projects conformed to Coastal Act requirements and approved a facility in Sand City (xx) using a subsurface intake, and two subsurface intake pilot studies in Long Beach (xx) and Dana Point (xx).

many beneficial uses to the public that, as shown in Section 2.5.2 of these Findings, could continue without reliance on continued intake operations and with much less dredging than has been required. It is therefore not in the public interest to approve a project whose effects would run counter to the extensive public efforts focused on improving this waterbody.

- **Loss of site for power plant expansion:** Pursuant to Coastal Act Section 30413(b), the Coastal Commission and the Energy Commission identified the location of the proposed project as a site appropriate for power plant expansion. The report required pursuant to this Coastal Act provision provides an initial analysis of potential power plant expansion opportunities along the coast to help ensure there are adequate sites available to serve California's energy needs. The report identifies this parcel as one of only 19 sites along the coast and one of only four in San Diego County available for power plant expansion.[78]

  Use of this site for a desalination facility could reduce the site's value as a designated location for coastal power plant expansion. The San Diego region has identified the need for additional electricity generation as well as additional water sources, and alternatives available for water supply are not nearly as limited as the locations available for electrical production. Use of this site for a non-power plant use may limit future energy development needed in the region. Although the current power plant owner is planning to shut the existing plant and build a new plant on part of the designated expansion area, the new plant would provide less electricity than the existing plant – 558 megawatts versus the existing 965 megawatts – and the San Diego region continues to seek out new energy sources. This site may be needed for additional power generation.

- **Public welfare as applied to public or private water supplies:** As noted in the Commission's 2004 report, Seawater Desalination and the California Coastal Act:

  > *A fundamental Coastal Act principle is that many coastal resources are imbued with a public interest and value that must be vigorously protected for the benefit of current and future generations. Unlike many coastal resources that are privately owned, ocean water, and the uses and values it embodies, constitute a public trust resource held in common for public use and enjoyment. This principle is codified in numerous federal and state laws and regulations, including the Coastal Act… Notwithstanding the public nature of coastal ocean waters, use of such waters and of living and non-living resources in and under them have historically been allowed for non-public purposes.*
  >
  > *Ocean water serves a number of beneficial uses and vital environmental, social, and economic functions. It is part of the shared public "commons", it serves as habitat for a multitude of species, it is a source of food and livelihood for society, and it is used to*

[78] Coastal Act Section 30413(b) requires the Commission to designate areas along the coast where presence of a power plants would prevent conformity to Coastal Act requirements, and to identify areas where expansion of existing power plants would be suitable. It further requires the Commission to present these designations to the Energy Commission for use in its siting decisions. Pursuant to this Coastal Act requirement, the Commission has designated 19 sites at existing coastal power plants as suitable for expansion. See California Coastal Commission, Designation of Coastal Zone Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976, December 1985, and Energy Commission, Opportunities To Expand Coastal Power Plants In California, June 1980.

> *support transportation, commerce, recreation, and other important societal uses. For the most part, these uses are non-consumptive and sustainable, in that using ocean water for one of these purposes does not necessarily impair its ability to be used for others.*

Privatization of water supplies, in and of itself, may not cause effects on coastal resources different than those caused by a public agency. Most differences would be due to how each type of entity implements its water use. Both public and private projects may include particular characteristics that change how they affect resources and how they meet the public interest. Further, California has recognized there is a role for private water purveyors and for providers of other basic utilities such as gas and electricity. The state has a system to regulate public and private utilities to ensure that public interests are being met.

Private entities can clearly bring benefits to public agencies. One of the benefits stated by the public agencies involved with Poseidon's proposed project is that Poseidon is willing to provide the initial capital investment and obtain the approvals needed to build and operate the facility, which can represent a significant savings to public agencies. However, this benefit comes with risks and costs, as noted by the Commission in previous decisions.

The Commission in the past has both approved and denied proposed private desalination facilities. For example, it approved a privately-owned facility on Catalina Island in part because there were no feasible alternatives for the proposal. In 1994, the Commission denied construction of a private desalination facility (A-3-SNC-94-008-E2, Sterling Center in the City of Sand City) based in part that it would result in fragmentation of public works facilities. In 1995, the Commission's Findings for an adopted LCP amendment to the Santa Barbara Coastal Program stated: "Private desalination facilities also raise the basic policy question of the effect of allowing the proliferation of privately owned and operated water supply facilities on the ability to comprehensively plan for the provision of essential public services". Those Findings go on to express concerns about the abilities of private owners to operate and be accountable for desalination operations, to mitigate associated impacts, to maintain the facility in a manner necessary for public health and environmental safety, and other issues. The Findings also state that proliferation of private desalination facilities could fragment public utility services.[79] They conclude by stating that proliferation of such facilities where consolidation is feasible is inconsistent with the Coastal Act. In 1997, the Commission found in its consideration of a LUP update in San Luis Obispo County that a proposed desalination facility would be inconsistent with Coastal Act policies because it would provide for continued urban development that could not be supported by existing water supplies.

[79] Poseidon's proposed project has already affected the ability of the regional public water agency to provide public services. At about the time Poseidon had proposed its facility, the San Diego County Water Authority proposed a similar desalination facility at the same site as Poseidon proposal; however, after several months of attempted collaboration, the Authority was unable to reach agreement with Poseidon and ended its attempt to construct a publicly-owned facility. Absent Poseidon's proposal, or possibly with Poseidon's cooperation, the site may have served as a publicly-owned facility.

The recent history of privatizing water services has identified some of these risks and has resulted in some key questions about such proposals: Will there be adequate public oversight and monitoring, and transparency in decision-making and financial issues?; What measures will ensure that ecosystem values are protected?; How will privatization affect initiatives related to water-use efficiency and conservation?; and, What happens if it doesn't work?[80]

For this particular project, answers to these questions raise more concerns than they address. For example, regarding transparency in decision-making and financial issues, both the State Desalination Task Force and the California Resources Agency have recognized that private desalination proponents should disclose the same information as that disclosed by public entities.[81] Public water districts are required by law to publish financial statements that disclose the basis of a district's revenues, costs, cash flow, and other basic economic data that describe the financial health of the district. These statements are public documents and serve to inform the public about the basis for a district's rates, the need for additional funding for various projects, etc. Many districts provide this information on their websites, along with meeting agendas, meeting minutes, information about health and safety-related characteristics of their water supplies, and other information useful to the public to find out about its water and about the important decisions to be made about its water supply.

Poseidon, as a private entity, is not required to disclose nearly that amount of information, and it has not disclosed requested information relevant to determining its expected costs for providing water or its ongoing capability to provide a reliable source of water. Although various public entities reviewing the proposed project have requested this information, Poseidon has not provided it. As noted previously in these Findings, Poseidon provided only a minimal and inadequate response to Commission staff's request for some of this information, thus limiting the ability to fully evaluate the proposed project. As recently as October 2007, one of the water agencies that agreed to purchase water from Poseidon asked for Poseidon's financial information but was refused.[82] Further, as described previously in these Findings, much of the information Poseidon has provided does not appear to accurately account for project costs.

Poseidon's non-disclosure raises significant concerns about the known and potential burdens this proposed project would create for public agencies and ratepayers. Its non-disclosure also goes against the guidance provided by the numerous public agencies and water-focused interest groups that were a part of the State's Desalination Task Force. As shown earlier in these Findings, those cost estimates Poseidon has made available show that its expectation of providing water at or below the cost of imported water is not likely to be met any time in the near future. Unless there is a drastic and unexpected increase in the cost of imported water or a similarly drastic decrease in the cost of seawater desalination, public agencies wishing to buy Poseidon's water will need to pay more than anticipated and may likely need to raise their rates significantly.

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[80] See the Pacific Institute's report, The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water, February 2002.

[81] See State Desalination Task Force xx recommendations and March 15, 2004 letter from Resources Secretary Mike Chrisman to Coastal Commission.

[82] See October 12, 2007 minutes of the Olivenhain Municipal Water District.

Along with the direct effects of higher water costs, public entities that might initially become reliant on water from Poseidon would bear the burden if Poseidon were to experience financial difficulties. It may need to sell its facility or raise its rates, either to make its reasonably expected profit or to avoid bankruptcy. If local agencies were unable to afford either the water costs or the costs of the facility, or if its ratepayers were unwilling to pay the necessary rate increases, the water may go to a higher bidder, perhaps at some distance from the area, while the burden of supporting the facility and its environmental impacts would remain locally. This scenario is practically built into the proposed project, since Poseidon's water purchase agreements both allow for a third-party purchase and are based on an unrealistically low expectation of the price for the water. As noted previously, this scenario could lead to fragmentation of essential public services, loss of local decision-making ability about how to use that water, and other losses that are not in the public interest.

Further, this particular project would not provide the set of public benefits provided by a local public supply. While the project would produce water locally, in many important aspects, it does not include the characteristics required of a fully local and reliable supply of water. Along with having water produced locally, a local supply needs to have decisions about that supply made locally. With public water districts and some private water purveyors (e.g., a regulated private utility), decisions and disputes about how to price and distribute water and about what to do with the available amount of water are made at the local level by elected board members and voters based on local values and concerns. Those same participants in the decision-making process ensure that accountability for the decisions resides at the local level. For Poseidon, those decisions must be with primary consideration given to the interests of its non-local owners or shareholders, which may not coincide with local interests. In many important ways, this proposal is not actually a local water project, since the ultimate say about these decisions would not lie with local elected officials or local ratepayers. In that way, this proposal is little different than the distant water sources the area now relies on, and it does not address the stated project objective of, or the public interest in, developing a local water supply.

Poseidon could likely address many of these concerns by entering in to a public-private partnership that includes the elements necessary to provide these public benefits. For example, public benefits would be enhanced with a partnership in which Poseidon's decision-making, its financial capabilities, its rate-setting, and other similar elements were part of the public process.

- **Other alternatives are available that provide for the public welfare:** The Commission also believes that in combination with a well-designed desalination facility that conforms to Coastal Act provisions, other water sources are available to provide a local and reliable water supply. These other sources, including conservation, recycling, and others, are feasible, less environmentally damaging, and are already being done to some degree in the San Diego area and elsewhere.

  Regarding conservation, it is considered the least expensive and often the least environmentally damaging type of local water supply. Water users and providers in the San Diego region have already implemented a number of effective conservation measures to increase the local water supply and have recognized it as a necessary part of the regional water portfolio. For example, the San Diego County Water Authority's May 2007 draft Blueprint for Water Conservation states that conservation is the cheapest form of new water supplies and shows that it expects

conservation to go from providing about seven percent of the region's supply (about 51,000 acre-feet per year) to about twelve percent (100,000 acre-feet per year) by 2030. As noted previously in these Findings, the Blueprint also shows that seawater desalination is expected to provide about ten percent (89,000 acre-feet per year) of the regional supply by 2030. Similarly, in March 2002, the San Diego County Board of Supervisors adopted Policy No. A-106, which emphasizes the need for water conservation as a significant part of the County's water portfolio. That same policy identifies seawater desalination as an unacceptable option for near-term uses due to its high cost.

The region could develop even more new water through conservation, similar to other coastal areas in California with limited local water supplies but with ongoing growth. For example, in Long Beach, conservation is expected to provide 15 percent of the water supply by 2015, and in the Monterey County area, conservation accounts for about twenty percent of the supply. Applying those percentages to San Diego's total expected water use in 2030 would result in conservation supplies of about 125,000 to 160,000 acre-feet per year.

Although many of the region's water districts have developed effective conservation programs, there are still a substantial number of conservation measures and initiatives that could provide significant amounts of water. For example, many of the agencies that have agreed to purchase water from Poseidon are members of the California Urban Water Conservation Council, which has developed a menu of cost-effective Best Management Practices (BMPs) to reduce urban water use. These member agencies are implementing some, but not all, of the Council's fourteen adopted BMPs, suggesting that there is an as-of-yet untapped source of conservation water available. Other sources include recycling and even indirect potable reuse. Carlsbad recently reported that it is using less than half the recycled water it has available to it, which suggests it has an underused local and reliable option.[83] We note, too, for example, that the same treatment system Poseidon proposes for its facility is used in indirect potable reuse applications.

Based on the above, the Commission finds that the proposed project does not meet the final test of Section 30260.

## *Conclusion*

Although the Commission recognizes that the San Diego region is clearly in need of reliable and local water sources, the project as proposed does not conform to Coastal Act provisions. There are better alternative intake and outfall locations available that would provide a local water supply from seawater and there are feasible mitigation measures available that would allow a better designed and sited facility to significantly reduce environmental impacts from the levels described herein. Because there are feasible alternative locations that would be less environmentally damaging, because denial of the proposed project would not adversely affect the public welfare, and because the proposal is not mitigated to the maximum extent feasible to reduce its adverse environmental effects, the Commission denies Poseidon's coastal development permit application #E-06-013.

[83] See Carlsbad's 2007 State of Effectiveness Report.

# 3.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT

On June 13, 2006, the City of Carlsbad certified an Environmental Impact Report for the proposed project. In addition, Section 13096 of the Commission's administrative regulations requires Commission approval of CDP applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Public Resources Code Section 21080.5(d)(2)(A) prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant impacts that the activity may have on the environment. The previous Findings have established that there are such alternatives and mitigation measures that have not been incorporated into the project. Therefore, this proposed project does conform to the above-cited CEQA standard and thus must be denied.[84]

Since the City of Carlsbad certified the EIR, and after Commission staff filed Poseidon's CDP application as complete, the project changed.[85] Rather than co-locating the desalination facility with an operating power plant and using water already used by the power plant for cooling, the proposed project would now operate as a stand-alone facility most of the time. Additional information, as described below, is needed to fully identify the project's impacts and whether its significant adverse effects are mitigated as required by CEQA:

- Change in power plant operations: The EIR assumed that the desalination facility would use water after it had been used in the power plant's once-through cooling water system. The power plant owner recently announced that it would shut down the existing plant and is seeking approval from the California Energy Commission to build a new plant on the site that would not use seawater for cooling. While the EIR described part of this changed circumstance – i.e., it evaluated an increase in the desalination facility's entrainment impacts – it did not evaluate whether this change to the project would result in a different set of feasible alternatives for the proposed desalination intake system, whether it offered an opportunity to reduce entrainment and dredging-related impacts in Agua Hedionda, and whether it would allow removal or alteration of the power plant's discharge structure across a state beach and state tidelands. This additional information is necessary for the Coastal Commission to fully evaluate project alternatives.

- Mitigation of marine life effects: Poseidon proposes to mitigate for its entrainment effects, but its current mitigation proposal is conceptual only and lacks the information needed for the Commission to determine that the project's entrainment effects will be fully mitigated. Additionally, the conceptual proposal does not provide information about how it would address marine life effects caused by the desalination discharge.

[84] Pursuant to P.R.C. 21080(b)(5), a denial of a proposed project is statutorily exempt from the CEQA.

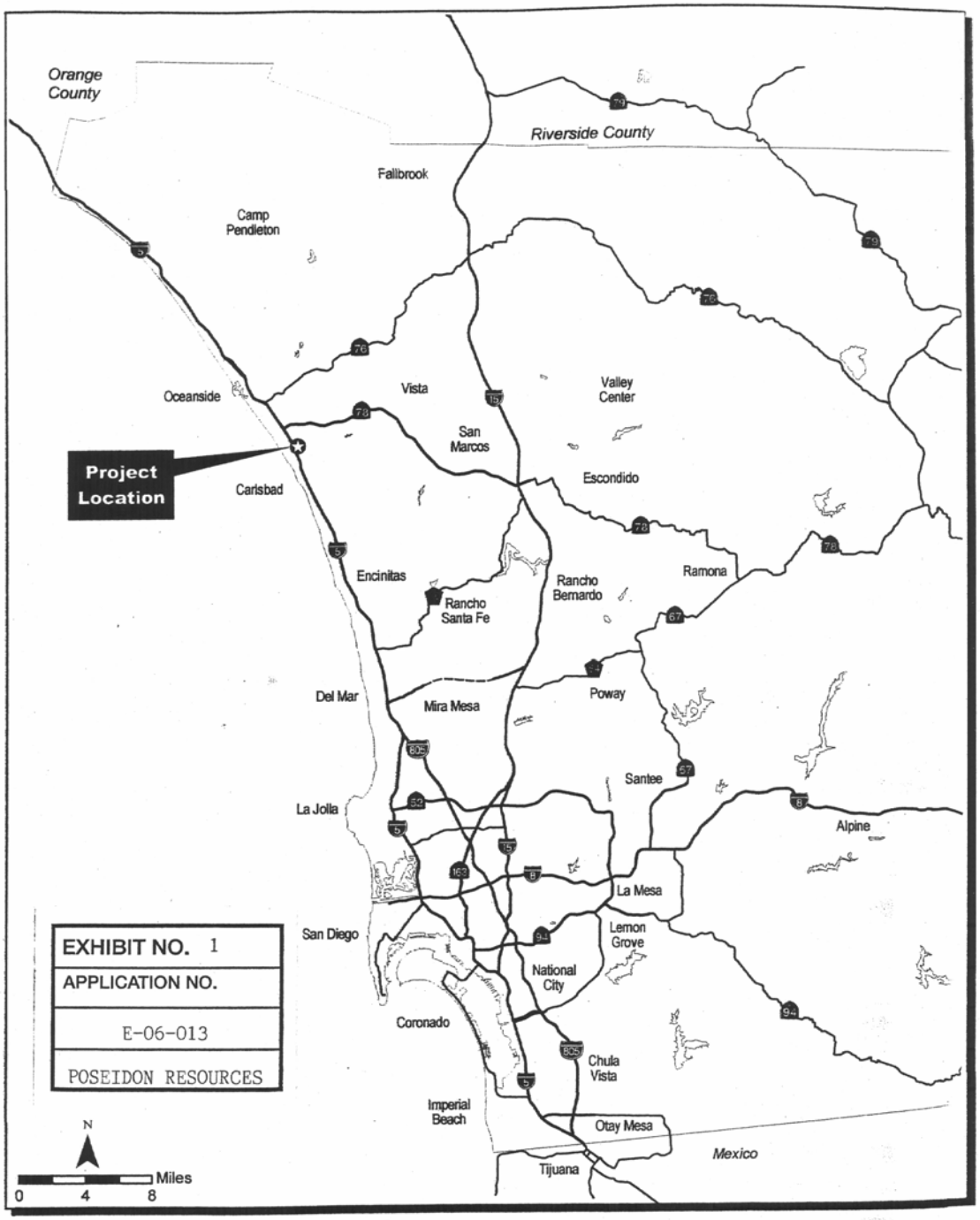
[85] Relevant timeline: On June 13, 2006, the City certified the project EIR. That certified EIR described as "speculative" the possibility that the power plant would shut down, though it included information about the increased entrainment impacts that would occur if the desalination facility operated when the power plant was not operating. On July 25, 2007, Coastal Commission staff determined that Poseidon's CDP application was complete. On September 14, 2007, Cabrillo Power II LLC filed with the California Energy Commission its application for a new power plant that would not use seawater.

- Greenhouse gases: Poseidon proposes to mitigate for the greenhouse gas emissions its facility would cause, but its current mitigation proposal is conceptual only and lacks the information needed for the Commission to determine the effects of these emissions on coastal resources will be fully mitigated.

- Growth-implications: At the time the City published its EIR, and when Commission staff filed Poseidon's coastal development permit application as complete, it was unclear as to where much of Poseidon's water would go. Since then, Poseidon has announced contracts with purchasers for over 100% of its expected water production. The Commission does not yet have the information needed to evaluate the growth that would result from the now-known service areas that Poseidon would supply.

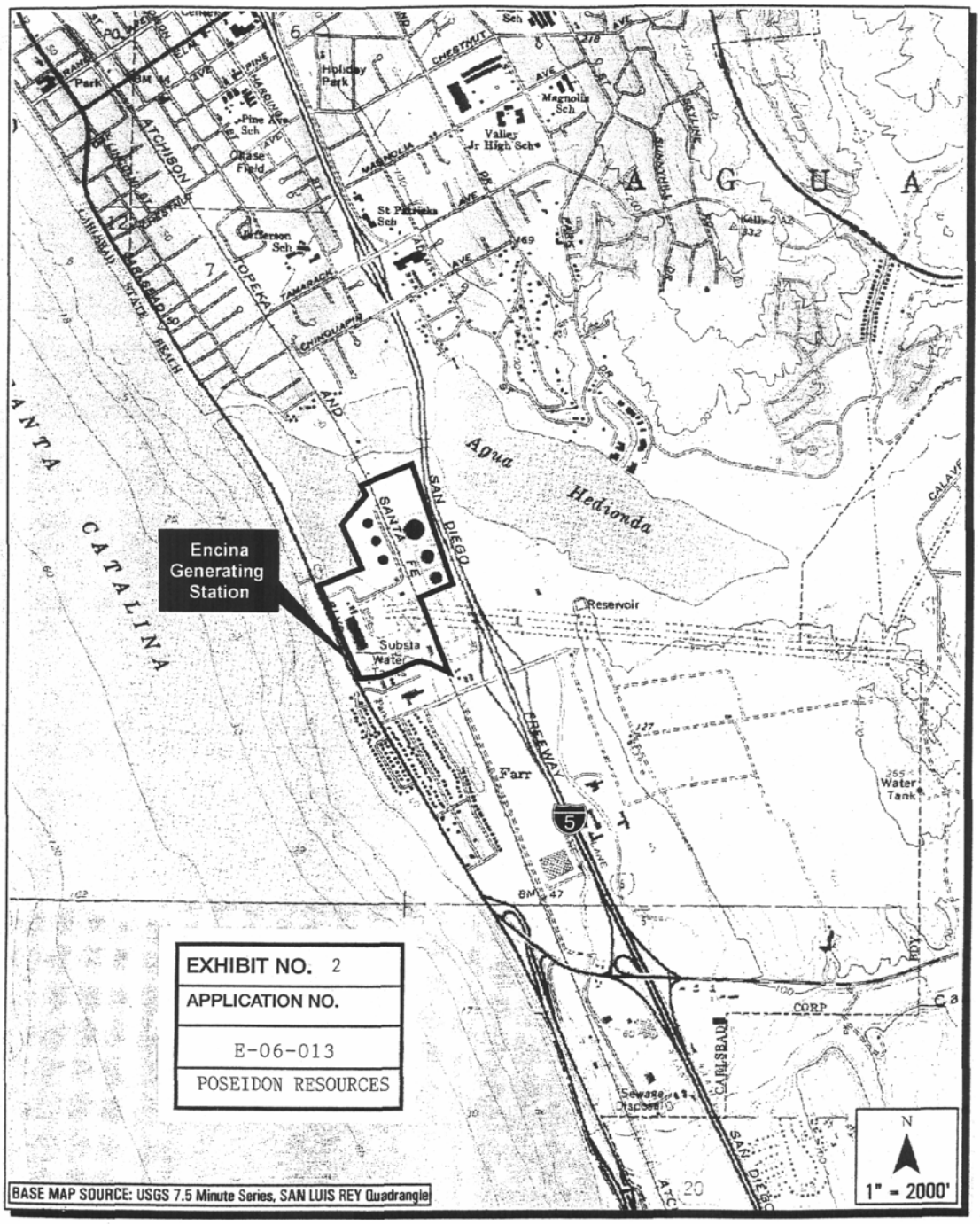
- CEQA "piecemealing": The purpose of Poseidon's proposed project is to provide 50 MGD of water for local and regional distribution. For the water planned to be transported to the regional distribution system, the project would rely on a pump station and pipeline that have not yet gone through CEQA analysis and have not been approved, funded, or constructed. The pump station and pipeline are in areas where additional information is needed to determine impacts related to sensitive habitat areas, growth-inducement, greenhouse gas emissions, and other impacts that may be determined significant.

This information is needed for the Commission to identify the project's effects and determine whether its significant impacts will be mitigated. In addition, as discussed in previous sections of these Findings, the Commission has found that there are feasible and less environmentally damaging alternatives to Poseidon's proposed use of the power plant intake to draw in seawater. For these reasons, the Commission finds that the proposed project cannot be found consistent with the requirements of CEQA.




**Precise Development Plan and Desalination Plant - EIR**
**Regional Map**

FIGURE 3-1




Precise Development Plan and Desalination Plant - EIR

**Vicinity Map**

FIGURE 3-2

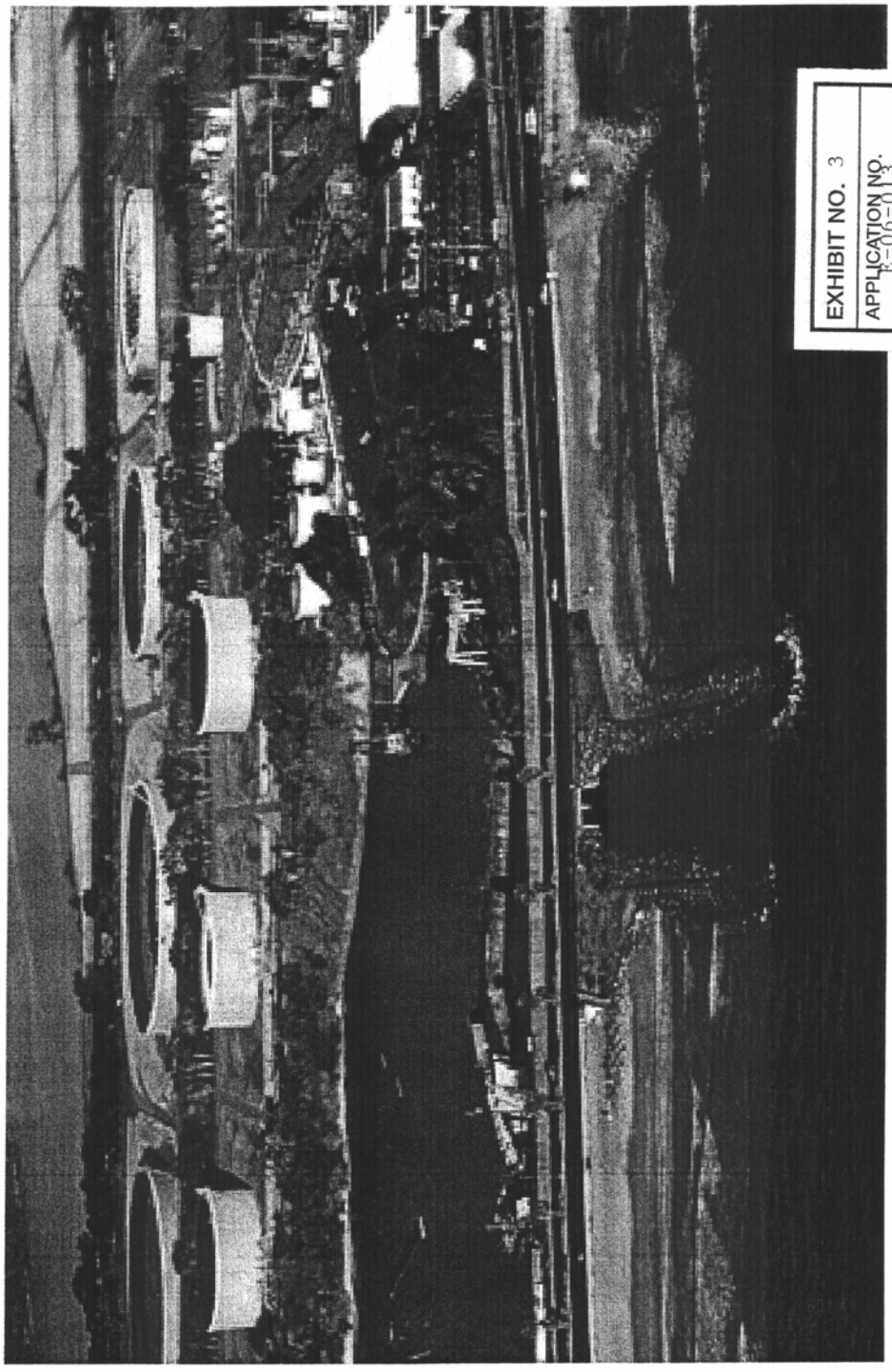


EXHIBIT NO. 3
APPLICATION NO. E-06-013
OUTFALL
(from CA Coastal Records Project)

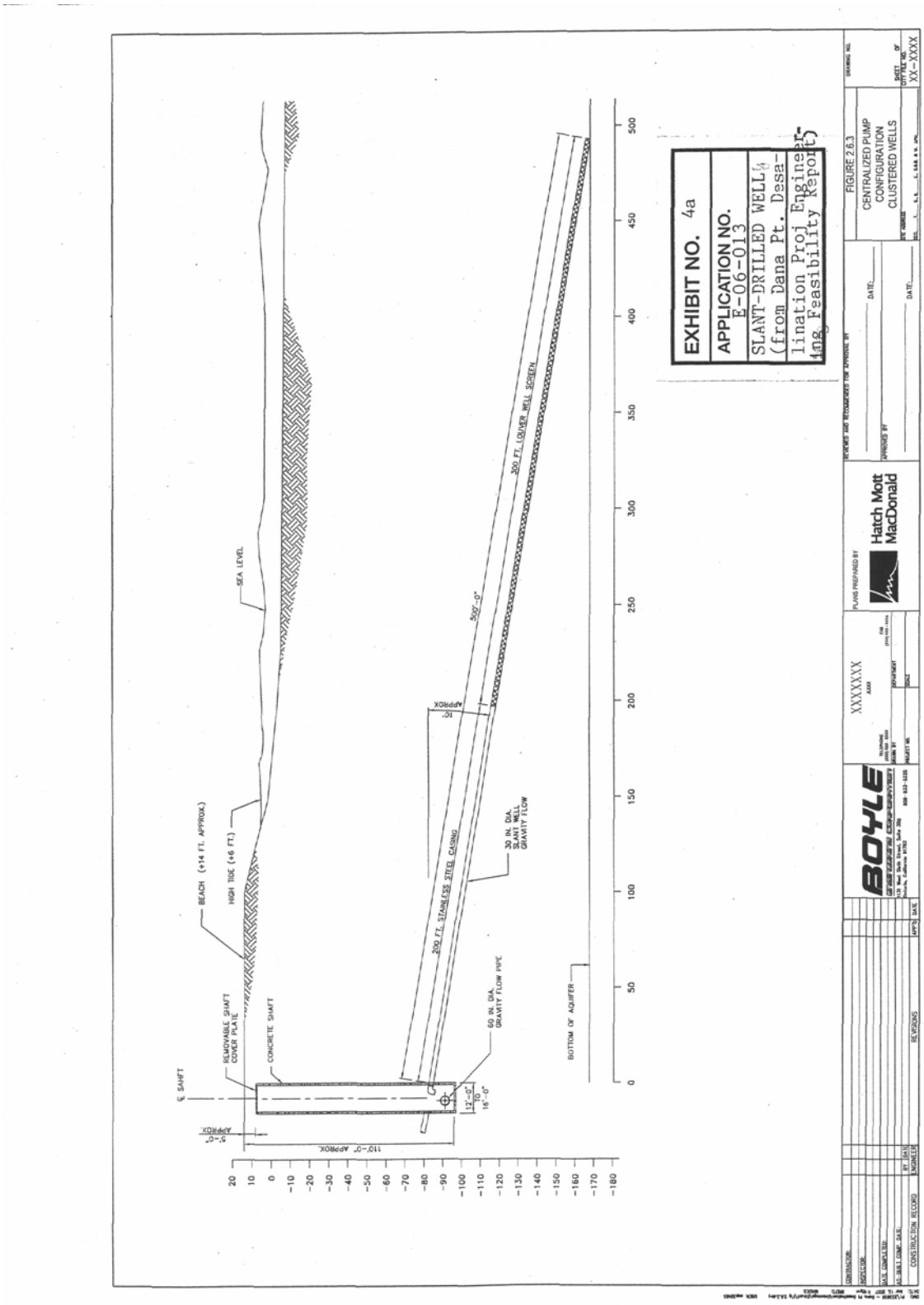


EXHIBIT NO. 4a
APPLICATION NO. E-06-013
SLANT-DRILLED WELLS (from Dana Pt. Desalination Proj Engineering Feasibility Report)
FIGURE 2.6.3
CENTRALIZED PUMP CONFIGURATION CLUSTERED WELLS
SEA LEVEL
BEACH (+14 FT. APPROX.)
HIGH TIDE (+6 FT.)
REMOVABLE SHAFT COVER PLATE
CONCRETE SHAFT
℄ SHAFT
200 FT. STAINLESS STEEL CASING
200 FT. LOUVER WELL SCREEN
500'-0"
30 IN. DIA. SLANT WELL GRAVITY FLOW
60 IN. DIA. GRAVITY FLOW PIPE
BOTTOM OF AQUIFER
110'-0" APPROX.
APPROX.
Hatch Mott MacDonald
BOYLE

# Images of Infiltration Intake



EXHIBIT NO. 4b

APPLICATION NO. E-06-013

INFILTRATION GALLERY (from City of Long Beach Research Presentation on Infiltration Galleries)

## **APPENDIX A:** SUBSTANTIAL FILE DOCUMENTS E-06-013

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***Appendix A: Substantive File Documents E-06-013, Page 3***

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